Stock Pricing in Malaysia

STOCK PRICING IN MALAYSIA

Corporate Financial & Investment Management

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Preface

There is broad-based consensus that the path to sustained social and economic progress of nations should be founded on transparent political management and economic activities based on market signals. As more developing countries begin the process of adapting to a world-wide shift towards policies consistent with neo-classical theories of development based on greater transparency and reliance on market signals, it has become very urgent for emerging economies, in the process of strengthening their capacity, to mobilise more savings to re-order their capital markets to function efficiently. This focus on capital markets has taken place with increasing financial liberalisation, which fosters greater competition among participants in financial markets, which in turn improves efficiency in the pricing of risky assets traded in emerging capital markets. Critically, it engenders discipline in capital allocation.

One such market that has now become a significant player, especially since 1990, in the Asia Pacific is the Kuala Lumpur Stock Exchange of Malaysia. That market is one among sixteen capital markets stretching from Bombay to Jakarta, to Sydney, to Manila, and to Tokyo having about 10,000 listed companies, several thousand bonds, warrants, options and futures not to mention the currency and interest rate swaps in the OTC markets in the region. Tokyo is a major market, four are developed and eleven are emerging markets according to the IFC/World Bank classification.

This book is about the accounting, financial and economic behaviour of the well-organised and long-established emerging market in Malaysia. The book was conceived by us and the needed research was executed over several years resulting in the body of knowledge we produce here for serious students of finance and finance based professionals. The lessons learned from the findings in this book are relevant to (i) those conscientious students of finance in Malaysia (ii) professionals such as accountants, bankers, financial analysts, financial economists and regulators in the securities industry in Malaysia and (iii) other serious students in many countries who want to learn about the behaviour of a successfully-organised capital market in the Asia Pacific region. We recommend this book to all students and professionals who are interested in finding out about the fundamentals that drive a capital market.

We like to acknowledge our thanks to several persons and institutions having significant roles in the preparation of the book. We owe our gratitude to reviewers, Asjeet Lamba of Melbourne University and Toh Thian Ser (a former finance practitioner) of Nanyang Technological University, for reviewing this book carefully. Many of the chapters benefited from reviews and comments of colleagues at the National University of Singapore (NUS), Universiti Putra Malaysia (UPM) and peers elsewhere. Of them, we like to mention a few: Frank Finn of University of Queensland, Steve Dawson of University of Hawaii, Nic Groenewold of University of Western Australia, Zainal A. Kidam of UPM, Lim Kian Guan of NUS and Takaiki Wakasugi of Tokyo University deserve our special mention for their contributions in one way or other to our research efforts. We thank Lester W. Johnson for his guidance and encouragement that led to the fruition of this work. Our work has also benefited from their encouragement, comments, reviews (in some cases), ideas and help. Head of Universiti Putra Malaysia Press, Sumangala Pillai, and the copy editor, not only did a timely job but also worked hard with us to ensure its release as an international edition of the UPM Press. This task would not have been easy but for the encouragement and help we received from those next to us ... family members, our peers, and the graduate students in our respective classes.

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PART 1

Introduction: Asia Pacific Emerging Markets

This book reports carefully researched findings about capital market behaviour by applying the latest theoretical and analytical framework used by accounting and finance specialists (accountants, financial analysts, investment bankers, finance professionals, etc.) and by financial economists studying emerging share markets. This is the first study of its kind of an emerging market in Asia. These findings reveal the economic and financial behaviour of stocks traded in the Malaysian share market over a sufficiently lengthy period of 21 years in some cases. These findings form the basic material for an in-depth understanding of the financial economics of this important emerging Asia Pacific capital market. The detailed results reported on several aspects of this market can help lay a sound foundation for the teaching and practice of financial and investment management in this country, and, by extension also in other countries with similar markets, for example, in Jakarta in ASEAN, Korea in East Asia and India in South Asia. We hope the lessons are relevant for the teaching and the practice of financial and investment management beyond the shores of these countries.

Part I consists of three chapters. Chapter 1 provides a brief introduction to the key concepts and techniques in financial economics and in accounting-cum-financial practices relevant to this discipline. In fact, this chapter is a quick review of the financial economics paradigm and of the practices in the industry that have guided our work in this book. Chapter 2 is an introduction to 17 capital markets, some developed and some emerging. The aim of this chapter then is to give a concise description of these markets to provide a backdrop, against which the Malaysian findings discussed in this book must be considered. It has reguired comparative analysis to ensure this book can be placed in a multi-country context. Chapter 3 describes in some detail the organisation, structure and performance of the Malaysian spot capital markets along with a brief overview of the currently traded derivative instruments, which will be the next frontier in capital market development in Malaysia.

CHAPTER

1

Financial Research in an Emerging Capital Market*

Abstract

This book is about the financial behaviour of Malaysia's listed companies traded on the Kuala Lumpur Stock Exchange. Malaysia's long-run 20-year risk-return ratio is 1.6. The ratio for the 25 developed markets is about 1.56 and for the 60 emerging markets it is 1.90. This would have us conclude that emerging markets have a *lower* rate of reward per unit of risk in capital market. Before starting the documentation of significant findings from what we consider to be a well-developed emerging market in Kuala Lumpur, we describe in this chapter the central ideas which form the core of finance. These ideas were applied systematically to obtain the findings published in this book.

Finance in Emerging Economies

Finance-based research in emerging capital markets has increased in the last 15 years as governments of various emerging economies take measures to nurture capital markets as part of undertaking market-based structural adjustment programmes to develop their economies. Impetus for research has also come from the growing cadre of academics and professionals within the financial communities. Capital markets have emerged rapidly in many former *command economies*, as well as in non-Communist countries undergoing reforms. About 12 new capital markets have emerged since 1991 in such diverse economies as China in Asia and Hungary in Eastern Europe. In addition, the euphoria for market-based structural reforms – especially since the collapse of the classical position for Communism, which denied a role for capital in society's development – has led many developing countries to remove impediments hampering the growth of capital markets, which in turn has led to the deepening of capital markets. Securitisation in turn has led to increased market breadth.

In the Asia Pacific region, 10,059 companies are listed in 1997, including about 7,500 listings in South Asia. Capitalisation of *emerging* equity markets is growing at about 8 per cent per annum in this region, which is three times the rate in developed capital markets. There were 60 emerging capital markets in 1996 compared with half this number two decades earlier. The World Bank has set up a subsidiary, the IFC, to help nurture private capital markets. Importantly also, emerging capital markets accounted for 21 per cent of world capitalisation of nearly US$16,000 billion[1] in 1996 compared with a mere 8 per cent in 1989.

* This chapter was written by M. Ariff after completion of the international review of the remaining chapters of the book.

The increased interest in financial research of emerging capital markets is primarily due to the increasing importance of emerging capital markets (as well as financial sector reforms) in further developing these economies. A parallel development is also taking place in research-cum-teaching of accounting, finance and financial economics as a tertiary subject in institutions of higher learning in these economies[2]. More and more tertiary institutions and, move importantly, the professionals in the finance sectors, have turned to the finance discipline to understand the process by which securities markets in general and the stock markets in particular function to reveal information about risk, and to understand the idea of efficient pricing of securities traded in organised public financial markets.

The growing body of financial research findings in emerging economies therefore serves the important economic function of determing whether emerging markets are capable of efficiently and accurately revealing risk differences across the different types and kinds of securities traded in emerging markets. This study addresses the significant question of whether the body of knowledge derived from appling financial concepts developed primarily in the more liquid and historically more mature capital markets of the developed countries, is non-contestable when applied to resolve practical issues that are found to arise in the financial sectors of developing and emerging economies.

This chapter provides a brief introduction to the core ideas forming the finance discipline as taught in tertiary institutions and as applied by professionals in accounting, finance and financial economics. Sections 2 and 3 outline the conceptual framework, usually refered to as the market microstructure (institutional finance, if we may) and efficient market hypotheses respectively. The central ideas of asset pricing are described in Section 4. Asset pricing of futures securities is described in Section 5 and the plan of this book in Section 6.

2. Market Microstructure

Institutional finance is perhaps a more apt description of market microstructure. Market *microstructure* has emerged as a new and important field of inquiry in financial economics (Schwartz 1989).[3] Organised securities markets are structured as auction markets subjecting prices to public view (be it an open-outcry floor/pit or a computer screen) in centrally organised market places where transactions are executed under certain strict trading conditions aimed at establishing transparent dealings based on good quality disclosures of information relating to the securities being priced. All share markets have this important characteristic, and its discovery by the Dutch (the English improved it while the Americans further refined the trading systems) led to a modern tool for price discovery of uncertain prices through a consensus on the value of disclosed information made to a central market place. Despite this shared fundamental character, the details or the *micro-structure* therefore of markets can differ from one market to the next. These details have also been shown to affect price formation (McInnes and Wood 1992 and Ball and Walters 1996).

Share markets have developed to their current state of sophistication from simple beginnings, often on kerbs outside public places as in London and New York as much as in coffee shops in Asian financial centres. During their 200-year development, the simple initial ideas have taken various shapes and forms thus assuming distinctive characteristics which through growth and sophistication has led to their present-day complexity. Firstly, securities markets are *auction* markets, which are central trading places, geared towards revealing consensus prices of securities by bringing together both buyers and sellers and also presumably reliable information relating to the securities. This price discovery tool enables public revelation of prices. Secondly, early in the formative period, of capital markets, these transactions were based on the highest bidder prices (English auction) though in some markets, the Dutch and the French auction methods of choosing *not-the-highest* price was adopted.

Thirdly, when liquidity was low, the buyer had to wait for the seller and the seller had to wait for the buyer, a condition under which all trades were done on *batch* or *when-occurred* basis. This was inconvenient as there would be likely delays in settlement in the absence of one party to such batch transactions. The solution soon devised was to permit the broker to carry an inventory of securities so that the buyer or seller lacking a counter party could still make a deal with the broker-dealer. Thus, the term *dealer* crept in to replace the term broker as brokers began to hold inventory of securities to reduce the problem of delays in trade, which soon improved liquidity of the market place. However, permission to hold inventory led to self-interest motivating the dealer, whose duty it was to act unequivocally with out self interest. The dealer system was hence further refined into a *jobbing* system by the English, and almost all share markets nowadays follow this jobbing method of trading. The Kuala Lumpur market is such a dealer-driven market for price discovery. Finally, market liquidity was further improved by permitting a special class of brokers to be the missing counter party during periods of market inactivity. This was designated as the *market-maker* broker system as practiced at the New York Stock Exchange. The Japanese use a modified version named the *sitory*.

Thus, there are differing characteristics in the manner in which transactions can be made in an auction market. Further, the mode of order arrival and its subsequent clearance can also be organised differently in different markets. The study of the effects of these and other differences in the execution of trades has led to some empirical facts about the effects of the market microstructure on price formation and volume activity.

This area of research, which is perhaps better explained as institutional finance, has become increasingly specialised. In addition to studying the effects of price settlement systems, some researchers have examined the effects of restrictions on market price formation under the broad topic of *segmented market* behaviour (Eun and Janakiramanan 1989; Gultekin, Gultekin and Penati 1989; Ariff and Khan 1997). In Asia, and indeed in other regions, there are special regulations that apply to different parts of the market. For example, the Tokyo Stock Exchange, in its efforts to draw attention to liquid stocks, re-lists stocks regularly from one less-liquid section to another more liquid section of the same market. This leads to abnormal price gains for erstwhile less liquid stocks at the time of a *re-listing* exercise (Asjeet and Ariff 1997). In some markets, such as those in China, foreigners are restricted to trading in a different class of shares from the locals, who deal in a class of shares called A-shares. This is a case of hard *segmentation* of markets. These and other effects on the market be it structural or regulatory may also be studied under the broader market microstructure or institutional financial behaviour. These theories are still in their infancy, and we have not fully explored these aspects in this book except to describe the revelant facts.

3. Pricing Efficiency

Security prices must have the attribute of being formed in response to the arrival of information in an unbiased manner, reflecting the economic value of information, so that the resulting prices may be considered *efficient* prices. Financial economists conceptualise each price formed in a pure auction market as the value of a security given the likely revelation in the next period of a particular state(s) of the World with infinite possible states. This is the line of reasoning advanced in State Preference Theory (Arrow 1964; Hirshleifer 1965). A fall in the value of a currency (example the 8.5 per cent decline in the value of the Thai baht in the last week of June 1997) is the consensus price given the revelation of the state of the future world when the Thai central bank announced that the baht will be fully floated instead of being heavily weighted and managed by the American dollar holding.

Markets where prices are formed efficiently are nowadays described as *Fama-efficient* in honour of the man who made advances in this area of financial research (Fama 1970, 1991). If information relating to, or affecting, a security arrives in a random manner, then it makes sense to assume price will change in a random manner due to randomly-arriving information set. Consistent with the property of Random Walk hypothesis (Bachelier 1890), such security price changes ought to be independent of past security price changes. Thus, price changes observed over time, given no systematic information arrival, are independent over time as predicted by the *Random Walk Theory*.[4] Since some security prices (for example, share prices) are formed with a drift over time (due mainly to additions of retained earnings and business cycle), theory predicts that tests of independence in price changes should incorporate a control for time trend, which is the now well-known *Sub-Martingale* test (also known as the *Random Walk with drift*).

The independence of price changes over time is described in the literature as the first degree of Fama-efficiency in that historical prices are *independent*. Any pattern in price changes cannot be used, over time, to predict likely future prices! This condition is called the *weak-form efficiency*, a condition all developed and several emerging markets, including the Kuala Lumpur stock market, satisfy because such markets are liquid, information dissemination is efficient, and there are many buyers and sellers of a security. Another, higher degree of efficiency is the *semi-strong form efficiency* that refers to the quality of security price reactions (at the time of arrival of information) to publicly disclosed information. A semi-strong efficient market is described as being able to instantly or rapidly incorporate into prices the value of public information. After the first marginal investor had profited from a price increase, subsequent traders with the same information obtain no significant profits. This condition is important as security prices, having semi-strong efficiency, serve to signal fair prices being formed for all traders, both informed and uninformed, since the value of the information is already rapidly incorporated in prices.

Empirical tests of price reactions to public information – normally done using the event study method (Ball and Brown 1968; Brown and Warner 1980, 1985) – have shown that most developed securities markets are semi-strong efficient whereas most emerging markets are not information-efficient. The Malaysian share market has been shown to be semi-strong efficient (Anwar, Ariff and Shamsher 1994) whereas the Jakarta stock market is not efficient (Groenewold and Ariff 1997). Thus, the prices in such markets not being information efficient, are not fair prices for all investors. Doubts will therefore exist as to whether prices in inefficient markets could be driven by fundamentals, apart from doubts about the prices at any time being a fair signal of value.

The third degree of efficiency requires that prices must instantly incorporate the value of special information known to private (and professional) individuals as these persons trade on the basis of such inside information. This is *strong-form efficiency*, which follows from the prediction of semi-strong efficiency of instant incorporation of value of information through trading on *private* information. Parties who possess inside information are the insiders of firms having access to price-sensitive information and those professional traders who often have access to insiders in the course of their professional practices. It has been shown that insiders trade under moral hazard conditions, which creates costs in such trades, and thus may lead to abnormal profits to be earned with the danger of being caught for indiscretions, which creates that moral hazard. Besides, the outside professionals who trade on information must be able to, in the short-run at least, profit from the use of inside information. Empirical tests of the third degree of efficiency reveal that only a few major markets are efficient in this degree, and that the strong-form efficiency of less developed markets is still unknown because of lack of research as well as legal prohibitions of this form of trading.

A controversial view receiving attention among economists is that no market can be fully informationally efficient. A fully efficient market will not leave sufficient incentives for market participants to discover fair prices through spending resources to find fair value for given information set. Grossman and Stiglitz (1980) therefore argue in favour of the impossibility of efficiency, a claim hotly disputed by mainstream finance researchers. Further, some scholars believe that, in the absence of incentives for truthful and full disclosures in some markets, at a certain time, prices are mis-priced though, at a later time, prices may tend towards equilibrium value suggested by theory. Hence, it is argued that there is room for *over-* or under-*reactions* in prices, at least over some undefined forward window of time (Ajayi and Mehdian 1994). Researchers often call this the post-announcement drift (Easton 1991). If this view is accepted, then emerging markets can be shown to be mostly forming prices satisfying the Over Reaction Hypothesis (ORH). Thus, truthfulness of information, such as in earnings disclosures, may have to be accepted as being inadequate if the over-reaction hypothesis is true. A counter argument is that all prices are equilibrium prices, and that the more correct information arriving at a later date is another piece of information, and not a more truthful version of the earlier information. This line of reasoning would suggest that ORH is a moot argument.

The foregoing descriptions of prices are descriptions of the quality of the price formation, and may be considered an ordinal ranking of markets based on the quality of price formation. A market that is weak-form efficient is less superior to one with semi-strong efficiency, and so on. Another dimension of efficiency is in measuring the *time lapse over which all information* is incorporated as price changes, thus enabling researchers to typecast a market with one day efficiency as being superior to a market with 12 days to achieve efficiency. This mode of thinking is consistent with the works of Amihud and Mendelson (1990) and Damodaran (1994). By modelling the variance and covariance of security prices as a function of the speed of absorption of all information, these researchers helped to establish quantitative procedures to measure the *speed of adjustment coefficient* that establishes the days taken by a market to reach full absorption of information value. Continuing research shows that this coefficient is very small for major markets such as the New York Stock Exchange whereas it is larger for less developed markets (Chan 1996; Chan and Ariff 1997).

Finance theories covering the market microstructure, segmentation, and market efficiency are concerned with the way in which prices are formed in organised markets, with different trading arrangements. These form the first set of very powerful theories, still not broadly tested in emerging markets to study the nature of market organisation and price discovery process. These first-level theories have therefore not been verified, and it is still contestable if emerging markets behave in ways consistent with the propositions of independence in historical prices, instant price reactions to disclosures, segmentation effects, quick speed coefficients, and so on. In this book, we have documented tests of market efficiency, and wherever relevant, we draw the attention of readers to characteristics of institutional financial behaviour. Some published works on these areas are cited.

4. Equilibrium Asset Pricing Ideas

Discounted Cash Flow Approaches

The *Discounted Cash Flow* approach is well-entrenched in professional accounting-cum-finance research, thus deserving scrutiny as the first set of asset pricing ideas. The bond valuation model (Williams 1938: Makeham) and the *Dividend Valuation Model* (Gordon and Shapiro 1956) are key fundamental discounted cash flow models for pricing securities. Discounting the expected coupons and face value of a bond at a comparable discount rate for risk provides the expected price of a bond. The discount rate can be obtained by looking at the going yield of a similarly-graded bond of the same class. For this purpose, rating agencies such as Standard & Poor make rating disclosures of the quality of firms as belonging to investment grades (A to C) and non-investment grades (D and Junk Bonds). The Rating Agency of Malaysia (RAM) has provided similar services since 1995.

This approach of discounting expected cash flows as the valuation approach drives very large fixed-income securities markets all over the world, be it the Japanese, or a Malaysian bond market. This simple idea when extended to discounting dividend flows of common stocks led to the valuation model for common stocks. Therefore, these two DCF models so well entrenched in professional and research works are asset pricing models based on estimating the risk levels, which are then converted as discount rates for finding a fair price for cash flows. This has a long tradition, and the theories also lend easily to tests.

Tests done over the years claim that the models are quite robust in valuing securities (see Aggarwal, Hiraki and Rao 1992 for a review of literature). The results from one such attempt to see the applicability of the dividend valuation model, DVM, to emerging markets is found in this book (Chapter 15). In it we find reasons to suggest that analytically intensive markets such as those in Japan appear to have prices formed from changes in fundamental variables of the type found in the model. Developed markets have 60-80 per cent of price changes explained by changes in four fundamental variables from the DVM. Price changes in developing markets are less affected by changes in fundamental variables. This creates a strong doubt as to the usefulness of the DVM for pricing securities in developing and emerging markets. We contest the general applicability of the DCF model, at least for the share markets in developing and emerging markets. Tests, if done in the future, on bond pricing mechanism are more likely to confirm the usefulness of the bond valuation model even in Malaysia's bond market, which is ranked as the fifth largest bond market in Asia by a World Bank study released in 1996. Such tests have yet to be done in this or other neighbouring markets because of the lack of liquidity in bond markets and more importantly, due also to a lack of reliable database.

CAPM as an Asset Pricing Theory

Financial economists (Markowitz 1958; Sharpe 1963; 1965; Miller and Modigliani 1958, 1961; Roll 1976; Breeden, Gibbons and Litzenberger 1989) developed key ideas to determine the processes that determine equilibrium security prices in financial markets. Their joint contribution led to a set of equilibrium pricing theories that today form the core of the finance discipline, which also guides practices of several professions aligned to finance. Financial behaviour of firms listed on the KLSE is examined by operationalising some of these theories to see if the pricing behaviour is in accordance with the predictions of these theories (see Part 3 and 5 of this book).

Markowitz demonstrated through the analytical framework of portfolio formation that an investor holding a diversified portfolio of securities would reduce a substantial portion of the risk of investing in individual securities. Furthermore, there is an optimal combination of wealth proportions in any portfolio formation. The Markowitz Efficient Frontier in a mean-variance space would contain portfolios with maximum returns for given risk levels. Thus was the discovery of the idea of portfolio formation as standard risk-reducing procedure in investment decision as well as the idea of risk reduction via diversification across dissimilar securities. These ideas won international accolades, and later also led to the idea of *international diversification* of risk (Solnik 1974, 1977). Reference to any standard finance textbook reveals the importance of these ideas for continued development of finance as an academic discipline.

Sharpe (1963) represented the market portfolio as an entity against which the relative performance of individual securities could be judged. This led to the now well-entrenched Single Index Model of return generation process, which was used as a basis to simplify portfolio selection model in Elton and Gruber (1989). This simplified the non-linear portfolio computation to a linear problem based on cut-off point as the breakpoint at which an optimal portfolio is formed. He also used the idea of market portfolio to derive a partial equilibrium model of pricing of securities widely used as the CAPM (Capital Asset Pricing Model) since 1965.[5] This theory predicts that a risky security's return is determined by the systematic risk of the security and the long-run market risk premium in a capital market. This proved to be a watershed in theory development, and was widely acclaimed at its inception as providing a sound principle of both a pricing formula and a risk formation formula.

CAPM spawned a large literature, apart from leading to revisions of many books, in risk analysis (*beta* risk, *alpha* as performance risk as in Jensen (1968), *non-synchroniety* problem as in Scholes and Williams (1977), etc., capital structure as in beta effect on the cost of capital (Hamada 1972), and test of CAPM predictions as in Fama and MacBeth (1973) and Brown, Finn and Officer (1979). While there is good evidence of the soundness of the reasoning behind the CAPM theory, there is growing doubt as to whether the theory could ever be tested because of the joint hypotheses problem and also the impossibility of observing the capital market (Roll 1977). Many of these ideas are still being examined, and there are several chapters in this book on these issues of general importance in the Malaysian market.

Some degree of doubt on CAPM led to a search for alternative approaches to pricing of securities. Two of these approaches deserve the reader's attention. These are the APT (Arbitrage Pricing Theory) of Ross (1976) and Breedon, Gibbons and Litzenberger's (1989) Consumption CAPM. The latter overcomes the problem of unobservability of *the* capital market by looking for equilibrium in the consumption domain. Consumption can be measured more accurately than one could *the* capital market. However, tests of CCAPM, while leading to a better set of results from the pricing of risk relative to the *consumption* stream, still leads to results that are inconsistent with theoretical predictions.

APT, on the other hand, is developed from more realistic assumptions of capital market behaviour. In several tests done in many countries, researchers have shown evidence to the effect that risk is determined relative to a *finite number* of price-relevant-factors rather than a globally true single measure of systematic risk as postulated in the CAPM. Some examples of tests are Chen, Roll and Ross (1986), Faff (1990) and Ariff and Johnson (1990). The APT framework is able to explain a greater degree of price variation, as measured by coefficients of determination close to 90 per cent, compared to lower values in CAPM tests. The reader may wish to note details of these in relevant chapters in the book.

Finally, the idea of *optimal capital structure* is today an insight of great significance that establishes the primacy of positive net present value for value creation by firms (Miller and Modigliani 1958, 1961). From this original idea, we have learned the process by which tax shield value is created from tax-deductibility of interest incomes, the positive bankruptcy costs that suggest a turning point for value of firms as debt is increased, and the postulation of positive relation between risk and cost of capital (Hamada 1972). Further ideas on agency costs, signalling, asymmetric information and monitoring costs are grafted to these theories to give us a richer menu describing the dynamics of costs and risks in firm. Aspects of these are included in chapters on CAPM, APT, beta estimates and corporate controls.

A new area of considerable interest is the extent to which the performance of a firm is determined by insider ownership. Inefficiency in the management of firms is said to promote merger and takeover activities in all capital markets. Predominantly, owner-managers manage firms in Malaysia, and hence it is an interesting question as to whether non-professional managers contribute to higher performance of firms. In a similar quest, we also examine the price behaviour of merger-cum-takeover of firms to document evidence on synergy effect. Evidence suggests that the results are consistent with the propositions advanced by theories on ownership control and acquisition.

5. Discovery of Futures Prices

When the first financial futures were traded in the Philadelphia Stock Exchange in 1972, the world witnessed price discovery of futures at current times. It can be shown that an economy with a market for futures price discovery would gain a one-time efficiency improvement as such an economy with revealed futures prices experiences reduced uncertainty about the future states of the world. Thus, if one could make an auction market to reveal the value of a security in the future at the current time ($F_{t,T}$ with t=0 and T=maturity date of a futures contract), spot traders could take positions in the futures market to *hedge* the risk of spot price changes. Thus, this will reduce uncertainty and hence, help improve risk-return relationship. Commodity traders have used this principle for a very long time to hedge against commodity price changes, but the extension of hedging to the financial market had to await development in the 1970s. In Malaysia, there are two financial futures contracts traded since 1995.

Working's (1952) Cost of Carry Model can be applied with minor changes to price a whole host of financial futures. This is exactly what happened. Interest rate futures, stock index futures, currency futures, etc. have been financially engineered since 1972 leading to the development of almost 40 futures markets in several developed (examples are Chicago Board of Trade, LIFFE in London, SIMEX in Singapore) and developing financial markets (KLSE-CI Index Futures Contract, KLIBOR interest rate futures, etc.). As at end-1996, the nominal values of financial futures contracts, and the options market were estimated to be about US$14,000 billion with currency swap and interest swap markets valued at about US$9,000 billion. In addition to the organised exchanges, OTC markets have been made among interested parties as arranged by financial institutions. The rate of growth in futures or derivative-related markets is estimated to be about 14 per cent per annum in nominal terms. This growth is mainly experienced by markets in the developed countries.

The share of the developing/emerging markets in futures-related trade was negligible in 1996 at about US$1,000 billion (or about 3-5 per cent of the total) but it is predicted to grow soon. With the advent of the futures trades has come increased *systemic risk* threatening to effectively cripple financial markets, economies and institutions and companies in some economies when things go wrong. Three examples are (a) Mexico's s current account crisis in 1994 that wiped out 20 per cent in output over two years, (b) the collapse of a billion-dollar Barings Bank Plc in the United Kingdom in 1996, and (c) the loss of several billion dollars in the hedging actions of Orange County in California. There are also several examples of such systemic risk suffered by Asia Pacific entities.

The options market has also developed alongside the development of futures contract-based markets. Theoretical developments in this area have been phenomenal, leading to the engineering of exotic options being offered in the market's pursuit to manage risk of securities investments. Continued developments following the original Black and Scholes (1973) and Merton, (1973) Options Pricing Theory have lent considerable weight to the development of derivative markets around the world. In this book, we show some behavioural norms of securities in the derivative markets traded in this part of the world. It has been found that it takes a while for markets to attain liquidity and hedge interest to be able to price options and futures efficiently (Ariff, Johnson and Chan 1995 on options).

6. Purpose and Plan of the Book

Purpose of the Book

This book is a modest effort to draw carefully researched findings on accounting, financial and economic behaviour of Malaysia's financial markets using as our reference the body of well-established stock pricing propositions in the three fields of studies. Reliable evidence on capital market behaviour is collected in this book for training any serious student in accounting, finance and economics to understand how (a) markets are organised, and (b) prices are formed efficiently, along with providing in one book (c) comprehensive evidence on the applicability of equilibrium asset pricing theories in a fast growing market, which is officially called an emerging market.

The prices formed in the market under study in this book are taking place in institutionally well developed spot and futures markets. Broadly speaking, prices clearing in these markets appear to be fair prices, though there are some significant variations that could not be explained by the existing finance framework adopted in this book. More research is needed in areas which we felt we could leave out for others to follow up to gain a better understanding of other aspects of securities pricing behaviour in this increasingly significant capital market located in Southeast Asia.

Plan of the Book

The book is divided into seven parts. Part one introduces the reader to the position of the Kuala Lumpur stock market in relation to the markets in the Asia Pacific. The development of the capital market and its contemporary position are also described. Part two is concerned with the effect of liquidity on the measurement and efficiency of securities markets. Overall pricing efficiency of the share market is documented. Part three examines the effect on share prices when capitalisation changes are initiated by firms or when firms issue new shares. We trace the source for the very high degree of underpricing in the share market. In part four are to be found the empirical tests of the very important asset pricing theories that guide research and practice among professionals. Evidence is mixed as to the fundamental-based pricing of shares in this market. A significant issue of management in Malaysia is the family or interest-group based management of companies. That is, firms are managed predominantly by owner-managers. Its implication for performance and for the mergers and take over market is tested. Capital structure issues and the applicability of financial ratios to gauge performance of firms are tested in Part six before turning to document some key research issues in Part Seven. The 32 chapters in this book provide adequate introduction for serious students and professionals on how Malaysia's capital markets function to reveal fair prices for investors in the context of fifteen other Asia Pacific capital markets at different stages of development.

End note

1. See International Finance Corporation (IFC) publications for details. The world capitalisation of the share market was estimated in 1996 to be 70 per cent of GDP. The 60 emerging share markets accounted for 21 per cent, and the 25 developed captial markets for 79 per cent of the word capitalisation. Typically, an emerging share market is capitalised at less than 40 per cent of GDP;

the number for a typical developed market is 90 per cent. Financial centres (in England, Hong Kong, Malaysia, Singapore and Switzerland) are capitalised at greater than 120 per cent of GDP.

2. In this respect credit must be given to several academic efforts of scholarly groups promoting good quality research. Among these are the group in Australia that has for several years held an annual conference in finance and banking in Sydney, the Center for Pacific Basin Capital Market studies at Rhode Island, USA and the Asia Pacific Finance Association that holds annual conferences. Recently, the moderately priced database of Datastream has immensely advanced comparative studies. Of course, we must mention the collection of volumes edited by the PACAP and the *Pacific Basin Finance Journal* edited by the North-Holland group.

3. A graduate level course in market microstructure was recently offered at the New York University by a group of scholars.

4. The reader will note that the changes in prices are being modelled as independent over time. One could also test this hypothesis, though at a weaker level of power, by testing for unit roots in prices rather than in changes. The intercept and the slope coefficient in unit root test are predicted respectively to be equal to 0 and unity, which is an equivalent test of Random Walk. For this and other ways of modelling random price formation, see Groenewold and Ariff (1997).

5. CAPM was also independently derived by Lintner (1964) and Mossin (1966).

CHAPTER

2

Capital Markets in the Asia Pacific Region*

Abstract

This chapter provides an introduction to capital markets in the Asia Pacific. Broadly defined, the Asia Pacific is the region from Japan through Southeast Asia to Australia and back through Indonesia to India. The region has 16 of the world's 85 organised capital markets: Japan's is a major market; four are developed; and 11 are emerging markets. This region includes economies at very different stages of development, ranging from former command economies now returning to a market economy model to mixed to fully capitalistic economies. Their capital markets are growing at about twice the speed of markets elsewhere as is also the GDP over the last two decades. Excluding China's emerging markets, the average reward rate of investment in these markets is slightly lower than in much more developed markets.

1. Introduction

Several economies in the Asia Pacific region[1] have sustained average economic growth rates of more than 7.5 per cent per annum from 1975 to 1996. This has led to substantial growth in demand for capital, thus putting pressure on the economic planners in these countries to adopt liberal trading and financial policies aimed at (a) mobilising domestic savings and (b) removing impediments to flow of foreign capital, both of which have the desirable side effects of nurturing the growth of financial markets and of increasing the efficiency of financial intermediation.[2] IMF statistics suggest that the savings rate in the region is a respectable 24 per cent of GDP (38 per cent in Malaysia) compared to the world average of 19 per cent. Further, the region's share of foreign capital flow is half of an estimated US$165 billion in 1995 (this declined dramatically in 1997). The financial sectors of most but not all these countries have undergone reforms aimed at increasing competition among financial institutions and securities markets. At the same time, regulators of the financial sector have taken steps to nurture the growth of capital markets from scratch as in China in August 1986. Some markets had developed over a century or more as in India and Japan.

Thus, the region constitutes an environment in which substantial pro-growth activities are taking place despite the marked lack of democratic reforms in some countries. Though there are some doubts as to whether the input-based as against efficiency-based growth (Krugman 1992; Young 1994) in some of these countries can be sustained in the long run, growth rate has been above 5.6 per cent in the 1990s, which is twice the average world rate. In this chapter, we describe the structure, composition and performance of

* This chapter was written by M. Ariff on completion of the international review process of the remaining chapters of the book.

the capital markets in this region. Section 2 depicts the structure of selected capital markets while Section 3 examines the yield rates over a recent 15-year period to provide a benchmark for comparison with the Malaysian capital market, which is the subject of this book. Section 4 identifies significant capital market issues that will determine the shape of things to come in the next decade. In most of the discussion, we deliberately exclude Japan's markets as this book is about emerging markets.

2. Institutional Structure of Capital Markets

The 15 capital markets (excluding the Tokyo Stock Exchange) may be grouped under three categories. There are four developed markets, two of which are the financial centres of Hong Kong and Singapore (the first category), and two matured markets in Sydney and Auckland (the second). The remaining 11 emerging markets (in the third category) can be grouped into two distinct sub-groups of well-developed emerging markets (Bombay, Kuala Lumpur, Manila and Taipei) and truly emerging markets (Bangkok, Colombo, Dhaka, Jakarta, Seoul, Shanghai and Shenzen). Some markets, such as those in Singapore (and therefore Kuala Lumpur), Bombay, and Sydney began in the last century as trading places of securities of merchant houses, spice traders and of plantation stocks. In contrast, new markets such as those in Bangkok, Shenzen and Jakarta had their significant beginnings during the last two decades. Others have grown over several decades assuming their present position as a result of substantial economic growth of the post-war years, as in the cases of the Philippines, Thailand, Taiwan, etc.

But all 15 bourses share some common structural features. The markets are formally organised public auction places, trading, in most cases, in both bonds and shares with a smattering of bills and in some cases (Osaka, Korea, Hong Kong, Kuala Lumpur, Singapore and Sydney) a few derivative securities: common stocks form the bulk of the listed instruments. The exchanges function as private limited companies providing market places for trading or as quasi-independent branches of government bodies (in the cases of Shanghai, Shenzen, and Jakarta, the last until August 1994). These markets come under the supervision of formally-established securities exchange boards (example, the Securities Exchange Board of India (SEBI)) in all cases except in Singapore and in China. In Singapore, the Ministry of Finance and the Monetary Authority of Singapore supervise the bourse, though the market is self-regulating for the most part. In China, there is a complex chain of bodies up to the Cabinet level for supervision of capital markets.

The exchanges for trading derivatives come under different supervisory arrangements. There are separate derivative and spot exchanges in Sydney, Singapore, Manila, Kuala Lumpur (two), Hong Kong, and Japan. There are no supervisory disputes as all the derivative markets come under the same supervisory boards though individual markets may specialise in selected securities: in Malaysia, for example, the Securities Commission (SC) is the supervisory body of both spot and futures markets, unlike in the developed markets, where different supervisory bodies regulate the futures markets. The more common securities traded in these markets are interest rate futures (Sydney's Bankers Acceptance Bills, and Kuala Lumpur's KLIBOR Futures, Singapore's Euro-yen and Euro-dollar futures), share market indices (Nikkei Average Futures, KLSE-CI Futures, Hang Seng Index Futures, etc.) and options as well as warrants. Except for the very successful SIMEX-based international derivatives and the Australian derivatives, most derivative markets are not successful, as evidenced by their lack of volume, contract failures, and market withdrawals (Ariff, Johnson and Chan 1995). It is estimated that for every successful contract in futures, there are at least two failed contracts within two years of the advent of derivative markets.

There is also an interesting intellectual dilemma of how some regulators could approve derivative trading when the underlying securities are known to be priced inefficiently![3] If a spot market could not form fair prices of the underlying spot securities, could a futures on the underlying security be licensed? Given the very low level of hedge interest, an initial burst of speculative interests could often sustain new derivative markets over very short time periods only. Further, low volumes attract higher transaction costs relative to the spot market trades. In many cases, there are market peculiarities that are attractive as alternatives for making speculative profits in many of these markets. Examples are the forward sales (badla) in Bombay, the delayed settlement of less liquid stocks in some markets, and other practices. Derivative markets in the region are organised as open outcry markets based on trading in pits. The two exceptions are the screen-based trading in the KLOFFE in Kuala Lumpur and in Delhi in India.

Until about 1990, all the spot exchange markets, including the Tokyo bourse, were organised as floor trading market places. Some are now organised fully as screen-trading market places without a trading floor (Sydney, Singapore, Hong Kong, Kuala Lumpur, Shenzen and Shanghai). Tokyo still retains a floor though some listed shares are cleared through a screen-based system; Tokyo's bond trading has long been fully screen-based. The bourses in other countries still retain floors, with plans to convert to automated screen-trading in the near future. Except for Tokyo, where there is a market-maker system of clearing orders (named the *sitory*), all markets are dealer-driven markets with orders being matched on actual trades queued in the system. The Kuala Lumpur regulators have approved limited short sales in the case of 50 out of about 470 stocks. This is the case with Hong Kong as well. Thus, trade can also be cleared on the basis of short sales under some strict conditions since the new regulation came into force in September 1996 in KLSE. The requirement that actual orders drive settlement execution tends to make markets less liquid at some periods when there is a lack of activities in the bourse.

Brokers are licensed as individuals who could form companies to employ dealers to assist them in obtaining and servicing clients. In almost all exchanges, brokers and dealers are required to pass a test or examination to practise securities trading in spot and futures markets. Broker licences are sold by the exchanges as and when it is deemed that there is an increased demand. These are sold at fixed prices, and are not auctioned as in New York. Some data available on licensing practices suggest that fewer than 300 brokers are licensed in a typical bourse and there are about three to four times that number of dealers.[4] Foreign brokerage houses have been increasingly permitted to set up offices in almost all these countries since 1986/87. There was subtle pressure put on developing countries as part of the Uruguay Round of trade negotiations to open up the services sector at that time.[5] However, there is also pressure from the broker-dealer communities to restrict the number of foreign licences in all these countries. Given the practice of fixed commission rates for retail trade below some stated amount (for example, S$1 million in Singapore) the brokerage function is highly profitable except when the bears return to the market. It is common in some years, as in the 1993 super bull run, for brokerage firms to earn income equivalent to ten years of trade. Transaction cost is estimated to be around 2.5 per cent for a round-trip trade in all these markets except in Tokyo, where it is estimated to be 1.8 per cent in recent years. Costs are expected to come down with the new package announced in June 1997 to further liberalise stock trading in Japan.

Capitalisation and Market Depth

The Tokyo Stock Exchange is the second largest exchange in the world in terms of its capitalisation, which has been shrinking since 1988-89 when the share market index was at its peak. Since then, the Nikkei-225 average has come down; the 1991-1997 trading range was 15,000-21,000. Capitalisation thus hovered around US$3,800 billion during most of 1993-1997. The New York Stock Exchange was capitalised at US$5,800 billion in 1995; its capitalisation had increased by 35 per cent by mid-1997, when the average July price was at its historic peak of 8,150 (Dow Jones Industrial average). The size of the London Stock Exchange was US$1,250 billion in 1995. This had increased by 24 per cent by mid-1997. London's gilt (bond) market is very large, estimated to be larger than the share market. Thus these three major markets have a combined capitalisation representing 68 per cent of the world's capitalisation of US$16,000 billion. A total of 12,500 companies are listed in these three markets, representing about 45 per cent of all listings in the 85 capital markets in the world.

The share of the 25 developed capital markets (including the three major markets just described) accounts for 79 per cent of the total capitalisation. There are almost 20,000 stocks (53 per cent) listed in the 25 markets, in addition to the very large number of bonds traded in these markets. The 60 emerging markets have a total capitalisation of about US$2,000 billion. But the number of stocks listed in the 60 markets is about 18,000, which account for 47 per cent of world listings. The bond markets in these 60 places are less developed because of the regional planners' quest to develop the equity market faster than the bond markets. Only Australia, Japan, India, Malaysia, New Zealand and Thailand have debt markets described by the World Bank as reasonably developed. Some countries have taken steps to concurrently develop resilient bond markets with policies aimed at (a) increasing competition amongst commercial banks, (b) de-regulating interest rate controls, (c) providing tax incentives, (d) securitisation of sovereign debt and (e) retail marketing of bonds, as steps towards developing resilient markets. Thus, Asia Pacific capital markets are set to gain depth and size in the next decade through possible faster growth in bond markets. With the 1997 currency crisis, this may take more time.

The region represents a fast growing capital market place. As such, it is worthwhile examining the size of the 16 markets in relation to the two major markets outside the region (Table 2.1). It can be seen from the statistics on share market capitalisation that the region's capital markets have grown substantially to their present size at a rate of about 8 per cent to the present capitalisation of US$5,637 billion (US$1,837 billion if Japan is excluded). This represents a capitalisation-to-GNP ratio of 73 per cent in the cases of emerging markets and 134 per cent in the cases of the five developed markets. The very newly-emerging economies of China, India, Indonesia, Sri Lanka and Bangladesh have lower depth in that their average ratio is 24 per cent or a third of the overall average for the 11 emerging economies.

Table 2.1 Relative Size of Share Markets in Asia Pacific: 1995/96

No	Location of Market	GDP $b 1995	Cap $b 1995	Firms	Value in $b	Depth	Activity per firm
	Developed	-	**4,492**	**4,453**	-	**134%**	**$321 m**
1	Tokyo	4,200	3,800	2,300	1,121	91%	$487 m
2	Auckland	53	27	220	7	51%	$31.82 m
3	Hong Kong	118	280	560	155	237%	$553 m
4	Singapore	66	145	259	82	220%	$565 m
5	Sydney	332	240	1,200	98	73%	$408 m
	Emerging	-	**1,145**	**10,057**	-	**73%**	**$137 m**
6	Bombay	300	144	7,000	28	48%	$194 m
7	Bangkok	141	135	400	82	96%	$607 m
8	China*	697	72	290	98	10%	$338 m
9	Colombo	12	3	220	1	25%	$4.5 m
10	Dhaka	28	1	185	0.1	4%	$0.54 m
11	Jakarta	161	56	235	12	35%	$51.1 m
12	K Lumpur	72	204	490	136	283%	$277 m
13	Manila	61	64	197	14	105%	$71.1 m
14	Seoul	416	210	710	295	51%	$415 m
15	Taipei	220	256	330	711	116%	$2154 m
	Major	-	**8,162**	**10,005**	**6,335**	-	-
16	London	1,138	1,320	2,200	235	116%	$107 m
17	New York	5,600	6,842	7,805	6,100	82%	$777 m
	All	-	-	-	-	99%	$442 m

Sources: IFC and IMF publications, various years. At end-1997, the values of some of these markets declined due to the Asian Currency Crisis.
* Refers to both Shanghai and Shenzen capital markets.

The number of stocks traded has also increased to its present total of 14,594 firms listed, as has also the volume of activities, which is US$137 million per year per firm in the case of emerging markets compared to US$321 million per year per firm. Asia Pacific represents 38 per cent of all listed companies in the world, and their activity is lower than that of the rest of the world, though higher than the emerging markets.

The value of trade in shares was US$2,840 billion (or 28 per cent) compared with the world total of about US$10,000 billion in 1995. On a per firm basis, the average value of trade was US$253 million per year. The activity per firm per year for all the 60 emerging markets was US$91 million, which is lower than the average for the Asia Pacific economies.

Thus, on average, the share market depth and average activity levels in the Asia Pacific are consistent with the region's higher level of economic activities throughout the last 15 years relative to the world levels. Now let us examine the bond markets in the region. As comprehensive bond data are not readily available, we will examine only a few markets, preferring to focus on the markets other than that of Japan. Japan's bond market has grown very large after its government took steps to introduce tax-exempt bond mutual funds through regulatory changes in the early 1970s. Japan had a huge bond market during the period of the Second World War, but the market collapsed with the capitulation of Japan to the Allied Forces, especially when the war bonds were cancelled by the post-War Allied Administration. Japan today has one of the three largest bond markets in the world, estimated to be about 120 per cent of the value of share market. About half is made up of government bonds at various levels; the rest is made up of corporate bonds. Bonds are traded mostly in the screen-based trading room in the Tokyo Stock Exchange.[6]

It is evident from the statistics given in the financial press that the bond markets are not developed to any reasonable level relative to the size of the economies, except in the cases of Australia, New Zealand and Malaysia. The total face value of the bond market in the Asia Pacific (excluding Japan) is US$450 billion, which is a mere 17 per cent of the total GNP of US2,700 billion (minus Japan). The 25 developed countries have bond markets valued at about 120 per cent of their GNP. There are several reasons for the lopsided development of capital markets. The main reason is the governments' pre-occupation with developing equity markets to securitise firms to undertake the kind of investment demands made by the high growth over the last 15 years. An important second reason is the absence in several countries of social security systems of the type found in the developed countries. Social security systems lead to the growth of both private and public pension funds with their trust requirement of prudential investments, which prompt the growth of bond securities as safe investments. A third reason - at least in some cases such as in China, India and Thailand - is the huge public borrowing made possible in four ways. Where there were some social security savings, the governments borrowed these funds for public investment purposes, as in Malaysia and Singapore. Where the banking system was underdeveloped, governments extracted huge funds by making the banking reserve requirements punitive, as in the case of India which had a reserve ratio of above 35 per cent until 1994. Since then, the ratio has been reduced to a single digit. Fourthly, national savings schemes were put in place to garner savings to be made available to bodies that came under government control; this enabled interest rates to be controlled since such deposits in savings banks often represented about half of all deposits in the banking system. Finally, many governments had either balanced budgets or had surpluses as in the cases of Singapore, Hong Kong, Malaysia and Taiwan. With no demand for public borrowing, there were few incentives for governments to develop bond markets except for the express purpose of revealing base market rates through the issue of a small tranche of bills and short-dated notes.

Among the larger bond markets are those in Australia, New Zealand, India, Malaysia and Thailand. These five countries account for more than half the face value of the

US$450 billion in bond markets. Next in importance are the bond markets in Korea (US$75 billion), Taiwan (US$31 billion) and Singapore (US$16 billion excluding the Ginnae Mae from USA). The bond issues are mostly government issues, which represent about three-quarters of all issues. The only exception is that of Korea, where the corporate bond is 80 per cent of the total issues. Most bonds are short-dated, with 10 and 15-year terms being the most common among the government issues. Notes with about a 5-year term are the more common instruments issued by the private sector firms.

Australia, Japan and New Zealand have well-developed bond rating agencies, unlike many Asia Pacific markets. Where there are bond rating agencies, the investors pay for such services as in Malaysia, which has two agencies: one is named the Rating Agency of Malaysia. Japan has two well-established agencies which have provided rating services since the late 1970s. In Singapore, there are two agencies from which such services have been obtainable for a fee since 1992. In view of the poor development of the institutions associated with bond markets, some regulators are now taking a fresh look at developing the bond markets speedily after two decades of attention given to the equity markets. One reason for this new-found enthusiasm is the need to finance huge infrastructure projects in water, electricity and road- rail -port building to cope with the next phase of economic growth to spur efficiency.[7] Therefore, bond markets will start to grow faster over the next two decades.

Listing of state-owned firms as private listed firms is adding much needed depth to some share markets. For instance, both Malaysia and Singapore added very large privatised firms to their bourses. In the case of Singapore, about 49 per cent of capitalisation in 1994 was from such companies, whereas in Malaysia, the share of such firms is about 24 per cent. Many governments have drawn up plans to increase the entry of state firms to their stock exchanges; China, India and Indonesia are big players in this respect. For example, Indonesia has 2,000 firms, of which 150 firms are slated for listing in the near future. India has classified its 200-odd state-owned firms so that the better performing ones can be corporatised and later listed on the stock exchange to provide new sources of finance to improve their performance. Similar efforts by other governments will eventually lead to the much needed depth in the listing available for broad-based portfolio selection so essential for good investment management.

3. Asia Pacific Region's Yield Structure

Average yield structure of money and capital (bond and share) markets provides important financial economics statistics needed for the formulation of several macro-economic decisions by governments. The average yields are also used in micro-economic decisions taken by firms and individuals. Historical records of yield structure are indicative of the fundamentals of money and capital markets in any country, to provide the basis on which informed decisions may be made by economic agents. Besides, yields of various markets provide a record of the financial performance of markets in an economy. Thus, we provide in this section a description of yields in Asia Pacific countries over the latest 15-year period to give a fair idea of the long-run behaviour of these markets (Table 2.2).

The inflation experiences of the Asia Pacific countries show that some countries had very high inflation rates during the period, 1989-1996; we measured inflation over a 8-year period since reference to a period earlier than eight years may be less representive

Table 2.2 Inflation and Yields in Asia Pacific Financial Markets

No	Economics	Inflation	Deposit Rate	Share Market Mean	Share Market Std Dev	Reward Rate	Risk Premium Bond	Risk Premium Share
	Developed	**3.4%**	**5.4%**	**28.4%**	**13.7%**	**2.13 x**		
1	Tokyo	2.0%	2.5%	20.0%	14.0%	1.43 x	+	+
2	Auckland	2.8%	4.6%	34.0%	12.0%	2.83 x	+	+
3	Hong Kong	5.8%	7.8%	37.0%	12.5%	2.96 x	+	+
4	Singapore	1.9%	3.6%	27.0%	17.0%	1.59 x	-	+
5	Sydney	4.6%	6.0%	24.0%	13.0%	1.85 x	+	+
	Emerging	**5.9%**	**11.9%**	**41.1%**	**31.6%**	**1.56 x**		
6	Bombay	8.8%	8.2%	38.0%	24.0%	1.58 x	-	+
7	Bangkok	4.9%	11.8%	31.0%	24.0%	1.29 x	+	+
8	China*	7.6%	12.0%	86.0%	74.0%	1.16 x	+	+
9	Colombo*	9.5%	18.0%	43.0%	55.0%	0.78 x	+	+
10	Dhaka	8.8%	19.8%	-	-	-	+	NA
11	Jakarta	7.2%	14.2%	40.0%	23.0%	1.74 x	+	+
12	K Lumpur	3.6%	7.6%	32.0%	21.0%	1.52 x	+	+
13	Manila	4.8%	7.6%	33.0%	21.0%	1.57 x	+	+
14	Seoul	4.8%	13.8%	32.0%	11.0%	2.92 x	+	+
15	Taipei	3.5%	5.8%	35.0%	23.0%	1.52 x	+	+
	Major	**2.80**	**5.8%**	**21.5%**	**16.5%**	**1.30 x**		
16	London	3.2%	6.1%	21.0%	16.0%	1.31 x	+	+
17	New York	2.4%	5.5%	22.0%	17.0%	1.29 x	+	+

Sources: IFC and *Economist*. * Over shorter periods of about 6 years. Figures for 1997 are excluded.
-: indicates that inflation is higher than yields in markets

of inflation expectation. The double-digit inflation rates of the 1980s are now over thanks to the sound macroeconomic policies adopted by governments in countries such as China, Bangladesh, India, Indonesia and Philippines to bring down high inflation. The average inflation rate in the Asia Pacific developing countries is 5.9 per cent, which is about twice the rate of inflation in the five developed Asia Pacific countries, but is much lower than, for example, the rate in Eastern European or Southern Cone countries in South America.

Consistent with falling interest rates (and also due to interest rate liberalisation measures adopted in the 1980s), deposit rates have slowly declined. Thus the averages have declined to 11.9 per cent in developing, and 5. 4 per cent in developed Asia Pacific countries. A primary reason for high deposit interest rates is the savings-to-investment gap of some 3.0 per cent estimated for the developing countries particularly the fast-track countries such as China, India, Indonesia, Korea. Thus, with the more reasonable levels of inflation in the Asia Pacific in the mid-1990s, interest rates are likely to decline in some countries. But in others, they are likely to increase if there is a continuing large savings-to-investment gap, as is the case in Korea and Indonesia (this is the case after the currency crisis).

The average deposit interest rate in savings banks is taken as a good proxy for near-riskless interest rates because many of these countries do not have liquid Treasury instruments, and savings deposits carry guarantees of repayment. The average yield in deposit markets of 11.9 per cent is considered to be high. Given the average inflation of 5.9 per cent, a rough measure of the real interest rate is 6 per cent, which is quite high in the ten developing Asia Pacific countries compared with the five developed countries, where the real interest rate is a mere 2.0 per cent. But there are two countries where the real interest rates in recent years have been negative. Malaysia has a healthy real interest rate of 4.0 per cent, which is in the middle of the rates for all countries. Some countries, such as Korea, Bangladesh and Indonesia have higher real rates, which is indicative more of the under-development of the fixed-income securities markets rather than a reflection of true rates.

The average share market yield in the two major markets in London and New York was 21.5 per cent over the 1982-1996 period. The long-run average of the two major markets was around 14 per cent for the period 1960-1989. There were two good years of equity market growth in 1993 and 1996 to an, which pushed up the average yield over the latest 15 years used in this study. The standard deviation has increased from the earlier average of 12 per cent to the 1982-1996 to an average of 16.5 per cent. This means that the reward rate (yield divided by the standard deviation) in the major markets still remains about the same as before at about 1.5 times the risk rate. In the Asia Pacific developed markets, the average reward rate is extremely high at 2.13 times the risk levels. This means that the reward rate of the Asia Pacific developed markets is 1.5 times that of the two major markets. The average yield is 28.4 per cent, with a standard deviation of 13.7 per cent.

The emerging markets have lower yields relative to their higher riskiness. The average reward rate is 1.30 times, which is about half the developed market's average reward rate, and is also lower than the average reward rate in the major markets. This confirms the higher riskiness of the emerging markets. However, the 60 emerging markets have an average reward rate of less than 1, which makes the Asia Pacific emerging markets (with a reward rate of 1.30) a little better than the average of the 60 emerging markets.

This brief discussion about the yield structure in the Asia Pacific suggests that a select number of financial factors are important for decision making. First, these economies are managing their price policies effectively, and this has led to falling inflation rates, which were all in single digits by the mid-1990s. Second, given the savings-to-investment gap in some emerging economies, deposit rates in the Asia Pacific emerging markets are very high, and are likely to remain high relative to the level of inflation in these economies. Third, the yield rates in the Asia Pacific countries, on average, are higher than the yield rates in any other emerging groupings. It is likely that some of these pro-growth factors will continue to influence the money and capital market yields in the region.

4. Significant Financial Sector Issues in the Region

Asia Pacific money and capital markets have grown very rapidly in the last six years compared with any previous period. For example, the growth in capitalisation of the 16 capital markets was about 8 per cent compared with the overall growth of about 3 per cent per annum in the 85 capital markets. There are several factors contributing to this rapid growth rates. In this section, we describe some of the critical factors that will determine the future of the financial markets in this region.

Financial Liberalisation

The foremost factor driving the region's financial markets is the financial liberalisation taking place in the region. The early reformers in this game were Hong Kong, Malaysia and Singapore, joined later by Australia and New Zealand. These countries recognised the importance of the need for sound financial systems to facilitate exchange in the real sector.[8] Hence, these countries deregulated the financial sectors by (a) increasing competition among financial institutions, (b) dismantling interest rate controls, (c) opening foreign exchanges to respond to market forces, (d) introducing tax incentives to spur trading in securities and (e) permitting financial institutions and corporations to introduce a variety of securities to increase the depth of the markets. These policies have been pursued over 1978-1985 (1986-1992 in New Zealand) by these pioneer countries, which helped to improve the efficiency of their payment systems and the efficiency of pricing of securities in the market places.

Other countries followed soon in this reform track. Indonesia, Thailand and Japan introduced reforms in the 1980s, followed by China and later by India. Korea and Thailand who made plans (prior to the mid-1997 current account crisis) to introduce more openness in the near future. These countries are slowly dismantling their controls of the financial markets while also improving the soundness of their financial systems. Many more countries are now recognising the usefulness of the need to macro-plan improvements in the financial sector in order to gain advantages in terms of greater savings rate, better intermediation, and lower costs of money and capital, all of which lead to greater depth and sophistication in the financial markets.

Market Organisation and Fee Structure

Asia Pacific capital markets are still largely organised as floor-traded, dealer-driven auction markets in the case of spot securities and as open outcry pit-trading in the cases of derivative securities. There are some notable exceptions: Japan has an active screen-traded bond market; Sydney, Singapore and Kuala Lumpur gave up floor-traded stock exchanges in 1989 by switching to screen-traded share markets. China installed screen-based trading from the outset in Shanghai and Shenzen. Bombay is now slowly nurturing a screen-based spot market for both bonds and share trading to speed up back-office work. However, most markets still maintain floor-trading with plans to convert to screen-trading in the future. Thus, an important future development will be the conversion of more markets to screen-based trading leaving behind few newly emerging markets with low liquidity adopting floor trading.

Except in the five developed Asia Pacific markets, the transaction costs are still very high. The new issues markets can extract an average of 4-6 per cent in issue fee. Secondary market trade can cost up to 4.0 per cent for a round-trip in some markets, though in most markets the commission is 1.0 per cent each way with no discount for block purchases; large trades attract a 40 per cent commission in Japan, Malaysia and Singapore. The next revolution will be the demand for lower transaction costs, given the high liquidity in the Asia Pacific markets. In the more liquid markets, the average trading value is almost as much as that in major markets. While the major markets deregulated their fee structures as early as in 1976 (New York) and 1985 (London) leading to drastic falls in transaction costs, the Asia Pacific community of brokers have protected their terrain from any deregulation of fee structures. With low cost transactions possible with new technology, there is added reason for adopting measures to bring down fees.

Another area of reform is the accommodation of foreign ownership of securities in the local stocks. Regulatory responses to this international flow of trade has been mixed. Some have adopted heavy-handed measures of strictly segmenting the markets. China restricts foreign trade to B-shares (which account for only 10 per cent of trading) while some have designated shares which are permitted to be owned by foreigners, as in Thailand, by placing these in an Alien Board and others have softer forms of restrictions, as in the case of Singapore's foreign share restrictions. While the developed countries adopt the principle of equal access except in cases of strategic companies, the approach taken by Asia Pacific countries has been very conservative. With the WTO's decision to make services sector openness as a negotiable item in 1997, there is likely to be more pressure for openness to foreign ownership of stocks in the near future. This is likely to be a welcome development as it can spur liquidity as it did in the case of Indonesia when foreign ownership was liberalised to 49 per cent in 1992 and above 49 percent in 1997. Indonesia's liquidity is about 70 per cent due to foreign trading of domestic shares. Obviously, liberalisation adds to liquidity.

There is pressure in many emerging markets for the introduction of derivative securities. Already six of the 16 Asia Pacific countries have permitted some limited derivative trading. The demand for derivatives has come from the argument that derivatives can help manage risk, especially at times of large price changes in the spot markets. Further, financial institutions exposed to greater currency riskiness would need to take derivatives in managing their currency and interest rate exposures. These are valid reasons and constitute sufficient economic basis for introducing derivative trading. However, there is also the other issue of whether derivatives are likely to be useful in markets where prices are still inefficiently formed (that is, Fama-efficiency is lacking). From a practical point of view, many derivatives failed to take off in several markets.

Examples include the interest rate futures in the SIMEX and the Hang Seng Index in Hong Kong. This is an area for further scrutiny and resolution of sound policy.

Depth of Markets

The three financial centres of Hong Kong, Kuala Lumpur and Singapore have an average capitalisation-to-GNP ratio of almost 200 per cent. The other share markets can be grouped into two classes: those with ratios close to (a) 100 per cent and those with (b) 50 per cent of GNP. There are six emerging markets with a low depth of about 50 per cent or less. A further issue is the availability of a sufficient number of quality listings to enable reasonable selection across a wide set of stocks in a given market. Except for the share markets in Bombay, Bangkok, Japan, Kuala Lumpur, Seoul and Sydney, the other markets have such small numbers of stocks listed that no meaningful selection of quality stocks can be made by large investors. That is, there is a need for more listing of quality stocks. This can be done by speedier privatisation of large state firms (as is being done in Indonesia and Singapore) or by encouraging the trading of foreign scripts on local bourses.

Another issue relating to depth is the status of the bond markets. Bond investments provide an avenue to switch to at times of liquidating shares when the markets turn along with the business cycle. To do this and to develop bond mutual funds, there is a need for well organised and liquid bond markets. At present, such markets are only available in Japan, Australia and New Zealand. In all other markets, the bond markets are so poorly developed that investors are unlikely to have bond securities as viable additions to their portfolios. This is clearly recognised by regulators, and plans are afoot to spur the development of bond markets in several countries. Malaysia has taken some decisive steps in this direction, as have China, India, and Thailand. More are likely to look to bonds to add further depth to the market, especially as a method of attracting funds for infrastructural projects in many of these countries.

Money Markets

A liquid and well-organised money market is needed for managing current transactions amongst firms, individuals and governments. Money markets also reveal the base yields on which other interest rates are determined. Money market depth in the Asia Pacific countries is poor (Ariff, Kapur and Tyabji 1995). This is especially a problem in the emerging economies where the M1-to-GDP ratio can be lower than 40 per cent. Developed countries have a ratio of 120 per cent. Development of money markets requires increased competition among financial institutions in the interbank market, de-regulation of interest rates formation, exchange rate liberalisation, and removal of restrictions on credits. These measures are at the heart of liberalisation of financial institutions and exchange rate policies. Changes in these areas are beginning to occur, as for example in China and India, both of which are moving slowly to international openness in both the real and financial sectors. Changes are likely to come fast in money markets in the near future.

This brief discussion of issues of significant future interest provides a benchmark to assess the likely changes in each of the Asia Pacific countries. International openness is more important for some of them (for example, China and India), than for others, such as Korea. Whatever a country's particular priorities, Asia Pacific countries are likely to have financial liberalisation, market reorganisation, reduced transaction costs, increased market depth, and international openness on their agenda for changes in the future. The ways in which these countries adopt changes will determine the relative standing of these markets in the next century.

5. Conclusion

Asia Pacific money, bond, share and derivative markets have doubled in size in the last eight years, reflecting the strong driving force, which is the sustained economic growth rate of more than 7.5 per cent over the last 20 years. The money, bond and derivative markets have substantial room for growth as the emphasis of economic planners shifts to the need for developing these markets along with the already fast developing share markets. Money market depth in most emerging markets is below 40 per cent of GDP whereas bond markets with a total capitalisation of US$450 billion are a mere 17 per cent of GNP of the 15 Asia Pacific countries excluding Japan. The share market depths of 73 per cent (emerging markets) and 134 per cent (developed markets) suggest that the share markets have developed very much faster in the region than the money and bond markets. Though there are 10,057 individual firms listed in the 16 markets, only four markets have a sufficient number of quality stocks for any broad-based selection for effective portfolio investments.

Securities activities in the share markets have also been very high. Annual traded value is US$137 million per company listed in the 11 emerging markets. This represents a third of the activities of the more developed markets, where the average is US$442 per listed firm per year. In some markets, perhaps due to unsatisfied demand, trading activity is rather high. For example, the average trade per company in China is US$338 while that for Korea is US$415 and US$667 for Bangkok. Hence, there is a wide variation in the activities of share markets in this region. In terms of share market depth, share capitalisation to GNP is 134 per cent for the developed markets and 73 per cent for the remaining emerging markets. These numbers compare very well with the average of under 40 per cent for the World's 60 emerging markets. Thus, share markets appear to have developed sufficient depth ahead of other emerging markets. This is partly due to the 12 per cent rate of addition of new firms into the emerging markets to beef up the equity of firms, which, given the fast economic growth, must have had very good opportunities to find positive net present value projects to invest the equity raised.

In the near future, the shape of the money and bond markets will change more dramatically than the share markets or even the derivative markets. With increased financial liberalisation, money markets are likely to gain more depth. There are also plans to develop the bond markets to meet the demand of investors for more stable returns. Finally, the market arrangements for trading, fee structure and segmentation may also change radically with the ongoing conversions to screen-based trading and competitive fee structures. These and other changes will continue to make the Asia Pacific financial markets gain needed efficiency and depth ahead of many other regions. Malaysia's financial markets provide an appropriate subject for a study of the evolution and performance of the transformation of a leading emerging market into a developed market.

End note

1. The Asia Pacific region is variously defined depending on the political interest of the writers. We adopt a more comprehensive definition in order to include in our analysis those capital markets that are of interest to a study of emerging capital markets. There are 28 countries and one economy (Hong Kong) in the region, but only 16 have organised capital markets. There are no organised capital markets in eleven countries in this region.

2. There is an increasing awareness of the need for financial liberalisation for mobilisation of capital resources as well as for improved financial intermediation. Australaia, New Zealand and ASEAN countries have taken decisive steps, which led to their capital markets becoming more efficient over the last fifteen years ahead of other capital markets (Ariff 1996).

3. Derivative theories state that a derivative can be priced, given an efficiently priced underlying security. In ten of the 16 markets, it can be shown that spot securities are priced inefficiently (Fama's Efficient Market tests). Thus, it is a debatable point whether the prices formed in derivative markets with underlying prices formed inefficiently can be fair prices. There is a need to examine this aspect in view of the push for the formation of derivative markets in several countries in the region.

4. Though a ratio of 1:3 is a rough guide to brokers and dealers in the region, the number varies depending on the ease or tightness of policy of an exchange. Where there is a desire to restrict at least the number of brokers, the ratio becomes larger. In Malaysia, there are fewer brokers, and it is noted by market participants that there are about 4 remisiers (dealers) to a broker. Remisiers join a broker-owned firm with a surety bond, and are responsible for bringing clients to the firm and servicing them. For this, a remisier gets a 40 per cent of the brokerage commission.

5. The WTO. has agreed in late 1997 with Southeast Asian countries to permit greater openness of the financial sector/services.

6. The bond trading room in the new exchange building in Tokyo is a very quiet place where experienced bond traders trade by watching computer screens in fornt of them. There is an absence of the raucous din of floor trading in the share market–such as in New York.

7. A dramatic example of the need for good infrastructure was highlighted in a Northwestern University student's project on domestic distribution networks. It takes about 7-14 days to deliver consumer items using the road network in China, the equivalent time in developed countries is a mere 3-4 days. See *Economist*, 1996 for this story. A new concept in marketing such bonds is to form investment companies listed on the exchange to take equity and debt positions in infrastructure projects. Such a company was floated by the Singapore government in 1996 to invest solely in infrastructural projects. In Malaysia, rules have been relaxed for such companies to be listed on the exchange.

8. It has now been recognised that efficient financial systems can help add 1.5-2.5 per cent to GDP growth (see World Bank 1992) in developing countries. This makes good sense because an efficient financial system not only improves payment efficiency needed for exchanges to take place speedily but it also improves the yield structure of the markets.

CHAPTER

3

Malaysian Capital Market: Structure and Historical Performance

Abstract

About 75 per cent of the world's organised capital markets are classified as *emerging markets*, and the Malaysian markets share more of the risk-return character of the emerging rather than the developed markets. The average annual yield over 22 years in the Malaysian stock market is 19.9 per cent: the standard deviation is 32 per cent. Malaysia's *fixed-income* market is among the four largest in Asia, and is expected to grow rapidly. The long run average yield on default-free Treasury instruments is about 7.5 per cent and the minimum lending rate averaged 10.31 per cent over the study period of 22 years. Six *derivative contracts* are already traded, but their growth, except in commodities markets, has not been substantial because of lack of hedge interest from large investors. Malaysian capital market has a good chance of developing into a viable regional competitor to several currently large markets in the Asia Pacific region.

1. Why Study an Emerging Market?

A study of the emerging markets is worthwhile and useful for professional practices as it reveals major differences in their behaviour compared to developed markets in general. Some recent studies are Wilcox (1992) Buckberg (1993), Claessens, Dasgupta and Glen (1993), Adler (1993), Ariff, Kuhan, Annuar and Shamsher (1994) and Ariff (1996). As a result of these and other studies, a consensus is forming regarding the behaviour of financial markets in developing countries. We would like to highlight the following characteristics as these have implications for financial and investment management of companies in emerging markets.

1. Several emerging markets have delivered total returns in excess of those in developed markets. Though the returns vary from period to period, on average, the emerging markets have yielded an average of 20 per cent return per annum with a standard deviation of about 40 per cent over the last decade compared with an average return of about 15 per cent and a standard deviation of below 20 per cent in the developed markets. This suggests a higher risk and return of investing in emerging markets.

2. Fundamental factors appear to be closely correlated with long-run share prices in developed markets such as New York and Tokyo stock markets. The same fundamental factors only explain about a quarter of the price changes in less developed markets (Ariff, Kuhan, Annuar and Shamsher 1994).

3. High autocorrelations in returns, characteristic of inefficiency indicates that lagged prices may contain useful information about future returns (Buckberg 1993).

4. Emerging markets are less correlated with a global portfolio or a developed market portfolio in sharp contrast to the high positive correlations amongst developed markets. India for example has -0.14 correlation coefficient while the correlation of Canadian or United Kingdom market with United States is close to unity. This means that emerging markets provide efficient international diversification benefits. "..modest investments would lead to a lower rather than higher portfolio risk ..." (Adler 1993). Of the 276 correlation coefficients observed in a recent 7-year period, 89 are negative in emerging markets!

5. Financial markets in general are suppressed in emerging markets (with few exceptions such as in Chile and Malaysia), which leads to (a) very delayed transmission of international effects of price and interest rate parities, and (b) inefficient securities markets (Ariff 1996).

6. Most of the emerging markets are too small with too few listed firms that it would be difficult for fund managers to diversify risk effectively (for example, four emerging markets in the world list 22,000 firms compared to 13,000 listed firms in four developed markets). This often results in poorly diversified mutual funds. Often, a small foreign portfolio investment may lead to a sudden price increase, which would reverse itself with equal speed when the foreign investor liquidates investment. This happened in 1993 and in 1997 in several markets, and continues to affect emerging markets each year.

Therefore, this study of a leading emerging market holds lessons on the general behaviour of similar markets in many countries. Malaysia's emerging market, as will be noted later, straddles the middle region between the emerging and developed markets because of its longer history and better regulations as well as sophisticated trading infrastructure. Hence, the results of this market may only hold for emerging markets at a similar stage of development as Malaysia, and *not* those that are at early stages of development. Two examples of the latter are Jakarta and Shanghai-Shenzen as these were organised in the mid-1980s.

2. A Quick Overview of Malaysia's Capital Market

At the end of 1996, the Malaysian share market with a capitalisation of US$282 billion (both debts and shares) was ranked among the top 15 of the world's 85 stock markets, and is the fourth largest emerging market in Asia after Korea, Taiwan and India.[1] Despite its size, improved liquidity especially during 1990-1997 following a major re-organisation in January 1990, and well developed infrastructure, it is an emerging market as defined by the International Finance Corporation (IFC), the private sector arm of the World Bank. This definition is based on per capita GDP, which places 25 markets from developed countries as the *developed* and 60 from the developing countries as *emerging* markets. To some extent the Kuala Lumpur Stock Exchange (KLSE) shares the characteristics of an emerging market as this book will make abundantly clear, though there are features of this market such as the mode of market-making, quality of information processing and disclosure rules that are no less stringent than in a typical developed capital market. Therefore, this study of the Malaysian capital market is an interesting case study of a capital market that straddles the developed and emerging market categories.

During the 1989-1996 period, the Malaysian economy grew at an average rate of 8.5 per cent per annum, which has been the main catalyst for the fast development of the share and other financial markets. This has led to greater depth, increased liquidity and more new listings and trading activities in the stock market. The rapid development has also led the market to play a key role in sourcing public funds for much of the private and public sector firms' investment needs. Malaysia is one of the few countries where public listed firms meet a larger portion of the demand of the private sector through access to share capital.

The present close-to-double-digit rate of economic growth is expected to be sustained over the next 10 years since Malaysia is a prominent location for multinational industrial activities, which account for 12 per cent of the GDP. These are increasing, and the government is committed to achieving a fast-phased growth to realise a target it has set for itself to reach the status of a developed economy by the year 2020: with the 1997 Currency Crisis, this vision may have to be reassessed. Achieving this aim requires proactive industrial and social policies to sustain high economic growth with the private sector leading the way with public sector divesting its economic interests while also employing the private sector to actively develop and undertake public-funded infrastructural development. Another key factor that will contribute to growth in the capital market is the public sector activities under the Privatisation Master Plan, with its aim of listing several of the 400-odd government-linked firms on the exchange. As will be discussed later in this book (see Chapter 11), 17 large government-linked companies and statutory authorities have already been listed since 1985 and these firms constitute 20 per cent of share market capitalisation in 1995.[2]

The 1989-1996 period has seen significant restructuring and liberalisation, both of which have helped to smooth the changes needed to cope with the rapid growth of the capital markets. A major restructuring was the decision taken in October 1989 to limit listing of the Malaysian-domiciled public companies to the Malaysian exchange. This led to the de-listing of 53 Singapore-domiciled firms from the KLSE and de-listing of about 196 Malaysian-domiciled firms from the Stock Exchange of Singapore. This resulted in a substantial increase in the trading activities on the KLSE, which had a spin-off effect of almost 150 new firms seeking listing over the ensuing four years, while also helped the brokerage industry to diversify and improve its capital base after the severe effect the 1988-1989 recession had on the securities industry. Licensing rules for stock brokerage were also relaxed with a few foreign firms admitted, especially those that were linked with local brokerage firms, being licenced. The government securities and corporate bond markets have also undergone a period of growth and changes in rules. Amendments to remove restrictive legislations concerning institutional investment also led to greater participation of the Employees Provident Fund (EPF) in the stock market: in 1994, the EPF invested an excess of 10 per cent (RM 2 billion) of its investment capital in the share market. Restrictions on EPF investments in shares are planned to be eased to enable more investments in the capital markets. More unit trusts were set up, and foreign fund management firms are now permitted to manage 100 per cent of their local funds.

There were significant moves to start the process of developing the derivative markets to facilitate futures price discovery, which would benefit the economy in the long run as investors would have a means of anticipating more accurately the futures prices at the current time. Call warrants on three counters, namely Malayan Banking, Renong and Sime Darby shares were introduced during this period: there are some 50 warrants now. Interest rate futures saw their debut in association with the Malaysian Commodities Exchange, a well-established commodity trading exchange with long experience in tin, rubber and palm oil contracts. A market on the KLSE Composite Index Futures was introduced by the Kuala Lumpur Options and Futures Exchange (KLOFFE) on 15 December, 1995.

These are harbingers of more to come as options on stocks, currency futures, etc. so on that will hopefully lead to an orderly, unhurried, and phased development of liquid derivative markets linked to the domestic capital market in ways similar to the most developed domestic Asia Pacific derivative market in Sydney. This is a welcome new development that has long-term implications for increased sophistication in the capital market. Finally, the KLSE is actively promoting professional development of dealers, analysts in the market through training, research seminars and even degree programmes organised in collaboration with an overseas university. All this augurs well for an orderly development of the capital market which, since March 1995, is under the supervision of an independent Securities Commission, a development very uncommon in Asian countries, which prefer to leave the share market to be managed as a self-regulated club of the brokers, and supervision emanates from the halls of the central bankers and the ministries of finance. Developing an independent regulatory body can only achieve its aim if the body has the investors' protection as the main base for its activities. The market is keenly aware of this, and is carefully monitoring the activities of the Commission as it can set an example for good regulatory design for several emerging markets of the world.

This chapter is a brief introduction to the structure and performance of this fast developing capital market in Asia. In Section 3, we review briefly the history and then describe the current status of the capital market. The derivatives market is discussed in Section 4 while the yield structure and returns on the stock market, and government short-term Treasury bills market are summarised in Section 5. Sections 6 and 7 provide respectively a brief summary of the inflation experience and possible future developments in the markets.

It is obvious from the materials presented, the Malaysian capital market is among the leading emerging markets and its long-run average return is 19.9 per cent with a standard deviation of about 32 per cent per annum (coefficient of variation is therefore 1.6 times). In this respect, it shares the risk-return characteristics of an emerging market since the long-run average return of the 25 developed share markets is much lower at 15 per cent with a lower standard deviation of about 20 per cent (coefficient of variation is less than 1.2 times). However, the Malaysian market's risk-return behaviour is not as risky as much less developed emerging markets such as the Jakarta Stock Exchange, which yielded an average of 40 per cent with standard deviation of 70 per cent over 1983-1994, or Shanghai and Shenzen exchanges (in China, with low returns and high risk).

3. The Stock Market

Background

The history of the KLSE is closely tied to political developments in West Malaysia and Singapore. The first stock exchange for stock trading was a joint stock exchange of both Malaya and Singapore. Thirty years after the formation of the Singapore Stockbrokers Association in 1931, the Malayan Stock Exchange was formed in March 1960. The first public trading of shares commenced on 9 May 1960. The Malayan Stock Exchange was renamed The Stock Exchange of Malaysia when the Federation of Malaysia was formalised in 1963. Following the separation of the State of Singapore as an independent country on 9 August 1965, the Exchange was once again renamed the Stock Exchange of Malaysia and Singapore. A new Companies Act came into force in 1968 and a Bumiputera Stock Exchange was formed in 1969 as a second stock exchange for the Bumiputera companies. It began trading in 1971. The latter has not developed into a significant exchange since the main stock exchange took on characteristics that helped to also achieve the aims of the latter.

When the Malaysian and Singapore governments agreed to cease the single currency arrangement in June 1973, the joint exchange began operation as two separate exchanges of the two countries, and trading of listed shares of both countries was done in different currencies. The KLSE Board was changed to KLSE and was regulated jointly by the Capital Issues Committee, Foreign Investment Committee, Registrar of Companies, the Takeover Panel and KLSE after 1976. On the 26 April 1994, the KLSE was renamed the Kuala Lumpur Stock Exchange (KLSE). KLSE formally adopted its objective as having responsibility for maintaining liquidity of trading securities issued by listed companies by creating an orderly trading on new issues and by also making an orderly secondary market for outstanding shares.

The final connection between the Malaysian and Singapore exchanges was the dual listing arrangement by companies in each other's exchange though the companies were domiciled in either country. From about 1987, firms became reluctant to seek a new listing in each other's exchange, and this arrangement was officially withdrawn effective 1990, when the then Malaysian Finance Minister adopted regulations to restrict Malaysian-domiciled firms to listing only on the KLSE. About 196 firms listed on the Singapore market and 53 on the KLSE were de-listed from the respective exchanges. The Stock Exchange of Singapore moved the more active of the Malaysian-domiciled companies to a separate Board, the CLOB International, and it continues to trade the scrips of a large majority of the de-listed Malaysian companies. This move was necessitated since Singapore residents had a large tranche of shares of the Malaysian de-listed companies, and the Exchange wanted to provide a service to the investors affected by the sudden change in the dual-listing arrangement that had existed for several decades. If the CLOB International (which also includes about 50 non-Singapore and non-Malaysian companies) was not set up, the Singapore holders of the Malaysian scrips would have faced currency risks if the trade was restricted to the KLSE. With the decision of KLSE to go scripless by the year 1996, most of the trade of these previously dual-listed firms will eventually be done on the KLSE.

The Securities Commission was formed in March 1993 to preserve the financial integrity of the market and to enhance investor protection from manipulative activities of management of companies and speculators. The Main Board sectors were revamped in September 1993, to reflect the changed core business activities of firms. This resulted in regrouping the companies into 10 sectors. The KLSE shares are listed on the Main Board and the Second Board was formed in 1988: the latter is for smaller companies that could not get listing on the more prestigious Main Board. The Main Board lists shares of companies which have a proven track record and healthy financial performance, and are generally large, with a minimum paid-up capital of RM20 million widely held by the public. The companies listed on the Second Board are smaller but diversified firms with good prospects of future profits. Once listed, the companies are continuously required to comply with the KLSE rules and regulations (in the Exchange By-Laws), failing which they are suspended or, in serious non-compliance cases, de-listed.

Table 3.1. Number of Firms and Capitalisation in Spot Securities Market, 1990-1996

Listed Markets	No. of Listed Firms		Capitalisation (Rm billion)	
	1990	1996	1990	1996
Main Board	295	410	131.00	746.00
Second Board	14	208	0.56	60.80
Total	309	618	131.56	806.80

Source: KLSE Fact Book, various years. Capitalisation declined sharply in 1997

Table 3.2. Capitalisation, Volume and Listing on the Main Board of KLSE, 1985-1996

Year	Debt (RM bill.)	Equity (RM bill.)	Total (RM bill.)	No. of Firms	Volume bill. units	GDP in (RM bill.*)	No. of New Firms
1985	0.79	69.34	70.13	284	2.9	57.1	5
1986	0.88	63.61	64.49	289	2.3	57.8	4
1987	0.96[e]	72.41	75.27[e]	293	5.3	60.9	7
1988	1.04	97.68	98.72	300	4.0	66.3	6
1989	1.25[e]	154.50	155.75[e]	306	10.2	72.5	14
1990	1.46	129.00	2.75	271	13.1	79.6	21
1991	2.43	157.38	159.81	292	12.1	86.3	25
1992	6.04	236.86	242.90	317	18.6	93.1	12
1993	18.25	587.78	606.03	329	43.1	100.8	19
1994	18.43	474.51	492.94	347	58.7	109.9	22
1995	25.64	526.36	551.00	369	30.9	120.3	19
1996	27.34	718.66	746.00	410	47.4	130.4	43

* Real GDP
Source: KLSE publications

Listed firms gain publicity and have trading data reported in the daily news. Only firms which have met the stringent listing requirements are accorded listing on the KLSE, which reflects the quality of the firm, which would have a favourable effect on business and may also add to the value of the firm. Besides enhancing the prestige of

Table 3.3. Capitalisation, Volume and No. of Firms on the Second Board of KLSE, 1989-1996

Year	Debt (RM bill.)	Equity (RM bill.)	Total (RM bill.)	No. of Listed Firms
1989	-	0.12	0.12	2
1990	-	0.56	0.56	14
1991	-	1.49	1.49	32
1992	-	2.88	2.88	52
1993	-	13.56	13.56	84
1994	0.18	15.68	15.86	131
1995	0.53	22.17	22.70	160
1996	2.10	58.70	60.80	208

Source: KLSE Fact Book, various years. - indicates not applicable.

such firms, the value of the listed firm is revealed more reliably by the investors than an unlisted firm. Tables 3.1, 3.2 and 3.3 show the growth in the number of listed firms and market capitalisation of equity on the two boards over the period 1985-1996.

The number of listed firms on the main board has increased by 53 per cent but the total capitalisation jumped by 469 per cent. This implies that the firms listed over the years are generally large. The Second Board, though incorporated in 1988, started trading with two firms in 1989. This number has since increased by 15 times from 14 in 1990 to 208 in 1996, but the total market capitalisation increased 60 times. The Second Board firms are, however, relatively smaller in size than the Main Board firms.

For both boards, more than 90 per cent of the total capitalisation is composed of equity. The corporate and government debt securities market, though on the increase in recent years, has not reached the large size that one finds in more developed markets, such as those in Sydney and Wellington. The value of debts of listed companies on the Main Board has increased substantially compared to those on the Second Board. At the end of December 1996, the total market capitalisation of companies listed on the Main Board was 746 billion Ringgit, which is about 12 times larger than the total capitalisation of the Second Board companies. With the 1997 Asian Currency Crisis, market value declined sharply when the composite index declined from over 1,000 to about 500.

The Malaysian Stock Market Indices

A market index is needed to measure periodic changes in the prices of all firms listed in the market, for example, the Main Board (Chapters 3 and 7 in Ariff and Johnson 1990) for the method of constructing an efficient index). A reasonably well designed stock index gives an unbiased indication of price changes over a period of time. To attain this objective, the stock index should record changes of a representative number of listed companies as well as the 10 sectors in the market. Value weighted and capitalisation-adjusted index is generally preferred over price-weighted and unadjusted index for the simple reason that emerging markets have (a) a small number of firms dominating market capitalisation. That is, the markets are concentrated (the average market

Table 3.4. KLSE Stock Indices In Malaysia as at December 1996

Name of Index	Components
EMAS	All Main Board Shares
KLSE Composite	100 Shares (w.e.f. 18.4.95)
KLSE Industrial	30 Shares
KLSE Consumer Products	57 Shares
KLSE Industrial Products	85 Shares
KLSE Construction	24 Shares
KLSE Trading/Services	67 Shares
KLSE Finance	56 Shares
KLSE Property	63 Shares
KLSE Mining	10 Shares
KLSE Plantation	40 Shares
KLSE Second Board	208 Shares
NST Industrial Index	30 Shares

Sources: KLSE publications, various years.

capitalisation concentration in emerging markets is 40 per cent compared to 15 per cent in developed markets), and (b) have serious thinness of trading.

Prior to 1986, the more widely-used stock indices that measured the overall market were the KLSE Industrial (an all-shares value-weighted index), the New Straits Times Industrial Index (a 30-share price-weighted index) and the OCBC Composite Index (55-stock multi-sector-based value-weighted index). The Malaysian economy and consequently the firms listed on the KLSE, have experienced rapid growth which has rendered these indices somewhat obsolete as they were not designed to absorb and reflect such rapid changes. Consequently, the KLSE Composite Index (KLSE-CI) based on 67 shares was designed to reflect the changes in the economy. The index design features included a requirement that it closely reflects the relationship between the market and the economy, a claim made by its designers but yet independently demonstrated. Presently, the KLSE publishes thirteen indices as shown in the Table 3.4:

A Second Board Index was launched on 2 January 1989. The Index values are calculated by the value-weighting method and the weights used are the number of outstanding ordinary shares in relation to the total shares in the market. This makes these such an index reflect the correct amount of value change in the market provided all the shares are traded at measurement times. Thin-trading (Annuar 1990) is a serious problem in this market that will render these indices, especially because of their all-shares basis, inefficient. There will be a systematic downward bias in all the parameters measured by these indices (Ariff 1987).

The index is calculated using the formula:

$$\text{Index}_1 = (\text{AMV}_1 / \text{AMV}_0) * 100 \tag{3.1}$$

where

$AMV_1 = \Sigma P_1 . Q_1$= current aggregate weighted market value, ϕ and

$AMV_0 = \Sigma P_0 . Q_0$= base aggregate market value.

As new firms enter the market and some firms are de-listed, the base values will be recalculated. Similarly, capitalisation changes due to bonus and rights issues (as well as conversion of warrants etc.) will also attract revisions in the index values. Details are contained elsewhere as cited in this chapter.

Since 18 April 1995, all 13 KLSE indices are computed instantaneously instead of every 15 minutes, prior to that date. The 86 counters of KLSE CI were expanded to 100 counters ahead of the introduction of the KLSE-CI Index Futures trading in December 1995. In 1977, the KLSE had only one board with 264 listed companies, and the rule of thumb used to select component stocks for the Composite Index was 5 per cent each from the biggest and smallest companies and 10 per cent from two middle groups, totalling 67 counters. The new Composite Index is open-ended as companies can be added or deleted as deemed necessary by the Exchange. The number of stocks was increased to 82 in 1986, and in 1995, 100 counters were included. The 1995 recomposition was done by deleting 15 counters from the original 86 counters and then adding more firms to make a list of 100 component stocks.

There are also private-sector-designed indices widely followed by investors. One of these known internationally is the Morgan Stanley Malaysian Index which is made up of a sample of composite stocks from all sectors. The Business Times Group, a newspaper publisher, has published its own indices (known as BT Index) since June 1981. Since 1990, it published BT Ordinaries, BT Industrial and BT Composite Indices, but not much information is available for the public with regard to its component stocks, base year and the weightage system. The New Straits Times, another newspaper group, publishes the NST Industrial Index which is a price-weighted index widely followed by the local public.

Sectorial Composition of Indices

The EMAS (Exchange Main Board All Share) index was launched by the KLSE in October 1991 with the base year 1984, a relatively stable year for the Malaysian economy. This index includes 413 stocks listed as at the end of December 1996. All stock indices are continuously monitored to account for de-listings, suspensions of component stocks and capital changes such as rights issues. Table 3.5 shows the sectoral components of the EMAS index which is dominated by the consumer product, industrial product, trading and services and construction (formerly grouped as industrial sector) (57 per cent) followed by the property (15 per cent), finance (14 per cent) and the plantation (10 per cent) sectors.

The KLSE Composite is the popular market barometer. It represents all sectors of the economy and the base date goes back to 3 January 1977. To ensure that the component stocks do not over- or under-represent certain sectors, the number of stocks selected for different economic activities is also designed to be correlated with sectoral contribution to the Gross Domestic Product (GDP). The sectoral component of this index is shown in Table 3.6. It shows that 60 per cent of its component companies are from the consumer products, industrial products, trading and services and construction sectors.

Table 3.5. Sectorial Composition of EMAS and KLSE Composite Index

Sectors	EMAS Index		KLSE CI	
	No.	%	No.	%
Consumer Products	57	14	16	16
Industrial Products	85	21	23	23
Construction	24	6	7	7
Trading & Services	67	16	16	16
Finance	56	14	14	14
Hotels	6	1	2	2
Properties	63	15	15	15
Plantations	40	10	6	6
Mining	10	2	1	1
Trusts	3	0.008	-	-
Total	411	100	100	100

Source: KLSE publications, various years.

All the sectorial indices of the KLSE are all-share indices (KLSE Consumer Products, Industrial Products Finance, Properties, Mining, Trading and Services, Construction, Hotels and Plantation) with the base year 1970. The KLSE Finance Index is composed of 56 companies, the Properties Index has 63, the Mining Index has 10 and the Plantation Index (which includes the oil palm and rubber firms) had 40 at end of 1996. The NST Industrial Index is composed of 30 stocks from the industrial sector, and is a price-weighted index constructed in much the same manner as the Dow Jones Industrial Average for the New York shares.

Derivatives Markets

Commodities Futures Contracts

The Kuala Lumpur Commodities Exchange (KLCE) was established in July 1980. It started trading its first futures contract (Crude Palm Oil) in October 1980. There are at present seven commodity futures contracts traded on the KLCE (Table 3.6), namely the RSS Rubber Futures Contract, SMR 20 Rubber Futures, Tin Futures, Cocoa Futures, RBD Palm Olein, Crude Palm Oil Contract and Kernel Oil Futures Contract. The KLCE is regulated and supervised by the Commodities Trading Commission (CTC). The basic functions of the commodities futures market are to provide a forum for futures commodities price discovery and serve as a mechanism for transferring price risk. The ability to transfer the price risk by participants results in increased credit worthiness of the companies involved, which would otherwise be at the mercy of the commodities price fluctuations. The transfer of risk-exposure by participants renders the companies to assume less risk and lower financing costs.

Among all the commodity contracts traded on KLCE, about 95 per cent of trading volume of the futures contracts market is contributed by the CPO futures contract (Table 3.7). It is the most active contract because palm oil producers and manufacturers use the contracts to hedge against price change risk as palm oil is subjected to significant price fluctuations. Malaysia is the largest producer of palm oil products. The Mcbean Index of price instability which measures the average of absolute deviations around the mean rate of palm oil price changes (index value=2.09) is unstable compared to natural rubber (index value=1.7) and sawn timber (index value=0.9).

Table 3.6. Type of Commodity Futures Contracts Traded on the Kuala Lumpur Commodity Exchange

Name of Contract	Date of Commencement	Contract Size Per Lot
1. Crude Palm Oil	October 1980	25 Tonnes
2. RBD Palm Olein	February 1990	25 Tonnes
3. RSS 1 Rubber	March 1983	10 Tonnes
4. SMR 20 Rubber	March 1986	10 Tonnes
5. Tin	October 1987	5 Tonees
6. Cocoa	August 1988	10 Tonnes
7. Kernel Oil	October 1992	15 Tonnes

Source: KLCE Annual Reports, various years

Table 3.7. Characteristics of Malaysian Commodity Futures Contracts: Crude Palm Oil Contract Futures (One Lot = 25 tonnes)

Year	Open Interest ('000 Lots)	Volume of Tranding ('000 Lots)
1990	10,242	241,984
1991	6,420	320,109
1992	7,487	255,870
1993	14,233	355,826
1994	17,026	567,542
1995	13,147	525,889
1996	9,962	498,118

Source: KLCE Annual Reports, various years

Financial Futures

As an attempt to introduce financial derivative trading, which is a natural extension in the development process to aid futures price discovery at an appropriate stage of the development of the spot financial markets, the Futures Industry Act was passed into law in 1993, and plans were put into place to commence financial derivative trade. This led to the formation of the Kuala Lumpur Options and Financial Futures Exchange (KLOFFE) and the Kuala Lumpur Futures Market (now known as the Malaysian Monetary Exchange (MME)) in 1993. An interest rate futures contract started trading on the KLCE in August 1994 (now being traded on the Malaysian Monetary Exchange). The contract is based on a standard interest rate instrument of a 5-year note. Trading has not been very active as the speculative interest has not surfaced sufficiently. With the expected growth in the fixed-income securities market expected to take place in view of funding requirements from a large number of infrastructural investments in the next 10 years, and with possible rapid change in the interest rates as the economy continues to grow, this contract has potential for growth in the long run. Both the KLOFFE and MME share the facilities of the Malaysian Derivatives Clearing House (MDCH).

KLOFFE is expected to limit its trading in equity options and index futures (introduced on 15 December 1995) and stock index futures and other still undefined financial products. The introduction of the financial options and futures markets is designed not only to complete the natural evolution of financial markets from spot to futures price discovery stage, but also to reduce risk from uncertainty of the future conditions on the spot market through index futures prices. These products will also help institutional investors to manage their risk exposure to sudden price changes better, and for speculators to capitalise on the benefits of the same sudden price changes which have increased in the last 11 years.

A KLSE Composite Futures Contract started (KLFC) trading in December 1995, and is based on KLSE-CI times 100-Ringgit value. Trading has been lacklustre, but this contract promises to be a popular instrument once speculative interest starts on the derivative side of the market away from the spot market and the learning stage is passed. Further, this instrument will be a boon to the international investors only if the speculative interest develops sufficiently enough to attract hedge interest (open contracts): activity improved during the 1997 Currency Crisis. In developed and more settled derivative markets with hedge efficiency, open interest is about 25-30 per cent of monthly traded contracts. The investors are watching the KLSE-CI Futures Contract avidly to see when this will be reached. Whenever portfolio investments from abroad pick up, this contract can be expected to benefit from their hedge activities. Further, the large number of mutual funds found in Malaysia also need this contract for their risk hedge management against downward market price changes, a characteristic very much in evidence in the recent history of the KLSE. For example, there was a 29 per cent decline in 1994 after a 104 per cent increase in 1993 and a 24.4 per cent increase in 1996 followed by a 54 per cent decline in 1997.

The average daily turnover in 1996 was less than 500 contracts. This is far below the expected critical mass of 3,500 contracts per day. Twenty per cent of the market activity was contributed by local members, 53 per cent by foreign institutions, 1 per cent by domestic institutions, 3 per cent by overseas retail, 18 per cent by domestic retail and 5 per cent by proprietory. The average open interest was in the range of 200-2,000 contracts. The low activity coupled with the high volume of trade in short-term (mainly 1-3 months contracts) indicate the speculative nature of the market.

4. Yield Structure and Returns

This section examines the *long-run average yields* on three key sectors of the financial system (Table 3.8).

The bench-mark yield on the Treasury bills market more or less sets the tone for all other interest rates. Further, this market, being default-free, provides financial economists with an easily observable risk-free proxy rate of return in an economy. Where there is no market-based Treasury bills market (for example, in Vietnam), it is difficult to establish this key economic variable. Ideally, this should be yields on a liquid secondary market for the T-bills, but we observe the yields on the month-end auctions of 3-month Treasuries as the secondary market for bills is not active in Malaysia, and also data are not available for the public. As can be seen from Table 3.8, the average T-bill yield, thus the risk-free return over the last 11 years, was 5.11 per cent. The *average over the 1975-1996 period is about 7.5 per cent.* The bill rates do vary over the years from its 11-year average of 5.11 per cent. The highest yield recorded was 7.78 per cent in 1989, a period of rapid

Table 3.8. Percentage Average Yields on Stocks, 3-Month Treasury Bills and Bank Borrowing Agreements: 1980-1996

Year	3-Month T-bill Rates (% per annum)	Equity Market Mean Returns (% per annum)	Mena Prime Rates (% per annum)
1985	4.11	-22.14	10.75
1986	3.85	8.00	10.00
1987	3.22	3.61	7.50
1988	4.26	36.83	7.00
1989	7.78	57.33	7.00
1990	7.20	-10.02	7.50
1991	7.67	9.94	9.00
1992	7.08	15.77	9.29
1993	4.99	98.04	8.22
1994	4.56	-29.76	6.83
1995	5.92	6.83	8.03
1996	6.45	24.4	9.18
Mean	5.11	15.85a	8.31
Std. Dev	(1.55)	(35.46)	(1.31)

Source: Bank Negara Reports, various years

The mean return on the share market during 1975-1989 was 18 per cent (Annuar 1990). Hence, the long-run average return from 1975 to 1995 is 19.91 per cent per annum. The market has become more volatile over the last 11 years than during the previous 15-year period. Its risk has increased from around 28 per cent per annum in the previous 15 years to the 35.46 per cent average risk over 1985-1996.

economic growth at the start of a business cycle, and the lowest was 3.22 per cent in 1987 when the economy was experiencing one of its worst recessions. Notice that this yield is mildly variable over time with a standard deviation of 1.55 per cent per annum.

Next in importance is the average cost of borrowing for the companies in the economy. There is a small corporate bond market valued in 1994 to be US$4,000 million and, as its liquidity is poor, we decided to use the average lending rates of the commercial banks for the minimum cost of borrowing for the companies. In reality, the actual cost will be about 2 per cent above this for the listed firms since banks charge a premium for average-quality companies, though for companies outside the KLSE, the costs are even more variable. As shown in Table 3.8, the average prime rate is 8.31 per cent, which suggests that the *borrowing costs of companies may be approximated as 10.31 per cent per annum*. The average prime lending rate for the period 1985-1996 ranged from 6.83 per cent (in 1994) to 10.75 per cent (1985). Note the very high prime rate in 1985, which was the peak of a business cycle that turned downward in the following year. The standard deviation of the prime rate is also mildly variable as can be seen from its standard deviation of 1.31 per cent over time. The low variability is consistent with the managed nature of the prime rates whereas the publicly traded bond market yields have standard deviations in the range of about 8-12 per cent in Malaysia.

The returns on the share market computed using the KLSE Composite Index without dividends averaged about 15.85 per cent over the same 11-year period. But its long-run rate measured with dividend yields over 22 years is 19.91 per cent (see the note to Table 3.8) with a standard deviation of about 32 per cent per annum. This makes the coefficient of variation of the KLSE over the last 22 years 1.6 times the mean return. Thus, coefficient of variation has increased to 2.3 times (volatility of 35.46 against the average returns of 15.85 per cent) in the recent 12-year period. This aspect of an increasing riskiness is one that the KLSE shares with the emerging markets whereas the developed markets, on average, have maintained about the same coefficient of variation over the more volatile 1980-1996 period except for 1996-1997 years.

The yield structure of the Malaysian share market is high, as is also its riskiness. The mean returns, on the NYSE is estimated to be about 13 per cent, in Sydney to be about 14 per cent with standard deviations well under 20 per cent. That would make these two developed markets' coefficients of variation about 1.4 times in the recent, but very volatile, share market conditions. The coefficient of variation of NYSE over a 56-year period is estimated to be 1.2 times, and this has changed by a 0.2 point in the last decade to 1995. This must be contrasted with the above Malaysian experience, which indicates that the recent changes in its volatility is far too severe, and as a result, the coefficient of variation has increased from 1.6 in the 1975-1989 period to 2.3 times in the 1985-1996 period.

If we compare this level of riskiness of the local market with a majority of the 60 emerging markets, it appears that most of the emerging markets experienced an average return of about 19 per cent but the standard deviation of returns was about 48 per cent in the 1980-1996 period. This makes the average coefficient of variation of emerging markets 2.6 times. Thus, the KLSE is not as risky as a typical emerging market. This indicates the level of development of the Malaysian market as one that straddles the developed and the emerging capital markets. In our opinion, there is a need to reduce the volatility in this market, and that will reduce the presently high riskiness of the market. Volatility arises from significant speculative activity on this market, as is also the case with several East and South Asian stock markets.

5. Inflation and Default-Free Return

Besides the stock indices, there is another index constructed to measure the change in the general price level of goods and services in the country. Since the inflation rate is eventually incorporated into the yields of financial securities, the inflation rate is a significant economic variable followed by financial economists. The official index constructed in Malaysia follows international rules of capitalist economies. It is the Consumer Price Index (CPI) released by the Department of Statistics of the Ministry of Finance. The CPI measures the changes in the general level of prices of a fixed representative basket of goods and services relevant for all economic agents in an economy. There are producer price indices used to measure price changes to wholesale buyers, and also an index for lower income groups. All are weighted indices with different weights assigned to different items in the basket. In 1994, the Department of Statistics conducted an extensive household expenditure survey and came up with a basket of 430 items classified into nine broad groups: food, beverages and tobacco, clothing and footwear, gross rent, fuel and power, furniture, furnishings and household equipment, medical care and health expenses, transport and communications, recreation and entertainment, education and cultural services, and miscellaneous goods and services.

The CPI is based on the Paspeyres Index formula with a month in 1994 as the base period, when the index is set equal to 100. Movements of the CPI are measured on a monthly basis and expressed in percentage changes. For example, in May 1995, the change was 3.8 per cent; it is against this summary of inflation that the government has launched a campaign of *zero-inflation target*. This campaign was launched to mitigate the inexorable effect of inflation on the purchasing power of the local currency, the ringgit, and the politically dangerous effect on future wage bargains in the midst of steady economic growth of more than 8 per cent over a sustained seven-year record. For this book, the inflation rate is needed to estimate the important variable namely the real returns defined as gross returns less the inflation rate.

The average inflation rate as captured by the CPI for the same period is about 4 per cent. Comparing this against the risk-free rate of 5.11 per cent, we get a default-free return (before transaction costs) of about 1.1 per cent. This is a characteristic commonly observed in a well-functioning financial system in that the risk-less rate is marginally higher than the inflation experience. In countries with deep financial suppression (some examples are China, India and Korea), the inflation rates are often very high, and the default-free interest rates, which are often administered rates, are either set just above the inflation, or set too low, as in China, with the result that the real riskless return is negative. We also observe this same effect in economies with underdeveloped or suppressed fixed-income securities markets. In this aspect, Malaysia appears to have a well-functioning bills market and an economy with low inflation rates over a very long period, though there have been exceptions in 1946-1951 (end of World War II) and 1973-1977 (the First Oil Shock), when inflation went up to 17 per cent. The inflation rate in 1996 was 3.6 per cent and it is forecast to range between 3 and 4 per cent in 1997 and 1998 before the 1997 currency crisis.

Though in theory, zero-inflation is an ideal situation, the CPI tends to overstate inflation because the improvements in quality and shifts in spending are not fully accounted for by the CPI. Therefore, even if the zero-inflation target is achieved, the official price index will still record an inflation of one-two per cent.

6. Contemporary and Future Developments

The Malaysian securities markets have experienced many significant events in the last five years which have helped them to reshape and adjust to major economic and financial conditions that have emerged over the last five years. As noted earlier, the dual-listing arrangement with the Singapore market ceased effective January 1990, and Singapore-domiciled companies were de-listed from the Main Board. The main reason for this move was to increase the volume activity on the KLSE but the official explanation given is that by limiting the trading to the KLSE, price changes in Malaysian companies could be monitored and regulated more effectively. As events have shown over the past five years the volume activity leaped, but the volatility in market prices has in fact increased in the KLSE. The standard deviation on the returns from new issues on the KLSE over 1990-1992 has markedly increased after the cessation of the dual listing arrangement. This suggests that Malaysian firms can only tap the funds of Malaysians at the time of new issues now, and with the unavailability of funds from Singapore, the riskiness, on average, of new issues has gone up (Ariff and Prasad 1996). An opposite effect is observed on the Singapore market. As more money is now available to companies seeking listing on that market, the volatility in the prices of new issues declined during the 1990-1992 period.

To ensure a healthy development of the Malaysian capital market in line with the objective of making it function no less efficiently than a world class market fitting its capitalisation rank as the 15th largest in the world, the Securities Commission (SC) was set up in 1993 to effectively regulate the market independently to ensure a fair playing field for all players. Its presence is expected to increase investor protection, and to lessen unfair practices of companies and speculators in this market. Its first year was marked by an active campaign that led to the fining of 12 company executives and speculators for unfair trading practices, as reported in the press in 1994.

The market clearing process and monitoring of listed companies received a boost with the introduction of the Central Depository System in 1992. All listed stocks are now traded without the physical transfer of scrips. Scrip delivery has been a major security risk (there have been spectacular highjackings of motor vehicles carrying scrips!) and scrip-based trading is a major reason for delays in complying with the T+5 trading day settlement rule. Scripless trading would improve trading in the future. To minimise the agency cost as well as to increase the transparency of activities of listed companies, every listed company is required to set up audit committees and a company board of directors must include at least three members who are not associated in any way with the operation of a listed company. This would enhance investor protection in the face of well-documented insider frauds (Pan Electric Affair in 1984) and professional speculators (as for example revealed through the litigations of speculators in 1993-1994).

To ensure greater liquidity in shares of large firms which are often expensive and beyond the reach of ordinary investors, a 200-share lot has been introduced as well as the normal 1,000- shares lot. In 1994, the tick sizes of large-priced shares were changed to improve liquidity, and to reduce volatility in those shares. In an effort to provide more investment and hedging alternatives to investors, the Kuala Lumpur Options and Financial Futures Exchange has been set up to offer financial derivative products. The options on shares are expected to follow soon; it will be worthwhile to learn from the experience of the first Asian options market that failed (see Chapter 19).

With a view to developing an active corporate bond market (the existing bond market is dominated by government securities), a Rating Agency of Malaysia (RAM) has been set up to grade the potential loan papers of companies seeking public funds. RAM has the task of objectively assessing the credit ratings of private debt securities, based on the issuer's likely ability to repay the principal and interest coupons over the life of a rated security. There are three massive infrastructure projects that will need huge borrowings from the public. These are Putrajaya City, the New Kuala Lumpur International Airport, and the continued extension of the highways. The fixed-income securities that will be needed for the firms participating in these projects, and the investments of the government, will further add to the development of a more vibrant fixed income Malaysian market in the next ten years. Malaysia's fixed income market is rated the fourth largest in Asia after Korea, Hong Kong and India (Japan is not included). Hence, its development will help in making the Malaysian capital market compete effectively with other regional and international markets in about ten years.

The rapid economic growth has created higher household incomes, and now there is an improved demand for investment funds offered by unit trusts in addition to already large holdings of 13 government-controlled Amanah Saham including the giant, the Permodalan Nasional Bhd. More activity in unit trusts will emerge in the years to come, especially if the Securities Commission takes steps to improve the transparency and transaction costs of trading in this sector (see Chapter 21).

Further, companies which do not meet the listing requirements of the first and second boards also want to access public funds. To provide an alternative source of funds for these companies, the government has indicated the need for a third stock market (the first is the KLSE, the second is the Bumiputera Stock Exchange). It is likely that a third exchange or possibly a Third Board may be set up with less stringent listing requirements to meet the demand for funds of a large number of local firms. This will be set based on the OTC market, and will be known as MESDAQ (Malaysian Securities Dealings and Automated Quotation). It will be the third-tier capital market for firms with potential marketable concepts and innovative products in the high-technology sectors to tap capital from the market. The main difference between the KLSE's two boards and Mesdaq is that shares listed on Mesdaq will be quote-driven rather than order-driven. In our opinion, this exchange should take the form of more successful OTC markets with a screen-traded facility similar to the OTC markets in New York and in several countries including one in Bombay that was established in June 1995.

Other developments in the near future may include rapid securitisation of government-linked companies. The 17 listed (see Chapter 11) so far are the bigger ones with massive capitalisation, such as Tenaga Nasional Bhd. and Telekom Malaysia Bhd. More medium-sized companies are also being privatised to offer a wider range of choices for investors. This is already happening as evidenced by the privatisation of water supply by Indah Water, and postal services.

End note

1. With the 1997 Asian currency crisis, US dollar value of KLSE declined by 38 per cent by end 1997. Other markets were also devalued. Thus, KLSE's size has been marked down. Priority for future development is to manage the market to regain its status prior to the 1997 crash following the currency crisis.

2. The privatised firms account for a substantial capital base of the market, and have provided for diversification.

PART

2

Liquidity, Information Effects and Efficiency

The focus in this Part is the examination of the important issue of *market efficiency (Fama-efficiency)*, which refers to the ability of a securities market to evaluate and incorporate on to the security prices the economic value of information relevant to the pricing of securities. The findings reported herein provide important conclusions about the efficiency of the pricing process of this reasonably well-organised and large emerging market in the Asian Pacific region. These conclusions are very important because such *structural differences* as low liquidity, high concentration and small size of several emerging markets make significant impacts on pricing of securities. These factors, though present to some degree, does not make this market less efficient.

Chapter 4 examines the relation between price and volume of stock. Results reveal that information about intensity of trading (liquidity) and market conditions are efficiently absorbed into prices, thus suggesting that the market is broadly informationally efficient. Chapters 5 and 6 are about a popular topic on *usefulness of technical rules*. A total of 9 technical trading rules, actively promoted by chartists in Asia as profitable investment tools, are tested. Results from operationalising these rules give only very weak support for the usefulness of charting techniques since applications of these rules by an investor do not lead to returns significantly higher than is possible from a simple low-transaction-cost buy-and-hold strategy. This would be consistent with a fairly efficient market.

Traditional theory of efficient market suggests that *prices must adjust rapidly to information*. This means that historical prices must not be serially correlated and stock prices must change speedily at the time of relevant public disclosure of information whereas private information of professionals and insiders would also be impounded in prices as these knowledgeable persons trade on their private information. The predictions of this theory are modelled in Chapter 7. The results show that the Malaysian share market is generally efficient, and that inefficiency only lingers in the cases of very thinly-traded stocks forming about 13 per cent of the market. These results reported in this Part, taken together, are consistent with the quality of disclosures and unbiased speed of price adjustment, which would have us argue that the Malaysian share market is among the more efficient of the 60 emerging markets, but it has some thin-trading problem.

CHAPTER

4

Share Price-to-Volume Relationship: An Efficiency Angle*

Abstract

An empirical regularity reported in several developed markets is a positive *relationship between security prices and traded volume*. This is investigated in the Malaysian share market using individual company and market data over recent years. Trading volume and market conditions, i.e. bull versus bear market or infrequently traded versus frequently traded stocks, appear to convey information. The evidence in this study is consistent enough to suggest that the market is weak-form efficient. Violation of efficiency is rather weak. This is encouraging as it is also not inconsistent with published local evidence in support of efficient market hypothesis.

1. Introduction

An old Wall Street adage is reported in the literature as, "*It takes volume to make prices move.*" Much research has been done to address this assertion. The general findings suggest that absolute price changes and trading volume are positively correlated. There is reasonable empirical evidence (Karpoff 1987) reported in developed capital markets to suggest that share prices are linearly related to trading volume. This line of research has yielded results that provide some insight into the structure of information being used in financial markets. The price-to-volume relationship depends on the rate of information flow to the market, how the information is disseminated, the extent to which market prices convey information, the size of the market and the existence of short sale constraint. Empirical relations between prices and volume can help discriminate between differing hypotheses about market structures. So, it is a worthwhile topic for research on information efficiency.

It is argued by some theorists that price-to-volume relation reflects two things (Beaver 1968). It can mean that there is a lack of consensus about how a newly disclosed piece of (for example, public) information should be interpreted, or that there is no agreement amongst investors as to the extent to which information changes individual investor's expectations.

The most notable relationship between price changes and trading volume is that absolute price changes and price change *per se* are positively correlated with trading

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volume though it is recognised that this relationship is generally weak for the latter. This is probably due to the asymmetric volume and price change relationship in the sense that the ratio of trading volume to absolute price change is greater when the price moves up compared to when prices decline. Such asymmetric relationship may be due to the difference in costs of going long and short as well. Lagged relationship between trading volume and price change *per se* is generally found to be not significant (Rogalski 1978), which if otherwise, is inconsistent with the technical analyst's claim that movement of prices in one direction with increasing trading volume would be repeated over time. Hence, markets may be predicted through this relationship, if that condition is true.

There is no published evidence on the relationship between stock price changes and trading volume of firms listed on the Malaysian share market. This study is a first modest attempt to test the price-to-volume relationship. Findings from this study are presented as follows. A short review of theory and evidence todate is in Section 2. Section 3 describes the data sources and test methods employed. The Malaysian results are subsequently presented. Findings are consistent with an efficient pricing process, and do not indicate that technical trading rules are useful.

2. Price-to-Volume Relationship

Trading volume has been modelled from three perspectives: its relationship to the bid-ask spread, relationship to price changes and relationship to information. This study is an investigation of the latter two aspects. Empirical evidence indicates that volume is negatively related to bid-ask spread. In the first study of this kind, Osborne (1959) attempted to model the stock price change as a diffusion process with variance dependent on the number of transactions; this suggests a positive correlation between absolute price changes and trading volume. By assuming transactions are uniformly distributed in time, he expressed the pricing process in terms of time intervals, but did not directly address the price-to-volume issue empirically. His work was extended with various modifications in Tauchen and Pitts (1983). Stock price series and the series of sales volume of stocks are found to be wholly unrelated, and in the same vein, no connection is found between the price series and the corresponding volume series (Crouch 1970).

Failure to detect significant correspondence between price and volume (Godfrey, Granger and Morgenstern 1964) led to re-examining the applicability of the then existing theory. The price-to-volume relationship was analysed by Ying (1966) by applying a series of chi-squared tests, analyses of variance and also via cross-spectral methods; this study has become a reference. The findings became consistent with theory developed later by Karpoff (1987), but his empirical methods came under criticism. Nevertheless, this study by Ying is the first to document price-to-volume correlation in a share price data set.

Trading volume relation is also important in the mixture of distributions models (Tauchen and Pitts 1983) which provide some explanation for the leptokurtosis in the distributions of speculative security prices. These models predict that volume is positively related to the magnitude of the corresponding price change over fixed time intervals or on a given transaction. The model reported by Pfleiderer (1984) considers price and volume in a noisy rational expectations equilibrium. The magnitude of the price change is not correlated with trading by speculators with private information, but is positively related to trading by liquidity-motivated investors. So the correlation between absolute price changes and volume is negatively related to the existence of private information, so it was argued.

The reliability of reported findings in Beaver (1968) could be due to some other factor(s). For example, the impact of earnings reports is one among many, and Beaver helped to pioneer this line of research. Since investors may differ in the way they interpret such reports, some time may lapse before consensus is reached, during which time interval an increased volume in trade could be observed as a resolution of this uncertainty. If consensus were reached at the time of reports when the first bout of transactions occur, there would be a price reaction but no volume reaction, assuming homogeneous risk preferences among investors. If risk preferences differ, there could still be a volume reaction, even after the equilibrium price had been reached; this is Verrechia's (1981) argument.

Several theoretical models have been developed to ascertain the relationship of trading volume to price changes. A new model in which a common piece of information arrives sequentially to investors is also tested in Epps (1975). Using simulations, it is shown that volume, after all investors had received information, should be positively related to the magnitudes of price changes. This model was extended in Jennings, Starks and Fellingham (1981) to include real-world margin constraints and the possibility of short sales; they came up with the additional prediction that volume is relatively heavy on transactions when prices are on the up-tick. However, a significant feature of each of these models is a dependence on behavioural distinction between groups of market participants, e.g. bulls versus bears or optimistic versus pessimistic traders. Theodossiou and Unro (1995) found no relationship between stock market volatility and expected returns in ten industrial countries. However, they reported significant serial correlations in returns suggesting lack of weak-form efficiency.

Therefore, there are a number of theoretical reasons as well as empirical support for theories on why a price-to-volume relationship may exist in securities markets. Market conditions and investor strategies may both form an information base for prices and volume to be related.

3. Data and Methodology

Data and Date Sources

The data set was compiled from daily price and volume records of the KLSE over the period from January 1985 to December 1992. Daily closing values of the Composite Index and the total number of shares traded were collected from the *Daily Diary*, a KLSE publication, at the KLSE Library. Change in the logarithms of the daily closing composite index values $(D\,CI)_{it}$ is the proxy for the market price changes:

$$(D\,CI)_{it} = \ln(CI)_{it} - \ln(CI)_{t-1} \qquad (4.1)$$

The difference in the natural logarithms of the index values (denoted as CI) are taken as price change in the market as a whole. The daily total market turnover divided by the closing index is used as a proxy for volume transacted in the whole market (denoted as V, hereafter) following Lam, Li and Wong (1989). These data are accessed from data made available to us by the KLSE and extracted from its publications.

Methodology

The first test using daily *absolute* price changes (|CI|) is to test the correlation of prices with daily volume, V, to observe any significant relationship between them at 0.05 and 0.01 per cent acceptance levels. Statistical analyses are performed on a yearly basis in order to bypass the possible non-stationarity problem of shorter period price and volume time series. The second test measures the effect of volume on the magnitude of price changes. The days in a year are grouped into three equal groups, resulting in small, medium and high volume of transactions. Then the analysis of variance (ANOVA) test is done to ascertain any significant differences in the absolute changes in the price for the three trading intensity groups (Chan 1989 for a description of this method). The results, if positive, will substantiate findings from the first test. The two tests (denoted 1A and 1B) are repeated using the price and volume data. Any statistical difference in results using the index and absolute price changes are then observed.

Test number three is meant to measure if there is a difference in the postulated relationship during bull and bear market conditions. The asymmetric relationship between price and volume is tested using regression, where price is an independent variable and volume is the dependent variable:

$$V_t = a + b(CI_t) + g(D_t)(CI) + e_t \tag{4.2}$$

where, D_t: is dummy variable introduced to indicate a positive price movement (D_t=1) or a negative price movement (D_t=0), and

CI and V are price and volume respectively.

Price-to-volume relationship will have a positive slope when price changes are positive and negative slope when price changes are negative. The hypothesis of symmetry is H_0: $(b + g) = 0$ and the asymmetric alternative is H_1: $(b + g) > 0$. The number of years with or without asymmetric relationship are observed.

Tests 4A and 4B are meant to examine respectively the lagged and leading relationship. These examine the causal relationship between price changes and trading volume. To ascertain the causality our test follows the approach in Granger and Newbold (1986):

$$DCI_t = c + Sa_i DCI_{t-i} + Sb_i V_{t-i} + e_t \quad \dots i = 1..k \tag{4.3}$$

where i indicates four lags of both prices and volume and S is the summation operator from i=1, ...4. In the first test, price (CI) is taken as the dependent variable and the criterion variables are the lagged values (i=-1,...,-4) of volume. In the second test, the variables are switched and volume is the dependent variable; four lagged prices are included as the independent variables. The null hypothesis is that the lagged coefficients are equal to zero.

In testing for causality, a one-way Granger causality test as suggested in Geweke (1984) is considered sufficient. This test uses the ordinary least squares regression and the following specification is used to test causality between X (Volume) and Y (Composite Index values) in the first test and then the variables are reversed:

$$Y_t = a_o + Sa_i Y_{t-i} + e_t \tag{4.4a}$$

$$Y_t = b_o + Sb_i Y_{t-i} + Sb_i{}^b{}_k X_{t-k} + e'_t \tag{4.4b}$$

Where et and e't are disturbance terms, i is counter relating to lagged values, and k refers to lagged values of X_t variables. As a rule of thumb applied in most causality studies, four lags of X_t are used in this study. The null hypothesis is that X does not cause Y based on Equation 4.6: the regression is tested with the F-statistic estimated as follows:

$$F = \frac{[(SSE1 - SSE2 / N)]}{[(SSE2 / T\text{-}M\text{-}N\text{-}1)]} \quad (4.5)$$

Where SSE1 and SSE2 are the sums of squared errors from the OLS regression respectively. T is the number of observations of Y_t and F is distributed with (N, T-M-N-1) degrees of freedom. M and N are the maximum number of lags in the Y and X variables respectively. The first direction of causality is whether trading volume causes price changes and the second direction is whether price changes cause trading volume.

4. Findings

The results from these tests are discussed in this section. The more general results are examined first so that the refined test results can shed increasing clarity on the effect that the observed price-to-volume relationship is in fact the result of information effect rather than a causal effect.

Test 1A: Absolute Price Change and Trading Volume

Table 4.1 is a summary of test results of regression runs using absolute price changes and volume. These show that absolute price changes and trading volume are significantly and positively correlated at the 0.05 and 0.01 significance levels over five out of six years tested. The correlation coefficient ranges from 0.064 to 0.256. The average correlation coefficient is 0.178. These findings suggest trading volume does affect price changes

Test 1B: Absolute Price Change and Trading Volume

Table 4.2 is a summary of results on whether the level of trading activity affects the price-to-volume relationship. For days with high trading activities, the average magnitude of percentage changes in price is 41.02 per cent.

The corresponding percentage changes for medium and low trading activities are 33.7 and 17.76 per cent. These results are consistent with the findings that volume is correlated with price changes. Further, the more the intensity of trading volume (per unit of outstanding shares) the higher is the strength of the correlation of volume on prices. The magnitude of percentage price changes represents risk of investment for the investors in the sense that the higher the trading activity the greater is the variance of prices, and hence the greater is the risk exposure of investors.

Thus, these findings are consistent with the premise that risk is higher on days with higher trading volume than on days with lower volume since stock prices are more volatile on days with higher trading activities. The percentage price change for the high volume category averages 23.26 per cent, and is higher than the price changes during low volume days. However, the analysis is not totally satisfactory as the classification into low, medium or high volume is arbitrary based on simple classification.

Table 4.1 Price-Change-to-Volume Relationship in Malaysia, 1985-1992

Year	Correlation Coefficient	Calculated F-Ratio	Significance at .05 (3.84)	at .01 (6.63)
One	0.256	15.06	S	S
Two	0.240	15.05	S	S
Three	0.092	2.11	NS	NS
Four	0.193	9.40	S	S
Five	0.163	6.57	S	NS
Six	0.174	7.52	S	S
Seven	0.243	15.53	S	S
Eight	0.064	1.01	NS	NS
All Years	0.178	-	-	-

S and NS indicate significant and not significant respectively.
(.) indicates critical values for the probability level.

Table 4.2 Trading Intensity and Price-to-Volume Relationship in Malaysia

Year	High Vol.	Medium Vol.	Low Vol.
One	0.3420	0.2248	-0.0259
Two	0.3772	0.2266	0.0038
Three	0.4818	0.4702	0.4105
Four	0.3408	0.2442	0.1017
Five	0.2596	0.2359	0.1602
Six	0.6417	04748	0.2975
Seven	0.4591	0.4420	0.1864
Eight	0.3788	0.3746	0.2859
All Years	0.4101	0.3366	0.1775

Tests 2A & 2B: Absolute Price Change and Trading Volume

The relation between risk involved and volume transacted is investigated further and these results may help to reinforce these findings. Table 4.3 contains a summary of results on correlation coefficients of price changes *per se* (not absolute price changes) and volume. The variables are significantly and positively related: the average yearly correlation coefficient is 0.151.

However, there is no clear relationship between price change *per se* during different levels of trading intensity; see Table 4.4. The average value for price changes during days with high volume is 0.124 per cent. The equivalent figures for medium and low volume are -0.195 and -0.0562 per cent. The prices fall when transaction volume is medium or low whereas high volume seems to accompany price changes upward.

Prior evidence suggests that, although there is a positive correlation between price and volume, it is generally a weak relationship. This is examined again and the results are reported in Table 4.5.

Table 4.3 Price Changes *Per Se* and Trading Volume in Malaysia

Year	Correlation Coefficient	Calculated F-Ratio	Significance at .05 (3.84)	Significance at .01 (6.63)
One	0.183	7.40	S	S
Two	0.230	13.70	S	S
Three	0.077	1.48	NS	NS
Four	0.100	2.47	S	S
Five	0.047	0.53	S	NS
Six	0.187	8.78	S	S
Seven	0.304	25.07	S	S
Eight	0.081	1.62	NS	NS
All Years:	0.151	-	-	-
Range:	.047-.304	-	-	-

S and NS indicate significant and not significant respectively.
( ) indicates critical values for the probability level.

Table 4.4 Trading Intensity and Price-to-Volume Relationship in Malaysia

Year	High Vol.	Medium Vol.	Low Vol.
One	0.0004357	-0.0011440	-0.0007786
Two	0.0027643	-0.0008770	-0.0015030
Three	0.0008233	-0.0003083	-0.0003374
Four	0.0007868	0.0008865	-0.0000136
Five	0.0012246	0.0009588	0.0002321
Six	0.0009452	-0.0008133	-0.0007094
Seven	0.0018570	-0.0003661	-0.0009933
Eight	0.0010465	0.0001060	-0.0003904
All Years	0.0012354	-0.0001947	-0.0005617

Table 4.5 Absolute and *Per Se* Price Changes in Malaysia

Year	Absolute Corr. Coeff.	Corr. Coeff. (Pdr Se)	Acceptance ABS or PER SE
One	0.256	0.183	ABS
Two	0.240	0.230	ABS
Three	0.092	0.077	ABS
Four	0.193	0.100	ABS
Five	0.163	0.047	ABS
Six	0.174	0.187	PER SE
Seven	0.243	0.304	PER SE
Eight	0.064	0.081	PER SE
All Years	0.178	0.151	ABS

A theoretical explanation for the above positive relationship between prices and volume is that there is an asymmetry in the relationship. The results are in opposite directions when prices are up and down respectively. Note that if the relationship were symmetrical there should be no correlation between price and volume. This is further investigated in the next section.

Test 3: Absolute Price Change and Trading Volume

A number of test models is constructed following the work of Epps and Epps (1976) to investigate how the trading volume and price change relationship is steeper for positive returns than for non-positive returns. The findings suggest that days with general price increases had larger transaction volume than days with equivalent price decreases. This model relies on a behavioural distinction between two types of investors during bullish and bearish conditions. There is evidence supported by findings in Karpoff's study that the asymmetry is due not to behavioural distinction, but to the institutional rules which raise the costs of selling short at different times. It was observed in some futures markets that the relationship between price changes and volume is not significant since no asymmetry can be found in futures markets. In such markets, the costs of going long and short are the same, and hence no asymmetry can be observed.

Short selling is illegal in Malaysia (though since September 1995 limited short sales are permitted in trades relating to futures and spot), thus short-selling costs can be regarded as being higher than in normal transactions. Therefore an asymmetric relationship between price changes and volume is predicted on the Malaysian share market. The findings reported in Table 4.6 show the presence of asymmetry in the price changes and trading volume. This satisfies the alternative hypotheses of positive and negative relations as described in an earlier section. It is, however, difficult to determine whether such asymmetry is caused by investment behaviour or is due to institutional rules.

Table 4.6 Asymmetry in Price Changes and Trading Volume in Malaysia

Year	+	-	Accept H_0 or H_1
One	3.695.63	-758.71	H1
Two	21133.39	-548.19	H1
Three	1638.32	-475.21	H1
Four	2666.55	-475.21	H1
Five	3244.82	-1218.70	H1
Six	5243.98	-951.41	H1
Seven	7882.87	-1536.46	H1
Eight	3056.63	2039.16	H1

Test 4: A Theoretical Model on Price-to-Volume Relation

If inter-transaction price changes are approximately independent, then return variance should be a linear function of the number of transactions (Osborne 1962). This is an alternative theory to the one based on Karpoff (1987). If traded volume is a proxy for the number of transactions, then variance of returns on the index should be a linear function of volume. Hence, test 4 is meant to examine if the predicted relation occurs as hypothesised in theory.

The results in Table 4.7 suggest a concave relationship between variance of returns and volume traded. This would suggest that risk does depend on trading volume, consistent with the findings in Tauchen and Pitts (1983).

Table 4.7 Variance of Returns and Volume Relationship in Malaysia

Year	*	Relationship
One	< 0.5	Concave
Two	< 0.5	Concave
Three	< 0.5	Concave
Four	< 0.5	Concave
Five	< 0.5	Concave
Six	< 0.5	Concave
Seven	< 0.5	Concave
Eight	< 0.5	Concave

Key: 0.5 linear relationship; <0.5 concave relationship;
>0.5 convex relationship; and 0 constant relationship.

Tests 5 and 6: Causality and Price-to-Volume Relationship

Evidence also reported by Karpoff would have us believe that the relationship between price changes and trading volume is almost contemporaneous since most leading and lagging relations are found to be statistically insignificant. Causality tests can therefore be applied to the local market data to determine whether trading volume causes price changes or price changes cause trading volume to change. It has been assumed up to this point that trading volume changes prices, a critically important unproven basis of technical analysts.

If there is a significant causal direction from trading volume, then past volume data can be used to devise profitable investment strategies. If economically viable strategies exist under these conditions, it would suggest a lack of weak-form efficiency. Contrary to the belief of technical analysts, and in a weak-form efficient market, the value of past information including trading volume should be fully reflected in current prices, and hence would not be of any use to predict future prices. Thus, the causality test is a strong test on the foundation of technical analysis.

The findings reported in Table 4.8 show that there is no causality between trading volume and price changes as the lagged values are not correlated at all in the regressions though different lag lengths were used. However, these results must be qualified, because even when there is significant causality, it just means that a linear model can be relied upon to predict future price changes using past volume data. When no significant causality is observed, this implies that a linear relationship cannot be used to predict future price changes.

However, it does not preclude the possibility of a non-linear relationship between volume and price changes. In fact, the market belief that the lagged relationship between trading volume and price changes is interactive in the sense that large transaction volume coupled with an increasing trend in prices would lead to the market gathering momentum and the price may continue to increase further.

Table 4.9 provides some evidence of this effect. However, the economic viability of such a relation for designing profitable investment strategies has not been ascertained yet in the local market. The earlier findings of no causality between volume and price changes would have us believe that at best this interaction is weak, and hence no profitable strategies can be devised.

Table 4.8 Causality and Price-to-Volume Relation in Malaysia

Dependent Variable	Lags	Calculated F-Ratio	Significance at .05 (2.37)	Significance at .01 (3.32)
CI	1	0.0600	NS	NS
CI	2	0.0059	NS	NS
CI	3	0.0298	NS	NS
CI	4	0.0238	NS	NS

NS indicates not significant.
(.) indicates critical t-values for probability level.

Table 4.9 Causality and Price-to-Volume Relationship in Malaysia

Year			Acceptance H_0 or H_1
One	0.0087679	-0.5942	H1
Two	0.0040950	0.4552	H1
Three	0.0019589	0.9552	H1
Four	-0.0004767	-0.1726	H1
Five	0.0059158	-1.3397	H1
Six	0.0027263	0.3955	H1
Seven	0.0022803	-0.8732	H1
Eight	0.0014456	-0.8732	H1

The second direction of causality is whether price changes cause trading volume. Findings reported in Table 4.10 suggest that this relationship is significant at the 0.05 level using 3 lags while, at the 0.01 level, only 2 lags are significant. Therefore, the alternative hypothesis that price changes drive trading volume cannot be completely rejected.

5. Price-to-Volume Relationship and Investment Implications

There is evidence in Richardson and Thomson (1986) of a positive relationship between price changes *per se* and trading volume, though researchers have not reached a consensus on any theoretical explanation for this documented phenomenon. This study provides some evidence on this topic purely from the point of view of investigating the

Table 4.10 Causality and Price-to-Volume Relationship: Direction

Dependent Variable	Lags	Calculated F-Ratio	Significance at .05 (2.37)	at .01 (3.32)
V	1	13.300	S	S
V	2	7.690	S	S
V	3	2.807	S	NS
V	4	1.904	NS	NS

implications for market efficiency should price-changes-to-volume relationship be found to be true in the Malaysian Main Board stocks. Absolute price changes are found to have a strong relationship with trading volume compared to price change *per se* (0.178 against 0.151). Days with high volume are found to be associated with greater price changes compared to days with low volume.

Flow of information is a possible reason for these simultaneous large volume and large price change (both positive or negative) effect. Investors should be wary that risk is higher on days with high volumes. For this market, transaction volume on price up-turns is on average larger than the transaction volume on price down-turns. This asymmetry is suspected to be the reason behind the positive correlation between price changes *per se* and trading volume. Further, volatility increases on high volume days, and hence high volume serves as a signal for increased riskiness of the market during such periods. Prohibition of costly short sales restricts some investors from acting on their information when the effect is to decrease their demand.

Variance of returns for the KLSE CI changes trading volume is non-linear. For the period of study, the findings show a concave relationship indicating high returns on high volume. This shows that risk does depend on trading volume and confirms our earlier findings that risk on days with high volume is higher than in other cases. This could be attributed to the highly speculative mode of trading in most Asia Pacific markets (Ajayi and Mehdian 1994), a hallmark of most emerging share markets.

The causality tests indicate that there is a possible two-way direction in causality relationship between price changes and trading volume. The tests indicate that price changes are weakly causing volume to change, but volume does not cause price changes, a claim contrary to the claims of the technical school of investing. Technicians suggest that volume is the confirmatory signal for trading, and therefore it causes prices to change. The interaction test implies that large transaction volume coupled with an increasing trend in price will add momentum and may result in further increases in price.

Taken together, all the evidence presented here however does not suggest that the share market is not weak-form efficient thereby providing an opportunity to investors to devise strategies to devise profitable trading rules. In fact the relation is weak, and is probably not economically viable whatever the strategies. Thus, these results are consistent with other evidence (Anwar, Ariff and Shamsher, 1991) that the share market is weak-form efficient and the value of past information including price and volume data is already fully reflected in the present price.

These preliminary findings on the Malaysian market on price-to-volume relationship are in some respect consistent with the findings in developed markets. This implies that investors and the regulating agencies should not be unduly alarmed at occasional temporary price-volume irregularities. *The market is fairly efficient*, and is capable of weeding out irregularities over time. More importantly, these *findings are not consistent with the basic tenet of technical* analysis, which claims that past price and volume data can be used to design profitable investment strategies. Market organisers and regulators should be wary of such claims that are bandied widely by both foreign and local proponents, which, given the above evidence, work against public interest and professionalism in investment practices in Malaysia. There is a need to counter the claims of this school of thought, and promote investment analysis based on fundamentals. In some respect this is being done since 1995 with the active promotion of investment analysis by the Research Institute for Investment Analysts Malaysia (RIIAM).

CHAPTER

5

A Test of Relative Strength Theory*

Abstract

Proponents of technical analysis claim that profitable investment portfolios of stocks can be formed by selecting stocks by using *past patterns of share price behaviour*. However, the more established weak-form Efficient Market Hypothesis refutes this claim. The viability of one technical analysis trading rule, namely the Relative Strength Theory, is tested in the Malaysian share market to judge the claim of technicians. The results are consistent with the Efficient Market Hypothesis, and not the technical analysis.

1. Introduction

The Relative Strength rule is one of several technical trading rules for investment strategy widely advocated by technicians as a means to profitable investment strategy in selecting securities. Mainstream theory states that investors need to make informed judgements about future performance of shares in order to select securities to be grouped into portfolios. It is argued by technicians (also known as Chartists) that if the strategy for selection of securities is based on sound trading rules, information about past performance can be used to predict future prices. This is the basic premise of the Relative Strength Theory (RST). It is based on the belief that performance of a stock tends to persist over time. Thus, those stocks which have performed better than the market in the past are expected to perform better in the future as well. Conversely, a poorly performing stock relative to the market would continue to under-perform in the future relative to the market. This claim is widely advocated by technical analysts as a method of devising a profitable investment rule.

An alternative investment strategy is based on the premise that stocks which have done poorly against the market in a period are likely to perform better than the market in a future period. This is an entirely opposite claim to the one stated previously. Therefore, relatively poorly-performing stocks should be bought and held. Such a view is the premise of the Contrary Opinion Theory (COT). The contrarians assume that the market over-reacts to events. For example, adverse news pulls the stock price very much below its true value and positive news pushes the stock price well above its fair value (and this may be true if there is systematic over-reaction (Ajayi and Mehdian 1994). Once the investors digest the news and trade on the over-reaction, fair value (i.e.

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equilibrium price) of the stock will be approached as the prices adjust towards fair values over time. Prices recovering to fair values are described by the technicians as consolidation or technical correction of prices.

A more well-accepted mainstream school of thought refutes the above ideas as being incorrect. It is argued that current prices formed in a competitive and well-regulated market place reflect all known relevant information and, at any time, the market clearing price is an unbiased estimate of the stock's equilibrium value. This is the Efficient Market Theory (EMT). This would have an investor believe that any future prices will be based upon new information or new interpretation of the existing information in the light of more recent developments. Over-reactions are ruled out, and price changes are due to new information. These changes are equally likely to be in either direction, positive or negative. Therefore, it is not possible to make consistent predictions about how future prices will evolve based on past price patterns. If RST or COT is true, then it would be possible to predict future prices based upon past information to earn excess profits. This means that the stock prices on the Kuala Lumpur Stock Exchange (KLSE) will not be weak-form efficient if the evidence in this chapter supports the RST.

Test results on this theory are presented in this chapter. A brief review of literature and test methodology is given in section 2. Findings are reported in section 3. RST is not supported by these test results, thus strengthening evidence in favour of a weak-form efficient Malaysian share market.

2. Relative Strength Theory and Test Methodology

Evidence for Theory

There is no published evidence on the validity of RST on the Malaysian stocks. Some evidence on weak-form efficiency of this market exists, and these will be referred to shortly. However, this brief review accesses studies from other markets.

Levy (1967) provides evidence supporting RST from a study of New York Stock Exchange (NYSE) stocks. Securities which performed better than the market over past periods (therefore exhibiting relative strength) were formed into portfolios. These portfolios out-performed those chosen by a random selection. The out-performance of stocks was claimed as supporting the RST though the behaviour of the prices was remarkably not too far from those predicted by the EMH. On the basis of the evidence gathered, the random walk or weak-form efficiency was refuted by Levy. Jensen and Bennington (1970) pointed out the existence of a subtle form of selection bias in the tests, which could have produced the biased results favouring RST.

Wong and Mak (1983) found that this theory is fairly accurate in describing the behaviour of Hong Kong stock prices. They concluded that the Hong Kong market is more efficient in the weak-form in the short-run but less efficient in the longer-run. However, Dawson and Wong (1981), found that there is no statistical relationship between Hong Kong stock performance in one year and the following year over the period 1972-1979, which weakens the above conclusion. Though the findings are not conclusive, there is some indication that RST does not apply to the Hong Kong stock market.

Hwang and Finn (1983) and later Chou and Wong (1990) tested the RST for the Singapore stock market by performing rank correlation analyses on 35 of the 250 stocks. Their findings are only weakly supportive of RST, but further tests supported the EMH. There was some degree of inefficiency over certain lengths of time intervals, which make the findings inconclusive.

Data and Methodology

Tests are conducted with data covering the period January 1988 until December 1988 using two (weekly and monthly) intervals. A total of 60 monthly and 260 weekly closing price data are used. The prices are adjusted for capitalisation and dividend changes. The weekly and monthly returns are generated for 16 actively traded (selection being based on ranking by the annual volume of trading divided by outstanding number of shares) and 24 inactively traded shares. The thirty stocks are from those listed on the Main Board. The market return is calculated using the Composite Index, which is not adjusted for dividend flows. Returns are calculated as rates of change in prices for the (a) individual stocks and (ii) market.

(5.1) $$R_t = \ln((P_t + D_t)/P_{t-1})$$

The actual return in a previous period (week or month depending upon the data set used) is compared with a current period. On the basis of the performance of each of the 30 stocks in the previous period relative to the market return, the stocks are grouped into out-performing and under-performing stocks. The average returns at each interval of time are noted for each stock; these numbers are then used for ranking the stocks from lowest to highest. The market returns for the corresponding period are also calculated. The 30 stocks are then ranked according to the size of the actual returns over the next period. This process is repeated for all remaining time periods. The relative strength of the sampled stocks is tested through the statistical significance of Spearman's rank correlation coefficient between average returns of out-performed (denoted as + in the table) and under-performed (- in the table).

The rank correlation test was also applied to returns of stocks over different time periods to ascertain the relative strength over different lengths of time to test if the behaviour in some periods conform to RST.

3. Findings

Relative Strength Test

Recall that the test results on RST are from weekly and monthly data. The actual performance in the forward period is compared with market return in the forward period while the + and - refer to the two portfolios respectively under-and out-performing the market in the prior period. In the case of the monthly data, we extended the tests for 2, 3,..., 12 month intervals as well. The findings in Table 5.1 show that out of 559 generated coefficients, 45 per cent are positive and 55 per cent are negative. That is, the distribution is almost binomial with about half out-performing and another half under-performing the market. This evidence is not supportive of the RST since the percentage of out-performing combinations should be significantly different from under-performing observations for RST to be true. Only when the market is weak-form efficient would the expected percentages of positive and negative correlation coefficients approximate binomial distribution.

Table 5.1 Test of Relative Strength Theory with Malaysian Stocks

Length of Period	Rank Correlation Coefficients			Significant at .05% Level			Range of Coefficients
	No.	+(%)	-(%)	No.	+(%)	-(%)	
1 Week	259	42.08	57.92	80	10.42	20.46	-0.81 to 0.6
1 Month	59	38.98	61.02	16	11.86	15.25	-0.58 to 0.4
2 Months	57	45.61	54.39	17	8.77	21.05	-0.71 to 0.47
3 Months	55	41.82	58.18	22	9.09	30.91	-0.81 to 0.56
6 Months	49	46.94	53.06	20	12.24	28.57	-0.65 to 0.57
9 Months	43	60.47	39.53	6	6.98	6.98	-0.63 to 0.5
12 Months	37	56.76	43.24	5	8.11	5.41	-0.51 to 0.43
Total	559	44.90	55.10	166	10.02	19.68	-

This evidence is strengthened further by a lower number of significant positive coefficients (10.02 per cent) compared with the negative coefficients (19.68 per cent) at 0.05 acceptance level. However, there is some weak evidence in support of the theory for the 12-month comparison period only. The percentage of significant positive coefficients is higher (8.11 per cent) compared to the lower negative coefficients (5.41 per cent) at the 0.05 acceptance level. Thus, the findings that there is no strong statistically significant relationship between ranks from one period to the next do not lend support to the widely-propagated claim in support of RST. However, the weak relationship between ranks of 12-month suggests that certain inefficiency does exist for some subsets, and its predictability and economic usefulness are questionable.

Active and Thinly-traded Stocks

Some writers (Fama 1970; Keane 1983) have suggested that the share prices may not reflect the true value if there is an inefficient flow of information. This problem is even more serious in developing or emerging markets with thin-trading problem, which would mean that no timely information is provided; thus the opportunity for information value to be incorporated in prices may be absent. Therefore, the data set was regrouped into active and inactive stocks based on their daily volume traded adjusted for outstanding shares. It is assumed that the actively traded stocks are more likely to be weak-form efficient, and the pricing behaviour of actively-traded stocks is expected to be anomalous to the prediction of RST. These tests are similarly done with both weekly and monthly data. The findings are summarised in Tables 5.2 and 5.3 respectively.

The findings reported in the tables are similar to those in Table 5.1, giving consistent results. There is no support for the RST. The number of negative correlation coefficients is much higher than for positive correlation coefficients especially for the 1-week, 1-month, 2-month and 3-month periods.

Table 5.2 Test of Relative Strength Theory with Actively-traded Malaysian Stocks

Length of Period	Rank Correlation Coefficients			Significant at .05% Level			Range of Coefficients
	No.	+(%)	-(%)	No.	+(%)	-(%)	
1 Week	259	38.61	61.39	34	1.16	11.97	-0.92 to 0.66
1 Month	59	45.76	54.24	6	1.69	8.47	-0.82 to 0.6
2 Months	57	45.61	54.39	1	0.00	1.75	-0.69 to 0.47
3 Months	55	43.64	56.36	7	5.45	7.27	-0.60 to 0.61
6 Months	49	32.65	67.35	1	0.00	2.04	-0.62 to 0.37
9 Months	43	55.81	44.19	0	0.00	0.00	-0.45 to 0.28
12 Months	37	35.14	64.86	1	2.70	0.00	-0.33 to 0.52
Total	559	41.14	58.86	47	1.43	6.98	–

Table 5.3 Test of Relative Strength Theory with Thinly-traded Malaysian Stocks

Length of Period	Rank Correlation Coefficients			Significant at .05% Level			Range of Coefficients
	No.	+(%)	-(%)	No.	+(%)	-(%)	
1 Week	259	39.38	60.62	34	4.25	8.88	-0.79 to 0.54
1 Month	59	33.90	66.10	7	3.39	8.47	-0.66 to 0.55
2 Months	57	31.58	68.42	14	5.26	19.30	-0.61 to 0.51
3 Months	55	23.64	76.36	11	1.82	18.18	-0.62 to 0.54
6 Months	49	36.73	63.27	6	2.04	10.20	-0.74 to 0.65
9 Months	43	44.19	55.81	3	4.65	2.33	-0.42 to 0.48
12 Month	37	55.05	45.95	0	0.00	0.00	-0.34 to 0.27
Totals	559	37.57	62.43	75	3.58	9.84	-

4. Relative Strength Theory is Rejected

The predictions of RST are tested by observing share price behaviour of 30 common stocks using data over weekly and different monthly intervals. The findings from tests of this hypothesis suggest that the Malaysian share price behaviour does not support this theory. In fact, the results are consistent with the prediction of a weak-form efficient market. Examination of active and inactive stocks also led to a similar conclusion. Thus picking *past* winners in Malaysian share markets relative to any length of time except 12-month intervals does not ensure abnormal future returns for investors as advocated by technical analysts' Relative Strength rule for stock selection.

Taken together with the findings in the previous chapter, it appears that there is strong evidence to refute the technical analysts' claim and accept, with some minor qualifications, that historical information is not useful for any investment strategy. The Malaysian share market and stocks traded therein are broadly weak-form efficient.

CHAPTER

6

Economic Viability of Technical Analysis for Stock Selection*

Abstract

This chapter analyses the economic viability of further commonly used technical tools by investors in the Malaysian securities markets. The findings suggest that use of none of the eight *technical tools would lead to consistent out-performance over the market in all the three testing periods* (boom, recession and the long-term). This would have us argue that these technical analytical rules are not sufficiently superior to consistently beat the market, though there may be other yet untested profitable rules. However, three of the eight rules consistently generated positive results in all the three test periods, but the returns generated are not enough to offset the transaction costs.

1. Introduction

Computer application of technical analysis of stock market information is no more the domain of the sophisticated investors and investment analysts of established brokerage firms. In the present technological sophistication found in the securities markets, a variety of computer software is available to investors at reasonable costs. Computer software such as Win-Stock, AIQ, Super-Charts, Metastocks and many others are available to help investors convert the available information into technical indicators or signals in a variety of forms (such as charts, graphs, bar charts, etc.) to allegedly guide them in making investment decisions; some software programs are carried in the Internet. There must be some economic rationale for investors to invest in these tools to help them make investment decisions, or is it just a vogue in the securities industry to use sophisticated measures to demonstrate analysts' supposed prudence?

The economic viability can only be justified if the tools do guide investors make profitable decisions that are better than those on a market portfolio proxied by the KLSE Composite Index. This chapter presents some evidence on the economic viability of some commonly used technical tools by investors in Malaysian securities markets. Section 2 describes popular approaches, which are operationalised for testing. The results are surprising in that there is no evidence to support the much-vaunted high returns for following the rules.

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* This is a reproduction of an article that appeared as 'Economic Viability of Technical Analysis' by Shamsher M., and Annuar M.N. and Ong B.T. in *Captial Market Review* Vol. 4(1) (1996). We thank the Editor for permission to reprint the article in this book. This article has been edited by M. Ariff to conform to the style and format adopted in this book.

2. Approaches to Stock Valuation

Generally, there are three approaches to share valuation, namely the fundamental, the technical and the efficient market approach: (any standard textbook, e.g. Fisher and Jordan 1990; Bodie, Marcus and Kane 1996). The fundamentalists believe that all stocks have an intrinsic value different from the market. At any moment of time, the market price of a stock can be above or below its intrinsic or equilibrium value and will eventually adjust to its intrinsic value (an argument consistent with the over-reaction hypothesis). The intrinsic value is determined using fundamental factors such as company earnings, dividends, cost of borrowing, management credibility and the performance of the economy.

The technical analysis approach in stock valuation suggests that the price of a stock can be predicted using past prices and volume data rather than economic factors (and if the market is weak-form inefficient). The technicians believe that the price of a stock is strictly dependent on the interaction between the buyers and sellers who use past price and volume information. The technical analysis assumes that investors continue to make the same mistakes they had made in the past, consistent with the adage that history repeats itself in the stock markets . There are many tools available for technical analysts to examine the price and volume trends, though some are more commonly used than others based on reasons of costs and ease of applicability.

Efficient market approach postulates that a competitive stock market is efficient in interpreting the available information regarding a particular stock such that the price of a stock at a given time is the true price (Fama 1970; 1991). Efficiency is categorised into *weak-form*, *semi-strong* form and *strong-form* based on the types of information relating to a security. The weak-form (historical price) suggests that all past information is fully reflected in current prices, implying that past information has no economic value for investors. The *semi-strong-form* based on public information postulates that only insiders can generate abnormal returns as publicly available information is readily impounded into the share prices at the time of announcement when the first person to possess the information trades. The *strong-form* based on private information indicates that the current market prices reflect all pertinent information, whether publicly available or not. Even insiders are not expected to earn abnormal returns in the stock market using their privileged information, except the first insider to trade on the inside information. In general, the efficiency hypothesis supporters believe that the current price of a share is determined by future expected events, and not current or past events.

Commonly Used Technical Tools

Technical analysts have an arsenal of tools to generate *indicators* to help them analyse the performance of stocks and allegedly make consistently profitable investment decisions. A brief survey of the stock market indicated that there are at least forty-five indicators available though only eight are commonly used due to their easy applicability and relative cost-effectiveness. These tools provide automatic buy or sell signals based on certain quantifiable parameters that are claimed to ensure maximum objectivity in the decision-making process. The commonly used tools which require substantial intuitive judgement like Andrews' Pitchfork, Bollinger Bands, Trend lines are not selected. The following commonly used tools were selected for evaluation.

(1) The Moving Average Convergence/Divergence (MACD): This indicator is calculated by subtracting a 26-day exponential moving average from a 12-day moving average. The basic trading rule is to sell when MACD falls below its 9-day trigger line and buy when MACD rises above the trigger line.

(2) Single Moving Average Crossing Method

(3) Two Moving Averages Crossing Method

(4) Three Moving Averages Crossing Method: The moving average method calculates the average value of a security's price (the indicator) over a period of time. There are simple, exponential and weighted moving averages differentiated by the weights assigned to the most recent data. The trading rule is to buy when stock price rises above its moving average and sell when the price falls below the moving average. This is also known as the single moving average crossing method. The two moving average crossing methods employ two moving averages, the short and the long-term. A buy signal is rendered when the short-term moving average crosses above the long-term moving average and a sell signal is indicated when the short-term moving average cross from above to below the long-term moving average. The three moving averages crossing method employs the short-term, medium-term and the long-term averages. A buy signal is indicated when the short-term average is higher than the medium-term and the latter is higher than the long-term moving average. Conversely, a sell signal is indicated when the short-term average is below the medium-term and the latter is below the long-term moving average.

(5) Parabolic Stop and Reverse (SAR): This indicator is used to set stop price when the stock has reversed direction. A buy signal is signalled when the closing price of the stock moves above the SAR and a sell signal is indicated when the closing price of the stock moves below SAR.

(6) Directional Movement System: This has five indicators, but the commonly used are the Plus Directional Indicator (+DI) and the Minus Directional Indicator (-DI). Usually a 14-day +DI and -DI are plotted one above the other. A buy signal is indicated when the +DI rises above the -DI and a sell signal when the +DI falls below the -DI. This trading rule is further substantiated by the 'extreme point value' or the price of the stock on the day the line crosses. For example, when a buy signal (+DI rises above -DI) is indicated, the investor should wait until the stock price rises above the extreme point (the high price on the day the +DI and -DI crossed) before buying.

(7) TRIX: It displays the percentage of a triple exponentially smoothed moving average of a stock's closing price. The TRIX indicator oscillates around a zero line. Its triple exponential smoothing is designed to filter out insignificant cycles (those are shorter than a predetermined x period). Trades are placed when the indicator changes direction, buying when the TRIX is above its trigger line (moving average line computed over a set number of days) and selling when it falls below its trigger.

(8) Stochastic Oscillator: It compares a stock's closing price relative to its trading range over the last x-time periods. It ranges from 0 per cent to 100 per cent, a reading of 0 shows that the stock's closing price was the lowest price at which the stock has

been traded during the preceding x-time periods. A value of 100 per cent shows the highest price that the stock has been traded at during the preceding x-time periods. For an interesting reading of the different techniques of this esoteric area, the reader is referred to Arnold (1993), Edwards and John (1992), Equis (1992), Fisher and Beck (1990), Gerald and Hitschler (1980) and Hagstrom (1994).

Viability Measurement of Selected Tools

The measure of the viability of the selected technical tools evaluated in this study is based on the following criteria in Tauchen and Pitts (1983). The rule should be able to establish its profitability net of costs over a period of time, that is the net profits should be greater than the profits from the benchmark portfolio (in this chapter KLSE Composite Index). It should be sufficiently simple to use. The losses resulting from the use of the tool should be sufficiently small so that even a string of losses does not seriously erode the capital base. Finally, decisions can be automatically initiated based on the clear signal indicated.

The performance of the selected tools is measured based on their application on a portfolio of eight blue-chip stock portfolios for eight different sectors. The performance of this portfolio is compared to that of the KLSE Composite Index during the same period. The analysis is performed over the bullish market that ran through the year 1993 (period 1), the bearish market in the year 1994 (period 2) and a lengthy time period from 1989 to 1994 (period 3).

The evaluation of the selected tools is performed using the Metastock computer software with the following assumptions: the beginning capital is RM1,000; every buy or sell transaction involves the whole amount of equity with a 1.25 per cent of transaction cost one-way, inclusive of commission and stamp duty; no interest is added to the equity during *out-of-market* situations; there are no minimum bids and lot size restrictions; since short-selling is illegal on the cash equity market, only long positions are analysed (short-selling became legal in September 1995); closing prices are used for all the tests, and all trades are terminated by selling at the end of the test period. Thirty trades were transacted for each tool over the three test periods, and the average profitability generated using the tools is compared with the average profitability of the KLSE Composite Index (indicated in the tables as KLSE-CI).

Based on these assumptions, the *System Tester* function of the *Metastock* generated the profit/loss of the selected tools and the benchmark portfolio. An example of profit/loss calculation based on the transactions generated by MACD method on the KLSE Composite Index over the first period is shown below:

The transaction on 26/2/93 was bought at RM638 and sold on 9/3/93 at RM631. The difference in price was RM7 (RM638-RM631). The number of shares purchased at the price of RM638 ((RM1000-RM12.35)/RM638) was 1,548. The shares were sold at RM631 for a total amount of RM976.82. Net of commissions (RM12.21) the sale generated a loss of RM35.39 (RM1000 - RM964.61).

3. Evaluation of the Tool

The results of the evaluation of the selected tools are described below:

(i) MACD

The trading rule is: buy/sell when MACD goes above or below its 9-day trigger line. The test results for the three test periods are summarised in Table 6.1 below.

Table 6.1 Results from the Use of Technical Tools and the Market

Tools	1993	1994	1989-1994
MACD	411.14	-170.72	-600.51
Single MA	455.68	-169.90	-850.84
Two MA	1015.69	82.66	728.06
Three MA	1146.38	47.52	971.50
Parabolic SAR	1098.39	-146.95	733.28
DX	1065.56	96.87	173.98
TRIX	659.67	323.38	2441.36
Stochastic Oscillator	572.50	17.32	1590.21
KLSE CI	968.08	-256.06	1091.61

In the bullish year 1993, although all tools generated profits, only four (Two MA, Three MA, Parabolic SAR and Directional Movement) beat the profitability of the market. The most profitable is the Three Moving Averages with an average profitability of RM 1146.38, that is 18 per cent higher than the KLSE-CI. The MACD recorded the worst performance with profits of RM 411.14, that is 57 per cent lower than the KLSE-CI.

In the bearish period 2, three tools (MACD, Single MA and Parabolic SAR) and the KLSE-CI recorded losses. The MACD generated the most losses among the tools and in general all tools fared better than the KLSE-CI. The most profitable tool was TRIX with profits of RM323.28.

For the long-term period 3, only two tools (MACD and Single MA) recorded losses, with the latter being the worst performer. Among the tools that generated profits, TRIX performed best with 120 per cent higher profits than KLSE-CI. The market performed better than four of the profitable tools (Two MA, Three MA, Parabolic SAR and DX).

Overall, in the bullish period, all tools generated profits. In the bearish market and the long-term period MACD and Single MA consistently recorded losses whereas Two MA, Three MA, DX, TRIX, and Stochastic Oscillator consistently recorded profits, with TRIX consistently recording higher profits. None of the eight technical tools consistently outperformed the KLSE-CI over all the three testing periods. This suggests that no single tool of the technical analyst is sufficiently superior to consistently beat the market.

4. Conclusions

The findings suggest that investment decisions should not solely be based on signals from technical tools, but should also consider the usefulness of information generated by fundamental factors affecting the decisions. Investors should not be dulled by the apparent sophistication of these computer-based tools but rather seriously consider the viability of the tools in terms of their ability to generate profitable investment decisions. Though technical tools are useful as a supplementary device to help investors make investment decisions based on some concrete facts and figures, these still lack the human intelligence and psychology that can intuitively combine a large number of facts in a logical sequence that cannot be captured in the mathematical equations of the tools.

Further, current prices in a competitive securities market must absorb the value of known information, and theory (as will be seen in later chapters in this book) suggests that current prices are estimates by a large number of investors of possible future cash flows of the firms issuing the securities. These future cash flows are determined by the unfolding of real world events though the investors make expected guesses of what these are likely to be at the time of pricing the securities. Therefore, technical analysis is founded on a unreal approach, and perhaps fits the need for certainty when speculative and not investment positions are taken. Only strategies still unincorporated into prices can help to out-perform the market. Those who possess such strategies do not have incentives to reveal them to the general public. If they do, they do so after they have exploited the potential of using these strategies. (A recent study - M. Ariff and Steven Dawson "Investes Returns from Secondary Distribution of Brokers's recommendations by the Press in Singapore," a mimeo at Monash University - showed that following brokers's recommendations does not lead to abnormal returns after transaction costs.)

CHAPTER

7

Is Kuala Lumpur's Emerging Share Market Efficient?*

Abstract

This study develops a *relevant methodology to test market efficiency hypotheses* across both thinly- and thickly-traded *individual shares* in an emerging share market. It reveals new findings across the whole market, which suggest that the Malaysian share market is moderately efficient with some inefficient pricing at the margin for 13 per cent of thinly-traded shares. Further, the price formation of thinly-traded shares is found to be at a premium.

1. Introduction and Objectives[1]

The idea of an efficient market describes time series independence of price formation in a competitive market where prices react rapidly to randomly arriving information (Fama 1991). This basic idea can be applied to emerging markets to describe how information relating to shares in thinly-traded emerging markets is captured with a time delay at the time of arrival of information when shares actually trade. Traditional tests of efficiency indicate that any competitive capital market is broadly efficient though reports of significant (but unexploitable) systematic anomalies in several markets continue as challenges to the more established capital market efficiency paradigm. This chapter presents a critical review of selected studies along with fresh evidence on the issue by controlling for the effects of infrequently-traded shares on the reliability of test results.

The next section provides a brief discussion of the institutional arrangement for share trading in this emerging market. A review of selected studies on KLSE's efficiency is given in Section 3. Careful evaluation of the evidence indicates that this emerging market is broadly efficient except in cases of thinly-traded shares. The methodology adopted to control the effects of infrequent trading is useful for application in the other 56 (1995 figures) emerging markets. The chapter ends with an exposition of the implications of the findings for researchers and policy-makers in the developing KLSE capital market.

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Institutional Arrangements

Share buying and selling had existed on a quasi-informal basis at an exchange in Singapore at the end of the nineteenth century. It was formalised and regularised in a self-regulating exchange formed in 1960 for trading local shares, mostly from the then Federation of Malaya (now Malaysia) and the Colony of Singapore. The Kuala Lumpur stock exchange was then very small as the shares listed were those of tin, mining, plantation, shipping and trading firms, which formed the economic basis of the same shares under a double-listing arrangement using two currencies with a common value untill May 1973. With the cessation of currency convertibility, the Kuala Lumpur Stock Exchange (KLSE) traded its shares in Malaysian ringgit from June 1993 and in January 1990, pulled all Malaysian companies out of the Singapore exchange. At the start of 1994, the market consisted of 360 shares listed on the Main Board and 72 on the Second Board with a combined capitalisation of US$190 billion, which puts the KLSE as a very large emerging market next to those of Korea and Taiwan but ahead of India. At US$590 million value traded, on average, per day, this market is very liquid today relative to any time in this market's history or in relation to any emerging market.[2]

The exchange is organised as a limited partnership with sufficient self-regulatory powers though in March 1993 a Securities Commission was established to enforce discipline, and to regulate the securities industry. Based on screen trades, the market is driven by dealers, who work as commission-sharing agents for some 55 broker firms licenced to trade on the boards. The dealer are called remisiers, and they assist brokers in bringing in and servicing investors. There are no market makers nor specialists, which combines to make the KLSE highly volatile. Market volatility is about 34 per cent per annum relative to the NYSE's 14 per cent. With about 20 per cent of shares held by institutions while individuals are the major holders and traders of securities.

A special feature of the market is the presence of a number of investment firms which since 1976 have received a proportion of all new shares on behalf of certain segments of the population under a national policy of increasing the equity holding of these segments. These firms and the pension funds hold a substantial 35 per cent of all shares, which add liquidity to the market. Over the years from 1989, the capital market has been increasingly deregulated with fewer remaining controls still in place, especially for brokerage licences (30 per cent local ownership) and investment banking activities. Overall, the KLSE is increasingly exhibiting trading, regulatory, and other characteristics of a more developed rather than an emerging market.

2. Kuala Lumpur Equity Market and Market Efficiency

Efficient Market Hypothesis

Prices in efficient markets provide accurate signals for the scarce capital resource allocation and this is critical for emerging markets in developing countries since these economies are short of capital for their growth needs. The literature on capital market efficiency has grown substantially and the cumulative evidence from developed (Fama 1991) and developing (Annuar *et al.* 1991; Ariff and Finn 1989; Barnes 1986; Hong 1978; Neoh 1989) share markets supports the general validity of EMH argument. Documentation of stock market anomalies such as calendar effects (Chen 1986; Gibbon and Hess 1987), and widely-known price to earnings anomaly, etc. have challenged the market efficiency idea (Summers 1986). But the persistent presence of anomalies may not in itself be a sufficient condition to reject EMH if the anomalies are not exploitable and are due to frictions (Keane 1989). Also, in the light of recent theories on time-varying risk premiums, the assumption of time-*un*varying market return assumption in all efficiency tests is not valid nor is it practical, especially for volatile emerging markets.

The validity of efficiency idea tends to be less pronounced for developing and emerging share markets. The developed markets are characterised by active trading, large turnover, large number of utility maximising investors, less entry barriers, active analysis, and timely disclosures and dissemination of more accurate information. Developing markets are characterised by low liquidity, investors trading on less accurate information, inadequate disclosures and non-trivial barriers to entry (Ang and Pohlman 1978; Ariff and Finn 1989; Barnes 1986). A priori, one would therefore expect emerging stock markets to be efficient to a lesser degree than developed stock markets.

Recent evidence suggests that intensity of market activities such as lack of analysis (Arbel and Strebel 1983), size (Hong 1978), number of traders (Verrechia 1979), etc. influence efficiency. Therefore, infrequency of trading resulting from lack of intensity separates active from inactive markets. But none of the studies in both developing and emerging markets has attempted to control the effect of thinness on efficiency tests since it is difficult for new information to be translated rapidly as price signals in such markets; this creates a delayed immediacy cost. Thinness of trading predisposes efficiency propositions to be erroneously rejected (Lo and McKinlay 1989).

Present Evidence on KLSE's Efficiency

Evidence on weak-form efficiency of KLSE - there are eight studies - and the findings are mixed. For instance, two studies reported opposite conclusions; Barnes (1986) found KLSE efficient while Neoh (1986) reported otherwise. The latter used an index while the former used a small sample of 30 stocks included in a blue-chip index, equivalent to Dow Jones Industrial Average, issued by the *New Strait Times* newspaper. The market capitalisation of the firms in that index is 8 per cent, which does not enhance external validity results of Barnes (1986). There are only two studies on semi-strong efficiency (Dawson 1981, Neoh 1986). Both studies found the market not semi-strong efficient. These studies also assumed a risk level of one - rather than computing the thinness-adjusted systematic risk - for all stocks, used small samples, and failed to check the event dates accurately. Thus the results are also subject to some error. None of the studies controlled the effects of market thinness on test results, which could lead to an erroneous rejection of efficiency hypothesis (Lo and McKinlay 1989). Further, the strong-form efficiency of this market has not been tested.

The non-synchronous trading effect[3] on market index and the beta adjustment are two key factors that will affect the robustness of reported results (Ariff and Lim 1989; Scholes and William 1977). Also, the study period needs to be lengthy and the sample has to be large to provide external validity to the findings. The most definitive study (Barnes 1986) has little external validity, addressed only the weak-form efficiency, and did not control the effects of thin trading as it excluded almost 90 per cent of listed firms including thinly traded shares. Because capitalisation of emerging markets is known to have increased at rates three to four times those of major markets in the 1980s, and the test model should incorporate a trend factor to avoid biased results from missing variable problem on the residuals. None of the studies to-date has considered these serious methodological issues, and hence there is a need to re-examine KLSE's efficiency question.

3. Test Procedures and Results

Data, Variables and Test Procedures

Data for this study came from the Securities Clearing Automated Network (SCAN) daily price records of the KLSE and the annual *Companies Handbook* published by KLSE over the test period. Price relatives were computed from monthly capitalisation- and dividend-adjusted closing prices of all stocks traded at anytime over the test period, January 1975 to December 1989. An equally-weighted share price index was constructed using the adjusted prices to provide an adjusted market index. Publicly available indices do not adjust for dividend streams, and are value-weighted in most cases. Companies de-listed or suspended or listed after 1985 were eliminated. This resulted in a data set of 280 companies with monthly price relatives and an equally-weighted market index. The *Investors Digest* (a KLSE publication) provided the monthly transaction volume figures while the annual *Companies Handbook* furnished financial information on earnings and dividends, earnings announcement dates and the number of shares outstanding.

In order to control the effects of thinness on test results, portfolios with similar thinness were formed. Starting from the year 1975, the stocks in each year were ranked in ascending order according to the trading volume divided by the outstanding shares of each stock in that year. The stocks thus ranked were then pooled into deciles, resulting in ten portfolios, each of which had similar thinness, but the degree of thinness differed across the portfolio deciles. This procedure controls the effect of thinness to within each portfolio while thinness varies across portfolios.

The tests for efficiency using unit root procedures were conducted across each portfolio with similar thinness. Hence, the test results would reveal how the thinness affected intertemporal stock price changes and price reactions to information arrival across the deciles. Instead of the traditional correlation tests (runs and serial correlation tests, Q-statistics, etc.), unit root tests were conducted to evaluate weak-form efficiency; unit root tests are appropriate for computing robust results (Said and Dickey 1984). For semi-strong efficiency, the well-accepted event study methodology, using Sharpe's Market Model as the price-generating model and changes in earnings as the information set, was applied. Since beta measures are biased in a thin market (Annuar *et al.* 1991; Ariff and Finn 1989; Scholes and William 1977), non-synchronous-corrected parameters were estimated with two lags and two leads incorporated into the Market Model. The ten deciles of thinness were regrouped into two portfolios of thinly-traded and "thickly"-traded stocks as there were insufficient observations on earning changes to justify using more than two groups. The information set used for strong-form efficiency consists of 128 stocks-of-the-month recommended by informed analysts. This can constitute a weak test of the strong-form efficiency. Event-study methodology was also used for this test.

4. Results

Predictability or Weak-form Efficiency

The findings from the unit-root tests are reported in Table 7.1.

Table 7.1 Unit Root Regression on 82 Stocks on the Kuala Lumpur Stock Exchange, 1975-1989 (Unit Root Model: $P_t = a + b\,(P_{t-1}) + c\,(t\text{-}1\text{-}(T/2)) + e_t$; P=price)

Degree of Thinness	Frequency Deciles	No. of Stocks	Average value of "b" Coefficient	Significant* % unit root
Most	1	12	0.750	75
infrequently	2	5	0.840	80
traded	3	8	0.835	75
	4	8	0.954	100
Moderately	5	7	0.954	86
traded	6	6	0.910	100
	7	3	0.963	100
Most	8	8	0.940	88
frequently	9	10	0.910	70
traded	10	15	0.953	93

* Refers to percentage (%) of total shares that possess unit root at 0.01 confidence level. The Dickey -Fuller critical values are 3.14 for 2-tail test (.10 level) and 3.43 for 1-tail Test (.05 level). Intercept, "a", and coefficient, "c", are not reported in the table.

The unit root coefficients for the moderately and frequently-traded portfolios of stocks are relatively larger and closer to unity than the coefficients for the thinly-traded stocks. The coefficient for decile 7 is 0.963 whereas the coefficient for decile 10 is 0.953. For stocks in each decile, the percentage acceptance rate of the null hypothesis of unit roots was calculated; this number is shown in the last column. The average acceptance of null hypotheses that the individual stocks in all deciles possess unit roots is 87 per cent, which implies that 13 per cent of the stocks in the ten deciles did not possess unit roots. This suggests that the idea of weak-form efficiency is valid for all the stocks (both thin and non-thin stocks) but there is a 13 per cent chance that a price may be contrary to weak-form efficiency. This supports the idea that the KLSE is generally efficient with a 13 per cent chance that some securities are inefficiently priced.

Results: Informational or Semi-strong Form Efficiency

The results of semi-strong tests are presented in Figure 1 for earnings per share (EPS) information, and Figure 2 for dividend per share (DPS) information: increases are shown as "up" and decreases as "down" in the graph.

For both the actively and non-actively traded stocks, the market anticipates changes in annual earnings and dividends well.

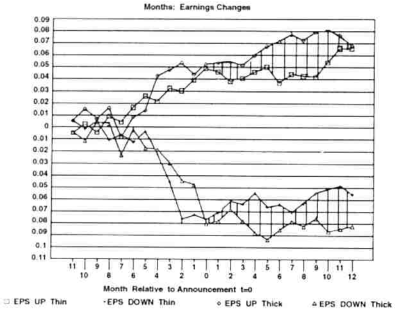

Figure 1: CAR Relative to Announcement: Earnings Changes

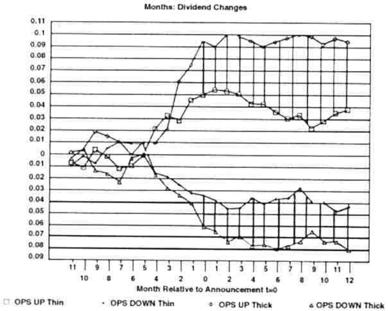

Figure 2: CAR Relative to Announcement: Dividend Changes

before the official announcement dates. The information content of these announcements may have been anticipated by investors as is also the case in developed markets, through more timely sources such as preliminary reports, interim reports and statements by corporate officials. This is consistent with lack of strong-form efficiency. In both graphs, abnormal returns of thickly-traded shares are always greater than those of the thinly-traded shares: see shaded area. The lower returns are probably the cost of delayed immediacy or perhaps the cost associated with greater degree of price uncertainty associated with likely delays in trading a given set of infrequently traded shares.

It is also evident that after public announcements are made abnormal returns are not found to be significantly different from zero: the coefficients are insignificant at 0.05 confidence level. Post-announcement drift in prices is more pronounced (see for example the "DPS UP THIN" plot) in the cases of thinly-traded shares. After the announcement date, t=0, prices appear to adjust rapidly. This systematic behaviour of cumulative abnormal returns (CAR) in the cases of the thickly-traded shares suggests semi-strong or informationally efficient market (see the uppermost graph in the figures). Therefore, the results in this section obtained by controlling for (a) thinness and (b) non-synchronous effects on regression parameters are unsurprisingly quite different from those reported in earlier studies. As pointed out earlier, these reported inefficient pricing. Similar findings using somewhat similar procedures have been reported for the Stock Exchange of Singapore (Ariff and Finn 1989).

Results: Private Information or Strong-form Efficiency

It is not possible to test strong-form efficiency on KLSE as insider trading is not legal. But the nearest proxy for such a test, though indirect, is to use information available on professional stock selection, which is believed to be based on price sensitive non-public information from brokerage firms, unit trusts, pension funds specialists and directors who reveal the private information to clients. Using this source, some results on strong-form efficiency are reported.[4]

The findings are summarised in Table 7.2. There are significant risk-adjusted abnormal returns in the post-recommendation period; an example is the 1.32 per cent return at time t=5. The risk-adjusted excess returns 23 months around the event date suggest that investors may generate above-average returns of about 1 per cent net of round-trip transaction costs estimated at 2.7 per cent. An investor acting on the recommendation at event date t=0 and holding the stock for 9 months can generate an average net return of 1.24 per cent (5.84 per cent on t=9 less 1.60 at t=0 less 2.7 per cent). This finding suggests that the KLSE is not strong-form efficient. Large investors (e.g. fund managers) who have well-established channels to secure price-sensitive information are relatively better positioned to exploit this information before it is released to the public.

5. Is the Kuala Lumpur Share Market Efficient?

Studies reviewed here have stimulated strong agreement and conflicting views on the interpretation of results in relation to KLSE's efficiency. Also, recent evidence on market anomalies worldwide has seriously questioned the empirical validity of the efficient market idea in developed and developing securities markets. It might be argued that these anomalies are not inconsistent with the idea of efficiency as there is well-documented evidence on the general validity of the EMH in several markets (Ariff and

Table 7.2 Risk-adjusted Abnormal Returns (AR) and Cumulative Abnormal Returns (CAR) on the KLSE, 1975-1989

Month Relative to Announcement	Abnormal Returns	t-Statistics	Cumulative Abnormal Returns
-11	-0.0109	-1.720**	0.0109
-10	-0.0128	-1.860**	-0.0237
-9	0.0099	1.550	-0.0138
-8	0.0010	0.440	-0.0128
-7	0.0400	3.930*	0.0272
-6	-0.0087	-1.430	0.0185
-5	0.0089	1.510	0.0274
-4	-0.0146	-1.970	0.0128
-3	0.0062	-0.820	0.0066
-2	0.0132	1.930*	0.0198
-1	0.0093	1.590	0.0291
0	-0.0131	-1.880	0.0160
1	0.0070	1.390	0.0230
2	-0.0098	-1.570	0.0132
3	0.0057	0.770	0.0189
4	0.0038	0.410	0.0227
5	0.0132	1.910**	0.0359
6	0.0108	1.690**	0.0467
7	0.0077	1.430	0.0544
8	-0.0027	-0.320	0.0517
9	0.0067	0.920	0.0584
10	-0.0219	-2.250	0.0365
11	-0.0098	-1.640	0.0257
12	0.0064	0.870	0.0331

*, ** Significant at 0.05 and 0.10 confidence levels respectively.

Finn 1989; Keane 1989; Lo and McKinlay 1989) and that unexploitable anomalies are not sufficient proof to reject the cumulative evidence in support of market efficiency. Given its thin-trading, KLSE provides a suitable setting to explore this issue in a developing context; similar explorations have been made in other thin markets (Ariff and Finn 1989).

Previous studies conducted in KLSE[5] using small samples for different time periods are deficient in some crucial aspects, such as comprehensiveness, ignoring the impact of transaction costs and market thinness. External validity, therefore, is also suspect in those studies. It appears that to obtain robust test results, the effects of thinness of trading should be controlled and data from larger samples should be used.[6] The findings from this study strongly supports the idea that the KLSE is generally efficient, but there is some inefficiency at the margin.

The findings have a number of implications. For those intending to do research, the study has shown reasonably well that the average behaviour of KLSE is not different from that of any other reasonably-sized, competitive and well-regulated developing share markets, provided appropriate methodology is employed to test this issue. At the margin, there is inefficiency with a low probability of a lack of random walk providing exploitable opportunities for insiders who have access to private information. More deregulation and more timely and accurate disclosures may make the market more efficient. Policy-makers should also check any attempt to restrict unimpeded price formation. Further, this study, by including all shares and by controlling the effects of sizeable uptrend in prices, has produced results across the whole market rather than only the thickly-traded parts of the market.

End notes

1. The authors thank the three anonymous reviewers of the journal for their useful comments that improved the quality of this paper (reproduced here as this chapter). M. Ariff thanks the Department of Accounting and Finance at the University of Melbourne for the facilities extended to complete this paper (in mid-1993). M.N. Annuar thanks the National University of Singapore for the facilities made available to undertake this major research and to Professor Ariff Hussein of University Putra Malaysia for his assistance in this research. The views expressed and any existing errors are those of the authors.

2. Ratio of market capitalisation to GDP is below 0.40 for emerging markets. For Malaysia this works out to 3.39 (GDP = M$152 billion and capitalisation = M$515 billion)! Further, volume traded is more akin to that of a more developed market such as Singapore or Hong Kong.

3. Value-weighted indices are inefficient for measuring infrequently traded stocks: see Ariff (1987).

4. The stock-of-month recommendations made by informed analysts over the study period appear regularly in an investment journal (*Malaysian Business*). After eliminating some recommendations and other data inconsistency, a sample of 128 was chosen.

5. Findings from the traditional tests using Q-statistics suggest that the KLSE is weak-form efficient (Annuar 1990). These results are not robust compared to unit root test results in Table 7.1, and hence not reported here.

6. The numbers are not reported here but may be found in Annuar (1990).

PART 3

New Issues and Capitalisation Changes

While Part II reveals results about the efficiency with which an Asia Pacific emerging capital market reacts to information disclosed by seasoned firms already trading in the market, Part III investigates *price effects from unseasoned (or new issues) and capitalisation changes*. In Chapter 8, we find that firm size and its capital structure are key determinants of Malaysian firms' financing behaviour in raising new capital, both debt and equity. Borrowing is not correlated with other variables found to be relevant in more developed markets. Perhaps this reflects the information quality of larger firms making it easier for institutions to monitor their performance, and the tax shield effect predicted by the now famous MM Proposition.

Chapter 8 is a broad-based test of what factors determine borrowing. Chapters 9 to 11 aim to provide carefully researched findings on the behaviour of newly listed firms, both from the government (privatised firms) and from the private sector. During the years 1968-1997, almost 400 firms have been listed, and the market expanded. A key contribution of these chapters is that the Malaysian new issues market yields the world's highest average adjusted return of 135 per cent on the first day of listing. Second, the portion of shares retained by insiders at the time of a new issue is 70 per cent, also among the largest averages in the world. The reasons for these results are investigated. The share allocation policy to ensure a minimum 30 per cent participation by Bumiputera individuals, organisations, and unit trusts is perhaps the reason for this high rate of underpricing, which, we believe, ensures that none of the new issues provide less than positive returns to attract popular participation in the issues, while also preventing political costs of failure of floating government firms (17 have been listed out of 400 government-linked firms). Private firms retain more of the shares, as predicted by the Signalling Theory about firm quality, to prevent loss of value in the face of this regulation.

The remaining chapters, 12 and 13, investigate capitalisation changes. Contrary to a positive effect from dividends widely found in the literature, a positive effect from bonus, and not dividends in a bonus issue period, is found. Also, rights issues produce a negative price effect, which is different from a positive effect found in all other Asia Pacific capital markets. These findings are interesting as these show major differences in pricing behaviour of new issues and also the effects of capitalisation on stock prices.

CHAPTER

8

What Factors Determine Corporate Borrowing?

Abstract

This chapter examines the association between six theory-based determinants of corporate borrowing and the levels of borrowing of Malaysian firms. The test results suggest that only two factors, *firm size and gearing ratios*, are significantly correlated with borrowing. Also, the level of borrowing significantly differed among industries, but there was no difference in corporate borrowing on account of whether a firm uses more or less capital. The empirical approach developed in this study offers a useful tool to investigate the factors affecting borrowing behaviour in an emerging capital market.

1. Introduction

Firms generally have two principal sources of funds to finance their operations: internal sources from the current period's retained earnings and from additional equity of shareholders, and external sources, loans from financial institutions and primary debt issues in the debt markets. Internal sources provide about 60 per cent of total funds raised in developed economies. Though no studies have been done in emerging economies, available information suggests the percentage there is even higher. Capital structure theory is inconclusive about which factors determine borrowing levels, except providing a general idea that a firm's ability to identify positive net present value investments should determine capital needs, and further that a firm's capital structure quality also determines the tax shield value from debt (if interest-deductions are permitted for the firm). Some theories of capital structure provide guidelines on the effect of debt on the overall cost of capital of a firm.

The traditional approach of valuation theories is based on the well-establsihed idea that firms can lower their cost of capital by raising their values through leverage, as long as the tax-shield value of debt is positive, provided the probable cost of financial distress is nil. However, due to the excessive financial risk from high levels of debt, capital market participants will react unfavourably to any increase in leverage of a firm considered large enough to cause an increase in the average cost of capital. Thus, the traditional approach implies that there is an optimal capital structure that minimises cost of capital up to a point when the cost of financial distress from excessive debt is nil (or is trivial).

Operationalising capital structure based valuation ideas is fraught with difficulties. Hence, an alternative approach taken in this chapter is based on examining empirically-identified factors associated with debt-taking behaviour of firms. This approach is developed in Section 2. The sources of data and the variables used in this study are described in Section 3. Findings about the behaviour of factors or determinants are presented in Section 4, which is followed by a discussion. Size and gearing of firms (out of six theory-based variables) are two statistically significant debt-relevant factors in the Malaysian capital markets.

2. Finding the Determinants of Borrowing

Modigliani and Miller (1958) argued that the cost of capital is not influenced by a firm's financing mix under the assumptions that the capital markets are perfect and there are no corporate income taxes (MM Proposition 1). This was later amended to take into account taxation effect, leading to the now well-established idea that the value of a firm increases by the value of tax shield arising from the tax-deductibility of interest expense (before determining a firm's taxable income). Given this argument, an optimal strategy for a firm is to take the maximum amount of debt! The advantage of debt, according to Miller and Modigliani (1961), is the reduction in the cost of debt, which arises from interest deductions in the case of debt. Compared to equity financing, there is no similar deduction permitted by law since a dividend paid to a shareholder is *after* the tax is paid, and thus enjoys no benefit from tax.

The consequence of this inaptly named market imperfection is that it leads to a lowering of the average cost of capital, hence an increase in the value of a firm subsequent to borrowing. However, a continuous increase in total borrowing will correspondingly increase the financial risk of the firm (Robicheck and Myers 1966; Hamada 1972). Therefore, corporate debt requires a trade-off between risk and return. Furthermore, shareholders, because they are are generally risk-averse, expect higher returns if they are to be induced to buy and hold equity in a firm with extra risky debt.

Gupta (1982) demonstrated that the maximum value of the firm will always be reached before the maximum available debt is utilised. Gupta's findings strengthen Myers' (1977) argument that maximising debt does not lead to maximisation of the value of the firm, even with taxes. Dilip (1994) has made some contribution in this area as well extending Miller's 1977 argument further; this contribution is in line with MM's arguments.

MM's and Myers' theories stand at opposite poles. However, the principal differences between them disappear in a world where interest expense is tax deductible and the market permits deductions of interest before determining taxable income. Thus, the optimum capital structure idea should be applied under conditions approximating the actual business environment. A firm's management will attempt to seek an optimum capital structure with the objective of maximising the value of the firm, which is the same as minimising the average cost of capital. However, there is no empirical evidence to support the claim that companies actually choose between debt and equity to maximise their values. But the analytical proof is overwhelming. If firms do use debt in their capital structure, a relevant issue is: what are the determinants of corporate borrowing? Existing studies suggest some factors: industry, size, firm's growth rate, return on firm's capital, tax rate, leverage or gearing and risk factor (which are analytically explained later). It is worthwhile finding the empirical regularity since it is difficult to test the theory directly.

Type of industry

Type of industry has been studied as a major determinant of corporate borrowing. Industry classification can be used as a proxy for business risk because firms in the same industry are assumed to have similar technology, liquidity requirements, type of asset, overall level of profitability and growth rate. In general, firms in heavy industries require lumpy capital compared to light industries. The former are therefore assumed to have a higher level of leverage. Examples of firms in heavy industry are those in vehicle manufacture (e.g. PROTON Bhd. and PERODUA Bhd.) and petroleum refining while consumer product firms in food and apparel industries are examples of light industries.

Gordon (1990) examined the relationship between a firm's financing structure and its technology. His results support the idea that firms with high capital-to-labour ratios acquire more debt than firms with low capital-to-labour ratios. Dilip and Donald (1990) showed that heavily concentrated industries tend to employ higher levels of equity in their capital structure. Schwert and Aronson (1967) found that financial structure measured by book values does not vary significantly within an industry, but does vary significantly among industries. They concluded that industries develop optimum financial structure conditioned by their inherent business risk as well as, possibly, the monitoring behaviour of banks that may use the industry average leverage ratios for managing debt levels of firms (Ariff and Lau 1997). Further, Scott (1972) employed a multiple comparison test to overcome the weakness in the tests employed by Schwart and Aronson (1967). They report that various industries, subject to different degrees of business risk, have indeed developed characteristically different financial structures. There are thus differences in capital structure among industries.

Size of Firm

Size of firm is usually measured based on paid-up capital, total assets, market share or total sales depending on the purpose and the nature of the studies. Large firms, due to their large asset bases, are assumed to have higher capacity for borrowing. Firms with larger assets may have greater resources to support themselves in the event of adverse fluctuations in earnings, and this comes from greater stability in earnings, which cushion debt service obligations. Since large, multi-product firms are generally less risky than small one-product firms, it is expected that large firms are relatively more geared.

Taub (1976) studied a random sample of firms in the United States, and concluded that there is a direct relationship between the size of firms and the debt-equity ratios. However, studies by Chudson (1945), Bray (1967), Toy *et al.* (1974) and Ferri and Jones (1979) found no evidence to suggest that debt ratios are a function of company size. Remmers *et al.* (1974) also found no relationship between firm size and corporate borrowing, but their findings indicate that small firms had higher debt ratios than larger firms in Japan, Norway, the Netherlands and France. They also showed that certain institutional variables, such as earnings rate and growth rate, seem to be more important determinants of debt ratios internationally. Ariff *et al.*(1994) showed that debt asset ratio is positively correlated with stock price changes in Japan, Malaysia and Singapore.

Firm's Growth Rate

The expansion of a firm's activity leads to an increase in the value of its assets and its capital value. The growth rate of a firm can be measured by the rate of increase in assets. Fast growing firms are expected to resort to higher levels of borrowing to supplement their internally generated demand for more funds than firms with lower growth.

Toy *et al.* (1974) is an example of a comparative international study on determinants of corporate debt ratios in the manufacturing sectors of industrialised countries. They concluded that growth rate in assets is a highly significant determinant of debt of the firms in the France, Japan, and United States but not, or only marginally, in Holland and Norway.

Return on Firm's Capital

Earnings rate or profitability is assumed to be negatively related to the level of corporate borrowing. Firms with a high earnings rate, all else being equal, would maintain relatively lower debt ratios because of their ability to finance themselves from internally generated funds. Toy *et al.* (1974) and Kester's (1986) cross-sectional studies of debt ratios in America and Japan indicate that profitability has a negative influence on debt ratios. Allen and Mizuno (1989), who used 125 Japanese industrial firms, found that profitability is the most significant determinant of borrowing by Japanese firms. This result is consistent with Kester's (1986) study. Perhaps this supports the Pecking Order Hypothesis of Myers and Majluf (1984); this hypothesis predicts that the most profitable companies generally borrow the least. There is an inverse relationship between profitability and debt ratios.

Tax Rate

The advantage of debt in a world of corporate taxes is that interest payments are deductible as expenses, which helps to reduce the cost of debt to shareholders, whereas dividends or preferred dividends are not tax-deductible. Thus, the total income for both debtholders and shareholders is greater if debt is employed in all cases where a firm earns enough to pay its cost of capital. In essence, the government provides the tax shield as a subsidy to levered firms. Consistent with the traditional and MM's theories, the tax rate is directly related to the debt-equity ratios of firms. Increases in the tax rate will cause the firm to increase its debt-equity ratio to increase the debt shield value.

DeAngelo and Masulis (1980) suggested that each firm has a unique interior optimum leverage decision due to the interaction of personal and corporate tax on debt and equity. Taub (1975) concluded that increases in the tax rate have a negative impact on the desired debt-equity ratio. This is contrary to both the traditional view and MM's approach.

Gearing or Leverage (Debt/Asset Ratio)

There are three types of leverage in financial management: operating, financial and total leverage. Firms have some fixed production costs, for example buildings, machinery, etc. Fixed production costs cause operating profits to vary more than sales over the business cycle. The employment of fixed production costs is operating leverage. Financial leverage refers to the extent to which fixed income securities such as debt and preferred stock are present in a firm's capital structure. Financial leverage is concerned with the relationship between the firm's earnings before interest and taxes (EBIT) and the earnings available to common stockholders as net income. Higher leverage increases expected earnings per share, but it also increases the firm's risk (Hamada 1972), whereas total leverage reflects the impact of operating and financial leverage on the total risk of the firm.

Leverage, defined as total-debt-to-total-asset, is a factor affecting the determination of the capital structure. Gupta (1969) studied the financial ratios (one of them is leverage) with respect to three exogenous variables, namely industry, size and growth. He reported that growing corporations have high total debt to total asset ratios. The corporations tend to have large amounts of bank borrowings with respect to their assets. He also reported that the total debt to total asset ratio is found to be negatively related to the size of the corporation.

Risk Factor

Risk is defined as the uncertainty of future earnings outcome of a firm. An alternate definition by Webster might be a hazard; a peril; exposure to loss or injury . There are three basic types of risk in a company. Business risk is the uncertainty of income flows caused by the nature of a firm's business. For example, firms in the food industry with stable sales and earnings growth over time would have low business risk compared to firms in the auto industry. Financial risk is the uncertainty associated with the way the firm finances its investments. If a firm uses only common stock to finance its investment, it incurs only business risk. A firm that borrows money to finance its investment increases its cost of debt and also increases the required return to compensate the common stockholder for the increased risk.

A credibility gap or investor relation risk arises when management does not tell the truth, or fails to reveal adequate information. This risk varies from industry to industry, and may also affect debt. Thus management in risky businesses might be reluctant to increase the total risk of the firm by increasing the level of borrowing, preferring to resort to internal financing by using retained earnings (and to some extent stretching trade accounts). Firms that are categorised in the low risk class should have greater financial flexibility to resort to higher levels of borrowing.

Myers (1984) suggested that the level of borrowing varies between industries because of difference in asset risk between industries. Toy *et al.* (1974) hypothesised that higher earnings risk, all other things being equal, is associated with a relatively lower debt ratio because of risk of bankruptcy and possibly monitoring limits placed on the firm by lenders. Earnings risk is a significant variable in determining debt ratios.

This discussion from the perspective of known factors that may be related to borrowing behaviour lends some insight, in addition to the analytical framework of capital structure theories of MM, Myers and Majluf and others. Reasons for the alleged association of suggested factors on corporate borrowing and the level of borrowing of firms may be investigated from this empirical perspective. This is an useful approach as there have been significant problems in operationalising traditional capital structure theory.

3. Sample Selection and Methodology

Data and Sample Selection

A sample of 60 firms comprising consumer product firms (n=15), industrial product firms (10), construction firms (1), trading and services (4), plantations (10), properties (12), mining firms (2), hotels (1) and financial firms (5) are included in this study. All are firms continuously listed on the KLSE over the years 1983-1992. The sample was selected randomly from those continually traded. They were further divided into two broad groups covering industrial sector (consumer products, industrial products, construction and the trading-cum-service) and non-industrial sector (mining, plantation, property, hotels and financial firms). Appendix 8.1A lists the selected groups and the firms. Further, the firms were re-grouped into capital-intensive and non-capital-intensive firms to ascertain whether corporate borrowing differs across these categories.

Data on the variables discussed in the previous section were gathered from the *Companies Handbook* (a KLSE publication) and financial reports of the selected firms. No accounting adjustments were made and the values of the variables were collected as they appeared in the Handbook. The Handbook reports these data on a consistent basis, and therefore enables a comparison across firms.

Methodology

An ordinary least square (OLS) regression was used to test the null hypothesis that corporate borrowing in Malaysia is not affected by any of the suggested determinants. In this exploratory study, a linear functional model describing the determinants in corporate borrowing is specified as:

$$CB = f(a; b; c; d; e; f; g) \tag{8.1}$$

where

CB: total borrowings, excluding trade credits of firms,

a : industry type classified according to main business,

b : size of firms measured as natural log of total assets,

c : growth rate in the book values of total assets,

d : net income divided by number of outstanding shares

e : tax rate as recorded by the Internal Revenue Department,

f : gearing is book value of debt divided by equity, and

g : risk measured as Scholes-Williams beta taken from the authors database. The systematic risk factor is considered appropriate as most of the sampled firms are well diversified.

This functional model is operationalised as a multiple regression without any corrections for violations of statistical assumptions from the characteristics of the variables. A one-way analysis of variance (ANOVA) test was done to ascertain any significant difference in corporate borrowing firms in different industries to determine if industry factor is a determinant of corporate borrowing.

4. Findings

Total Sample

The results of the multiple regression using all the firms are presented in Table 8.1. The regression correlation coefficient suggests that 91.3 per cent of the variation in the levels of corporate borrowing is explained by the six suggested determinants. This is rather substantial, and is expected using levels data. Hence, the factors identified in the literature appear to be collectively responsible for almost all the variation in debts of the sampled firms in the Malaysian market.

Further evidence from the t-tests on the significance of individual factors suggests that growth, tax and risk factors are not statistically significant. The coefficients for size, returns and gearing factors are, however, significant at 0.10 or better probability levels.

The coefficient (1.139) for size in Table 8.1 is positive and significant at the 0.05 level with a t-value of 19.035. This implies that there is a direct relationship between the size of the firm and corporate borrowing, consistent with Taub's (1976) findings.

The size of a firm is measured by the book value of total assets of the firm. Smaller companies with greater bankruptcy risk are more likely to issue higher levels of equity. In contrast, larger firms tend to have more resources to support a high level of debt. In general, the potential borrowing capacity of larger firm is a significant determinant of the level of borrowing compared to a smaller firm.

The coefficient for growth is positive, but not significant at the 0.05 level. This is not consistent with the theory that suggests a growing company would have greater debt.

Table 8.1 Determinants of Corporate Borrowing of Malaysian Listed Firms

Variable	Coefficients	Computed t-statistic	Probability
Size	1.139	19.350*	0.000
Growth	0.003	1.540	0.130
Return	-0.398	-1.708	0.093
Tax	-0.002	-1.034	0.306
Gearing	0.028	2.795*	0.007
Risk	0.059	0.569	0.572
Adj $R^2 = 0.913$			

* Exceeds critical t-value of 1.960 at 0.05 acceptance level.

The coefficient for return on the firm's capital or profitability is negative, but not significant. The coefficient for return on the firm's capital has the expected sign, which is consistent with Toy *et al.*(1974), Kester (1986) and Allen and Mizuno (1989). For the Malaysian listed firms, it is evident that return on the firm's capital has no significant relationship with the level of borrowing. This is partly explained by the fact that almost all firms experienced substantial growth during the test period, and there were no significant differences in their growth, thus there was probably no effect on borrowing ability.

The coefficient for tax rate is negative, but not significant. The negative coefficient is not in the expected direction, is inconsistent with Taub (1975), and is contrary to the capital structure theory. The possible reason for the contrary sign of the coefficient is data inaccuracy. The tax rate figures collected for this study are based on cumulative figures. The actual amount of tax paid by the companies each year is the most relevant data, but these data are not available in the form required for analysis.

The coefficient for gearing (0.028) is positive, and significant at the 0.05 acceptance level. This suggests that there is a direct relationship between gearing and corporate borrowing. The coefficient for risk factor has a positive sign but is not significant, inconsistent with the findings in Toy *et al.* (1974), which state that there is a negative relationship between earnings risk and the debt ratio.

In summary, the test results suggest that only two (size of firm and gearing) of the six possible determinants of corporate borrowing in the literature are significant. This, however, could be sample specific, and therefore, in that case, may not be generalisable to all Malaysian firms. It is also possible that due to differences in the institutional, economic, social and cultural characteristics of a developing economy, not all literature-suggested determinants of corporate level of borrowing could be expected to be relevant.

Industry Factor

A collinearity problem exists as the independent variables are correlated with one another. The adverse effect is that the standard deviations of the coefficients may be overestimated. As a result, the t-statistic is smaller than it should be, and some independent variables may appear not to be linearly related to corporate borrowing. This problem does not affect the F test, thus analysis of variance (ANOVA) is used to examine the industry factor as a determinant of corporate borrowing of Malaysian firms. The results are shown in Table 8.2.

The results show one-way ANOVA on nine industry groups. The financial firms have the highest mean debt among the nine industries due to the nature of these financial businesses, which are highly levered. The lowest mean debt is observed in the mining sector, probably due to lack of growth opportunities and lack of reinvestment opportunity in the sector. The F-statistics suggest that there is a significant difference in corporate borrowing of different industry groups. These results are consistent with previous findings by Scott (1972) which showed that industries are subject to various degrees of business risk. Thus, financial structure differs significantly across industries. Therefore, the industry factor seems to be an important determinant of corporate borrowing of Malaysian firms.

Table 8.2 Industry Differences and Corporate Borrowing in Malaysia, 1983-1992

Industry	Mean Debt	Industry	Mean Debt (RM million)
Consumer	122.590	Construction	169.744
Industry	115.435	Trade/Service	451.859
Property	125.076	Finance	3.579.413
Plantation	73.497	Hotel	379.535
		Mining	2.002
Average for All			
Computed F	38373*		559.684

* Exceeds critical t-value of 1.960 at 0.05 acceptance level.

Does Capital Intensity Affect Borrowing?

Gordon (1990) suggests those firms with high capital-to-labour ratios are likely to acquire more debt than firms with low capital-to-labour ratios. This is to finance the relatively higher cost of capital such as machines and modern technology. The difference between the debt level of capital-intensive and non-capital-intensive Malaysian listed firms was ascertained using one way ANOVA. The results are presented in Table 8.3.

The findings in Table 8.3 suggest that there is no significant difference in the level of corporate borrowing between capital-intensive and non-capital-intensive Malaysian firms. These results are inconsistent with Gordon's (1990) findings.

Table 8.3 Capital Intensity and Borrowing of Firms in Malaysia

Industry	Capital Intensive	Not Capital Intensive	F-prob. Intensive
Mean Debt	RM120,256	RM98,044	1.363 (0.258)

(.) indicates probability value of mean difference.

5. What Determines Debt-taking in Malaysia?

The levels of corporate borrowing of Malaysian firms are explained substantially by size, gearing and industry factors. The other factors appear to have no significant relationship with the level of debt. In our analysis of industry factor as a determinant of corporate borrowing, the findings indicate that the levels of borrowing differ significantly among the industries. The finance sector highlights the rationale for this difference across industries, which is that firms in the same industry face similar environmental and economic conditions, use similar technology and have similar levels of profitability and growth rates. Therefore, they tend to acquire similar levels of debt. In general, there is no evidence to support the theory that there is a difference in corporate borrowing between capital-intensive and non-capital-intensive firms.

Capital-raising is a complex phenomenon requiring consideration of several theories and factors. However, this study is a modest start to examining the empirical correlations with some possible factors. A more elaborate examination of several theories and special factors in the Asia Pacific region is needed on this important area since capital raising activities is intensifying in the region.

APPENDIX 8.1A
LIST OF SAMPLED COMPANIES IN INDUSTRIAL SECTOR, MALAYSIA

CONSUMER PRODUCTS	
Ajinomoto (M) Bhd	AJI
Bata (M) Bhd	BATA
Berjaya Industrial Bhd	BERJAYA
Carlsberg Brewery (M) Bhd	CARLS
Cold Storage (M) Bhd	CSM
Cycle & Carriage Bintang Bhd	CCB
DNP Holdings Bhd	DNP
Dutch Baby Milk Industries (M) Bhd	DUTCH
Hong Leong Industrial	HLI
Innovest Bhd	IV
Malayan Flour Mills Bhd	MFM
Malaysian Tobacco Company Bhd	MTC
Sanyo Industries Bhd	SANYO
Tan Chong Motor Holdings Bhd	TC
Yeo Hiap Seng (M) Bhd	YEO(M)
INDUSTRIAL	
Aluminium Company Alcom	
Amalgamated Steel Mills Bhd	ASMB
CI Holdings Bhd	CI
Chemical Company of Malaysia Bhd	CCM
DMIB Bhd	DMIB
Esso (M) Bhd	ESSO
Keck Seng (M) Bhd	KS
Lion Corporation Bhd	LION
Malex Industries Bhd	MLX
MMC Engineering Group Bhd	MMC
TRADING/SERVICE	
Magnum Corporation Bhd	MAG
New Straits Times Press (M) Bhd	NST
Sime Darby Bhd	SIME
Time Engineering Bhd	IME
FINANCE	
Development & Commercial Bank Bhd	D&C
Killinghall (M) Bhd	KIL
Malaysian Building Society Bhd	MBSB
MBF Finance BHd	MBF
Public Bank Bhd	PBB
HOTELS	
Faber Group Bhd	FABER

cont'd

Appendix 8.1 A (cont'd)

PROPERTIES	
Advanced Synergy Bhd	ADV
Austral Amalgamated Tin Bhd	AMAL
Bandar Raya Development Bhd	BR
First Allied Corp Bhd	FAC
IGB Corporation Bhd	IGB
Island & Peninsular Bhd	I&P
Kemayan Oil Palm Bhd	KEM
Lion Land Bhd	LLB
Malaysian Resources Corporation Bhd	MRCB
Paramount Corp Bhd	PMT
Petaling Garden Bhd	PG
Worldwide Holdings Bhd	W'WIDE
PLANTATIONS	
Batu Kawan Bhd	BK
Chin Teck Plantations Bhd	CT
Consolidated Plantations Bhd	CONSO
Guthrie Ropel Bhd	GR
Kuala Lumpur Kepong Bhd	KLK
Kulim (M) Bhd	KULIM
Mentakab Rubber Company (M) Bhd	MEN
PJ Development Holdings Bhd	PJ DEV
TDM Bhd	TDM
United Plantations Bhd	UPT
MINING	
Timah Langat Bhd	TIMAH
Tronoh Mines (M) Bhd	TRONOH

CHAPTER

9

Underpricing of Primary Issues: Are New Share Issues Excessively Underpriced?*

Abstract

Since 1976, the Malaysian primary market has yielded one of the highest rewards for those who have been allocated new issues. On the first day of listing, the new shares are *underpriced* by 135 per cent, which is eight times the average annual return in the secondary market over 22 years. However, after adjusting for the average successful allocation ratios of the new issues and including the time value of money for unsuccessful application money earning no interest, the average net return to a successful bidder is only 3 per cent per annum. This is a surprising result given the widespread advertised information that underpricing is excessive in this emerging market.

1. Introduction[1]

The average over-subscription in new issues made during a recent 16-year period was 35 times the offered tranche. This works out, for a typical subscriber to new issues, a hit rate of a mere 3 per cent allocation of new issues. Investors and speculators believe that new issues generate lucrative and assured returns. This belief has led to record numbers of new issues (56 in 1993 consisting of 12 on the Main Board and 44 on the Second Board). Chasing after these new issues is mistakenly considered prudent investment behaviour. This perception is also reinforced by research reports that in Malaysia new issues are underpriced 7.5 times the average normal returns in the stock market. How accurate is this common perception of excessive underpricing?

This paper attempts to answer this question by analysing underpricing of sixty-five new issues over 16 years ending 1990.[2] We re-examine the gains to short-term speculators *and* long-term investors.

2. The Research Question

Malaysian laws define sale of expanded authorised shares of a company as new issues.[3] The offer of shares from existing share-holdings to the public is defined as sale of shares. The new issues market therefore consists of new issues and the sale of shares of

* This chapter is a reproduction of an article that appeared as 'Analysis of Underpricing in the Malaysian New Issues Market During 1975-1990: Are New Issues Excessively Underpriced?' by Shamsher M., Annuar M. Nassir and M. Ariff in *Capital Markets Review* Vol 4(3) (1994): 17-28 (Malaysia). We thank the Editor of the Review for permission to reproduce the article, which has been edited slightly by M. Ariff to fit the style and format adopted in this book.

private companies and government-linked enterprises to the public. New issues are subjected to public scrutiny by the investment bankers (any one of the merchant bankers in Malaysia), the Securities Commission (Capital Issues Committee and the Foreign Issues Committee prior to March 1993), the Registrar of Companies and the Kuala Lumpur Stock Exchange. Regulators approve new issues with elaborate care to ensure public interests are safeguarded, and the approval process may take up to a year in a large placement. Normalised P/E rule and sustainable earnings rule in force from 1980 have been withdrawn since 1990.

The average time for approval is estimated to be 16-24 weeks against a much shorter average time of 1-8 weeks in developed markets in Australia, United Kingdom and United States. Because of the longer time it takes to approve new issue applications, there is the higher risk of stock market conditions changing relative to prices fixed at the time of application for approval.[4] This may be termed the approval delay risk in the new issues market in emerging economies. Second, the application money is not returned to applicants for about 2 months after invitation to apply; this accrues an opportunity cost.

Approval delay risk due to application processing delay is much higher in emerging than in major markets, where the regulations are more flexible, and approval therefore is speedier. While regulations in Malaysia ensure that no documentation is released to investors until an application is approved, regulators in major markets permit investment bankers to offer new issues on a *non-binding* basis through the so-called *red-herring* offers to obtain potential investors' assessment of the value of the offer. Therefore, investment banks start *building-books* before the application is approved. This is designed to reduce the extent of risk of (a) offer price being too high or too low and (b) estimating the likelihood of failure of off-take of new issues.

To reduce their own risk of failure of the off-take of new issues, investment bankers and regulators have greater incentives to reduce the offer prices in Malaysia's emerging market since the market conditions do change substantially between the time a price is determined and the actual time of approval to list. Given the generally higher returns in the new issues market in Malaysia, the risk of failure of new issues is much lower than in major markets. This probably explains the very low underwriting fee of about one per cent for managing flotation compared with 3 or more per cent in other markets. Failure of an issue is termed the underwriting risk.

It is found that insiders (that is, the existing shareholders of the company) offer an average of 30 per cent of existing shares to outsiders, therefore preferring to keep 70 per cent for themselves. Offering new issues to outsiders helps to raise finance for expansion, and to obtain less costly sources of new funds. Companies listed in the New York market raise capital at lower costs, the savings from which amount to three-quarters of one per cent compared to unlisted companies (Fama 1984). By the same logic, when owners of a company have a considerable amount of wealth invested in a company, and are therefore interested in diversifying their portfolios to add liquidity to their investments, they usually offer new issues to the public to reduce their own exposure to risk. Given the financial economics of owning a company, the owners are willing to pass part of their profitable real investments in the company by reducing their proportions of ownership. Hence, the new issue applicants making a bid to own part of about 30 per cent of equity of companies that are offered to obtain higher value, and thus a higher return than in alternative investments, for instance, in the secondary market.

Purchase of shares listed in the secondary market obtain normal yields, which are lower, on average, than in the new issues market. This extra return in the new issues market is the insider value factor, which makes offer prices lower thus giving a high return. Our scrutiny of the prospectuses of all new firms listed over 1975-1990 included in this study indicates that management's main purpose for listing is to get funds for business expansion. Expansion would not be possible without sharing part of the value of a closely-held firm - for example by releasing 30 per cent of equity - to the outsiders, who show great enthusiasm to subscribe to new issues in Malaysia. Note that this third factor should make the new issues market more profitable, holding other things constant: the first two factors being the approval delay risk and underwriting risk. The long-term annual return inclusive of dividends over the 16 years in the secondary market was 18 per cent.[5]

Over-subscription of most new issues keeps feeding the frenzy for new issues. Studies have suggested that the over-subscription rate in Malaysia averages 46 times (Dawson 1987; Yong 1991). The majority of applicants are unable to purchase shares at offer prices as there is roughly a 1 in 35 chance (based on the average over-subscription rate) of winning an allocation as reported in financial press and official reports. We use a 35 times over-subscription rate as an average over 16 years. The evidence suggests that not a single new issue failed to provide a positive rate of returns over any 6-month holding period after the listing date.[6] Just as in other share markets, most of the new issues are listed at the peak of a market cycle, probably to reduce the underwriting risk and also to obtain higher prices than would be the case if the issue was made at other than a peak period in the stock market cycles. New issues are priced by the market at a much higher level than would be the case if (a) the new issues were equally likely to be issued in bull or bear markets and (b) there is no frenzy in wanting to subscribe to new issues.

Because of the frenzy in the new issues market, there is price pressure during the initial few months, which keeps the prices artificially high during this early period after listing. By the same token, one would expect the prices in the new issues market to attain normal levels after the initial few months, when normal prices, unfettered by price pressure, begin to emerge. This line of reasoning suggests a fourth risk, namely the short-run price pressure. Only speculators stand to gain by buying and disposing of new issues over the short period when the prices are artificially high, whereas the long-term investor's prices are the ones that prevail after the price pressure has abated.

A fifth risk factor arises from (a) opportunity cost of money tied up over the interval from application time to return of the application money to unsuccessful applicants. Money is returned shortly before the listing day. (b) The likelihood that an investor's application is unsuccessful is another risk. Rock (1986) proposed this factor as a pricing variable. It is estimated that application money is tied up for a period of about two months, and that the probability of allocation is 0.03. A simple calculation using commercial bank average deposit rate of about 7 per cent per annum for money held over 2 months would show that RM10,000.00 application money would lose RM167.00 if no shares are allocated; this is a return for balloting risk. A single successful allocation for RM10,000.00 would have to earn 35 times the opportunity cost to breakeven the losses incurred as the opportunity cost! If the allocation ratio is smaller than the lot applied for, the opportunity cost is even higher.[7] However, we do not take this into account. Thus, the new issues are not without a high price risk in any market, let alone in Malaysia.

3. Research Data and Methodology

To investigate the new issues behaviour, 65 new issues during 1975-1990, which had all the required information for analysis, were studied. Public records in various issues of *Investors Digest*, *Daily Diary*, and the company files from the Registrar of Companies were accessed to obtain values for the variables. For each new issue, the offer price and prices on the first day, first week, first, third, sixth month, and so on until the thirty-sixth month of trading were extracted. The capitalisation and dividend-adjusted monthly price relatives were used to calculate the rates of return for each new issue. The KLSE Composite Index, which is a value-weighted price average representing all sectors, was used as a market proxy.

Next, for each new issue, we calculated the rate of underpricing over (a) a shorter time period of less than 12 months, (b) a longer time period over the next 2 years and (c) adjusted the rate of return of each new issue by subtracting price changes in the overall market.[8] From (a) and (b) it was possible to distinguish short- and longer-term price changes respectively while (c) enabled us to calculate the return due to the new issue adjusted for the general price move in the overall market. The Ball and Brown (1968) event study method was applied; this provided the framework for computing market-adjusted average return, AR_{it} over different time periods (e.g. first day, first week, first month, etc.). By cumulating the average AR_i for all the companies (i=1,....65) over time from t = 1,...., 36 months, it is possible to address research questions about new issue behaviour over short- and long-term periods. Finally, we calculated the degree of underpricing, and compared this value with the overall secondary market return of 18 per cent per annum for seasoned issues as a benchmark for measuring the underpricing (a) over short- and long-term and (b) other markets.

The formula for cumulation is

$$CAR = \Sigma_{t=1,\ldots,T} AR_t \tag{9.1}$$

where CAR is the cumulative average market-adjusted returns over time. We plotted the CAR from issue date to 36 months after issue date. This revealed that the prices declined after about 12 months, suggesting a high return in the short-run and a lower return in the long-run The test hypothesis of underpricing (H_1) can now be extended to test the price pressure hypothesis (H_2) as follows:

H_1: The average first-day abnormal return for IPOs is positive; and

H_2: The average abnormal return in the long-run is less than average in the short-run.

The null of H_1 is expected to be rejected. This will confirm the already existing evidence that the new issues are underpriced. The null of H_2 is expected to be rejected in favour of the alternative hypothesis that the long-run, returns are lower than the short-run returns; this is already evidenced by the CAR analysis. Demand pressure can then be attributed as the main reason for underpricing so that, for an investor, the longer term lower return is the relevant rate of underpricing. Therefore, the short-run higher returns can be deemed as returns to speculators. One study provided evidence that long-run returns in the American new issue market are lower than short-run returns (Aggrawal and Rivoli 1990).

4. Comparative Findings and Discussion

Findings

New issues are substantially underpriced in the Australian, United Kingdom, United States and other developed markets. Similar behaviour is found in Malaysia, Singapore and other developing markets because the offer prices appear to be a deep discount of the initial listing day market prices. But the extent of underpricing is smaller in the developed markets than in the developing markets. Australia's underpricing of 22 per cent is 1.7 times the return in its secondary market of 13 per cent; the ratios for United Kingdom and United States are 1.75 and 1.32 respectively. Those numbers work out to an average ratio of 1.6 for developed markets Ariff and Chung's (1993) study contains more details. The short-run underpricing of 135 per cent in Malaysia is 7.5 times the normal secondary market return of 18 per cent there.[9] The corresponding ratio for Singapore is 2.60. Hence, the gain in the new issues market in Malaysia appears, on the basis of these statistics, to be excessive.

These findings are widely documented in studies covering the initial or short-run pricing periods of about 6-12 months only, and *not* the longer period of beyond one year relevant for our discussion. Market conditions arising from demand pressure in the short-run may account for the increasingly reported regularity of a long-run decline in the prices of new issues. Our analysis is over short-run and long-run periods.

Short and Long-run Performance of New Issues

The extent of underpricing over the first 6 months is summarised in Table 9.1.

Table 9.1 Malaysian New Issues Underpriced over Initial Period: 1975-90

First Day	First Week	First Month	Third Month	Sixth Month
135% (t=8.67)*	122% (t=8.91)*	128% (t=9.52)*	129% (t=8.36)*	133% (t=9.33)*

* Significantly underpriced at 0.05 confidence level

The average refers to market-adjusted return in the Malaysian new issues market over 16 years. The first-day average excess return is 135 per cent: this number is different from other published reports, which cover shorter periods and fewer new issues. There is a slight downward pressure in the first week and month, but prices recover over the six months soon enough to the first-day level. Judging by the high t-values shown in brackets, the returns are significantly larger than zero at 0.05 level. Hence, the underpricing hypothesis cannot be rejected. Therefore, short-run average return is about 130 per cent of the offer price.

The lowest underpricing among the 65 cases was 4.7 per cent and the highest was 563 per cent, with a volatility of 111 per cent! There were no issues marked below the offer price in this market. This ensured that no speculator who held a new issue for 6 months lost any money. Regulators and investment bankers priced new issues such that the new issues market yielded positive returns, substantiating the public perception of handsome rewards for investment in new issues listed on the KLSE. Speculators tend to obtain a high rate of return by holding in the short-run only.

Is this a correct interpretation? First, the relevant return for an investor is the long-term return and not the initial period underpricing, which reflects the effect of short-run price pressure. Second, this assumes that every investor gets all the shares he applies for. If the chance of allocation is one in 35 for a small investor (it is more favourable for large applications), then, for the average investor to breakeven, 1.86 successful strikes out of the 65 new issues are needed. This means that in 63.14 cases, he does not get any allocation, and loses an average of RM167.00 per issue in opportunity costs by tying up his money during application time. The total loss for the hypothetical average investor is 63.14 multiplied by RM167.00 which equals RM10,545.00 against a gain of RM25,110.00 at the rate of 135 per cent return on investment of 1.86 multiplied by RM10,000.00. The net gain is RM14,565.00 on an investment of RM18,600.00 or a net return of 78 per cent (not 135 per cent)! Since the allocation ratio applied is likely to be less than the full lot applied for, the net return of 78 per cent has to be accordingly reduced even further. If the allocation ratio is 50 per cent only, then the net return would be 39 per cent and not 78 per cent.

Now we examine the long-term return behaviour (Table 9.2). Here the returns are calculated over the offer prices from the seventh to the twelfth month and then over the next two years. Note that the prices were sustained at the initial price levels up to the end of the first year: 133 per cent. However, underpricing gain over the long-run was actually 94 per cent if the investor held the stocks for two years.

Table 9.2 Long-run Underpricing in Malaysian New Issues Market (1975-1990)

7th-12th Month	Two Years	Three Years
133% (t-8.18)*	94% (t=6.00)*	77% (t=4.70)*

* Significantly underpriced at 0.05 probability levels

At the end of three years, the underpricing is actually only 77 per cent. Hence, if we compare the short-run gain of 135 per cent against the 94 or 77 per cent respectively for 2-year and 3-year periods, it can be shown that the long-run equilibrium prices, and hence the returns on the new issues market, are significantly lower than the short-run price-pressured short-run returns. Judging by the high t-values, which are for differences of these returns relative to short-run returns of 130 per cent, the alternative hypothesis on H_2 cannot be rejected. The long-run return is 77 per cent at the end of the three-year period.[10] Hence, the alternate hypothesis of H_2 is accepted.

Is a 77 per cent return over three years a high return? We compute the profits from 1.86 successful allocations for a RM18,600.00 investment against the cost of bidding for 63.14 unsuccessful bids. The net return is 21 per cent per annum over a three-year period. The long-run return from holding new issues is only slightly more profitable (assuming a full and not partial allocation) than the 18 per cent rate of annual return in the KLSE over the 1975-1990 period! Hence, for a long-term investor, the rate of return in the new issues market is not excessive as commonly perceived. It is only marginally higher than the normal returns. If the hypothetical investor is applying for larger lots, the probability of allocation is likely to be higher than 3 per cent. Larger investors will therefore reap higher returns even after costs because of the higher odds of being allocated shares.

5. Conclusion

Malaysian regulators appear to have put into place a mechanism for intervention in the stock market listing process to achieve positive rates of return in all new issues. Unlike other markets where about a third of all new issues yield negative returns to applicants, as is the case in Hong Kong, Malaysia's new issues have never yielded a negative return relative to offer prices over any period. Even then, or perhaps because of this, the public perception of lucrative gains has been fanned by inaccurate analysis of data in previous research on this subject, which estimated the gains to speculators and not to long-term investors, and that too without adjusting for allocation ratio and opportunity costs.

Findings from what we believe to be a comprehensive study with a large sample suggest that the average abnormal returns on the first trading day are no doubt very high: 135 per cent, which is the largest reported for any country. But this high return is but 78 per cent over the offer price net of opportunity cost. Since this rate of returns accrues to speculators while the investors holding new issues over three years obtain only 21 per cent per annum, it can be concluded that the primary issues market does not generate excessive returns in the longer term! Specifically, the low allocation ratio for small investors, given the high application interest, makes the issue not substantially more attractive than trading on a well-diversified portfolio in the secondary market on the Malaysian bourse. Hence, the large underpricing gain is driven mostly by the short-run price pressure, and is not entirely the result of normal factors arising from the other four reasons advanced in theories reviewed in this chapter. Increasing the allocation ratio to a higher rate of application lots for small investors could improve the profitability for long-term investors and that will truly increase returns.

End notes

1. The third-named author (Ariff) acknowledges with thanks permission to use research facilities to complete this study at the office of the HIID, Harvard University, where this paper was written in 1993. The main ideas included in this paper were presented at a KLSE seminar on 20 September 1993 sponsored by KLSE's Research Institute for Investment Analysis Malaysia. The views expressed and the remaining errors are our responsibility. We thank a reviewer of this paper for the contructive comments at the FMA conference in St Louis, Missouri, in October 1994.
2. Of the 65 issues included, 13 are government-linked enterprises.
3. Malaysian laws regulating firms and investment banking come from a number of Acts of Parliament. These are Securities Industry Act 1993, Companies Act 1965, Bank and Financial

Institutions Act 1989, and the Securities Commission Act 1993. Malaysia's penal code includes provisions for prosecuting criminal acts in commercial activities. Civil redress can be obtained under common law and contract law action.

4. Ariff and Johnson (1990: p.15) document the relative volatility of Asian share markets. Standard deviation of rates of return of KLSE over 1980-1990 is about 31.9 per cent per annum against 13 per cent in the New York Stock Exchange. Price changes in Malaysian share market are two-and-half times more likely even if the approval takes same time. Since self-listing is not permitted in Malaysia, all firms appoint investment bankers to make application (i) to the Securities Commission for approval for issuing prospectus to investors for sale of shares and (ii), to the KLSE for permission to list the firm.

5. This estimate made by Annuar (1991) is based on all listed companies over 1975-1989, and was extended to 1992 and found to be 18 per cent per annum.

6. The only new issue to sell below the offer price during initial days was that of Malaysian International Shipping Lines; the issue was oversubscribed on trading day only by 1.13 times. The poor performance was due to a sudden market correction after the end-1985 Pan El Affair involving share fraud by a group of insiders. Prices recovered later.

7. There are few markets where new issues trade on "when issued basis". New issues start trading within a day or two of applications being closed. Applications may be permitted without the ready cash basis, especially if there is a bank account, which can be vouched. In this way, some regulators (Singapore is one) have reduced this risk considerably. Malaysian regulators are studying the introduction of when-issued basis of listing.

8. The return is calculated as the difference in prices over any two periods expressed as a percentage of the previous period's price: R_{IT}. Similar calculations are made for the market: R_{mt}. The difference between the two is the rate of return to a new issue: $e_{it}=R_{it}-R_{mt}$. AR_{it} is the average of e_i: over all the 65 issues. If prices are not affected by price pressure, the e_i: will be about the same over the short and long runs. Measured against the offer prices, price pressure means that the long-run AR_{it} will be smaller than the short-run ones. These are then statistically tested. Aggrawal and Rivoli (1990) were the first authors to detect the decline in prices in the longer run.

9. The reported figures of 166 per cent (Dawson 1987) and 154 per cent (Yong 1991) are higher as their studies are over shorter time periods. Also, they did not correct for market cycles and trends over time.

10. This is the geometric annual returns based on the 77 per cent returns over the three-year period.

CHAPTER

10

Underpricing and Signalling in the New Share Issues Market*

Abstract

Evidence from this study using a very large sample suggests that the *average underpricing* in Malaysia on the first trading day is 135 per cent, the highest in the world. The rate of returns declined slightly in the first week after lisitng of new issues, and then gradually increased over several months up to the fifteenth month, after which the average return declined over the next 36 months. Those allocated new issues earn average abnormal returns of 133 per cent after one year, but this declines to 77 per cent after 3 years, which is evidence of inefficiency or more appropriately, evidence that new issues are overpriced in the initial period. *Signalling* hypothesis tests reveal a significant positive relation between underpricing and (a) firm risk and (b) changes in firm value. However, the results are inconsistent with the predictions of signalling theory.

1. Introduction

An initial public offer or IPO is a new issue of shares, which is the sale of ordinary shares to the public out of previously closely-held authorised shares of a firm. Malaysian laws recognise sale of expanded authorised shares of a firm as new issues. Offer of existing share holdings are defined as simply sale of shares. Private placements of shares are permitted in limited cases, and these account for about 5-10 percent of the funds raised by listed firms in the stock exchange, and these are not IPOs.

In the case of new issues and sale of shares, which form the IPOs in Malaysia, applications must be open to the public and allocation in the event of oversubscription is done by a public lottery regulated by the Securities Commission and the KLSE. An auditor is appointed to oversee share allocation. Also, about one-third of the issued shares of each IPO are compulsorily acquired by designated investment funds and members of certain segments of the Malaysian population, who are considered to have less equitable capital ownership in Malaysia's stock of private capital. This is a unique market micro-structure built into the new issue process since August 1976 to achieve public policy objective approved by the country's legislature for that purpose.

* An unedited version of this paper was presented by the first and second authors at the Occasional Research Seminar Series of the Research Institute for Analysts, Malaysia (RIAM) in Kuala Lumpur in March 1994. We would like to thank Haji Wan Fauzi and Mr. Loganathan of KLSE for making arrangements for a review of the paper before presentation at the Seminar, and for facilitating publicity on this study. This paper was written in Melbourne by Ariff when he was a Visiting Associate Professor of Asian Finance at RMIT, Australia. Data collection and analysis were done jointly with Shamsher M. and Annuar Md. Nassir of UPM, Malaysia.

Regulators approve the sale of new shares of any kind with elaborate care, and the approval process may take up to a year in a large placement. The average time for approval is estimated at about 4-6 months against a much shorter time of 6-8 weeks or lower in developed markets, and the rules do not permit self-listing in the Malaysian primary market. Potential for higher risk from price changes over the long approval process makes it interesting to study IPOs in emerging and developing markets, since the regulatory process is deemed to have a significant effect on the setting of prices.

A distinctive feature of regulation is that no documentation can be released to prospective investors until a firm's application is approved; and the approval includes approval of the offer price. Therefore, investment banking practices of *building-books* or *red-herring offers* that are designed to reduce uncertainty of off-takes of a new issue in major developed markets, such as Australia and the United States, would be illegal in this country. There is, therefore, a very high risk of price changes away from the offer prices during the application period. Also, investment bankers have greater incentives to underprice in Malaysia's emerging market since the market conditions are likely to change substantially between the time a price is determined at application time and the time of approval since the standard deviation of rates of return in this market is high (about 31.9 per cent per annum against 13 percent in the New York Stock Exchange, for example).[1]

Companies resort to listing in public exchanges to refinance expansion and to obtain new funds at low costs. When owners of a firm have considerable amounts of wealth invested in an enterprise, and are interested in diversifying their portfolios to add liquidity to their investments, they usually go public to reduce their own exposure to risk. Listing is considered in the local market as a prelude to a longer-term push for expansion by using the funds from sale to outsiders and later via rights and debt issues. Insider signalling is still untested in this market. The motive for seeking less costly sources of financing through going public is justified in order to take advantage of positive net present value investment opportunities available to firms through real investments in the rapidly developing economy. Scrutiny of the prospectuses of firms included in this study suggests that management's main purpose for listing is to get funds for business expansion.

New issues are avidly followed by the public as profitable short-term investment as most believe, with past evidence over 22 years, that such issues are substantially underpriced and will thus provide larger than normal returns at minimum risk. The lowest return of an IPO was 4.7 per cent. Over-subscription of most new issues also supports this belief. Oversubscription averages 46 times (Yong 1991). The majority of applicants are unable to purchase shares at offer prices. Most are driven to buy in the secondary market at the post-listed prices, which would generally lead to no large gains if the prices on listing day are maintained *in the longer term*. The excess returns, if any, will be arbitraged away once share prices are established. The market may initially overprice the IPOs in the midst of public enthusiasm over underpricing and over-subscription. A widespread belief has emerged, as a result of three underpricing studies by scholars using short post-listed periods, that the short-run price increases will be followed by continuing price rises. For example, prices at the end of a year are slightly higher than prices in the third month. This implies that the initial price increases do not fully reflect the amount of underpricing, which creates demand for shares which is self-generating even after the listing. If the market subsequently corrects the short period overreaction and prices then adjust downwards to their true intrinsic value in the long run, investors would lose. This has yet to be studied.

Therefore, secondary market performance over the longer term is important to investors as it sheds light on possible deviations between offer price and the listing-day market price. This aspect has been ignored in existing studies. Only results from a period longer than a year can reveal the correctness of investors' behaviour. The findings of this study analysed in this chapter cover price behaviour over 15 years. Published research (Dawson 1987 and Yong 1991) which included IPOs over five and six years respectively and thus used fewer observations (21 and 33) do not investigate performance beyond the short period. This study expands the previous IPO studies over a longer time period using a larger number of firms. It also documents the validity of the Grinblatt-Hwang signalling hypothesis (Grinblatt and Hwang 1989) in the local market, which is a leading emerging market progressing towards the IFC's status of a developing market.[2]

2. Prior Research and Possible Theoretical Explanations

Conventional Underpricing Hypotheses and Evidence

Considerable research findings on pricing of IPOs in the developed (Australia, United Kingdom, United States and others) and developing markets (India, Korea, Malaysia, Singapore and others) suggest an apparent underpricing of new issues because offer prices appear to be a large discount off the initial listing day market prices. Such findings are so widely documented that only a summary of selected studies needs to be presented in this chapter (Table 10.1).

The underpricing of new issues reported in several studies is in the range of 9.9-28.5 per cent in the developed share markets in Australia, the United Kingdom and United States. Their respective country averages from the cited studies are 21.90, 9.1,18.9 per cent. The averages reported in Singapore and Malaysian studies are 36.5 and 135.00 per cent respectively, which are over short periods using smaller samples. Malaysia's figure is excessive, and is the highest for any country. Considered against the long-run share market returns reported in all these countries, the reward rates of those allocated new issues are substantially higher than normal rates of returns in the secondary markets of these countries.

The ratio of *abnormal returns-to-normal returns* in the respective markets (Table 10.2) can be used to assess the extent of comparative underpricing. These figures suggest that Malaysia's underpricing discount is excessive. Also, the two Asian markets in the table appear to generate higher rewards to the investors. It is a popular explanation that the high discount over offer price on day one is caused by adverse incentive of investment bankers to underprice to reduce losses from failure of an issue: preservation of underwriter reputation argument. There is documented evidence (Ibbotson 1975; Ibbotson *et al.* 1988) that new issues are riskier than average shares in the market.

Therefore, new issues should provide higher rewards, which is the source of underpricing. Investment bankers try to reduce the offer risk and costs of underwriting by underpricing the issue.

The persistent evidence of underpricing may also be due to the uncertainty about the real value of shares and the related need to offer compensation to investors for assuming

Table 10.1 Findings on IPO Underpricing in Developed and Developing Markets

New Issue Market Study	Year of Issues	No. of pricing	% Under-pricing
United States:			
Reilly-Hatfield (1969)	1963-65	53	9.9
McDonald-Fischer (1972)	1969-70	148	28.5
Ibbotson (1975)	1960-69	120	12.8
Newberger-Lachapelle (1983)	1975-80	118	27.3
Ritter (1984)	1977-82	1028	26.5
Ibbotson, Sindeler and Ritter (1988)	1960-87	8668	16.4
Aggarwal-Rivoli (1990)	-	283	-13.73*
United Kingdom:			
Buck-Herbet-Yeomens (1983)	1965-75	297	9.7
Australia:			
Finn and Higham (1983)	1976-1982	-	22.6
Deloping Markets:			
Malaysia:			
Dawson (1984)	1979-83	29	37.5
Dawson (1985)	1978-83	21	166
Koh and Tee (1985)	1973-84	62	33.8
Wong and Cheng (1986)	1975-84	64	36.8
Koh, Loke, Phoon and Lim (1989)	1987-88	9	30.82
Yong (1991)	1983-88	33	167

* This is the average decline in price over day one to 250.

Table 10.2. Underpricing Adjusted for Differences in Normal Returns

Market (1)	IPO Abnormal Return (2)	Normal (3)	Ratio of Return p.a (2) / (3)
Australia	21%	12.4%	1.70
Malaysia	135%	18.0%	7.50
Singapore	36%	16.0%	2.25
United Kingdom	9.1%	8.0%	1.15
United States	18.4%	13.0%	1.40

Source: These figures are taken from published studies (e.g. Ball, Brown, Finn and Officer 1979, and journals) and these are included in the references.

the risk of this uncertainty. However, recent evidence (Ariff, Prasad, Shamsher and Annuar 1994) contradicts this widely disseminated explanation. Shares appear to be issued at their intrinsic value but then prices are bid up by an overly optimistic investment market, which wrongly interprets demand pressure as underpricing.

Baron (1982) and Koh, Loke, Phoon and Lim (1989) assume that investment bankers are better informed about investors' demand for new issues, and therefore in most cases, the issuing company delegates the pricing decision to them. However, the issuer compensates the bankers for the use of his superior information by allowing bankers to offer new issues at a discount from the expected price in the aftermarket. Baron further suggests that the discount be an increasing function of the issuers' uncertainty about market demand for new issues. Recent studies have established that this uncertainty varies from period to period with uncertainty being lowest at or near the peak of business cycles when most IPOs tend to be issued (Rahman 1990).

Rock (1984) explains the underpricing of IPOs using the idea of information asymmetry between informed and uninformed investors. He suggests that the asymmetry of information between the issuer and their investment bankers is less relevant for pricing. Participation of informed investors determines the true price of the new issue. A discount is offered by the bankers to lure the *informed* investors to participate in the issue to reveal the correct value of shares during the initial period of trading, a task the informed investors will not engage in if there is no reward for this activity. Compared to informed investors, the *uninformed* investors end up buying more of the overpriced issues and less of the underpriced issues. Over time, however, the uninformed investors may become informed by learning to anticipate prices correctly through this adverse selection problem facing them. They may learn to bid only if the offer price is far below their expected market price to compensate them for the expected losses from overpriced issues. This is the winner's curse argument of Rock.

Speculative traders who did not get allocations of the oversubscribed new issues or received fewer shares than they wanted from the underwriters or at public lottery at the offering price will purchase additional shares after the secondary market trading begins. Their continued stagging activities in the aftermarket, i.e. their constant efforts to buy shares that were not allocated to them, push up and lead to overpricing of new issues temporarily. Thus, demand pressure at or after listing moves prices beyond the intrinsic values (Ariff *et al.* 1994). A recent study (Aggarwal and Rivoli 1990) appear to suggests that the prices are pushed up by demand pressure or *fads* in the short run. If this is true in an emerging market, then prices of new issues should decline in the long run after demand pressure subsides during the short run.

These explanations appear to suggest those underpricing rewards, which are slightly higher than the normal returns in most markets, may be explained away by higher riskiness of the new issues because of the *ex ante* uncertainty (Ritter 1994; Chua, Koh and Koh 1985) about the future profitability of the newly-listed firms. Alternatively, the presence of adverse incentives of underwriters and selling the issue at a discount to lower their losses or to ensure investor participation could all combine to lead to underpricing. Market conditions of demand pressures may account for the increasingly reported regularity of a long-run decline in the prices of IPOs. But some other explanation is needed to account for the new issue reward rate of 7.5 times the normal return of 18 per cent per annum in Malaysia. Underpricing reward is at most twice the rate of normal returns in other markets.

Kunz and Aggarwal (1994) found a 35.8 per cent first day underpricing in Switzerland. However, the average return over a 3-year period was negative. Loughran and Ritter (1995) found that IPOs are poor long-run investments for investors. During the five years after issue, investors received an average return of about 5 per cent. This is an unresearched theme, which we hope to cover in this study.

Grinblatt-Hwang Signalling Hypothesis

Underpricing of IPOs is also a signal about the quality firms with superior to inferior prospects (Grinblatt and Hwang 1989; Ippolito 1989). These firms signal their expected good fortunes to new investors using a low IPO price, and thus underprice the initial offering and make initial owners absorb these losses. Underpricing is a signal to investors that the issuing firm is a good performer which expects to cover losses after their expected good performance is realised; they are prepared to put the money to vouch for the quality of the firm. Good firms find it worthwhile to underprice their IPOs because it conditions investors to more favourably interpret subsequent financial results.

Grinblatt and Hwang (1989) cited in Ippolito developed a two-signals model to explain the information asymmetry between the firm that has better knowledge about the true value of the firm and outside investors who are uninformed. Firm value is assumed to be described by its future cash flows, which may be measured by the expected value of cash flows (mean=μ) and its dispersion (variance=σ^2). The two signals are needed to convey the firm's value because both mean and variance of the firm's cash flows are unknown at the time of new issue. In the context of Leyland and Pyle's (1976) paper, the issuer signals the true value of the firm by retaining a proportion of new issue, -, in his portfolio as well as by underpricing the offered portion as new shares at a discount D. They suggest that a risk-averse issuer raising capital to undertake an investment will prefer to issue equity to diversify his/her own portfolio and chooses - as the proportion of the equity to be retained where - > 0.

It may be reasoned that by retaining a higher proportion of the total share capital, the issuer forgoes the diversification of his personal portfolio, and thereby incurs a signalling cost. He will retain a significant ownership interest only if he expects the uncertainty of future cash flows from investments to be low relative to current value of those cash flows. So rational investors will see the fraction of equity retained by the issuer as a signal of firm value. In a class of issuers with the same firm risk, a high-value firm is motivated to signal itself vis-a-vis a low-value firm by retaining a greater fraction of the total share capital. The marginal cost of signalling is lower for high-value firms. There is some weak evidence (Ippolito 1989; Miller and Gehr 1978) for this hypothesis.

The second hypothesis proposed in Signalling Theory is that there could be a positive relationship between the degree of underpricing and the level of *ex ante* uncertainty (proxied by variance of returns) faced by investors. Beatty and Ritter (1979) and Rock (1985) provide evidence supporting this hypothesis. Another researcher (Jensen 1969) suggested that high-value firms underprice their shares more than low-value firms knowing that they can recover what they give away at the time of IPOs when the true values of firms are revealed over time after the issue date. This is another reason to include a longer window for studying the IPOs.

3. Data, Research Methods and Hypotheses

Sixty-five IPOs of Malaysian-incorporated companies from industrial, finance, properties, plantation and tin sectors are selected over the period 1975-1990 to form the sample. Public records in various issues of *Investors Digest*, *Daily Diary*, and the company files from the Registrar of Companies were accessed to obtain values for the variables. For each IPO issue, the offer price and prices on the first day, first week, first, third-, sixth-month of trading and so on until the thirty-sixth month of trading were extracted. The capitalisation-and dividend-adjusted monthly price relatives were used to calculate the rates of return for each issue. The KLSE Composite Index, a value-weighted index representing all the sectors, was used as a market proxy.

Returns to investors holding IPOs were estimated by computing the average return in excess of the market return at each time period t = first-day, first-week, etc. The listing date is marked as day zero, followed by the subsequent time at which prices were observed in event time. A period of 36 months after listing date is chosen to find out the price performance of the IPOs in the longer run. The first-day excess returns, the short-run, i.e. up to 6 months, and long-run excess returns from month 7 to month 36 were computed for each IPO. The first day return was computed by dividing the difference between closing price of the first trading day and the offer price with the offer price. This is also a proxy for the degree of underpricing.

This event-study approach is well suited to address the underpricing issue. The market-adjusted abnormal returns (AR) of each share (i=1,...N=65) are calculated for different time periods t (t = 0, 1, ..., T = 36 month) against the market returns from the Composite Index.[3] The risk-adjustment procedure using Market Model risk parameters and market returns cannot be applied as there are insufficient IPOs during each month to apply the RATS (Roll 1978) procedure.

$$AR_t = (N)^{1}\ \Sigma_{i=1..N}\,[R_{it} - E(R_{it})] \tag{10.1}$$

where

AR : market-adjusted average excess returns,

N : the number of firms i=1,...N=65 covered in the period,

R_t : rates of returns of firm i at event time t=0,1,..,36, and

E(R) : expected returns as being equal to returns in the market.

The excess returns from Equation 10.1 are equal to the excess returns over the market performance. This is unlikely to be different from the risk-adjusted returns because, first, the riskiness of the new issues in Malaysia is mostly around one, and second because the new issues are frequently traded to have little or no non-synchronous effects. The average returns were cumulated over event window over month one to month 36 to estimate the price performance over a sufficiently long run. The formula used was

$$CAR = \Sigma_{t=1..T}\,AR_t \tag{10.2}$$

where CAR is the cumulative average excess returns over time. Hypothesis tests are done using the conventional t-values on the assumption that the errors are i.i.d. and that serial dependence is zero. Further, with such few new issues, it is not possible to operationalise the RATS procedure to estimate systematic risk of new issues for risk adjustment.

Next we computed the variables for the signalling hypotheses of GH. The firm risk, σ, was proxied by the variance of returns between the offer and listing dates. Firm size

(FS) was measured as the market value of the firm, which is the number of shares multiplied by the offer price. The change in firm value (FV) is the percentage change in market capitalisation scaled by the ratio of the market index at the offer date and the listing date. Specifically, the change in firm value is computed by adjusting the percentage change in the market capitalisation between the offer date and the listing date. The fractional holding of the issuer, the insider shareholding, -, is measured by the number of shares retained by the issuer divided by the total number of shares outstanding at the issue date. Multiple regression and correlation analyses were used to investigate the relationship predicted by the signalling hypotheses. The signs of the correlation coefficients among the variables in the GH tests were observed along with the t-values. Control variables were entered in the regression to filter out the confounding effects of these variables on the signalling variables.

The following hypotheses on the performance and the signalling process were evaluated:

H1: The average first-day abnormal returns for the IPOs is positive.

H2: The abnormal returns in the aftermarket are small and insufficient, which would support demand pressure theory.

H3: The value of the firm is positively related to the fractional holding of the issuer, holding the variance constant.

H4: The degree of underpricing, D, is an increasing function of the variance, given the issuer's fractional holdings.

H5: The firm value is positively related to the degree on underpricing, given the issuer's fractional holdings.

The first two hypotheses are tests of underpricing under the conventional explanations - underwriters' reputation, seasoning, winners' curse and *ex ante* uncertainty of performance - for the existence of underpricing. Rejection of the null of H_1 is a test for significant initial period excess returns to reconfirm and quantify the existence of underpricing. Demand pressure explanation is valid if null hypothesis of H_2 is accepted. The rest of the hypotheses test the predictions of signalling via new issue proportional holding (H_3) and the degree of underpricing (H_4 and H_5).

4. Findings and Discussion

Short and Long-run Performance of IPOs

First day performances of IPOs are summarised in Table 10.3. The averages refer to first-day market-adjusted abnormal return of the Malaysian new issues over fifteen years. The first-day average excess return is 135 per cent.[4] This number is lower than the figures reported in other studies using a shorter period. The excessively high underpricing is slightly different from the findings reported in new issue studies on the market.

The minimum was 4.7 per cent and the maximum 563 per cent with a volatility of 111 per cent! No issues were marked below the offer price in this market. This ensures that the probability of loss by the special funds from overpriced new issues and, therefore,

Table 10.3. Average First Day Underpricing of IPOs in Malaysia

IPOs	
Mean	135%
Std. Deviation	111%
Coefficient of Variation	0.82% X
Minimum	4.7%
Maximum	563%

of their bankruptcy cost is zero. Further, the investment bankers in Malaysia appear to have no risk of underpricing as none of the issues failed, nor did any issue result in negative prices.

This suggests that the pricing is decided in such a way that all IPO events yield positive abnormal returns. This aspect can be investigated only in the context of market intervention to achieve the public policy goal of the Malaysian New Economic Policy for equitable capital ownership distribution over the long-run to achieve imbalances in capital ownership by the country's majority people.

There is, therefore, evidence to support H_1 that the first-day average underpricing is significantly higher than normal, and that this rate is the highest reported in any market. However, it is possible that the shares of new firms are in fact lower to reflect their intrinsic value but that the prices are bid up by an overly optimistic market as a fad builds up. This may be investigated by examining the performance over the longer run.

Performance over the initial period of six months is defined arbitrarily as the short-run performance (Table 10.4).

Table 10.4. Short-run Underpricing of IPOs Relative to Offer Prices: Malaysia*

First Day	First Week	First Month	Third Month	Sixth Month
135% (t=8.67)*	122% (t=8.91)*	128% (t=9.52)*	129% (t=8.36)*	133% (t=9.33)*

* Significant at or better than 0.05 acceptance levels

It is the price performance of IPOs from the close of the first trading day over intervals of time up to the sixth month after listing relative to the offer price. At the end of the first day, an average of 135 percent of abnormal returns was observed. At the end of first week of trading, the public offers recorded 122 per cent abnormal returns.

There is a slight price decline compared to the first day performance, probably due to profit-taking activities of some investors who sell their new issues. After the first week, there is a slight upward trend in the abnormal returns at the end of first month (128 per cent), third month (129 per cent) and sixth month (133 per cent). Generally, IPOs show significant excess returns at the end of first trading day, which decline slightly in the first week and then recover at the end of the sixth month. These findings again support the first hypothesis, and are supportive of H_2 in that there is no evidence of price pressure at or near the start of trading.

It is possible that IPOs are priced by the participants (the firms, the investment bankers, the informed investors and the government in the case of privatised firms) efficiently at their intrinsic value as the offer price but the optimistic expectations of after-market investors push up the prices during the initial period. However, this reasoning cannot account for the (a) large abnormal returns observed at the end of the sixth month and (b) short-run excess returns are about 7.5 times the normal returns of 18 per cent in the KLSE.

Long-run performance refers to the price performance of IPOs from the 7th to the 36th month of trading. Table 10.5 summarises the average abnormal return in the long-run. The percentage average abnormal returns measured against the offer prices at the end of the seventh month to the first year are 133 per cent, whereas at the end of the second year they are 94 per cent. They decline to 77 per cent at the end of the third year. In general, though the average abnormal returns in the long run are smaller than those in the shortrun, these are positive and statistically significant. These findings, therefore, do not support H_2 which maintained that the market prices the IPOs correctly soon after the listing. The market is inefficient to some extent with respect to the pricing of new issues in the long run, or alternatively the market appears to be influenced by demand pressures in the short run. However, as the prices had not declined to anywhere near the long-run normal returns of about 18 per cent even after three years in the Malaysian market, it is possible that the high returns can only be explained by another economic reason, which is important in Malaysia.

TABLE 10.5. Long-run Underpricing of Malaysian IPOs Relative to Offer Prices

7 Months - 1 Year	2-Year	3-Year
133%	94%	77%
(t=8.08)*	(t=6.00)*	(t=4.60)*

* Significantly underpriced at, or better than 0.05 levels.

Malaysian regulators have put into place a mechanism for intervention in the stock market listing process to achieve an equitable distribution of growth in capital among the various segments of the Malaysian investing public. Each firm issuing shares to the public is required under the country's investment rules to issue about a third of the tranche to special investment funds and/or Bumiputra individuals. This regulation was introduced at the national level in 1976 to ensure that over the long run all segments of the population would have equitable ownership in the productive capital of the economy. No market intervention, however, takes place to redistribute existing shares of already-listed firms, a phenomenon associated with the economic concept of nationalisation that rocked the world in the 1950s-1970s with disasterous consequences to several economies. The investment trusts, but not individuals, must compulsorily acquire the allocation. Being mutual funds acting on behalf of targeted segments of the population, these trust firms are therefore exposed to a high risk of bankruptcy if IPOs are priced too high or if the prices fall below the offer prices. Reducing offer prices sufficiently below true values would ensure these mutual funds get positive returns as an incentive to compulsorily acquire the offered tranche. Recall that, unlike any other market, Malaysian IPOs have never yielded a negative return on any period relative to the offer price! Only by ensuring offered prices are sufficiently below long-run prices could the public policy goal be achieved while also preventing failures of these investment firms. Thus, we reject H_2 and advance a market micro-structure reason of market intervention as an explanation for the massive underpricing observed in this market.

Signalling Hypotheses

The results of signalling tests on IPOs are discussed here. Table 10.6 highlights summary statistics of the firms with regard to the variables used. The average underpricing, D, is 135 per cent and average proportion, α, of retained equity is 70 per cent with a range from slightly above zero to 89 per cent. To examine the testable implications of the GH model, statistics in Tables 10.6 and 10.7 are examined. Results reported in Table 10.6 suggest that there is a statistically significant positive correlation between firm risk, α, and the degree of underpricing D. There is also a significant positive correlation between firm risk and change in firm value, FV. But there is a positive but not significant correlation between level of insider shareholding and change in firm value.

Table 10.6. Summary Statistics of Variables for Signalling Tests

Variables	Mean	Std Dev	Min	Max
D, Underprising	132%	133%	-2%	569%
α, Insider Shareholding	70%	11%	0%	89%
FS, Firm size	RM77.6m	RM66.3m	RM5m	RM1200m
Issue Size*	RM17.96m	RM14.56m	RM2.4m	RM203.9m

* Issue size refers to the size of IPO defined as the total number of shares offered to the public multiplied by offer price.

Table 10.7. Correlation Coefficients from IPO Signalling Tests

	α	D	γ	FS	ΔFV
α	100				
D	0.30 (4.15)**	1.00			
γ	0.24	0.93 (2.56)*	1.00 (268.89)*		
FS	0.20 (1.75)	0.15 (0.968)	0.08 (0.271)	1.00	
Δ	0.23 (2.45)	0.83 (93.00)*	0.70 (40.36)*	-0.04 (0.067)	1.00

(.) indicates t-statistics

Significant at * (.01) and ** (0.05) probability levels

Table 10.8 shows results from a set of three regression runs. In regression one, the change in firm value appears to be negatively related to the level of insider shareholding. Firm size entered as a second independent variable is held constant in this regression. However, the relationship is not statistically significant (coefficient = -0.142 with p-value of 0.780). These findings are inconsistent with the predictions of the Grinblatt-Hwang (GH) model, which suggests that insider shareholding signals firm value. Regression two revealed that when firm size is held constant, firm risk is a good explanatory variable for the degree of underpricing (coefficient = 0.141 with a p of 0.000). There is no statistically significant relationship between the degree of underpricing and the level of insider shareholding (coefficient = 0.716, p = 0.086), which is consistent with the prediction of the GH model and is supportive of H_3 and H_4.

Table 10.8 Multiple Regression Results from Signalling Tests

	Intercept	α	D	Υ_2	FS	Adj R	F-STAT
Regression 1 Δ	0.0502	-0.142	0.641	-	-	0.68	68.6
Regression 2 D	0.327 (0.264)	0.716 (0.086)	-	0.141 (0.000)	-	0.87	21.5
ΔFV	0.156 (0.237)	- (0.000)	1.117 (0.000)	-0.076 (0.002)	1.45	0.76	66.9

(.) indicates probability values in parentheses

There is no statistically significant relationship between the degree of underpricing and the level of insider shareholding (coefficient = 0.716, p = 0.086), which is consistent with the prediction of the GH model and is supportive of H_3 and H_4. In the third regression, where the level of insider shareholding is controlled, which is also predicted to be related to firm value, the change in firm value is found to be an increasing function of underpricing (coefficient = 1.117, p = 0.000). These findings support H_5.

Although the results of the correlation and regression analyses support two of the three testable implications of the GH model, the changes in firm values are estimated from the change in values between two discrete points in time. Therefore, an analysis of abnormal returns of the sampled firms over the sampled period using event-study methodology is carried out to substantiate the above analysis.

The findings presented in Table 10.9 show that none of the abnormal returns in the three categories of insider shareholdings are statistically significant, or consistent with the results of the regression analysis reported above. These results are inconsistent with the prediction of Signalling Theory.

Further analysis was also done. Eight IPOs were categorised in the very high-to-high category respectively, 16 in the average category and 33 in the low category. The findings summarised in Table 10.10. show that only the average excess returns for the low category are statistically significant over the three-year period. These findings are anomalous to the prediction of the GH model, but are consistent with the findings on the Singapore market cited earlier.

Table 10.9 Average Underpricing of IPOs in Post-listing Period and Insider Shareholdings

Category	Average daily market adjusted returns		
	Year 1	Year 2	Year 3
High (80 < α > 89)	-0.279% (-0.585)	-0.021% (-0.042)	-0.302% (-0.0312)
Average (70 < α > 79)	0.263% (1.054)	0.183% (0.372)	0.195% (0.276)
Low (0 < α > 69)	0.034% (0.121)	0.146% (0.196)	0.123% (0.178)

(.) indicates t-statistics

Table 10.10 Average Underpricing of IPOs in the Post-listing Period and Premium Discount

Category	Average daily market adjusted returns		
	Year 1	Year 2	Year 3
1: Very high underpricing (D > 100%)	-0.593% (-0.708)	-0.716% (-1.020)	-1.033% (-1.061)
2: High underpricing (51% < D < 100)	-0.321% (-0.883)	-0.467% (-0.835)	0.500% (0.770)
3: Average underpricing (31% < D < 51%)	-0.224% (-0.845)	-01.91% (-0.549)	-0.428% (-1.40)
4: Low underpricing (0 < D < 30%)	0.558 (3.189)*	0.451 (1.854)**	0.549 (2.119)**

(.) indicates t-statistics

* Significant at .01 and ** at .05 probability level

Tests of signalling hypotheses provide inconclusive results in the Malaysian market. A probable reason for this result is that the signalling costs are likely to be higher for inside owners given the costs of complying with the market intervention rule regarding the national objective of fairer distribution of newly-issued capital ownership. Therefore, it is difficult to signal given the constraints facing the firms.

Indirect evidence in support of this explanation is the high proportion of retained ownership ($\alpha = 0.70$) compared to Singapore or other countries with no such regulation; retained ownership is below 60 per cent. That suggests that the original owners retain a high proportion of shares to minimise the cost of complying with the rule on share distribution to specific groups. Thefore, the signalling effects are swamped by other factors dominant in the Malaysian economy.

5. Conclusions

The short- to long-run performance and the signalling tests on a sample of Malaysian IPOs were examined over fifteen years. Findings from this comprehensive study over a long test window suggest that the average excess returns on the first trading day were 135 per cent, which is smaller than the figures reported in prior studies. This average return declines slightly in the first week and then gradually increases over several months till the 15th month. The long-run returns are lower as they decline gradually from the 16th month. However, all returns are positive and statistically significant from zero. Those investors who receive the new issue from the issuing firm earn average abnormal returns of 133 per cent after one year and the returns decline to almost half (77 per cent) after 3 years. This appears to suggest that, on average, the IPOs are inefficiently priced and the KLSE is inefficient with respect to pricing the IPOs. Alternatively, the prices formed in the initial period of three years are either driven by fads in the early period and/or the true value of new issues are resolved after three years of trading on disclosed performance of firms after the listing.

However, the absence of negative returns in any issue, coupled with the long-run performance at about 4.5 times the annual normal returns of *seasoned* issues, requires other than the conventional explanations advanced for underpricing in the developed markets. Perhaps *market intervention* is a key variable for the excessive underpricing. The public policy objective requires compulsory off-take of about a third of new issue tranche by certain investment firms and certain segments of the population perceived to have low share ownership. This market micro-structure in the new issue processing is the reason for the high excess returns. The excessive returns are to reduce the bankruptcy probability of these publicly-financed special investment firms. It may also reflect the policy-maker's belief that the population targeted to receive the compulsory off-takes should suffer no losses if the scheme is to be credible. This would have us argue that the excessive underpricing arises from regulatory intervention and preservation of the reputation of the government, which pursues the intervention partly through established market procedures.

Underpricing in Malaysia is the result of a unique share allocation procedure in the market-making of new issues. Such unique characteristics are worth investigation, for example, using the model on allocation lottery as in Koh and Walters (1990). Therefore, underpricing is the consequence of the design of the market-making apparatus in place in the new issues market, and not merely the result of asymmetric information, winners' curse or *ex ante* uncertainty or seasoning.

On the signalling hypotheses of IPOs, only two of the three testable implications of the Grinblatt-Hwang version of the Signalling Theory are supported. There is a significant positive relationship between underpricing and (a) firm risk and (b) change in firm value. However, the results of the abnormal returns analysis are inconsistent with the prediction of the model. It is possible that the model requires some refinements to suit the requirements of a developing securities market. Alternatively, the extent of underpricing on the KLSE arising from market intervention is too large, and this swamps the effects of signalling.

End notes

1. Ariff and Johnson (1990: p.15) document the relative volatility of Asian share markets. Since self-listing is not permitted, firms appoint investment bankers to make application (i) to the

Securities Commission (the Capital Issues Committe of the Central Bank prior to August 1993) for approval for issuing prospectus to investors for sale of share and (ii) to the Kuala Lumpur Stock Exchange (KLSE) for permission to list the firm. On average, the KLSE-listed firms raise about RM16 billion per year, of which 75 per cent was from new issues in 1993.

2. The Malaysian share market is classified by the International Finance Corporation Inc. as an emerging market. This market's capitalisation in June 1993 was 160 per cent (*Business Times*, July 1993) of the GDP of Malaysia, and hence is closer to the definition of a developing than an emerging market. An emerging market's capitalisation is usually below 40 per cent of GDP.

3. The effect of thin-trading on the systematic risk of new issues is not likely to be significant since new issues are generally heavily traded in the Malaysian market.

4. The reported figures of 166 per cent (Dawson, 1987) and 154% (Yong, 1991) are slightly higher than the abnormal returns of all IPOs included in this study.

CHAPTER

11

Underpricing of Government-Linked and Private New Issues*

Abstract

Listing of *government-linked companies* on the stock exchange is on the rise in Asia Pacific countries. Large capitalisation of these companies help to boost the size of the stock markets, and often results in these companies constituting about 15 per cent of total capitalisation of markets in some exchanges. There are special reasons for such firms to be *more underpriced* than private issues. This study of 17 such firms in comparison with private issues over a sixteen-year period suggests that there is a systematic higher underpricing though the difference is not statistically significant.

1. Introduction

The privatisation programme in Malaysia began in earnest in 1983 with the objectives of (a) reducing the government's financial burden to run government-linked companies, (b) increasing the depth and liquidity of the stock exchange through listing some of the large entities (examples are Tenaga Nasional, Telekoms and Proton) and (c) to provide the public with more efficient services while providing better remuneration for employees of these companies. The privatisation master plan identified at least 246 out of 400 government-linked companies as likely candidates for privatisation. The expected proceeds by 1995 from this exercise on public sector reform is estimated to be RM16 billion, about 9 per cent of the GDP in 1995. Some of the large privatised entities that qualify for listing on the stock exchange have already been listed. At the time of this study at end-1994, 17 privatised government entities were already listed, of which ten entities added a total of RM34 billion (18 per cent) to market capitalisation at the time of listing.

The new issues of Government-Linked Initial Public Offers (GLIPOs) are widely scrutinised even before privatisation by the regulators, the financial community and the public. At the time of new issues from privatisation, wider publicity is given by the government and the underwriters compared with little or no promotion done for the private non-government companies seeking listing. Since, prior to listing, the performance of the GLIPOs is already closely scrutinised by the public through

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Parliamentary supervision, their *ex ante* uncertainty about its future performance is likely to be lower than that of private companies. Therefore the *underpricing* of GLIPOs can be expected, on this theory alone, to be lower than that of the private entities, where the *ex ante* uncertainty is greater. Thus, private IPOs ought to be underpriced more.

However, there are special reasons why GLIPOs may be priced higher than equivalent private issues. The government is expected to attain public policy goals of egalitarian wealth distribution among different ethnic sectors of the Malaysian population and this would encourage lowering the offer prices to enable a premium to be built in to make such offers attractive enough for members of public to participate in the market. To minimise the political costs of flotation failures, both the government and the investment bankers may lower offer prices as well so that future privatisation would look attractive to encourage further listing of GLIPOs. Also, once listed, the GLIPOs are expected to be more efficiently managed as private sector firms, so that these firms are good buys. Privatisation also helps to deepen the capital market by adding more firms. These public policy goals require that GLIPOs should be very successful, and therefore, there are incentives to underprice them to achieve these goals.

For these reasons, it is highly probable that the government agencies and investment bankers price the GLIPOs lower than the new listings of private entities. This line of argument suggests that GLIPOs are underpriced more than the private IPOs. The main concern in listing private company shares is not the achievement of public policy goals of welfare economics and political considerations but rather the successful listing and generation of maximum wealth for its shareholders through profitable investment ventures.

Thus the objectives of this chapter are first, to compare the underpricing of GLIPOs and private entities and second, to measure the pre- and post-listing performance of GLIPOs to evaluate the gains from privatisation. A brief review of existing studies is highlighted in Section 2, which is followed by an explanation in Section 3 of how this study is conducted. The findings are reported in Section 4. There appears to be no significant difference in the underpricing of the two classes of firms through systematic higher average return to investors from GLIPOs.

2. Review of literature

Studies on underpricing of private IPOs in developing markets (Aggrawal and Rivoli 1990; Ritter 1991) and developing markets (Ariff and Chung 1993 for Singapore and Malaysia) provide evidence that there is initial underpricing, except that the degree of underpricing is about three times greater (70 per cent) in developing markets then in developed markets (19 per cent). Several theories, such as winner's curse, asymmetric information, *ex ante* uncertainty, seasoning costs, etc., have been advanced to explain the underpricing, all of which can only partially explain this regularity.

Baron (1982) suggests that issuing firms delegate the pricing decision to investment bankers who are assumed to have more information about the potential demand for new issues. Investment bankers have incentives to offer generous discounts to mitigate the probability of failure of an issue and hence avoid legal liability. This idea is also consistent with Rock's (1986) proposition that underpricing brings informed investors to the market to subscribe for those issues that are likely to result in higher after-listing price, whereas uninformed investors learn over time through adverse selection process.

Beatty and Ritter (1989) proposed that the level of underpricing is a function of the *ex ante* uncertainty of after-listing performance, whereas Aggrawal and Rivoli (1990) and Ritter (1991) argued that new issues are correctly priced but the price is pushed up temporarily through short-term speculative demand.

There is scarcity of published evidence concerning the underpricing of government-linked companies; one is the study by Ariff and Chung (1993), which reported higher underpricing for GLIPOs than private IPOs for a small sample of firms on the Singapore and Malaysian market using trend analysis.[1] For government linked entities, higher underpricing could be explained away by intentional efforts to improve the chances of success of an issue to minimise political costs and provide precedence for successful future listings. It also protects issuer reputation. GLIPOs also have the welfare economic objective of egalitarian distribution of wealth among the various ethnic sectors of the population, which has become a major platform of governance of this multi-ethnic country to save it from inter-ethnic strife of the type that occurred in 1969.

Privatisation is a novel public sector reform first initiated in developed countries such as Britain and France. This reform has been adopted by developing countries since 1984 as a means of addressing public sector efficiency. For a review of theories and the role of privatisation within the larger framework of development planning, see Ariff and Iyer (1995). Better services from privatised firms are offered at higher costs because of the absence of government subsidy, though the higher cost is partially offset by the large initial discount, greater share ownership and later cash dividends to shareholders.

The large underpricing for GLIPOs could also be due to speculative demand created by intensive marketing of the GLIPOs compared to private listings. However, the speculative demand is expected to subside in the long-run when the euphoria of share promotion settles down. In Malaysia, the average underpricing for private IPOs at the close of first trading day is 104 per cent and it declines over time to about 70 per cent at the end of three years (Ariff, Prasad, Shamsher and Annuar 1995). This study substantiates these findings by directly observing the underpricing of 11 Malaysian GLIPOs and 53 private IPOs.

3. Data, Methodology and Hypotheses

Eleven GLIPOs and 53 private IPOs traded over the period 1975 - 1992 were included in this study. The offer price and the price at the end of first day of listing, the first week of trading, the first, third, sixth month (short-term) and first, second, and third year (long-term) of trading were sourced from various sources such as *Daily Diary* files and newspaper clippings. The market returns were calculated from the Composite Index for the corresponding period. Both risk-adjusted and market adjusted returns were used to measure performance of IPOs. The market adjustment procedure (Chapter 9 for explanation of how to compute the MAR)was used to calculate the excess returns as there is evidence (Ariff and Johnson 1990) of relative superiority of this procedure for calculating excess returns in a relatively thinly-traded market such as the KLSE. The average returns at the close of the first trading day to the end of six months represent the short-run performance and the return from the end of the seventh month to the end of the third year reflects the long-run performance.

The first two hypotheses test the short- and long-term underpricing of GLIPOs and private IPOs respectively. That is, the null hypothesis of market adjusted returns of these firms is equal to zero against the alternative hypothesis that is significantly positive. The third hypothesis is a test on the differences in adjusted returns of the GLIPOs and private IPOs. That is, the null hypothesis of greater underpricing for GLIPOs over private IPOs against the alternative hypothesis of no difference in the underpricing of the two groups of IPOs. The fourth hypothesis concerns the apparent benefits from privatisation. That is, the null hypothesis of market adjusted return in the post-listing period of GLIPOs is greater than pre-listing against the alternative hypothesis of no difference in the adjusted returns of pre- and post-listing of GLIPOs.

4. Findings

GLIPOs and Private IPOs are Underpriced

The findings summarised in Table 11.1 show that the average underpricing (market adjusted) is positive and significantly different from zero. The first-day underpricing in either case is about 100 per cent, which is maintained up to the 24th month (recall it was up to the 15th month in Chapter 10) though the returns at end of 36 months are significantly lower. This is in support of the alternate hypotheses that there is significant underpricing in the short- and long-term for both the GLIPOs and the private IPOs.

Table 11.1 Average Market Adjusted Returns (MAR) of Private and Public IPOs

Period	Private Firms			Public Firms		
	MAR	t-Stat	Std dev	MAR	t-Stat	Std dev
Day 1	108.28	9.25	92.91	103.32	4.99	85.32
1st Week	104.99	9.76	85.36	103.89	4.67	91.68
2st Mth	103.92	9.15	90.19	101.09	4.93	84.58
2nd Mth	96.72	8.48	90.52	112.05	4.79	96.49
3rd Mth	105.08	7.87	106.04	108.56	5.74	78.00
4th Mth	97.27	7.83	98.65	111.56	5.60	82.12
5th Mth	95.03	7.25	104.00	108.81	5.92	75.76
6th Mth	105.55	8.07	103.82	109.91	6.07	74.66
12th Mth	105.48	7.63	109.76	123.89	5.12	99.84
24th Mth	99.70	6.04	131.04	99.89	5.08	76.09
36th Mth	83.89	3.89	171.17	92.56	4.96	72.30

* Significantly underpriced at 0.05 or better level

Due to the deliberate lowering of offer prices by offering agencies, the short-run underpricing is expected to be higher than the long-run underpricing, assuming that the share markets are reasonably informationally efficient. The findings (Table 11.2) show that the premiums for GLIPOs are not consistent with this conjecture as the level of short-run underpricing is about twice that of long-term underpricing. These findings are not in support of the speculative demand hypothesis (3) which suggests that there is a temporary demand shift in the short run due to the intense publicity campaigns for the GLIPOs to obtain higher equilibrium prices at listing to minimise the chance of failure.

Table 11.2 Market Adjusted Returns (MAR) of Private and Public IPOs

Period	Private Firms			Public Firms		
	RAR	t-Stat	Std dev	RAR	t-Stat	Std dev
Day 1	9.43	1.56	47.97	-0.29	-0.03	41.47
1st Week	5.98	1.22	38.80	0.32	0.04	34.41
2st Mth	-3.80	-1.02	29.65	6.26	0.92	25.38
2nd Mth	3.27	0.62	41.5	0.10	0.01	28.14
3rd Mth	-2.93	-1.01	22.94	-0.39	0.12	27.34
4th Mth	-0.09	-0.03	22.90	-1.69	-0.29	13.41
5th Mth	8.42	1.63	41.11	-0.50	-0.07	2378
6th Mth	3.77	0.51	59.18	15.38	1.77	2762
12th Mth	-3.56	-0.36	79.56	3.57	0.32	35.92
24th Mth	-3.56	-0.36	79.56	3.57	0.32	43.63
36th Mth	-24.17	-3.03*	63.21	-24.45	-2.14*	44.16

* Significantly underpriced at 0.05 or better levels

Are GLIPOs more Underpriced than Private IPOs?

For the private IPOs, the level of underpricing is about equal for both the short and long terms. These findings support the notion that there are positive expected benefits from privatisation of GLIPOs, which apparently are observable over the three-year analysis. The statistics in Table 11.3 show that, except for the difference in market

Table 11.3 Differences in Short-term and Long-term Underpricing (percentage) between GLIPOs and Private IPOs: 1975-1992

	1st Day	1st Wk	1st Mth	3rd Mth	6th Mth	1st Yr	2nd Yr	3rd Yr
Return	-14	-9	-9	-31	58	23	45	31
t-	-0.5	-0.33	-0.47	-0.23	0.09	1.46	1.03	2.1*

* Significantly underpriced at 0.05 or better levels

Table 11.4 Test on Difference in Mean Market Adjusted Returns

Day	MAR (Private-Public)	t-Stat	RAR (Private-	t-Stat Public)
1st Day	1.06	0.036	-20.29	-1.54
1st Week	3.93	0.13	-18.12	-1.39
1st Mth	26.25	0.80	6.14	0.59
2nd Mth	16.24	0.44	-0.65	-0.060
3rd Mth	21.63	0.64	-3.49	-0.31
4th Mth	17.58	0.50	-3.65	-0.540
5th Mth	23.22	0.70	1.63	0.186
6th Mth	10.03	0.35	11.89	0.837
12th Mth	10.24	0.30	3.51	0.215
24th Mth	68.55	1.41	30.74	1.17
36th Mth	2.12	0.031	0.94	0.059

* Significantly underpriced at 0.05 or better levels

adjusted average returns for the third year, the underpricing of GLIPOs appears to mitigate political costs of flotation failure. The level of underpricing is about equal to the private IPOs. This could be due to the lower *ex ante* uncertainty of the GLIPOs caused by massive information dissemination prior to listing.

5. Conclusions

The Malaysian government's privatisation programme has led to the listing of many of the privatised entities on the KLSE with the objective of attaining public policy and welfare economics goals apart from the normal aims of developing an efficient capital market for the private sector. The success of listing the GLIPOs is of paramount importance to the government for reasons of political costs and the need for maintaining continued public interest in future listing of privatised firms. Therefore, there is special incentive to underprice these issues (or even to support higher post-issue prices). Evidence from this study is not strongly in support of this idea, but the direction of the results is as predicted. A possible reason for this is perhaps due to not adjusting for the lower-risk of GLIPOs. The 11 GLIPOs have an average risk comparable to the blue-chip counters, and the private IPOs have an average riskiness of 1.2. Hence, the market adjustment procedure used in this study would have underestimated the average underpricing of GLIPOs, and thus the results only show a systematic greater underpricing but not a significant difference predicted by the theory developed here to deal with GLIPOs. Further study is encouraged in this direction when more such firms are listed, which will enable the application of risk-adjustment using the RATS procedure.

End note

1. A special Issue of *Financial Management in* 1994 has four articles on privatisation.

CHAPTER

12

Stock Price Reaction to Bonus Issues*

Abstract

Announcement effect on share prices at the time of bonus issues (stock splits) in the Malaysian share market is examined. The findings suggest that *bonus issue announcements are anticipated by the market about three weeks before announcements.* For the joint announcement sample, the incremental effect of dividend announcements is not statistically significant, suggesting that the information content of bonus announcements dominates. Bonus announcements appear to be interpreted as good news, perhaps indicating that there is likely to be increased dividend yield after the split. This requires further scrutiny.

1. Introduction

Bonus issues are offered at zero subscription price to existing shareholders in proportion to their shareoldings. A bonus issue is equivalent to a stock split in the New York Stock Exchange or Australian Stock Exchange. There is no change in the total shareholders' fund after the bonus issue and the total value of the firm should remain unchanged. The only change is an accounting re-arrangement of capital accounts. Thus bonus issues have no direct cash flow implications for valuation and hence share prices (assuming that the bonus-issuing company cuts dividends in proportion to the increased portion of the shares issued).

Bonus issues are frequently accompanied by favourable news of revaluation of assets or by forecasts of higher dividends. Bonus issues also serve to remind investors of the firm's inability to pay cash dividends. Research on the announcement effects of stock splits in several developed capital markets suggest that these announcements contain information relevant to market participants for reassessing share prices of announcing firms. The market makes advance forecasts of the information content and is generally efficient in that the prices adjust quickly and fully to new information contained in these announcements (Fama, Fisher, Jensen and Roll 1969; Ball, Brown and Finn 1977; Grinblatt, Masulis and Titman 1984). However, in developing and thinly-traded markets, many investors believe that bonuses are of value even after the public announcement of these events; examples are Neoh (1986), Ann and Keep (1987), Ariff and Finn (1989) Guo and Keown (1992).

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* This is a reprint of an article that appeared as 'Share Price Reactions to Bonus Issues' by Annuar Md. Nassir and Shamsher M. in *Capital Market Review* Vol. 1(2) (1993): 67-81 (Malaysia). We thank the Editor of the Journal for permission to reproduce this article. The article has been edited by M. Ariff to conform to the general style and the format of this book.

This study substantiates evidence on the efficiency of the KLSE with respect to bonus issues announcements. This chapter extends the earlier work of Neoh (1986) on the announcement effect of bonus issues on share prices of firms on the KLSE with some refinements. The refinements are: it uses a more recent set of data over a lengthy period of 1980-1990; it adjusts for thinness of trading of stocks on the KLSE; it uses daily instead of weekly data to evaluate the speed of price adjustment to the announcements; and it determines the materiality of any inefficiency observed. This is an important study as evidence of efficient capital market behaviour assures an optimal transfer of savings to investments. Prevailing prices in such markets reflect all available information, and prices are good indicators of efficient capital allocation. Further, the existing studies covered a shorter span of time, which could have led to a general perception that profitable investment strategy can be adopted to earn abnormal returns after announcements, which militates against the findings reported in other recent studies. There is a need to replicate the study of Neoh (1986) over a longer window using a better measure of the market as this study in particular has led to results inconsistent with the implications of a recent study on market efficiency (Anwar, Ariff and Shamsher 1994).

2. Previous Studies

In their now celebrated study, Fama, Fisher, Jensen and Roll (1969) attributed the price reaction to stock splits to market's reassessment of likely future dividend changes rather than to the split itself. The information implied in the split is, on average, fully reflected in the prices immediately after the announcement dates. However, the use of monthly data may fail to measure the speed of price adjustment to these announcements.

Ball, Brown and Finn (1975) investigated the market reaction to capitalisation changes in Australia and found that the information effect is attributed to the dividend implications contained in these announcements; in Australia there is clustering of dividends and bonus issues. They showed that stock splits that were not accompanied by subsequent dividend increases showed no price reactions, consistent with dividend information effect hypothesis. They concluded that the Australian stock market appears to be efficient with respect to the announcement of bonus issues, as post-announcement drifts fluctuate randomly around zero. Grinblatt, Masulis and Titman (1984), in an American study, found that the price reaction to announcement of splits and stock dividends is due in part to dividend information effects and in part to information which is not dividend related.

Neoh (1986) investigated the announcement effects of 182 bonus issues in the Malaysian share market for the period 1968-1983 using weekly data. This study provides evidence that the market as a whole is not efficient to bonus issue announcements as there is significant residual movement from 15 weeks before to 4 weeks after the announcements. This study used a privately constructed index on which no information is publicly available.

Ann and Keep (1987) studied 88 bonus issues on the Singapore stock market during 1975-1984 using daily prices to measure the direction of market response to bonus issue announcements and ex-bonus share prices. They concluded that there is a non-Random-Walk-consistent behaviour of share prices after the announcement of bonus issues and the price adjustments are not immediate when stocks go *ex*-bonus. This would mean that the Singapore share market is inefficient in pricing the value of the capitalisation changes from these events during the period of study. Ariff and Finn (1989) examined the price response to capitalisation changes in the Singapore stock market, including a larger sample of 371 bonus issues during 1973-1982. Using monthly data and refined methodology dealing with thinly traded stocks as suggested by Dimson (1979) and corrected by Fowler and Rorke (1983), this study provided evidence that the market is efficient with respect to bonus issues announcements. In fact, prices react over the pre 2-month period and returns increase by about 14 per cent on account of the expected increases in the dividends following the capitalisation changes.

Guo and Keown (1992) studied the impact of dividends and bonus issue announcements on 40 listed firms on the Hong Kong Stock Exchange using daily data for the period 1984-1988. Using a sample of 188 dividends and 41 bonus announcements, they concluded that there is significant market reaction for bonus issues and dividend decreases at the time of the announcement, although the speed of adjustment in anticipating the information is slower and lasts longer compared to the U.S. market.

3. Data and Methodology

Data for this study were obtained from various financial publications such as the annual *Company Handbook*, *Investors Digest*, *Daily Diary* and local business newspapers. A total sample of 65 bonus issues from 1980 to 1990 was included for analysis. This is a very small sample out of the population, but it is a representative sample. A bonus issue often comes along with a cash dividend announcement prior to it. The total sample is categorised into two sub-samples of pure bonus issue announcements (n=32) and a sample of joint-dividend announcements (n=33). The sampled firms made no other major announcements during the period of analysis and are also actively traded.

The Market Model (Sharpe 1963) was used to estimate the normal returns. The disturbance term in the regression Equation (12.1) was used to empirically estimate the abnormal returns at each time, t = 1,...., T and over each event i = 1,....,N.

$$R_t = \alpha_i + \beta_i (R_{mt}) + e_{it} \tag{12.1}$$

where

R_{it} : return of i-th security during period t,

R_{mt} : return of the market using KLSE Composite Index,

e_{it} : return attributable to non-market forces, and

α and β_i : intercept and slope of a particular security respectively .

To test for significant changes in the average behaviour of a large number of securities subject to a given information event at different times, t, the average and cumulative average abnormal returns were used. The daily average residuals (AR) for each of the 30 days before and after the announcement day were computed by averaging the daily abnormal returns across all the stocks in the sample.

To eliminate the possible problem of non-constant variances of the abnormal returns (heteroscedasticity), they were standardised by the standard deviation of the abnormal returns for the estimation period (day -90 to day -31 and day +31 to day +90). The standardised abnormal returns (SAR) are defined as follows:

$$SAR_{it} = AR_{it} / S_{it} \qquad (12.2)$$

where S_{it} is the standard deviation of abnormal returns in the estimation period. To mitigate possible non-synchronous trading problems (arising from market's price at the end of the day t being inaccurately matched with prices of thinly-traded shares and consequently resulting in biased estimates of systematic risk), this study adopts the Dimson's procedure with Fowle-Rorke corrections as developed in Ariff and Lim (1990).[1]

For the sample of joint bonus and dividend announcements, share price response to changes in dividends was evaluated. A naive model was used to determine the direction of change in dividends. This model assumes that the best estimate of future dividends is the current dividends. For each firm in the sample, the dividends per share (DPS) at time t were compared with DPS at time t-1. To evaluate the incremental effects of dividend announcements on share prices for the sample of joint bonus and dividend announcements, the Wilcoxon signed rank test was used to test the null hypothesis of no difference in abnormal returns between pure bonus issue samples and that of joint announcement samples.[2]

4. Findings

Total Sample

Table 12.1 presents the results for the total sample bonus issues announcements. The cumulative abnormal returns (CAR) took off from day -12 and climbed from 0.97 to 4.78 per cent on the 27th day after the announcements. The CAR up to and including the announcement day was large, positive and significant (3.09, t(CAR) is 4.55). The significant abnormal returns (AR) on days -25, -24, -8, -3 and -2 also suggest that there was anticipation of the announcement as early as 25 days before the announcement. This might have beeen due to either insider trading activities or leakage of information. The gradual rise of CAR from day -25 to -7 might be due to possible leakage of price sensitive information and the sharp price rise from day -7 to the announcement day could be attributed to insider trading. The AR on announcement day was positive and significant, which suggests that bonus issues announcements are perceived as good news and investors expect some windfall from the announcement. In the post-announcement period, the market corrected itself immediately after the announcement and stabilised around day +13, after which there was a clear upward drift until day +22. From day +23 onwards there was a downward drift. The decline in CAR immediately after the announcement reflects profit-taking activities and suggests a consolidation phase where market correction took place. The CARs from day +1 was generally higher than that of the announcement day, and the largest CAR was observed on day +27 (4.78) before the downward drift begins.

These findings are consistent with those of Neoh (1986) for the Malaysian market and Ann and Keep (1987) for the Singapore market. However, if an investor buys shares at announcement and holds them for 27 days, his or her returns net of transactions costs would be -1 per cent.[3] This implies that the positive drift after day +13 is of no economic significance to investors as they can only earn returns commensurate with the assumed

Table 12.1 CARs Around Bonus Issue Announcement in Malaysia

DAY	AR	T-AR	CAR
-29	0.1235	1.1320	0.1235
-28	0.0662	0.9900	0.1897
-27	0.0926	0.3670	0.2824
-26	0.0011	0.0130	0.2835
-25	0.1198	1.7240*	0.4032
-24	0.2244	2.4050**	0.6276
-23	0.0013	0.0120	0.6290
-22	0.1597	1.3840	0.7298
-21	-0.0189	-0.5150	0.7521
-20	0.0223	0.3540	0.7380
-19	-0.0141	-0.2370	0.7148
-18	-0.0232	-0.2850	0.6881
-17	-0.0267	-0.3740	0.8127
-16	0.1247	1.5470	0.8523
-15	0.0395	0.4330	0.8271
-14	-0.0252	-0.4150	0.8922
-13	0.0651	0.9190	0.9780
-12	0.0858	0.7650	0.9320
-11	-0.0460	-0.5050	1.9320
-10	0.1180	1.1080	1.0500
-9	0.1802	1.3270	1.2302
-8	0.1607	1.9590*	1.3909
-7	0.0821	0.8190	1.4731
-6	0.0708	0.9070	1.5438
-5	0.0175	0.2060	1.5613
-4	0.0648	0.6720	1.6261
-3	0.2538	2.1100*	1.8800
-2	0.4864	4.0900**	2.3664
-1	0.1083	4.0900**	2.4750
0	0.6218	3.6000**	3.0965
1	0.2338	1.6000	3.3297
2	0.0127	0.1700	3.3424
3	-0.0832	-1.1370	3.2590
4	-0.1373	-1.0590	3.1219
5	0.0634	0.6520	3.1852
6	0.0774	0.9580	3.2627
7	0.0803	1.0590	3.3430
8	0.0518	0.7790	3.3947

* Significant at .05 and ** at .0-1 probability levels

level of risk. With few exceptions, the ARs in the post-announcement period are randomly distributed about zero, consistent with the idea of near market efficiency as suggested by Keane (1983) and consistent with the general findings of efficiency for this market (reported in Chapter 14) and consistent with Ariff and Finn (1989).[4]

Bonus Announcements Excluding Dividend Notices

Table 12.2 presents findings on the pure bonus announcements sample. The ARs in the pre-announcement period are not significantly different from zero except for days - AR

Table 12.2 Bonus Issue Announcements in Malaysia: Dividend Effect Controlled

DAY	AR	t-STATIST	CAR
-29	0.9686	-0.8760	-0.986
-28	0.0716	0.8190	-0.0270
-27	0.1223	1.1210	0.0954
-26	0.1631	1.3090	0.0954
-25	0.2204	2.0670*	0.4788
-24	0.2536	1.8190	0.7324
-23	0.1837	1.0870	0.9162
-22	0.1153	1.0090	1.0315
-21	-0.1568	-1.4110	0.8747
-20	0.1182	1.2240	0.9929
-19	-0.0080	-0.0930	0.9849
-18	-0.5980	0.4540	1.0450
-17	0.1739	-1.9520	0.8707
-16	0.0830	0.7150	0.9537
-15	-0.0452	-0.2930	0.9085
-14	-0.0522	-0.2930	0.9085
-13	-0.0278	-0.5920	0.8285
-12	-0.1854	-1.9100	0.6432
-11	-0.1786	-1.1070	0.4646
-10	0.2100	1.3290	0.6745
-9	0.1718	0.8030	0.8463
-8	0.0486	0.3860	0.8949
-7	0.0346	0.2390	0.9296
-6	0.0276	0.2230	0.9572
-5	-0.0391	-0.2620	0.9181
-4	0.0658	0.3930	0.8939
-3	0.3106	1.6620	1.2945
-2	0.4327	3.0840**	1.7270
-1	0.0996	0.4980	1.8270
0	0.9811	3.2060**	2.8079
1	0.1900	0.9250	2.9978
2	0.0665	0.5589	3.0644
3	-0.0523	-0.4680	3.0121
4	0.0161	0.1270	3.0281
5	0.0394	0.4170	3.0675
6	0.0408	0.3210	3.1083
7	0.2371	1.9080*	3.3460
8	0.0566	0.6140	3.4020
9	0.1130	1.1690	3.5151
10	0.0872	0.6150	3.6023
11	-0.2280	-0.1690	3.5795
12	-0.0415	-0.5690	3.5380
13	0.0194	3.5574	0.1840
14	0.0269	0.2270	3.5843
15	-0.9090	-0.4320	3.4934
16	0.2068	1.5780	3.7002
17	0.2207	1.7800**	3.9210
18	-0.1367	-0.5360	3.7852

*Significant at 0.05 and ** at 0.01 acceptance levels

Table 12.3 Bonus Issue Announcements in Malaysia: Dividend Effect Not Controlled

DAY	AR	t-STATIST	CAR
-29	0.3389	1.8920*	0.3380
-28	0.0610	1.5970	0.3999
-27	0.0638	0.7720	0.4638
-26	-0.1560	-1.3380	0.3078
-25	0.0222	0.2530	0.3309
-24	0.1961	1.5510	0.5621
-23	-0.1755	0.7720	0.3506
-22	0.2028	-1.3380	0.5534
-21	0.0360	0.1810	0.5894
-20	-0.0707	-0.8930	0.5186
-19	-0.0201	-0.2380	0.4986
-18	-0.1036	-1.0690	0.3950
-17	0.1160	1.0890	0.5110
-16	0.1651	1.4580	0.6761
-15	0.1217	1.2150	0.7978
-14	0.0010	0.0120	0.7988
-13	1.1552	1.5090	0.9540
-12	0.3487	2.3310*	1.3028
-11	0.0826	0.9710	1.3853
-10	0.0288	0.1990	1.4141
-9	0.1884	0.0940	1.6026
-8	0.2694	2.5890*	1.8720
-7	0.1282	0.9110	2.0020
-6	0.1126	1.1580	2.1138
-5	0.0723	1.8550	2.1851
-4	0.0639	0.6280	2.2489
-3	0.1988	1.2890	2.4477
-2	0.5384	2.820*	2.9862
-1	0.1167	0.9310	3.1029
0	0.2723	1.7630*	3.3764
1	0.2753	2.3130	3.6516
2	-0.0395	-0.4290	3.6122
3	-0.1132	-1.1740	3.4990
4	-0.2861	-1.2830	3.2129
5	0.0866	0.5110	3.2995
6	0.1129	1.1040	3.4124
7	-0.0718	-0.8810	3.3406
8	0.0470	0.4850	3.3876
9	-0.0600	-0.6190	3.3276
10	0.0112	0.1060	3.3388
11	0.0294	0.3120	3.3682
12	0.0352	0.3390	3.4030
13	-0.0873	-0.8030	3.3161
14	-0.0506	-0.5290	3.2655
15	-0.0943	-0.9820	3.1712
16	0.1065	1.0860	3.1712
17	0.0231	0.2290	3.3008
18	0.0952	0.8503	3.3960

* Significant at 0 .05 and ** at 0.01 probability levels

is positive (0.98) and significant (t= 3.206), as investors perceive bonus announcements as positive news. With few exceptions, the post-announcement drifts are randomly distributed about zero, consistent with near market efficiency hypothesis. The CAR takes off from day -4 (0.984) to a maximum value of 4.84 per cent on the 27th day after announcement. The CAR net of transaction costs is of no economic significance to investors if they purchase the shares after the announcement. However, there are some potential gains if the shares are bought before the announcement.

Joint Announcement Sample

Table 12.3 shows findings on the effect of joint bonus and dividend announcements on share prices. The market anticipates the forthcoming announcements as early as the 29th day before announcement. Positive and significant returns are also observed on days -21, -12, -2 and -8. The announcement day AR is positive and significant (0.274, t=1.76) at 5 per cent level. The post-announcement AR drift from day +1 to +20 is consistent with market efficiency prediction.

The CAR for day -29 to day +30 is positive with the largest value observed on day +27 (4.73). The CAR from day -29 to the announcement day is positive and significant at 1 per cent level (3.376 per cent with t(CAR) of 3.54). Though the post-announcement CAR drift is positive and statistically significant, it is not economically significant. No trading strategy would enable investors to earn abnormal returns net of transactions costs after the announcement, consistent with market efficiency.

Incremental Effect

To ascertain the incremental effect of dividend announcements, significance differences in the ARE between pure and joint announcement samples for each day in the analysis period were estimated. The findings show no significant difference (t=0.77, Wilcoxon Rank Test Statistic is 0.3681) suggesting that the effect on share prices observed for this sample is attributable to the bonus issue announcements, and not to the dividend announcements.[5] No clear reason could be found to explain these findings as bonus issues have no cash flow implications, though investor response indicates that they perceive bonus issues favourably.

5. Conclusions

In investigating the announcement effect of bonus issues on share prices of firms listed on the Malaysian market, this study took into consideration thinness of trading. The findings suggest that:

- Bonus issue announcements are anticipated by the market about three weeks before the announcement and a major part of the price adjustment takes place prior to the actual announcement.
- Bonus issue announcements are interpreted as good news by investors, accompanied by positive and significant abnormal returns of about 4 per cent. These findings are consistent with the findings on bonus issues studies in other developing markets, but inconsistent with the findings in the developed markets.
- The magnitude and suddenness of the surge in share prices shortly before the bonus announcements suggest insider trading activities on the forthcoming announcement.

- Shortly after the announcement there is market correction, which might be due to profit-taking of traders and speculators who had responded to the information.
- Though the CAR drift in the post-announcement period is statistically significant, the materiality of such significance is doubtful as it lacks economic significance since no investor can earn positive abnormal returns net of transactions estimated at 2.7 per cent. The post-announcement ARE are randomly distributed about zero, consistent with market efficiency. For the joint announcement sample, the incremental effect of dividend announcements is not statistically significant, implying that the information content of bonus announcements dominates the effect on share prices.

These findings would argue that the KLSE Main Board is efficient in pricing the bonus issues announcements and also with respect to other information sets reported in previous studies (Annuar and Shamsher 1991b). The informational efficiency of KLSE to various publicly announced events makes it at par with the developed markets and a potential investment avenue for international investors. Reliability and confidence in the Malaysian market would be increased from both the local and the international investors' perspectives. The globalisation of international securities markets has given investors around the world the opportunity to diversify internationally, specifically in a number of efficient Pacific Basin markets. KLSE, a fast developing and the fifth largest emerging securities market in the Asia Pacific rim, is well placed to attract foreign funds.

End note

1. For a description of the methodology, see Annuar and Shamsher (1991a).
2. For a detailed description of the test, seee Seigel (1956).
3. The estimated round-trip transaction cost for shares with an average price of RM2.50 is 2.7 per cent (Annuar and Shamsher 1991b)
4. Similar findings were found using OLS, Dimson and Scholes-Williams procedures.
5. For purpose of completeness, the effects of dividend changes (increase, decrease and constant) were evaluated and similar findings were observed.

CHAPTER

13

Stock Price Reaction to Rights Issues*

Abstract

This chapter discusses the share price effect from rights issue announcements of Malaysian listed firms and also the implication for informational efficiency of the market. Abnormal returns are positive to rights announcements in Asia Pacific markets whereas negative in Toronto, London and New York markets. Findings reported here suggest that *rights issue announcements are perceived as unfavourable news* and information content appears to be anticipated prior to rights announcement. This is consistent with market efficiency theory, but is anomalous to most reported results from the developing capital markets.

1. Introduction

Most new equity capital in Malaysia is raised via the rights issue method. From 1975 to June 1992, RM14.9 billion (9 per cent of GDP in 1994) was raised in this way, accounting for more than 50 per cent of the total funds mobilised by the Malaysian listed firms on the KLSE.[1] This indicates the importance of equity rights issues for corporate financing of Malaysian firms.

A rights issue is an offer by a listed firm to its existing shareholders to subscribe to new issues in the firm in proportion to the number of shares the shareholders already hold. Rights entitlements to new shares may be sold in the market if shareholders do not wish to accept the offer of more shares. The rights issue usually contain a bonus element since the subscription price for rights is below the market price of the firm's existing shares at the time of the issue. Thus rights issues have direct implications for the firm's future value and cash flows. Rights issues represent a unique situation in evaluation of a firm's shares by the shareholders since they will be forced to decide whether to subscribe or to sell their rights. If the shareholders are convinced that the firm's prospects are bright, the proceeds from the rights issue will generate healthy returns and a majority of the shareholders will take up their entitlements. The potential shareholders whose assessments are similar will bid up the price of the rights as these come on the market. This will have a positive impact on the share price of the firm. Conversely, if shareholders feel that the firm's investments have not generated the expected rewards and supplying more capital to the firm will be equally non-rewarding, they will sell their rights and there is a possibility that the rights will be traded below their theoretical rights price.

* This is a reproduction of an article that appeared as 'Rights Issues' by Shamsher M. and Annuar M.N. in *Investors Digest* (November 1992): 9-10, (Malaysia). We thank the Editor of the Journal for permission to reproduce this article. The article has been edited by M. Ariff to conform to the general style and format of this book.

Another issue of concern is the efficiency of the KLSE to rights issues announcements. There is evidence that the KLSE is fairly informationally efficient in the semi-strong sense with respect to annual earnings and dividends announcements (Annuar and Shamsher (1991a), interim earnings announcements (Shamsher and Annuar (1992a) and bonus issues announcements (Shamsher and Annuar (1992b), but there is no published evidence with respect to rights issues announcements. If the KLSE is efficient with respect to rights issues announcements, investors using a trading strategy based on the announcement will not be able to consistently earn a return in excess of that commensurate with the level of risk. This implies that current prices have already reflected all the information contained in the announcement.

However, despite the general inclination towards market efficiency, some investors believe that they can outperform the market because of imperfections such as inadequacy and bias of some reported research findings and there is an inefficient flow of information from the source to the market. These imperfections render the market inefficient at times and provide opportunities to alert investors to earn abnormal returns. This is perfectly consistent with the market efficiency theory provided abnormal returns are not earned on a consistent basis based on the same information.

This chapter attempts to determine the price effect of rights issues announcements and the efficiency of the share market in Malaysia with respect to these announcements. The findings, reported in Section 5, lead us to argue that there is a negative price effect from rights issues, a result not consistent with the trends in developed markets in the Asia Pacific. At least one possible reason for this behaviour is suggested in our discussion.

2. Prior Studies

Scholes (1972) examined a sample of 696 rights issues on the New York Stock Exchange from 1926 until 1966. He found abnormal returns in the period leading up to the issue, a small price decline in the month of issue and no abnormal gains or losses in the post-announcement period. Smith (1977) did a similar study on 853 rights issues on the NYSE from 1926 until 1975 and reported 8-9 per cent abnormal returns in the one year pre-announcement period and virtually no abnormal returns thereafter. Ball, Brown and Finn (1977) observed similar results for 193 Australian rights issues between 1960 and 1969. A mean abnormal return of 10 per cent was observed in the year before the issue with no abnormal gains thereafter.

Merrett, Howe and Newbold (1967) studied 110 rights issues on the London Stock Exchange in 1963 and observed abnormal gains (unadjusted for risk) of a mere 1 per cent over the issue date and 3 per cent over the year following the issue. A similar but larger study by Marsh (1979) on 254 rights issues for the period 1955-1974 reported large positive abnormal returns prior to the announcement and after the news had been made public. He attributed the significant abnormal returns in the post-announcement period to a factor strongly associated with the size of the firm. In view of these findings, he concluded that there is no strong evidence of significant market inefficiencies associated with rights issues and that the hypothesis that the United Kingdom market is efficient with respect to rights issues announcements was not rejected. Glass (1995) studied a different issue, and found that the British firms are reluctant to raise capital other than through rights issues. This could explain the positive effect, though a very marginal one, on rights issues in that market.

Dawson (1984) studied the efficiency of the Stock Exchange of Singapore (SES) using bonus and rights issues announcements and concluded that, on average, market prices did not fully adjust to these announcements. Positive and significant abnormal returns are observed on ex-bonus and ex-rights date and one week after. Srinivasan and Kiat (1986) did a similar study using 25 rights issues on the SES from 1976 to 1978. They reported that, despite an upward residual movement in the pre-announcement period, on average, investors cannot earn abnormal returns from rights issues announcements and the prices of shares drift downwards after the announcement. These studies did not make adjustments for non-synchronous trading, and the period covered was short. A later study (Ariff and Finn 1989) over a 16-year period, and using corrections for non-synchronous trading, reported that the rights issues resulted in significant abnormal returns only on and prior to the announcement dates, and that post-announcement drifts are not significant.

Data and Data Sources

Thirty-three rights issues announced on the KLSE from January 1980 to 1991 were selected for this study. The sampled firms had no other announcements made at or around the same date as the rights issues announcement, which might have had a confounding effect on the share prices. Daily closing prices of selected shares as well as daily KLSE Industrial index values were collected to observe daily residual behaviour of sampled firms. This index was chosen because most of the sampled firms were from the industrial sector and it is an equally weighted index. There is evidence (Brown and Warner 1980) that using an equally weighted index gives a greater chance of picking up abnormal returns if they are present.

Methodology

An event study approach similar to that adopted by Fama, Fisher, Jensen and Roll (1969) was used to determine the price effects of rights issues announcements. This approach involves estimation of expected return model parameters from outside the analysis period and the use of these parameters to calculate the abnormal returns in the analysis period. The abnormal returns were calculated by taking the difference between observed and expected returns. The abnormal returns were then averaged across securities and cumulated over time to identify aggregate abnormal returns behaviour. Positive and statistically significant abnormal return (AR) indicates abnormal gain and significant negative abnormal return indicates abnormal loss.

The Market Model was used to isolate the effect of general market conditions on the returns of securities announcing rights issues announcements. This model assumes that securities returns are a linear function of general market factor expressed as follows:

$$R_{it} = \alpha_i + \beta_i \ R_{mt} + e_{it} \qquad (13.1)$$

where

R_{it} : returns on security i in period t,

R_{mt} : returns on market portfolio in period t,

α, β : intercept and slope of the regression, and

e_{it} : the i.i.d. error term which capture firm-specific effects.

The AR was estimated as follows:

$$AR_{it} = R_{it} - (\alpha_i + \beta_i R_{mt}) \tag{13.2}$$

where

AR_{it} : abnormal returns on security i at period t,

R_{it} : observed returns of security i at period t-1, and

α, β and R_{mt} are as defined in Equation (13.1).

The sample average residual for day t relative to the announcement day (day zero) is:

$$AR_t = \Sigma_{i=1 \ldots n} AR_{it} \tag{13.3}$$

The AR_t is the average estimated percentage deviation of the returns of the sampled securities from the normal relationship to the market. The average percentage of abnormal returns of sampled stocks in any day t relative to the announcement day are cumulated to identify the aggregate abnormal returns behaviour:

$$CAR_T = \Sigma_{t=1 \ldots T} AR_t \tag{13.4}$$

CAR_T is the cumulative deviation of returns of sampled securities from their normal relationship to the market.

A major problem is that shares listed on the KLSE are thinly traded, thus leading to the problem of non-synchronous trading where the market's price at the end of the day t cannot be accurately matched with prices of thinly traded shares.[2] Consequently, estimates of systematic risk of thinly traded shares will be biased (Annuar and Shamsher 1991b). If the estimates of a and b in equation (1) are biased, the estimate of the e_{it} will also be biased and the extent of the bias will be more serious for more thinly traded stocks. Dimson (1979) proposed the specification of the market model in the time series with lags and leads of market returns and aggregation of the resulting beta coefficients as an appropriate method for correcting for the non-synchronous trading effect on estimates of a and b. Fowler and Rorke (1983) suggested that the coefficients in Dimson's procedure be corrected by serial correlation in the market returns to obtain unbiased estimates of the parameters. This study adopted Dimson's procedure with Fowler-Rorke corrections as extended to the Singapore market in Ariff and Lim (1990).

3. Findings

The findings are presented in Table 13.1. The findings show that average residuals were on the downward drift from day -30 to day +11, after which the upward drift began. Negative and significant abnormal returns are observed on day -13, -6, -4, and -3. This could have been due to information leakage and/or anticipation of rights announcement by investors. Most information was anticipated as the abnormal returns in the post-announcement period were not significantly different from zero, consistent with market efficiency. The CARs took a nose dive from day -21 to day -4 and there was a short upward trend from day -4 to day -1 after which the CARs drifted downwards again. On average, investors on the KLSE do not respond favourably to rights issue announcements. In contrast to recent evidence from the developed markets where most rights issues are made when stocks are performing better than the market, the firms on

Table 13.1 Abnormal and Cumulative Abnormal Returns around Malaysian Rights Issues Announcements

DAY	AR	t-AR	CAR
-29	-0.1288	0.937	0.1288
-28	-0.0613	-0.604	-0.1902
-27	-0.1630	-1.509	-0.3532
-26	0.0364	0.229	-0.3168
-25	-0.0596	-0.409	-0.3168
-24	-0.0311	-0.304	-0.4075
-23	0.0294	0.173	-0.4075
-22	-0.1877	-1.840	-0.5658
-21	-0.0876	-0.508	-0.6534
-20	-0.0237	-0.216	-0.6670
-19	0.1823	1.067	-0.4947
-18	0.1294	0.599	-0.3652
-17	-0.0586	-0.437	-0.4238
-16	0.0206	0.189	-0.4032
-15	-0.1558	-1.480	-0.5590
-14	-0.0881	-0.833	-0.6471
-13	-0.350	-3.311*	-0.9523
-12	-0.016	-0.118	-0.9628
-11	-0.0004	-0.004	-0.9632
-10	-0.0815	-0.884	-1.0448
-9	-0.1924	-1.729	-1.2372
-8	-0.1425	-0.803	-1.3796
-7	0.1089	0.650	-1.2706
-6	-0.2513	-2.561*	-1.5219
-5	0.2031	1.707	-1.3188
-4	-0.1693	-2.189*	-1.4882
-3	0.2799	2.496*	-1.2082
-2	0.0488	0.415	-1.1594
-1	-0.1478	-0.770	-1.3073
0	0.0328	0.113	-1.2745
1	-0.2899	-0.769	-1.5644
2	-0.0584	-0.352	-1.6228
3	-0.2028	-1.491	-1.826
4	0.0504	0.489	-1.7753
5	-0.0404	-0.492	-1.7753
6	-0.0024	-0.023	-1.8181
7	-0.0456	-0.494	-1.8636
8	0.0957	1.248	-1.7679

the KLSE seem to announce rights issues when their share prices are on the decline. It is possible that despite the declining share prices, most firms performed better than the market, an aspect that requires an investigation of financial performance not done here.

There are several possible explanations for the downward drift of average abnormal returns around the rights announcements. First, shareholders may believe that the firms have no profitable use for the funds mobilised via rights issues. The funds could be used to pay debts or invested in less profitable projects. Second, there is a possibility of significant dilution in earnings per share, which is perceived as a decline in future expected earnings. Third, there are significant flotation costs associated with rights issues and the drop in share price could be the present value of these costs.

In Table 13.2, we summarises the reasons given in the prospectus for rights issues. The most cited reasons are to reduce debt of the firm and to have working capital. Expansion is the third most common reason. These three account for over 80 per cent of responses.

Table 13.2 Reasons Given for Issuing Rights by Firms in Malaysia

Objective	Number	Percentage
Reduce Borrowing	19	30.2
Working Capital	20	31.7
Paid-up Capital	6	9.5
Investment	3	4.8
Acquisition	1	1.6
Expansion	14	22.2
Total	63	100.0

4. Conclusions

This study researched the price effect of rights issues announcements and the efficiency of price adjustment in the Malaysian share market to announcements. The findings suggest that rights issue announcements are perceived as unfavourable news, a result consistent with recent evidence in the United States market, but opposite to reports of positive price effects in several Asia Pacific markets. The announcements are anticipated, and price changes are informationally efficient to such announcements. The findings suggest that investors can earn abnormal gains if they sell the shares a month before the announcement and buy back the shares 10 days after the announcement. This will only be possible if shareholders have inside information about the forthcoming announcement and/or are able to anticipate the announcement by analysing financial information (i.e. financial reports, consultants' reports, market reviews and industry reports by various financial institutions) and foresee the need for funds for future investments and expansion.

End notes

1. Investing in the Malaysian Stock Market (1991), a KLSE publication.
2. For a description of the methodology see Ariff and Johnson (1990).

PART

4

Test of Capital Asset Pricing Theories

Findings reported in this Part are central to understanding the financial economics of asset pricing in an emerging capital market. The factors associated with pricing of securities in the Malaysian and three other markets suggest that this emerging market is unlikely to be analytically intensive as most changes in prices in this market are *not correlated with fundamental variables*. Results from tests of some other theories are also included. There is fairly consistent evidence to suggest that, because of the developing nature of this market, asset pricing theoretical results are not as robust as those reported in developed capital markets.

Chapter 14 reports findings from a study that four key fundamental variables are significant determinants of share prices though these factors together explain only about a quarter of the price changes in this emerging market. In more analytically-intensive and developed markets, up to 60 per cent of price changes are determined by some combination of 6 fundamental variables. The test of Gordon's Dividend Valuation Theory reported in Chapter 15 suggests a high degree of dividend effect on share prices; this needs further exploration. The next two chapters suggest that the share market, because of thinness of trading, requires econometric procedures to correct systematic bias in the measured market parameters. Chapter 20 (from a Singapore study) provides an introduction to the thin-trading theory.

Chapters 17-19, 21 and 22 report on the behaviour of Malaysian securities as analysed by applying well-established theories on asset pricing. Systematic risk of firms appears to be strongly correlated with price changes (Chapter 17): an interesting result on Arbitrage Pricing Theory is found in Chapter 18. Lessons for developing an options market are put forth from a study of a failed option market (Chapter 19). Careful study of 54 unit trusts over a 10-year period leads to the results in Chapter 21, which show that the mutual fund market yields are very poor compared with the average main market yields. The post-listing earnings performance of new firms are very close to the predictions contained in prospectuses issued before listing. This result is the opposite of that reported for new issues in developed markets. Perhaps this is due to greater public interest question in the Asia Pacific countries, which perhaps leads to efficient regulatory supervision and professional underwriting activities.

CHAPTER

14

Finding the Factors Associated with Stock Price Volatility: A Comparative Study of Developed and Developing Share Markets*

Abstract

Asset pricing theories suggest a number of fundamental factors that should drive stock price changes. We identified 6 factors, and tested if individual stock price changes are correlated with these factors during eighteen years in one analytically intensive Japanese market and two developing markets. Results suggest that only about half the changes arise from changes in fundamental factors in the Malaysian and Singapore markets compared with the Japanese market. The *securities in the Malaysian and Singapore developing markets are much less sensitive to changes in the fundamental factors;* the securities in these markets are perhaps more prone to speculative trading effect, and less to changes in fundamental factors. This is a surprising finding on less developed markets

1. About Stock Price Changes and Factors Driving the Changes

Investors in the very large fixed-income securities - notes and bonds - markets are less worried about changes in prices of these securities than those investing in common stocks. The fundamentals driving price changes in fixed-income securities are relatively better specified; in essence, two major factors, namely intertemporal changes in interest rates and default risk of issuing firms, affect fixed-income security prices and thus the yields. One can readily immunise an investment portfolio from the effects of interest rate risk by matching the investment holding period to duration of fixed-income investment portfolios. In this way portfolio managers circumvent the effects of interest rate changes on fixed-income security prices and coupon reinvestment yields. So, one worries less about these price changes; investors are concerned about the default risk of fixed-income investments.[1]

This is not the case for investment in common stocks.[2] Much less is known about what factors drive the changes in share prices except the vague idea that some fundamental factors affect share prices. This is worrisome for investors and investment

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specialists (stockbrokers, fund managers, analysts, etc.). The study of price changes is therefore receiving increasing attention and more research reports on this subject have been published in recent years especially in view of the worldwide increases in share price volatility in several markets; e.g. William and Pfeifer (1982), Downs (1986), Baskin (1989), and the Spring issue of *Journal of Economic Perspective* (1991). Share price volatility has actually increased in the last decade. Our knowledge about whether the various factors suggested by valuation theories and practices are in fact *jointly* related to share price volatility is still untested. Further, a recent study revealed that share price returns are explained more by factors such as size and book-to-price ratio than by the CAPM-suggested beta factor (Fama and French 1991).

Another related issue, which has also received much attention since the mid-1980s is the search for factors that change the values of firms, which in turn leads to changes in the share prices of firms. If one can identify these factors, then it makes sense to relate changes in the values of firms as being driven by these factors. Share price volatility may ultimately be due to changes in the values of firms arising from changes in the fundamental factors associated with changes in the values of firms. Consequently, increased volatility in share price may be indeed a result of increased volatility in these value drivers. There are theoretical and practitioners' guidelines which can be scrutinised to identify some of these probable factors. Recent examples of such studies include Wilcox (1984), Rappaport (1986), Baskin (1989), and Downs (1991). These factors influence price changes in the longer term and not day-to-day or short-term price changes.[3]

The purpose of this chapter, therefore, is to address the two related questions of individual share price changes represented as volatility in prices and firm value changes as essentially being determined by factors which are responsible for creating changes in the values of firms. We did this by scrutinising related theories and industry/professional practices to build empirical models to specify and then isolate value drivers (i.e. the factors) associated with share price changes. Share price changes were measured as volatility in prices; this is shown in Section 2. Next, we proceed in Section 3 to present the results of a study on the behaviour of Kuala Lumpur, Singapore and Tokyo share prices; the Tokyo market is taken as a developed share market since it is the largest (in 1990 prices) single and very liquid in the world. The findings suggest that part of the volatility in share prices can be attributed in both developing and developed share markets to four out of six key variables which are identified from commonly accepted valuation theories and investment practices.

2. Stock Price Volatility Factors and Test Model

There have been several limited attempts to investigate individual share price volatility by relating share price changes to one or more independent factors suggested by existing theories in finance and accounting. The derivation of the relationship between price volatility and value drivers (factors) is given elsewhere.[4] The relationship derived from several studies using this line of enquiry can be generalised as

$$PV_i = a + \Sigma^k_{j=1}\, b_j(X_j)_i + \varepsilon_i \qquad (14.1)$$

where PV_i is the cross-sectional observed values of share price volatility of a representative sample of i = 1,......,n shares in a country market under study; a and bj are respectively the intercept and coefficients of theory-suggested independent variables j = 1,...,k (we chose six such factors observed for each firm in our sample over each year of the test period from year one to 1990 in each country); Xj is a matrix of six independent variables observed over each year for each firm included in this study; and -i is the independent and identically distributed (i.i.d) residual term satisfying zero expectation, constant variance unrelated to the independent variables.[5]

The values of all but one of the independent variables, $(X_j)_i$, are obtained as averages of the individual firm variable over the test period of 16 or more years in each market. One variable is expressed as a standard deviation. That is, each variable is a simple average over several individual years for each firm and the sample size is 54 firms constituting an investor index in Singapore, 30 firms of the Industrial Index in Kuala Lumpur and all firms on the Tokyo Stock Exchange. The share price volatility, PV_i, was measured by Parkinson's extreme value method (Garman and Klass 1980)[6] in order to have an efficient estimate of this dependent variable. Also, a most readily available source for individual shares provided the financial year-end high and low prices of shares. Price volatility is the standard deviation (i.e. the root of the square root) of the following volatility value of share prices of firms in a country sampled over the cross section of time series represented by the test period:

$$PV_i=(\{[AP_i(high)AP_i(low)]/0.5[AP_i(high)+ AP_i(low)]\}^2)^{1/2} \qquad (14.2)$$

The capitalisation adjusted high prices, AP(high), and low prices AP(low), of each firm's share were observed. The volatility is the square of the price difference between the high and low prices in each year divided by the firm's average price of shares in each financial year. The square root of this variable is the standard deviation which is used as the share price volatility variable PV_i, in this study, i.e. i=1,2,........,n firms at a cross-section over 16 or more years. Thus, we represent share price volatility as the extent of variation of share prices in a market and there are three markets included in this study.

The Japanese market data set was obtained from the Nikkei-NEEDS database and statistical series but on all shares traded on the Tokyo Stock Exchange. The end-of-year data were collected for this share market from 1959 to 1989, a total of 31 years. The values observed at the close of a year for all listed firms were then used for calculating the seven variables; the first variable is the stock price volatility using the extreme value method. The six independent variables are also year-end values of the same six variables to be described shortly. The data for the Kuala Lumpur Stock Exchange were set up in the same way as data for the Singapore exchange. The financial database of stock prices was accessed for the Singapore data while the data for the other market were collected from annual reports in the *Company Handbook*. In the case of Kuala Lumpur, the firms are the 30 included in the New Strait Times Industrial Index, a popular price-weighted index which measures the market price changes more accurately than the value weighted all-shares index released officially by the exchange. The sample represents more than 50 per cent of the capitalisation of that market. The Singapore market is represented by 54 firms included in a widely followed index (the OCBC Index) representing some 58 per cent of market capitalisation.

The first of the six variables is the dividend yield, DY, which as per Gordon's (1962) theory is inversely related to share price.[7] It was measured for each year as the ratio of the sum of interim and final dividends for the year divided by the closing price at the end of each financial year over the test period for each firm; the closing price is the average price over the three months. The cross-sectional average is the simple average of the variable of each of the firms over the test period in each market: 16 years in the case of Kuala Lumpur and Singapore and 31 years in the case of Japan. So, this variable is a simple ratio of yields of the firms in the sample. The second variable, POR or the payout ratio, is calculated similarly but with the dividend divided by the after-tax net earnings of the firm.

The third variable suggested by evidence on the now well-entrenched efficient market theory (see Ariff and Finn, 1989 for Singapore; Anwar, Ariff and Shamsher, 1994 for Kuala Lumpur; Elton and Gruber, 1990 for Japan for evidence on this theory for these markets) is the earnings variable, which should be related to stock price changes and thus to volatility. Share prices react directly in response to changes in the reported or predicted earnings changes in these markets. It is therefore logical to suggest a direct relationship between share price volatility and earnings volatility, EV. It is measured by the standard deviation of the earnings per share of firms over the test period in the cases of Kuala Lumpur and Singapore and by changes in earnings of firms over adjacent years in the case of Tokyo.

A greater rate of asset growth suggests that a firm's share prices change further; thus, Ag is positively related to volatility. Gordon's dividend valuation theory for firms with dividend growth suggests growth as an important variable. Though this relates to dividend growth, we assume that it is monotonically related to growth in assets of a firm over a long period for it is the asset growth potential that sustains the long term dividend growth. Hence, the fourth independent variable is measured as asset growth, Ag, which is the ratio of the change in assets to total book value assets of a firm at end of each year over the test period. We collected data from 1974 (in the case of Singapore) in order to have observations over the test period starting with 1975. Similar procedures were followed for other markets but with different starting years. The values of this ratio for each year were calculated and the average over the test period is a simple average of the time series for the firms in the cases of Kuala Lumpur and Singapore; for Japan, Ag is the growth rate in assets of all listed firms over any consecutive moving average over a five-year period. The fifth variable, DA, is also a ratio of total borrowing to assets of a firm at the end of each year averaged over the test period. Corporate finance theory on financial leverage predicts that increases in the debt-asset ratio should lead to a greater rate of change in a firm's value provided that the firm had unused debt capacity as per MM Proposition II. Thus this variable of surviving firms should be positively related to price volatility. We exclude trade debt as it is not a leverage-related variable. Firms in all test markets raise debt capital mostly from banks in the form of line of credit extended over each year and/or as term loan from banks.

H_o : There is no significant joint relationship between the fundamental variables and share price volatility.

H_1 : There is a significant joint relationship between the fundamental variables and share price volatility

3. Stock Price Volatility Model Tested

Tokyo Stock Price Changes

The results of the analysis of the Japanese market revealed some regularities in the behaviour of individual variables: these are not shown here. The extreme value volatility measure is small compared with the values obtained for developing markets in Kuala Lumpur and Singapore. The mean value of this variable was 25.98 per cent over the 1959-1989 period. The average dividend yield was 2.99 per cent; this is consistent with the historically declining dividend yield of Japanese firms from its high of about 4.5 per cent in the 1960s to the current value which is less than 1 per cent. The payout ratio in Japan was 43.45 per cent, again not inconsistent with published reports. The earnings volatility was rather high; Japan experienced high earnings growth during its high economic growth period of 1958-1973, after which the earnings declined to half their earlier level. The change in the debt-asset ratio was moderate at 15 per cent. Asset growth was represented by the change over a five-year moving average in the growth rate of the total assets; the mean was 14.79 per cent per annum which is about right given the historical growth in assets of Japanese firms of about 15 per cent per annum.

Table 14.1 Share Price Volatility and Fundamental Variables in Japan: 1959-1989 (General Model)

	DY	EV	POR	SZ	DA	Ag
Coefficients	2.51	-0.33	-0.06	-0.44	0.95	0.79
T-ratio	-0.0706	-1.76**	-0.221	-0.024	1.161	1.765**
F-ratio	6.36*					
Adj. R^2	42.30					

Note: Significant at about 0.10* and 0.05** confidence levels

The relationship between share price volatility and fundamental variables was tested again to find a simpler model that could explain as much of the variation in the general model, but using fewer variables. The results are in Tables 14.1 and 14.2. About 42 per cent of share price changes are explained by the model.

Table 14.2 Share Price Volatility and Fundamental Variables in Japan: 1959-1989 (Simpler Model)

	Intercept	DY	Ag	DA	EV
Coefficients	28.23	-2.74	0.778	0.885	-0.39
t valuese	2.873**	-2.175**	3.142**	1.774*	1.838*
F-ratio	12.45**				
Adj. R^2	42.12				

Note: Significant at about 0.10* and 0.05** confidence levels

The results of a multiple regression of Equation (14.1) with Japan's data set are summarised in Table 14.2. The residuals were examined and found to be normally distributed, which suggests that the results included are reliable. Note, first that the adjusted R^2 value suggests that 42.3 per cent of the variation in share price volatility of Tokyo stocks was explained by the six theory-derived variables and that the alternative hypothesis was acceptable; the F-value of 6.36 was significant. The model fit is very pronounced relative to the more speculative Singapore and Kuala Lumpur stock markets to be described below. Next, note the individual coefficients which were also significant. The dividend yield was negatively related to price volatility as suggested by theory.

Singapore Stock Price Changes

The first set of results for Singapore firms is meant to describe the summary character of the variables. Next, we will examine the results of the general model prior to the stepwise selection of a simpler model. Table 14.3 contains the descriptive statistics on the seven variables.

Table 14.3 Descriptive Statistics of Fundamental Variables in Singapore: 1975-1990 (variable x 100)

	PV	DY	EV	POR	SZ	DA	Ag
Mean	68.30	3.21	2.88	50.92	5.92	15.00	19.68
Std Dev	15.04	1.74	2.00	40.49	0.49	11.78	19.80

The sample of firms can be described as having a price volatility of 68 per cent per annum (two and half times that of Tokyo) with an average dividend yield of 3.21 per cent, volatility in earnings of 2.88 per cent, a payout of 51 per cent. The debt rate of the firms was moderate at 15 per cent, and the asset size was about S$600 million with assets growing at about 20 per cent per year. These estimates were consistent with evidence on similar sets of firms reported in existing studies of this market. The size by extreme value method of estimation of volatility was certainly very large (68 per cent). The normal volatility of the market is only 27 per cent per annum.

Table 14.4 is a summary of the results from a general model in Equation 14.1. The test on the error term produced a mean value equal to 0 (-2.9E-15), skewness equal to 0.527 and kurtosis equal to 2.76. These and the plot of the residuals (not shown) suggested

Table 14.4 Share Price Volatility and Fundamental Variables in Singapore: 1975-1989 (General Model)

	DY	EV	POR	SZ	DA	Ag
Coefficients	-2.40	1.87	0.01	2.16	0.20	0.22
t-ratio	1.99	1.59	0.17	0.50	1.10	2.30*
F-ratio	3.43**					
Adj. R^2	21.90					

Note: Significant at 0.10* and 0.05** confidence levels that the regression assumptions specified in the model were not violated, and thus the results are reliable. Now we examine the regression results.

Table 14.5 gives a summary of the results after the procedures adopted to remove multicollinearity and for stepwise selection of variables to select a parsimonious model. The payout ratio and leverage variables were excluded by the procedure adopted for multicollinearity. The former was found not to contribute further to explaining the variation in the model and the latter was significantly negatively multicollinear with dividend yield (confidence level 0.05) and positively with earnings volatility (confidence level 0.05). The size variable also did not produce significantly different results in explaining the variation in the dependent variable. This left (a) asset growth Ag, (b) dividend yield DY and (c) earnings volatility EV as the remaining variables to enter the regression after completing the stepwise procedure.

Table 14.5 Share Price Volatility and Fundamental Variables in Singapore, 1975-1990 (Simpler Model)

	Intercept	Ag	DY	EV
Coefficients	66.94	0.23	-2.91	2.16
t-values		2.44**	-2.71*	2.29*
F-ratio	6.49*			
Adj. R^2	24.10			

Note: Significant at 0.05* confidence level

Malaysian Share Price Changes

Information on the behaviour of the seven variables in the Kuala Lumpur market is given in Table 14.6. The volatility of 38.8 per cent is less than that of Singapore (68.3 per cent) but more than that of Tokyo (25 per cent): this makes sense as the Singapore market experienced dramatic changes over the test period with two deep recessions in 1975-76 and 1985-86 and a share scandal in 1984 referred to as the Pan El Crisis. The Kuala Lumpur dividend yield was 4.98 per cent but these firms had the lowest payout ratio of 23.21 per cent. The payout ratio for Tokyo firms was 43.45 per cent and that for Singapore was 50 per cent. Earnings volatility was 28.8 per cent and the debt rate was higher at 34.4 per cent. The asset growth rate was only 11.73 per cent, which is the lowest among the three markets. The average behaviour of the firms as suggested by these number are not inconsistent with public knowledge about this market. Now, we proceed to isolate the value drivers associated with share price volatility.

Table 14.6 Descriptive Statistics of Fundamental Variables in Kuala Lumpur, 1975-1990 (variable x 100)

	PV	DY	EV	POR	SZ	DA	Ag
Mean	38.80	4.98	28.00	23.21	6.41	34.40	11.73
Std Dev	16.62	1.64	16.90	13.31	0.87	20.46	6.77

Table 14.7 is a summary of results from fitting the general model to the data from the sample of firms in this market prior to parsimonious model selection. Overall, the six fundamental variables do not appear to jointly determine the share price changes. The null hypothesis accepted as the F ratio was not significant at the 0.10 confidence level. Only 20 per cent of the variation in price changes is explained by the models.[9] It therefore appears that the general model does not fit the observations in this market. It should be borne in mind that these results are not reliable as multicollinearity is not controlled in the test.

Table 14.7 Share Price Volatility and Fundamental Variables in Kuala Lumpur, 1975-1989 (General Model)

	DY	EV	POR	SZ	DA	Ag
Coefficients	1.00	0.37	-0.76	-.003	0.15	0.21
t-ratio	0.403	1.503	-2.121	-0.136	0.808	0.420
F-ratio	2.232					
Adj. R^2	20.30					

Note: Most results are not significant at acceptable level

With a correlation of +0.65 between POR and DY, there is a need to eliminate one variable, which we did by retaining POR and then we proceeded with the stepwise regression. The resulting parsimonious model produced the results presented in Table 14.8.

Table 14.8 Share Price Volatility and Fundamental Variables in Kuala Lumpur, 1975-1990 (Simpler Model)

	Intercept	EV	DA	SZ	POR
Coefficients	0.43	0.39	0.13	-0.0004	-0.67
t valuese		1.85**	0.759	-1.314	-2.68*
F-ratio	3.507*				
Adj R^2	25.70				

* Significant at 0 .05 acceptance level

First, note the F-ratio of 3.507 and the adjusted R^2 value of 26 per cent. The null hypothesis was rejected at the 0.10 confidence level and 26 per cent of the variation in share price volatility was explained by (a) earnings volatility (EV), (b) debt usage DA, (c) size of firms SZ and (d) payout ratio POR. The signs on the four variables were the same as predicted by theory. Greater volatility of earnings suggests a higher probability that a firm will have higher or lower earnings - hence the observed positive relation which was significant with t = 1.850. Firms apply more debt, providing gearing for equity leading to higher price changes. Large firms have stable earnings and thus should have less earnings volatility so that the size effect of a firm should be inversely related to price changes. But the size effect was marginal at -0.0004, which is negligible. Finally, the greater the payout ratio, the higher was the dividend rate, which means that the price volatility is lower as suggested by the significance of its coefficient with t = -2.682.

4. Conclusions

This study started with the objective of isolating the factors, call them value drivers, associated with stock price changes defined in this study as share price volatility in one developed and two developing share markets. Factors suggested by valuation theories and investment practices were isolated and then related to price changes in a test model with share price volatility at firm levels. We tested the price volatility model with data from representative firms in three markets. In running the linear regressions of the model, sufficient care was taken to produce results that are robust and reliable by examining collinearity, normality and parsimonious modelling.

It appears that factors associated with share price volatility in both developed and developing markets are as follows:

1. Dividend related variables, either dividend yield or payout rates, are negatively related to share price changes as suggested by theory.

2. Earnings-related variables, earnings changes or earnings volatility, are positively related to share price changes. The more stable the earnings of a firm, as in the case of large firms, the less likely are share prices to change. The sign of the coefficient of the earnings variable in the Japanese market was anomalous.

3. Debt usage is significant for firms in Kuala Lumpur and Tokyo but not for Singapore firms. Evidence suggest that the rates of change in debt usage in these two markets is at least twice as much as in Singapore.

4. The growth rate in the accumulation of assets of firms is the fourth factor. This is the highest and most significant for the Tokyo market. This variable is a proxy for two other factors, namely retention ratio and positive net present values from projects with ROE>k undertaken by firms.

5. Firm size is not important, though it appears to be marginally significant in the model fitted for Kuala Lumpur firms.

Important value drivers therefore appear to be dividends or earnings or debt or asset accumulation factors in both the developed and the developing markets. The same variables explain more of the price volatility in the developed market than in two developing share markets. These findings corroborate indirectly the share valuation theories commonly referred to as the dividend valuation and price-earnings models. The results are consistent also with the Efficient Market Theory's predictions about the earnings changes affecting share prices; similar remarks can also be made about the leverage theory's prediction about magnifying effects of leverage on the value of firm: MM's propositions.

A limitation of this study is the linearity relationship assumed in the tests. Theory does not provide any guide on this issue. It is suspected, however, that the relation may be nonlinear, in fact, concave. This may be true if firms are likely to face grater and increased competition from other firms to maintain higher return rates than moderate or smaller rates of abnormal returns. This line of reasoning suggest that the relation is unlikely to be monotonically increasing as modelled by a linear relation; therefore, the relation may well be concave. More research is needed to address this limitations. More markets - especially American and British ones known for lower volatility rates - should be included in further tests of the model developed in this chapter. Further work is also needed to validate the results of this study by re-specifying the variables not as averages but as volatilities of the fundamental variables along the price volatility as the standard deviation of the average of high and low prices.

Note: The results reported in this chapter are from research that commenced in Singapore and was extended to Japanese stocks when the first author was a Komai Fellow in Japan at the Faculty of Economics of Tokyo University. The study was later replicated with data from the Kuala Lumpur Stock Exchange. The first author wishes to express his gratitude to the Hitachi Foundation for the financial assistance in this regard. This paper was presented at the Micheal Smurfitt Graduate School of Business, University College Dublin, Faculty of Commerce, University of Western Australia, Perth and RMIT University of Technology, Melbourne. Comments of Philip Bourke, Phillip Brown, Izan, Kevin Davis and Kim Sawyer have been particularly useful, for which the first author expresses his gratitude. He also thanks Dilip Ghosh and the editors of Routledge for speedy and efficient editing of the manuscript. For the remaining errors, the authors are jointly responsible.

End notes

1. Results from a test using data on 200 stocks in the developed New York market and using the models developed in this chapter suggest that about 60 per cent of price changes are explained by the same fundamental factors. These results should be considered here in interpreting the findings in this chapter.

   The changes induced in prices of fixed-income securities can be tracked approximately by following the forward rates implicit in the spot term structure of interest rates. Duration theory (Macaulay 1938) also suggests that immunisation is a strategy to neutralise the effect of interest rate changes on the value of a fixed-income investment portfolio. Therefore, the source of uncertainty for immunised fixed-income securities is only the default risk.

2. The standard deviations of rates of change in the last 10 years to 1990 are 8 per cent (London), 12 per cent (Tokyo), 13 per cent (New York), 27 per cent (Singapore) and 31 per cent (Kuala Lumpur) (see Ariff and Johnson 1990). Share and bond price volatility is much lower in earlier decades (see *The Wall Street Journal*, 15 May, 1987). There is parallel literature which examines the factors - e.g. introduction of derivatives - that influence the volatility of share markets. This research is focused on the volatility of individual share prices rather than the market.

3. There has been a spate of research in the last 10 years to explain the changes in share price indices using high-frequency data such as daily closing prices; an example is French *et al.* (1987). Volatility of the whole market is investigated in this line of research but this study is concerned about individual common stock volatility in three international markets.

4. The model is derived through an examination of the dividend valuation model and the duration theories to identify likely factors affecting share prices, and hence share price volatility. See William and Pfeifer (1982) and Baskin (1989) for two examples among several studies which

relate volatility with one or more theory-suggested variables. This study is concerned with examining the joint linear effect of several variables.

5. The model tested in this chapter is specified as a linear model. If in fact the relationship is nonlinear, further work is necessary to test other functional forms of the model. These and other refinements are suggested for continuing research on this subject.

6. The extreme value method is computationally more efficient as it is obtained from high and low (i.e. extreme) prices of a firm's share price over the test period. The traditional standard deviation calculated as the root of the variance in prices is only one-third as efficient as this extreme value measure for measuring the volatility; see Garman and Klass (1980). Kunitomo (1992) suggests an improvement to this method; however, he admitted in his conversation with me (the first author) in Tokyo in June 1991 that this would require a lot more data than are publicly available and that this improved method could be feasible for investment houses. Hence the reason for the choice of Parkinson's measure in the cited paper. Most print data series available on companies report year's low and high prices in their annual reports; extreme value volatility thus makes full use of the low and high price data series.

7. Gordon's share valuation theory can be extended to show that the dividend yield and payout ratio are inversely related to share price changes (see William and Pfeifer (1982) and Baskin (1989).

8. The positive effect of financial leverage must be balanced agaist the costs arising from increased financial distress. In either cases, price changes are likely to be directly related to debt-to-asset changes.

9. Pairwise regression results revealed substantial multicollinearity between some independent variables: POR and DY multicollinear by definition. Some of these varibales were dropped in order to improve the reliability of the test results. The normality assumption tests done by plotting the residuals indicated that the remaining variables were normally distributed with constant variance. The parsimonious model was built using Akaike's procedure as in Mendenhall and Sincich (1989). Therefore the test results reported later are robust and reliable.

CHAPTER

15

Gordon's Dividend Valuation Model and Malaysian Share Prices*

Abstract

A widely used model in share valuation practice in both developed and developing share markets is *Gordon's Dividend Valuation Model*. We operationalise this model using both book- and market-value based measures to examine the extent to which the average long-run prices share price changes of 100 continually-listed stocks in the Malaysian emerging market are associated with *ex post* values of the predictors in this Model. The findings are surprising in that 70 per cent of the share price variation is explained by the predictors namely the dividends and the discount measured as (k-g). This is anomalous to other test results.

1. Introduction

All investors, be they institutional or individuals, hold one common objective when they invest in the share market... they all hope to maximise expected returns adjusted for some preferred level of risk. The Capital Asset Pricing Model suggests that risk determines returns and, therefore, perception of risk changes must change share prices. This is well founded in theory though tests of this theory have been shown to be a tautology (Roll 1977). For investment in common stocks, not much is known about what factors other than risk causes the changes in share prices, except the vague idea that some fundamental variables and other unsystematic factors affect share prices. This creates great concern to investors and others such as stockbrokers, fund managers and investment analysts. Due to worldwide increases in share price volatility in recent years, as shown in Chapter 14 (see endnote No. 2), studies on share price volatility to isolate factors associated with share price changes have received increasing attention. The issue of whether the various factors suggested by valuation theories and practices are in fact *jointly related to share price* volatility has not been resolved.

The objective of this chapter is to go a step further, first to address whether the share prices on the KLSE are formed in accordance with Gordon's Dividend Valuation Model (Gordon 1962). It has been shown that the fundamental factors are related to share price changes: Parkinson's measure of volatility and share prices are significantly related in a linear model. But it is evident that changes in the six fundamental factors explain

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only about 26 per cent of the changes in share prices (Ariff, Kuhan, Shamsher and Annuar 1995). We operationalise Gordon's model as a non-linear model, limiting the variables to those suggested by the Gordon's Valuation Theory. We find that the non-linear model is able to explain in excess of 60 per cent of the changes in share prices. This is startling in that the model is relevant and more so in its non-linear form.

2. Gordon's Dividend Valuation Model

The theory of the firm suggests that the objective of the firm is to maximise its value by undertaking positive net present value investments. For a listed firm, the value of investments is the NPV which should be captured as an increase in share price equivalent to the aggregate NPV of investments.[1] Since almost all price increases, in the long run, must arise from the ability of firms to obtain positive net present value opportunities, it can be hypothesised that variation in common stock prices must be correlated with a firm's financial plans. In an informationally efficient market, excess returns are possible only if stocks are mispriced, probably because the current price does not reflect unanticipated future growth from positive net present value projects. Therefore, valuation models can provide an avenue for investors to translate their judgements into investment decisions and a widely applied valuation model is described by Gordon and Shapiro (1956) and Gordon (1962).

Gordon's model relates share prices to expected cash flows (dividends or earnings) of the firm:

$$P_0 = Y_1\ (1\text{-}b)/(k - br) \qquad \text{or } D_1/(k\text{-}\ g) \tag{15.1}$$

where

- P: the present value of firm s expected future dividends, which is given by the firm's current income,
- Y: the earnings of the firm,
- r and b: respectively the return on equity and retention rate of earnings in the firm,
- k: the relevant discount rate being the opportunity cost of capital for investment selection, and
- g: the product of and b and the retention rate.

The higher the growth rate of dividends, br = g, the greater the value of a firm's common stock. The greater the risk of the firm or the required rate of returns, k, the lower the value of the stock. The required rate of return, k, can be a book value measured as the return to equity over the test period assuming that short-term variations are levelled over the 16 years, market value (CAPM) measure using share market returns, the risk-free returns and the firm's beta risk.

This model is used to find the investment rate that maximises the share value and assumes that dividend policy *per se* has no influence on the firm's share price. Other assumptions are that an investor buying shares purchases a dividend expectation, and that in placing a value on the expectation, the rate of profit the investor requires is an increasing function of the rate of growth of dividends, and that one growth rate is appropriate forever for listed firms. The last assumption is suitable for valuing stable and mature firms, which are the ones mostly included in this study as we exclude firms that did not have continuous listing over the test period of 16 years.

Gordon tested a version of this model using data relating to a sample of NYSE-listed firms and reported that it did a credible job of explaining the variation in price of common stocks in different sectors. With R-squared values ranging from 0.80 to 0.92 in different sectors, he claimed that the test results from a linear model are consistent with the model. In his test, he used a proxy variable for k as the theory for calculating this variable, namely the CAPM was still undeveloped at the time this model was tested. There have been no tests of his model with a re-specification of this variable.

The empirical version of the model is

$$\text{Log } P_t = a + b_1 \text{ Log DPS}_t + b_2 \text{ Log } (k\text{-}g)_t + e_t \qquad (15.2)$$

Some variations of the model are examined here to develop a model suitable for the Malaysian context. An empirical test was conducted on the validity of Gordon's model on 100 firms listed on the KLSE using k based on (a) book value and (b) market value measures. The findings are summarised in Tables 15.1 and 15.2 respectively for book, and market value measures.

Table 15.1 Gordon's Model Using k Based on Book Values
$\text{Log P} = \log a + b_1 \log \text{DPS} + b_2 \log (k\text{-}g)$

Regression	DPS	k-g
Coefficients	0.443	-0.094
t-value of	12.910*	-1.835*
R-squared	69.33	
F-ratio	8465**	

Significant at ** (0.10)and * (0.05) confidence levels

Table 15.2 Gordon's Model Using k Based on CAPM:
$\text{Log P} = \log a + b_1 \log \text{DPS} + b_2 \log (k\text{-}g)$

	DPS	k-g
Regression		
Coefficients	0.347	-0.062
t-value	10.138*	-0.754
Regression		
F-ratio	89.86*	
Adjusted		
R-squared	70.88	

* Significant at 0.05 confidence level

3. Findings on Gordon's Model

Findings reported in these tables show that Gordon's model is able to explain 70 per cent of the variation in prices of common stocks of firms. In both tables the model holds well with the F-statistic being significant at 0.05 confidence level. The signs of the regression coefficients of the independent variables are in the predicted directions; dividends are positively and (k-g) is negatively related to prices. But the coefficient for the (k-g) variable is not significantly different from zero as its t-value of 1.835 is not significant at 0.95 probability level. The coefficient for dividends is significant at the .05 level. These findings are consistent with the suggestion in Fama and French (1992) that book value measure explains the variation in common stock prices.

Examination of the numbers in Table 15.2 reveals how the results are different using the *theory-suggested-method* from the CAPM. The discount rate is calculated using the Securities Market Line:

$$K = R_F + \text{Beta}\,(K_m - R_F) \tag{15.3}$$

which uses the risk-free rate, R_F, from 3-month Treasury bills, K_m is the average KLSE rate of return, and beta is calculated from Scholes-Williams equivalent procedure explained in Chapter 16. As can be noted, this measure is widely used in corporate financial practices based on the CAPM theory, and therefore is thought to be superior to the book value measure. The use of theory-based measure improved the results only marginally as the explained variation from the coefficient of variation is slightly higher at 70.88 per cent compared with the equivalent figure of 69.33 per cent. The other results remain more or less the same.[2] This is surprising in that the book value measure gives broadly the same outcomes in this Asian share market whereas market value measures have been shown to yield superior results in the developed share market, namely the NYSE.

4. Conclusions

The objectives of this chapter were to isolate the value-drivers associated with stock prices and to evaluate the relevance of Gordon's share valuation model to firms listed on an emerging Asia Pacific market. With respect to the first objective, factors suggested by valuation theories and investment practices are included in a test model developed to study one developed market and two (Malaysia and Singapore) developing markets in another study. Results from that study suggested that only a small proportion of share price variation in the developing markets is explained by a combination of six fundamental variables. The results using the non-linear Gordon's model is surprising in that 70 per cent of share price variations of 100 continually listed stocks in the Malaysian market are explained by variations in dividends and the (k-g) discount factor! This is a surprising result given the findings reported here and elsewhere that there are pockets of inefficiency in this share market. Further work is warranted to replicate these findings.

Both the general and a parsimonious model in the previous chapter were examined. The findings suggest that dividend yield, payout ratio, debt to assets ratio, asset growth and firm size variables explained 26 per cent of the price changes in the Kuala Lumpur market for the period 1975-1990. Only the asset growth and debt usage variables were significant at 0.05 confidence level; the other three variables were not significant in the model fitted for the KLSE. These findings are consistent with the leverage theory's prediction about the magnifying effects on the value of a firm by leverage and the positive effect of asset growth on price changes.

A limitation of this study on price volatility is that linear relation was assumed in the test. Though theory does not provide any cue on this issue, it might be that the relationship is non-linear. If firms experience an increase in competition from other firms to maintain their higher rates of return, it is more difficult to maintain higher rates than moderate or small rates of abnormal returns. This suggests that the relationship is unlikely to be monotonically increasing as modelled by a linear relation; the relationship may well be concave. This issue should be pursued in further research on the topic.

With regard to the applicability of Gordon's Dividend Valuation Model for valuing shares, the findings suggest that the model holds surprisingly well. This appears to suggest that Gordon's model with a book value measure of k can be reliably used by investors to value common stock prices though this assertion needs to be checked further with a study of similar markets. This is particularly so in view of fundamental factors (which include dividends and a proxy for discount rate) used in the previous chapter being poorly correlated with share price changes.

End note

1. The value of a firm is also increased by (a) tax-shield value arising from deduction of interest costs prior to corporate taxation and (b) synergy value of take over and merger activities. These increases are not considered in this valuation model.
2. Similar results were found for the samples of blue chip and speculative firms.

CHAPTER

16

Stability and Predictability of Systematic Risk of Common Stocks*

Abstract

The CAPM and the Market Model have entrenched the application of beta measure as a practical estimate of *the riskiness of stocks, companies*, for computing required rate of returns and other parameters. Theories also suggest that measurement of beta has to reckon with stability problems and non-synchronous errors, the latter being very relevant for any thinly traded market such as the one studied here. Investigation of these issues reveal that by using month-end price data over a 4-5-year interval and specifying 2 lags and 2 leads of market returns in the Market Model leads to both stable and unbiased/correct beta estimates in the Malaysian capital market. Portfolio betas are more stable than individual betas. These results have significant theoretical and practical implications for accounting and finance practices and research.

1. Introduction

The development of the concept of systematic risk coefficient popularly referred to as beta in accounting and finance literature, is based on the Capital Asset Pricing Theory (Sharpe-Lintner-Mossin) developed in the mid-1960s, and beta is measured by the 1963 Market Model. It is an important statistic for estimating the expected returns on financial assets, and consequently is very useful in investment and corporate financial decisions. Considerable efforts have been expended to obtain empirical estimates of betas (Wallace 1980), and today such estimates are routinely reported in financial and accounting services. It is generally accepted that the total risk of investing in a spot financial security consists of a diversifiable (non-systematic) and a non-diversifiable (beta) risk. Diversifiable risk is attributed to factors which are specific to the firm issuing the security, in this case the common stock, and can be eliminated through diversification of the investment by holding a basket of dissimilar securities rather than one or a few similar securities. The non-diversifiable risk is due to factors which influence all securities in a given security market, and hence constitutes the only *relevant risk* in investment decisions.

The measure of beta is complicated by (a) the period over which it is calculated and the (b) frequency of trading of a security in relation to all other securities traded. The former determines the stability of beta while the latter introduces measurement error in the actual calculated value. Both issues are relevant in any study of Asia Pacific share

* This study was completed and the chapter was written by Annuar Md. Nassir and Shamsher M. The chapter was edited by M. Ariff.

markets as there have been only few studies on these aspects (and none in Malaysia). The theories relevant to beta measurement are described in the next section. The methodology applied to address the two issues are explained along with a description of the data set in Section 3. The results and conclusions are presented in the later sections. Stability of beta is achieved by using monthly data over about 60 months while errors in beta are corrected by using a two-lag and two-lead version of the Market Model. Non-synchronous errors are a serious problem in this market as is also the case in any thinly-traded market such as Australia (Sinclair 1982) and Singapore (Ariff and Lim 1990). The methodology used in this chapter closely follows the latter study.

2. Theories Relevant to Beta Estimation

The CAPM suggests that beta is the appropriate measure of risk for both efficiently and naively diversified portfolios (Jensen 1968) given an efficient market (Fama 1970: 1991). Therefore, on average, the amount of returns an investment manager can expect above the risk-free rate is dependent solely upon beta, which is the sensitivity of the investment's return to the changes in market returns. Sharpe (1964), Lintner (1965) and Mossin (1966) developed the Capital Asset Pricing Model (CAPM) to explain how the a risk-averse investor chooses a particular security by demanding a higher rate of return for holding a security with a higher systematic risk. The non-systematic risk can be diversified away given Markowitz (1958) Efficient Frontier. The CAPM states that the risk premium for any asset is related to the market risk premium in the following way as described by the Securities Market Line (SML):

$$E(R_i) = R_F + \beta_i(E(R_m - R_F)) \qquad (16.1)$$

where

$E(R_i)$:the expected return on security I held by an investor,

R_F : the yield on a default-free security with identical horizon,

α_i . β_i : the constant and the true systematic risk measured with stability and no errors from thin-trading, and

$R(R_m)$: the expected return on the market for all similar securities.

SML is a partial equilibrium pricing theory of securities given an exogenous riskless security. The importance of beta as a tool for making investment decisions has been increasingly recognised and the local investment advisory firms regularly provide information on beta coefficients of a large number of stocks.

Beta is measured over a sufficiently long period of time to obtain an estimate with stability. Sharpe's (1963) Single Index Model (the widely-used SIM in markets) provides a measure of beta values in relatively well-traded markets such as the NYSE and London Stock Exchange. The model is:

$$R_{it} = \alpha_i + \beta_i(R_{mt}) + e_{it} \qquad (16.2)$$

where

R_{it} and R_{mt}: the actual returns of the security and the market respectively,

α_i, β_i : respectively the intercept and slope coefficient in the regression, and

e_{it} : the i.i.d. residuals that have zero mean and constant variance with no autocorrelation.

Beta measured over a period of 60 months has been shown to be stable (Levy 1971). A good review of the problems associated with beta estimation is found in Shapiro (1990) to which the reader is referred for more details.

Scholes and Williams (1977) showed that the beta estimates using the above model yield incorrect values in that the infrequently traded stocks have their betas estimated with positive errors whereas the frequently traded stocks have their betas estimated with negative errors. Others examined this problem in several markets (see Dimson 1979 in England; Fowler and Rorke 1983 in Canada; Sinclair 1982 in Australia; Ariff and Lim 1990 in Singapore; Murray and Chan 1995 in Ireland). An alternative measure of beta based on five accounting variables has been suggested in the literature and applied in Australia (Castagna and Matolsky 1978) and Malaysia (Loo and Maheswary 1989). This approach is not followed in this discussion.

Institutional investors want *unbiased* estimates of ongoing or possibly changing betas of competitive funds to develop investment strategies relative to expected performance of their portfolios and those of the competitors' ahead of the market cycles. These estimates allow inferences to be made with respect to expected market outlook of competitors. For example, a gradually increasing fund beta would indicate a bullish outlook on the part of the competitor. An implicit assumption of such an inference is that betas are stable and hence predictable. A stable and predictable beta estimate will enhance the validity of the beta-based investment performance ranking tools such as Treynor's (1965) and Jensen's (1968) performance measures. The portfolio manager's ability to select securities is reflected in the sum of returns above or below expectations as defined by beta. If beta values are not accurate measures of risk, these will provide misleading signals on the portfolio management's performance.

There is mixed evidence on whether beta is a robust description of how market prices lead to risk perception under conditions of uncertainty and how investors expect their portfolios to perform under these conditions. Sharpe and Cooper (1972) and Fama and French (1992) observed that the positive relationship between OLS beta and the average returns on United States stocks observed by Black, Jensen and Scholes (1972) and Fama and MacBeth (1973) do not seem to hold any more and that the book-to-market equity is a better explanatory variable in the cross-section of average returns. This has started a debate on whether beta is still relevant as (a) tests of CAPM using betas have been criticised effectively by Roll (1977) and (b) repeated attempts using book-value measures are superior in explaining return differences compared with the beta estimates. Two recent studies have shown the relevance of beta in explaining return variations. Pettenghill *et al.* (1995) reports a consistent and highly significant relationship between beta and cross-sectional returns. They used expected rather than realised returns to support a positive payment for beta risk. Rosenberg and James (1995) discuss the role of beta in evaluating *ex post* degree of risk undertaken in a diversified investment programme. The authors developed relevant criteria for optimal prediction and estimation of beta. Despite these studies, there is a debate about the relevance of beta. This debate is ignored in this chapter as the aim of this chapter is to provide an introduction to the idea of how to calculate beta correctly rather than to use it to explain return variations in the local market (to verify claims of theory).

The ordinary least square (OLS) regression using Equation 16.2 is usually applied to estimate beta, which is the regression coefficient obtained with the data of at least 50-60 monthly returns data to ensure stability (Levy 1971; Sharpe and Cooper 1972; Alexander and Chervany 1980). The next problem with the KLSE is that this is a thinly traded market. As such, the continuous trading assumption - that all stocks have clearing prices at the market closing intervals in the data set - is not expected to be met. Applying the OLS regression to Equation 16.2 gives beta values with a systematic bias; measured betas of thinly traded stocks will be upward biased and the frequently traded stocks will be downward-biased. Thus, there is a serious problem of non-synchronous trading errors in measured betas (Annuar 1992). The objective here is to empirically validate the stability and predictability of beta estimates by correcting for non-synchronous errors using three lead and lag versions of Fowler-Rorke procedure as developed in Ariff and Lim (1990).

$$\begin{aligned} R_t = \alpha + \beta_3 R_{mt-3} + \beta_2 R_{mt-2} + \beta_1 R_{mt-1} + \beta_0 R_{mt} \\ + \beta_{+3} R_{mt+3} + \beta_{+2} R_{mt+2} + \beta_{+1} R_{t+1} + e_{it} \end{aligned} \tag{16.3}$$

where

- subscript i for stock is not shown, and - and + indicate respectively the lags (up to 3) and leads (up to 3) of market returns.

  Market returns are calculated from a representative large-sample-based index of the market.

The non-synchronous error corrected beta is the sum of a weighted average of the 7 beta values (-3, -2 and -1 lags, current beta and +1, +2 and +3 lead betas). The weights are derived from the serial correlations of the market returns over the respective lag and lead periods. The equation for the weights are given in Chapter 20.

3. Data and Results

Data

This study used monthly returns of 148 common stocks traded over a recent 15-year period. The stability and predictability of beta were studied over three 5-year periods: first five-year, the second five-year and the third five-year periods. Two more sub-periods were used by dropping the first year and running the regressions over two seven-year periods, sub-periods 4 and 5. The Fowler-Rorke (FR) betas are estimated following the formulae developed in Ariff and Lim (1990). for 3 lags and 3 leads. The equally weighted index of all listed stocks on KLSE is used as a proxy for market index.

Results

The profile of the FR beta coefficients of the firms for the sub-period estimating intervals are summarised in Table 16.1.

Table 16.1 Estimated FR Beta Coefficients for the Sampled Firms

Period	Mean	Std. Dev.	Min. Value	Max. Value	Std. Error	Variance
			5-Year Interval			
Sub-period 1	1.00	1.157	-5.357	4.351	0.095	1.339
Sub-period 2	0 482	0.746	-1.100	8.426	0.061	0.557
Sub-period 3	0.621	0.658	-2.080	3.716	0.054	0.433
			7-Year Interval			
Sub-period 4	0.960	1.100	-7.180	3.499	0.090	1.210
Sub-period 5	0.436	0.787	-3.241	7.334	0.065	0.619

For both the five- and seven-year estimation intervals, there were negative betas. The mean of all betas is 1.00 for sub-period 1 with a standard deviation of 1.15, whereas the beta for sub-period 2 is 0.96 with a standard deviation of 1.10. To ascertain the distribution of beta values, the sample was categorised into six risk classes according to their beta values in ascending order. The frequency distribution is summarised in Table 16.2.

For the fist five-year estimation interval, fewer than 40 stocks (27%) and 72 (48.6%) over period 3 had beta values of less than 0.3 whereas 26 stocks (17.5%) and one stock for the third period had beta values greater than 1.8. The number of stocks outside the beta range of 0.3-1.8 is small. A similar distribution of betas was observed over the two 7-year intervals.

Stability of Beta of Securities: The stability of beta has received considerable attention in the financial economics literature. Baesel (1974) provided evidence that the stability of beta is dependent upon the estimation period length but Theobald (1981) demonstrated that the beta stability does not increase indefinitely with estimation period length, implying that there is an optimal estimation period for beta stability.

This study examined the stability of estimates for individual stocks and portfolios over five- and seven-year periods using the transition matrix and product moment correlation. If the betas are stable and hence predictable, then investors can assess the future riskiness of their investments from past riskiness, since stable beta values indicate that past betas can be used to predict future values. The correlation analysis measures the strength of co-movement of the two sets of betas as well as tests its significance.

To test the stability of betas over estimation periods of different lengths, first the rates of returns were calculated for each stock, and then returns from the market index. Then over the 15-year period, beta coefficients were obtained for five consecutive years resulting in three betas per stock. Then two betas per stock were calculated for two consecutive seven-year intervals. After estimation of beta coefficients, the stocks were grouped into different risk classes by ranking them according to beta values. We then estimated the number of stocks that stayed in the same risk class over the various estimation intervals. Tables 16.3 and 16.4 summarise the findings for the five- and seven-year estimation intervals respectively.

Results show that, on average, more than 50 per cent of the stocks in the risk class one and 29 per cent in the risk class two stayed in the same risk class over the three

Table 16.2 Frequency Distribution of Non-synchronous Corrected Betas: **5-year Interval**

Risk Class	Beta Midpoint	Sub-period 1 FR Cum. FR	Sub-period 2 FR Cum. FR	Sub-period 3 FR Cum. FR
(Low Risk)				
1	0.2	40 40 (27%)	40 40 (27%)	72 72 (48.65)
2	0.4	18 58(39.2%)	18 58(39.2%)	63 135(91.2%)

Table 16.3 Frequency Distribution of Non-synchronous Corrected Betas: **7-Year Interval**

Risk Class	Beta Midpoint	Risk Class FR Cum. FR	Sub-period 1 FR Cum. FR	Sub-period 2 Fr Cum. FR
(Low Risk)				
1	0.2	29 29(19.56%)	38 38(25.67%)	38 38(25.67%)
2	0.4	35 64(43.24%)	32 70(47.29%)	32 70(47.29%)
3	0.8	31 95(64.14%)	28 98(66.21%)	28 98(66.21%)
4	1.2	21 116(78.37%)	27 125(84.45%)	27 125(84.45%)
5	1.6	18 134(90.54%)	13 138(93.24%)	13 138(93.24%)
6	2.0	14 148(100.00%)	10 148(100.00%)	10 148(100.00%)
(High Risk)				

periods whereas 7 per cent (period 1 and 2), 19 per cent (period 1 and 3) and 56 per cent (period 2 and 3) of the stocks in risk class three stayed in the same risk class over the three periods. Overall, this finding suggests that there is substantial stability over a 5-year estimation interval. Similar conclusions can be made for betas in the seven-year estimation intervals, as shown in Table 16.4.

Table 16.4 Stability of FR Betas for Individual Securities (7 years)

Risk Class	Beta Midpoint	Distribution of betas remaining the same over sub-periods 1 and 2: Number (%) in same class	Total number
1	0.2	19 (66%)	29
2	0.4	11 (31%)	35
3	0.8	3 (10%)	31
4	1.2	3 (11%)	21
5	1.6	7 (38%)	18
6	2.0	7 (51%)	14

The results for the portfolios are examined below. Seven portfolios were formed each consisting of 21 randomly selected stocks. Statistics in Table 16.5 shows the risk-class membership of the seven portfolios with different betas. The results show that, irrespective of the estimation intervals, portfolios of lower risk class are more stable than those in the higher risk class. Further, the risk class membership of portfolios is more stable than individual securities as securities moving to higher classes are normally offset by those moving to lower classes.

Predictability of Betas: The reliability of beta coefficients as a tool for investment decisions can be observed only if betas are estimated with a certain degree of accuracy from past information. The degree of association between past and future beta values is measured by product-moment and rank-order correlation coefficients. The higher the association, the more reliable are the historical betas as estimates of future beta values.

Table 16.5 Stability of Non-synchronous Beta Portfolios

Risk Class	Beta Midpoint	Sub-period 1-2	Sub-period 1-3	Sub-period 2-3
		Number (%) Total in same class	Number (%) Total in same class	Number (%) Total in same class
		5-year estimation interval		
1	0.2	2 (50%) 4	2 (50%) 4	2 (67%) 3
2	0.4	2 (100%) 2	1 (100%) 1	1 (100) 1
3	0.8	- 1	1 (50%) 2	2 (67%) 3
		7-year estimation interval (76/82 - 83/89)		
1	0.2	1 (100%) 1		
2	0.4	2 (50%) 4		
3	0.8	2 (100%) 2		

The product-moment and rank-order correlation analysis of the beta values of the sampled firms for the sub-periods are presented in Table 16.6. The results in Panel A indicate that there is significant rank-order and product moment correlation between beta values for the three periods. Similar results were observed in Panel B. These results imply that the beta coefficients of the stocks can be predicted fairly accurately from betas of the previous periods. To ascertain the predictability of portfolio betas, the product-moment and rank-order correlation coefficients of beta values of 7 portfolios were observed. Each portfolio consisted of 21 stocks randomly chosen in the first period (historical betas) with their corresponding values in the following period (future betas). The correlation coefficients are summarised in Table 16.7.

The results show that there is significant correlation between portfolio betas in the various periods. However, there is a lower degree of stability compared to betas of individual securities. These findings are inconsistent with those of Blume (1971) and Levy (1971) for betas of stocks in a developed market. This inconsistency could be due to the use of Fowler-Rorke betas adjusted for thinness of trading in this study instead of Ordinary Least Squares (OLS) betas. The OLS portfolio betas showed a higher degree of stability than those of individual securities.

Porter and Ezzell (1975) and Alexander and Chervany (1980) provided evidence that the method of portfolio formation and level of diversification affect the stability of portfolio betas. In view of this evidence, portfolios consisting of 5, 10, 15 and 20 stocks were formed both randomly and by a ranking procedure based on beta coefficients over the five- and seven-year estimation intervals. For the ranked portfolios, individual stocks were ranked in ascending order of their beta coefficients, and sequentially formed

Table 16.6 Product-moment and Rank-order Correlation of Security Betas (Prob > R under Ho: = 0, N = 148 Individual Stocks

Rank-order	Correlation		Product-moment	Correlation
	Sub-period 2 Beta	Sub-period 3 Beta	Sub-period 2 Beta	Sub-period 3 Beta
Panel A: 5-year estimation interval				
Sub-period 1				
Corr	0.395 (0.001)	0.450 (0.002)	0.342 (0.004)	0.406 (0.002)
Sub-period 2		0.107	0.248	
Corr		(0.031)	(0.023)	
Panel B: 7-year estimation interval				
	Sub-Period 4 Beta	Sub-Period 5 Beta		
Corr.	0.353 (0.001)	0.204 (0.035)		

Note: (.) indicates the probability levels of correlation

into stock portfolios. The portfolio beta coefficients were calculated as the average of the betas of stocks in the portfolios. The association of the portfolio's beta coefficients for the succeeding five- and seven-year periods were tested using product-moment correlation, rank-order correlation and mean absolute deviations method. The findings are presented in Table 16.8.

Table 16.7 Product-moment and Rank-order Correlation of Portfolio Beta (Prob > R under Ho: = 0, N = 7 portfolios

Rank-order	Correlation		Product-moment	Correlation
Panel A: 5-year estimation interval				
	Sub-period 2 Beta	Sub-period 3 Beta	Sub-period 2 Beta	Sub-period 3 Beta
Corr	0.286 (0.001)	0.357 (0.001)	0.084 (0.072)	0.096 (0.068)
Corr		(0.035) (0.261)		(0.359) (0.011)
Panel B: 7-year estimation interval				
	Sub-Period 4 Beta			Sub-Period 5 Beta
Corr.	0.081 (0.069)			0.178 (0.5)

Note: (.) indicates the probability levels of correlation

Table 16.9 presents the descriptive summary of the 5-year (Panel A) and 7-year (Panel B) set of portfolio betas. The findings show that the standard deviation (SD) of the randomly formed portfolio beta coefficients in Panel A and B becomes smaller as the number of securities in the portfolio increases. A similar observation for the ranked portfolios is not as apparent. The decrease in SD is most noticeable when the portfolio size increases to 15 securities in Panel A and 10 securities in Panel B with relatively little improvement thereafter.

Table 16.8 Descriptive Summary of Non-synchronous Beta Coefficients

Estimation Interval	Portfolio Method	Number of Stocks	Correlation Coefficient (probability)	Mean Deviation PM	Absolute
Panel A: 5-year estimation intervals					
Sub-period 1-2	Ranked	5	0.193	0.000	0.917
		10	0.129	0.032	0.889
		15	0.317	0.057	0.874
		20	0.393	0.067	0.829
	Random	5	0.454	0.238	0.564
		10	0.604	0.629	0.487
		15	0.251	0.417	0.683
		20	0.287	0.084	0.458
Sub-period 1-3	Ranked	5	0.415	0.384	0.769
		10	0.490	0.491	0.786
		15	0.667	0.778	0.753
		20	0.643	0.526	0.669
	Random	5	0.549	0.525	0.575
		10	0.112	0.192	0.274
		15	0.783	0.813	0.629
		20	0.357	0.096	0.406
Sub-period 2-3	Ranked	5	0.631	0.461	0.292
		10	0.719	0.586	0.278
		15	0.817	0.764	0.244
		20	0.893	0.800	0.235
	Random	5	0.127	0.189	0.303
		10	0.068	0.181	0.439
		15	0.183	0.264	0.161
		20	0.036	0.359	0.257
Panel B: 7- year estimation intervals					
Sub-period 1-2	Ranked	5	0.267	0.049	0.790
		10	0.490	0.364	0.720
		15	0.450	0.299	0.731
		20	0.643	0.684	0.662
	Random	5	0.589	0.233	0.511
		10	0.442	0.308	0.269
		15	0.300	0.096	0.657
		20	0.081	0.178	0.501

These statistics reveal that the beta stability of randomly-formed portfolios increases with increases in the number of securities, although the rate of increase decreases after 15 securities for the five-year intervals and 10 securities for the seven-year intervals. This implies that *shorter* term portfolio betas are more stationary with a larger number of securities in the portfolio.

Table 16.9 presents the summary of alternative measures of portfolio beta stability from comparisons of portfolio beta coefficients between the three five-year periods (Panel A) and the two seven-year periods (Panel B). These results show that both the rank-order (RO) and product moment (PM) correlations increase as the portfolio size is increased for the ranked portfolios, suggesting greater beta stability for more diversified portfolios. Similar observations are not discernible for random portfolios, implying no improvement in beta stability for more diversified portfolios. The alternative measure of beta stability, mean absolute deviation, suggests a decrease in value as the size of portfolios is increased for both the ranked and random portfolios, consistent with the findings in developed markets (Porter and Ezzel 1975; Blume 1975).

Table 16.9 Stability of Portfolio Betas

Estimation Interval	Portfolio Stocks	Number of Portfolios	Random Rank Portfolios		Portfolios	
			Mean	SD	Mean	SD
Panel A: 5-year estimation intervals						
Sub-period 1	5	29	0.973	0.311	1.102	0.743
	10	14	0.874	0.232	1.071	0.700
	15	9	1.128	0.200	1.115	0.679
	20	7	1.153	0.192	1.071	0.713
Sub-period 2	5	29	0.530	0.338	0.491	0.326
	10	14	0.387	0.114	0.500	0.213
	15	9	0.444	0.089	0.493	0.166
	20	7	0.495	0.166	0.500	0.164
Sub-period 3	5	29	0.429	0.281	0.632	0.297
	10	14	0.825	0.186	0.642	0.234
	15	9	0.500	0.163	0.613	0.217
	20	7	0.647	0.129	0.641	0.216
Panel B: 7-year estimation intervals						
Sub-period 4	5	29	0.902	0.311	1.105	0.743
	10	14	0.758	0.232	1.071	0.701
	15	9	0.914	0.211	1.115	0.679
	20	7	0.036	0.201	10.71	0.715
Sub-period 5	5	29	0.454	0.287	0.441	0.367
	10	14	0.536	0.164	0.413	0.237
	15	9	0.257	0.153	0.427	0.218
	20	7	0.465	0.132	0.423	0.135

4. Conclusions

Study of the stability and predictability of betas of a large number of continually-listed securities traded in Malaysia over a lengthy fifteen-year period shows that beta coefficients as measures of systematic risk measures are quite stationary over time under some conditions. For example, there is stability of beta coefficients over a five- or seven-year estimation interval using month-end prices. The risk class membership of portfolios is relatively more stable than individual securities. Therefore, stable betas must be calculated over lengthy periods. Further study using weekly returns is needed to shed light on whether beta of new firms or firms undergoing restructuring can be measured effectively as one cannot wait for five years to calculate betas of such firms. This is urgently needed. Second, mutual fund managers in unit trusts will have less worry of instability as they deal with portfolios of stocks. Corporate advisory services must realise that individual betas are far less predictable and are less accurate.

Using standard deviation of beta coefficients as a measure of stability shows that the beta stability of randomly formed portfolios increases with increases in the number of securities, although the rate of increase decreases after 15 securities for 5-year betas and 10 securities for 7-year betas. Using alternative measure of beta stability such as product-moment and rank-order correlations shows that beta coefficients of ranked portfolios are relatively more stable and related to the number of securities in a portfolio, and the reverse is true for randomly selected portfolios. On average, there is substantial stability between betas of individual securities for the three 5-year and two 7-year periods. However, there is a lower degree of stability for portfolio betas. The use of correlation coefficients as a measure of beta stability masks the possibility of decrease in the magnitude of intertemporal changes in portfolio beta coefficients as the number of securities in the portfolio rises, regardless of the method of portfolio formation. Therefore, the mean absolute deviation statistic is used to measure time stability of beta coefficients and the results show that the time stability of portfolio beta coefficients is directly related to the number of securities in the portfolio. It is significantly stable for portfolios of 15 or more securities, irrespective of method of portfolio formation.

Overall, the results indicate that the individual securities and portfolio betas are relatively stable and investors can reliably utilise them especially the portfolio betas for estimation of expected returns. Hence, informed portfolio selection and investment/financing decisions can be accurate if thin-trading effects are adjusted. An appendix to this chapter provides stable and non-synchronous-corrected beta values for a large number of firms traded over the 1990-1994 period; the tests reported in this chapter are based on betas calculated over an earlier fifteen-year period.

APPENDIX 16.1A
STABLE, NON-SYNCHRONOUS CORRECTED BETA OVER 1990-94: MALAYSIA

Company Names	Dimson beta	(OLS beta)
Aluminium Company of M'sia	1.11	(1.14)
Amalgamated Steel Mill	1.25	(1.28)
Antah Holdings	1.17	(1.35)
Aokam Perdana	1.04	(1.30)
Arab M'sian Development	1.08	(1.5)
Arab M'sian Merchant Bank	1.11	(0.9)
Asia Pacific Land	1.05	(1.08)
Asiatic Development	0.85	(1.24)
Bandaraya	1.35	(1.5)
Berjaya Group	0.93	(1.24)
Berjaya Sports	1.44	(1.37)
Cement Industries of M'sia	1.04	(0.92)
Commerce Asset	1.09	(1.00)
Consolidated Plantations	0.97	(1.03)
Development and Commercial Bank	1.06	(1.19)
Diversified Resources Bhd.	1.50	(1.61)
Dunlop M'sian Industries	1.21	(1.39)
Esso	0.56	(0.7)
Faber Group	1.36	(1.69)
Federal Flour	0.47	(0.34)
General Corporation	1.31	(1.60)
Genting	1.13	(1.03)
Golden Hope	0.88	(1.13)
Golden Plus	1.32	(1.54)
Granite	1.29	(1.68)
Guinness	0.74	(0.79)
High & Low	0.96	(1.11)
Hong Leong Credit	1.06	(0.98)
Hong Leong Industries	0.96	(0.77)
Hume	0.96	(0.91)
Idris	1.33	(1.58)
IGB Corp	1.18	(1.34)
IJM	0.99	(0.85)
IOI	1.13	(1.36)
Johan	1.41	(1.73)
Kamunting	1.12	(1.48)
Kian Joo	0.99	(0.83)
Kuala Lumpur Industries	1.04	(1.58)
Kuala Lumpur Kepong	0.96	(0.94)
Land & General	1.41	(1.10)
Landmark	1.26	(1.40)

cont'd

Appendix 16.1A (cont'd)

Leader Universal	1.18	(1.17)
Lien Hoe	0.89	(1.37)
Lingui	1.19	(1.46)
Magnum	0.98	(1.08)
Malayan Banking	1.15	(1.11)
Malayan United Industries	1.01	(1.10)
Malayawata	1.05	(1.06)
MMC	1.12	(1.22)
Malaysian Cement	0.94	(0.90)
Malaysian Mosaics	1.08	(1.39)
Malaysian Pacific Industries	0.87	(0.76)
Malaysia Resources Corp	1.49	(1.43)
MISC	0.84	(0.85)
MBF Holdings	1.41	(1.71)
Metroplex	1.22	(1.42)
MAS	0.93	(0.86)
Mulpha	1.53	(1.60)
Multipurpose	1.38	(1.52)
MWE Holdings	1.11	(1.21)
Mycom	1.09	(1.15)
New Straits Times	0.82	(0.79)
Oriental Holdings	1.00	(0.87)
Palmco	0.83	(1.1)
Perlis Plantations	0.69	(0.55)
Pilecon	1.14	(1.33)
Promet	1.36	(1.51)
Public Bank	0.90	(1.06)
Rashid Hussein	1.22	(1.34)
Renong	1.30	(1.50)
Selangor Dredging	1.26	(1.69)
Selangor Properties	1.02	(1.51)
Shell	0.69	(0.69)
Sime Darby	1.15	(1.07)
Sistem TV3	0.61	(0.65)
Tan Chong	1.29	(1.44)
Time Engineering	1.33	(1.37)
Tractors	0.73	(0.69)
TRI	1.17	(1.42)
UMW	1.32	(1.19)
Uniphoenix	1.51	(1.16)
United Engineers	1.18	(1.16)
YTL	1.13	(0.95)
Average	1.09	(1.19)

CHAPTER

17

A Test of CAPM Predictions (Despite Roll's Critique)*

Abstract

The CAPM predicts that asset returns are positively correlated with asset risk measured as systematic risk, which is now the popular beta. The Fama-Macbeth (1973) and Fama-French (1992) methodologies on six variables - beta, beta-squared, size, leverage, earning-price ratio and book-to-market equity ratio - were used to test this model. The *results are consistent with theories*, which suggests a significant effect from beta. Other results are, however, anomalous, and we believe are confounded despite using credible test procedures. For these reasons, we believe no firm conclusions about risk-return can be made for Malaysia s emerging market.

1. Introduction

The Sharpe-Lintner-Mossin, or the standard asset, pricing model assumes that investors are risk-averse, and the required rate of returns is commensurate with the systematic risk or beta of the assets in which investment is held. Accordingly, there is a simple linear relation between *expected* return of an asset and risk of that asset. There is a caveat to this prediction. Given Markowitz's proof that investors will hold diversified assets represented by portfolios plotting on the Efficient Frontier in the mean-variance space, it is reasonable to assume that this linear relationship between expected returns and systematic risk is more likely to be good for portfolios than for individual securities. Hence the practice of testing with portfolios of assets rather than individual securities as the latter would have too many errors in the measured variables. At least the linear relationship is likely to be stronger and more stable for sets of portfolios than for individual stocks.

These then form the basis for developing a test of the relationship between portfolio returns and portfolio risk in Malaysia's capital market. As discussed in Chapter 16, risk measures must be stable (this is likely if risk is measured over a lengthy interval) and these must be corrected for *non-synchronous errors* using the methods developed in Chapter 20. The purpose of this chapter is to investigate if there exists a linear relation between the *ex post* portfolio returns, thus removing the non-systematic risk, and stable measures of beta risk of portfolios.

The next section has a short discussion of theory and alleged (alleged because of serious problems in testing the theory, according to Roll 1977) evidence on this line of

* The research design for this study was developed jointly by M. Ariff and Annuar Md. Nassir. The results were written up by the latter, and later revised by the former.

research. This test was done to examine if a positive relationship exists in this capital market in order to be able to compare the results with similar test results in developed markets. There is no intention to engage in a discussion on the merits or demerits of such tests as we leave this to a different audience. The results are shown in Section 4, which then leads to comments on the relevance of these results for the local market. Cautiously putting aside the issue of the reliability of the results, it may be simply stated that there appears to be a linear relationship but some of the results are contrary to theory. We have also extended this test to include a few more variables than are strictly included in the CAPM.

2. Theory and Evidence

Partial equilibrium theory of asset pricing attributed to Sharpe-Lintner-Mossin's research is represented by a expression linking expected (E) returns and risk (β_j) of an asset:

$$E(R_j) = R_F + \{E(R_m) - R_F\}\beta_j \tag{17.1}$$

where

j : indicates any asset that is expected to produce a cash flow,

m: indicates the market for a set of similar assets traded in an asset market,

F: the yield on a default-free asset with identical interval of time as the asset, and

R: represents the returns over intervals of time.

The systematic risk is a measure of the marginal change in an asset's price relative to one unit change in the overall price of all assets traded. If the measure is two units, then a one unit change in the market for that asset will induce a two-unit change in the price of that asset. Any standard finance text usually provides the derivation of the relation. Derivation of the test model may be found in Ariff and Johnson (1990) and Elton and Gruber (1996).

Simply put, the theory predicts a positive relationship between risk and expected return. Chapter 16 has elaborated on procedures needed to calculate accurate and stable measures of this risk variable. Fama and Macbeth (1973) developed a method of forming portfolios across time to (a) form differentiated portfolios, (b) obtain portfolio returns and beta independent of each other. This method is based on ranking the individual assets by their beta values and then aggregating n-assets into several portfolios with differing values of beta. Since stable beta is measured over the initial m-months of data, the portfolios in each year thereafter are formed with recalculated beta values so that different individual securities having the same risk level will constitute each portfolio over time. An alternative method of forming independent observations of returns and beta is to use odd and even months (Ball, Brown and Officer 1979). This takes care of the beta estimation, which is recursively evaluated over the prior periods.

The returns of portfolios are measured *ex post* since expectations cannot be observed. In all the tests done in other markets, the returns were calculated in each calendar month for a number of portfolios so that the returns of each portfolio in a calendar month can be matched with the beta of that portfolio from a period *prior* to the month. It is argued, because of the impossibility of measuring expectation, actual returns are good proxies, especially when the returns are averaged over a long period of 20 or more years. On average, the expectation must approximate the actual over long investment horizons; otherwise, an asset market cannot survive. The relationship between these variables are predicted as linear as in

$$R_{pt} = a_p + b_p (\beta_{pt}) + v_{pt} \tag{17.2}$$

where, following the definitions earlier, p represents portfolios of assets, and v_{pt} are the i.i.d. residuals. If the predicted linear relation is valid, then it follows any addition of non-linear terms such as the squared values of the beta must not be statistically significant. For a further discussion of derivation of this equation and other specifications see Ariff and Johnson (1990: Chapter 5). The t-value for the b coefficient is expected to be significant and positive, and the equation fit may be judged by the size of the correlation coefficient and the significance of the F-ratio. These procedures form the test of CAPM predictions.

Evidence on Linear Relationship

Fama and Macbeth (1973) was the first reported study in America of the linear relation as predicted by the CAPM. They reported t-statistics for the slope coefficient as being between 0.7 and 1.73 for the years 1946-55 and 1956-68 respectively. Ball, Brown and Officer (1979) reported evidence of a robust positive linear relationship between risk and returns in Australia. Further, they tested if the relation was non-linear or if the total risk as represented by standard deviation of returns was correlated with returns. These two are not statistically related thus making the linear relation hypothesis quite strong for the Australian share market. However, as in the case of Fama and Macbeth, they found the measured intercept too large compared to the theory prediction of $(1-\beta)R_F$. Ariff and Johnson (1990: Chapter 16) found a strong linear relationship in the Singapore share market, thus suggesting that portfolio risk and returns are positive and linear. Their reported coefficient of variation was as high as 70 per cent especially over long period tests of 18 years, but both the slope coefficient and the coefficient of variation in tests done in short periods were insignificant. Worse still, the intercept suggested a riskless rate six times larger than the actual risk-free yield of Treasury bills, while in some years the linear relation was negative! This latter result suggests that pricing in some periods can be irrational and contrary to the theoretical prediction.

In a recent study, Fama and French (1992) reported that the relationship between beta and average returns disappeared during the more recent 1963-1990 period. They examined the joint roles of market beta, size, earnings/price ratio (E/P), leverage and book to market equity ratios to explain the cross-sectional returns on the NYSE, AMEX and Nasdaq stocks, which makes this study a major contribution. They found that there is a simple positive relationship between average return and beta during the pre-1969 period; no significant relationship was found for a more recent 1963-1990 period. They observed a strong negative relationship between size and average returns, which has been documented before and justified on the grounds that large firms have more stable earnings, and thus are lower in risk. They also reported that beta showed no explanatory power when used in combination with size, book-to-market equity, leverage and E/P. Pettenghill *et al.* (1995) found a positive relation between beta and cross-sectional portfolio returns. They used expected and not ex post returns to support a positive payment for beta risk.

3. Data and Methodology

The observations for this test consisted of 60 industrial stocks selected from companies continuously listed and traded on the local share market during a period of 15 years with month-end adjusted returns: test period is a lengthy period with 180 monthly dividend-and-capitalisation-adjusted data for each firm. Data on month-end prices and cash dividends were collected for the stocks. After adjusting the price series for bonus issues and other capital changes, dividends were added and then the monthly *excess returns* for each stock were computed using the following formula:

$$r_{jt} = R_{jt} - R_{Ft} \tag{17.3}$$

where the upper-case letters are as defined before. The lower-case returns, r_{jt}, refer to 180 monthly returns minus the yields on riskless returns on Treasury bills with 3-month duration traded at month-ends. Excess returns were used to limit the test so that the risk-free rate is eliminated. Thus the CAPM prediction under this specification is for a zero intercept.

The monthly market excess returns, r_{mt}, are equal to the gross returns minus the riskless returns in respective months using an equally-weighted index of all shares set up by the researchers. The annual data for size, earnings-to-price ratio, leverage and book-equity and market-equity ratios were obtained from the *Companies Handbook* published annually by the local stock exchange; these are defined below.

$$\text{size} = \text{total book value of assets at financial year-end} \tag{17.4}$$

$$\text{E/P} = \text{Gross EPS/(Year s highest price + lowest price)/2} \tag{17.5}$$

$$\text{leverage} = \text{total long-term liabilities/total book assets} \tag{17.6}$$

$$\text{book equity/market equity} = \text{(ar x utstanding)/(last price x outstanding)} \tag{17.7}$$

The test model is as specified in Equation 17.2 above with past data proxying for the CAPM predicted returns and beta values. These data were set up on monthly cross-sections using the Fama-Macbeth procedures with beta ranking and portfolio formation. As was done by Fama and MacBeth (1973) and later by Fama and French (1992), this study examined the relation between portfolio returns and portfolio values for beta, beta-squared, size, earnings-price ratio, leverage and book- and market-equity ratios. The 15-year period was divided into three sub-periods. The first five years were used for setting up the beta and other values, the second five years were used for estimating the variables and the last five years were used for testing the relationship. Thus there were two tests done on two five-year periods. This is a revised and simplified approach compared to the monthly cross-sections on a moving window basis done by the scholars cited. We do not expect the results to be systematically different.

Using monthly excess returns of each individual stock and market index for the construction period, the Market Model was applied for each stock to estimate its beta. Since the 60 stocks chosen are the more frequently traded stocks, we did not attempt to correct for the beta error as the errors of frequently traded stocks are not as seriously biased as are the thinly traded stocks (see Ariff and Lim 1990). As a result, 60 individual betas were generated. The formation of portfolios was based on ranking of betas from highest to the lowest. The first portfolio consisted of the first 10 stocks with the highest beta, the second portfolio with next highest beta and so forth. Therefore, there were 6 portfolios available, consisting of 10 stocks each.

In the estimation period, the beta of portfolio 1 was computed assuming equally weighted composition. This procedure was repeated for portfolios 2 to 6. Therefore, 6 portfolio betas were available for the second test to be done on the final five-year period. Grouping of individual securities into portfolios is consistent with the diversification theory, and also minimises measurement error in the estimation of betas. The econometric problem of errors-in-variable was minimised in this manner. The average portfolio size, leverage, earnings-price ratio and book- and market-equity ratio are estimated with the same procedure with an assumption of equally weighted composition.

Moving to the testing period, by using the monthly returns for the first testing periods of the first year, the average return for each stock was obtained by averaging the monthly returns. The average return for portfolio 1 to portfolio 6 were computed, again, assuming equally weighted composition. The procedure was applied for the subsequent test period of the second year by moving one year forward to incorporate the next year but excluding one year in the estimation period. This process was repeated for the rest of the testing periods.

The test was done by regressing the average portfolio returns against the portfolio betas, beta-squared, size, leverage, earnings-price ratio and book-to-market equity ratio obtained from the two estimating periods:

$$R_{pt} = \alpha_{ot} + \gamma_{1t}\beta_{pt-1} + \gamma_{2t}\beta^2_{pt-1} + \gamma_{3t}(\log S)_{pt} + \gamma_{4t}(L)_{pt} + \gamma_{5t}(EP)_{pt} + \gamma_{6t}(BE/ME)_{pt} + e_{pt} \tag{17.8}$$

where the variables are as defined in equations 17.3 to 17.7.

4. Findings: Does the CAPM Prediction Hold?

The findings revealing the cross-sectional relationship between returns and the independent variables (beta, beta-squared, size, leverage, earnings-price ratio and book-to-market equity ratio) are presented in Table 17.1.

The numbers in the first column highlight the variables under study, with the coefficients from the regression appearing in the second column. The third column shows the t-statistics that explain the significant coefficients while the numbers in the last column indicate the probability values. Also shown are the F-statistics and R^2 values.

The R^2 value indicates that approximately 34 per cent of the variation in stock returns can be attributed to beta, beta-squared, size, leverage, earnings-price ratio and book-to-market ratio. However, as shown, the overall results indicate that only beta, beta-squared and size are statistically significant. The t-statistics are -1.9752, 2.0875, 1.7744, -0.0085,

Table 17.1 Summary on Tests of CAPM in the Malaysian Share Market

Variable	Coefficient	t-statistic	Probability
Beta	-0.2660	-1.9752**	0.060
Beta-squared	0.0225	2.0875*	0.048
Size	0.0334	1.7744**	0.089
Leverage	-0.00079	-0.0085	0.993
E/P	-0.02731	-0.4977	0.0623
BE/ME	0.0597	0.3691	0.715
F-stat=1.932			
R^2= 0.3351			

Statistically significant at * (0.05) and ** (0.10) levels

-0.4977 and 0.3691 for beta, beta-squared, size, leverage, earnings-price ratio and book-to-market equity ratio respectively. Not only is the explanatory power of these variables rather low, but some of the variables are not correlated with returns. However, the theory-*not*-suggested relationship between beta-squared and returns is unexpected. The negative risk-return relationship which is shown by the beta coefficient, γ_1, appears to be inconsistent with theory where theory predicts a positive relationship between risk and stock returns. Moreover, the results are statistically significant at 0.10 level. Does this indicate a non-linear relationship not predicted by the theory?

Therefore, it implies than in making investment decisions in the local exchange, an investor should not only assume a positive trade-off between returns and risk as one would normally do, but also that the beta-squared coefficient, γ_2, is statistically significant (0.05 confidence level). This is contrary to results in other markets and does not concur with the general linear relationship predicted in many asset pricing theories. Rather than accept the non-linearity, one can interpret the results as being confounded by some variables. The findings also revealed contrary evidence with regard to the size effect. Evidence elsewhere on the size effect reported that smaller firms exhibit returns that on average exceed those of large firms. In this study, the size coefficient, γ_3, shows that stock returns are positively related to size at 0.10 significance level.

Similar to beta, the results also showed a negative relationship between stock returns and leverage. This is what one might have predicted given the negative-risk-return relationship found in this study as leverage could be used as a proxy for the risk of a security. In other words, an increase in the leverage of a firm would also increase the risk of its common equity, thus making the required returns higher. There is no significant relationship between stock returns and earnings-price ratio as shown in Table 17.1. However, the probability value is better compared to leverage and book-to-market equity ratio although the negative relationship between stock return and earnings-price ratio is inconsistent with theory.

As indicated by the t-statistic, the book-to-market equity ratio coefficient, γ_6, is statistically not significant. When each variable was considered separately, several sets of different results cropped up. These are summarised in Table 17.2.

As noted in Table 17.2, when each of the variable is considered separately to explain stock returns, some of the results differ significantly from previous findings. The most statistically significant variable is still beta-squared (contrary to theory), but the

Table 17.2 Relationship between Stock Returns and Beta, Beta-Squared, Size, Leverage, Earnings-price Ratio and Book-to-Market Equity Ratio

Variable	Coefficient	t-stat.	Prob.value	R^2	F-statistic
Beta	0.0424	1.3756	0.180	0.0633	1.8922
Beta-squared	0.0766	1.8875*	0.070	0.1129	3.5626
Size	0.0225	1.4553	0.157	0.0703	2.1181
Leverage	0.0323	0.3414	0.735	0.0041	0.1166
E/P	-0.0144	-0.5444	0.591	0.0105	0.2963
BE/ME	0.0442	1.4471	0.159	0.0696	2.0942

* statistically significant at .10 acceptance level.

significance of beta and size coefficients decreases. Unlike the findings for the second test period, the beta and leverage coefficients show that there is a positive relationship between stock returns and beta as well as leverage. This is consistent with the proposition that returns are positively related to risk. Furthermore, the book-to-market equity ratio coefficient increases significantly when it is considered alone. Therefore, there might be some multi-collinearity among the variables included in this study which is confounding the results. This requires further examination in a separate study.

5. Conclusions

This study demonstrated that the major theories on asset pricing relationship predict a linear and positive relationship with risk while the nature of the relationship of the control variables entered (consistent with later studies) has different predictions. These were tested in the Malaysian emerging market with a small sample of carefully selected firms to avoid thin-trading effects. The variables specified as independent ones are beta and beta-squared measures while the control variables are size, leverage, earnings-price ratio and book-to-market equity ratios obtained from a sample of 60 industrial firms listed and traded over a recent 15-year period. A linear relationship is predicted by theory for beta and no relation should be found for beta-squared values.

It was found that among these variables, only beta, beta-squared and size are significant in explaining stock returns. The negative risk-return trade-off with beta-squared values and size is not acceptable, while the positive effect from beta is consistent with theory. This study raises more questions than it answers. Therefore, more carefully constructed tests using a longer time frame and a larger sample should be conducted to gain insights on the behavioural aspect of stock returns towards different variables. Such a study should also attempt to operationalise the more powerful Arbitrage Pricing Model in this market. An example of such a study from a neighbouring market is given in the next chapter.

CHAPTER

18

Ex Ante Risk Premia on Macroeconomic Factors in the Pricing of Stocks: An Analysis Using Arbitrage Pricing Theory*

Abstract

Proxies for macroeconomic factors suggested by received theories were pre-specified within the Arbitrage Pricing Theory (APT) framework to identify relevant factors that may be priced in valuing equity securities on the Singapore stock market. In addition to returns on the market portfolio, factors considered relevant for pricing of assets are inflation, business expectations, Singapore's international trade, and tonnage of cargo cleared. The APT was operationalised to test if the return on 17 equally-weighted portfolios formed out of 252 continually traded equity securities contain *ex ante* risk premia on the factors. Market-wide risk premia and portfolio coefficients were estimated using a full information maximum likelihood (FIML) estimation procedure yielding significant results suggesting that *three of the four APT factors are priced.* Are these the only relevant candidates for the APT? More research is needed to answer this question.

1. Introduction

Researchers have increasingly resorted to the Arbitrage Pricing Theory (APT) (Ross 1976; Ingersoll 1984; Connor 1985) to explain and test the asset pricing relationship in securities markets of several developed economies. To our knowledge, there is a dearth of similar studies in the many developing or emerging capital markets (Ariff and Johnson 1988; Elton and Gruber 1989 are exceptions). Consequently, asset pricing research work is hindered by a lack of comparative literature. This chapter provides a contribution to this literature as a preliminary investigation to ascertain if the factors considered as relevant in the economic literature are entering the asset pricing process in the stock market. Observation of significant risk premia on more than one factor is likely to

* This chapter is a reproduction of a chapter with the same title by Mohamed Ariff and L.W. Johnson that appeared in Mohamed Ariff and L.W. Johnson (1990) *Securities Markets and Stock Pricing*, Longman Professional Books, Singapore, Sydney and London. We thank the publisher for permission to reproduce this chapter in this book. Minor changes have been made to conform to the format adopted in this book.

The 17 portfolios used in this study were formed with both Singapore *and* Malaysian firms listed and traded from 1975 to 1989. Hence, these results are relevant to the latter market as no similar study has yet been made on portfolios formed from prices cleared on the Malaysian market.

suggest that the APT's premise of a multi-factor pricing is probably well founded for the market under investigation

A summary of the theory and evidence to date is given in Section 2. We outline the three broad sets of results emerging from applying the theory in different operational versions. The operational version for this research is stated in the form that enables one to empirically obtain estimates of the *ex ante* risk premia using ex post data. The procedure used is that of full information maximum likelihood estimation (FIML). In the next section, we describe the data set, the research design and state the hypotheses. The results are presented and discussed in Section 4 which is followed by a brief examination of the limitations of this study.

2. APT and Evidence

Theory

The APT as an *a priori* return generating idea is attributed to Ross (1976), though the equilibrium pricing version came later in the works of Ingersoll (1984) and Connor (1985). The original theory was built on two simple assumptions: (a) k-factors are associated with security return generation and (b) the idiosyncratic return independent of the k-factors will have an expectation of zero given diversification opportunities. The usual assumption of a competitive market with no friction is necessary for this model as well. The first assumption will lead to a linear return generating function under conditions of no arbitrage profit opportunity existing in a competitive market with informed investors who will search out and reduce arbitrage opportunities. The second assumption is not inconsistent with earlier theories where (as in the Single Index Model or SIM) the idiosyncratic residual risk can be diversified away. There is also empirical evidence to the effect that the presence of a slight non-zero covariance amongst securities enables reductions in portfolio risk. Hence the theory may be stated as a k-factor return generating process as Equation 18.1 in matrix notation.

$$R = E + \beta F^{\circ} + \varepsilon \qquad (18.1)$$

for N assets and k factors

where

R: an (N x 1) vector of expected returns on the i-th security i = 1, ... N.

E: an (N x 1) vector of expected returns when the effects of factors are equal to zero,

β: is an (N x k) matrix of security-relevant systematic factor weights (or loading) j=1,....k factors.

F°: is the (k x 1) vector of actual returns to the systematic factors. The factors are distributed as $N(0,\sigma)$,

ε: is an (N x 1) vector of returns on idiosyncratic firm-related (therefore unrelated to the k-factors) events, and ε is assumed to have zero mean and constant variance.

The theory states that the return generating process which determines a security's returns is equal to the expected returns, E, plus the net effect of (a) factors and (b) firm-specific events. The factors contribute in proportion to the security's sensitivities to the factors. In its simplicity, the APT is a generalisation of the SIM mentioned earlier to a multi-factor setting. The resulting factor weights are systematic constants in the security's relationship to factors in much the same way as the beta measure is in relation to stock market returns, R_{mt}.

The empirical form of the APT is usually stated as a multiple regression between the returns on a security and (a) the k-factors, F_{jt}, and (b) the idiosyncratic term, e_{it} as in Equation 18.2.

$$R_{it} = a_i + b_{i1}(F_1)_t + b_{i2}(F_2)_t + .. + b_{ik}(F_k)_t + e_{it} \tag{18.2}$$

where a_i is the rate of return when the value of $b_{ij} = 1$. A useful way to define a_i is to consider it as the normal expected returns on the security when all the factors are equal to zero.

Unlike the Capital Asset Pricing Model (CAPM) which requires the construct of the market as the factor that prices the security, the APT specifies a general idea that *several factors may price the security*. This is an advantage in that the non-observability of the market (Roll used this to critique the tests of theory) is no longer an obstacle to testing the theory and factors may be either (a) identified from the variance-covariance matrix of a set of securities or (b) suggested by theory as factors related to the returns on securities. The former approach (discovering the latent structure in prices) using maximum likelihood factor analysis (Roll and Ross 1980) or the principal component method (Chamberlain and Rothschild 1983) yields results suggesting whether one or more factors are found in the variance-covariance matrix and the resulting loadings of a set of securities. The other approach is guided by economic theories which may be searched to suggest possible economic factors that are likely to be endogenous to a given economy within which the securities are traded. There is a tradition, going back to the discovery of business cycles, of studying the fundamentals of the economy in judging the likely future prices of the securities in an economy. The former method does not yield *named* factors while the latter is capable of identifying the presence or absence of factors related to the generation of returns. Since the specification of the factors is not suggested by the APT, the analysis is not directly guided by that theory.

Research Procedure and Models

Evidence generally in support of the APT has been reported using the latent structure procedure as well as the pre-specified method. In the factor analytic method to identify the latent structure, researchers first compute the variance-covariance matrix, Σ, of a set of securities returns. The next step is the identification of the number of factors F and their sensitivities, b_{ij}, which are then used in the final step to explain the cross-sectional variation of individual estimated expected returns as well as to measure the significance of the estimated parameters. The majority of researchers have used the maximum likelihood factor covariance matrix. This traditional approach to factor analysis is both time consuming and expensive to apply to a large number of securities.

A new method less demanding of time and expense was developed by Chamberlain and Rothschild (1983). They demonstrated that the eigenvectors associated with the k unbounded eigenvalues of a principal component analysis are asymptotically equivalent to the estimates of the loadings matrix, b_{ij}, in the factor analysis. This procedure does not search for an exact factor structure, and thus provides an approximation, which is an advantage in the context of searching for an unspecified k-factor structure among different securities.

Pre-specifying the macroeconomic factors (suggested by economic theories) to explain the return generation is simply a regression procedure aimed at identifying association between the returns on securities and the factors (see Chen, Roll and Ross 1986). Since most economic variables are likely to covary, this will introduce econometric problems of measurement. The relevant factors may constitute a long list, and that again creates problems of model specification. A more serious problem with this regression approach is the difficulty in obtaining expectation data when we only have access to ex post data (see Chen 1986 for a discussion).

An alternative econometric procedure is to apply a full information maximum likelihood method (FIML) using the APT-suggested restrictions on the way the factors are related to the security returns. The APT assumes that N assets have generating functions given by

$$R_{it} = E_i + b_i f^1_t + \dots\dots\dots b^k_i f^k_t + e_{it} \qquad (18.3)$$

$$(i=1,\dots.N)$$

where the factors (f^j_t) and the error term (e_{it}) have zero means and are uncorrelated. The APT in the expectation form has been shown (e.g. Ross 1976) to be:

$$E_i = E_0 + b_{i1}(E_1 - E_0) + \dots + b_{ki} E_k - E_0) \qquad (18.4)$$

$$(i=1, \dots.N)$$

given no arbitrage profits are possible. E_0 is the return on the asset with all sensitivities to factors, $b_j = 0$ (i.e. a riskless or zero-beta return) and (b_j - E_0) is the premium on a security with b_j=1 and all other bs = 0. Now define the zero-mean factors F_t as F_j - $E(F_j)$ where F_j is the observable value of factor j. Substituting the zero-mean definition of f_t in equation (18.4) yields

$$R_{it} = E_i + b^1_i(F^j_1 - E(F^j_1)) + .+ b_{ki}(F_{ki} - E(F_{ki})) + e_{it} \qquad (18.5)$$

Now substituting the right-hand side of (18.4) for the first term E_i on the right hand side of Equation (18.5) and simplify. This suggests

$$R_{it} = E_0 + \Sigma^k_{j=1} b^j_i[E^j - E_0 - E(F_i)] + \Sigma^k_{j=1} b^j_i F^j_t + e_{it} \qquad (18.6)$$

$$(i=1,\dots.N)$$

Let $a_i = (E^j - E^0 - E(F^j_i))$, then equation (18.6) can be restated in a form that the *ex ante* risk premia on the non-market factors and the coefficients on the individual factors can be estimated separately (see Sweeney and Warga 1986b; Ariff and Johnson 1988). Using this methodology, it is possible to estimate *ex ante* risk premia on any number of non-market factors using FIML specification of the APT model. If we have say, three factors, then the operational equation is

$$R_{it}=(1-b^1_i)a_0+a_2b^2_i+a_3b^3_i+b^1_iF^1_t+b^2_iF^2_t\ b^3_iF^3+e_{it} \tag{18.7}$$

where $a_0 = -E_o$ and (arbitrarily) the first factor is specified as the returns on the market. The equation is estimated simultaneously for n-securities over T-time periods by constraining the estimates to having common market risk premium (Ej - Eo) for respective factors. The resulting estimates provide estimates of the *ex ante* risk premia (a_2 and a_3) for non-market factors and the coefficients (b^1_i, b^2_i and b^3_i) on the observable factors F^j_t).

Use of this procedure means that the relevance of the macroeconomic factors for the pricing of equity securities can be tested by specifying the factors in the model. Factor one is specified to be the market factor, which attracts an *ex ante* risk premium in general. Since we will restrict ourselves to a three-factor model in this paper, factors two and three can be any macroeconomic factors suggested by theory or prior research to be relevant for pricing of securities. To the extent that the model is able to estimate significant *ex ante* risk premia as measured by a_2 and a_3, the factors are said to be relevant for market-wide pricing of the factors. To a lesser extent, one should also observe whether the individual security's (portfolio's) factor loadings are priced for each security since this is a joint estimation procedure in a simultaneous equation format.

Thus we note that there are three different methods of operationalising the APT for testing asset pricing behaviour in general: the factor analytic methods are the original procedure whereas the multiple regression and FIML methods may be considered appropriate for pre-specified economy-wide variables. The FIML is preferred as it can make use of the restrictions in factor behaviour implied by the APT to separate an *ex ante* risk premium from the estimation of the sensitivities of the factors in the context of the securities under test.

Evidence

Almost all the reported studies are based on investigations done on asset pricing in the developed capital markets. The earliest were the three studies using daily data from the equity market in the United States (US): Roll and Ross (1980), Reinganum (1981b) and Chen (1983). In the Roll and Ross study, 42 groups of 30 stocks each over the test period 1962-1972 were selected. The stocks' b_{ij}s were estimated along with factor loadings and cross-relationships between stock betas and rates of return were estimated. That study used the maximum likelihood factor analysis in an APT framework. Results indicate that in over 38 per cent of the groups, there was a less than 10 per cent chance of more than six factors.

Reinganum's study was concerned with the relevance of firm size as a factor, and tested its explanatory power. He found that firm size does have explanatory power. However, this was rejected by Chen (1983) who used a different research design. Chen also made a direct comparison of the APT with the CAPM. The residuals from cross-sectional regression using CAPM were regressed on the APT factor loadings and APT residuals. The APT appears to explain a statistically significant portion of the CAPM residual variance, though the latter could not explain the residuals in the APT. He suggested that APT is a more general model.

Brown and Weinstein (1983) examined whether the intercept and the estimated factor prices are the same across groups and suggested that their results cannot unambiguously accept the APT. In the same vein, Dhrymes, Friend and Gultekin (1985) found that the intercept term may or may not significantly differ across securities and that the number of factors tended to increase with more stocks added to the test. Sweeney and Warga (1986a) and Choh, Eun and Senbet (1986) found evidence that the two-factor approach seemed consistently priced.

Kryznoski and To (1983) reported consistent test results with Canadian data while Beenstock and Chan (1986), Diacogiannis (1986) and Abeyasekara and Mahajan (1987) provided evidence on the APT using United Kingdom data. A recent study by Elton and Gruber (1989) found four pricing factors in the Tokyo Stock Exchange.

Four separate studies investigated the APT framework for pricing Australian stocks. Sinclair (1984, 1987) found evidence in support of a three-factor model for pricing a large sample of stocks over the test period 1958-1977. He used factor analysis, and reported evidence of intertemporal non-stationarity which led, in his opinion, to different numbers of factors becoming significant. He also pointed out that ".... security return data which are affected by either infrequent trading or variance non-stationarity leads to extraction of more than the true number of factors" (Sinclair 1987: 30).

Leukecke (1986), Trzcinka (1986) and Faff (1988) used the principal component analysis method. The first two did not distinguish between whether the results suggested an approximate one factor or an approximate many factors structure. Faff, on the other hand, found evidence for a single dominant factor though he could not rule out the possibility of additional factors as there were three significant minor (minor in term of explanatory power) factors. The APT suggested that the intercept term was about twice the value of the risk-free returns in Australia. This supports the existence in the APT context of a zero-beta portfolio, $R_z > R_f$.

Chen, Roll and Ross (1986) generated expectational data from macroeconomic factors - inflation, spread between short- and long-term interest rates, spread between high and low grade bonds and industrial production - and tested if these pre-specified factors are associated with returns for stocks traded on US markets. They found these factors significantly correlated with stock returns. This is an example of a study in the APT framework by pre-specifying factors. Sweeney and Varga (1986a) examined the possibility of unanticipated changes in interest rates entering pricing of stocks in US markets. Employing the FIML estimation technique on three groups of 25 individual firms likely to be sensitive to interest rate changes, they found that the interest factor was priced. Ariff and Johnson (1988) employed a similar procedure for 150 common stocks traded in Singapore in 1975-1988 and found mixed evidence of the pricing of the interest rate factor. The coefficients of the security betas across the ten portfolios were generally not significant, but the *ex ante* premium for interest rate risk across the market was significant.

3. Data, Research Design and Hypotheses

The data for this study consisted of monthly returns on 252 common stocks traded on the Stock Exchange of Singapore (SES) over a recent 14-year period. The 252 stocks were selected from among 344 by imposing a selection criterion that a stock should have been around for a minimum of 50 periods over which they were continually traded.

Sixteen portfolios of 15 stocks each and a 17th portfolio of 12 stocks were formed after sorting the securities on the basis of mean returns over the test period.

The macroeconomic variables were the rates of change in (a) inflation (IF), (b) industrial production (IP), (c) gross business expectation index (GBE), (d) tonnage of cargo (TC), and (e) trade volume (sum of imports and exports in dollar value) (TRD) in addition to changes in interest rates and stock portfolios. There is sufficient theoretical justification to expect inflation to be a factor priced in the market. Inflation expectation is taken into account in forming a priori expectation of security returns. An anticipated increase in inflation is likely to increase the expected returns on a portfolio of assets. Hence, we maintain this as a second factor in addition to the returns on the stock market index. The remaining variables - IP, GBE, TC and TRD-are considered economy-wide factors relevant for pricing of Singapore stocks. The justification for including these variables in the Singapore market is based on earlier work done in the developed markets (Merton 1973b, Chen, Roll and Ross 1986). It was suggested in these earlier studies that industrial production, among others should be significantly related to stock price formation in the American economy. Also, business cycle theory (see Burns and Mitchell 1946; Moore 1983) posits that levels of economic activities do affect stock market performance. Tonnage cleared at the Singapore ports and trade volume are two important indicators of economic activities in Singapore as two-thirds of the gross national income of this country is generated by external trade. The gross expectation index - created out of quarterly surveys of business - is again an expectation index of economic activities. It was hypothesised that one or more of these variables could serve as good proxies for the APT factors in the economy.

The model to be tested is a variation of Sweeney and Warga's (1986a) FIML procedure adapted by specifying three factors at a time. As the multicollinearity amongst the macroeconomic variables is likely to be high, it was decided to enter these variables one at a time in the model holding constant the effects of the market index (R_m) and inflation as the first two variables. Thus, the generic model of the tests is

$$\begin{aligned} R_{pt} = {} & (1-b^{M}p)a_o + a_2 b^{IF}_{p} + a_3 b^{EC}_{p}(EC_t) + b^{M}_{p}(RM_t) \\ & + b^{IF}_{p}(IF_t) + b^{EC}_{p}(EC_t) + e_{pt} \\ & (p=1,\ldots\ldots\ldots N) \end{aligned} \tag{18.8}$$

where

a_2, a_3 : the *ex ante* risk premia for inflation (IF) and the specific economic variable entering the regression,

bM_p, b^{IF}_{p} and b^{EC}_{p} : respectively the sensitivities of each of the 17 portfolios (P=1,....N) to the factors, the market returns (Rm), the rate of inflation (IF) and the rate of change in the economic factor (EC),

R_{pt} : the rate of return on the portfolio p, and

a_0 : the mean expected return when all factor betas, bp, are equal to zero. This is equivalent to the riskless return or zero-beta return.

Four separate FIML runs were made to obtain separate measures of four macroeconomic variables selected as possible factors entering the return generation process of common stocks.

The null hypothesis of concern for identifying the factors that are attracting *ex ante* risk premia are

$a_2 = 0$

$a_3 = 0$ (There are separate a_3 parameters in the four test runs of the model).

The APT predicts (assuming we have chosen the correct factors) that $a_2 > 0$ and $a_3 > 0$ if factors are attracting risk premia. Thus, the null hypothesis should be rejected if the factors are the relevant factors pricing the securities.

4. Results and Discussion

The results of the tests for four separate runs are summarised in Table 18.1. The *ex ante* mean returns when all the factor loadings - the betas, b_p - are equal to zero are estimated as being in the range 0.00168-0.00255 (i.e. 0.168-0.255 per cent monthly) and are all significantly different from zero; that is, these are monthly risk premia.

Factor 1 (inflation) has *ex ante* risk premia between 0.00183 and 0.00838 (i.e. 0.183 per cent 0.838 per cent) and has the right sign on the parameter. These values are significant in two of the regression runs (t-values 3.235 and 6.496) and almost significant in one run (1.605). Hence it appears that inflation is probably one factor that is priced in the Singapore equity market.

The *ex ante* risk premia on three of the four economic factors, namely gross business expectations (see FIML 2 in Table 1), tonnage cleared and trade volume are positive (consistent with theory) and significant at or above the 10 per cent level. Industrial production, though it has positive premium, is not statistically significant.

Thus it appears that the three factors - GBE, TC and TRD - are relevant in pricing the equities while industrial production is not a likely candidate as a factor. Amongst those four factors identified, the factor with the highest marginal value is the trade volume (25 per cent impact per unit change in sensitivity) followed closely by tonnage cleared (21 per cent impact). The impact of business expectations is 6.6 per cent per unit change in beta sensitivity, while the impact of inflation is small.

The marginal sensitivity values appear reasonable for an economy which is two-thirds driven by external demand and had very low inflation rate during the test period. If foreign trade, which determines the cargo cleared and trade volume, is the primary factor, one should expect this factor to be an important element in the business performance of firms in general and thus stock prices. Therefore, it is not inconsistent to observe the given results purely from the empirical point of view. Given low or no inflation, the premium expected on the market is likely to be very low, which indeed it appears to be. Industrial production forms about 20 per cent of total economic activity, though nearly half of all securities on the exchange are from the industrial sector. It is highly likely that industrial production is not an economy-wide factor. Thus, this factor is unlikely to be priced in the same way as the other more pervasive factors. We offer this explanation as an ex post rationalisation as to why this factor may be insignificant. In the American economy, where industrial production has been found to be significant, it is a more pervasive factor for the American equity market.

Table 18.1 *Ex Ante* Risk Premia on Market Returns and Five Factors on the Singapore Stock Exchange

Economic Factor	a_o	Inflation (a_2)	Economic Factors (a_3)
FIML Regression 1 Industrial Production	0.00168 (7.073)	0.007000 (1.605)	0.03853 (0.753)
FIML Regression 2 Gross Business Expectations	0.00180 (7.145)	0.00183 (0.794)	0.06556 (1.747)
FIML Regression 3 Tonnage of Cargo Cleared	0.00188 (3.537)	0.00217 (6.494)	0.21271 (4.017)
FIML 0.00255 Regression 4 Trade Volume	0.00838 (3.369)	0.25119 (3.235)	0.25119 (8.298)

(.) Figures in parenthese are t-statistics: 10 per cent significance is at 1.64.

The coefficient for the 17 portfolios can also be examined to see if these are significant for each. These results show (table not shown) that the trend established above is also found for individual portfolios. The t-tests may be used as an indicator to summarise these results. We summarise the number of t-tests that were significant for the individual factors in Table 18.2.

These results are very surprising in some respects, and are consistent with our expectations in some other respects. The market factor is always priced in each of the seventeen portfolios, thus lending support to the often reported findings that one factor appears to be dominant in the factor. With respect to the other five factors, it appears that tonnage cleared and inflation are the more significantly associated factors with the individual portfolios than any of the other factors. Third in importance are the gross business expectations. Trade volume and industrial production were found not to be significantly related to portfolio returns.

The coefficient estimated by the FIML procedure provides the values estimated with the within-equation constraints of three *ex ante* common premia across all the 17 portfolios and across equation constraints that the risk premia are the same for each factor across the securities.

It would be highly desirable for each factor to be not only priced but also be significant factors (b_j) for each of the portfolios that make up the market. Viewed differently, the b_j suggests the degree of sensitivity of that factor across all securities (in our case, portfolios) for it to be priced across the market as *ex ante* risk premium. Looked at in this manner, only the market factor is consistently significant for all portfolios. In summary, it appears that three factors namely (a) the market factor (b) the inflation rate and (c) the tonnage cleared at ports (a macroeconomic factor) are predominant asset pricing factors in the Singapore equity market.

Table 18.2 Number of Significant* Coefficients for Factors, 17 Portfolios of Singapore Equity Securities

Economic Factor	Market Index b_r	Inflation b_r	Economic Factor b_p
FIML Regression 1 Industrial Production	17 out of 17	6 out of 17	1 out of 17
FIML Regression 2 Gross Business Expectation	17 out of 17	6 out of 17	4 out of 17
FIML Regression 3 Tonnage Cleared	17 out of 17	12 out of 17	11 out of 17
FIML Regression 4 Trade Volume	17 out of 17	5 out of 17	2 out of 17

* Significance is tested at the 10 per cent level.

5. Conclusions

We generated five macroeconomic variables suggested by APT research as possible candidates for pre-specification in a general test of the theory in the Singapore Equity market. The methodology applied is the more elegant procedure of simultaneously estimating and testing the time series and cross- sectional relationship in a way suggested by theory while avoiding the pitfalls of previous techniques of measuring betas in first pass and specifying the parameters therefrom in the second pass cross-sectional tests. The FIML procedure generated *ex ante* risk premia significant enough to accept the theory's prediction of positive premia. We identified at least one dominant factor - the market factor - and three economic factors, namely inflation expectations, changes in business expectation and change in the tonnage cleared at ports. Probable fourth and fifth factors may be the term structure (on which we need a good proxy) and change in consumption, both of which should be included in an extension of this research. Finally, we believe that the findings of this study are not inconsistent with APT predictions. Perhaps the latent structure that may be found in a factor analysis (maximum likelihood or principal component analysis) may lend itself to empirical interpretations in terms of the factors identified in this study.

CHAPTER

19

A Case Study of a Failed Call Options Market*

Abstract

Three years after the introduction of exchange-traded options in America, a call options market was opened in Singapore in early 1977 with ten popular common stocks. Only calls were traded and no puts were introduced. After six months of trading actively, volume dwindled, and the market was withdrawn in early 1980. Three currency options markets introduced in 1987 continue to thrive at the time of this study. The *reason for the demise of the call options market* is mainly the significant mispricing of the contracts as most contracts were systematically above the theoretical fair prices. Low volatility in the spot market after the calls were introduced, availability of alternative speculative instruments for traders, high transaction costs and lack of knowledge about the complexity of option trades are suggested as reasons for the failure of the market. As a new options market has been introduced again in March 1993 (again with signs of low liquidity), it is worthwhile learning from the past.

1. Call Options Market[1]

The Stock Exchange of Singapore(SES) introduced an options market on a pilot basis on 2 February 1977 by making a market for trading on call contracts written on ten popular common stocks.[2] The phenomenal success of two overseas options exchanges in the United States of America (USA) and Australia in the first half of the 1970s prompted the SES venture into making a market for options even though it had no experience with any form of contingent claims market. The only futures contracts available then were the currency forward markets in the commercial banks. In the words of one of the observers, the advent of the call market was expected to "increase the breadth, liquidity and sophistication" of the secondary market, the SES, which was then, and still is, one of the leading Asia Pacific markets.[3]

We note forthwith some important characteristics of this experiment before moving on to the analysis. The SES made some modifications of the options trading systems of the Chicago Board of Trade's Options Exchange, and the options market was introduced. The contracts were American options. The Options Clearing Company (OCC) undertook to honour all the contracts: OCC was a subsidiary of the SES and was not an arms-length organisation as in major exchanges. The transaction costs on an average lot

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value of about S$300 for 1000 calls were fixed high enough to make it worthwhile for the dealer to make a market, and this led to higher transaction costs than in other exchanges. This cost was several times the costs of transacting in the margin account under a *delayed settlement* scheme applicable to Section B stocks, which meant that there was an alternative speculative market available at lower transaction costs than the options market.

Contracts were offered in calendar quarters, and expired on the last trading Friday (or the day before, in case of a holiday) in the quarter. Short maturity contracts gained liquidity rapidly and contracts beyond nine months did not exist. Option holders were entitled to normal cash dividends only if advance notice before ex-date was given. The average dividend yield was then about 4 per cent. More stocks were added later and there were 21 underlying stocks (out of about 264 listed stocks) with about 80 different contracts at different exercise prices traded at some time. No put contracts were introduced. To simulate trading in call options, the exercise price was pegged at around 15 per cent below the closing prices of the previous day.

Why should this market fail within about two years? This study gives a unique case history of a failed market, and investigates possible reasons for the demise of this market. At the time of writing this paper, options trading has been re-introduced with four counters but their liquidity performance over a 10-month period is lacklustre. It is pertinent, therefore, to examine (i) the institutional reasons and (ii) the market-making reasons for the failure of this limited options market 17 years earlier. The latter objective is also a test of a call option market behaviour in relation to the application of Black-Scholes Model to a relatively small and less liquid, if not less developed, market in the 1970s. The market was active for a year, then registered low liquidity, and then the contracts were withdrawn at the end of 1980. Section 2 outlines relevant points of the options literature for this study while Section 3 outlines the data and research methods followed in this study. The findings on the institutional history and experience are presented in Section 4 followed by the results of tests on the market and theoretical prices. For comparison, we also provide brief details on a successful currency options market. The paper ends - Section 5 - with conclusions pertinent for the new market in the making.

2. Call Options Theory and Experience

Much has been written about Black and Scholes Option Valuation Theory from different perspectives as the theory has proved admirably useful to model several finance issues in corporate and investment decisions. The model has been tested by several writers and extended to new areas of application by others. The model is specified here for the purpose of developing a method of research for answering the question as to whether the prices paid by the investors in the failed market were fair prices. For, if the prices were not fair, there was an inherent valuation reason - in addition to institutional shortcomings - for the failure of the market. In general, the fair price of a call option without dividend payments is given by the Black-Scholes valuation model:

$$P_c = P_{us} N(d_1) - X (e^{-Rft}) N(d_2) \tag{19.1}$$

where

P_c : the fair value of a call option traded on the market,

P_{us} : the price on the spot market of the underlying stock,

X : the exercise price entered in the call contract,

Rf : the risk-free interest rate for computing time value,

T : the remaining time to maturity of a call contract in years,

e : 2.17838, a constant for continuous compounding and $N(d_1)$ and $N(d_2)$ are values of the cumulative normal probability distribution,

$$d_1 = [\ \ln (P_{us} / X_c) + (R_f + 0.5\sigma^2)T] / \sigma T$$

$$d_2 = d_1 - \sigma \sqrt{T}$$

where

ln : the natural logarithmic operator, and

σ^2 : square of standard deviation defined above.

As stocks traded were liable to pay dividends at least once a year in this test market, the prices of the underlying spot stock P_{us} had to be reduced on the ex-dividend date of the stocks to factor the expected price drop in the spot market; this follows the extension of the model for dividend-paying stock options (Merton 1976). Black introduced a modified model for the valuation of currency options (Fischer 1976). This model will be used for pricing the currency options contracts in a later part of the book.

There has been a great deal of research on virtually all aspects of option pricing since the early works of Black and Scholes (1973) and Merton (1976). Much of this is summarised in Jarrow and Rudd (1983) and Cox and Rubinstein (1985). Of critical importance in the use of model (Black and Scholes 1973) is the estimation of the variance rate of returns of the underlying stock. No evidence was found to suggest that the changes in *expected* volatility and historical volatility (measured over a sufficient prior history of spot returns) are the same (Ariff and Johnson 1990). Others (Latane and Rendleman 1976) have provided empirical evidence to show that implied volatility derived from an option pricing model with actual option prices are better predictors of stock's future volatility than historical volatility. Nevertheless, historical volatility is widely used for valuing options. Certain stylized facts about the performance of the model have gained support in the literature(see Macbeth and Merville 1979:1980). These are quite well known; the model is able to price at-the-money options quite fairly especially for the shorter maturity options and that the model prices are generally *lower* than, or about equal to the market prices for at-the-money options. The model's ability to adequately price the options accurately is generally acknowledged.

3. Data and Research Method

The data employed in this study consist of daily closing transaction prices of call option contracts written at different exercise prices on the 21 underlying stocks traded on the

SES anytime during the 24 months the market was alive. A call contract is included if it had at least 60 daily records of transaction prices. This procedure is important to exclude very seriously thinly traded calls from the study. With too much thin trading, the call market takes the form of a jump process, and the Black-Scholes is not applicable to such a situation. Hence the included set is representative of stocks exhibiting a reasonable amount of liquidity, thus enabling some valid tests to be carried out. Only 10 out of the 21 stocks met our selection criteria.[4] The *Daily Financial News* (an SES publication) provided the primary source for cross-checking the data on closing prices, the exercise prices, the maturity, and volume of contracts, all collected from financial press holdings/archives in local libraries. The assumption of no dividend prior to the expiration of the contract was relaxed. Prices were adjusted on ex-dividend dates by the amount of dividends paid. The interim and final dividends were converted to a continuous yield and the current stock price was reduced by the present value of this yield.

The spot stocks' returns were obtained from adjusted price relative files of one of the authors. Information about dividends and bonus issues or stock splits was extracted from the SES *Journal*. These were used to adjust stock prices for capitalisation changes. Daily closing adjusted transaction prices of these stocks were used for estimating historical variance on a moving window basis. That is, variance was calculated using the most recent price data prior to the trading date of the options. The risk-free, Rf, interest rate data were the yields on 3-month Treasury bills published in *The Monetary Authority of Singapore Quarterly Bulletin*. The yield rates on the weekly tenders were averaged over the contract months. The interest rates for traded options were chosen from these average rates such that the last tender bill for the month would expire beyond the expiration dates of these options.

To find out whether the call options were correctly priced according to the Black-Scholes valuation model, daily model prices for the call contracts were computed. The current stock price (P_{st}) and the exercise price (X) are straightforward, and were read from the source data, carefully screened for accuracy. Time to expiry (T) was determined by counting the number of calendar days to expire and annualising the results. The risk-free interest rate (Rf) is the average yield described above. The volatility should be the expected volatility of the rates of return of stock prices at the current time over the expiration of the contract. It can only be estimated from historical data or, alternatively, by the implied variance method. Most contracts had no more than a nine-month term. Thus, it was decided that a reasonable estimate of the volatility should be the historical variance of the rate of return on the stock.[5]

Had the contracts been traded over several years successfully, say 12-18 months, it would be more accurate to use the implied volatility: markets do take some time to stabilise after its advent. Also, given the thinness in the market, and our attempt to test the performance of the model, historical variance was thought to be more appropriate. Also, the spot market volatility was not markedly different except over the second part of the year after the advent of the options trading.

Model prices of contracts on 10 stocks with different exercise prices were calculated separately, and then grouped under the contract identity of the underlying stocks. This resulted in 10 separate computations, one for each stock: we did not group by exercise prices to simplify the analysis. The contracts were also regrouped on intrinsic values, i.e. at-the-money, in-the-money and out-of-money options, which resulted in averages for each of these three categories. There were few 9-month contracts, so we decided to categorise the 3-month contracts as short-term, 6-month as medium-term and the 9-month as the longer-term maturities. This resulted in comparative prices for three maturities for testing the maturity hypothesis. Finally, the contracts written in the first year (1977) were grouped as contracts during the market learning period, and the rest over most of the time the market was alive formed another group. This enabled a comparison over a learning period. In addition to this fair-pricing analysis, the market characteristics in the spot market (volatility, value of contracts, number of contracts) were investigated to find reasons for the failure of the call market. The interviews and press coverage of the market gave some opinions on the topic. The currency futures contracts traded on a successful options market on the Singapore International Monetary Exchange (SIMEX) were valued using the Black model (Fischer 1976); this provided comparative results, albeit limited.

Fair prices computed by the models were tested against observed market prices to find out whether there were significant differences. The familiar t-test on mean difference of two sets of observations was used. The null hypothesis is:

> There is no significant difference between the Black-Scholes mean call contract prices and the mean market prices of call contracts.

Of special interest is anomalous pricing by the market. Overpricing, especially by a substantial margin by the market, which in the longer-run will reduce investors' endowment, can be a disincentive for trading in the call market; This has been documented in some markets to be discussed later. Further tests of significant differences were conducted to find out the performance of the market over time. In most markets, the Black-Scholes model using historical volatility priced the at-the-money options fairly. The three intrinsic values were therefore tested separately.

Experience gained from tests conducted in other markets at the time of the operation of the tested market (and even subsequently) suggests that the null hypothesis may hold. This would suggest that the market's demise was not due to mispricing: this is especially true if the market prices are only marginally lower than theoretical prices to cover the transaction costs. If overpricing prevailed in the test market, then the null hypothesis would be rejected. That would be a plausible reason for the demise of the market. All the tests were conducted at 95 per cent ($p=0.05$) or better confidence levels.

4. Results

Market-Making and Institutional Arrangements

Optimism over this new trading asset was high in the first month of the market with the first month's value of contracts being 1.5 per cent of the value of the already large spot market.

Of the 10,638 lots traded, 8,912 (93 per cent) were traded in the first year: interestingly 65 per cent of the volume occurred in the first three months of the life of the market. The market settled to about 100 or fewer lots per month for the rest of its three-year life. The market did not record phenomenal values. The average value of the calls traded to the spot market was less than 1 per cent, though in some quarters it exceeded 1 per cent (Table 19.1).

Table 19.1 Volume and Value of Calls and Equity, Singapore

Quarter end of	Call Volume	Spot Volume	Call value $('000)	Call value % of Spot
Mar 1977	6,393	65,814	1,313	0.98
Jun 1977	2,035	187,689	172	0.064
Sept 1977	153	213,689	34	0.008
Dec 1977	331	128,198	49	0.022
Year 2	8,912	592,964	1,577	0.149
Mar 1978	240	151,422	109	0.053
Jun 1978	226	390,790	114	0.015
Sept 1978	55	683,262	60	0.009
Dec 1978	327	266,635	189	0.027
Year 3	783	1,492,109	473	0.014
Mar 1979	523	266,088	354	0.061
June 1979	160	253,665	101	0.036
Sept 1979	192	211,866	87	0.028
Dec 1979	58	143,857	16	0.004
Year	933	875,476	557	0.026
Total	10,636	1,662,674	2,607	0.190

Judging by the number and value of contracts, the market did not show much promise of becoming very liquid as did the markets in Australia and the USA, where there were steady gains over time until the value of options was a large fraction of the spot market. Throughout the final year of the market, option trades were inactive on the SES and by November 1979, only three lots were traded.

Table 19.2 provides some descriptive statistics on the average prices of the included call contracts. The average prices of the ten ranged from a low of $0.128 (United Overseas Land) to a high of $0.80 (Cycle & Carriage).[6] The average price of all calls was $0.297, hence a lot value of about $300.00. The model prices were systematically lower than the market prices for all calls. This suggests two possibilities. The market was continually overpricing the calls. This is plausible given the absence of puts to arbitrage the difference. Alternatively, the model prices could have been mis-estimated. Given the evidence that the market was only mispriced in the first year of operations (discussed later), this explanation is not plausible. It appears that the former reason is more plausible.

Options are valuable for hedging if the market is volatile, as is suggested by the positive relationship predicted by theory between the value of calls and volatility of the underlying stock. The spot market was bearish the year before the advent of the calls market: it started the year around 220 (SES All Industrial) and ended the year around 230. The second year saw about the same bearish conditions with the market moving rather horizontally. The optimism at the start of the options market was not sustainable without the spot market becoming volatile and no players were coming in large numbers to hedge nor speculate in the call market. The spot market started to pick up in the second year, and went upto a high of 410 in September closing at year end at 310. But the option market did not react to this as a year had passed without much activity and perhaps investors and speculators lost interest in calls. Three-quarters of the call contracts traded over one year were in a six-month period when the spot market moved up between a year later but this did not match the enthusiastic trade in the first three months. Volatility

Table 19.2 Average Prices (Market and Model) of 673 Call Options Contracts, Singapore

Serial No	Name of Stocks	Market Price S$	Model Price S$
1	Cycle & carriage	0.800	0.742
2	DBS Bank	0.235	0.147
3	Inchcape	0.155	0.120
4	OUB	0.205	0.151
5	Pan Electric	0.176	0.137
6	Sime Darby	0.589	0.540
7	United Engineer	0.139	0.098
8	UOB	0.222	0.163
9	United O'seas Land (OUL)	0.128	0.102
10	Wearne	0.324	0.256
All counters		0.268	0.217

in the underlying spot market, which would have stimulated hedging and speculative play on call market, was very limited in the first 15 months of the market. Perhaps this dampened the usefulness of the calls for risk-hedging and speculative activity in the calls market.

On careful analysis, the primary market in stocks seemed to have overshadowed any potential future growth of the new market. The primary market in 1978 was bullish and all interest could have by then been directed towards this trade. Only a few of the remaining traders were still active in options trading. Figures for option and spot trades suggest that all activity was concentrated on the stock market. Total spot turnover in 1978 was 1.5 billion lots valued at S$3.4 billion. Turnover peaked at 284,466 lots in August 1979 and that was a record for a single month in the history of the SES at that time. Pan Electric, Sime Darby and UOB were among the top 10 active stocks traded in that year. There was no similar interest in options on the same stock!

Trading on the spot market had less stringent rules then. Prior to 1985, the spot market operated on a delayed settlement system on some very volatile small stocks while the higher-priced stable stocks (usually the type included in the options market) were traded on a ready delivery in Section A. delayed settlement meant that the account with the broker was settled on the last Tuesday of the month. For ready delivery, all contracts were required to be delivered by the following Tuesday. Speculators could trade on the spot delayed settlement stocks and sell prior to the settlement date at the end of the month to guarantee profits in an up-trending market. Any leverage advantages that options were supposed to offer were rendered inconsequential by the advantages of the delayed settlement system for speculating on volatile stocks. Inside observers agreed that options trading had to contend with a very competitive investment tool offered by the delayed settlement system as long as it was in force (it was abolished in early 1985). Under that system, speculators could buy in the market and settle within four weeks as against the post-1985 practice of settling within a week of the trade. Hence, in a booming market at the time options were introduced, speculators would find it profitable to buy and sell within the settlement time, and make money without committing their own cash in the delayed settlement shares. The number of underlying stocks for options trading had been extended to 21 by year two. However, not all of them were actively traded. Certainly the interest on these was much lower than on the volatile delayed settlement stocks.

On the issue of whether the traders were knowledgeable about this complex instrument, some observers pointed out that there was no structured programme of training (as opposed to familiarising) for those involved on strategies of options trading. Brokers and dealers (called remisiers in Singapore) lacked experience and knowledge of the listed options market and perhaps lacked the sophistication to deal in this new tool. Very little literature was available locally on the use of options for both institutions and ordinary investors. This could have indirectly contributed by not bringing in investors to use the market to hedge investment. Perhaps the speculators dominated the market and exited it as there was alternative speculative possibility in the spot market at lower transaction costs. The minimum charge per contract was fixed at \$5.00. With the lower-priced option lot valued at about \$130.00 for the more actively traded 10 stocks, transaction costs was too high. A trader would incur a minimum of 8 per cent in transaction costs or alternatively he had to buy at least five call-lots value to equalise the lower transaction costs in the spot market. Combined with the delayed settlement system and the high transaction costs, the speculators would have found the spot market more attractive. This may have been the critical reason for the unwillingness of the speculators to move into the options market. Without the liquidity from speculation, the market would have failed to attract hedge interest from portfolio managers.

Issue of Learning

Market participants take time to learn to trade a new instrument. A call option is a one-sided contract without the flexibility of put options on the same market. It is therefore useful to examine the model prices in the first year of operations against the following two years. The results are shown in Table 19.3.

Results for the learning period in Panel A indicate that five of the six contracts were significantly mis-priced. The difference between the model and actual prices was significant at 95 per cent confidence levels. Therefore, call contracts appear to have been mis-priced relative to the valuation formula. In the post-learning period, 1978-1979, the null hypothesis of no mispricing is accepted for all stocks at 95 per cent confidence levels as there were no significant differences between market and model prices for contracts in the post-learning period. After a year of experience, the market prices appear to have converged to fair prices. This is interesting given a lack of volume in the second period, which could have been due to institutional reasons suggested earlier.

Pricing the Maturities

Tests done on short, medium and long maturities are summarised in Table 19.4. Maturity effect hypothesis suggests that the longer maturities must be priced higher than shorter maturities. The results are contrary to this prediction. Note that the historical price of short maturity at \$0.296 is higher than the long maturity price at \$0.222. More interestingly, the market prices of calls were higher than the model prices. Again the market appears to have been significantly overpricing the calls, as can be seen by the

Table 19.3 Tests of Learning Effect on Pricing of Calls, Singapore

Serial No	Stocks	t-values on market	Significant at 5 per cent	Number of contracts
Panel A:				
1	Inchcape	3.4640	Yes	106
2	Pan Electric	3.2570	Yes	72
3	Sime Darby	1.8440	No	13
4	United Engineers	4.2840	Yes	46
5	UOB	7.3360	Yes	146
6	Wearne	4.6140	Yes	56
Panel B:				
1	Inchcape	0.5783	No	33
2	Pan Electric	0.4886	No	16
3	Sime Darby	1.3104	No	70
4	United Engineer	1.9520	No	17
5	UOB	0.65025	No	35
6	Wearne	0.60606	No	9

rejection of null hypotheses in the three tests at very high probability values. These results are anomalous to valuation theory. The difference in price of short term maturity is the lowest (\$0.032 = \$0.296-0.264) against the higher differences for the longer maturities. This is consistent with the view that the more liquid short maturities are less badly priced than the thinly traded longer maturities.

We investigated the behaviour of one very liquid call contract further. The tests on the difference between model and market prices of Sime Darby call contracts were not highly significant throughout the period irrespective of the maturity or the year of trading.

Table 19.4 Tests of Market vs Model Prices by Maturities of Calls, Singapore

Maturities	Market Price	Statistic SEE	Model Price	Statistic SEE	t-values*
Short Maturiy 3-month	\$0.296	0.318	\$0.264	0.310	12.93
Medium maturity 6-month	\$0.250	0.219	\$0.183	0.215	20.055
Long Maturity > 6-month	\$0.222	0.067	\$0.160	0.075	9889

The statistics are from n=763 contracts. * Significant at 0.0001

Sime Darby was a very actively traded stock on the SES with a broad-based ownership. About 85 per cent of the call contracts on this stock were traded in the post-learning period. In addition, more than 67 per cent of call options on this underlying stock were call options of short maturities. Hence, there was no reason for the calls on Sime Darby to be mispriced as these were predominantly traded in the post-learning period in short maturities. Liquidity appears to have been a strong reason for the success of this case.

Issue of Fair Pricing of Calls

The more actively traded call contracts were compared in terms of model prices and market prices (see Table 19.5). The mean market prices ranged from \$0.128 to \$0.80 whereas the fair price calculated by the model ranged from \$0.098 to \$0.742. The model prices were systematically and significantly lower than the market prices for every one of the stocks. The average model price of \$0.224 and the market price of \$0.268 put the difference at \$0.054; this difference is statistically significant (t-value of 24.43 with p-value of 0.0001).

Table 19.5 The Pricing of 763 Call Options on 10 Stocks, Singapore

Underlying Stocks	Market Price	Statistic SEE	Model Price	Statistic SEE	t-values
Cycle & Carriage	\$0.800	0.500	\$0.742	0.459	3.82
DBS Bank	\$0.235	0.156	\$0.147	0.136	15.80
Inchcape	\$0.155	0.089	\$0.120	0.082	7.64
OUV	\$0.025	0.133	\$0.151	0.215	2.24
Pan Electric	\$0.176	0.119	\$0.137	0.116	16.57
Sime	\$0.589	0.271	\$0.540	0.276	8.82
United Engineers	\$0.139	0.090	\$0.208	0.090	14.29
UOB	\$0.222	0.280	\$0.163	0.211	20.29
UOL	\$0.128	0.089	\$0.102	0.180	5.62
Wearnes	\$0.324	0.189	\$0.256	0.180	11.34

* Significant at or less than 0.03 probability values

On average, the call contracts on each of the underlying stocks were significantly overpriced as can be seen by the p-values of less than 0.03 on tests done on differences in prices. For example, the Cycle & Carriage price of \$0.80 was significantly different from its fair price of \$0.742 (t-value of 3.82 and p-value of 0.0005). These test results suggest that the market was consistently overpricing the call options, which (if the model price is not measured with error) suggests that this mispricing is anomalous to theory. Similar anomalous pricing behaviour over some time of the market was documented elsewhere but the market appears to have correctly priced the calls in the

1978 to 1979 period. Hence, the tendency to underprice may have been severe in the learning period examined above. The extent of underpricing was about \$0.045 in 1977 against \$0.0081 in 1978-1979. Hence, the errors in pricing during the learning period dominate the reason for mispricing.

We proceed to examine the intrinsic values of the different call contracts, namely at-the-money, in-the-money and out-of-the money contracts. The contracts were evaluated in terms of these contracts being in any one of these categories by examining the market prices against the exercise prices. Prior research (Black and Scholes 1973; Galai 1977) have suggested that the model tends to correctly price at the money options even with historical volatility though the other intrinsic values tend to be less efficiently priced by the model. Our grouping of the contracts resulted in the following summary results in Table 19.6.

On average for all contracts, the model mispriced by a magnitude of \$0.05 (about 3 per cent).

Table 19.6 Test of Market vs Model Prices for Different Intrinsic Values of 763 Call Contracts, Singapore

Intrinsic value	Market Price	Statistic SEE	Model Price Price	Statistic SEE	t-values
At the Money	\$0.180	0.073	\$0.124	0.049	7.68*
In the Money	\$0.419	0.316	\$0.377	0.305	10.468*
Out of the Money	\$0.135	0.074	\$0.076	0.056	34.098

* Significant at 0.0001 probability value

At-the-money call contracts were priced lower at \$0.124 by the model against the market price of \$0.18. This suggests an underpricing of \$0.056 which is statistically significant in our tests though results reported in other markets for this intrinsic value were not seriously and significantly different. In other words, the Singapore market is inefficient in pricing the at-the-money calls correctly. In-the-money contracts were also mis-priced: the difference between the market price of \$0.419 and model price of \$0.377 is statistically significant (t-value on mean difference of 10.46 with p-value of 0.0001). Similar results were found for out of-the-money contracts. The t-value of 34.09 for the mean difference between the market price of \$0.315 and the model price of \$0.076 is statistically significant with p-value of 0.0001. Results similar to the last two intrinsic conditions have been reported as being due to the model's inaccuracy; thus this can be explained away, but not the results for at-the-money call contracts.

Other Contingent Contracts

Options trading on currency futures commenced on the SIMEX on 25 September 1987. There is now very active trading in currency futures contracts. We examined the pricing behaviour of this liquid market over a short window between September 1987 and December 1988. The contract included are the currency options on Eurodollar deposits (which is fungible on the Chicago Mercantile Exchange without having to pay transaction costs again), the Deutschemark and Japanese Yen contracts.

We used Black's model (1975) for the valuation of the currency options contracts to examine if the model priced correctly against the market prices of the (a) Eurodollar Futures, (b) Deutschemark futures and (c) Japanese Yen futures option (call and put) contracts. The Eurodollar contract is the cash cow of SIMEX and is a very liquid contract with the added attraction of being linked to the very well-established Chicago counterpart through a link-up arrangement for passing trades back and forth between the two locations. We also included the results of the Japanese Yen and German currency futures, which were the next most liquid contracts at that time. The results of our tests are summarised in Table 19.7.

Table 19.7 Tests of Market vs Model Prices of Three Currency Futures Options on the SIMEX, Singapore

Currency Futures Option Contract	Market Price	Statistic SEE	Model Price	Statistic SEE	t-values*
Eurodollar Futures contract N=4157	1.0598	1.0748	1.1280	1.0324	-28.40*
Japanese contract Yen N=2407	0.00019	0.00017	0.00018	0.00017	-17.30*
Deutschmark contract N=2,186	0.01055	0.1147	0.01052	0.01142	-0.77

* Significant at 0.0001 probability value

The market prices for the Eurodollar and the Japanese Yen futures option are lower than the fair value calculated by the Black's model. In these two cases, there is enough incentives for traders to profit from the trade as the market is below the fair value. This is in contrast to the call options market on underlying stocks described earlier. The difference between the market and model prices are significant (see the t-values of -28.40 for Eurodollar, -17.30 for Japanese Yen, both being statistically significant) enough to be profitable. In the case of the German currency, the difference is not significant but the two prices are about equal, perhaps suggesting that substantial arbitrage opportunity existed in that currency's futures, which wiped out significant profit opportunities beyond the risk-free money rates in Singapore.

These results from three balanced - calls and puts traded - options market with substantial liquidity appear to suggest that the institutional arrangement at the SIMEX may have led to correct pricing of the contracts and hence the continuation of the market. Also, it must be said that the 1987-1988 period was one of high volatility in currencies driven by the interest and inflation rates declines through concerted actions of several monetary authorities. These economic conditions were favourable for the liquidity needed to make a market in options contract.

5. Lessons on Contingent Claims Market-Making

This paper's analysis of the events that took place more than a decade ago in an experiment with making an options market was contrasted with a more recent experience 11 years later on a similar venture but in currencies. The former venture failed while the latter is successful. What are the lessons to be learned?

Market participants do take some time to learn how to trade a new instrument. Introduction of new financial instruments, especially the complex kinds, should be carefully planned and marketed. Sufficient investment in training of traders and publicity would ensure the participants made fewer errors and also make them participate if marketed aggressively. The major markets had just introduced options trading, and the lessons they had learnt were not widely known at the time of introducing the call options in Singapore. Second, the introduction of an unbalanced option was not sustainable as is clearly evidenced by the successful introduction of a balanced options on currencies. Introducing only call contracts perhaps precluded the flexibility needed for a full range of options strategies. Third, the timing of the market introduction is crucial for options, which can only thrive if there is sufficient volatility in the underlying stocks or currencies. Volatility in currencies was markedly high which helped to fuel interest in hedging and speculation on calls and puts on currency futures. The months immediately after the advent of the equity option in Singapore saw a bearish equity market, which did not augur well for speculative or hedging interests. Fourth, transaction costs on options were too large because of the penny-sized values of calls traded (the highest average price per call was $0.80 or US$0.40 at the 1978 exchange rate) which meant that only those trading in large numbers of lots could sustain the transaction costs. Agencies were said to be reluctant to introduce options trading to clients due to the low commission earnings charged for options contracts. From the traders' point of view, transaction costs appeared high. Fifth, the peculiar delayed delivery system provided by the regulators in the spot market afforded a low-cost market for speculation in up-trending market. Investors had a more attractive investment tool with transaction costs at a quarter of the transaction costs in call option markets.

We also found that the inclusion of dividends and the subsequent use of dividend adjustment in the pricing model had very little effect on the qualitative results discussed above. A final note is worth voicing ..... there is still room to examine alternative explanations for the anomalous overpricing of the calls in the equity options market.

End note

1. The readers will note that four of the 10 stock options analysed in this chapter are Malaysian stocks that were traded on the Stock Exchange of Singapore as call option counters under the dual-listing arrangement that ended on January 1990. Thus, the inclusion of this article is the only published source on Malaysian stock options trade (on Cycle & Carriage, Inchcape, Sime Darby, and United Engineers). There are six commodities, interest rates (introduced in August 1994) and KLSE Composite Index (introduced in December 1995) futures contracts in Malaysia. Hence, the inclusion of this article provides a reference to derivative analysis.

2. Of the 10, one (Pan Electric) has ceased to exist, another (Strait Steamship) has been taken over and the remaining eight are DBS Bank, Fraser and Neave, Inchcape, OCBC, OUB, United Engineers, UOB and Wearnes. None of these are included as optionable counters in the new options market introduced in 1993.

3. An observer who had a role in the introduction of the call contracts, Mr Ng Soo Peng, added rightly that the options market would give investors the tools to diversify and reduce their exposure to market risk. His willingness to be interviewed by Ms Chan Poh Kum, the co-author, is deeply appreciated.

4. The 10 that met our criterion were Inchape, Pan-Electric, Sime Darby Holdings, United Engineers, United Overseas Bank, Cycle & Carriage, DBS Bank, United Overseas Land and Wearne Brothers.

5. Two sets of historical variances of the rates of return on the underlying stocks were used: 3-month and 6-month rates of return prior to the traded date of the option were computed on a *moving window basis*. The results were not significantly different, and hence, we report only one set of results.

6. US$1.000 was approximately equal to S$1.65 in early 1993.

CHAPTER

20

Method Selection for Correcting Non-Synchronous Trading Bias in Beta Risk of Stocks*

Abstract

The presence of a slight positive correlation between stock prices and the market price (the index) has been investigated by several researchers. The resulting non-synchronous stock trading literature provides several methods for correcting the systematic bias in the estimated security parameters, especially the beta risk metric. This chapter investigates the relative efficiency of the methods for correcting the bias, while also identifying the optimal lags and leads required on the Singapore stock market. While three methods are found to be suitable, the Fowler and Rorke method specifying three lags and leads is relatively more efficient. We extended the Fowler and Rorke's two lag/lead equation to a three lag/lead equation for application in a very illiquid market.

1. Introduction

Non-synchronous trading problems arise in securities markets due to the time lag between the setting of market clearing prices for securities and the market index computed at the end of a discrete time interval. So, a stock price that cleared the market on the 25th of a month is non-synchronous with a market price for the month computed at the end of the last trading day of a month, say on the 29th; the same applies to a stock that trades in the morning when compared with the index price at the end of the day. Therefore, there is a periodicity problem, as pointed out by some researchers (Cohen, Hawawini, Maiers, Schwartz and Whitcomb, 1983) called the phenomenon an intervalling effect. Others have examined the problem from a prescriptive perspective by seeking a correction for the effect of bias on parameters calculated from the non-synchronous data (see Choles and Williams (1977) and Dimson (1979)). An example of an application of Dimson (1979) is Sinclair (1981).[1]

As the length of time lag between a security's trade in a market and the market index lengthens substantially - for example when most securities in developing capital markets are traded on few days in a month - then the problem becomes one of examining the

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* This chapter is a reproduction of a chapter by Mohamed Ariff and Justin Lim in *Securities Markets and Stock Pricing* by Mohamed Ariff and L.W. Johnson (1990) Longman Profersionel Books, Singapore, Sydney and London. We thank the publisher for permission to reproduce this chapter in this book. Minor changes have been made to conform to the format adopted in this book.

The 221 stocks included in this study include the 129 stocks also traded in the KLSE. Hence the relevance of this chapter to KLSE.

liquidity of the market. In this context the market clearing prices also include a premium for delayed immediacy which can be measured in the form of large bid-ask spreads on the securities. A study that attempted to throw light on this is Grossman and Miller (1988). Another effect of this is on tests for market efficiency. Lo and McKinlay (1989) showed that this affects tests of market efficiency.

This chapter is concerned with the problem of non-synchroneity in stock prices on the Stock Exchange of Singapore (SES) over the 1975 - 1988 period, in particular the 1983 - 1988 period. Specifically, it examines the relative efficiency of the three methods available for correcting the effect of non-synchronous trading on the market model parameter, the beta, which is used extensively in research and practice; the methods are briefly explained in section 2. The data set, the research design and the extension of a formula for a three-period specification of the market model are described in section 3. The relative efficiency of the methods based on our results is presented in section 4.

2. Methods for Correcting Non-Synchronous Bias in Beta

In a perfect stock market where prices are continuously formed, the problem of non-synchronous trading should not exist as every stock in the market would have registered

Table 20.1 Unit Root Regression on 82 Stocks on the Kuala Lumpur Stock Exchange: 1975 to 1989

{Unit Root Model: $P_t = a + bP_{t-1} + c(t) + e_t$; P=price}

Degrees of Thinness	Frequency Deciles	No. of Stocks	Averange value of Coefficient "b" root=1.00*	Acceptance % of unit
Most	1	12	0.750	75
Infrequently	2	5	0.840	80
Traded	3	8	0.835	75
	4	8	0.954	100
Moderately	5	7	0.954	86
Traded	6	6	0.910	100
	7	3	0.963	100
Most Frequently	8	8	0.940	88
Traded	9	10	0.910	70

*Refers to percentage (%) of total shares that possess unit root at 0.01 confidence level.
Note: The augmented Dickey-Fuller critical values are 3.14 for 2-tail test (.10 level) and 3.43 for 1-tail test (.05 level). Intercept, "a", and coefficient, "c" for controlling price trends, are not reported in the table.

a market clearing price at the discrete time of observing the market index which is the average of all prices at that instant. A significant proportion of the stocks in a market, however, trade so infrequently that prices may be cleared on a few days in a typical month. This is a general behaviour in the developing capital markets. Consequently, the measured market price (and the market return, R_m) deviates from the actual *true* returns had there been continuous trading.

Accordingly, the stock returns, R_j, and the R_m used in the market model regression using Ordinary Least Squares (OLS) introduce the econometric problem of errors in variables. The estimate of the systematic risk measure in the market model is measured with a non-synchronous (or thinness in trading) bias where the systematic risk measures of (i) less frequently traded stock is lower and (ii) the more infrequently traded stock is higher than it would be under continuous trading and (iii) the average of the systematic risk for the market is greater than unity (Scholes and Williams 1977). The measure of systematic risk is the commonly used measure, beta, which is

$$B_j = \frac{\text{cov}(R_j, R_m)}{\text{var}(R_m)} \tag{20.1}$$

Since the covariance of returns of R_m with itself is the variance ($\sigma_{m,m} = \sigma^2$), then β_m must be equal to 1. Reported research by Dimson (1976, 1983), Sinclair (1981) and Ariff (1987a) produced evidence that thinness in trading produces biased estimates of the beta metric. One test of the presence of this bias can be the aggregate beta of all the stock beta taking an average value greater than unity. Another convenient cross-sectional measure is the bias ratio:

$$\hat{\sigma}^2\left(\beta_j\right)/\hat{\sigma}^2\left(\hat{\beta}_j\right) \tag{20.2}$$

where

$\sigma^2\left(\hat{\beta}_j\right)$: the measured variance of beta estimates, and

$\sigma^2\left(\hat{\beta}\right)$: the variance of betas

The ratio should be unity when β_j has no thin-trading error; this ratio will tend to be lower than 1 in the presence of systematic error on β_j. Blume (1975) suggested that the variance of the true beta ($\sigma^2(\beta_j)$) can be estimated from the cross-sectional variance in the test period's beta estimates.

Scholes and Williams (1977) showed that the consistent beta estimator which corrects for thinness of trading in a market when R_{jt} leads and R_{mt} lags (t being the time of measurement of the market returns) by one period is given by

$$\hat{\beta}_j = \frac{\beta^{-1} + \beta^0{}_j + B_j{}^{+1})}{1 + 2\rho_1} \tag{20.3}$$

where

$\hat{\beta}_j$: the parameter estimated as thinness corrected beta of j-th stock,

$\beta^{-1}, \beta^0, \beta^{+1}$: the respective beta estimates from one-period lagged, the current, and one period leading specification of the market model in three OLS regressions, and

ρ_1 : the first order serial correlation coefficient between r_{mt} and R_{mt-1}

They suggested that the β_j computed thus should correct for the non-synchronous effect if the extent of the bias is not pervasive beyond a single period.

Fowler and Rorke (1983) generalised the above to the case of two-period lag/lead by deriving the relationship as

$$\hat{\beta}_j \quad \frac{\left(\beta_j^{-2} + \beta_j^{-1} + \beta_j^{0} + \beta_j^{+1} + \beta_j^{+2}\right)}{\left(1 + 2\rho_1 + 2\rho_2\right)} \tag{20.4}$$

where the superscripts -2 and +2 refer to the second-period lag/lead specification and ρ_2 is the second order serial correlation between R_{mt} and R_{mt-2}. We have extended the two-period estimator to a three-period estimator by deriving the relationship (see Appendix 1) for the Singapore market, where we suspect a three-period specification may be appropriate as there is pervasive thinness of trading.

Equation (20.5) gives the relationship.

$$\hat{\beta}_j \quad \frac{\left(\beta_j^{-3} + \beta_j^{-2} + \beta_j^{-1} + \beta_j^{0} + \beta_j^{+1} + \beta_j^{+2} + \beta_j^{+3}\right)}{\left(1 + 2\rho_1 + 2\rho_2 + 2\rho_3\right)} \tag{20.5}$$

As before, superscripts -3 and +3 refer to the third lag and lead and ρ_3 is the third- order serial correlation between R_{mt} and R_{mt-3}

These three procedures, which are called Scholes-Williams estimators, are meant to correct different degrees of pervasive thin-trading conditions. Each is meant for an OLS regression in separate passes before aggregating the betas and correcting for the serial correlations in the market returns. For example, in equation (20.1), one needs to run three OLS regressions to estimate β^{-1}, β^{0} and β^{+1} and another regression to measure ρ_1.

Dimson (1979) took a radical departure from these data intensive procedures by specifying the lags and leads in a multiple regression. For one-period case, it is

$$R_{jt} = \alpha_j + \beta_j^{-1}(R_{mt-1}) + \beta_j^{0}(R_{mt}) + \beta_j^{+1}(R_{mt+1}) + e_{jt}$$

It can be seen that this is a re-specification of the market model with one lag and one lead and α_j is the usual intercept term and e_{jt} is the usual i.i.d. (identically and independently distributed) residuals with expectations of zero and constant variance. He showed evidence that the aggregated coefficient method (ACM) is capable of producing efficient estimators in the presence of thinness of trading on the London Stock Exchange. An important point to note is that the procedure is more efficient as there is no need for a series of simple regressions. Fowler-Rorke (1983) has, however, shown that the procedure is not equivalent to Scholes-Williams. They further derived the following relationship to make the OLS multiple regression estimators equivalent to the Scholes-Williams procedure in three steps which are shown in equations (20.7a), (20.7b) and (20.7c).

$$\hat{\beta} = W_2\left(\beta_j^{-2} + W_1\left(\beta_j^{-1}\right) + \beta_j^{0} + W_1\left(\beta_j^{+1}\right) + W_2\left(\beta_j^{+2}\right)\right. \tag{20.7a}$$

$$R_t = \alpha + \beta^{-2}(R_{mt-2}) + \beta^{-1}(R_{mt-1}) + \beta^{0}(R_{mt}) + \beta^{+1}(R_{mt+1}) + \beta^{+2}(R_{mt+2}) + e_t \quad (20.7b)$$

Equation 20.7c gives the values for weights (W.) for correcting the beta coefficients as follows:

$$R_{mt} = \rho_0 + \rho_{-2}(R_{mt-2}) + \rho_{-1}(R_{mt-1}) + \mu_t \quad (20.7c)$$

$$W_1 = \frac{1 + 2\rho_1 + \rho_2}{1 + 2\rho_1 + 2\rho_2} \quad (20.8a)$$

$$W_2 = \frac{1 + \rho_1 + \rho_2}{1 + 2\rho_1 + 2\rho_2} \quad (20.8b)$$

Fowler and Rorke argued that the Dimson procedure will not provide consistent and unbiased estimators if the coefficients in 20.7b are simply aggregated without scaling them by these weights. We have (see Appendix 1) extended the two-period case to a three-period by deriving the weights for a more-pervasive thinness in trading in the Singapore stock market.

It remains now to develop a data set and research procedure to apply the three different models which are equivalent to the Scholes-Williams procedure. Dimson's procedure is also evaluated. To summarise, there are three versions of the Scholes-Williams model for three different lag/lead specifications, including our three lag/leads version. The second model is Dimson's ACM estimator, again in separate versions for different lags/leads. Finally, the Fowler-Rorke procedure is for one and two lags while our extended version is for three lags/leads.

3. Data and Research Design

The data for this study were from a dividends-include monthly price relatives file on 340 stocks traded on the SES anytime over the period 1975 - 1988. R_{jt} were calculated from this file on 221 stocks which had at least 20 monthly prices: the actual number used will depend on the filter established at the time of running the regression, and may be lower than that number. R_{mt} are the *equally weighted mean rate of returns on all the stocks listed* - but not necessarily traded - on the SES. Thus R_{mt} was measured with non-synchronous errors, as the actual returns may be calculated on the basis of trades prior to the end of the trading month.[2] Prior research cited earlier has established thinness of trading. Of the 340 stocks over the 1975-1988 period, only 50 maintained a continuous monthly trading and, on an average, a typical stock would have missed trading 27 per cent of time in a monthly data set.

By examining the stock market conditions over the test period on the basis of trends, 1975-1979 wss characterised as a period of subdued growth except for the last year; 1979-1983 witnessed sustained growth; and the market decline was substantial during 1983-1988. Of course, the major break on Black Monday reduced the stock value by a whopping 40 per cent to end a few days after the Black Monday at 45 per cent of the pre-break levels. Following the 13 October 1989 crash on the New York market, the Singapore stocks lost 10.5 per cent of value, the second biggest decline in the world, on

16 October 1989. The test period includes, therefore, all typical conditions including crisis conditions.

Our discriminating test wss based on the extent of over- (under-) estimate of the expected market beta of unity for reasons explained in relation to Equation (20.1). The test procedure was simply to apply the three variations of each of the equations of the three suggested methods and aggregating the market beta from all the individual beta estimates. The equations of each of the runs are shown in the Appendix.

The next procedure followed was to sort all the individual securities from the lowest frequency of trading - these having in theory the most biased estimation error in individual-betas - to the highest frequency of trading. The 10 deciles were partitioned, and the aggregate beta of each decile was computed. Other researchers have formed three groups, but we thought it meaningful to make a larger number of portfolios for observing the effect as we had some industry groups which missed trading 43 per cent of the time on a monthly basis during 1975-1978. It should be mentioned that non-trading is not as extreme in the current period: the lowest percentage of non-trading was 33 per cent for the worst industry during 1983-1988.

In establishing the number of lags and leads - that is to establish the priors - for this data set, we examined the extent of serial correlations in the R_{mt} (see Table 20.1). Standard errors have been omitted to show only the magnitude. It is obvious that serial correlation is substantial, the magnitude being as high as 0.256. Next, the magnitude of the numbers was large up to the second order, and decayed to a small number especially for the latest period 1983-1988, a period of most practical importance for application of the beta correction methods. Thus, it was decided to assume non-trivial and trivial serial correlations existing for up to three periods.

Table 20.2 Serial Correlation in Market Returns on the SES

Test Periods	Serial Correlation Observed		
	First Order ρ_1	Second Order ρ_2	Third Order ρ_3
Whole period 1975-1988 (March)	0.224	0.182	0.012
Sub-period I (1975-1979)	0.200	0.232	0.207
Sub-period II (1983-1988 March)	0.183	0.014	-0.139
Sub-period III (1983-1988 (March)	0.213	0.256	0.003

4. Results and Beta Correlation Method Selection

The first results for the market portfolio for the whole period (Panel A) and three sub-periods (Panel B) are shown in Table 2. The OLS market model beta is shown first, which is a measure of the extent of non-synchronous bias in the market. The deviation from expected beta of unity for the market was 39.9 per cent over the whole test period, 83.3 per cent over the earliest period, 1973-1979, 47.9 per cent in the years 1979-1983 and 33.6 per cent in the period, 1983-1988. It is apparent that the market model measure for any period has serious estimation bias for the beta metric to be useful in research and practice. The next three columns contain corrected beta estimators for three different versions of the three methods - SW = Scholes and Williams, DIM = Dimson and FR = Fowler and Rorke procedures. Looking at the results in Panel A, the three sets of numbers for the market portfolio tend to regress towards unity but are not equal to one even when up to three periods of lag/lead were applied. Dimson's method reverses the trend towards one at a three-period lag/lead. The same trend reversal is found for Dimson's procedure at period three in all subsequent test periods - see Panel B under DIM β. For the other two methods, in general, the specification of increased lagging/ leading periods resulted in a smaller market beta. However, the maximum of two or three lags/ leads appeared to produce expected market beta of one only in the most recent period: the SW β of 0.982 (3 periods), DIM β of 1.007 (3 periods) and FR (of 1.008 (3 periods) relative to the market model biased estimate of 1.336. While the non-synchronous correction over the whole test period and the latest test period appeared to work with three lags, it did not lead to a market beta of unity during the bear period (low liquidity) and the period of bull runs in 1979 to 1983.

Table 20.3 SES Market Beta Estimates Using Various Methods in Singapore

Period	No. of lead/lag	OLS β	SW β	DIM β	FR β
		PANEL A			
Whole Period (Jan 75-Mar 88)	1	1.399	1.260	1.305	1.324
	2		1.113	1.083	1.159
	3		0.071	1.171	1.172
		PANEL B			
Subperiods	No. of lead/lag (N)	OLS β	SW β	DIM β	FR β
Subperiod (Jan 75-Dec 79)	1	1.399	1.260	1.305	1.324
	2		1.452	1.870	1.871
	3		1.317	1.954	1.932
Subperiod (Jan 79-Dec 83)	1	1.479	1.477	1.463	1.467
	2		1.456	1.435	1.440
	3		1.459	1.458	1.458
Subperiod II (Jan 83-Mar 88)	1	1.336	1.25	1.170	1.136
	2		0.949	0.834	0.966
	3		0.982	1.007	1.008

Prescription on the priors is difficult to state. A general statement that the extent of non-synchronous errors is so pervasive that at least a three-period specification is required over the whole period and during the current period is probably true. Next, it appears that both the Dimson and Fowler-Rorke procedures - these two are efficient in requiring a multiple regression as against simple regressions for Scholes-Williams - appear to provide near equivalent results. For reasons stated elsewhere, the Fowler-Rorke procedure is computationally equivalent though it requires estimating serial correlation weights in addition to Dimson's regression to make the results unbiased in theory.

Having selected the Fowler and Rorke method of unbiased estimator calculation with three period lags and leads, the behaviour of 10 portfolios formed of 10 deciles of the stocks over the 1983-1988 period was investigated. Table 3 is a summary of the results. Portfolio beta is an equally-weighted average of betas.

The trading frequency was measured by the non-occurrence of trading observed on a monthly data set. The first portfolio is the 10% of stocks that had the lowest frequency of trading of 40.3% trading. The next 10% of stocks form the next portfolio which had 54.1% trading; the others are similarly formed. The OLS market model beta for the portfolios' range of 1.16 - 1.48 - and we noted the average for all at 1.336 in Table 2 - is a smaller range than the actual corrected portfolios' beta of 0.75-1.57 (Scholes-Williams), 0.84-1.38 (Dimson) and 0183-1.38 (Fowler-Rorke). It appears that the market model beta underestimates the variance of the true - we mean corrected and not theoretical - beta.

The OLS estimator for the first two portfolios, the lowest frequency ones, were much smaller than are the corresponding corrected beta using any of the three methods. The extent of under-estimation by OLS market model was +0.41 (for Scholes-Williams), +0.22 (for Dimson) and +0.22 (for Dimson) and +0.26 (for Fowler-Rorke). From the third portfolio onwards, the OLS market model consistently over-estimated the size of the portfolio beta in relation to the three correction methods. The extent of over-estimation was worst in the middle range of frequency of trading as for example on the fifth portfolio: OLS beta of 1.39 versus the respective corrected betas over-estimated by -0.55 (Scholes-Williams), -0.53 (Dimson) and -0.51 (Fowler-Rorke). The portfolio betas of the most frequently traded were overestimated by a margin of as low as -0.27. The standard deviation of the OLS beta was about 9.10 while the standard deviation of the corrected beta was much smaller at 0.19. Prior research cited above has established[1]

Table 20.4 Beta Variation Across Portfolios of Different Thinness of Trading on the Ses

Decline of trading frequency	Trading frequency	OLS a	SW a	DIM a	FR a
(infrequent)					
1	0.403	1.16519	1.57261	1.38510	1.38129
2	0.541	1.21720	1.38359	1.24637	1.23350
3	0.638	1.48245	1.22507	1.19635	1.10603
4	0.755	1.44221	1.08222	1.20471	1.20552
5	0.839	1.39306	0.82336	0.86736	0.88617
6	0.883	1.22500	0.75014	0.84139	0.83703
7	0.924	1.33423	0.92786	0.96444	0.99879
8	0.957	1.34583	0.87013	0.96668	0.86043
9	0.992	1.46043	1.08192	1.22377	1.18559
10	1.000	1.40523	1.08321	1.12709	1.13622
(frequent)					

different levels of infrequent trading across industries. The market model betas and corrected betas for respective industries which were computed showed similar trends. The frequencies of trading for industry portfolios over 1983 - 1988 were 66 per cent (Mining), 76 per cent (Plantations), 84 percent (Hotels), 85 per cent (Industrials), 89 per cent (Properties) and 92 per cent (Finance). In all instances, the β_s obtained through OLS market model were substantially different from the corrected betas using the three methods.

5. Conclusion

This chapter set out to specify the priors for the periodicity of the lags and leads and to select an efficient method for correcting the bias in the betas computed for stocks from a very thinly-traded developing stock market, namely the SES and KLSE. On account of the efficiency in obtaining the market portfolio beta of unity, the Fowler-Rorke procedure with three lags and leads appears to be the best method. However, Dimson's method gives about the same value, though it does not require the involved processing of the serial correlation weights. The results reported are based on a judgemental decision without resource to other available test procedures, for example, Blume (1975). We strongly advise researchers and practitioners to treat market model betas with caution even if corrected by expectation corrections (as for example Visicek 1973). Much of the prior research in Singapore using market model betas requires review in the light of our findings.

APPENDIX

a) DERIVATION OF SCHOLES-WILLIAMS ESTIMATOR OF BETA, WITH THREE PERIODS OF LEAD/LAG BETWEEN R_{jt} AND R_{mt}.

For three periods lead/lag, the beta estimator is

$$\hat{\beta}_j = \frac{\left({}_3\beta_j + {}_3\beta_j^{0} + \beta_j^{+1}\right)}{\left(1 + 2\,{}_3\rho_1\right)}$$

$$(1 + 2\,{}_3\rho_1)$$

where ${}_3\beta_j^{-1}$, ${}_3\beta_j^{0}$, ${}_3\beta_j^{+1}$ are ordinary least square estimators based on three period returns. The period betas and the serial correlation coefficient of determined as follows:

$${}_3\beta_j^{+1} = \frac{\operatorname{cov}\left({}_3R_{jt},\, {}_3R_{m(t+3)}\right)}{\operatorname{var}\left({}_3R_{m(t+3)}\right)}$$

$$\frac{\operatorname{cov}\left(R_{jt} + R_{j(t+1)}R_{j(t+2)},\, R_{m(t+3)} + R_{m(t+4)}R_{m(t+5)}\right)}{\operatorname{var}\left({}_3R_{m(t+3)} + R_{m(t+4)} + R_{m(t+5)}\right)}$$

$$\frac{\frac{1}{K-1}\sum_{t=1}^{K}\left[\left(R_{jt}+R_{j(t+1)}+R_{j(t+2)}-3\bar{R}_j\right]\left[R_{m(t+3)}+R_{m(t+4)}+R_{m(t+5)}\right)-3R_m\right]}{\frac{1}{K-1}\sum_{t=1}^{K}\left[\left(R_{m(t+3)}+R_{m(t+4)}+R_{m(t+5)}-3R_m\right)\right]^2}$$

$$\frac{\mathrm{cov}\left(R_{jt},R_{m(t+1)}\right)+2\,\mathrm{cov}\left(R_{jt},R_{m(t+2)}\right)+3\,\mathrm{cov}\left(R_{jt},R_{m(t+3)}\right)+2\,\mathrm{cov}\left(R_{jt},R_{m(t+4)}\right)+\mathrm{cov}\left(R_{jt},R_{m(t+5)}\right)}{3\,\mathrm{var}(R_{mt})+4\,\mathrm{cov}\left(R_{mt},R_{m(t+1)}\right)+2\,\mathrm{cov}\left(R_{mt},R_{m(t+2)}\right)} \tag{A2}$$

Similarly

$${}_3\beta_j^0=\frac{\mathrm{cov}\left(R_{jt},R_{m(t-2)}\right)+2\,\mathrm{cov}\left(R_{jt},R_{m(t-1)}\right)+3\,\mathrm{cov}\left(R_{jt},R_{mt}\right)+2\,\mathrm{cov}\left(R_{jt},R_{m(t+1)}\right)+\mathrm{cov}\left(R_{jt},R_{m(t+2)}\right)}{3\,\mathrm{var}(R_{mt})+4\,\mathrm{cov}\left(R_{mt},R_{m(t+1)}\right)+2\,\mathrm{cov}\left(R_{mt},R_{m(t+2)}\right)} \tag{A3}$$

And

$${}_3\beta_j^{-1}=\frac{\mathrm{cov}\left(R_{jt},R_{m(t-5)}\right)+2\,\mathrm{cov}\left(R_{jt},R_{m(t-4)}\right)+3\,\mathrm{cov}\left(R_{jt},R_{m(t-3)}\right)+2\,\mathrm{cov}\left(R_{jt},R_{m(t-2)}\right)+\mathrm{cov}\left(R_{jt},R_{m(t-1)}\right)}{3\,\mathrm{var}(R_{mt})+4\,\mathrm{cov}\left(R_{mt},R_{m(t+1)}\right)+2\,\mathrm{cov}\left(R_{mt},R_{m(t+2)}\right)} \tag{A4}$$

$${}_3\rho_1=\frac{\mathrm{cov}\left({}_3R_{mt},\ {}_3R_{m(t-1)}\right)}{\mathrm{var}\left({}_3R_{m(t-1)}\right)}$$

$$\frac{\mathrm{cov}\left(R_{jt},R_{m(t-5)}\right)+2\,\mathrm{cov}\left(R_{jt},R_{m(t-4)}\right)+3\,\mathrm{cov}\left(R_{jt},R_{m(t-3)}\right)+2\,\mathrm{cov}\left(R_{jt},R_{m(t-2)}\right)+\mathrm{cov}\left(R_{jt},R_{m(t-1)}\right)}{3\,\mathrm{var}(R_{mt})+4\,\mathrm{cov}\left(R_{mt},R_{m(t+1)}\right)+2\,\mathrm{cov}\left(R_{mt},R_{m(t+2)}\right)}$$

Therefore,

$$1+2\,{}_3\rho_1=\frac{3\,\mathrm{var}(R_{mt})+6\,\mathrm{cov}\left(R_{mt},R_{m(t-1)}\right)+6\,\mathrm{cov}\left(R_{mt},R_{m(t-2)}\right)+6\,\mathrm{cov}\left(R_{mt},R_{m(t-3)}\right)+4\,\mathrm{cov}\left(R_{mt},R_{m(t-4)}\right)+2\,\mathrm{cov}\left(R_{mt},R_{m(t-5)}\right)}{3\,\mathrm{var}(R_{mt})+4\,\mathrm{cov}\left(R_{mt},R_{m(t+1)}\right)+2\,\mathrm{cov}\left(R_{mt},R_{m(t+2)}\right)} \tag{A5}$$

Only covariances of lead/lag if three periods or less are assumed to be non-zero. Dividing the numerator and denominator of equation (A2), (A3), (A4) by var(R_{mt})

$$ {}_3\beta_j^{-1} + {}_3\beta_j^{0} + {}_3\beta_j^{+1} = \frac{{}_3\beta_j^{-3} + {}_3\beta_j^{-2} + {}_3\beta_j^{-1} + {}_3\beta_j^{0} + {}_3\beta_j^{+1} + {}_3\beta_j^{+2} + {}_3\beta_j^{+3}}{3 + 4\rho_1 + 2\rho_2} \tag{A6} $$

Dividing numerator and denominator of equation by var(R_{mt}), gives

$$ 1 + 2\,{}_3\rho_1 = \frac{(3 + 6\rho_1 + 6\rho_2 + 6\rho_3)}{(3 + 4\rho_1 + 2\rho_2)} \tag{A7} $$

Dividing equation (A6) by equation (A7) gives the Scholes-Williams estimator for 3 period lead/lag, i.e.

$$ \hat{\beta}_j = \frac{(\beta_j^{-3} + \beta_j^{-2} + \beta_j^{-1} + \beta_j^{0} + \beta_j^{+1} + \beta_j^{+2} + \beta_j^{+3})}{(1 + 2\rho_1 + 2\rho_2 + 2\rho_3)} \tag{A8} $$

b) DERIVATION OF FOWLER-RORKE ESTIMATOR FOR BETA WITH SINGLE PERIOD LEAD/LAG BETWEEN R_{jt} AND R_{mt}.

Dimson's regression for single period lead/lag is

$$ R_{jt} = \alpha_j + \beta_{j+1} R_{m(t+1)} + \beta_j R_{mt} + \beta_{j-1} R_{m(t-1)} + \varepsilon_j \tag{A9} $$

Partial differentiation of Rjt wrt Rm(5+1) gives

$$ \frac{\partial(R_{jt})}{\partial(R_{m(t+1)})} = \beta_{j+1} + \beta_j \frac{\partial(R_{mt})}{\partial[R_{m(t+1)}]} + \beta_{j-1} \frac{\partial(R_{m(t-1)})}{\partial[R_{m(t-2)}]} $$

Assuming serial correlations of ρ_2 and above are zero,

$$ \beta_j^{-1} = \beta_{j+1} + \beta_j \rho_1 \tag{A10} $$

Partial differentiation on R_{jt} wrt R_{mt} gives

$$ \frac{\partial(R_{jt})}{\partial(R_{mt})} = \beta_{j+1} + \beta_j \frac{\partial(R_{m(t+1)})}{\partial[R_{mt}]} + \beta_j + \beta_{j-1} \frac{\partial(R_{m(t-1)})}{\partial[R_{mt}]} $$

$$ \beta_j^{0} = \beta_{j+1}\rho_1 + \beta_j + \beta_{j-1}\rho_1 \tag{A11} $$

Partial differention of R_{jt} wrt $Rm_{(t-1)}$ gives:

$$\frac{\partial(R_{jt})}{\partial(R_{m(t-1)})} = \beta_{j+1} + \frac{\partial(R_{m(t+1)})}{\partial[R_{m(t-1)}]} + \beta_j \frac{\partial(R_{mt})}{\partial[R_{m(t-1)}]} + \beta_{j-1}$$

$$\beta^{-1} = \beta_j \rho_1 + \beta_{j-1} \tag{A12}$$

Summing the left side of equations (A10, (A11) and A12), and dividing by $(1 + 2\rho_1)$ gives the Scholes-Williams beta estimator for single-period lead/lag as in equation

$$\hat{\beta}_j = \frac{(\beta_j^{-1} + \beta_j^{0} + \beta_j^{+1})}{(1 + 2\rho_1)}$$

$$= \beta_{j+1} \frac{(1 + \rho_1)}{(1 + 2\rho_1)} + \beta_j + \beta_{j-1} \frac{(1 + \rho_1)}{(1 + 2\rho_1)} \tag{A13}$$

Therefore,

$$\hat{\beta}_j = W_1 \beta_{j+1} + \beta_j + W_1 \beta_{j-1} \tag{A14}$$

where the weight

$$W_1 = \frac{(1 + \rho_1)}{(1 + 2\rho_1)} \tag{A15}$$

Therefore,

$$\hat{\beta}_j = \frac{(\beta^{-3} + \beta^{-2} + \beta^{-1} + \beta^{0} + \beta^{+1} + \beta^{+2} + \beta^{+3})}{(1 + 2\rho_1 + 2\rho_2 + 2\rho_3)}$$

$$\frac{\begin{bmatrix} \beta_{j+3}(1 + 2\rho_1 + \rho_2 + \rho_3) + \beta_{j+2}(1 + 2\rho_1 + \rho_2 + \rho_3) \\ + \beta_{j+1}(1 + 2\rho_1 + 2\rho_2 + \rho_3) \\ + \beta_j + \beta_{j-1}(1 + 2\rho_1 + 2\rho_2 + \rho_3) + \beta_{j-2}(1 + 2\rho_1 + \rho_2 + \rho_3) \\ + \beta_{j-3}(1 + 2\rho_1 + \rho_2 + \rho_2) \end{bmatrix}}{(1 + 2\rho_1 + 2\rho_2 + 2\rho_3)} \tag{A16}$$

Therefore,

$$\hat{\beta}_j = W_3\beta_{j+3} + W_2\beta_{j+2} + W_1\beta_{j+1} + \beta_j + W_1\beta_{j-1} + W_2\beta_{j-2} + W_3\beta_{j-3} \qquad \text{(A17)}$$

where the weights

$$W_1 = \frac{(1 + 2\rho_1 + 2\rho_2 + \rho_3)}{(1 + 2\rho_1 + 2\rho_2 + 2\rho_3)} \qquad \text{(A18)}$$

$$W_2 = \frac{(1 + 2\rho_1 + \rho_2 + \rho_3)}{(1 + 2\rho_1 + 2\rho_2 + 2\rho_3)} \qquad \text{(A19)}$$

$$W_3 = \frac{(1 + 2\rho_1 + \rho_2 + \rho_3)}{(1 + 2\rho_1 + 2\rho_2 + 2\rho_3)} \qquad \text{(A20)}$$

End note

1. A growing interest in the effect of liquidity on the volatility of stocks has produced a large number of studies: see Karpoff (1987). We do not address this issue.
2. To overcome this problem, some writers have designed a trade-to-trade regression. This is a laborious procedure, and has not gaimed acceptance.
3. See Ariff and Lim in Ariff and Johnson (1990).

CHAPTER

21

Performance of Mutual Funds (Unit Trusts)*

Abstract

The chapter provides some evidence of the performance of unit trusts in Malaysia. The results show that for the 1988-1992 period, the *average returns on investments in unit trusts in Malaysia were well below the market returns*. The degree of diversification of the portfolios is below expectations and the performance is not consistent over time, as is also the case in other markets. The actual returns and risk characteristics of the funds are inconsistent with their stated objectives. The findings on foreign managed trusts are similar to their local counterparts.

1. Introduction

Institutional investors such as pension funds, insurance companies and unit trusts (mutual funds) play an important role in providing investment capital to firms (and government) in the financial markets of developed and developing economies. The term unit trust is applied to what is called mutual funds in the literature. In the United States, unit trusts are known as mutual funds whereas in Commonwealth countries, these are more popularly referred to as unit trusts. Unit trust is a general name that may be further classified according to its objective such as growth, income and balanced trusts each of which can be reclassified according to sectors such as property trusts, sectoral trusts, equity trusts and gilts (in the United Kingdom). Irrespective of their specific objectives, the general objective of a unit trust is to pursue investments which generate higher returns to small investors by pooling their resources so that the returns per unit of risk may be improved by investing in unit trusts. In this chapter, we are excluding the closed-end unit trusts as these are few, and do not play a significant role in improving the returns to small investors who form the bulk of the unit holders.

There have been regular press reports on the performance of unit trusts. To our knowledge no systematic study has been made of the performance of these funds, especially using carefully-constructed financial measurements. Hence, the motivation for this study. Section 2 is a description of the 57 unit trusts managed by 16 managers in Malaysia in 1993. Their performance over the period 1988-1992 is analysed and reported in the following Section 3. Unit trusts do not appear to be generating reasonable returns to unit holders in this market. The reasons for their poor performance are not investigated, which should be of great public interest and warrant a more detailed investigation in future.

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2. Unit Trusts in Malaysia

The Industry

The unit trust serves as a medium through which small investors can acquire a share in a diversified portfolio of corporate securities (bonds and equity), thereby pooling the risks of capital appreciation with other small investors who form the unit trust. A unit trust consists of three parties, namely the unit-holders who are the owners of the fund, the manager(s) who manage the fund, and the trustee (usually a large bank or well-established trust company) that lends its name to make the trust sound. By design it is meant to play an important role in the development of the private capital market through mobilising small savings for active participation in the direct corporate securities markets. Investors in unit trusts benefit from their investment in terms of the opportunity to spread risks over many different securities (portfolio diversification) and professional management of their investments, which relieves them of their time and energy needed to do search and securities trading. There is also improved liquidity of investment as unit trusts are obliged to create a ready market to redeem investors' units.

Unit trusts were first introduced in Malaysia in 1959 with the establishment of the Malayan Unit Trust Limited by the Australian firm, Cooper Brothers. Then, the company managed four funds; in 1969, it ceased its operaion. Until recently, the growth of the unit trust industry in Malaysia has been slow, due mainly to lack of awareness on the part of investors about the salient features of investment in unit trusts, the close regulation by the government (which itself has several unit trusts) and lack of convenient facilities for investors to invest in unit trusts. The second unit trust was only introduced some seven years later after the first in 1966 followed by Amanah Saham MARA Berhad (ASM) a year later in 1967. Following another lapse of ten years, MIC Unit Trust Berhad launched its first fund in 1977. This was followed by the launch of two other major funds in 1981.

There were 16 unit trusts management companies in Malaysia managing a total of 41 funds as at the end of 1993. There were also three foreign companies licenced to operate; these are the Singapore Unit Trust, Schroeders and DBS Asset Management Ltd. managing 6, 2 and 8 funds respectively, making a total of 67 unit trusts.

The unit trust industry in Malaysia currently accounts for 5 per cent of the total share market capitalisation. The unit trust industry is expected to play a more important role in the economy and garner at least 20 per cent of the market capitalisation by the year 2000. In developed countries, unit trusts play a more significant role, accounting for at least 40 per cent of total market capitalisation (refer to Table 21.1). Now, Amanah Saham Nasional and Amanah Saham Bumiputera together account for 94 per cent of the total market capitalisation of the unit trust industry in Malaysia.

Objectives of Unit Trusts

Unit trusts can be classified into various categories based on their stated objectives in the prospectuses filed with the Registrar of Companies (ROC): growth, income, balanced and property trust funds. The primary objective of a growth fund is to achieve higher returns through capital gains by investing in securities of higher risk. A large proportion of their funds is invested in high-growth common stocks or small companies which offer good prospects of growth. Funds are also invested with long-term maturity and

Table 21.1 Market Capitalisation of Investment by Unit Trusts as a Percentage of GDP

Country	Percentage market capitalisation
Japan	48 %
Australia	40 %
United States	40 %
India	25 %
Thailand	16 %
Malaysia'	5 %

Source: *Business Times* (Malaysia) (6 February, 1994)

capital gain. Income funds provide investors with a stable and regular source of income at lower risks, and the funds are primarily invested in high quality bonds and/or low-risk stocks; this may include blue chip stocks. In short, funds are placed in well diversified portfolios comprising income generating investments. Balanced funds try to strike a balance between the growth and income funds by providing investors with moderate returns at average risks. The portfolio will be a balanced mix of investments in shares, bonds and money market instruments. Property trust funds' main source of income is through property rental

3. Review of Literature on Fund Performance

Studies on the performance of mutual funds in the more developed economies are prompted by the need to compare their performance with other investments which are facilitated by the availability of composite measures of performance. Also, regular reports (for example, the *Business Week* in February each year) provide a summary of relative performance of funds over the previous calendar year so that there is an independent opinion about how the funds have been managed each year. In addition, the industry association also appoints *independent bodies* to do an arms-length ranking of performance. Hence, it has been long accepted as a public interest issue to have objective, timely and independent opinion about the performance of mutual funds. In addition to these industry studies, academics have developed significant measures of performance since 1966 and refined them over the years so that performance can be unambiguously compared and attribution can be made as to how the performance has been achieved.

This section reviews the findings of some of these academic studies. Sharpe (1965) studied the performance of 34 mutual funds in the US and found that, on average, mutual funds did not outperform the market (the Dow Jones Industrial Average or DJIA). Only 11 of the 34 mutual funds had higher Sharpe Index performance value than the market. Another study (Jensen 1968) covering the period 1965-1984 also reported similar results. The evidence on mutual fund performance indicates not only that the 115 mutual funds examined were, on average, not able to predict security prices well enough to outperform a buy-the-market-and-hold policy, but also that there is very little evidence that any individual fund was able to perform better than expectations.

The performance for 143 mutual funds in the United States over the period 1965-1984 (Ippolito 1989) showed that mutual funds with higher turnover, fees and expenses, earned rates of return sufficiently high to offset the higher charges. One study based on the performance of 15 US-based internationally diversified mutual funds over the period 1982-1988 (Cumby and Glen 1990) using Jensen's measure and the positive period weighting measure found no evidence that the funds, either individually or as a whole, provide investors with performance that surpasses that of a broad, international equity index over this sample period. However, the average returns to investors were reported to be some 3-4 per cent lower than the market average and these researchers argued that the 3-4 per cent is attributable to management charges incurred in the process of managing a pooled fund. The conclusions discussed were valid even when the returns were measured gross of management expenses (i.e. on the assumption that bookkeeping, research and other expenses except brokerage commissions were obtained free). Thus, on average, the funds apparently were not quite successful in recouping even their brokerage expenses. However, the question of diversification was not considered.

The performance of unit trusts in Singapore for the period 1980 to 1984 as reported in Chua and Koh (1985) concluded that the unit trusts under-performed the share market, were poorly diversified, inconsistent in their performances over time and the actual return and risk characteristics were not entirely consistent with the stated objectives in the prospectus. Also, another study (Ariff and Johnson 1990) on the performance of 14 unit trusts in Singapore covering the period 1984-1989 using weekly dividend adjusted returns found that there is room for further diversification of the composition of the funds. The fund managers select low-beta stocks which suggest that they place safety as the first principle and therefore limit the extent of diversification benefits. Finally, the performance of the funds over 6 years suggests that, on average, they did not do better than the market portfolio given the transaction cost and an economic price for the services of pooling and managing the small investors' funds. Worst still, the average returns to investors fall very short of the market returns. Ariff (1996) showed evidence that the average returns of all unit trusts over 19 years was a mere 7 per cent compared to the market average estimated at about 16.5 per cent capital gains and unknown dividends.

The performance of 72 unit trusts in the United Kingdom (Firth 1977) using the capital asset pricing model and Sharpe's reward-variability index for the period 1965-1975 show that, on average, managers of unit trusts were not able to forecast share prices accurately enough to outperform a simple buy-and-hold policy. None of the unit trusts examined provided investors with the opportunity to invest in a portfolio of greater volatility than the market portfolio. The results also imply that unit trust managers have no superior investment selection ability, which perhaps is not surprising in view of the competitive nature of the British stock market coupled with more efficient price formation in the bond and equity markets. However the returns to unit trusts were very close to the market average.

All these results are consistent with the notion that mutual funds are efficient in their trading and information-gathering activities (Grossman 1976; Grossman and Stiglitz 1980) but do not possess superior ability to outperform consistently. In general, the evidence from the developed markets therefore shows that investors in unit trusts do not earn the expected returns and investors are probably better off investing and holding their money in a portfolio that replicates the market portfolio. Bauman and Miller (1995) found that the ranking of investment performance of mutual funds and pension funds is relatively consistent over time for the general policy portfolios and the growth-style portfolios. However, average returns for different style groups tended to cluster together when returns were measured over several stock market cycles. This is further evidence lately of the state of affairs.

4. Data and Methodology

Fifty-four unit trusts were analysed, of which 9 were managed by two foreign trust management companies. Monthly returns, adjusted for dividends and bonuses distributed to unit holders, were computed for the five-year period from January 1988 to December 1992. To serve as a benchmark, the KLSE Composite Index was used. The beta, which measures the market risk of a diversified portfolio of stocks, was estimated by regressing the returns on a stock against the returns on the KLSE Composite Index. The R^2 statistic measures the proportion of total variance of returns of a unit trust that is explained by the Composite Index (the proxy for the market portfolio). It measures the degree of diversification of the unit trust and the value ranges from zero (no diversification) to one (perfect diversification). It is computed by regressing the returns of the unit trust on the returns of the market index. The returns on the unit trust were estimated as follows:

$$R_p = (NAV_t - NAV_{t-1} + D_t + C_t)/ NAV_{t-1} \tag{21.1}$$

where

D_t : the dividends or cash disbursements at time t, usually once a year,

C_t : the capital gain disbursements at time t, usually at the end of the year,

NAV_t : the net asset value at time t, which is our measurement period, and

Nav_{t-1} : the net asset value one period before time t.

The returns on the market index are measured as the rates of returns over the corresponding monthly intervals of time:

$$R_m = (I_t - I_{t-1}) / I_{t-1} \tag{21.2}$$

where

I_t : the market index in time period t, which is month-end, and

I_{t-1} : the market index one period before time t.

The two composite performance measures considered are the Treynor Index and the Jensen ex-post alpha measures. However, their use in portfolio evaluation has been criticised (Roll 1977) because of the necessity of deriving the actual composition of the market portfolio before any reliable performance evaluation can be carried out. A performance measure that is not affected by Roll's critique is the Sharpe Index, but it has also been found to be a biased measure (Miller and Gehr 1978). Subsequently, this problem was mitigated (Jobson and Korkie 1981) by introducing the adjusted Sharpe Index which is used in this study and expressed in the following equation:

$$SSI = SI [N / (N + 0.75)] \tag{21.3}$$

where

SSI : the adjusted Sharpe Index,

N : the number of return intervals in the evaluation period,

SI : the traditional Sharpe Index defined as $(R_p - R_f)/S_p$ with R_p being the average returns on portfolio over the evaluation period and R_f is the average risk-free interest rate over the evaluation period estimated using the 3-month Treasury bill yields. S_p is the standard deviation of the portfolio annual return.

The Spearman Rank Correlation tests were done to find out the consistency of performance of the unit trusts over time. The paremeters for Malaysia in SS5 may be slightly underestimated.

5. Findings

Objective and Performance of Unit Trusts

The unit trusts analysed in this chapter were classified into (a) growth funds (b) income funds and (c) balanced funds: no property trust was included. Potential investors are obviously interested to know whether unit trusts do achieve their stated objectives. Based on this classification, the sample had 23 growth trusts, 24 balanced trusts and 7 income trusts. Each classification is further divided into the total sample, Malaysian unit trusts and foreign trusts. Two proxies for risk of each trust are considered as the standard deviation and the beta. The returns and risk of total and the sub-samples are summarised in Tables 21.2 and 21.3.

Total and the Malaysian Sample: Table 21.2 shows that for both the total and the Malaysian sample the growth funds yielded the highest returns per unit of risk measured in terms of standard deviation (17.2 and 11.5 respectively) compared to the income (10 and 9.7) and the balance trust (9.4 and 8.1). However, the returns per unit of risk were higher for the balanced trusts (107 and 123 respectively) than the income (100 and 103) and growth trusts (58 and 87).

The income trusts have lower returns and lower risk than the balanced trusts. Similar results are observed using beta as the risk measure. These results suggest that the risk and return characteristics of the total sample and the Malaysian trusts are inconsistent with their stated objectives.

Foreign Unit Trusts: Table 21.3 shows that the growth trusts had higher returns and highest risk than the income and balance trusts. The balance trusts had higher returns and risk than the income trust, which is in the expected direction for risk. These findings indicate that only the risk and returns characteristics of foreign growth funds are consistent with their stated objectives. The inability of the unit trusts to achieve their stated risk-return objective certainly warrants a close scrutiny of their activities.

Degree of Diversification of Unit Trusts

One of the benefits of investing in unit trusts is the reduction of portfolio risk through diversification in a large number of securities. Investors, being generally risk-averse,

Table 21.2 Returns and Risk Profile of Unit Trusts: All and Only Malaysian

	Total Sample			Malaysia Sample		
	Growth	Income	Balance	Growth	Income	Balanced
Mean Returns	0.067	0.032	0.068	0.06	0.03	0.06
Std. Dev.	3.90	3.20	7.20	5.20	3.10	7.40
Coeff of Variation	17.2	10.0	9.40	11.50	9.70	8.10
Mean Beta	0.53	0.41	0.63	0.63	0.44	0.57

Table 21.3 Returns and Risk Profile of Foreign Unit Trusts

	Growth	Income	Balanced
Mean Returns	0.16	0.04	0.05
Standard Deviation	6.3	3.3	4.1
Return per unit of Std. Deviation CV	25.4	12.2	12.2
Mean Beta	0.81	0.39	0.51

would prefer less risk and more returns. The degree of diversification of a trust is measured by the R-square statistic that ranges from 0 to 1. The R-square statistic is estimated by regressing the returns on unit trust (the dependent variable) with the returns on the market index (the independent variable). The R-square statistics of the total sample and sub-samples are summarised in Tables 21.4 and 21.5.

Total Sample and Malaysian Unit Trusts: Table 21.4 shows that the mean R-square statistic of the 54 unit trusts ranged from 0.30 for the balanced funds to 0.36 for the growth funds. Thirty-nine (per cent) of the unit trusts were not well diversified with R-squared values below the 0.5 cutoff points. The results suggest that although growth trusts are marginally better diversified than other categories, none of the categories achieved the expected level of diversification.

The Malaysian unit trusts show similar results. Twenty-six of 37 the funds (70.3 per cent) had a low degree of diversification. None of the trusts had an acceptable level of diversification, although the growth trusts were the most diversified, with R-square of 0.45 compared to income with 0.29 and balanced with 0.28. The low R-squared values imply that the degree of diversification of unit trusts was lower than expected. This might be due to the various investment constraints faced by unit trust managements and/or the management strategy to sacrifice diversification. Examples of these constraints are: unit trusts are not allowed to rotate their funds on an international level; the maximum

Table 21.4 Diversification of Unit Trusts: Total and Malaysian Sample

	Total Sample			Malaysian Sample		
	Growth	Income	Balanced	Growth	Income	Balanced
Mean R-squared	0.36	0.32	0.30	0.45	0.36	0.29

Table 21.5 Diversification Measure of Unit Trusts: Foreign Sample

	Growth	Income	Balanced
Mean R-squared	0.28	0.26	0.38

units allowed for investment in each trust is only 200 million, and these are not allowed to invest in non-trustee stocks; the maximum exposure in the stock markets is 85 per cent and 15 per cent must be kept in fixed deposits; no trust can invest more than 5 per cent of capital of any firm at a point in time. The numerous investment constraints imposed on unit trusts are currently being reviewed by a special committee appointed by the Securities Commission of Malaysia.

Foreign Unit Trusts: Table 21.5 shows that balanced funds are the most diversified, with R-squared value of 0.38, compared to growth funds (0.28) and the income funds (0.26). Only four (23.5 per cent) of the 17 foreign funds had reasonable R-squared values greater than 0.5, the highest degree of diversification. These findings imply that, in general, the foreign trusts did not achieve the expected level of diversification. Therefore investors could be better off buying stocks across the board themselves or buying a portfolio that replicates one of the commonly used broad-based stock indices. The diversification level of both Malaysian and foreign unit trusts was low compared with those reported in developed markets (for example, Moles 1981; Ippolito 1989; Glen 1990) where the average degree of diversification is as high as 0.70.

Risk-Adjusted Performance

Unit trusts are managed by professional managers, and investors expect returns on their investment to be higher than those of a naive buy-and-hold strategy with equivalent risk, at least prior to their management fees. The usual benchmark used by investors to evaluate the investment performance of unit trusts is the return on the market portfolio proxied by the market index. The findings of risk-adjusted performance of the total sample and sub-samples are summarised in Tables 21.6 and 21.7. The results for the total sample show that the mean returns for the growth, income and balanced trusts were 2.1, 4.0 and 4.1 per cent respectively which are *woefully low* compared with the market returns in double digits over the period. The average returns for investing in the unit trusts was 3.5 per cent, which was significantly lower than the 6.5 per cent average returns on the risk-free treasury bills!. The return on market portfolio proxied by the KLSE Composite Index was 17.8 per cent for the same period.

The Malaysian unit trusts had similar results, except that the returns on the growth (5.2 per cent) and income (8 per cent) funds were positive, and the returns on balanced fund were negative. The foreign trusts had negative returns for their growth and income funds and positive (11 per cent) returns for the balanced fund. Twenty-six funds had negative returns, another 26 had positive returns, but significantly lower than the returns on the risk-free.

Table 21.6 Risk-Adjusted Performance of Unit Trusts: Total and Malaysian Sample (1988-1992)

	Total Sample			Malaysian Sample		
	Growth	Income	Balanced	Growth	Income	Balanced
Return	0.021	0.04	0.041	0.052	0.08	-0.05

Table 21.7 Risk-Adjusted Returns of Unit Trusts: Foreign Sample (1988-1992)

	Growth	Income	Balanced
Returns	-0.025	-0.100	0.113

Treasury bills yield was 6.5 per cent. Two trusts outperformed [(80 per cent) (growth, local fund) and 30 per cent (balanced, foreign fund)] the risk-free rate and the market return (17 per cent). Classified in terms of their objectives, the growth funds outperformed the balance and income funds for the Malaysian sample. For the total and foreign sample, the balanced funds performed better. These findings suggest that despite the reliance on professional investment managers, unit trusts were not able to generate an expected reasonable risk-adjusted returns, consistent with the performance of unit trusts world-wide (Chua and Koh 1985; Firth and Ippolito 1989; Cumby and Glenn 1990). The under-performance could be partially due to the various restrictions imposed by the authorities on unit trusts with regard to amount and the avenues for investment and management. It could well be due to lack of professionalism. The recent decision by the Securities Commission to amend the investment guidelines on the unit trust funds is timely, pertinent and certainly should improve the investment performance of unit trusts.

The literature on the performance of unit trusts suggests that the management of unit trusts do sacrifice the diversification in pursuance of higher returns with more riskier investments (Lehma and Modest 1987). The findings in this study suggest that 72 per cent of the sampled trusts were poorly diversified (Table 21.5), the risk was relatively low (Table 21.3) and the risk-adjusted returns were low (Table 21.4), inconsistent with the suggested conjecture.

Consistency of Performance

Assuming that investors are risk-averse and utility maximisers, they would prefer not only high returns per unit of risk but also consistency of good performance over time because a consistently well-performing fund reduces transaction and search costs. Given the investment opportunities scenario, a superior management team should not be only able to maintain a consistent performance but also improve the performance over time. There is evidence (Sharpe 1966; Jensen 1969) that only few unit trusts in developed markets perform consistently from one period to another.

The findings of this study are summarised in Table 21.8. For the total sample and the sub-samples, there was no consistency in the performance rankings of unit trusts over the five-year period. The results for the periods, 1989-1990, 1990-1991 and 1991-1992, show negative rank correlation coefficients, though not significant (at .05 level). This indicates no apparent relationship between the return rankings in different periods, and the negative rank correlations (though not significant) suggest that some firms had reversals in performance rankings from positive to negative, that is, their performance deteriorated over time.

These findings suggest that performance of unit trusts in Malaysia is not consistent over time and therefore investors should not rely on past performance as a guide for future performance.

Table 21.8 Consistency of Performance of Unit Trusts for the Period 1988-1992 as Measured by Spearman Rank-order Correlation Coefficient

Period	Total Sample	Malaysian Sample	Foreign Sample
1988-1989	0.1757	0.1752	0.5367
1989-1990	-0.3739	0.1032	-0.4093
1990-1991	-0.4222	-0.4608	-0.1152
1991-1992	-0.1723	-0.2287	-0.2892

6. Conclusions

This chapter provides some evidence on the performance of unit trusts in Malaysia, specifically with respect to a number of aspects: congruence of risk-return characteristics with stated objectives, degree of diversification, performance in comparison to the risk-free and market returns and the consistency of the performance over time. The results show that for the 1988-1992 period, the returns on investments in unit trusts in Malaysia were well below the risk-free, not to mention the market, returns. The degree of diversification of the portfolios was below expectations and the performance is not consistent over time. The actual return and risk characteristics of the funds were inconsistent with their stated objectives.

The findings on foreign managed trusts in Malaysia were similar to their Malaysian counterparts. The lackadaisical performances of these unit trusts in Malaysia cannot be attributed to the lack of profitable investment opportunities in the economy as the economy has grown steadily at about 8 per cent since 1988. A more relevant explanation could be the regulatory constraints imposed by authorities on the amount and type of investments allowed and a lack of professionalism in the industry. For example, unit trusts are not allowed to increase their investments above the 30 per cent limit when prices of non trustee securities appreciate highly (because the Deed of Trust prohibits the trust fund from investing more than 30 per cent of the value of the fund in non-trustee securities). Thus, the unit trusts will not be able to benefit from a bullish market.

The existing regulation also prohibits a financial institution from giving out loans to prospective investors to buy a unit trust managed by a company under the same group. Furthermore, the strict advertising code for the unit trust industry also contributes to its slow growth as public awareness is still low. These restrictions are currently being reviewed and hopefully there will be amendments which could activate the performance of unit trusts in the future. Besides statutory requirements, the management factor is also an important determinant of successful performance. Since all unit trusts are subjected to the same regulations, the superior performance of two of the 54 funds analysed is probably due to their superior management. A proactive role by management in their investment strategies could certainly boost the financial performance of unit trusts. (Rules relating to unit trusts have been liberalised in 1995 and thereafter to address the problems pointed in this chapter. However, no consensus seems to have occurred on the desirability, indeed, necessity of *independent* arms-length evaluation each year.)

APPENDIX 21.1A

LIST AND TYPES OF UNIT TRUSTS IN MALAYSIA AS AT END-1992

NAME OF COMPANY		DATE	TYPE OF FUND
LOCALLY-MANAGED COMPANIES			
1. AMANAH SAHAM NASIONAL BERHAD		20/04/81	Balanced
2. AMANAH SAHAM MARA BERHAD	First	09/04/68	Balanced
	Second	19/02/69	Balanced
	Third	01/11/69	Balanced
	Fourth	02/02/70	Balanced
	Fifth	03/09/71	Balanced
	Sixth	05/05/72	Balanced
	Seventh	28/12/72	Income
	Seventh	28/12/72	Balanced
	Warriors	14/08/72	Balanced
	Eighth	17/07/75	Balanced
	Ninth	22/10/77	Balanced
	Tenth	24/10/78	Balanced
	Eleventh	29/10/79	Balanced
	ASMFPT	20/04/92	Balanced
3. ASIA UNIT TRUST BERHAD			
Malaysian Investment		02/12/66	Income
Malaysian Progress		01/06/70	Growth
Malaysian Security		14/05/71	Growth
Malaysian Berjaya		05/05/76	Growth
Malaysian Equity		20/01/82	Growth
Malaysian Commerce		2/01/84	Growth
4. ARAB-MALAYSIAN UNIT TRUST BERHAD			
Arab-Malaysian	First	10/01/ 89	Income
Arab-Malaysian	Gilts	28/11/86	Income
5. BBMB UNIT TRUST MANAGEMENT BERHAD			
Unit Trust Fund		29/09/89	Growth
Prime Fund		14/05/91	Growth
6. BHLB PACIFIC TRUST MANAGEMENT BERHAD			
Double Growth Fund		05/91	Growth
7. DCM-RHB UNIT TRUST MANAGEMENT BERHAD			
DCM-RHB Dynamic Fund		28/09/92	Balanced
8. KUALA LUMPUR MUTUAL FUND BERHAD			
K L Saving Fund	One	29/03/81	Balanced
K L Growth Fund	Two	12/84	Growth
K L Index Fund		02/03/92	Growth

cont'd

Appendix 21.1A (cont'd)

9. MIC UNIT TRUST BERHAD			
MIC Investment Fund	One	12/07/77	Balanced
MIC Investment Fund	Two	15/05/81	Growth
MIC Investment Fund	Three	04/82	Balanced
10. MBF UNIT TRUST MANAGEMENT BERHAD			
First Fund		02/05/91	Balanced
11. MAYBAN MANAGEMENT BERHAD			
Mayban Unit Trust Fund		06/03/92	Balanced
12. PELABURAN JOHOR BERHAD			
Tabung Pelaburan		1980	Balanced
Amanah Saham Johor*		15/05/92	Balanced
FOREIGN FUND MANAGEMENT COMPANIES			
13. SINGAPORE UNIT TRUST LTD			
Singapore Commerce and Industry		30/11/63	Growth
Singapore Savings		26/06/65	Balanced
Singapore Progress		28/02/70	Balanced
Singapore Security		12/05/71	Income
Singapore Investment		21/04/75	Income
Singapore Equity		10/01/79	Growth
14. SCHRODERS MANAGEMENT LTD			
Schroder South East Asia Fund NA			Growth
15. DBS ASSET MANAGEMENT LTD			
Shenton Twin City Fund		11 / 06 / 84	Growth
Japan Growth Fund		03 / 12 / 85	Growth
Shenton Thrift Fund		12 / 06 / 87	Growth
ShentonIncome Fund		30 / 12 / 88	Income
Shenton Asia Pacific Fund		13 / 03 / 90	Growth
Malaysia Growth Fund		07 / 02 / 90	Growth
Mendaki Growth Fund		26 / 04 / 91	Growth
US Growth Fund		08 / 07 / 91	Growth
16. CREDIT LYONNAIS MANAGEMENT LTD			
Singapore Growth	NA		Growth
Asia Pacific Growth	NA		Growth

* This is a relaunched fund from Tabung Pelaburan 1 (1977).

CHAPTER

22

Accuracy of Profit Forecasts of New Issues*

Abstract

Local stock exchange regulations require that companies must disclose earnings forecasts at the time of seeking approval for listing on the Malaysian exchange. This chapter reports the degree of *forecast accuracy compared with the actual earnings* during the one year following listing. The results show reasonable accuracy of forecasts whereas studies done in developed markets show significant deviations in actual earnings. Greater forecast accuracy in this market is perhaps due to greater scrutiny by relevant regulators and professionals such as the merchant bankers, the valuers and the accountants.

1. Introduction

Every firm applying for listing on the local exchange is required under the Companies Act 1965 to issue a prospectus to potential shareholders. As the information contained in the Initial Public Offers (IPO) prospectus is usually the first publicly available information about the firm, more information is usually provided than is usually contained in an annual report. Investors subscribing for new shares read and understand the information content of the prospectus, and the financial press often plays the role of analyst by pointing to the news contents of these reports. The profit forecast contained in the prospectus is potentially more important to investors investing in the newly listed firms (Bashkar and Morris 1984) than a profit forecast made by a listed firm as it should form a fundamental part in an investor's valuation of the worth of the IPO (Blair and Taylor 1989).

From the information in the prospectus an analysis can usually be done to determine the potential profitability and growth of the entity. The profit and/or turnover contribution of all the business segments will provide an indication of the earnings dependency of the entity and the extent of IPO underpricing. Whether such a forecast is realised depends upon the relative accuracy of the forecast. While investors can evaluate the past forecasting accuracy of existing listed firms there is no comparable historical information for evaluating most IPOs, which are often closely held firms with little public exposure.

This chapter investigates the predictive accuracy of profit forecasts made by Malaysian IPOs listed during a recent fourteen-year period. The predictive accuracy was analysed

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based on the actual profits in the post-listing period compared with the forecasts in the prospectuses. To the best of our knowledge, this has not been done for any other Asian IPOs. The results are compared briefly with findings of similar studies in other countries. Indirectly it may be suggested that this study assesses the degree of professionalism of accounting firms responsible for certifying such forecasts as is required under the laws. Section 2 describes the process involved in listing information preparation. It also gives a brief review of similar studies done in other markets before explaining the data and methodology in Section 3. The results are presented in the Sections 4 to 6. The chapter ends with a discussion on the implications of these findings for emerging markets. The results suggest that the forecasts are not accurate.

2. Malaysian Initial Public Offers Defined

Malaysian laws recognise sale of expanded authorised shares of a firm as new issues. The offer of shares out of existing shareholdings is defined as sale of shares, and is therefore one form, though a less important form, of IPOs. Private placements of shares are permitted in limited cases, and account for about 5-10 per cent of the funds raised in stock exchange. In the case of new issues and sale of shares, which form the IPOs in Malaysia, applications must be open to the public and in the event of over-subscription, allocation is required to be done by lottery (except for the portion allocated to inside managers and reserved for special allocations). The special allocation includes one-third of the issued shares of each IPO that must be compulsorily acquired by designated investment funds owned by members of certain segments of the population, who are considered to have less equitable capital ownership in Malaysia's stock of private capital. This latter practice is a unique market micro-structure (directive from the Finance Ministry) built into the new issue process since August 1976 to achieve the objective of equitable distribution of controlling capital wealth in the private sector of the economy. Regulators approve new sales of shares of any kind with elaborate care, and the approval process may take up to a year in a large placement; the average time for approval is estimated at about 4-6 months against the much shorter time of 4-8 weeks or lower in developed markets.

Legislation covering the raising of finance and the content and form of prospectuses is provided by the Companies Act, 1965, and the Kuala Lumpur Stock Exchange Listing Regulations. Section 39 of the Act and Part 6 of the Regulations stipulate the contents to be included in a prospectus. Both require a prospectus to contain statements (in qualitative and/or quantitative terms) as to trading prospects and a quantitative forecast of statement changes in financial position for the year after the registration of the prospectus. In essence, Part 6 Section 218 of the Regulations requires a company to provide a profit forecast, the principal basis and assumptions (including commercial assumption upon which the directors have based the profit forecast) for the year subsequent to the registration date of the prospectus. In addition, Part II of the Fifth Schedule of the Act specifies that the auditor gives an opinion on the compilation of the specific forecast and on the accounting policies used.[1] Most IPOs go beyond the legal requirements and forecast profits and dividends to the end of the fiscal year (the date to which a company draws up annual financial statements). These forecasts can be compared against actual profits that form the main theme of this chapter. The amount of detail given in forecasts varies considerably. For example, some companies disclose a net income figure only while others disclose detailed revenue and expense items used for constructing the net income forecast. All companies sampled had some form of explicit profit forecast.

A number of studies investigating the accuracy of profit forecasts made by company management and by investment analysts have been carried out in developed markets. Some of these researchers have focused on comparing the accuracy of analysts' forecasts, managers' forecasts (Hagerman and Rulland 1979) and the predictions from various statistical models (Ibbotson 1975; Penman 1980), and examined the impact of forecast errors on stock prices. These studies discussed the forecasts of annual earnings of ongoing American corporations. Not much is reported of forecasts made during takeover bids (Dave 1972; Westwick 1972), and upon the issue of securities of newly listing companies (Dave 1972; Ferris and Hayes 1977). Capstaff, Paugyal and William (1995) provided evidence to indicate that analysts generally provide more accurate forecasts than the naive model but errors are much larger in magnitude when earnings decrease. Jacquillat and Grandin (1994) showed that consensus forecasts provide more consistent results than any single forecasting group. Hence, the forecasts by individual accounting firms and merchant banks may well be far from accurate.

3. Data and Methodology

Prospectuses of new issues were gathered from firms which sought listing on the local exchange over the period 1975-1988 by soliciting almost 170 firms which were known to have issued shares. Sixty-five usable forecasts were obtained. To qualify for inclusion in the sample, a specific forecast and the actual profits in the first year after listing had to be available to the researchers from publicly available information. The firms included covered a wide range of sectors in industrial, finance, properties, plantation and mining groups. Hence, there was no clustering of firms.

Forecasting accuracy varies across firms, and this study tests the hypotheses to explain the cross-sectional variations. The stock price performance of IPOs on the first day of listing is calculated to ascertain whether the stock market anticipates inaccurate profit forecasts. The accuracy of profit forecasts can be measured in a number of ways following Brandon and Jarrett (1976). Three measures[2] are chosen for this study: the forecast error, the absolute forecast error, and the squared forecast error. Their computations are described in Table 22.1. The mean forecast error is a measure of the bias in forecasting; that is, whether company management systematically over- or under-predicts earnings. The mean absolute forecasts error gives some insight into how near to actual profits are the predictions. Finally, the mean squared forecast error gives greater weight to large errors, and this may provide a refined measure of loss function to investors due to erroneous forecasts (Bashkar and Morris 1984).

4. Preliminary Findings

Table 22.1 is a summary of the results from the forecast error analyses of the 65 firms. The mean forecast error is a positive figure, and the actual profits are +9.34 per cent more than the forecast figures. This is much better than that reported for the British and New Zealand new issues, with their respective figures of 50 and 500 per cent. The mean forecast error was noted to have been influenced by the presence of a few very large forecast errors which are the result of both over- and under-forecasts. After omitting the four large errors, which are greater than +140 and -230 per cent, the mean forecast error is reduced to +5.25 per cent. In total, 44 companies exceeded their profit forecasts while 21 reported profits below those predicted in the prospectus. A majority of new issues, therefore, under-forecast their earnings. Table 22.1 also shows the distribution of the forecast errors. The absolute forecast error is slightly larger. Although direct

Table 22.1 Measures of Forecast Errors Used in this Study

Forecast Error = {(Actual Profits - Forecast Profits)/Forecast Profits} × 100
Absolute Forecast Error = {(Actual Profit - Forecast Profit)/Forecast Profits} × 100
Squared Forecast Error = {(Actual Profit - Forecast Profit)-/Forecast Profits} × 100

	Mean	Highest standard Deviation	Highest positive Error	Negative Error	n
FE	9.34%	52.65%	219.97%	-232.05%	65
AFE	27.91%	45.61%			65
AFE after a					
outliers	17.43%	21.02%			61
SFE	28.59%	94.62%			65
SFE after					
outliers	6.36%	23.61%			61

Descriptive Statistics of Forecast Errors

Distribution of Errors	% Forecast Error
201 to 200	3
71 to 100	0
61 to 70	2
51 to 60	2
41 to 50	2
31 to 40	3
21 to 30	4
11 to 20	6
0 to 10	22
-10 to -1	9
-20 to -11	5
-30 to -21	1
-40 to -31	1
-50 to -41	3
-60 to -51	1
< -61	1
Total	65

44 companies exceeded their forecast profits.
21 companies reported profits below those that are forecasts

comparison with new issues in the developed markets (Dave and Webb 1972; Firth and Smith 1992) is not possible, the level of forecasting accuracy in the cases of new issues in the local exchange appears to be comparatively better.

An alternative to omitting extreme observation and one that avoids the small denominator problem is to scale the difference between actual and forecast profits by the assets of the company after the new issue has been completed. As can be seen from Table 22.2 this refinement substantially reduces the error metrics to an insignificant level. In general, the forecast errors are standardised by the size of the company.

Table 22.2 Forecast Errors Computed from Scaling by Gross Assets of Companies

	Mean	Std Deviation
FE(%)	0.000000013%	0.00000172%
AFE(%)	0.000000068%	0.00000159%
SFE(%)	0.000000048%	0.00000151%

Distribution of Error	
% Forecast Error	No of Companies
0 to 1	44
< -1	21

To get some insight into the possible reasons for the negative forecast errors, the literature suggests some factors that form the basis of such errors. These factors are:

Forecast interval: Studies have shown that the shorter the forecasting period (in our case the time between the prospectus date and the year end to which the forecast pertains) the more accurate the profit prediction becomes (Colins and Hopewood 1980; Cooper and Taylor 1983; Brown, Foster and Noreen 1985). This also applies to the new issue forecasts (Dave and Webb 1972). Thus, forecast accuracy is greater the shorter the forecast interval. A variable representing the number of months making up the forecast interval is calculated, and a positive relation is hypothesised with the error metric.

Size of firm: There is some support for the contention that profits of larger companies are easier to forecast than smaller companies, and thus the size must be negatively related to forecast error. This is based on the premise that larger companies have a greater control over their market settings and enjoy comparative economies of scale, which make them less susceptible to economic fluctuations.

Prior existence of company profits: Profits of companies that have been in existence for a few years would appear to be difficult to forecast (Brandon and Jarret 1976; Cameron 1986). The prediction of earnings of newly listed firms is particularly difficult. This leads to a possibility that forecasting accuracy improves the longer the company has been in existence. This may be tested via two variables, the age of the company in years and a dummy variable taking the value one if the company had a trading record prior to the prospectus, otherwise zero. A negative relationship with forecast error is expected for both variables. Excepting the findings reported by Firth and Smith (1992), this does not appear to have been explicitly examined in prior studies of forecasting accuracy.

Size of auditors: The fourth variable is the credibility of the sponsors, promoters, underwriters and auditors of the new issue. The importance of the reputational signalling of these agencies and principals has been studied (Booth and Smith 1986, Simonic and Stein 1987; Wakeman 1981). The auditing profession in Malaysia does have an informal market segmentation for the 730 audit firms based on large and small firm status. In Malaysia, the criteria of large and small audit firms follow the international basis of annual income derived from audit activities. The large firms in Malaysia are the biggies in the international classification. The dichotomy of accounting firms into large and small is established and various arguments have been forwarded to the effect that the large firms produce better quality audits. Part II in the Fifth Schedule of the Companies Act 1965 requires an audited profit forecast to be reported in prospectuses. Therefore, auditors are involved in the auditing of profits forecasts appearing in the prospectuses of newly listing companies. Given that a large auditing firm has been retained to add credibility to the new issue, it is hypothesised that large audit firms are more accurate in their profit forecasts due to their ability to employ experienced staff and sophisticated forecasting tools.

Industry factor: Industrial classification may have an association with the level of forecast accuracy. That is, profitability in some industries may be inherently more difficult to predict than others. Empirical evidence on whether differences exist in forecasting errors across industries has been mixed (Ferris 1976; Richards 1976). For forecasts contained in new issue prospectuses in the United Kingdom (Brandon and Jarrett 1976) some industry differences are reported.

Table 22.3 Description of Variables Used: Absolute Forecast Errors

Variables	Descriptions
SIZE	Cross assets after the new issue (million)
PERIOD	Length of forecast period measured as the number of months between prospectus' date and the year is which the forecast is made
AGE	The number of years the company has been is existence
EXIST	A during variable taking a value of 1 if the Company existed prior to prospecters date, otherwise zero
AUDITOR	A dummy variable taking a value of 1 if the auditor is a member of the large firms, otherwise zero
LEVER	The ratio of debt to gross assets after issue
AFE	Absolute Forecast Error (see Table 22.1 for its construction)

An alternative to omitting extreme observation and one that avoids the small denominator problem is to scale the difference between actual and forecast profits by the assets of the company after the new issue has been completed. As can be seen from Table 22.2 this refinement substantially reduces the error metrics to an insignificant level. In general, the forecast errors are standardised by the size of the company. As the category is small, the statistical testing for differences is not feasible in this study.

Level of leverage: The net profits of companies with comparatively high levels of debt are traditionally regarded as being more difficult to forecast. To accommodate this factor as a determinant of forecast accuracy, a measure of debt divided by gross assets can be used. Then it is hypothesised that leverage may be used to relate to forecast errors.

This suggests that the forecast accuracy may be related by regressing this variable against size (SIZE), age (AGE), prior existence (EXIST), audit quality(AUDITOR) and leverage (LEVER) as the independent variables. Table 22.3 lists the variables with descriptive statistics in Table 22.4.

Table 22.4 Summary Statistics of Firms Listed on the Malaysian Stock Exchange

Variable	Mean	Standard Deviation
SIZE ($ million)	155.66	452.63
PERIOD (months)	9.07	14.45
AGE	10.93	8.07
LEVER	0.17	0.28

The size of sampled firms is small compared to listed firms in general. The total gross assets of the newly listed firms is RM5.04 billion or 5 per cent compared to RM99.1 billion for all listed companies as at end 1988.

5. Findings on Determinant of Forecasting Accuracy

The results of the regression on 61 firms (four outlier companies were with forecasts errors exceeding +140 per cent or below -230 per cent) are shown in Table 22.5.

Table 22.5 Relationship between Size of Forecast Errors and Various Explanatory Variables

Variable	Coeff	Standard Error	t-stat	p-level
Intercept	23.160	11.593	1.998	0.051
PERIOD	0.410	0.225	1.818	0.075
SIZE	-0.001	0.005	-0.144	0.886
AGE	-0.226	0.317	-0.715	0.477
EXIST	-7.369	11.051	-0.667	0.508
AUDITOR	7.988	5.130	1.557	0.125
LEVER	-20.496	9.386	-2.184	0.033

F Statistics=1.860, Significance level = 0.05 and R^2= 17%

The R^2 statistic indicates a moderate fit with only one variable, LEVER, being statistically significant at 0.05 per cent level. However, contrary to expectations, the coefficient for the LEVER variable had a negative sign. This could be due to firms with higher level of leverage being required to comply with the need to provide profit forecast more regularly than their lower geared counterparts. Close scrutiny by creditors improves the ability to forecast profits. This provides an explanation for the negative relationship between LEVER and magnitude of forecast errors.

The SIZE variable had the expected negative sign, indicating larger firms have a greater control over their market settings and they enjoy some comparative economies of scale which make them less susceptible to economic fluctuations, but it is not statistically significant at the 0.05 level. One possible reason for the lack of a significant relationship is that larger firms are capable of utilising the new issue proceeds to generate a minimum return at least equal to the rate of earnings from activities owned prior to the new issue. This minimises the profit forecast errors. This explanation supports the hypothesis about size, and provides a rationale for larger size firms having lower forecasting errors.

The profit forecasting accuracy results shown in Table 22.1 reveal considerable variability and dispersion. The interest is whether investors are able to predict, at the time of the issue, those forecasts as either overly optimistic or pessimistic. If it is assumed that the IPO is, on average, correctly priced, given the profits forecast,[3] then the initial listing price would be expected to be close to the issue price. In practice, however, underpricing of the IPO appears to be averaging about 135 per cent in Malaysia and this is rationalised on the basis of risk consideration (Rock 1986) and market structure explanation (Shamsher, Ariff and Anuuar 1993). A high level of underpricing is also reported in developed markets, for example, in New Zealand and Australia (Finn Higham 1986) and in the United States (Beatty and Ritter 1986; Ibbotson 1975; Logue 1973; Macdonald and Fisher 1972; Ritter 1984). Given the prevalence of underpricing, this study assumed that the level of underpricing (or equivalently the level of the premium)[4] is the same for all companies. Thus, the sponsors and underwriters of the firms seeking the new listing price the issue based on forecast profits besides a constant per centage to reflect the average underpricing discount.

Evidence indicates that the level of the premium does vary among firms. It is hypothesised that differences in premiums arise, in part, because of investors expecting actual profits to depart significantly from those being forecast. If investors believe that the forecast profits are unduly pessimistic, then they are likely to attach larger premiums to the issue price when the shares are first listed on the stock exchange (this assumes the issue price estimates based on the forecast profits). Conversely, if investors believe forecast profits are unduly optimistic,[5] then the initial listing price could be below the issue price. Based on this reasoning, the following hypothesis is formulated.

H_0 : The level of the premium is not related to forecast accuracy.

H_a : The level of premium is positively related to forecast accuracy.

In particular, a positive relationship is postulated between the forecast error metric (forecast error) and the level of the premium. A high positive forecast error (actual profits greater than predicted) is associated with a high positive share price premium (listing price substantially above issue price). Studies in one market (Logue 1973) report a negative relationship between premium and the size of the issue, and between premium and percentage of common stock held by outsiders. The prestige of the underwriter had an impact on the level of premium (Newberger and Hammond 1974; Newberger and LaChapelle 1983) and higher premiums for smaller size companies prior to the issue (Ritter 1984). In summary, the evidence on the determinants of the premium is inconclusive.

In testing the hypothesis, it was necessary to control for the potential influence of company size after the issue, the finance raised by the issue, the age of the company, and the percentage ownership of stock by company management.[6] Therefore, the following regression is done.

$$\text{LISTPREM} = b_0 + b_1\ \text{SIZE} + b_2\ \text{AGE} + b_3\ \text{INSIDE} + b_4\ \text{FE} + e \qquad (22.1)$$

SIZE and AGE are described in Table 22.3. The variable FE is the forecast error (see Table 22.1). INSIDE is the percentage of common stock owned by managers after the new issue. LISTPREM is the percentage change between the offer price and the initial listing price:

$$\{(\text{Initial listing price} - \text{Offer price})/\text{Offer price}\} \times 100 \qquad (22.2)$$

The SIZE variable is highly correlated with the RAISED variable (RAISED is the amount of new money raised by the issue) and so the following regression is also done:

$$\text{LISTPREM} = bo + b_1\ \text{RAISED} + b_2\ \text{AGE} + b_3\ \text{INSIDE} + b_4\ \text{FE} + e' \qquad (22.3)$$

The results of the regressions are shown in Table 22.6. Panel B of Table 22.6 uses RAISED as an independent variable in place of SIZE. The findings suggest that the independent variables have very low explanatory power for the large premiums. The

Table 22.6 Regression of Premium on Listing and Forecast Errors

Panel A: Using Size Variable

Variable	Coefficient	Standard Error	t-stat	p level
Intercept	149.57	80.605	1.856	0.069
SIZE	-0.001	0.038	-0.020	0.984
AGE	-0.515	2.288	-0.225	0.823
INSIDE	-28.114	104.615	-0.269	0.789
FE	0.754	1.046	0.725	0.471

F statistic = 0.291 significance level = 0.05 R^2 = 0.02

Panel B: Using Raised Variable

Variable	Coefficient	Standard Error	t-stat	p level
Intercept	158.811	81.687	1.944	0.057
SIZE	-0.325	0.538	-0.604	0.549
AGE	-0.354	2.276	-0.156	0.877
INSIDE	-33.531	104.242	-0.322	0.749
FE	0.727	1.044	0.697	0.489

F statistic = 0.384, significance level = 0.05 R^2 = 0.027

notion that the forecast error is positively related to the premium is not supported by the evidence. The coefficient is in the predicted direction, but not statistically significant at 0.05 per cent level.

6. Conclusions

The KLSE Listing Regulations and the Companies Act 1965 require companies listing on the Exchange to present a forecast profit figure in their prospectuses to the investors. This study observed that for some companies, profit forecasts were difficult and when projected were subject to comparatively larger errors. The results showed that firms seeking new listing had a low level of forecasting errors in contrast to those observed in the developed countries. The mean errors were 9.34 per cent but were reduced to 5.25 per cent after deleting outliers.

There is no requirement for Australian, Canadian and United States new-listing companies to disclose a profit forecast in their prospectuses (Elmslee 1988; Henderson and Pearson 1988). Presumably firms in those jurisdictions, who believe profit projections will be very tenuous, do not make forecasts. The International Stock Exchange (London) requires companies to include a statement of financial and trading prospects in their prospectuses and profit forecasts and statements of changes in financial position are not mandated. The small forecast errors in IPO prospectuses observed in this study compared to findings in the United Kingdom (Dave and Webb 1972; Ferris and Hays 1977) and New Zealand (Firth and Smith 1992) might be due to close vigilance of the relevant agencies. The formation of the Securities Commission effective from March 1993 has further enhanced the discipline among participants through strict enforcement of the requirement that companies should not depart materially (not more than 10 per cent) from their profit and dividend payment forecasts.

During the period of the study, corporate profits in Malaysia were increasing and there appeared to be no undue variability in profitability consistent with the New Zealand study (Firth and Smith 1992). The period 1975-1988 was not, therefore, an especially uncertain time for company profitability except for two short periods straddling the Pan Electric fiasco in 1985 and the October 1987 Black Monday incident. Of note, however, was the large number of IPOs during the period immediately after Malaysia set up its own stock exchange (previously Malaysia and Singapore shared a common stock exchange, ie the Stock Exchange of Singapore). The ratio of IPOs to already listed firms in Malaysia was far higher than in Australia, Canada, UK and the USA. This large ratio might be indicative of companies coming to the newly established stock market although their operating plans had not been carefully thought through; in such a situation it would not be surprising that some forecast errors occur. The above scenario requires company sponsors to acquiesce in the new issues; perhaps the buoyant stock market and large issue fees made company sponsors (stockbrokers, investment bankers) less circumspect in screening IPOs.

Based on the literature from other countries, attempts were made to model the degree of forecasting errors in an effort to explain the errors. In particular, the period of the forecast provided some help in explaining the errors. Although the variable had the hypothesised positive sign, it was not statistically significant. It is conjectured that the longer the forecast horizon the more time management has to employ the capital raised in the new issue, which probably explains the lack of significance in the relationship between PERIOD and forecast accuracy. The only significant variable in explaining absolute forecast errors was LEVER, which had a negative sign contrary to expectations. This could be due to the close and regular scrutiny of the firm by creditors, therefore the higher the leverage, the lower the forecast errors. The rationale for hypothesis may be suspect as the Malaysian IPOs with high level of leverage are still not very highly geared. Especially, evidence has shown that in most Malaysian IPOs, the original owners retain a sizeable amount (on average about 70 per cent) of equity and thus most of the newly listing provides inaccurate forecasts (though not materially inaccurate). The firm forecasts are not being closely scrutinised by many external parties. The AUDITOR variable, based on the large and small firm's dichotomy, did not explain the forecast accuracy. Likewise SIZE, AGE and EXIST (existence of a trading history prior to the new issue) were not statistically significant.

It was observed that the notion of forecasting accuracy being related to underpricing is not supported by evidence. Negative forecast error did not have significant effect on market prices of the firms concerned, which implies that investors in general are optimistic about the performance of new issues.

End notes

1. The Malaysian Institute of Certified Public Accountants has recently issued an Auditing Technical Release, ATR 3, stating that auditors should ensure that assumptions on which prospective financial information is based are not unreasonable (MIA, 1990).

2. These measures were used by Firth and Smith (1992) for the New Zealand IPOs.

3. Profit forecasts would, a priori, appear to be important in fixing the issue price. Some authorities contend that the profit forecast is all important (Hartford 1969).

4. Minimum is the difference between the initial listing price and the issue price. This is usually a positive amount (i.e. listing) price exceeds the issue price) reflecting underpricing. The percentage premium is the premum divided by the issue price, expressed as a percentage.

5. In this scenario, investors are unlikely to take up all of the issue and the underwriters will be left owning a larger chunk of the shares. In this study, there were no cases of under-subscription of IPOs.

6. Consistant with Firth and Smith's observation that no useful measurement could be attributed to the underwriter reputation, this variable was not used in the regression.

7. Pearson correlation is 0.65 and significant.

PART 5

Market for Corporate Control in Emerging Economies

A competitive market for corporate control exists in any reasonably developed free-market economy. This is evident from the existence of active managerial labour markets where prices are determined for managerial skills. This provides a market-based resolution to the agency costs problem arising from the separation of ownership from management of firms. Firms that are inefficiently managed are also taken over by superior firms (managed by superior managers) when merger and takeover activities are initiated, usually by successful managers who identify untaped values in badly managed firms. In the major economies, the values of takeover and mergers amount to about 3 per cent of the GDP in some years. Merger and takeover activities are not pronounced in developing countries for yet unknown reasons. A study of managerial behaviour dealing with corporate control in emerging capital markets in the Asia Pacific region may refute some culture-based explanations put forth for corporate control behaviour, especially in the business schools. Hence, in this Part, we provide some insights on this topic from five studies using the financial economics approach.

Chapter 23 measures the wealth effect from appointment of directors to the boards. Market participants appear to ignore appointments of new directors as having no value while resignations of top executives lead to a weak upward revision of prices. The literature on the conflict of interest between management and owners of firms is reviewed, and some insights from conclusions of studies in more mature economies are presented in Chapter 24. The agency problem is investigated in Chapter 25 as to whether structures could be built to reduce this risk.

Some companies disclose information beyond that required by accounting standards in the belief that such disclosure reflects socially responsible behaviour. This is examined for the Malaysian firms in Chapter 26. Preliminary findings in Chapter 27 suggest that acquired firms gain some value as predicted by the Synergy Effect Theory of mergers and takeovers. This is discussed in Chapter 27. In all, there appears to be some efficiency in the managerial control market in that target take-over firms gain marginal increases in values, but this is too small relative to gains in more developed free-market economies. In short, managerial control behaviour in the emerging capital market is present, but is weak at best.

CHAPTER

23

Wealth Effect of Changes in Board of Directors of Companies*

Abstract

Reconstitution of the board of directors of companies is a significant economic event that affects stock prices in more developed stock markets, including the Tokyo Stock Exchange. Nothing is known of the *wealth effect from board reconstitution* in other Asian markets. This study of new appointments to, and resignations from, board of directors suggests that the wealth effect from these two events is not pronounced. But resignations lead to some weak wealth effect. As these results are anomalous to existing evidence, more studies using refined categorisation of events are recommended.

1. Introduction

Changes in the board of directors are significant economic events in public companies. Favourable changes in a company's board should affect share prices positively and thereby increase the value of a company. Unfavourable changes are likely to have the opposite effect. This topic has not received much attention in the local market though the financial press in Malaysia attributes changes in stock prices at the time of changes in board of directors as if this hypothesis has been validated in the local market. Studies in several developed markets have produced evidence supporting the hypothesis. Evidence in support of a wealth effect from changes in the board of directors in the local market suggests that price formation following such events is rational and such evidence can strengthen our knowledge of the efficiency of the stock market.

This chapter is aimed at investigating if there is any wealth effect arising from managerial changes in listed companies on the KLSE. In the next section, we discuss the idea of wealth effect along with a summary of evidence on this topic from a number of stock markets. Section 3 describes the data set used and the methodology, which is based on event study procedure. The findings are discussed in section 4 and conclusions are given in the final section. Wealth effect is evidenced, and thus the local market's price formation around changes in board composition is efficient. This adds further evidence on semi-strong form market efficiency.

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2. Wealth Effect from Board Recomposition

The wealth effect is measured by change in the value of common stock prices around the time of announcements of managerial changes in the board of directors of companies. In this study, appointments and resignations of board members were studied. Assuming that the agency problem exists and the market is efficient in the semi-strong form sense, the information content of managerial changes should be reflected rapidly as changes in share prices of companies announcing changes in board composition. The direction of price change depends on the consensus of investors on the material content of the announcement and the expected implication for performance of the firm, and therefore, the value of the firm. Therefore, appointments and resignations of corporate directors are expected to affect the wealth of shareholders as share prices respond to these announcements.

The stock price reaction at the announcement of appointments and resignations can be either positive or negative, depending upon how the market views the appointments (Furtado and Rozeff 1987). If new appointments are expected to improve financial performance through a favourable shift in the firm's investment policies, then shareholders' wealth will increase when the market learns about this news. Conversely, shareholder wealth will decrease if appointments convey unfavourable news about a company's likely performance. Similarly, if resignations are meant to improve firm value by replacing poor performers, then firm value should increase when the decision to remove is made public (Hirshleifer and Anjan 1994). However, if board resignations involve prominent figures who have contributed positively towards the company's development and performance, then firm value is expected to decline. However, the predictions about the direction of stock price change in response to the changes in the board of directors are not precise. This is because abnormal stock returns at announcement is composed of the information component, that are positive if the change signals better management performance than anticipated, and the real component is negative if the change is not in the shareholders' interests. A positive net effect is expected only if the information component is larger than the real component. Unfortunately, each component is unobservable separately and it is only possible to determine whether, on average, the sum of the components is equal to zero.

There is evidence in the United States that boards of directors act in the interests of shareholders (Jensen and Ruback 1994). If that is true, the appointment and resignation of a the board of directors can provide additional evidence concerning whether the board's action increases or decreases shareholders wealth. If the board's decisions are consistent with shareholder wealth maximisation objective, then shareholder wealth should only increase or at worst remain unchanged, when investors learn of such changes. The wealth effect of company initiated top management changes has been investigated (Furtado and Rozeff 1987) by examining changes in share values at the time of top-level management changes at the board of directors level. The findings from that study using a sample of 323 board level appointments, showed that the capital market pays attention and responds to news concerning management appointments. Management changes signal a favourable shift in company policies and raise shareholders wealth around the time of such changes. In another study (Jensen and Ruback 1983) the stock price reaction to CEO resignations suggested that excess returns are positive and significantly different from zero at the time of announcements. The excess returns are greater for cases where the CEO is far from retirement age, which therefore constitutes favourable news of resignations of poor performers. Retirements at age 65 tend to be anticipated in the United States, and hence it is not an unexpected event. Weisback (1988) and Mahajan and Scott (1993) reported similar findings.

The relationship between outside directors, the board's independence and shareholders' wealth has also been investigated (Stuart and Jeffrey 1990) using 622 announcements of appointments of outside directors. Screening was done to pick those announcements not confounded by other events. The abnormal returns observed around the five days surrounding the announcements show that even though most boards are numerically dominated by outsiders before the appointment, the addition of an outside director reveals significantly positive share price reaction, which increases firm value. The results are consistent with the notion that outside directors are independent and are better able to protect the interests of shareholders. Kaplan and Barnadette (1994) provide evidence that appointments of bank and corporate directors to the board of non-financial Japanese firms resulted in poor stock performance. It was also found that banks and corporate shareholders play an important monitoring and disciplinary role in Japan. This is anomalous to other findings.

3. Data and Methodology

Data

The observations on board changes were from a sample of 200 companies listed on the main board of the KLSE. All sectors were represented in the sample but only companies that had continual trading history over a eleven-year test period (1981-1992) were included. All pertinent information was taken from exchange-published records in the *Investors Digest*, company files, *KLSE Gazette*, *Daily Diary* and various issues of the daily newspaper, the *New Straits Times*. The final selected observations of board changes satisfy a number of criteria:

1 Each firm was listed on KLSE during the period of study (i.e. January 1981-June 1992).

2 Only two announcements per firm is included, one for resignation and one for appointment. The objective is to sample as many firms as possible to generalise the findings across the market.

3 Only permanent appointments and resignations were included. Temporary, interim or acting appointments were excluded as these potentially give mixed signals.

4 If the company was involved in any major event, such as a merger, acquisition or divestiture during the event period over 29 transaction days before management change announcements and 30 days after announcements, the observation was excluded. This was to exclude confounding effects from affecting the results.

5 Each observation should have a complete price series throughout the 59 transaction days, which are 29 days before, the event date and 29 days after the announcement.

6 Firms that were not traded continuously for more than 6 consecutive days were excluded. This minimised the non-synchronous effect

Methodology

The event study approach along with appropriate refinements to correct thin-trading bias was employed (Ariff and Finn 1989) to address the wealth effect hypothesis arising from board of directors appointments and resignations. The abnormal returns for a given share price at any time period is the difference between its actual (ex-post return) and those expected under the assumed equilibrium return generating process using Sharpe (1963) Single Index Model or Market Model, which was used to generate expected returns since this model has wide acceptance for abstracting the effect of marketwide events from the share returns. The result gives the pricing due to the event affecting the firm at the time of board composition changes.

The abnormal returns were estimated as follows:

$$e_{it} = R_{it} - (\alpha_i + \beta_i R_{mt}) \qquad (23.1)$$

where

R_{it} : actual returns on stock of firm i on day t,

e_{it} : abnormal returns for stock of firm i on day t,

R_{mt} : market returns on day t calculated from market index, and

α, β : firm specific constants in the Market Model estimated using 60 monthly .

The intercept, α_i, can be interpreted as the average return (plus the riskless return) on the i-th company's shares when the market index is zero.

The $\alpha_{it}\ \beta_i R_{mt}$ is the portion of the returns to company i that is due to marketwide factors t adjusted for the firm's riskiness. β_i is the slope of the regression line of firm i and B_{it} measures the security's systematic risk. The α_i and β_i are estimated using data outside the analysis period, that is using 60 monthly returns prior to the event window of 59 days. The observed return, R_{it}, was calculated in the following way:

$$R_{it} = (P_{it} - P_{i(t-1)} + D_{it}) / P_{i(t-1)} \qquad (23.2)$$

where

P_{it} : capitalisation-adjusted share price of firm i at the end of day t,

$P_{i(t-1)}$: price per share of firm i at the end of day t-1, and

D_{it} : any dividend paid between period t-1 to t.

The market returns on days t = 1,..., T days were estimated using the New Straits Times Industrial Index using the above equation, which does not include dividends. This index was chosen as a proxy for the market because of the wider acceptance of this index as a good measure of marketwide changes on the KLSE and because a small-sample-based index gives more accurate beta and alpha values in a thin market. It is an equally weighted price index. There is evidence (Brown and Warner 1980: 1985) that equally weighted index is more appropriate in detecting abnormal returns than a value-weighted index, which tends to underestimate the true market returns, and statistical parameters (see Ariff *op cit.*) in markets similar to the test market.

A one-lead and one-lag version of the Dimson-Fowler-Rorke's (Fowler and Rorke 1983; Ariff and Lim 1990) beta was used in this study to mitigate the thin-trading bias on the systematic risk. To assess the average impact of these announcements on the market, the cross-sectional average abnormal return (AR_t) for each time period t (day) was estimated as follows:

$$AR_t = n^{-1} \Sigma_{n=1..n} [R_i - \alpha_i - \beta_i R_{mt}] \qquad (23.3)$$

where

n : the number of firms experiencing the event at time period t, and

AR_t : the average abnormal returns over time t for n stocks.

To observe the cumulative effect, cumulative abnormal returns (CARs) were calculated by summing up the AR_t over various time periods of interest. For example, the CAR_T for day T_1 until day T_2 was derived as follows:

$$CAR_T = \Sigma_{t=1,2,\ldots,T} (AR_t) \qquad (23.4)$$

where CAR_T is the cumulative abnormal returns for time period t =-k, -(k+1), -(k+2), ..., +k. To test whether the AR at day t was statistically different from zero, t-statistics were estimated and evaluated at 0.05 level of acceptance.

If AR is significantly different from zero at the announcement of board changes, this implies that the information content of the event had a significant impact on share prices of the firm. A non-significant AR would suggest that the event had no effect on the value of the company. Thus the strategic hypothesis is to evaluate the abnormal price changes as measured by AR_t.

3. Findings

Total Sample

The findings are summarised in Table 23.1. The CAR values show an upward trend from day -10 onwards. However, the abnormal returns in the same period were not significantly different from zero except for day -19 (AR=-0.12%) and day 14 (AR=0.59%). Obviously, this test ought to produce no wealth effect since the sample of favourable news from appointments and unfavourable news from resignations were not separated. These findings suggest that there were no significant price movements in response to *all* announcements of changes in the board of directors of firms listed on the KLSE.

Table 23.1
Risk Adjusted ARs Around Management Changes Announcement: Total Sample

DAY	AR	t-TEST	CAR	DAY	AR	t-TEST	CAR
-29	0.0033	1.6844	0.0033	1	0.0002	0.1696	0.0194
-28	-0.0010	-0.4882	0.0022	2	0.0035	0.1029	0.0231
-27	-0.0021	-0.9453	0.0001	3	-0.007	1.8358	0.0231
-26	0.0008	0.4381	0.0009	4	0.0036	-0.3215	0.0224
-25	-0.0017	-0.6897	-0.0008	5	-0.0028	1.5863	0.0260
-24	0.0018	0.7154	0.0008	6	0.0027	-1.1514	0.0232
-23	0.0001	0.0578	0.0009	7	0.0005	1.1350	0.0259
-22	0.0002	0.0604	0.0010	8	0.00010	0.2382	0.0265
-21	0.0011	-0.5187	-0.0001	9	0.0009	0.5532	0.0275
-20	0.0005	-0.1918	-0.0005	10	0.0009	0.3772	0.0284
-19	0.0012	-2.2989*	-0.0049	11	0.0013	0.4454	0.0293
-18	0.0011	0.5239	-0.0038	12	0.0034	0.8468	0.0308
-17	0.0015	0.4754	-0.0026	13	0.0026	1.3818	0.0340
-16	0.0012	0.6614	-0.0012	14	0.0059	2.758*	0.0385
-15	-0.0008	0.5502	0.0001	15	0.0015	0.778	0.0365
-14	-0.0010	-0.3587	-0.0007	16	0.0011	0.5031	0.0438
-13	-0.0010	-0.4825	-0.0018	17	0.5793	0.5793	0.0450
-12	-0.0023	-0.4825	-0.0018	18	0.0012	0.5483	0.0464
-11	0.0025	-1.1378	-0.0041	19	-0.0022	-0.8958	0.0476
-10	0.0021	1.1545	-0.0016	20	0.0007	0.3317	0.0453
-9	0.0027	0.9368	0.0006	21	0.0014	0.6047	0.0461
-8	0.0006	1.1876	0.0032	22	-0.0008	-0.3781	0.0475
-7	0.0012	0.0498	0.0038	23	0.0019	0.9016	0.0466
-6	0.0029	0.5365	0.0050	25	0.0002	0.2214	0.0486
-5	0.0011	1.3150	0.0080	26	0.0003	0.1296	0.0489
-4	0.0032	0.5361	0.0091	27	-0.0005	-0.2578	0.0510
-3	0.0033	1.5836	0.0122	28	0.0023	1.0729	0.0533
-2	0.0010	1.5822	0.0155	29	-0.0005	-0.2027	0.0528
-1	0.0025	0.4882	0.0165	30	0.0006	0.2668	0.0564

*Significant at 0.05 level

Sub-Samples

Table 23.2
Risk Adjusted ARs Around Management Change Announcement: Sub-samples

Panel A: Appointment				Panel B: Resignation			
DAY	AR	t-TEST	CAR	DAY	AR	t-TEST	CAR
-29	0.0041	1.2200	0.0041	-29	0.0023	1.1820	0.0023
-28	-0.0019	-0.2671	0.0022	-28	-0.0040	-1.4828	-0.0009
-27	0.0054	0.9663	0.0076	-27	-0.0014	-0.3951	-0.0023
-26	0.0015	0.2694	0.0057	-26	-0.0012	-0.3722	-0.0035
-25	0.0015	0.2694	0.0057	-25	-0.0010	-0.2547	-0.0044
-24	0.0034	0.6461	0.00091	-24	0.0027	0.8548	-0.0018
-23	-0.0004	-0.0977	0.0088	-23	0.0020	0.6548	0.0002
-22	-0.0030	-0.6287	0.0058	-22	0.0032	0.8478	0.0033
-21	-0.0019	-0.4762	0.0039	-21	0.0025	0.9244	0.0059
-20	0.0025	0.5144	0.0063	-20	0.0009	-0.2429	0.0049
-19	-0.0059	-0.5027	0.0042	-19	-0.0047	-1.4548	0.0002
-18	0.0000	0.0011	0.0042	-18	-0.0012	0.3926	0.0014
-17	-0.0059	-1.2458	-0.0017	-17	0.0041	1.2336	0.0054
-16	0.0035	0.7584	0.0018	-16	0.0026	0.7278	0.0081
-15	0.0027	0.5885	0.0044	-15	0.0037	1.2451	0.0118
-14	-0.0036	-0.8025	0.0009	-14	0.0002	0.0689	0.0120
-13	0.0003	0.0648	0.0011	-13	0.0002	0.0727	0.0123
-12	-0.0081	-1.4927	-0.0050	-12	0.0014	0.4530	0.0136
-11	-0.0020	-0.2995	-0.0070	-11	0.0043	1.4788	0.0180
-10	0.0045	0.8958	-0.0025	-10	0.0029	0.9108	0.0209
-9	-0.0040	-0.3998	0.0066	-9	0.0055	1.6609	0.0264
-8	0.0037	0.5514	-0.0028	-8	0.0012	0.3728	0.0276
-7	0.0015	0.3105	-0.0013	-7	0.0048	1.7174	0.0324
-6	0.0002	0.0417	-0.0011	-6	0.0064	2.270*	0.0389
-5	0.0063	0.8554	0.0052	-5	0.0052	1.6511	0.0441
-4	0.0012	0.3364	0.0064	-4	0.0074	2.422*	0.0514
-3	0.0069	1.1431	0.0134	-3	0.0052	1.7287	0.0587
-2	-0.0003	-0.0854	0.0131	-2	0.0005	0.1906	0.0572
-1	-0.0001	-0.0258	0.0130	-1	0.0051	1.2200	0.0623
0	0.0016	0.3564	0.0146	0	0.0012	0.3761	0.0635
1	0.0090	0.8428	0.0236	1	0.0010	0.2993	0.0645
2	0.0038	0.7564	0.0273	2	0.0064	2.627*	0.0710
3	-0.0003	-0.0589	0.0270	3	-0.0012	-0.4139	0.0698
4	-0.0049	-0.8367	0.0221	4	0.0051	1.4227	0.0749
5	0.0010	0.2026	0.0231	5	-0.0013	-0.3299	0.0736
6	0.0035	0.8077	0.0266	6	0.0051	1.3882	0.0787
7	-0.0012	-0.3477	0.0254	7	0.0033	1.0882	0.0819
8	0.0033	0.8694	0.0288	8	0.0013	0.4337	0.0832
9	0.0010	0.2185	0.0298	9	0.0063	2.0306	0.0895
10	-0.0012	-0.3014	0.0286	10	0.0019	0.6409	0.0914
11	-0.0005	-0.1261	0.0281	11	0.0044	1.4031	0.0958
12	0.0062	1.2483	0.0343	12	0.0005	0.1431	0.0963
13	0.0047	0.6193	0.0390	13	0.0048	1.6282	0.1011
14	0.0008	0.1631	0.0399	14	0.0053	1.6112	0.1064
15	0.0001	0.0224	0.0400	15	0.0021	0.8131	0.1085

Table 23.3 (cont'd)

16	-0.0037	-0.9364	0.0383	16	0.0023	0.5739	0.1109
17	0.0035	0.9544	0.0398	17	0.0008	0.2099	0.1116
18	-0.0003	-0.0777	0.0395	18	0.0014	0.4162	0.1130
19	-0.0070	-1.4123	0.0325	19	-0.0042	-1.1782	0.1088
20	0.0058	1.6485	0.0381	20	-0.0010	-0.2855	0.1078
21	0.0016	0.4173	0.0397	21	0.0012	0.3361	0.1090
22	-0.0032	0.7443	0.0366	22	0.0021	0.6014	0.1111
23	-0.0015	-0.3930	0.0351	23	0.0019	0.5762	0.1131
24	0.0057	1.1903	0.0408	24	0.0019	0.5624	0.1150
25	0.0022	0.6104	0.0429	25	0.0043	1.1336	0.1193
26	0.0054	0.9979	0.04845	26	-0.0016	-0.4428	0.1177
27	0.0102	2.1116*	0.0586	27	0.0012	0.4329	0.1190
28	0.0033	0.7909	0.0619	28	-0.0003	-0.0929	0.1188
29	-0.0026	-0.5439	0.0594	29	-.0060	2.2631*	0.1256
30	0.0046	0.9846	0.0839	30	0.0032	0.9642	0.1287

*Significant at 0.05 level

The total sample of changes in the board of directors was regrouped into sub-samples of appointments and resignations announced. The wealth effect from announcements was expected to emerge distinctly. The average abnormal returns for appointments and resignations are summarised in panels A and B of Table 23.2 respectively. Panel A shows that none of the abnormal returns were significantly different from zero except for day 27 (AR=1%). This implies that appointments of directors are not newsworthy to investors. This could be due to the announcements being leaked much earlier, or being correctly being anticipated and the value was not captured in our tests over 29 days. Or it might have been that firms studied were of stable and established businesses, where any new members of the board are not expected to make a difference to the wealth of shareholders.

For the resignations sample, some positive and significant abnormal returns were observed in pre- and post-announcement periods. The highest abnormal returns were observed (AR=0.74%) four days before announcement day, implying that news of the resignation was perhaps leaked to the market, and the investors in general perceived it positively.

4. Conclusions

The wealth effect of the announcement of appointments and resignations of members of the board of directors of companies listed on the KLSE was investigated in this study. The findings suggest that, unlike resignations, appointments have no effect on share prices. This could be due to the market's anticipation and discounting the information content of the event in the share prices much earlier than the test period in this study. It is also highly probable that the appointments are not news to the market because those appointed are not expected to make a material shift in firms policies that could effect the wealth of shareholders. These findings could hold for this specific set of firms that are well established and financially stable. The firms included are the more prominent established ones.

Announcements of resignations are perhaps anticipated by the market, but not as early as appointments. Resignations are perceived as favourable news, probably due to the market's disappointment over the performance of those resigning or those parting from a troubled firm. In general, the findings show that, unlike resignations, appointments have no wealth effect and that the wealth effect of resignations is also very weak. The information content of the announcements is anticipated early, probably due to superior analytical ability of the market and/or leakage of inside information. From the investor's prospective, these findings suggest that the Malaysian stock exchange appears to pay *no attention to board reconstitutions through new appointments, and pays at best scant attention to resignations*. Though the results on resignations suggest a semi-strong form efficient market, the wealth effect is not as pronounced as in the more developed markets. Further study is recommended. Such a study should make more refined groupings of board reconstitutions to investigate such events. Perhaps such a study might reveal that wealth effect is limited to severe events in this Asian market.

CHAPTER

24

The Agency Problem from Conflict of Interests of Managers and Owners

Abstract

Board composition, risk, and CEO duality characteristics are analysed in this chapter to address the agency problem faced by shareholders of Malaysian firms. There is weak evidence to suggest that there is a conflict of interests between operating managers and shareholders' representatives in the boards of directors. There is a need to carry out a more direct test of the effect of the agency problem on firm performance as these results are not robust enough to warrant sound conclusions.

1. Introduction

Shareholders elect corporate directors who have the power to appoint or dismiss corporate managers. This is a standard model of corporate governance widely applied in modern management in capitalist economies. Professional managers operate the business with a view to maximising shareholders' wealth. The corporate directors' main function is to evaluate and align management's performance to be congruent with shareholders' aspirations. To the extent that these managers have a negligible ownership interest in the firm, it is questionable as to what motivates them to make corporate decisions in congruence with shareholders' interests.

There is evidence (Marris 1964; Murphy 1985; Rappaport 1978) that managers pursue personal goals at the expense of shareholders. Since the operation of a business is in the hands of the Chief Executive Officer (CEO) and his/her management team rather than the elected directors, managers may pursue a course of action congruent with management's perceived interests or their perceptions of corporate self-interest rather than those of the shareholders. It has also been suggested (Dallon and Keaner 1987) that the incongruency of management and shareholders interests might be related to CEO duality and board composition. If the CEO is also the chairman of the board of directors (defined as CEO duality) it is difficult for him to represent the interests of shareholders and impartially sit in judgement on himself/herself. Although the board of directors is composed of internal and external directors, it is common for internal directors not to challenge their CEO, and the latter need only to persuade a few of the external directors to gain a majority vote on decisions taken at board meetings.

This chapter reports findings on this important question of whether there is a conflict of interests between the shareholders and the operating managers in Malaysian public firms. Findings reviewed in the next section suggest that there is a conflict of interest, especially when ownership is divorced from management of large well-established firms.

In section 3, the reader can find a description of the data sources and test methodology used to investigate this issue. The findings reported in section 4 suggest that the agency problem is a real issue that is evidenced from conflict of interests of shareholders and management.

2. Agency Problem and Conflict of Interests

An important indicator of the independence of a board of directors is its board composition (Baysinger and Buller 1985). Board composition is defined as the proportion of external directors to the total number of directors. External directors are not part of management but are elected by shareholders to check on the impartiality of the decisions made by the CEO and the internal directors, who are full-time officers of the firm, and are usually subordinate in rank and power to the CEO. A board composed of a relatively high ratio of outsiders is more likely to be able to exercise independent judgement in matters pertaining to shareholder interests, the garnering of managerial skill/expertise and cooperation with important external firms with which they are interdependent (Rechner and Dalton 1986). Both CEO duality and the low proportion of external directors in board composition are potential threats to the board of directors' independence, and there is evidence (Dalton and Kesner 198) that much of the board's inability to perform its expected role of controlling the management is related to its lack of independence from management. The inability of the board to control management may lead to managerial abuse of their fiduciary duty to shareholders and negatively affect the returns on common stocks, and therefore the value of the firm.

Evidence on CEO duality and board characteristics of listed firms may be examined by studying the relationships among board composition, CEO duality, firm size, systematic risk and rate of returns on common stocks of firms. Conclusions can then be drawn as to whether a direct comparison is possible because of differences in sample size, number of firms and period of study. Kumar and George (1993), Cooper and Glen (1994), Eckbo and Savita (1994) are examples of recent studies on this subject. Another recent study (Mehran 1995) finds evidence that firm performance is positively related to the percentage of equity held by managers. He also found that equity-based compensation is often used in firms with more external directors than internal directors.

3. Data and Methodology

Data Sources

Data on board composition, CEO duality and related board characteristics were collected from annual reports of companies listed on the KLSE. The market capitalisation data were collected from the *Daily Diary*, a publication of the exchange, and the data for computing systematic risk and rates of return on each stock were taken from a database compiled by the authors from their on-going research. To account for the thin-trading bias, the Ordinary Least Square betas were corrected using Dimson and Fowler-Rorke procedures (Dimson 1979; Fowler and Rorke 1983; Ariff and Lim 1990). Only firms actively traded and with sufficient monthly data for the five-year ending December 1990 were included. Ninety-two firms with financial years ending in December 1990 satisfied these criteria and were included in the study.

Information on CEO duality and board composition were obtained from the annual reports of the selected firms. If the CEO is also the chairperson of the board of directors, there is CEO duality. The board composition ratio was derived by dividing the number of external directors to the total number of directors. The size of the firm was measured using market capitalisation value, that is the total number of shares outstanding at the end of February 1991 multiplied by the closing market price (per share basis) on the same day. The last trading day of February was chosen for computing the firm's market capitalisation value because a 12-month period ending 31 March 1992 was used to compute the annual rates of return on common stock of each firm. The closing market price of the stock at the end of March reflects the information on the firm's market capitalisation value at the end of February. The year ending 31 March 1992 was chosen for the calculation of returns on the stocks because all firms with their financial year ending in December 1991 were required to announce their preliminary final results within three months after the end of their financial year. The information content of the 1991 financial report should have been fully reflected by the end of March 1992.

Methodology

The data were analysed by running a series of correlation matrices on the relationships between the various variables of interest. The sampled firms were classified according to CEO duality into high and low board compositions. The resulting data were randomised so that there was a randomised as well as a non-randomised set comprising portfolios of stocks that could be examined to reveal the relationship between firm size, beta, board composition and rates of return. For the non-randomised design, firms were divided into groups on the basis of their size (MV1 to MV3 from highest market value to the lowest) and their betas (BV1 to BV3 from highest to lowest systematic risk). Thirty-one stocks were included in each of the first two portfolios and 30 in the third portfolio. For the randomised design, these groups were then sub-divided and recombined to form two sets of randomised portfolios, namely a set of three portfolios (MV1* to MV3*) each consisting of stocks with similar betas and another set of three beta portfolios (BV1* to BV3*) each consisting of firms of similar size. The randomised portfolios with similar betas (MV1* to MV3*) had 40, 32 and 20 stocks respectively. Two randomised portfolios of similar size (BV1* to BV3*) had 31 and one portfolio had 30 stocks. The randomised portfolios were constructed to control for the effect of systematic risk and firm size, respectively, of the relationship between each of these factors and board characteristics.

4. Findings

Table 24.1 provides the descriptive statistics for the sampled firms and the relevant statistics of Japanese, British and American firms (from Cooper and Glenn 1994) and Singapore and Malaysian firms (from Shamsher and Annuar 1990). While the findings of this study are not directly comparable with those of Cooper and Glenn (1994) and Rechner and Dalton (1986) because of different economic settings, sample and time period, a general comparison is possible to distinguish characteristics for firms in the developed from those in the developing countries.

Table 24.1 Descriptive Statistics for Relevant Variables: Averages

	Malaysia (1991)*	Malaysia (1985)	Singapore	Japan	U.K.	U.S.A.
No. of internal directors	1.42	1.82	1.28	10.87	4.00	3.94
Outside directors	6.11	6.33	4.97	10.17	7.44	8.02
No. of directors	7.53	6.23	6.23	21.04	11.44	8.02
No. of directors	7.53	6.23	6.23	21.04	11.44	8.02
Board composition	80.18%	78.70%	79.20%	51.10%	83.8%	69.7%
CEO duality	14.13%	27.30%	20.00%	10.90%	30.0%	82.0%
Company size	RM469.8M	RM274.4M	S$152 M	NA	NA	NA
FR beta	1.11	1.52	1.21	NA	NA	NA
No. of companies	92	33	35	50	50	50

* The figure from current study. NA = Not available. RM = Malaysian Ringgit. S$ = Singapor dollar.

The board characteristics of the Malaysian firms shows similarity with those of the Singapore firms, except that the Malaysian firms have lower duality and risk. Malaysian firms have relatively lower duality than American and English firms but these have higher duality than Japanese firms. Among the developed economies, the Japanese firms have the greatest number of directors, lowest proportion of CEO duality and lowest board composition. Comparing the present findings with those of the Malaysian sample in Wong (1990) there is a significant decrease in CEO duality from 27 per cent to 14 per cent despite almost 100 per cent increase in sample size and about 40 per cent decrease in risk levels of firms.

Table 24.2(a) and 24.2(b) present the findings on the correlations of the various variables of interest for the present study and the former study respectively. Statisitcs summarised in Table 24.2(a) show that a greater number of external directors is significantly correlated with total directors and board composition. The total directors are positively and significantly associated with company size, implying the larger the size of a firm the larger is the total number of directors. The number of external directors is negatively correlated with CEO duality, but this is not statistically significant. CEO duality is negatively correlated with company size (significant at 1 per cent level), implying that larger firms have a lower incidence of CEO duality. The beta is positively and significantly associated with returns. The returns on stocks are not associated with any characteristics of the board of directors.

The findings in Table 24.2(a) are similar to those in Table 24.2(b) except that the latter study does not show a significant (at one per cent level) association between company size and total number of directors, and the association between risk and returns are unexpectedly negative. Table 24.3 presents the results from firms with CEO duality

Table 24.2(a) Correlation Matrix for Relevant Variables of Malaysian Firms (n=92)

	Total Directors	Outside Directors	Board Composition	CEO Duality	Company Size	DFR Beta	Return on shares
Total Directors	1						
Outside Directors	0.89*	1					
Board Composition	0.17	0.58*	1				
CEO Duality	-0.14	-0.06	0.14	1			
Company Size	0.28*	0.15	-0.16	-0.27*	1		
DFR Beta	0.12	0.05	-0.12	-0.17	0.08	1	
Return on Shares	-0.18	-0.19	-0.09	0.16	-.08	.32*	1

* $p < 0.01$

Table 24.2(b) Correlation Matrix for Relevant Variables of Malaysian Firms (n=33)

	Total Directors	Outside Directors	Board Composition	CEO Duality	Company Size	DFR Beta	Return on shares
Total Directors	1						
Outside Directors	0.73*	1					
Board Composition	0.18	0.52*	1				
CEO Duality	-0.24	-0.27	-0.70*	1			
Company Size	0.18*	0.13	-0.4**	-0.51*	1		
DFR Beta	0.01	-0.34	-0.54	-0.45	0.04	1	
Return on Shares	-0.13	-0.08	-0.10	0.03	0.05	-0.29	1

* $p < 0.01$; ** $p < 0.05$

and firms with no duality with the latter sub-sample categorised into low and high composition of external directors in the board. In market values of the three *size* portfolios, and the equality of beta values of the three *beta* portfolios can be rejected at 0.05 per cent level.

For the randomised size (MV1* to MV3*) and beta (BV1* to BV3*) portfolios, the Kruskal-Wallis test confirmed that neither the null hypothesis of equality of betas for size portfolios nor the equality size for beta portfolios can be rejected at 0.05 level of significance. This suggests that the procedures used to control for the beta in the size portfolios and control for size in the beta portfolios when the board characteristics, are examined in these portfolios.

The non-randomised size portfolios indicate that the total number of directors is associated with firm size, and smaller firms have a higher incidence of CEO duality and a lower proportion of external directors in the board composition. The randomised size portfolios also indicate similar findings except that small randomised firms have higher returns on common stock. The non-randomised beta portfolios (Table 24.4) show that high beta firms have a lower proportion of external directors in the board composition, lower CEO duality and higher returns. The randomised beta portfolios show that high beta firms have high returns and larger total number of directors.

Table 24.3 Results from the Firms with CEO Duality and with Low and High Board Composition: Averages

Firms With	Market Value ($M)	Beta Value	Total Directors (No.)	Board Composition (%)	Return on Shares (%)
CEO Duality	851.40	1.25	8.46	74.69	50.34
Low Composition	411.38	1.30	6.20	45.76	129.42
High Composition	549.08	1.26	8.71	94.29	113.85

Table 24.4 Results from the Distribution of Market Values, Betas and Board Characteristics for Non-randomised (Panel A) and Randomised (Panel B) Size and Beta Portfolios (Average Figures)

	Portfolio	Market Value ($M)	Beta Value	Total Directors (No.)	Board Compo-sition n(%)	CEO Duality (%)	Return on Shares (%)
Panel A	MV1	86.18	1.04	6.87	83.79	1.97	72.40
Size	MV2	249.18	1.20	7.35	78.13	1.81	154.54
	MV3	1094.4	1.10	8.40	78.52	1.80	73.37
Beta	BV1	369.77	0.76	7.48	83.53	1.90	50.13
	BV2	573.09	1.10	7.23	79.32	1.90	95.37
	BV3	466.97	1.49	7.90	77.55	1.77	157.53
Panel B	MV1*	263.95	1.10	7.22	81.77	1.90	104.90
Size	MV2*	1397.9	1.19	9.18	69.55	1.64	78.85
	MV3*	2424.3	1.20	9.67	77.27	1.67	62.48
Beta	BV1*	462.16	0.78	7.66	83.32	1.91	52.94
	BV2*	479.87	1.24	6.77	77.54	1.81	118.71
	BV3*	450.82	1.69	10.70	81.45	1.90	180.40

5. Conclusions

The board composition, risk, and CEO duality characteristics of 92 Malaysian listed firms were examined in this study to document evidence on the agency problem. Compared with the previous study on 33 listed firms in 1985, the findings showed that the degree of CEO duality and risk level of firms have decreased, whereas the average size of firms has doubled. Firm size has a significant positive association with the total number of directors and a negative association with CEO duality. There was a positive and significant association between beta and returns.

An analysis of firms with CEO duality as a group showed that they are smaller in size and have lower returns, but are not different in terms of board composition, total number of directors and market risk of firms without duality. Although the issue of board composition and firm performance have not been directly addressed in this chapter, the lack of significant association between board composition and returns (a proxy for firm performance) in this study is consistent with previous evidence (Rechner and Dalton 1986) in another market. This could be due to the true position of the external directors (who may be former employees of the company or former business associates of the company), who may have linkages with the company which obscure the independence of the directors. After controlling for market risk, portfolios of small firms showed a higher level of CEO duality and higher returns on common stocks, which is intuitively appealing. After controlling for size effect, firms with high betas showed a larger number of total directors and high returns on common stocks. These findings suggest that CEO duality is a prominent feature of small-sized firms and the lack of independence of the board of directors in these firms is further indicated by the small proportion of external directors in the board composition. However, despite the apparent lack of independence of the board of directors, small firms have higher returns than large firms, confirming the presence of size effect.

CHAPTER

25

Partial Solutions to the Agency Problem

Abstract

The idea that any manager will try to maximise shareholders' wealth is equally inapplicable in Malaysia as in the more developed countries because of the universal agency problem. This chapter discusses the international evidence that *managers do not maximise shareholders' wealth,* preferring to maximise firm size to escape scrutiny of their performance. We also discuss some means by which managers may be induced to seek value maximisation.

1. Introduction to Agency Problem in Operating a Firm

The economies of the late nineteenth and early twentieth centuries were managed on the premise that entrepreneurs sought to maximise profits (two classic studies are Berle 1962; Manne 1962), which in modern financial literature is equivalent to maximising the value of the firm. Modern finance theory suggests that the value represents the discounted value of the future stream of earnings from an economic asset. The value maximisation motive of these entrepreneurs is based on the *ownership and control* of the firm by its entrepreneurs. There is no absolute measure of wealth of shareholders, and the practical surrogate is the total market value of a firm, which is the number of shares multiplied by average price over a given interval of time. The literature enumerates several valuation measures of a firm's wealth such as the par value, book value, replacement value, liquidation value and present value. The present value measure has been universally accepted and is used in valuation literature. This is consistent with the finance professional's belief that the expectation hypothesis is valid despite opposition to its tenets from some economists (Summers 1980). The present value measure discounts future earnings to estimate the fair current value of assets. Assuming that most investors are risk averse utility maximisers, higher value is preferred to less, and therefore shareholders of firms with higher values are wealthier than those with lower values.

In today's modern businesses, especially in the developed countries, with the exception of a few with family or interest group ownership concentrations (for example, in Singapore), however, ownership is vested in the hands of the shareholders and control is vested in the hands of professional managers, who are paid salaries to pursue activities that presumably maximise the total value of a firm, which is synonymous to maximisation of shareholders' wealth.

In theory, shareholders elect corporate directors, who have the right to appoint or dismiss corporate managers. Since the operations of the business are in the hands of the corporate managers rather than the directors, who are policy makers, managers may pursue a course of action which relates to their perceived interests or their perceptions of corporate self-interest rather than those of the shareholders.

We examined this matter in the previous chapter, and found weak evidence for the argument that ownership appears to be positively correlated with performance, especially in smaller firms in the Malaysian corporate world, to the extent that these managers have a negligible interest in the firm. The factors that motivate them to make corporate decisions that are expected to be congruent with the shareholders' interest are uncertain. For example, there is evidence that managers' personal goals of security, power, prestige, advancement and personal income take precedence over corporate profits (Marris 1964; Murphy 1985). Rappaport (1978) suggests that management would be tempted to take this view, if they perceive shareholders as short-term investors rather than long-term owners of the firm.

Given the legal and regulatory framework managers must comply with in operating a firm, they may pursue *second best* investment decisions. They may take considerable discretion in providing themselves with perquisites such as large expense accounts, plush offices, and higher salaries at the expense of the shareholders, especially the absent shareholders. Managers may also make large contributions to charities (Manne 1962) or even spend large sums of money on improving the conditions of workers (Berle 1962), resources which could have been invested to generate more earnings.

Diamond and Verrecchia (1982) suggest that, assuming the full consequences of the managerial action are not measurable at the end of a contract period, and it is costly to recontract, managers may pursue investments which increase their expected utility rather than that of their shareholders. This is achieved, for example, by investing in less risky investments relative to more risky investments with higher returns, or consuming more perquisites than those agreed upon, or even simply being incompetent.

Marris (1964) and Murphy (1985)have suggested that managers tend to be more interested in maximising *corporate size* rather than shareholders' wealth. Beyond achieving a certain satisfactory level of profits, managers pursue a size maximisation strategy, which is positively related to financial (i.e. salaries, stock options, bonuses) and non-financial (i.e. prestige and authority) perquisites or benefits they enjoy. Size is also viewed as a defence against takeover as it is more difficult and expensive for the bidder to acquire control over the target's resources, and hence provides more avenues for the target managers to pursue their own goals (Ball 1987). In this instance, managers working in large firms can manage to escape the market discipline to which managers of smaller firms are tied when firms fail to perform. These actions by managers are generally perceived as a deviation from the objective of maximising shareholders wealth.

In this chapter, we examine the importance of this problem for managing firms in the Malaysian economy. As it is a universal problem, it is likely to be faced by firms in our midst even though a large number of firms on the KLSE are managed by (a) special interest groups or (b) family connections, as is consistent with the emerging nature of the Malaysian economy in the 1990s. We discuss how the interests of the two parties may be aligned by financial arrangements so that the damage is limited: this is done in the next section. In Section 3 is a set of warnings about how these arrangements may not be adequate. In Section 4, the importance of the wealth maximisation principle that is at the root of private-sector based efficient production of goods and services is discussed. As in the adage, wealth has to be created, before it can be distributed.

2. Possible Ways to Align Management and Shareholder Interests

Theory suggests several ways of motivating managers to maximise shareholders' wealth. A competitive takeover market (Chapter 27) can be an essential means of disciplining corporate managers who might choose to pursue personal ambitions at the expense of their shareholders (Jensen and Ruback 1983). This market disciplining argument is based on the assumption that management teams compete for the right to manage corporate assets (see the previous chapter). Assuming an informationally efficient market for the supply and demand of proficient managers, any form of exploitation by incumbent management will be reflected in the share price of their firms. A low share price relative to what it should be with more efficient management becomes an attractive opportunity for potential bidders. Such bidders will, on successful bids for firms, dismiss the inefficient managers and replace them with efficient ones.

The threat of a takeover, however, does not provide complete assurance against action by the incumbent management team. Defensive measures such as corporate charter amendments, going private, engaging in standstill agreements, repurchasing shares, restructuring of assets and other related measures are employed by targets to make it more expensive and difficult for the bidders. The effectiveness of the target's defensive measures will depend on the time and resources available, the reputation of the bidder, the regulatory framework, and the attitude of institutional investors towards the takeover. Whatever the limitations, there is evidence (Mitchell 1991) supporting the notion that competitive markets for corporate control provide a self-regulatory mechanism which deters management from diverging from shareholders' interests.

A competitive managerial market is also important for motivating management to act in the best interests of their shareholders (Fama 1980). In a competitive managerial labour market, the incumbent management team is disciplined by the threat of being replaced by an equally qualified and experienced management team without much higher remuneration. Assuming the market prices the services of managers according to their past performance, the value of the services offered by replaced managers would be adversely affected.

In reality, however, managerial labour markets cannot be totally relied upon to effectively discipline corporate managers, who, by virtue of their position within firms, not only enjoy valuable inside information concerning the firm's investment options and performance but are also able to cover up any deficiency in their management from outside detection. Fama (1980) therefore suggests that management face both opportunities and discipline of external and internal labour markets. Shareholders have an ownership interest in the firm's performance which constitutes the best available indicator of management's economic productivity whose price in the managerial labour market depends on the success or failure of the firm.

Since a firm's performance is determined at least partly by the performance of the entire management team, each manager has a stake in the performance of managers above and below him and will actively engage in two-way monitoring. The opportunity cost wages signalled by the external labour market and the two-way managerial monitoring of internal labour market work together to discipline managerial performance and eliminate the agency costs. In theory, two-way managerial monitoring in the firm has the potential to ensure efficiency in the face of asymmetric information between insiders and outsiders. In practice, however, when managers within an organisation are classified according to rank or authority, the efficiency of two-way internal monitoring becomes ineffective. Top managers are presumed to be relatively more talented and efficient in the management of a firm's assets and information than the lower-tier managers. Hence they dominate the decision-making process, which is against the notion of perfect monitoring symmetry.

Watt (1988) suggests that product markets are also important in disciplining all parties to the firm, including the managers. Firms that deliver products demanded by customers at the lowest price, while covering costs, survive (Fama and Jensen 1983) and thus provide firms with a strong incentive to control costs, including contracting costs, which are the costs of the firm's contracts which include agency costs.

If managers have relatively large ownership positions in their firm, they are expected to be more empathetic towards their shareholders and thus motivated to act more closely with shareholders interests (Shleifer and Vishney 1986; Rappaport 1986). Managers are then expected to bear a share of the wealth effect of their decisions. The *ownership stake* panacea can be effective if applicable to both top and divisional managers. Although most top managers do own large ownership positions, this is not necessarily true for divisional managers who are responsible for most of the resource allocation decisions made at divisional level.

Management could also be motivated to act in the interests of their shareholders by having their compensation (especially their perquisites) tied partly to market returns realised by the shareholders (Coughlan and Schmidt 1985). However, a compensation contract which relies wholly on market returns can be unfair because share price movements are partially influenced by factors beyond management control. Also, there is a problem of management being able to manipulate the performance indicators of the firm, for example, accounting measures of performance such as the price-earnings ratio and earnings per share.

Financial statements audited by independent auditors attenuate the managers' preference to deviate from the wealth maximising objective. Benston (1979; 1980) suggests that audited financial reports are a valuable device for monitoring managerial behaviour because external auditors provide independent assurance of financial report credibility. Audited financial reports also facilitate alignment of manager and shareholder interests through their impact on executive compensation and managers' opportunity wage rates (Larcker 1983; Healy 1985). However, compensation plans that link managerial pay to accounting measures of performance provide incentives for managers to manipulate the content of corporate financial reports (Johnson and Revsine 1988). It is also possible that the financial statements are prepared in compliance with all the legal and accounting standards and therefore solicit an unqualified auditor's opinion. This opinion, however, cannot ascertain the opportunity cost borne by shareholders due to management's conscious choice of second best options in making investment decisions.

The shareholder intervention mechanism can help to align the interests of managers and shareholders by either facilitating recovery of past losses or preventing future losses, and acting as a deterrent to opportunistic manipulative behaviour of managers. Several common measures that have been taken by shareholders against their management are corporate charter and by-law amendments, litigation and control contests (Johnson and

Revsine 1988). The purpose of corporate charter and by-law amendments is to restrict future managerial discretion by explicitly prohibiting certain activities or by requiring formal shareholder approval of planned activities. These amendments become subject to shareholder ratification at the annual meeting. Shareholder litigation is initiated against directors and managers, whose activities are alleged to cause an unwarranted reduction in the value of the firm. Sometimes, the corporation itself sues the managers and directors for breaching their duties to the corporation, inflicting injury to the corporation and thereby indirectly decreasing shareholder wealth.

Control contests are represented by proxy fights and cash takeovers. A proxy contest is initiated by dissident shareholders to wrest control from incumbent management. The aim is to gain support from holders of majority shareholdings to elect their own representative to the board and consequently gain control over the future policies of the firm. In cash takeovers, insurgents gain control of the firm through acquisition of a substantial number of shares directly from the target shareholders, at a premium over the prevailing market price. Direct shareholder intervention is a costly alternative to align managerial and shareholders' interests (Dodd and Warner 1983), and should only be utilised if it is cost effective.

Weidenbaum and Vogt (1987) and Hogan (1989) suggest that since high transaction and information costs in the market for corporate control limit the extent to which shareholders can monitor management activities, the board of directors should assume the responsibility for doing so. A more assertive board willing to take a stand against actions not in the best interest of their shareholders will ensure stronger internal checks on management.

3. Constraints on Shareholders' Efforts to Align Managerial Action

Shareholders' efforts to align managerial action are usually constrained (Jensen and Meckling 1983; Johnson and Revsine 1988) due to several obvious reasons. First, ownership of shares tends to be diffused and it is costly to monitor the activities of the management. Except for large institutional investors, individual shareholders are neither influential nor interested in the business operations. Furthermore, the benefits from monitoring management's activities would be dispersed among all shareholders according to their investments and not according to their monitoring efforts. This free-rider problem motivates shareholders to be passive and resort to shift their capital out of the firm if they are dissatisfied. Fama (1980) suggested that the concept of ownership of a firm is an irrelevant concept in modern business. The shareholders, being residual claimants, do suffer from the failure of the firm, but they have capital markets which allow them to shift among firms with relatively low cost and hedge against the failure of any firm by diversifying their shareholdings across firms. Broad diversification implies that an individual shareholder will have no special interest in personally supervising the detailed activities of any individual firm in his portfolio.

Second, managing a business is normally done on a team basis where no single manager expects to identify the full benefits of his work as there is no performance yardstick to measure the individual manager's contribution and offer reward commensurate with the contribution. Managers are aware of this fact and can exploit the situation by pursuing actions which are in their best interest. Third, managers are also protected by the *Business Judgement Rule* in courts of law, which states that courts will not second-guess the decisions of management or board of directors unless there is clear evidence of a conflict of interest provided by the shareholders.

Fourth, if the value change suffered by shareholders due to a manager's action is comparatively small relative to the aggregate value of a firm, the high costs of intervention will allow managers to pursue actions with relative impunity. Fifth, skilful timing by managers to pursue action that enrich themselves at the expense of their shareholders is also a constraint on shareholder intervention. For example, manipulative activities might be timed to coincide with predicted bull markets in the hope that the general upward drift will swamp the share price impact of manipulation and thereby preclude the loss measurement by investors.

4. The Importance of the Wealth Maximisation Objective

Some managerial action may seem to diverge from the wealth maximisation objective, but could be in the direct short-term interest of the shareholders and/or for the long-term stability of the firm. For example, charity contributions by firms could be part of a profitable advertising campaign, and could also be tax deductible. Forgoing high profits in time of shortage could be a strategy to create market loyalty, and improving the wages and conditions of workers could be an indirect attempt to improve the efficiency of production over the long term.

Managers should be aware that their decisions on the firm's activities could be construed as divergent from these are expected by shareholders. Any deviation from shareholders wealth maximising objective will disturb the balance of the financial relationship between the various components of the firm and consequently jeopardise the existence of the firm in the long run. Managers should pursue the objective of maximising shareholders wealth because in the long term, no matter how powerful or independent they are, any divergence from the stated objective will certainly work against them.

If the firm fails to satisfy claims, it will cease to exist in the long run. To fulfil its obligations, the firm requires cash which can best be generated through its business activities or through loans and share issues. Generating cash through business activities means to pursue investments that maximise the net cash flows (i.e. therefore maximise Net Present Value), and not just maximise size. A high price-earning ratio with no real cash growth potential may fool the shareholders for a short period, but certainly not the creditors and suppliers.

Even when the managers do generate enough cash from business activities to fulfil their obligations to the various components, doubts could still remain as to whether management pursued the most optimal investments subject to the constraints. If they did not then they are still diverging from the objective of maximising shareholders wealth. External sources of cash are loans and share issues. The value of loans that a firm can take depends on its cash generating ability. However, if firms resort to equity financing, for a given level of funds required the higher the share price the less dilution will be borne by current shareholders.

5. Conclusions

In modern businesses of developed economies, ownership is vested in the hands of the shareholders and control in the hands of professional managers. This is not the most prevalent case in Malaysia though larger public corporations are increasingly being managed by professional managers and the shareholders are outside the firm trying to get the managers to maximise the wealth of their firms. To the extent that the ownership is widely dispersed and managers have a negligible ownership in the firm, it is questionable that all business decisions by managers are in congruence with shareholders' interests. This chapter reviewed the ways managers are perceived to deviate from shareholders wealth maximisation objective, possible ways to align managers and shareholders interests, the constraints faced by shareholders in the alignment exercise and the importance of such alignment for the long-run survival of the firm. The long-term survival of firms depends upon the ability of its managers to pursue positive net present value investments that will maximise the net cash flows and therefore the market value of the firms they manage.

CHAPTER

26

How Socially Inclined are Corporations in Corporate Reporting?

Abstract

Socially responsible corporate reporting has increasingly become widely accepted in more developed economies, and is consistent with the long-run interests of firms. This chapter investigates the voluntary disclosure of information on *socially responsible activities of Malaysian listed firms* reported in financial reports. More such information is disclosed in the 1990s compared with 1980s reflecting the social awareness of the corporate sector. Large companies seem to disclose more information about their social activities probably because they can afford the cost and are more concerned about preserving their public image, though the quality and quantity of information disclosed can be improved further.

1. Introduction

About three decades ago, *social responsibility accounting* attracted attention from the accounting profession in developed economies. There has been an increasing emphasis since then on social responsibility of business organisations. Society has begun to realise that business firms cannot ignore their social responsibilities. In fact, they want to actively pursue socially responsible goals and make the public benefit from their activities. Complying with environmental legislation, promoting employees' and society's health and safety, providing better working conditions, donations to charitable funds are examples of socially responsible activities envisaged by those who laid the groundwork of this idea.

Environmental issues have become a central theme in political, economic and business discussions in developed countries; a second Earth Summit was held in 1997. Concern is increasingly expressed by the public on the impact of economic activities on the well-being of society and the environment, for example, the surge of support for the Green Party in the 1989 European elections. Issues such as natural resource depletion, unacceptably high levels of pollution, global warming, acid rain and deforestation have caused a fundamental questioning of profits as an adequate measure of an organisation's success. Such a development inevitably encourages managements to include environmental and social issues in their annual reports and statements of accounts. This poses a challenge to the accounting profession as accountants now need to find effective ways to report the social activities to the public through financial reporting.

In Malaysia, the lack of participation of the corporate sector in pursuing socially responsible objectives, particularly in environment-related issues in the past decade, has been criticised. However, increasing public awareness of corporate social responsibility, persuasion from the consumer organisations and relevant government agencies have motivated companies to act more responsibly to pursue social goals. This is not inconsistent with a firm s objectives and is a positive contribution towards achieving Malaysia s vision to become an industrialised nation by the year 2020.

In this chapter we discuss social responsibility from a firm's reporting of participation in such events. The next section sets out the objectives of social responsible reporting as part of the annual reports of listed firms. In section 3, we describe the concepts associated with this idea and report findings from a number of studies on this topic. Our analysis (see section 4) of data solicited from annual reports of 92 firms suggests that socially responsible activities and reporting have been on the increase since 1982.

2. Objectives

As a responsible corporate citizen, a firm is expected to accomplish some socially desirable functions for the society in which the firm is operating and produce a product that fulfils a legitimate need of society. In addition, the firm is expected to play the role of distributor of economic, social or political benefits to the society from which it obtains its power. Some researchers (Ramanathan 1976; Liang and Siang 1990; Phang 1979) suggest that determination of the success of a firm in delivering socially desirable goods and services be based on the balance between its aggregate contribution to society and its aggregate consumption from society's resources. However, it should be noted that though certain types of decisions or actions taken by individual firms may have an effect on society, the impact of such decisions is not reflected in the firm's profits. As an example, the closing down of a bank branch in a rural area that is not profitable may cause inconvenience to the particular community but is not reflected in the company's profit. Many such decisions, which are conceivable in the context of profit maximisation objective, may not be socially beneficial so it is claimed. Therefore, the first objective of social accounting is to identify and measure the periodic net social contribution of an individual firm, which includes not only the costs and benefits internal to the firm but also those arising from externalities affecting different social segments.

A second role of the firm is that of a trustee and agent in the resource sharing and wealth distribution processes in society. The hiring, training, retention and promotion policies, the plant location strategies, political philosophies, ethical norms, etc., which a firm adopts, have a direct impact upon how the aggregate benefits and sacrifices generated by society are shared among individuals, communities, social segments and generations. However, the complexities of making tradeoff decisions among these competing groups are overwhelming. Also, the absence of theories that deal with interpersonal preferences and aggregate social utility function are well recognised. Therefore, the second role of a firm's decision process concerns more the notion of fairness, equity and consistency with social goals than with considerations of optimality. The relationship between individual firm performance and social welfare is the basis for the second major objective for corporate social accounting. Corporate social reporting should help determine whether an individual firm's strategies and practices which directly affect the relative resource and power status of individuals, communities, social segments and generations are consistent with widely shared social priorities on the one hand and individuals legitimate aspirations on the other (Ramanathan 1976).

The third objective is to ensure that a firm equally disseminates social accounting information to various social constituents effectively. For internal reporting purposes, the firm's management will presumably develop specific reporting objectives consistent with the unique features of the firm's technology, the strategies the firm adopts for fulfilling its social responsibility and its internal management structure. However, there is a need for a public policy on corporate social reporting (Chen 1975). The purpose of such a policy is to ensure that social reporting by individual firm is adequate and relevant for aiding public accountability, evaluation, coordination and monitoring of corporate contributions towards attainment of social goals. Further, an over abundance of data on some aspects of social performance and a paucity of information on other relevant aspects could result. An objective of corporate social accounting is to make available information on its contribution towards social goals in an optimal manner to all social constituents. Optimality implies a cost-benefit effective reporting strategy that also optimally balances potential information conflicts among the various social constituents of a firm.

3. Socially Responsible Accounting: Definition and Evidence

Accountants need clear definitions of socially responsible activities to enable them to quantify and report the activities of a firm in its financial reports. However, there is no generally accepted definition of socially responsible accounting. The various definitions offered in the literature are not adequate for evaluating the success of firms in achieving their social goals. In their reports (Bradshaw 1978; Anderson and Frankle 1980) social accounting is viewed as the process of selecting firm level social performance variables, measures, and measurement procedures; systematically developing information useful for evaluating the firm's social performance; and communicating such information to concerned social groups, both within and outside the firm.

The special committee for designing the social accounting for the American Accounting Association (1975) suggested those social accounting concerns evaluating the impact of corporate social responsibility programmes; human resource accounting; measurement of selected social cost; measuring the full impact of an entity on society; social reporting and accounting for government programmes. Others (Preston and Diekes 1978; Preston 1978; Spicer 1978) have defined corporate social reporting as measurement of the social impact on the communities of a given corporation, its product, its production methods, and its internal and external social programmes. Corporate social reporting is limited to the reporting of events of significant social concern. The social impact of such events is often referred to as social responsibilities; these may be either positive or negative.

A study on the disclosure of social accounting information by 483 Fortune listed companies over 1975-1976 classified social information into two groups: Social Measurement Disclosure (SMD) and Meaningful Social Measurement Disclosure (MSMD) (Burke 1980). An SMD is defined as any disclosure about an area of social concern not traditionally reported upon, and as such covered a wide range. Even a somewhat vague description of an area of social concern would meet these criteria. MSMD is defined as an SMD that provides a reasonably comprehensive profile of a company's activities in such an area, and certain data expressed in quantitative form.

Burke finds that 54 per cent of the companies provided some form of SMD in their annual reports and 28 per cent of these companies met MSMD criterion. Generally, the study showed that larger companies are more likely to provide MSMD information. The areas of social concern that received most attention were environment control, energy conservation and human resources.

Another research study (Trotman 1979) reported a significant increase in social responsibility disclosure by the 100 largest companies listed on the Sydney Stock Exchange since 1967. Sixty-nine companies made some form of disclosure in 1977, against 48 in 1972 and 26 only in 1967. The social responsibility areas were categorised into environment, energy, human resources, products, community involvement and others. The most popular area of disclosure was human resources, followed by community involvement and environment. Generally, disclosures in all areas of social responsibility were on the increase. Companies in the services industries had a lower percentage of disclosure compared to the industrial groups. A similar study on 100 Australian companies listed on the Sydney Stock Exchange reported similar findings (Pang 1979). A comparative study of the top 30 English companies on the extent and nature of social responsibility accounting disclosure between 1975 and 1985 (Hall and Jones 1991) showed that the employee related data received the most attention. The areas of social responsibility disclosure were categorised into environment, employees, product, community and others. Disclosures in other categories were relatively low. The average number of items disclosed per company increased from five items in 1980 to eight items in 1985. After taking legislation into account, the disclosure was still approximately 6.7 items. Of those firms that disclosed, 71 per cent disclosed more information in 1985 than they did in 1975 while 14 per cent disclosed less. The general trend from 1980-1985 was towards fuller disclosure. Despite the absence of increased legislation, firms appear to be more socially inclined in their financial reporting.

An analysis of the disclosure of social responsibility of 100 largest (measured in terms of market capitalisation) Singapore and Malaysian incorporated companies listed on the Stock Exchange of Singapore (SES) for the year ended 31 December 1985 using Trotman's (1977) classification showed that most of the large companies (57 per cent) had some form of social reporting in their annual reports. Companies from service sectors (Finance and Hotel) recorded the highest incidence of disclosure (Liang and Siang 1990). These results conformed with findings of similar studies conducted in Australia and the U.S.A. The incidence of social responsibility disclosure was found to vary between industrial sectors and country of incorporation.

In general, the literature on this topic suggests that firms in developed countries do have some form of social reporting in their annual reports. Though not mandatory, this practice is on the increase probably due to increased public awareness and acceptance of the social accountability of business entities as societies progress.

4. Why is Social Reporting Important?

The traditional objective of financial reporting is to record the financial health of an entity for its shareholders who are only a small and unrepresentative group compared to other stakeholders. By stakeholders is meant the shareholders, employees, consumers, the social community and even the community worldwide, all of which have the right to information about operations and policy of a company, particularly with respect to the social disclosure. The idea of *stakeholders* is crucial to corporate responsibility reporting, and this is increasingly being recognised as the purpose of periodic financial reports. To a greater or lesser extent people within all these groups have a genuine interest in how an organisation does its business. Their lives, work opportunities, personal development and the surrounding social fabric have all been shown to be affected by the immense resources of manufacturing and retailing groups. There are companies whose social reporting is exemplary. Such companies have a reputation for straightforward financial reporting. By contrast, there are too many companies that operate defensively, providing the minimum required information under the accounting conventions and the Companies Act. Mukherjee, Hingroni and Lee (1995) examined the effect of a firm's socially responsible act on the wealth effect of shareholders. They found that abnormal returns are negative when such an act is voluntary and insignificantly different from zero when it is mandatory.

The reporting of social activities has a positive impact on the public perception of the company, such as attracting potential investors, new customers and helping to develop better rapport between the society and the company. In the long term this will reduce the probability of government intervention and enactment of mandatory requirements, that are not only costly but also restrict the managerial decision making process. Social reporting also has an internal value which can be used by management for long-term planning of corporate policy. Employees are not only interested in financial data, but are also concerned about product safety, the working environment, the firm's community involvement and so on. Management are interested in social reporting because it is the way to show the public their social accountability and therefore hope they accept the product and the business.

From the government's standpoint, social reporting is useful if both the positive and negative effects of social activities are reported. The creditors are interested in a company's profitability and liquidity. Social responsibility disclosure will provide information about future profitability and liquidity of a firm and it will help in measuring the risks related to litigation and sanctions. Creditors may argue that social disclosure may decrease the firm's need to borrow because socially responsible firms have a good public image and they can easily raise funds from the public. Social reporting has its shortcomings such as increases in cost and price to customers and there is a quantification problem when considering social disclosure. From the employees' viewpoint, social activities may result in increasing expenditure and may adversely affect their jobs and wages. They argue that they are already aware of their firm's social activities so social reporting is unnecessary. For managers, the funds invested in social activities may reduce the return to stockholders and therefore will have a negative effect on their firm's value. In general, the possible benefits from reporting of social activities by companies seem to outweigh the possible disadvantages.

Current Requirements on Corporate Reporting

Section 169 of the Companies Act 1965 stipulates that the directors of every company shall submit the audited profit and loss accounts together with a balance sheet as at the date to which the profit and loss account is made up. Each report shall state appropriate details such as the names, obligations and responsibilities of directors, the principal activities and equity of the company and matters relating to dividends and finance of the company. Section 326 of the Act states that an investment company is required to show a complete list of all investment and the quantities. Besides, income from underwriting activities must also be shown separately in the profit and loss accounts. However, the ninth schedule under the Companies Act 1965 only states the appropriate way of presenting the financial information in the profit and loss accounts and balance sheet in the annual report. This legislation does not state anything with regard to the appropriate way of disclosing social responsibility information. As a result, the disclosure of social information in annual reports is absolutely at the discretion of management of companies.

Specifically, the following issues fall within the ambit of socially responsible reporting:

a. What proportion of companies practise corporate social reporting and how it is reported in their annual reports?
b. What are the major areas emphasised in reporting social activities?
c. Are large companies (size measured in terms of market capitalisation) more socially inclined in their corporate reporting?
d. Is there any significant improvement in social responsibility disclosure over the last ten years?

5. Data and Methodology

The sample for this study consisted of the largest 100 companies continuously listed on the KLSE over a recent eleven-year period (1982-1992). Size was measured in terms of market capitalisation over the period. These firms represent major sectors traded on the local exchange. The annual reports of the 100 firms were analysed thoroughly for evidence of social reporting. The corresponding companys' 1982 annual reports were also studied to determine any incidence of social reporting and if there is any improvement in social reporting. This was necessary to establish the trend of corporate social responsibility disclosure among the listed Malaysian companies. The kind of information that satisfied the criteria of social responsibility was any information extra to that required by law. The information gathered on social responsibility from each annual report ws classified as either a social measurement disclosure (SMD) or meaningful social measurement disclosure (MSMD), consistent with Burke's (1980) approach. Any disclosed information that indicated social awareness or disclosure of any area of social concern was classified under SMD. As an example: - "company continues to support national and youth sport activities", "donations to various charitable funds". Those who provided specific quantitative data were included as MSMD. As an example: - "company contributed RM 1.5 million to the Football Association", "staff and management contributed RM22,708 towards the Disaster Fund on 17/05/91", "company offered 38 scholarships to the top STPM 1991 students". The nature of social responsibility disclosure was classified according to Trotman's classification.

6. Findings

Extent of Social Reporting Practices

Table 26.1 shows that 66 per cent of the sampled firms provided some form of socially responsible disclosures in their annual reports in 1992. The amount of information is triple the rate 11 years earlier. This indicates that not only firms disclosed their social activities but the incidence of disclosure has significantly increased over the test period. The number of companies providing MSMD information has increased from zero to 19.

Table 26.1 Social Information Disclosure by Listed Firms: 1982-1992

Year	No. of Companies	No. of Companies Disclosing	No. of Companies Providing MSMD	% of Disclosure
1982	63	14	–	22
1992	100	66	19	66

Disclosure by Company Size

The findings in Table 26.2 show that 92 per cent of companies with market capitalisation exceeding RM3 billion made some socially responsible disclosures. Sixty-seven per cent of the companies with market capitalisation below RM0.5 million had some form of socially responsible disclosures. In absolute terms, categories with market capitalisation ranging between RM0.5 million and RM3 million had the greatest number (79) of firms reporting social disclosures. Generally, the incidence of social responsibility disclosure increases with the size of the company; larger companies tend to provide more quantified information than the smaller companies. One possible reason is that large companies are more profitable and therefore can afford the expense to be more actively involved in social activities to promote their corporate image to the public. Since social responsibility reporting is not mandatory, companies presumably would not have voluntarily disclosed any information unless it served to promote the company's corporate image.

Table 26.2 Social Information Disclosure by Large and Small Firms

Market Capitalisation	No. of Companies	No. of Companies with Disclosures	Percentage of Firms with Disclosures
Below 500	9	6	67
500-800	33	18	55
800-1500	26	17	70
1500-3000	20	14	65
Above 3000	12	11	92
Total	100	66	66

Nature of Disclosure

Table 26.3 shows that information on human resources had the highest incidence of disclosure (48 firms) followed by community involvement (37 firms) and environment

(26 firms). The energy products sector had the lowest incidence with only 4 firms, probably due to the infancy of this industry in the economy. However, the quantitative disclosure (MSMD) was the highest for firms with community projects. For both the categories of SMD and MSMD, there were significant improvements of disclosures compared to 1982. In the 1992 annual reports, MSMD information was the highest in community involvement sector followed by human resource and environment, probably due to the government policy of encouraging the private sector to participate actively in these sectors consistent with the objective of developing the country into an industrialised nation. These findings are inconsistent with those in Australia and United States where the predominance of social information is on environment and energy. This may be due to the greater awareness of environmental issues instigated by government policies and active environmental pressure groups and also environment-friendly investors.

These findings indicate that social inclination in corporate reporting varies among sectors. The possible reasons for the observed differences are: the difference in the legislative requirements on companies in conducting their business; the difference in moral attributes of management among the companies; the degree of awareness of society about corporate social responsibility. Details of each of the four areas of disclosure were examined and the findings suggest that in the human resource category, staff training is the most widely disclosed social information (45 per cent of firms) followed by employees' share option scheme for staff (17 per cent). This could be attributed to these companies' concern for employee performance and skills that are the key elements for their success.

Table 26.3 Nature of Social Information Disclosure, 1982-1992

Area of Disclosure	No. of Firms with SMD	No. of Firms with MSMD	% of Disclosure
Environment	26 (5)	3 (0)	12
Community Involvement	37 (5)	15 (0)	41
Human Resources	48 (14)	7 (1)	15
Products	7 (1)	0 (0)	0
Energy	3 (0)	1 (1)	33

Figures in brackets ( ) are for 1982.

For the community involvement category, the highest incidence of disclosure was about donation of cash to welfare organisations and charities (58 per cent) followed by aid to education, colleges and sports (21 per cent). The possible reason for donations to charities is to exploit the caring culture of the Malaysian society and to earn acceptance from society which could contribute to the long-run survival of the firm in terms of obtaining potential customers and amicable support of the legislators.

For the environment category, most companies expressed support for environment conservation and protection (54 per cent). This contrasts sharply with only 2 firms expressing support for environment conservation in 1982 (compared with 19 out of 36 firms in 1992). This suggests the support from the private sector on the government policy of trying to balance the preservation of the environment and economic development in its quest to achieve industrial nation status. In the products and energy sector only nine companies reported information with respect to product quality, safety and research in 1992; no information on this sector was disclosed in 1982. For the other sectors, in general though there is an increase in SMD, the incidence of MSMD is much lower than SMD since 1992.

7. Conclusions

The findings in this chapter indicate that over an 11-year period, more firms voluntarily disclosed information about their social activities in their financial reports. This is probably due to the growing awareness of firms on the importance of maintaining good public image and perhaps due to the more active roles of consumer groups and the government, encouraging the corporate sector to be more socially responsible. By showing that they are more socially responsible, companies are able to establish better rapport with the public who are potential customers. The disclosure of this information ensures that their good work is recognised by the public at large, upon whose patronage they rely for survival. Large companies seem to disclose more information about their social activities, probably because they can afford the cost and are more concerned about preserving their public image.

Most Malaysian companies do disclose their social activities in their annual reports, though the information provided varies considerably between firms. The significant increase in the number of firms disclosing their social activities and the nature of the activities disclosed reflects the awareness of the corporate sector of the increasing importance of a desirable role in achieving the national economic and social integrity objectives. The type of information provided is generally a brief statement that tends to suggest that they are aware of their social responsibility and are working towards improving it. Unfortunately, most statements are vague and therefore uninformative or inadequate for users to perceive the nature of socially responsible activities pursued. The statements are made in view of getting acceptance as a good corporate citizen, but are not providing details to substantiate such claims. Legislation requiring such declared statements might be more pertinent in the light of current economic development and the recognition of the importance of social responsibility for (environment, soil erosion, etc.) continued development.

CHAPTER

27

Mergers and Takeovers: Share Price Reaction of Bidders and Targets

Abstract

This chapter examines the *announcement period share price performances of bidders and target firms* traded on the Malaysian stock exchange, and their combined wealth effect. The abnormal returns, around the two-day period surrounding the announcement, of all bidders in the takeover sample is not significantly different from zero, though significant negative returns were observed in the pre-announcement period. For target firms, positive significant abnormal returns were observed in the pre-announcement and during the two-day announcement period. This suggests that the combined gains are positive.

1. Introduction

Mergers or takeovers are important acquisition investment decisions that help to increase the size of an acquiring firm (bidder). They also constitute an important corporate economic activity because these activities lead to improvement in the efficient operations of otherwise inefficient target firms. Mergers and takeovers occur in cycles. The volume of merger activities at the peak of such cycles is estimated to be about 10 per cent of the GDP in the case of U.S.A. though mergers in Asian stock markets are not on such a scale. In Malaysia, any firm acquiring more than 33 per cent voting rights of another company is deemed technically to be pursuing a takeover, and is required to comply with the regulations of the Malaysian Code on Takeovers and Mergers 1987 as administered by the Securities Commission.

Takeovers can be broadly classified as friendly or hostile. A friendly takeover is a negotiated acquisition in which a willing buyer and willing seller negotiate the terms under which a takeover occurs. In a hostile takeover, the directors of the target company may oppose a takeover and, therefore, the bidder makes a direct bid by open public invitation to target shareholders to sell their shares to the bidder company. Even in friendly mergers, the practice is to offer publicly the shares for purchase the one difference in hostile takeovers being the opposition by a sitting management. One peculiarity in the local market is that the target may continue to be listed as a separate company after the takeover is completed, and many firms do this. All takeovers lead to a merger of the bidder and target firms in most developed capital markets such as the New York Stock Exchange.

This chapter examines the behaviour of share prices around the time of announcement of the bid. The bidder and target company shares are expected to behave in different ways as predicted by theory.

2. Why Bid for a Company?

Theories

There are several reasons offered in the accounting and finance literature as well as by companies on why bidders engage in takeover activities. They provide strategic diversification; operational gains; increased market power; gains from acquisition of special assets; or are simply a *face-saving* exercise. Firms can create value by undertaking positive net present value projects periodically by mergers. This maximises the value of the firms on behalf of the shareholders. An alternative to regular NPV-enhancing investments is the takeover of an ongoing firm which can increase the value of the bidder after merger for the reasons cited above. That should also be consistent with the shareholder wealth maximisation hypothesis.

This theory postulates that a takeover increases profitability for the joint bidder-cum-target firm's shareholders because the combined entity benefits from the synergy created through the takeover. The source of the synergy could be from operations, that is, through operating economies of scale; financial, that is the ability to take advantage of each other's financial strength, and/or improved management efficiency through replacement of incumbent management in the target firm. The wealth maximisation theory suggests that this form of new capital investment, that is a takeover, should only be pursued if it generates positive gains and creates wealth for the firm's shareholders. There is evidence (McConnell and Muscarella 1965) to support this view as significant positive share price reaction has been observed in many studies in several markets around the time of the announcement of takeover of targets. Acquisitions of targets, therefore, are capital investments and if the acquisitions create wealth for the bidder firms or the target firm, the joint effect for both the bidder and the target should be positive.

Takeovers could be an avenue for bidder management to maximise their utility instead of their shareholders' wealth; this may be called maximising management utility. This behaviour is usually reflected in the increased level of remuneration with an increase in corporate size, sometimes despite poor post- acquisition performance. This is consistent with the notion that seeking growth by means of a takeover is not so much a financially rational pursuit based on management ethics to work for the benefit of shareholders. In takeovers of this nature, overall economic losses are expected, if not at the time of merger, over a longer period of time. Thus, any positive gains obtained by the target firm's shareholders would be offset by a loss to the bidding firm's shareholders.

Another theory is information efficiency. This theory suggests that managers of bidding firms possess superior or unique information regarding the true value of the target firms while those outside the management do not have sufficient information on the target's true value. That is possible given the existence of superior management skills and the prevalence of asymmetric information between groups. However, dissemination of new information prompts the market to revalue the previously undervalued shares of the target firm. If the bidder possesses private information about the target's value it will reveal it in the bid and the stock price will increase to reflect this new information. In contrast, if the market believes that the bidder is overpaying, the bidder's stock price will decrease, a situation described as the winner's curse (Varaiya and Ferris 1987). In practice, at the announcement of a bid, the bidder is expected to offer a price above the current market price of the target firm but below the bidder's estimated true value (private information of bidder only) for the target. If the successful bidder has a high chance of acquiring the target firm at a price below the estimated value for the target, part of the potential gains from the takeover should accrue to the bidder's shareholders. The bidder firms should earn positive and significant abnormal returns at the announcement of the offer.

Evidence

Evidence from bidder returns in takeovers in the U.S.A. show mixed results, ranging from zero (Asquith and Kim 1982), positive (Bradley, Desai and Kim 1988) to negative (Dodd 1980) two-day announcement abnormal returns. Generally, most findings on daily and monthly returns to bidders in takeovers in the U.S.A. are either negative or insignificantly positive (Jensen and Ruback 1983; , Rappaport 1987; Ducan, Moores, Pead and Roberts 1989). The literature is unanimous regarding the positive target firm share price performance in the two-day announcement period (Asquith 1983; Weidenbaum and Vogt 1987; Jarell and Poulsen 1989). The positive abnormal returns probably reflect the expected gains from the combination and the large premiums offered by the bidder at the announcement. An attempt by a bidding firm to gain control of the target's resources to implement a higher valued strategy is assumed to create synergistic wealth effects. Synergy is realised when an increase in the aggregate market value of the two firms is more than a simple sum of the market values of each firm (Weston and Copeland 1988). Several more studies on takeovers (Dodd and Ruback 1977; Schipper and Thomson 1983) report large and significant positive abnormal returns for target shareholders and small but significant positive abnormal returns to bidding firms' shareholders, implying that the positive combined gains are in support of the synergy hypothesis. Since the presence of synergy in takeovers is created from a combination of factors, most analysts are unable to identify the source of synergy.

If the combined gains to target and bidding firms' shareholders are not significantly positive, it implies that there is merely a transfer of existing rights of ownership from the target to the bidder, consistent with the Hubris Hypothesis (Roll 1986). Significant negative returns for bidders and positive returns for the target firm's hareholders showed that gains arising from the acquisition to the target shareholders were at the expense of the bidding firm's shareholders (Dodd 1980).

In the United Kingdom (UK), the evidence (Firth 1980) suggested that successful bidders experienced a decrease in their share prices while the gains accrued only to the target firms. However, another study (Parkinson and Dobbins 1993) on returns to bidder shareholders in takeovers for a different period suggested that bidder companies achieve small, significant positive abnormal returns preceding the bid, which is sustained as small insignificant positive returns in the post-bid period. Findings on combined returns to bidders and targets in takeovers are inconclusive. The combined gains of bidders and targets in the announcement month range from virtually zero (Firth 1980) to positive (Franks, Broyles and Hecht 1977) implying the presence of synergy for merging firms. The wealth effects of takeovers in Australia for the period January 1981-June 1986 (Casey, Dodd and Dolan 1987) showed that the abnormal returns to bidders (called acquirers) are statistically insignificant. Further analysis also suggests that, on average, the raiding acquirors capture a significant greater proportion of the created wealth from the takeover than do non-raider acquirers. This implies that corporate raiders have superior skills in target selection and/or asset management or possibly possess superior information. A recent study (Davidson, Hatfield and Glascock 1994) examines the returns of three groups of bidders who purchased brokerage houses. The evidence suggests that only in the case of horizontal mergers (i.e. one brokerage firm taking over another similar firm) are there abnormal returns. Neither bank holding companies nor non-financial bidders gain significantly when purchasing a brokerage house.

Studies on the Malaysian bidder firm's behaviour have been done over a short period from 1984 to 1989 (Fauzias 1993; Mansor and Lim 1993). These reported that successful bidders neither gained nor lost, but the unsuccessful bidders gained over the announcement period. The acquisition activities create positive gains for the target firms consistent with the synergistic gains hypothesis that target's values are greater after a takeover. In general, most evidence suggests that bidder firms earn zero or negative returns in the post-announcement period. A study by Koh and Lee (1987) suggested that share prices in the Singapore market (this sample included Malaysian firms traded in Singapore) behave the same way with bidder's price not being significantly higher whereas the target firm's share price increases significantly.

Thus, there is strong evidence of target firms gaining from takeover activities. This might be because the full wealth effects may not be observed in the acquiring firms' stock prices at the time of the bids because they are disguised in other information or are a relatively small component of acquired wealth. Second, competition between alternate bidders ensures that any excess returns are earned by the targets. Third, the acquisitions are indeed poor investment decisions by bidders and consequently reflected in the share prices of bidders.

3. Data and Methodology

Data Sources

Sixty bidder and target companies involved in takeovers and listed on the KLSE over a nine-year period (1987-1994) were included in this study. These firms are identified by a search of various publications such as *Investors Digest*, *Daily Diary*, KLSE company files and local newspapers. Daily stock prices and the KLSE Composite Index data were obtained from *Daily Diary*. To ensure the results of this study would have reasonable external validity, the included firms had to satisfy the following requirements:

a. The takeover offer was considered successful if it was declared unconditional as to acceptances.
b. The included firms did not experience any major corporate event at the time surrounding the announcement of the bids. Examples of such events are death or appointment of key executives, announcement of financial reports and new investment programmes.
c. The target companies must be independent of the bidder companies. Target companies that are partially- or wholly-owned subsidiaries are excluded.
d. The shares of the company must be frequently traded in the KLSE. There must be continuous price information on its shares during the study period, at least 29 trading days before and after the announcement of takeovers.
e. All takeovers with unreliable and apparently incorrect data are eliminated.

Methodology

The event study methodology was used to examine the share price behaviour of bidding and target firms over a period of 14 days before and 14 days after announcement date. The announcement date was the date when the press first publicly announced the takeover proposals. However, for the purpose of analysis, the returns on both day -1 and day 0 were considered as due to possible leakage of announcement information. To measure the normal expected return, E(R), without the impact of the announcement, the Market Model regression (Sharpe 1963) was run using data over 60 months prior to the -14 days before the announcement:

$$R_{it} = \alpha_i + \beta_i R_{mt} + e_{it} \tag{27.1}$$

where

R_{it}: the expected returns for bidder firm i on day t,

α_i, β_i: ordinary least square intercept and slope coefficient respectively for firm i,

R_{mt}: returns at time t calculated from the market index, and

e_{it}: the i.i.d. residual with no autocorrelation.

The regressions were run separately for the pre- and post-announcement periods. Since merger or takeover changes the riskiness of firms, the parameters from the Market Model were re-estimated for the two separate periods. The daily returns of each firm were calculated as

$$R_{it} = (P_t - P_{t-1}) / P_{t-1} \tag{27.2}$$

where P indicates daily closing prices adjusted for capitalisation, t-1 is the previous lagged observation and i indicates bidding or target firms. The market returns were calculated in a similar manner using the daily closing index values. The intercept value was reset for daily.

The abnormal returns, AR_{it}, due to the effect of takeover announcement wes estimated after adjusting the returns to the bidding and target firms as follows:

$$AR_{it} = R_{it} - (\alpha_i + \beta_i R_{mt}) \tag{27.3}$$

where

AR_{it}: the abnormal returns of bidding firm i on day t,

Parameters α and β are estimated using the Market Model, and

All other terms are as defined earlier.

For a group of N firms, for example, the bidding firms daily *average* abnormal returns for each day t was computed as a simple arithmetic average of the abnormal returns of that group of firms at time t. This is the AR shown in the tables in the next section as average abnormal returns. The cumulative average abnormal returns (CARs) over an interval T_1 to T_2 were calculated as the sum of average abnormal returns over the time period between the intervals:

$$\mathrm{CAR}_T = \Sigma_{t=T1...T2} (\mathrm{AR}_t) \quad (27.4)$$

In the absence of a price effect from the bidding activities, the expected values of average abnormal returns (ARs) and cumulative average abnormal returns (CARs) must be zero. Price effect is likely to be observed around the time of announcement of takeover. Therefore, the strategic hypothesis is that there is a price effect at the time of takeover bids on the bidder and target firms. This suggests that there is significant positive ARs and CARs as tested by their respective t-values.

4. Findings

Price Effect on Bidder Firms

Table 27.1 is a summary of the average abnormal returns and the cumulative average abnormal returns for the 60 bidders in takeovers. The abnormal returns were measured 14 days before and 14 days after the announcement of the bids.

These findings show that the abnormal returns on day -1 and on the announcement day were positive but almost equal to zero and not significantly different from zero. The two days after announcement CAR (CAR=0.0014, t=0.235) were also positive but not significantly different from zero. This implies that bidding firms' shareholders in takeovers earn no normal returns at the announcement of the offer as there was no price effect. This could be due to early anticipation and discounting of the information content of the pending offer well before the announcement day (the AR for day -13 was negative and significant). Though these findings are apparently inconsistent with the view that acquisitions are wealth-creating investments, there might be other factors dominating the positive wealth effect of acquisitions at the announcement of the offer. For example, in the enthusiasm to take over the target resources, the bidder management may have overstretched its financial and management resources resulting in losses of efficiency in its current business activities.

There is also a possibility that bidders were offering higher premiums than what the market was expecting them to pay for their targets at the announcement of the offer. Large premiums are perceived by the market as increasing the chances of the bidder not being able to realise positive expected returns in the post-acquisition period. The pre-takeover share price can be assumed to reflect an expectation that the bidding firm will pursue investments, including acquisitions, yielding a rate of return above the minimum acceptable cost of capital. Thus, if the market believes that the acquisition will at best only earn the cost-of-capital used in acquisition, share price can be expected to decline. The negative AR on day -13 supports this conjecture.

The announcement day returns for all bidders in this study were consistent with the findings of announcement period returns of successful bidders (Mansor and Lim 1993) and inconsistent with most of the evidence from the U.S.A. (Mandelker 1974; Asquith 1983; Bradley, Desai and Kim 1988).

Price Effect on Target Firms

The average abnormal returns and the cumulative average abnormal returns surrounding the announcement of all target firms in takeover bids are presented in Table 27.2.

The abnormal returns on day-14 (AR=0.0124) were positive and significantly

Table 27.1 Average Abnormal Returns (AR) and Cumulative Abnormal Returns (CAR) for Sixty Bidder Firms Surrounding the Announcement

Day	AR	t-Statistic	CAR
-14	0.0048	1.364	0.0048
-13	-0.0055	-1.894**	-0.0007
-12	0.0008	0.204	0.0001
-11	-0.0031	-0.769	-0.0029
-10	-0.0012	-0.357	-0.0041
-9	-0.0060	-1.074	-0.0101
-8	0.0042	0.944	-0.0059
-7	-0.0010	-0.272	-0.0069
-6	-0.0049	-1.061	-0.0118
-5	-0.0070	-1.425	-0.0188
-4	0.0009	0.211	-0.0178
-3	0.0034	0.654	-0.0144
-2	0.0050	1.385	-0.0094
-1	0.0011	0.344	-0.0083
0	0.0002	0.051	-0.0081
1	0.0083	1.159	0.0002
2	0.0049	0.458	0.0051
3	-0.0035	-0.785	0.0017
4	-0.0036	-1.185	-0.0019
5	-0.0010	-0.279	-0.0029
6	-0.0074	-2.478*	-0.0103
7	-0.0062	-2.203*	-0.0164
8	-0.0046	-1.117	-0.0210
9	0.0036	0.382	-0.0197
10	0.0042	0.709	-0.0156
11	0.0001	0.019	-0.0155
12	-0.0089	-2.749*	-0.0244
13	0.0057	1.525	-0.0187
14	0.0013	0.193	-0.0174

Significant at * 0.05 and ** 0.10 per cent level

different from zero. The two-day announcement (day -1 and day 0) CAR was positive (CAR=0.0185) and significantly different from zero. These results mean that the target shareholders earned significant positive abnormal returns at the announcement of the offer. This might be due to the expected benefits from the takeover and the large premia offered by the bidders. The positive and significant ARs two weeks before the announcement were probably due either to calculated guess and/or information leakage about the offer. The latter is a more probable cause for the announcement day share

Table 27.2 Average Abnormal Returns (AR) and Cumulative Abnormal Returns (CAR) for Target Firms Surrounding the Announcement

Day	AR	t-Statistic	CAR
-14	0.01239	3.024*	0.0124
-13	-0.00293	-0.748	0.0094
-12	-0.00261	-0.674	0.0068
-11	-0.00448	-1.172	0.0023
-10	0.00412	1.392	0.0065
-9	0.00039	0.058	0.0068
-8	-0.00049	-0.779	0.0063
-7	0.00486	1.087	0.0112
-6	0.00092	0.210	0.0121
-5	-0.00156	-0.314	0.0105
-4	0.00527	0.819	0.0158
-3	0.00767	1.227	0.0235
-2	0.00693	1.456	0.0304
-1	0.00897	1.271	0.0394
0	0.00959	1.002	0.0490
1	0.00454	0.497	0.0535
2	0.00620	0.936	0.0597
3	-0.00225	-0.472	0.0574
4	-0.00248	-0.593	0.0550
5	-0.00745	-2.286**	0.0475
6	-0.00436	-1.186	0.0432
7	-0.00338	-0.842	0.0398
8	-0.00301	-1.006	0.0368
9	-0.00404	-1.683	0.0327
10	0.00164	0.486	0.0344
11	0.00292	0.593	0.0373
12	-0.00008	-0.286	0.0372
13	0.00280	0.792	0.0400
14	-0.00325	-0.985	0.0368

*Significant at 0.01 and ** 0.05 per cent level

price inactivity as bidders experienced negative and significant returns on day -13. These results are consistent with the findings on target firms' returns in developed economies.

Combined Price Effect of Bidders and Targets

Findings in Tables 27.1 and 27.2 imply that the combined price effect may still be positive for both firms. The distribution of expected benefits in favour of target firm shareholders at the announcement of the offer could be due to a combination of factors such as competition for the target, target management's resistance, and lack of information about the target firm and its industry. This implies that the combined gains are positive and there is synergy in takeovers. The combined gains summarised in Tables 27.3 and 27.4 show the presence of synergy in takeover activities of Malaysian firms, implying mergers and takeovers create value and therefore are consistent with wealth-

Table 27.3 Combined AR's of All Bidders and Targets

Day	AR	t-Statistic
-14	0.0172	3.176*
-13	-0.0084	-1.598*
-12	-0.0018	-0.314
-11	-0.0076	-1.143
-10	0.0029	0.529
-9	-0.0056	-0.571
-8	0.0037	0.510
-7	0.0038	0.597
-6	-0.0039	-0.552
-5	-0.0085	-1.098
-4	0.0062	0.677
-3	0.0110	1.125
-2	0.0119	1.985**
-1	0.0100	1.202
0	0.0098	0.889
1	0.1283	1.090
2	0.0111	0.934
3	-0.0057	-0.787
4	-0.0060	-1.011
5	-0.0084	-1.682
6	-0.0117	-2.246
7	-0.0095	-1.679
8	-0.0076	-1.357
9	-0.0027	-0.647
10	0.0058	0.785
11	0.0029	0.419
12	-0.0089	-1.550
13	0.0084	1.621
14	-0.0019	-0.263

* Significant at* 0.01 and ** 0.05 per cent level

Table 27.4 Combined CAR's for Various Periods with Different Intervals

Interval Period	CAR level	t-Stat	Significance
(-4, 0)	0.0491	2.425**	.05%
(-3, 0)	0.0429	2.378**	.05%
(-2, 0)	0.0318	2.104**	.05%
(-1, 0)	0.0199	1.434	Not Significant

creation hypothesis. The positive combined returns also imply that takeovers are an effective means of deploying resources to a higher value use and are consistent with the notion that takeover activity can effectively discipline complacent managers and mitigate the agency problem.

However, unlike most findings in the literature where the combined gains are observed at the announcement period, the information content of the takeover announcements in this study were anticipated well before the announcement day since significant abnormal returns were observed in the pre-announcement period.

The process restores some equilibrium in the industry in terms of relative firm size. There is an incentive to increase firm size because it is relatively expensive for potential bidders to take over large targets. Evidence in other markets (Jensen and Ruback 1983; Shamsher and Annuar 1991) suggests that bidder managers pursue growth rather than profit objectives because size provides both pecuniary and non-pecuniary benefits to the bidder managers.

5. Conclusions

The two-day period abnormal returns of all bidders in the takeover sample was not significantly different from zero, though significant negative returns were observed in the pre-announcement period. For target firms, positive and significant abnormal returns were observed in the pre-announcement and during the two-day period around announcements. The returns to bidder firms might have been due to one or more of the following factors: expected loss of efficiency for the bidders current business operations due to management time and effort expected spent on the takeover; the takeover's lack of commercial or industrial logic as perceived by the market; excessive premiums offered to target at announcement; competition from other potential bidders; and lack of information about the target's business and its industry.

The bidder firms' share price performance in the pre- and at announcement periods, however, should not be construed as a signal that bidder management are not acting in the best interests of their shareholders as the findings were not about the long-term effect of the takeovers to answer that question. It is naive to assume that bidder managers are consistently making irrational investment decisions, because they would be jeopardising their own position as they would become the target of other bidders. It might be that most of the bidders are pursuing targets merely as a long-term strategy to gain a competitive advantage in their respective markets or industries. This view is accepted by the market as the combined gains are significantly positive, implying that takeover firms do create wealth for the shareholders of the combined firm in the long run.

Managers prefer to increase the size of their corporation because of the ability of shareholders to monitor management decreases in larger and complex organisations (Weidenbaum and Vogt 1987). As described in Chapter 25, it is in the long-term interests of managers to pursue self-interest rather than shareholders' interests and this often implies increasing the size of the firm. Our evidence here is also consistent with the agency problem. While to some extent the agency problem is mitigated by the takeover market, it helps at the same time if firms increase their size to benefit bidder firm's management. If most bidder managers pursue takeovers for growth purposes at the expense of their shareholders' interests, we can expect on average their combined gains to be either zero or negative. The findings in this study are not consistent with the growth maximisation hypothesis. The positive significant combined gains of bidders and targets do not support the hubris hypothesis (Roll 1986) that postulates that takeovers are a zero-sum game, that is, gains to target shareholders are offset by the losses to bidder shareholders. In all, there are more questions raised by this study than answers, suggesting that more research should be done on this important topic.

PART

6

Corporate Financial Decisions

In this Part, we examine selected financial decisions of Malaysian companies. Corporations make five key financial management decisions, namely (a) working capital, (b) capital budgeting, (c) financing, (d) acquisition and (e) dividend decisions. These decisions are interrelated, but can be studied independently by examining the average behaviour of a representative sample of companies. Findings on the capital structure and dividend behaviour of Malaysian companies are reported in this part, which also examines the usefulness of financial ratios to describe the financial health of companies. (Acquisition decisions were examined in Chapter 27.)

In Chapter 28, we examine the application of financial ratios for describing and predicting the financial health of companies. To our surprise, we found that financial ratios are not very useful in predicting the future conditions of an average firm, though financial ratios are still useful in making comparisons across companies and industries. The distributions of various ratios were also found to be not normally distributed, as can be seen from the findings in Chapter 29. This suggests that statistical tests using ratios have to be designed carefully and interpreted with caution. The capital structure of Malaysian companies was found to be robust in that, on average, companies are capitalised predominantly with equity, and debt is less than 40 per cent of the capital structure; (Chapter 30). Firms in most East and South Asian economies have close to two-thirds debt and less than only one-third equity.

The final chapter, Chapter 31, covers dividend decisions. Malaysian firms pay reasonable dividends, and they do change dividends more often than in more mature markets. However, dividend yields of Malaysian companies are perhaps among the highest in the Asia Pacific countries. Earnings in the current year do affect the dividend decisions of companies, as the theory suggests. But the speed at which current earnings are translated into increased/decreased dividends is more moderate, reflecting management's tendency to retain more of the earnings (i.e. firms decide on low payout) to finance growth in sales.

CHAPTER

28

Financial Ratios and Investment Analysis

Abstract

This chapter examines the relationship between certain commonly used financial ratios and rates of return on common stocks. Analysis suggests that ratios *are not useful in differentiating between stocks yielding high and low rates of returns*. In general, neither the simple average ratio models nor the exponentially weighted average ratio models have (statistically significant) ability to predict future rate of returns. This evidence casts serious doubt upon the usefulness of financial ratios in helping Malaysian investors to form expectations about future common stock performance based on ratio analysis. These findings are consistent with an efficient market.

1. Introduction

Financial ratios are variables derived from data disclosed in financial statements, and are widely used by investors to evaluate corporate financial performance. Financial ratios are commonly used in analysis of industry characteristics and predictions of bankruptcy and bond ratings (Altman 1968), detecting distributional characteristics (Deakin 1976) and prediction of failure (Beaver 1966). However, there is scarce evidence on the usefulness of ratios to investors in common stocks. Any method for obtaining knowledge of the expected future rate of returns of a stock is valuable to investors for making informed investment decisions. Financial ratios play a significant role in financial analysis as these ratios can be used to describe the state of health of an ongoing firm at a given point in time. Further, the same information can be analysed over time to reveal trends which, hopefully, are correlated with the firm's stock price. It is in these two ways that the ratios are useful.

This chapter examines the usefulness of financial ratios to investors in making a calculated judgement about expected returns when investing in common stocks. The next Section looks at pricing process and how information is *embodied* in the prices. In Section 4, we examine evidence from several developed markets on how financial ratios behave and are correlated with stock prices. After examining the evidence in Section 5 on the use of ratios in the Malaysian capital market, this chapter ends with a discussion in Section 6.

2. Some Insights about the Common Stock Pricing Process

Common stocks represent ownership interest in a company, and entitle the owners to the residual earnings of the firm. The board of directors may choose to pay dividends and retain part of the earnings to invest in assets that produce more future earnings. The total returns for holding common stocks are (a) dividends and (b) capital gains, which are a reflection of the value of the future earnings from retained earnings invested in positive net present value projects. When stocks are sold at some future date at a price greater than the purchase price, capital gains are earned. Dividends are usually paid during the holding period. Though most firms have only one type of common stock, some firms issue more than one type of securities to meet their special needs (for example, there is one listing of a Share A firm on the KLSE). These include convertible loan stocks, options, preferred stocks, etc.

New companies seeking to obtain funds from outside sources frequently use different types of common stocks. For example, when a firm prepares for listing on the Main Board of the Malaysian Stock Exchange, its Class A stock is sold to the public, who are paid dividends but have no voting rights for five years. Its Class B stocks are retained by the founders and have full voting rights for five years, but dividends are not paid on the Class B stocks until the company has established its earning power by building up retained earnings to a designated level. The use of *classified* stocks enables the public to take a position in a growth company without sacrificing income, while the founders retain absolute control during the crucial early stages of the firm's development. Simultaneously, outside investors are protected against excessive withdrawals of funds by the original owners. Note that Class A, Class B and so on have no standard meanings. Most firms have no classified shares, but a firm that does could designate its Class B shares as founders' shares and its Class A shares as those sold to the public. Meanwhile, other firms could use stock classifications for entirely different purposes. For example, when General Motors acquired Hughes Aircraft for US$5 billion, it paid in part with a new Class A common, GMH, which had limited voting rights whose dividends were tied to Hughes's performance as a GM subsidiary. The reasons for the new stock were, first, GM wanted to limit voting privileges on the new classified stock because of management's concern about a possible takeover and, secondly, Hughes's employees wanted to be rewarded more directly on Hughes's own performance than would have been possible through regular GM stock.

The earnings of a firm do not automatically become returns to a common stockholder. The returns come from dividend payments and/or appreciation of the market value of the stock from reinvestments of earnings and new investments. The rate of returns on an investment in stock reflects both dividend payments and the change in market price of the stock since the date the stock was purchased. The investor's decision to buy, sell or hold a particular stock is largely dependent on his expectation of the future rate of returns on investment in that particular stock. Investors use the future rate of return as a yardstick for making investment decisions.

In general, an ideal market is one in which prices provide accurate signals for investors to choose among the securities that represent ownership of a firm's activities under the assumption that security prices at any time *fully reflect all available information*. A market in which prices always fully reflect available information is called a Fama-efficient market. If the stock price fully reflects all available historical market price information, then it is weak-form efficient. If the stock reflects all publicly available information (e.g. published financial data, announcement of annual earnings, etc.), then it is semi-strong efficient. The strong-form efficient market reflects all information including non-published private information through *insider trading* on unpublished information.

There is considerable evidence that investors use financial ratios in their analysis of published data (Deakin 1976; Lev and Sunder 1979), implying its usefulness consistent with the accounting and finance literature which asserts that ratio analysis is useful to investors. The semi-strong efficiency is relevant to the findings discussed in this chapter. In such a market the value of information is rapidly discounted in the share prices leaving no economic value other than to the first marginal investor processing the information. If the implications of semi-strong efficiency are accepted, then investors cannot use publicly available information in the form of financial ratios to consistently earn abnormal returns. Although published financial data in the form of ratios may serve a social function in assisting in setting equilibrium market prices, there is no reason to expect such data to be useful to the individual investor in predicting future returns on common stocks.

3. Evidence on Financial Ratios and Stock Prices

There are two principal uses of financial ratios. The traditional and normative use of a firm's ratios is to compare them to a standard set of ratios. Ratios are used positively when empirical relationships - usually for predictive purposes - are estimated from ratios and other variables such as prices. Financial ratios are used by accountants and financial analysts to forecast future financial variables, e.g. estimating future profit by multiplying predicted sales by the profit margin, and by researchers for predictive purposes such as corporate failure, credit rating, assessment of risk and testing economic hypotheses using financial ratios as inputs.

Beaver (1966) investigated the extent to which changes in stock market prices can be used to predict the failure of firms and the degree of reliance investors may place on financial ratios in assessing the solvency position of firms. Using a sample of 79 failed and 79 non-failed firms during the period 1954-1964, annual rates of return were computed for the failed and non-failed firms for five years before failure. The evidence suggested that the median of returns for the failed sample that was unadjusted for market-wide event was below the non-failed, and that the difference in medians increased as failure approached. Furthermore, the cross-sectional dispersion of returns for the failed firms was greater than the non-failed firms, which is consistent with the belief that the failed firms were riskier. To mitigate the effect of economy-wide events, each rate of return was adjusted for market-wide changes. Similar results are observed except that the differences between the failed and non-failed firms are slightly higher. Seventy-eight per cent of the sampled firms were accurately classified five years before failure using the ratios.

O'Connor (1973) studied the usefulness of financial ratios to investors in common stocks and concluded that ratios used either singly or from multivariate analysis are not useful in differentiating between stocks yielding high and low returns. Sundarsanam and Taffer (1995) that suggested that the effect of firm size must be controlled. For this to occur, the financial ratio analysis must ensure that the ratios in the values in the numerator bear strict proportionality with the values in the denominator. An analysis of 24 ratios in six different industries for over 500 firms showed that the proportionality condition was not satisfied for any of the ratio component relationship and this gives support for the use of industry mean in ratio analysis. Wu Chunchi, Chihwa and Cheng (1992) showed that the rational expectations model explains the dynamic adjustment of financial ratios reasonably well. This model provides a more efficient framework than simple partial-adjustment model for predicting future ratios.

4. Data and Methodology

Data

The data for this study were secured from the annual *Companies Handbook* published by the KLSE over the test period (1982-1991) for 54 firms in the then Industrial sector. This period was chosen by design because it allowed analysis to cover both economic recession and boom. The data were categorised into two five-year periods sequentially. The analysis was done with sub-samples for which we examined the ratios and then constructed multivariate models for prediction purposes. A validation sub-sample was used to test the validity of the predicted results.

The closing prices for the first and the last trading day of the financial year for the sampled firms and the market (represented by the Industrial Index and the KLSE Composite Index) were extracted from *New Straits Times* daily reports and the exchange's *Daily Diary*. Nine financial ratios suggested by theories were estimated for each firm in the study period as independent variables in the models. These ratios were:

a. Total liabilities over net worth (TL/NW). This ratio was expected to be positively related to the rate of return (ROR). An increase in this ratio suggests an increase in financial risk, and therefore an increase in shareholder required rate of return.
b. Working capital / Sales (WC / Sales). This ratio was expected to be negatively related to ROR because the lower value of this ratio indicates the more efficient use of working capital to generate sales and therefore higher returns per unit of working capital used (assuming that costs increase at a decreasing rate).
c. Sales / Total assets (Sales / TA). This ratio was expected to be positively related to ROR because of favourable market reaction to the efficient use of total resources.
d. Income available for common shareholders / Net Worth (IAC/ NW). This ratio was expected to be positively related to ROR because of favourable market reaction to an increased growth in distributable earnings.
e. (Income per common share - Dividend per common share) / Income per common share ((IPCS - DPCS) / IPCS). This ratio was expected to be positively related to ROR in a growth oriented market and negatively related in a dividend oriented market.
f. (Net income before taxes - taxes) / NIBT ((NIBT - IT) / NIBT). This ratio was expected to be positively related to ROR because a smaller tax will increase distributable net income per share.
g. Cash flow / Number of common shares (CF / No. Com. Shs). This ratio was expected to be positively related to ROR. The higher the cash flow, the higher the value of the firm.
h. Current liabilities / Inventory (CL / Inv). This ratio was expected to be negatively related to ROR.
i. Earning per share / Price per share (EPS / PPS). This ratio was expected to be positively related to ROR because an increase in this ratio implies an increase in risk and a demand for greater return.

Table 28.1 Expected Relationships between Ratios and Returns on Stocks

Ratios	Expected relationship with rate of return
TL / NW	Positive
WC / SALES	Negative
SALES / TA	Positive
INCOME / NW	Positive
INCOME(NET DIV) / INCOME	Positive
NIAT / NIBT	Positive
CASH FLOWS / COMM. SHARES	Positive
CL / INVENTORIES	Negative
EPS / PRICE	Positive

The expected relations between ratios and the rate of returns on stocks are indicated in Table 28.1. A correlation analysis between ratios for the first sub-sample showed that though intercorrelation existed among the nine representative ratios, it was low (less than 0.30). This strengthens the validity of the ratios as explanatory variables in linear multiple regression models.

Methodology

Simple and Exponentially Weighted Average Ratios: Two methods were employed in combining a series of five annual ratios of each firm into a single value used in the analysis. First, the simple average method, that is for each firm, five annual values (sub-periods 1 and 2) of each ratio were added and divided by five to derive average values. The simple average method does not reflect the fact that the recent ratios are more important in decision making. To overcome this problem, the exponentially weighted average method was used for computing average ratio values. The five annual values over the two sub-periods of each ratio were weighted with the most recent value given greater weighting as shown below:

Year	Weightage	Years	Weightage
1982	1/5	1987	1/5
1983	2/5	1988	2/5
1984	3/5	1989	3/5
1985	4/5	1990	4/5
1986	5/5	1991	5/5

To ascertain the difference between the mean ratio of upper and lower quartile firms for both averaging methods, the firm's single mean (average) values of each ratio were ranked from small to large values. The difference in the mean value of each ratio for both methods was computed with the lower and upper quartile (consisting of 14 firms each) and tested for statistical significance.

Multivariate Analysis: The multivariate analysis was divided into three sections, first, linear multiple regression; second, step-wise regression and the third tested explanatory relationship. The linear multiple regression was used to formulate the explanatory relationships between average financial ratios for both simple averages and exponentially weighted average ratios and the rate of return (ROR) on common stocks. The ROR unadjusted for both market and industry effects, ROR adjusted for industry effect, ROR adjusted for market effect and ROR adjusted for both market and industry effects served as dependent variables at different stages of analysis.

The rate of returns on common stocks (ROR_{it}), was estimated by adding the dividends and capital gains received by investors on investment in common stocks:

$$ROR_{it} = (D_{it} + P_{it} - P_{it-1}) / P_{it-1} \tag{28.1}$$

where

P_{it}: price for stock i at time t,

P_{it-1}:price for stock i at time t-1, and

D_{it}: cash dividends paid on stock i between time t-1 and t.

A step-wise linear multiple regression analysis was also conducted until one of the nine ratios entered the regression equation with a coefficient that was not significantly different from zero at the 0.05 level. The financial ratios in the regression for the step immediately preceding the entry of a ratio with a coefficient not significantly different from zero, along with their respective coefficient and the constant term formed the explanatory relationship that was later tested for predictive ability. A 0.05 level of significance was used in exponentially weighted average rate versus rate of return regressions because often the addition of explanatory variables with coefficients that were not significant at the 0.05 level did not show any improvement in R-square. However, a 0.10 level of significance was used in simple average ratios versus rate of return regressions because at 0.05, 0.06, 0.07 and 0.08 level of significance, the R-square for each regression was zero and the R-square improved at 0.10 level of significance.

The basic explanatory relationship between the rate of returns and the ratios is expressed as follows:

$$ROR_j = a + b_1x_{1j} + b_2x_{2j} + b_3x_{3j} + ... + b_9x_{9j} + e_j \tag{28.2}$$

$$\text{for } j = 1, 2, 3, \ldots, n,$$

where n is the number of firms in the sample. Eight sets of explanatory relationships were constructed. The first set of explanatory relationships was constructed using simple average ratios and rates of returns unadjusted for market and industry effects. The second set used simple average ratios and industry adjusted rates of return. The third set used simple average ratio and market adjusted rate of returns. The fourth set utilised simple average ratios and market and industry adjusted rate of returns. The fifth to eighth sets of explanatory equations were repeated using the exponentially weighted average ratios.

Tests of explanatory relationships between ratios: To test the predictive ability of the multivariate models, the explanatory relationship between ratios and rate of return for the first period was used to predict the stock returns for the second period. The predicted returns were compared with the actual returns and the differences between the mean values of the returns were tested for statistical significance. If the null hypothesis (H_0) of no difference in mean returns is accepted, it would imply that the future stock returns can be predicted using the regression equation and the financial ratios are considered useful. Otherwise, if H_0 is not accepted, this implies that there is a difference between the mean returns and the actual returns are difficult to predict and therefore the ratios are not useful in predicting the returns on common stocks.

5. Findings

Univariate Analysis

Differences in the mean ratio values of lower and upper quartiles: Findings summarised in Tables 28.2, 28.3, 28.4 and 28.5 show that there were very few cases of statistically significant difference between the mean ratio values of firms from the upper and lower quartiles.

Table 28.2 Mean Values of Ratios in Lower and Upper Quartiles and the t-Statistics on the Difference, 1982-86 (Simple Average, Unadjusted ROR)

Ratios	Upper Quartile Mean	Lower Quartile Mean	t- value for the difference
TL / NW	1.0052	1.6540	-1.311
WC / Sales	0.6164	0.6979	-0.538
Sales / TA	1.4195	0.8476	2.027
Income / NW	0.0866	0.0252	1.203
Income(net div) /Income	0.4557	0.7066	-1.655
NIBT / NIAT	0.8296	0.2176	1.271
Cash flow / Com. Shares	0.1984	0.3776	-2.009
CL/Inventories	3.8593	2.8262	0.614
EPS / PRICE	0.1107	0.0447	0.502

The findings suggest that, generally, financial ratios used on a univariate basis are not useful in differentiating between stocks yielding high and low rates of return. Similar findings are observed using exponentially weighted average ratios with market and industry-adjusted rates of return.

Table 28.3 Mean Values of Ratios in Lower and Upper Quartiles and the t-Statistics on the Difference, 1987-91 (Simple Average - Unadjusted ROR)

Ratios	Upper Quartile Mean	Lower Quartile Mean	t- value for the difference
TL / NW	1.6222	1.0822	1.234
WC / Sales	0.5249	0.9291	-0.865
Sales / TA	1.2366	1.1689	0.260
Income / NW	0.0539	0.0074	0.689
Income(net div)/Income	0.6857	0.2649	0.390
NIBT / NIAT	1.0363	1.0021	0.079
Cashflow / Com. Shares	0.2983	0.1700	0.716
CL/Inventories	1.8359	2.8618	-1.908
EPS / PRICE	-0.0071	0.1898	-1.181

Table 28.4 Mean Values of Ratios in Lower and Upper Quartiles and the t-Statistics on the Difference, 1982-1986 (Exponentially Weighted Average, Unadjusted ROR)

Ratios	Upper Quartile Mean	Lower Quartile Mean	t- value for the difference
TL / NW	0.6200	0.7380	-0.609
WC / Sales	0.3674	0.4027	-0.269
Sales / TA	0.7898	0.4711	1.966
Income / NW	0.0394	-0.0098	1.320
Income(net div)/Income	0.1897	0.3052	-1.038
NIBT / NIAT	0.1207	0.4825	-1.221
Cashflow / Com. Shares	0.2435	0.0619	2.739
CL/Inventories	1.1351	2.1372	-2.072
EPS / PRICE	0.0436	0.0608	-0.201

Multivariate Analysis

Linear Multiple Regression: Table 28.6 summarises the results of the multiple regression analysis. The simple and exponentially weighted average with unadjusted rates of return equations yielded a high R-squared values of 0.78093 and 0.80676 respectively over the first test period. This implies that 78 per cent and 80 per cent of the changes in the rate of returns were explained by the ratios. The large value of F-statistic suggests that the model is generally a good-fit and therefore might be useful for predictive purposes. Five out of nine ratios had coefficients in the predicted direction.

Table 28.5 Mean Values of Ratios in Lower and Upper Quartile and the t-Statistics for the Difference for the Period 1987-91 (Exponentially Weighted Average - Unadjusted ROR)

Ratios	Upper Quartile Mean	Lower Quartile Mean	t- value for the difference
TL / NW	0.9065	0.6214	1.043
WC / Sales	0.2961	0.2824	0.069
Sales / TA	0.7843	0.6930	0.604
Income / NW	0.0497	0.0065	0.942
Income(net div)/Income	0.0080	0.2472	-0.464
NIBT / NIAT	0.7339	0.7276	0.015
Cashflow / Com. Shares	0.2369	0.0644	1.527
CL/Inventories	1.1197	1.7373	-1.684
EPS / PRICE	0.1194	-0.0074	1.307

However, for the next sub-period, the value of R-square suggests that ratios did not have much ability to explain the variability in the rates of return. The highest R-square among the eight equations was 0.467 for the weighted average ratio with market and industry-adjusted returns. The linear multiple regression included all the independent variables simultaneously into the equation. Using this approach it is difficult to determine which variables belong to the model.

Step-wise Regression Analysis

To mitigate this problem a step-wise regression was used in which one independent variable was included at a time in the equation until all the strongly linearly-related variables were included and those not related to the dependent variable were excluded. The results from the step-wise regression analysis summarised in Table 28.7 suggest no explanatory relationships appear to exist between simple average ratios and adjusted or unadjusted rates of return at 0.05 level. Similar results were observed for exponentially weighted ratios. The order of entry of the ratios in the regression shows the greatest ability among the non-entered variables to explain the variability in the rate of returns. For all the four sets of simple average - rate of return explanatory equations, X_2 (Working Capital / Sales) is the first variable to enter the regression followed by X_7 (Cash Flow / Number of Common Shares) and the last variable entered is X_8 (Current Liabilities / Inventory) ratio.

The coefficients of all the variables entering the regression did not show signs in the predicted direction except for X_2 (Working Capital / Sales). The ratios did not show much ability to explain the variability in the rate of returns. The R-squares for simple average rates of return (adjusted or unadjusted) equations ranged from 0.2008 to 0.2519 for the period 1982-1986. The F-statistic suggests that the model-fit is weak to construct meaningful relationships between the ratios and the simple average rate of returns for predictive purposes.

Table 28.6 Summary Results for Linear Multiple Regression Analysis

Models	R-Square		F-Statistic	
	1982-86	1987-91	1982-86	1987-91
Simple Average Ratios Vs Uadjusted ROR	0.781	0.397	20.05	3.710
Simple Average Ratios Vs Industry Adjusted ROR	0.147	0.314	0.969	2.580
Simple Average Ratios Vs Market Adjusted ROR	0.331	0.326	2.781	2.729
Simple Average Ratios Vs Market & Industry Adjusted ROR	0.387	0.407	3.55	3.860
Weighted Average Ratios Vs Industry Adjusted ROR	0.202	0.243	1.424	1.806
Weighted Average Ratios Vs Market & Industry-Adjusted ROR	0.361	0.467	3.182	4.94

Table 28.7 Summary Results for Stepwise Regression Analysis

Models	R-Square	F-Statiostic
	1982-86	1982-86
Simple Average Ratios Vs Uadjusted ROR	0.20	4.21
Simple Average Ratios Vs Industry Adjusted ROR	0.20	4.18
Simple Average Ratios Vs Market Adjusted ROR	0.25	4.13
Simple Average Ratios Vs Market & Industry Adjusted ROR	0.20	4.25
Weighted Average Rations Vs Unadjusted ROR	0.36	7.11
Weighted Average Ratios Vs Unadjusted ROR	0.32	7.22
Weighted Average Rations Vs Market Adjusted ROR	0.32	7.77
Weighted Average Rations Vs Market & Industry-Adjusted ROR	0.38	7.69

The results for the weighted average ratios for the period 1982-1986 show that the first variable to enter the regression was X_2 (working capital/sales) followed by X_7 (cashflows/common stocks), X_8 (current liability/inventory) and lastly X_3 (sales/total assets) for all the adjusted and unadjusted rates of returns. The R-squared values ranged from 32 to 38 per cent consistent with the expectation that recent data are more informative than past data. Although there was an improvement in R-squared value compared to simple average returns, the R-squared values were too low to meaningfully explain the variability in the exponentially weighted rates of returns.

Similar results were observed for the second period. The R-squared values for both simple and exponentially weighted average ratios ranged from zero to 18 per cent, suggesting that the selected ratios were unable to explain a large part of the variability of rate of returns. Comparison of R-squared values for exponentially weighted averaged unadjusted return equation with that of exponentially weighted average market adjusted return equation (Tables 28.6) shows the presence of the market effect on the rate of returns for both periods. The R-squared values ranged from 0.806 and 0.407 for unadjusted equation to 0.316 and 0.217 for the market adjusted equation, consistent with King's (1966) findings.

Tests of Predictive Ability

The tests of predictive ability are poor: Table 28.8 shows that at 0.05 level of significance level, the explanatory relationships cannot be good for prediction. These findings suggest that the predicted returns for the first period are significantly different from the actual returns on the stocks during the same period.

Table 28.8 Results of Predictive Ability for Explanatory Relationship

Models	Difference	t-Value
Simple Average Ratios	Unadjusted ROR	2.0788
Simple Average Ratios	Industry-Adjusted ROR	2.1980
Simple Average Ratios	Market-Adjusted ROR	3.1366
Simple Average Ratios	Market/Industry Adjusted ROR	6.7235
Weighted Average Ratios	Unadjusted ROR	2.7694
Weighted Average Ratios	Industrial-Adjusted ROR	2.5560
Weighted Average Ratios	Market-Adjusted ROR	3.1835
Weighted Average Ratios	Market/Industry-Adjusted ROR	4.0235

* Significant at 0.05 level

6. Conclusions

This chapter examined the relationships between certain commonly used financial ratios and rates of returns on common stocks. The formation of expectation about future rates of return rankings was assumed to be important to investors. Therefore, the explanatory power of the relationships were used to examine if the rates of return rankings over time are useful. Univariate analysis suggests that ratios are not useful individually in differentiating between stocks yielding high and low rates of return. Multivariate analyses also suggest that ratios are of questionable usefulness in the prediction of return rankings for stocks.

In general, neither the simple average ratio models nor the exponentially weighted average ratio models showed (statistically significant) any superior ability to predict future rates of return. The evidence provided in this chapter on the predictive abilities of various ratios casts doubt upon the usefulness of financial ratios in helping investors to form expectations about future rate of returns on investments in common stocks. That is, the validity of ratios seems implicit in investment text books and literature but tests show that it cannot be assumed as the absolute truth. Investors need to consider multiple factors besides ratios to shape their informed investment decisions in stocks.

CHAPTER

29

Financial Ratios: Distributional Characteristics

Abstract

This chapter examines the distributional characteristics of selected financial ratios of firms from different sectors of the Malaysian economy. The findings show that the distribution of the ratios *do not conform to normal distribution*. Transformation and outlier trimming techniques do not improve the distributional characteristics of the ratios. These findings suggest the use of non-parametric statistics as most appropriate for analysis of ratios. An informational redundancy test identified ratios in four major categories and a representative ratio from each group that could be used without much loss in information.

1. Introduction

Financial ratios play an important role in the analysis of financial statements of firms in the various industries as they form a standard practice in accounting and financial analysis. They are used to help explain economic, accounting or financial theory with models that have ratios as surrogates to predict the likelihood or security risk (e.g. Koh and Loh 1988 for a sample of Malaysian and Singapore firms). Several studies have reported on the usefulness of financial ratios though the overall results are not encouraging. Very few studies examined the distributional characteristics of the ratios though violation of normal distribution would make the use of parametric tests in any ratios suspect. Users of financial ratios seldom stress the importance of the distributional characteristics, and the distributional properties of financial ratios are assumed to conform to the normal distribution though there is evidence that ratios have truncated distributions with pronounced skewness (Horrigan 1965). Since the 1970s, studies on the distribution of financial accounting ratios have been conducted in developed markets. However, there is no published evidence on distributional characteristics of financial ratios in any emerging markets.

This chapter investigates the distributional characteristics of financial ratios after classifying the Malaysian firms into industry groups. We hope to also detect the degree of informational redundancy among the ratios in a particular sector. In the event of finding non-normal distribution, standard transformation techniques will be employed to ascertain if the distributional characteristics of the ratios are improved with the transformation.

2. Review of Studies on Properties of Ratios

The financial ratio analysis literature usually views ratios as indicators of performance of firms and it reveals deficiencies such as poor liquidity or low profitability or even likelihood of bankruptcy. Thus, negative ratios are emphasised in looking for potential deficiencies. Ratios signal symptoms of the firm's economic conditions and provide the user an avenue for further investigation. There is no doubt that the use of individual ratios to ascertain characteristics of a firm is a sound practice.

There are two types of financial ratio analysis: one over time using observations made from the start to the end of a series and the other across entities using cross-sectional observations measured as averages of each entity over an interval of time. Analysis over time involves the search for identifiable trends, using ratios, in past company performance to predict future performance. The cross-sectional analysis involves the comparison of the results of a specific company against some benchmark (usually the industry average). Knowledge of the statistical distribution of financial ratios is important when undertaking cross-sectional analysis for several reasons. If one knows the mean and standard deviation of a particular distribution that is approximately normally distributed, then one can determine the relative position of a specific company ratio within the industry distribution. In addition, knowledge of the existence of an extreme outlier in a distribution allows the determination of their impact upon the average value of the ratio. For example, if a certain ratio is characterised by a number of extreme outliers, either positive or negative, a comparison of a company's ratio against some industry mean might be potentially misleading, since this benchmark might suffer some distortion in the case of companies. Indeed, it is important to appreciate the implications for inter-firm comparisons when the distribution for a ratio exhibits non-normality and is characterised by an extreme outlier. In such a situation it seems inappropriate to use the industry mean value as a benchmark for comparative purposes (Bougen and Drury 1980).

Deakin's (1976) study showed that 10 out of 11 ratios analysed for manufacturing firms were not normally distributed and that standard transformations such as square root and logarithmic transformations did not improve normality except in few cases. However he suggested that financial accounting ratios might be more normally distributed within specific industry groups. Koh and Loh's (1988) results were consistent with Deakin's only for three ratios of firms in the property sector and four ratios in the hotel sector were normally distributed. These findings are supported by Kolmogorov-Smirnov D-test and Shapiro-Wilk W-test for normality. Transformation and outlier trimming techniques are only able to improve the normality of some ratios slightly. Again, these findings are consistent with those of Deakin. Normality is not achieved despite the elimination of outlier and other appropriate transformations. They also carried out informational redundancy tests on various industries using factor analysis. The findings suggest that the main factors identified are leverage, profitability and liquidity. The additional factor for hotels is activity, while that for property firms is debt-servicing ability.

We start with two early studies. Altman (1968) assessed the analytical quality of ratio analysis and suggested that traditional ratio analysis was no longer an important analytical technique in the academic environment due to the relatively unsophisticated manner in which it had been presented. To assess its potential rigour, a set of financial ratios was combined using the discriminant analysis approach to the problem of corporate bankruptcy prediction. The theory is that ratios, if analysed within a multivariate framework, will take on greater statistical significance than the common technique of *sequential* ratio comparisons. The results do not have a good predictive value. Gupta and Huefner (1972) tested whether financial ratios can represent underlying industry characteristics, at least on a group-ordinal basis of measurement. They found that cluster analysis of the ratio data corresponded highly with the judgmental economic classification of the industries involved. Generally, they were able to relate asset ratios and industry characteristics both in terms of individual industries and industry groups. O'Connor (1973) studied the usefulness of financial ratios to investors in common stocks. He concluded that use of univariate analysis reveals that ratios used singly are not useful in differentiating between common stocks yielding high rates of return and those yielding low rates of return. These results suggest that even on a multivariate basis, individual ratios might be found to be of questionable usefulness in the prediction of return rankings for common stocks.

A study on the predictive power of financial ratios in the Malaysian plantation sector by Ng (1983) using discriminant analysis and multiple regression revealed that size has an impact on the predictive power of financial ratios. He had earlier (1981) examined the relationship of financial ratios with the market price using correlation and regression analysis. The findings suggest that financial ratios can be used not only as an indicator of failing companies but also as a predictor of the market price! This is in sharp contrast to the studies reported in more developed markets. Such results are only consistent with an inefficient market. Rohana's (1991) study on the predictive performance of financial ratios in the manufacturing sector suggested that size and profitability have a significant effect on only few financial ratios. Profitability has the greatest effect on predicting performance of Malaysian manufacturing companies.

On the distributional characteristics of ratios, Horrigan (1965) reported that financial ratios exhibit approximately normal distribution but are often positively skewed, a characteristic common with financial variables. The positive skewness seems reasonable because most of these ratios have an effective lower limit of zero but an indefinite upper limit. The pattern itself is significant, implying that financial ratios can be subjected to the usual parametric statistical techniques, although logarithmic transformations of the ratios might be in order where the positive skewness is extreme. O'Connor's (1973) analysis of ten ratios of 127 United States companies over the period 1950-1966 showed that although the distributions are skewed, the central area of the distribution is approximately symmetrical. Deakin (1976) studied the distributions of 11 commonly used financial ratios and reported that ten of the 11 financial accounting ratios were distributed in a manner that is significantly different from normal. However, it does appear that normality can be achieved in certain cases by transforming the data. The findings also suggest, consistent with other studies, that financial accounting ratios might be more normally distributed within a specific industry group. Aggregating across industries does the same as portfolio formation in share return analysis, and helps to get rid of firm-specific variations.

Using small samples of Australian companies in the food, electrical and accommodation industries for the years 1967, 1969 and 1971, Bird and McHugh (1977) tested the normality of the distribution of five financial ratios. They suggested that financial leverage and efficiency ratios are generally normally distributed with no conclusive results on profitability ratios. Bougen and Drury (1980) investigated the distributional properties of seven financial ratios for over 700 United Kingdom companies. The overall results suggested non-normality both for the whole sample and at individual industry level. Ezzamel, Mar-Molnero and Beecher (1987) tested the distributional properties of financial ratios of United Kingdom firms and reported that their results were consistent with findings from previous research: that is, the raw financial ratio exhibits positive skewness except for the leverage ratio for the retail food industry. The square root transformation is more successful in improving approximation to normality compared with logarithmic transformation.

A study (Frecka and Hopwood 1983) on the effects of outliers on the cross-sectional distribution properties of financial ratios of United States manufacturing firms confirms the earlier results of Deakin. Ten of the 11 ratios depart from normality in a highly significant fashion, as evidenced by large Chi-square statistics and generally significant skewness and kurtosis. Another unfortunate property of the distribution is that their variances are highly erratic as evidenced by the ratios of high to low variances. However a study by So (1987) on the outlier and the non-normal distribution of financial ratios concluded that outliers are one of the factors that cause the distribution of cross-sectional financial ratios to be skewed and non-normally distributed. The outliers are, however, not the only source of non-normality. After removing the outliers, the distributions of many financial ratios are still non-normal and asymmetrically distributed.

These findings imply that the basic assumption of ratio analysis, i.e. *proportionality*, may indeed be violated for most ratios and the violation seems to be more serious for the cash flow/total debt ratio, and the net income/total assets ratio. Since these ratios are significantly different from normal before and after the removal of outliers, the relationship between the two variables in the ratios may be either nonlinear or an intercept term exists when we regress one variable on the other variable in the ratio. The parameter estimates also reveal that non-normality and skewness tend to vary between ratios. The current assets/total assets ratio and the working capital/total assets ratio are normally distributed while others are sub-Gaussian. These non-normal ratios also possess characteristic exponents and skewness different from each other. This *non-homogeneous* characteristic and the *non-proportional* behaviour make it difficult, if not impossible, to identify outliers. Perhaps, it might explain why normality is not improved even when outliers are eliminated.

Factor analysis was applied to identify redundant ratios in a particular sector following the procedures of Pinches, Mingo and Caruthers (1973). This employs financial ratios as variables. The similarity of each variable in the reduced space with the factors is measured by its factor loading; which is simply the correlation of an original variable with a factor. These findings show that factor analysis yields seven factors or classifications of financial ratios for industrial firms. Ezzamel, Brodie and Mar-Molinero (1987) conducted a study on the financial patterns of United Kingdom manufacturing companies. Factor analysis was used again to uncover the patterns underlying financial ratios. Ten factors reflected five broad categories of firm's financial position: total funds, profitability, working capital, liquidity (both short-term and long-term), and asset turnover.

Chen and Shimerda (1981) tested whether the financial ratios of United States firms in bankruptcy could be classified by a substantially reduced number of ratios. The ratios classified by the same factor are highly correlated, and the selection of one ratio to represent a factor can account for most of the information provided by all the ratios of that factor. They concluded that a high correlation between ratios causes the results to be sample-sensitive and possibly lead to misleading results.

3. Data and Methodology

Data and Variables

To assess the distributional characteristics of ratios of firms in this test market, 57 companies were selected from various sectors over a recent five-year (1987-1991) period. The Company Handbook and financial newspapers were used as the basis for sample selection. For each firm, 13 ratios representing four major aspects of the firm's operations namely liquidity, leverage, profitability and turnover were estimated. The liquidity ratios indicate the firm's ability to meet its short-term financial obligations. Accordingly, attention was focused on the size of the firm's reservoir of liquid assets relative to its maturing liabilities.

Liquidity measures are believed to be of prime interest to short-term lenders such as banks, and merchandise suppliers. Leverage ratios indicate the firm's ability to meet both the principal and interest payments on long-term obligations. As opposed to the short-term liquidity ratios, these measures stress the long-run financial and operating structure of the firm. Profitability ratios are designed to evaluate the firm's operational performance. The numerator of the ratios consists of periodic profits according to a specific definition, while the denominator represents the relevant investment base. The ratios thus yield an indicator of the firm's efficiency in using the capital committed by stockholders and lenders. Finally, turnover ratios are ratios that usually consist of the sales figure in the numerator and the total assets in the denominator. The objective is to indicate various aspects of operational efficiency.

Altogether 13 ratios were generated for the sample of firms. These ratios are defined in Table 29.1. Only firms with adequate data for the financial year-end in December over the five-year period were included.

The relevant information to estimate the 13 ratios was extracted from the *Companies Handbook*. The entire five-year period ratios were pooled in this study to provide a larger base for meaningful distributional studies. This approach might be more useful for intra-industry comparisons. Data were collected on industrial, property, plantation, finance and tin sectors. Finally, there was a combined test on all the data in the sample. Only seven ratios were estimated for the finance sector as not all data for them were available. Besides the mean and median, three central moment statistics, variance, skewness and kurtosis were estimated for each ratio in each sector and the total sample to provide some insights about the distributional properties of the ratios.

Methodology

To test whether the sample was taken from a normal population, the Kolmogorov-Smirnov D-test was employed. The data are also subjected to transformations using traditional outlier elimination techniques namely, removing the top and bottom 1 per cent of the observations, removing 2 per cent likewise and removing data that are three standard deviations away from the mean. In addition, the raw data were transformed using square root and a natural logarithmic transformation. The distributional characteristics and normality test statistics were then re-estimated to observe any

Table 29.1 List of Ratios Computed for Malaysian Firms and Their Definitions

LIQUIDITY	Defined as:
Current Ratio	Current Assets/Current Liabilities
Quick Ratio	(Current Assets-Inventory)/Current Liabilities
LEVERAGE:	
Debt Ratio	Total Liabilities/Total Assets
	Long-Term Debt/Networth
Debt-Equity Ratio	
Debt to Total Capitalisation Ratio	Long-Term Debt/Total Capitalisation
Times Interest Earned	Earnings before Interest and Taxes/Interest
PROFITABILITY:	
Net Operating Margin	Earnings before Interest and Taxes/Sales
Net Profit Margin	Net Profit/Sales
Return on Investment	Net Profit/Total Assets
Return on Equity	Net Profit/Networth
TURNOVER:	
Asset Turnover	Sales/Total Assets
Inventory Turnover	Sales/Inventory
Receivable Turnover	Sales/Account Receivables

improvement in distributional properties. Factor analysis was used to determine the extent to which groups of financial ratios contain separate sets of information or some portion of the same information. Principal component analysis with a varimax rotation was used to identify the most relevant ratios for each sector.

4. Findings

Distributional Properties of Ratios

The summary measures and the central moments for the combined statistic confirms that the null hypothesis of normality is rejected at the 0.01 significnace level, implying that none of the ratios is from a normally distributed population.

Transformation techniques were applied to the ratios to see if these improve the distributional characteristics of ratios. The results for the natural logarithmic transformation are presented in tables 29.3(a)-29.3(f). The results of the other techniques are not presented in this chapter as the findings were similar in the sense that there was no significant improvement in distribution characteristics. In general, it was observed

TABLE 29.2(a) Summary Measures and Central Moments for Industrial Sector

Ratio	N	Mean	Median	Variance	Skewness	Kurtosis	D-Statistic	Critical D value of D ($\alpha = 0.01$)	
Current Ratio	265	1.528	1.267	1.157	34.73	18.903	3.124	> 0.1	Reject Ho
Quick Ratio	265	0.949	0.749	1.580	5.870	46.274	3.920	> 0.1	Reject Ho
Debt Ratio	265	0.481	0.471	0.056	1.159	4.150	0.892	> 0.1	Reject Ho
Debt-Equity Ratio	265	0.320	0.134	0.586	6.695	60.352	5.129	> 0.1	Reject Ho
Debt-Total Capitalisationl Ratio	265	177.816	69.497	96161.668	4.017	19.284	4.623	> 0.1	Reject Ho
Times Interest Earned	265	44.644	3.962	41519.451	7.880	71.924	6.516	> 0.1	Reject Ho
Net Operating Profit Margin	265	-0.075	0.077	4.656	-14.964	234.452	6.948	> 0.1	Reject Ho
Net Profit Margin	265	-0.669	0.044	122.691	-16.198	263.219	7.792	> 0.1	Reject Ho
Return of Investment	265	0.021	0.040	0.015	-5.556	45.135	3.789	> 0.1	Reject Ho
Return of Equity	265	-0.060	0.069	1.64	-8.657	86.029	6.322	> 0.1	Reject Ho
Asset Turnover	265	0.827	0.661	0.391	0.694	-0.590	1.881	> 0.1	Reject Ho

TABLE 29.2(b) Summary Measures and Central Moments for Industrial Sector

Ratio	N	Mean	Median	Variance	Skewness	Kurtosis	D-Statistic	Critical D value of D ($\alpha = 0.01$)	
Current Ratio	195	1.47	1.27	0.91	3.477	18.903	3.124	> 0.1	Reject Ho
Quick Ratio	195	0.96	0.77	0.76	5.870	46.274	3.920	> 0.1	Reject Ho
Debt Ratio	195	0.52	0.52	0.04	1.159	4.150	3.754	> 0.1	Reject Ho
Debt-Equity Ratio	195	0.36	0.13	0.64	6.695	60.352	4.135	> 0.1	Reject Ho
Debt-Total Capitalisationl Ratio	195	188.06	68.68	119384.48	4.017	19.284	3.567	> 0.1	Reject Ho
Times Interest Earned	195	44.90	4.27	45518.78	7.880	61.924	4.174	> 0.1	Reject Ho
Net Operating Profit Margin	195	0.06	0.07	0.10	-14.964	234.452	1.974	> 0.1	Reject Ho
Net Profit Margin	195	0.03	0.04	0.26	-16.198	263.219	1.856	> 0.1	Reject Ho
Return of Investment	195	0.03	0.05	0.01	-5.556	45.135	3.456	> 0.1	Reject Ho
Return of Equity	195	-0.02	0.09	0.88	-8.657	86.029	3.745	> 0.1	Reject Ho
Asset Turnover	195	1.03	0.97	0.37	0.694	-0.590	5.123	> 0.1	Reject Ho
Inventory Turnover	195	26.69	5.75	7923.50	6.886	56.500	3.461	> 0.1	Reject Ho
Receivable Turnover	195	9.40	5.19	265.36	6.452	60.142	3.924	>0.1	Reject Ho

TABLE 29.3(a) Summary Measures and Central Moments for Combination Sectors Using A Natural Logarithmic Transformation

Ratio	N	Mean	Median	Variance	Skewness	Kurtosis	D-Statistic	Critical D value of D ($\alpha = 0.01$)	
Current Ratio	265	0.264	0.236	0.294	0.374	1.246	1.242	> 0.1	Reject Ho
Quick Ratio	265	-0.258	-0.288	0.344	0.553	2.884	1.381	> 0.1	Reject Ho
Debt Ratio	265	-0.871	-0.752	0.335	-1.163	2.435	1.737	> 0.1	Reject Ho
Debt-Equity Ratio	262	-2.114	-1.999	2.307	-0.507	0.662	1.102	> 0.1	Reject Ho
Debt-Total Capitalisationl Ratio	265	4.222	4.241	2.312	-0.48	0.388	1.496	> 0.1	Reject Ho
Times Interest Earned	220	1.883	1.737	3.354	0.491	0.648	0.870	> 0.1	Reject Ho
Net Operating Profit Margin	207	-2.379	-2.354	0.948	-0.106	0.839	0.741	> 0.1	Reject Ho
Net Profit Margin	207	-2.713	-2.767	1.278	0.09	1.479	0.915	> 0.1	Reject Ho
Return of Investment	207	-3.195	-3.013	0.949	-1.252	2.314	2.102	> 0.1	Reject Ho
Return of Equity	208	-2.457	-2.341	1.186	-0.938	2.289	1.221	> 0.1	Reject Ho
Asset Turnover	265	-0.586	-0.414	1.072	-0.989	1.23	1.319	> 0.1	Reject Ho
Inventory Turnover	265	1.711	1.665	1.857	0.692	2.382	1.988	> 0.1	Reject Ho
Receivable Turnover	265	1.763	1.647	0.805	0.576	0.93	1.392	>0.1	Reject Ho

TABLE 29.3(b) Summary Measures and Central Moments for Industrials Sectors Using A Natural Logarithmic Transformation

Ratio	N	Mean	Median	Variance	Skewness	Kurtosis	D-Statistic	Critical D value of D ($\alpha = 0.01$)	
Current Ratio	195	0.256	0.236	0.221	0.647	1.746	1.18	> 0.1	Reject Ho
Quick Ratio	195	-0.206	-0.288	0.266	1.04	3.287	1.227	> 0.1	Reject Ho
Debt Ratio	195	-0.749	-0.752	0.194	-0.828	0.616	1.491	> 0.1	Reject Ho
Debt-Equity Ratio	194	-2.08	-1.999	2.379	-0.36	0.478	1.008	> 0.1	Reject Ho
Debt-Total Capitalisationl Ratio	195	4.202	4.241	2.312	-0.337	0.191	1.176	> 0.1	Reject Ho
Times Interest Earned	164	1.937	1.778	3.265	0.406	0.694	0.637	> 0.1	Reject Ho
Net Operating Profit Margin	164	-2.538	-2.534	0.853	0.068	1.038	0.763	> 0.1	Reject Ho
Net Profit Margin	156	-2.882	-2.975	1.216	0.279	2.316	1.037	> 0.1	Reject Ho
Return of Investment	156	-3.05	-2.959	0.764	-1.314	3.271	1.936	> 0.1	Reject Ho
Return of Equity	157	-2.243	-2.148	0.828	-0.917	3.429	0.781	> 0.1	Reject Ho
Asset Turnover	195	-0.248	-0.035	0.782	-1.377	1.809	1.675	> 0.1	Reject Ho
Inventory Turnover	195	1.947	1.75	1.563	1.232	3.777	2.453	> 0.1	Reject Ho
Receivable Turnover	195	1.771	1.647	0.686	1.011	1.91	1.498	>0.1	Reject Ho

TABLE 29.3(c) Summary Measures and Central Moments for Plantation Sector Using A Natural Logarithmic Transformation

Ratio	N	Mean	Median	Variance	Skewness	Kurtosis	D-Statistic	Critical D value of D ($\alpha = 0.01$)	
Current Ratio	25	0.061	-0.109	0.385	1.525	3.202	1.149	> 0.3	Reject Ho
Quick Ratio	25	-0.402	-0.417	0.551	1.347	3.827	0.608	> 0.3	Reject Ho
Debt Ratio	25	-1.443	-1.277	0.398	-0.362	-0.63	0.684	> 0.3	Reject Ho
Debt-Equity Ratio	25	-2.159	-2.079	0.786	-0.201	-0.77	0.702	> 0.3	Reject Ho
Debt-Total Capitalisationl Ratio	25	4.54	4.488	0.713	-0.083	-0.301	0.668	> 0.3	Reject Ho
Times Interest Earned	21	1.747	1.919	2.425	-1.194	2.477	0.921	> 0.3	Reject Ho
Net Operating Profit Margin	21	-1.97	-1.743	0.94	-2.705	9.147	1.286	> 0.3	Reject Ho
Net Profit Margin	20	-2.279	-2.154	0.521	-1.844	5.042	0.946	> 0.3	Reject Ho
Return of Investment	20	-3.429	-3.281	0.625	-1.659	4.16	0.8	> 0.3	Reject Ho
Return of Equity	20	-3.063	-2.859	0.565	-0.638	-0.113	0.654	> 0.3	Reject Ho
Asset Turnover	25	-1.104	-1.172	0.115	-0.455	-0.438	0.499	> 0.3	Reject Ho
Inventory Turnover	25	2.317	2.552	0.968	-0.784	1.303	0.616	> 0.3	Reject Ho
Receivable Turnover	25	2.6	2.642	0.618		0.636	0.606	>0.3	Reject Ho

TABLE 29.3(d) Summary Measures and Central Moments for Plantation Sector Using A Natural Logarithmic Transformation

Ratio	N	Mean	Median	Variance	Skewness	Kurtosis	D-Statistic	Critical D value of D ($\alpha = 0.01$)	
Current Ratio	40	0.374	0.32	0.575	-0.464	0.188	0.764	> 0.1	Reject Ho
Quick Ratio	40	-0.401	-0.408	0.569	-0.172	1.258	0.949	> 0.1	Reject Ho
Debt Ratio	40	-1.082	-0.994	0.718	-0.808	1.295	0.841	> 0.1	Reject Ho
Debt-Equity Ratio	38	-2.297	-1.798	3.292	-0868	0.053	0.887	> 0.1	Reject Ho
Debt-Total Capitalisationl Ratio	40	4.072	4.182	3.167	-0.649	-0.09	0.782	> 0.1	Reject Ho
Times Interest Earned	31	1.378	1.109	4.635	1.369	1.659	1.137	> 0.3	Reject Ho
Net Operating Profit Margin	31	-1.962	-1.95	0.977	0.255	0.328	0.813	> 0.3	Reject Ho
Net Profit Margin	27	-2.275	-2.395	1.64	-0.166	0.594	0.881	> 0.3	Reject Ho
Return of Investment	27	-3.987	-3.708	1.572	-0.497	0.093	0.767	> 0.3	Reject Ho
Return of Equity	27	-3.354	-3.147	2.594	0.018	0.262	0.819	> 0.3	Reject Ho
Asset Turnover	40	-1.839	-1.653	0.896	-1.488	3.317	0.949	> 0.1	Reject Ho
Inventory Turnover	40	0.374	0.167	1.547	1.099	4.247	0.74	> 0.1	Reject Ho
Receivable Turnover	40	1.088	1.161	0.559	-0.28	0.695	0.695	>0.1	Reject Ho

TABLE 29.3(e) Summary Measures and Central Moments for Tin Sector Using A Natural Logarithmic Transformation

Ratio	N	Mean	Median	Variance	Skewness	Kurtosis	D-Statistic	Critical D value of D ($\alpha = 0.01$)	
Current Ratio	5	0.584	0.64	0.228	0.217	-1.376	0.443	< 0.669	Accept Ho
Quick Ratio	5	-0.398	-0.623	0.483	0.953	1.008	0.507	< 0.669	Accept Ho
Debt Ratio	5	-1.08	-1.111	0/-5	-0.26	-1.345	0.469	< 0669	Ho
Debt-Equity Ratio	5	-1.806	-1.902	0.095	0.171	-0.834	0.496	< 0.669	Ho
Debt-Total Capitalisationl Ratio	5	4.585	4.664	0.026	-0.708	-2.188	0.642	< 0.669	Ho
Times Interest Earned	4	3.366	3.926	4.106	-1.444	2.437	0.607	< 0.733	Ho
Net Operating Profit Margin	4	-1.229	-0.842	0.704	-1.954	3.837	0.792	< 0.733	Reject Ho
Net Profit Margin	4	-1.228	-1.28	0.031	1.505	2.49	0.607	< 0.733	Ho
Return of Investment	4	-2.351	-2.323	0.049	-1.743	1.809	0.594	< 0.733	Ho
Return of Equity	4	-1.774	-1.735	0.007	-1.958	3.853	0.698	> 0.733	Reject Ho
Asset Turnover	5	-1.148	-1.251	0.068	0.611	-2.16	0.566	< 0.669	Ho
Inventory Turnover	5	0.182	0.161	0.039	0.268	1.333	0.44	< 0.699	Ho
Receivable Turnover	5	2.665	2.158	0.743	0.741	-2.305	0.72	> 0.699	Reject Ho

TABLE 29.3(f) Summary Measures and Central Moments for Finance Sector Using A Natural Logarithmic Transformation

Ratio	N	Mean	Median	Variance	Skewness	Kurtosis	D-Statistic	Critical D value of D ($\alpha = 0.01$)	
Current Ratio	20	1.012	0.89	1.745	-0.53	-0.019	0.994	> 0.356	Reject Ho
Quick Ratio	20	-0.685	-0.234	0.81	-1.495	0.911	1.568	> 0.356	Reject Ho
Debt Ratio	19	-1.726	-1.77	0.633	0.025	-1.136	0.556	> 0.363	Reject Ho
Debt-Equity Ratio	18	-2.034	-1.956	0.418	0.065	-1.244	0.691	> 0.371	Reject Ho
Debt-Total Capitalisationl Ratio	18	-4.192	-4.272	0.692	0.505	-0.49	0.602	> 0.371	Reject Ho
Times Interest Earned	18	-2.635	-2.635	0.561	-0.916	3.256	0.917	> 0.371	Reject Ho
Net Operating Profit Margin	20	-2.14	-2.14	0.357	0.873	-0.944	1.009	> 0.356	Reject Ho

that transformations and outlier elimination did not help much in improving normality except for a few ratios in the *tin* and *properties* sectors. However, for the tin sector some ratios could not be analysed due to lack of data.

These findings are consistent with those of Deakin (1976) and Francis and Lawrence(1988) in that most ratios analysed are not normally distributed and standard transformation techniques did not improve normality. These results imply that the assumptions of normality for financial accounting ratios are not satisfied. Analysis of financial ratios should use non-parametric tests that are distribution-free although their statistical power is less than that of parametric tests. These findings urge investors, researchers and policy makers to note that the standard statistical measures such as mean and standard deviation cannot be used to interpret the ratios that are commonly used for predicting bankruptcy and rating bonds. Further research is needed to search for more appropriate non-parametric techniques relevant for financial ratio analysis.

Factor Analysis of Ratios

The results of the factor analysis are shown in Tables 29.4-29.9. Table 29.4 shows the rotated factor pattern for the total sample. The following five factors were identified:

Factor 1 : Net operating profit margin, net profit margin, returns on invest ment, returns on equity
Factor 2 : Current ratio, quick ratio
Factor 3 : Debt-equity ratio, debt-total capitalisation ratio
Factor 4 : Times interest earned, receivable turnover
Factor 5 : Debt ratio, asset turnover, inventory turnover

These five factors explained almost all the variance of the ratios. These five factor ratios correspond to the factors of (a) profitability, (b) liquidity, (c) leverage, (d) debt servicing abilities and (e) activity.

Table 29.5 shows the results for the industrial sector. Six factors were identified explaining most of the variance corresponding to (a) and (d) profitability, (b) liquidity, (c) leverage, (e) and (f) activity. Table 29.6 shows the results for the plantation sector that identify four factors corresponding to (a) profitability, (b) leverage, (c) liquidity, (d) activity. For the property sector, Table 29.7 shows four factors corresponding to those of (1) debt servicing abilities, (b) liquidity, (c) activity and (d) leverage. Four factors are identified for the tin sector as shown in Table 29.8, which can be classified into (a) debt servicing abilities, (b) profitability, (c) activity and (d) leverages. Only three factors were identified for the finance sector (Table 29.9) corresponding to (a) profitability, (b) short-term operating efficiencies, and (c) leverage.

These findings identify almost similar factors for the various sectors. The profitability factor is the most important factor extracted for most of the sectors. The major difference is the presence of a debt servicing abilities factor for the *tin* and *properties* sectors and short terms operating efficiencies factor for the *finance* sector. These results are reasonable because tin and properties sectors borrow heavily and debt servicing is an important dimension. As for the finance sector, a firm's short-term operational performance is important for its long-term survival. In the industrial and other sectors, maximising profits is an important yardstick for survival. These results show that informational redundancy did exist between the ratio groups in each sector.

Table 29.4 Factor Analysis of Ratios (Combination of Sectors)

Ratio	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Net Operating Profit Margin	0.94449				
Net Profit Margin	0.92968				
Return on Investment	0.76222				
Return on Equity	0.75692				
Current Ratio		0.91058			
Quick Ratio		0.91336			
Debt-Equity Ratio			0.87415		
Debt-Total Capitalisation Ratio			0.8778		
Times Interest Earned				0.71228	
Receivable Turnover				0.63792	
Debt Ratio					0.52934
Asset Turnover					0.51694
Inventory Turnover					0.76712
PERCENTAGE VARIANCE EXPLAINED:	24.8	17.3	12.2	9.7	8

Table 29.5 Factor Analysis of Ratios (Combination of Sectors)

Ratio	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Net Operating Profit Margin	0.95278				
Net Profit Margin	0.94727				
Return on Investment		0.92799			
Return on Equity		0.92143			
Current Ratio		0.2295			
Quick Ratio					
Debt-Equity Ratio			0.84552		
Debt-Total Capitalisation Ratio			0.89092		
Times Interest Earned				0.63618	
Receivable Turnover				0.4486	
Debt Ratio					0.45051
Asset Turnover					0.85921
Inventory Turnover					
PERCENTAGE VARIANCE EXPLAINED:	24.3	15.2	13	8.4	7.8

These findings are consistent with those of Francis and Lawrence (1988) while comparison of these results with those by Pinches and Mingo (1973) suggest that the ratios for each sector can be classified into various factors and these factors of ratio analysis may be industry-specific. Thus, the characteristics of the various sectors are different because of the dissimilar operations of the sectors which result in different financial profiles. These results have few important implications for researchers, investors and policy-makers. First, there exist different financial patterns on the various industries and if identified they can become the focus of both internal (example managerial) and external (example financial institutions) decision-making. The identification of these

Table 29.6 Factor Analysis of Ratios (Combination of Sectors)

Ratio	Factor 1	Factor 2	Factor 3	Factor 4
Net Operating Profit Margin	0.66402			
Net Profit Margin	0.90609			
Return on Investment	0.87994			
Return on Equity	0.94813			
Current Ratio	0.94297			
Quick Ratio		0.76288		
Debt-Equity Ratio		0.98555		
Debt-Total Capitalisation Ratio		0.93916		
Times Interest Earned		0.72999		
Receivable Turnover			0.93082	
Debt Ratio			0.96344	
Asset Turnover				0.00702
Inventory Turnover				0.9032
				0.83254
PERCENTAGE VARIANCE EXPLAINED	37.4	24.9	14.3	12.5

Table 29.7 Factor Analysis of Ratios (Properties Sector)

Ratio	Factor 1	Factor 2	Factor 3	Factor 4
Net Operating Profit Margin	0.98775			
Net Profit Margin	0.98775			
Return on Investment	0.9715			
Return on Equity	0.72235			
Current Ratio	0.94139			
Quick Ratio	0.34032			
Debt-Equity Ratio		0.75014		
Debt-Total Capitalisation Ratio		0.78112		
Times Interest Earned				
Receivable Turnover			0.93082	
Debt Ratio			0.96344	
Asset Turnover				0.00702
Inventory Turnover				0.9032
				0.83254
PERCENTAGE VARIANCE EXPLAINED:	36.1	18.8	14.3	12.5

patterns is also useful for a variety of research purposes, for example prediction of bankruptcy.

Secondly, the existence of informational redundancy between the ratios in each industry brings up the possibility of data reduction in the context of financial ratios. The ratios classified under the same factor are highly correlated, and the selection of one ratio to represent a factor can account for most of the information provided by all the ratios of that factor. Thus, a few carefully selected ratios can be used to represent the main financial patterns with relatively little loss in information.

Table 29.8 Factor Analysis of Ratios (Tin Sector)

Ratio	Factor 1	Factor 2	Factor 3	Factor 4
Net Operating Profit Margin	0.71773			
Net Profit Margin	0.90296			
Return on Investment	0.93793			
Return on Equity	0.84793			
Current Ratio	0.75256			
Quick Ratio		0.78092		
Debt-Equity Ratio		0.96645		
Debt-Total Capitalisation Ratio		0.91074		
Times Interest Earned		0.9524		
Receivable Turnover			0.9503	
Debt Ratio				0.54673
Asset Turnover				0.94814
Inventory Turnover				0.15933
PERCENTAGE VARIANCE EXPLAINED:	60	19.2	11.8	9

Table 29.9 Factor Analysis of Ratios (Finance Sector)

Ratio	Factor 1	Factor 2	Factor 3	Factor 4
Net Operating Profit Margin	0.8774			
Net Profit Margin	0.93834			
Return on Investment	0.87658			
Return on Equity	0.15012			
Current Ratio		0.83436		
Quick Ratio		0.7198		
Debt-Equity Ratio			0.19648	
Debt-Total Capitalisation Ratio				
Times Interest Earned				
Receivable Turnover				
Debt Ratio				0.54673
Asset Turnover				0.94814
Inventory Turnover				0.15933
PERCENTAGE VARIANCE EXPLAINED:	42.6	33	15.4	9

5. Conclusions

This chapter examined the distributional characteristics of selected financial ratios from five different sectors of Malaysian firms namely industrial, finance, property, plantation and tin. The central moments of the ratios for the five-year period were analysed. The Kolmogorov-Smirnov test suggests that, except for the *tin* sector, the distribution of almost all ratios analysed in the other sectors did not conform to normal distribution properties. Transformation and outlier trimming techniques in general did not improve the distributional characteristics of the ratios. Informational redundancy of the ratios was analysed using factor analysis. The main factors identified for most sectors are profitability, activity, liquidity and leverage. Some industry specific factors were also identified, for example, the debt servicing abilities for tin and property; and short-term operational efficiencies for the *finance* sector.

The findings are consistent with the findings of similar studies in developed countries. That is, ratios from various industries are not normally distributed and standard transformational techniques did not significantly improve normality. Informational redundancy did exist between the ratios, and there were differences in the characteristics of the various industries. These results provide important implications for researchers, investors as well as other users of financial ratios in that non-parametric (distribution-free) statistics should be used to analyse ratios for more valid interpretation of results. Also, a small set of representative ratios could be used without much loss of information.

CHAPTER

30

Capital Structure of Malaysian Companies*

Abstract

This chapter describes the capital structure of Malaysian-listed firms over a recent 15-year period. The results suggest that (except for the finance sector) the *capital structure of firms differs significantly within and between industries*. The instability of the leverage ratios over time and industrial sectors suggests that firms in the various sectors respond to rapid changes in the local economic environment. Anomalous to the findings in developed capital markets, there is no significant relation between beta risk and capital structure in this study. The average debt-equity is 1.18 and the debt-asset is 0.41 in Malaysia.

1. Introduction

Most prevalent knowledge of capital structure behaviour is based on firms in developed capital markets (Hamada 1976; Myers 1977; 1984; Kim and Sorensen 1986; Gordon and Malkiel 1986) which are well-known earlier studies. Capital structure is defined as the mix of debt, equity and hybrid securities issued by a company to finance its operations. Capital structure is an important variable for decision-making within the firm as well as decisions outside of organisations with interests in the firm. To date, there is little evidence concerning the capital structure issue and its various aspects using data of Malaysian listed firms; one study including both Malaysian and Singapore firms is found in Ariff and Johnson (1990).

This study attempts to document the various aspects of the firm's capital structure from a representative sample of 60 continuously traded firms listed on the KLSE over the years 1975-1989. These firms are from five of the six sectors (the firms have been regrouped into 11 sectors since 1990). The difference in capital structure of firms across the sectors is assessed, the effect of the volatility of earnings on capital structure and the relationship between systematic risk and capital structure are also examined. However, this study does not address the issue of optimal capital structure.

2. Capital Structure Studies

The main objective of firms is to maximise their current market value, which is determined by their positive value investment programmes. If taxes and liquidation

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costs are ignored, the financing of the investment programmes becomes a separate and unimportant decision (Dobins and Pike 1979). A firm can resort to borrowing or equity capital to finance its investments. Equity is riskier than debt and rational investors expect a higher rate of return on equity than on debt. Borrowing is a low-cost alternative. In a world with taxation and transaction costs, there ought to be an optimal capital structure (DeAngelo and Masulis 1980). If interest is tax-deductible, firms can increase their after-tax cash flows by resorting to debt financing. Taxation favours the use of leverage. However, an increase in total borrowing increases the volatility of returns to shareholders and hence increases the financial risk. Shareholders are generally risk-averse and expect higher returns for taking on financial risk in addition to the business risk they accepted by purchasing a stake in the firm's future operational cash flows. If the firm cannot generate enough cash flows to pay investors (debtholders and shareholders) sufficient returns, repayment of principal amount, and the extra cash flows needed for continued operations will conflict with the aim of increasing the wealth of shareholders. This will eventually lead to the firm into liquidation, which incurs substantial costs and loss of wealth to shareholders. Therefore, there is a trade-off between the benefits of using debt and the costs of liquidation. To date, the issue of optimal capital structure has not yet been settled (Myers 1986b). There is inadequate understanding of corporate financing behaviour and how such behaviour affects a firm's value.

Modigliani and Miller (1958) suggest that in a world of no taxes and transaction costs, debt financing would have no impact on a firm's value: they incorporated the effect of tax as tax shield value in 1961. Miller (1977) argued that even in a world with differential personal taxes, the levels of leverage in a firm are still an irrelevant issue. DeAngelo and Masulis (1980) suggested that each firm has a unique interior optimum leverage level due solely to the interaction of personal and corporate tax treatment of debt and equity. Hamada (1972) showed that 21-24 per cent of the systematic risk of common stocks can be explained by the added financial risk a firm takes by using debt and preferred stocks. Myers (1984) suggested that the level of borrowing is determined not just by the value and risk of a firm's assets but also by the type of assets it holds. He also suggested that average debt ratios vary between industries because of differences in asset type, asset risk classes and different requirements of external funds of industries.

Taylor and Lowe (1995) studied the relationship between corporate strategy and capital structure and showed that it is less than robust. They concluded that the debt equity ratios of highly diversified firms are more strongly affected by firm-level variables. Firth (1995) reported that managers desire low levels of debt in the firm's capital structure, while outside shareholders, who hold diversified portfolios, tolerate higher debt ratios. The presence of institutional investors as shareholders constrains management discretion in setting capital structure and a positive relationship is identified between their fractional and dollar value ownership of a firm and debt-asset ratios.

3. Data and Methodology

A sample of 60 continuously traded firms from the industrial (n=30), plantation (n=10), tin (n=5), property (n=10) and finance sectors (n=5) on the KLSE were chosen. The firms were randomly selected and the initial sample was larger than 60 but some firms were dropped from the sample due to incomplete information needed for analysis. All firms had financial years ending in December.

According to capital structure theory, the higher the levels of debt the higher the financial risk (due to higher costs of financial distress) borne by common stock holders. Financial risk relates to the volatility of the earnings stream that accrues to common stockholders. Generally, the higher the relative amount of debt (i.e the higher the financial leverage) in the capital structure, the larger is the volatility of net earnings and therefore the higher should be the financial risk associated with common stocks. Financial leverage is measured by the ratio of debt to equity (D/E) or the ratio of debt to total assets (D/A) using market or book values. In this study, the ratio of the total debt (excluding trade creditors) to equity and the ratio of total debt to total asset was measured using book values. The reason for using book values was that only a small minority of the 295 listed firms in Malaysia had publicly-issued debts and the interest rates were relatively stable over the period of study with few exceptions. Thus the book value of debt is unlikely to differ substantially from the market value of debt. In determining the debt-equity ratio, owners' equity was measured as an annual average of the product of the number of shares outstanding and the year-end share price. In determining the debt-asset ratio, the total asset figure used was not reported in the financial statements of the respective firms. The average ratio for each year was estimated by taking a simple average of the ratio over the 15-year period for each firm. To assess the stability of the ratios within and between sectors, the 15-year test period was arbitrarily divided into three sub-periods and the analysis of variance formed the test. The null hypothesis of no difference in the means within and between sectors over the sub-periods was tested against the alternative hypothesis that the sectorial differences are significant.

In ascertaining the association between the capital structure and the systematic risk of listed firms, both the ordinary least squares (OLS) and the Fowler-Rorke (FR) measures of systematic risk were used. The issue of thin trading bias in a developing market context and its effect on systematic risk measures has been examined extensively for the Singapore market (see Chapter 22) and the Malaysian market (see Chapter 21). Both studies found that the systematic risk, beta, estimates using any thin trading adjustment method are more efficient estimates. The betas used in this study were taken from Annuar and Shamsher (1991). In testing the causality between earnings volatility and the leverage of firms, a one-way Granger causality test as suggested by Geweke (1984) was applied. This test uses the ordinary least squares regression and the following specification is used to test causality between X (leverage) and Y (earnings volatility):

$$Y_t = \alpha_0 + \Sigma\, \alpha_i\, Y_{t-i} + \varepsilon_t \qquad (30.1)$$

$$Y_t = \beta_0 + \Sigma\ \beta_i Y_{t-i} + \Sigma_j\ \beta_j X_{t-j} + \mu_t \qquad (30.2)$$

where ε_t and μ_t are disturbance terms. α_i and β_i are parameters relating Y_t and its lagged values, and β_j are parameters relating X_t and lagged variables. As a rule of thumb applied in most causality studies, four lags of X_t were used in this study. The test of null hypothesis that X does not cause Y based on equations (1) and (2) was carried out with the F-statistic.

4. Findings

Capital Structure of Malaysian Firms

The average debt-equity ratios (D/E) across industries during the test period are presented in Table 30.1. The industrial and finance sectors had average D/E ratios greater than one (1.04 and 16.29 respectively) for the 15-year period. The plantation sector had the lowest average D/E ratio (0.39). The low D/E ratio for the plantation sector was probably due to lack of reinvestment opportunity in the sector due to depressed commodity prices and the increasing role of the industrial sector as a catalyst of growth in the Malaysian economy. This sector also paid high average dividends per share (Annuar and Shamsher (1992a). The overall average D/E for the five industries over the period of study was 1.18. A one-way analysis of variance yielded an F-statistic with a probability value less than 0.0001, thereby rejecting the hypothesis that the mean leverage was the same across industries. The F-statistic (without the finance sector) yielded a probability value of less than 0.05. The results are consistent with those observed by DeAngelo and Masulis (1980) in the U.S.A.. This shows that firm leverage in Malaysia is industry-specific, that is capital structure between firms in different industries is maintained

Table 30.1 Debt-Equity Ratios of Malaysian Firms Across Industries, 1975-1989 (N = 60)

Year	Industrial	Property	Plantation	Tin	Finance
1975	0.84	0.58	0.34	0.53	10.47
1976	0.85	0.42	0.32	0.55	12.11
1977	0.84	0.36	0.34	0.50	13.93
1978	0.85	0.36	0.32	0.60	16.58
1979	0.94	0.67	0.29	0.57	20.74
1980	1.15	0.42	0.29	0.69	31.81
1981	1.31	0.38	0.16	0.64	35.74
1982	1.27	0.36	0.12	0.57	23.53
1983	0.94	0.61	0.43	0.51	12.59
1984	0.97	0.50	0.54	0.45	13.09
1985	1.04	0.53	0.30	0.71	17.30
1986	1.19	0.66	0.55	0.11	19.23
1987	1.31	0.89	0.51	0.20	19.99
1988	1.06	1.45	0.62	0.15	13.35
1989	1.04	0.97	0.89	0.15	13.94
Average	1.04	0.62	0.39	0.43	16.29
F-statistic	34.23*				

* Significant at 0.05 level

Table 30.2 Debt-Asset Ratio of Malaysian Firms Across Industries, 1975-1989 (N = 60)

Year	Industrial	Property	Plantation	Tin	Finance
1975	0.41	0.32	0.23	0.33	0.91
1976	0.39	0.27	0.22	0.34	0.92
1977	0.40	0.24	0.24	0.31	0.93
1978	0.39	0.23	0.23	0.36	0.94
1979	0.45	0.36	0.21	0.35	0.95
1980	0.46	0.29	0.20	0.33	0.96
1981	0.49	0.26	0.13	0.35	0.97
1982	0.48	0.26	0.10	0.31	0.96
1983	0.45	0.36	0.22	0.28	0.93
1984	0.46	0.31	0.24	0.26	0.93
1985	0.48	0.31	0.20	0.31	0.95
1986	0.49	0.34	0.26	0.27	0.95
1987	0.53	0.36	0.26	0.25	0.95
1988	0.53	0.36	0.27	0.22	0.93
1989	0.47	0.31	0.22	0.29	0.93
Average	0.46	0.33	0.24	0.26	0.94
F-statistic	62.73*				

*Significant at 0.05 level

over the 15-year period. However, findings from Table 30.3 suggest that, except in the finance sector, there is a significant difference in the leverage ratios of firms within (sub-period F-statistic) and between each sector (in Table 30.1, the F-statistic is 34.23) over the 15-year period.

The average D/E for the industrial sector was 1.04, property 0.62, plantation 0.39, tin 0.43 and finance 16.29. The average debt to total asset (D/A) ratios across industries for the test period are presented in Table 30.2. The finance sector had the highest average (0.94) and the plantation sector the lowest (0.24).

There is a significant difference (since F=62.73) in the D/A ratios of the various sectors over the 15-year period. Similar results were observed when excluding the finance sector. The highest D/E and D/A ratios were in the finance sector and the lowest in the plantation sector; this is due to the nature of the finance sector's business operations, which depend largely on borrowed funds and high asset base, whereas firms in the plantation sector tend to have a large asset base and low borrowing due to dependence on internal funds and lack of positive growth opportunities.

The low D/A ratio of Malaysian firms compared to firms listed on most Asian stock exchanges with D/A ratios as high as 0.90 (*Economist*, November 1988) can be explained by a combination of the following possible reasons. Most firms are in the advanced growth cycle and therefore do not need much financing. Malaysian market participants are to a large extent very risk-averse. Equity capital is readily available in Malaysia. There are a number of reasons for low average debt-equity industry ratios. One possible reason is differences in accounting practices.

Stability of the Leverage Ratios

Table 30.3 summarises the D/E and D/A ratios for the three sub-periods classified into sectors and an overall category. The three sub-periods were arbitrarily chosen to test the stability of the ratios over time. Except for the finance sector, the F-statistics indicate that the ratios for all other sectors are not stable over time. The stability of the D/E and D/A ratios of the finance sector is due to close regulation of this sector by the government through the central bank, especially with regard to the capital requirements of firms in this sector. Consistent with the findings in Table 30.2, there is a significant difference in the ratios within and between sectors. This instability implies that, in their bid to finance investment programmes, firms adjust their leverage ratios in response to the changes in the economic environment. For example, the recession period (1975-1976) and market crash years (1985 and 1987) and scandals (i.e BMF, Pan El Crisis in 1985 and October 1987) did affect the availability of debt and equity finance and the ability of firms to resort to such financing. These findings are inconsistent with the theory of optimal capital structure based on firms in developed markets which posits that firms in each sector and the overall category seem to maintain a stable leverage ratio over time (Ariff and Johnson 1990).

Table 30.3 Average Debt-Equity (D/E) and Debt-Total Assets (D/A) Ratios for the Various Sub-Periods, 1975-1989 (N = 60)

Sectors		1975-1979	1980-1984	1985-1989	F-stat
Industrial	D/E	0.864	1.128	1.128	5.21*
	D/A	0.408	0.468	0.5	19.39*
Property	D/E	0.478	0.454	0.9	5.93*
	D/A	0.284	0.296	0.336	4.60*
Plantation	D/E	0.322	0.308	0.574	4.68*
	D/A	0.226	0.178	0.242	6.49*
Tin	D/E	0.55	0.572	0.264	6.27*
	D/A	0.338	0.306	0.268	10.05*
Finance	D/E	4.766	23.352	16.763	2.87
	D/A	0.93	0.95	0.942	2.46
Overall	D/E	3.396	5.163	3.926	2.84*
(All sectors)	D/A	0.437	0.44	0.458	1.13

*Significant at 0.05 level

Capital Structure and Earnings Volatility

An important issue in the theory of optimal capital structure is the variability of a firm's value at the end of its accounting period. The greater the variability in the end-of-period value, for example, as predicted by the volatility of earnings hypothesis, the higher is the probability of incurring costs of financial distress. Bradley, Jarrell and Kim (1984) suggested an inverse relation between volatility of a firm's earnings and its leverage ratio. A simple test of this hypothesis using data on the 60 firms in the sample was conducted. The volatility of earnings was estimated by the variance of the earnings per share over the test period. The results from the regression of leverage on earnings volatility are shown in Table 30.4.

Table 30.4 Regression of Two Measures of Leverage on Earnings Volatility of Malaysian Firms (N = 60)

Leverage $\text{ratios}_i = \alpha_0 + \beta_1 (\beta_i) + \beta_2$ Standard $\text{Deviation(EPS)}_i + e_i$

Dependent	Variable	Intercept α_0	Slope β_1	β_2	F-value
Debt-Equity	Ratio	1.33	-0.425 (3.05)	0.003 (-0.368)	0.135
Debt-Asset	Ratio	0.414	-0.027 (12.02)	0.002 (-0.029)	0.089

t-statistics are in parentheses

When D/E is regressed on earnings volatility, the slope coefficient is not significant (t=-0.368), suggesting there is no relationship. When D/A is regressed on earnings volatility, again a negative slope of -0.027, which is not significant. However, the slope of the coefficients for both measures are in the predicted direction as suggested by Bradley *et al.* (1984). This inconsistency can be explained by the relatively low leverage levels of Malaysian firms and therefore this has insignificant effects on net earnings.

To substantiate the above findings, a causality test was conducted between earnings volatility and the leverage ratios. The findings are summarised in Table 30.5. The findings provide statistically significant support only for the causal relationship between earnings volatility and debt/equity ratio. This is inconsistent with theory prediction that changes in leverage cause changes in earnings volatility. These findings are not in conflict with the conservative attitude of Malaysian firms as they resort to leverage only when earnings are stable, and further they are constrained by the requirements of the financial institutions which advance loans at reasonable costs only to firms with stable earnings. Also the readily and relatively easily available equity financing than debt financing, as evidenced by the manyfold increase in rights and new issues by listed firms during the period of study (Annuar and Shamsher (1992b) is consistent with the findings in Table 30.5. This partially explains the relatively low leverage ratios of Malaysian listed companies.

Table 30.5 Causality Tests of Earnings Variability and Leverage of Listed Firms

Direction	Lags	F-statistics
Earnings to Debt/Equity	4	55.86*
Debt/Equity to Earnings	4	0.136
Earnings to Debt/Asset	4	1.216
Debt/Asset to Earnings	4	0.425

* Significant at 0.01 per cent acceptance level

Capital Structure and Market Risk

Hamada (1972) suggested that the higher the leverage of a firm the higher would be its systematic risk. If this is indeed true, than a significant positive relationship between the systematic risk and the capital structure of firms should be observed. The results are presented in Table 30.6. The results indicate that for the sample of Malaysian listed firms, there is a positive but not a significant relationship between leverage measures and systematic risk. The model does not hold and the R-squared value is too low to suggest any meaningful relationship between the two variables. It is probable that the relation is non-linear, which is a subject for future research.

Table 30.6 Measures of Leverage on Systematic Risk of Malaysian Firms (N = 60)

Leverage ratios$_j$ = α_0 + β_1 (β_j) + β_2 Standard Deviation(EPS)$_j$ + e_j

Dependent	Variable	Intercept	Slope α	β	F-value
Debt-Equity	Ratio	1.33	-0.425 (3.05)	0.003 (-0.368)	0.135
Debt-Asset	Ratio	0.414	-0.027 (12.02)	0.002 (-0.029)	0.089

t-statistics are in parentheses

5. Conclusions

To recapitulate, this study explored the nature of capital structure of Malaysian listed firms. The results suggest that (excepting the finance sector) the capital structure of firms differs significantly *within as well as between* industries. The average debt to equity (book value) ratio is 1.18 while the debt to total asset ratio is 0.41. The instability of the leverage ratios over time and industries would have us believe that these could be the result of the response of firms in the various sectors to the rapid changes in the local economic environment. Anomalous to the findings in developed capital markets, there is no significant relationship between capital structure and volatility of earnings and causality tests show that stability of earnings determines the level of leverage used by firms. This may be due to the conservative attitude of the financial institutions in giving loans to firms, and/or the easily available equity financing in the capital market. In contrast to the evidence on developed markets, there is no evidence of any significant relationship between capital structure and systematic risk of Malaysian listed firms. This might be due to structural, economic and regulatory differences between developed and developing markets.

CHAPTER

31

The Dividend and Earnings Behaviour and Corporate Decisions[1]

Abstract

Corporate dividends affect share prices in several ways. Of these, a management decision to change dividends has been modelled as a lagged adjustment process of current earnings and past dividends. This chapter reveals that Malaysian *firms do adjust their dividend policies to current earnings and past dividends* in much the same manner as in other markets. However, the speed of adjustment and the target payout ratios are much smaller, consistent with the stage of development of the local capital market, where there is greater need for financing projects using current earnings.

1. Introduction

There is substantial coverage in the accounting and finance literature on the role of dividends in corporate policy. One idea is concerned with providing explanations as to why firms actually pay dividends (Feldstein and Green 1983; Miller 1986). However, the role of dividends in corporate policy remains an unsettled issue, and is often dealt with in the theoretical literature as a residual issue after the investment decision is made. Dividend policy can be defined as the decision on how much of the earnings to pay as cash dividends to shareholders. There is evidence from studies done in the developed economies that firms have a target dividend payout ratio, and adjust their actual current dividends payout only partially in any payment period on the basis of their target payout ratio. Lintner (1956) suggests a lagged partial adjustment model of dividend behaviour which views current dividend as a function of past dividends and current earnings. This model, or its modified versions, has been applied to data from the United States (Roy and Cheung 1985), United Kingdom (Ryan 1974), Australian (Shevlin 1982; Partington 1984) and Singapore and Malaysia (Ariff and Johnson 1990). The findings reported in the studies cited here support the proposition that a target payout ratio and partial adjustment of dividends to current-cum-expected dividends is a reasonable representation of the dividend policy decision among firms in developed economies.

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[1] This chapter is a reproduction of an article that appeared as 'Earnings and Dividend Bahaviour' by Annuar M.N. and Shamsher M. in *Pertanika: Journal of Social Science and Humanities*, Vol. 1(2) (1993): 171-177 (Malaysia). We thank the Editor of the Journal for permission to reproduce the article. The article was edited by M. Ariff to conform to the style and format of the book.

There have been no studies done in Malaysia on whether dividend behaviour is consistent with existing theories as embodied in the lagged adjustment model. This chapter provides evidence from a large sample of firms. The theory is described in Section 2 and the methodology used in this study is explained in Section 3. The results are reported in the next section, following which conclusions are given in Section 5.

2. Theories about Dividends and Earnings Behaviour

Lagged Adjustment Model

The management of a firm, it is argued, pays part of the earnings as dividends to shareholders regularly since the firm that pays regular dividends can establish a reputation as one earning sufficient profits to be able to pay regular dividends. Thus, payment of dividends establishes a signal even though (in most countries) such dividends, if not paid out, will not be taxed in the hands of the shareholders. The issue then is to find how the firm decides on what level of dividends to pay to shareholders. This issue is addressed in the lagged adjustment model.

Lintner (1956) showed a partial adjustment of dividends to current earnings of the firm and applied it to data from firms in the U.S.A.

$$D_{it} = a_i + c_i(D_{it}^* - D_{it\_1}) + u_{it} \tag{31.1}$$

where

D_{it} : the change in dividends per share of firm i over time,

t-1 to t (i.e $D_{it} - D_{it\_1}$).

D_{it}^* : the target dividends of firm i for period t,

D_{it-1}: the actual dividends of firm i in period t-1,

c_i :the speed of adjustment in dividends to the difference between the target dividends and the last period's dividends,

a_i : intercept in the regression, and

u_{it} : a zero mean, constant variance, non-autocorrelated error term.

The target dividend, D_{it}^*, is assumed to be related to an adjustment to current earnings, E_{it}, such that $D_{it}^*=r_iE_{it}$, with a rate of adjustment of r_i to firm's earnings, E_{it}. Hence, the above equation can be rewritten as:

$$D_{it} = a_i + c_ir_iE_{it} - c_iD_{it-1} + u_{it} \tag{31.2}$$

Lintner's model therefore suggests that the change in dividends of firm i is a function of earnings in the current period t, and dividends in the previous period.

A number of studies done in recent years in several markets attest to the validity of this reasoning: management of a firm decides on current dividends in relation to past dividends as well as current earnings and a part of current earnings will be incorporated at a rate of transformation r into the current dividends. These studies include Hanson, Raman and Dilip(1994), Aharony and Amihud (1994), Mitra and James (1995), Bajaj and Anand (1995) and Siddiqi (1995). Nishina (1994) tested the no-cash-dividend rule on the Japanese stock market. The findings suggest that the new rule increases the economic welfare of market participants and consequently improves market efficiency. These findings are consistent with the idea that the no-cash-dividend rule solves the controversial issues related to dividends.

Earnings Behaviour

The earnings forecast is an important input for the valuation of securities and this variable has important implications for asset-pricing theories. Researchers in developed markets have addressed various issues concerning the earnings of firms. For example, in the earliest studies, Ball and Watts (1972) addressed the computation of earnings forecasts using naive models and Deschamps and Mehta (1980) addressed the same issue using complex models. Neiderhoffer and Regan (1972) investigated the incidence of security price changes with earnings behaviour, that is whether or not positive (negative) price changes are observed when earnings changes are positive (negative). If such relationships exist, there is economic rationale for forecasting earnings. There is also substantial evidence that earnings behave as a random variable at best with a time trend. For example, Fama and Babiak's (1968) study on American firms, Finn and Whittred's (1982) study on Australian firms and Ariff and Johnson's (1990) study of Singapore firms support the proposition that growth in earnings follows a random walk and therefore it is unlikely that one could meaningfully predict earnings changes.

Ball and Watts (1972) tested whether a naive earnings forecast model is as good as a complex model and concluded that the naive model is as good as any prediction model. Deschamps and Mehta (1980) reported essentially the same findings. There is hardly any published evidence on any of these issues in Malaysia (except for Ariff and Johnson (1990) who analysed the earnings of a mixed sample of Singapore and Malaysian firms). The earnings behaviour is analysed in terms of its randomness. The method of analysis is shown in Section 3.

This chapter provides evidence on the dividend behaviour of firms listed on the KLSE over a 15-year period with results from tests of Lintner's lagged adjustment model and the randomness of earnings changes.

3. Data and Methodology

The data for this study consist of annual earnings and dividends of 60 randomly chosen firms traded on the KLSE over a recent 15-year period. Dividends and earnings data were collected and verified from a variety of sources such as the *Investors Digest*, daily financial newspapers, annual *Companies Handbook* and company annual reports. The earnings per share (EPS) was estimated by taking the yearly earnings before tax and dividing by the unweighted number of outstanding ordinary shares. Dividends per share (DPS) were estimated by taking the total amount of dividends paid and dividing by the number of outstanding ordinary shares. A total number of 900 observations for EPS and DPS respectively were used in the study. The payout ratio was calculated by dividing the DPS by the EPS.

The simple model and Lintner's model were used to verify the relationship between dividends and earnings. The simple model is aimed at explaining changes in current dividends conditioned upon changes in current and past earnings using only the directions of changes, whereas Lintner's model relates the magnitude of dividend changes based on current earnings and past dividends. The randomness of earnings changes was measured by the difference between the expected and actual percentage of earnings changes. Using historical frequencies of changes in earnings of each firm across the market, the conditional probabilities of observing the significance of runs of earnings of the sampled firms were estimated. Ball and Watts (1972) and Deschamps and Mehta (1980) reported that the above (simple) model did as good a job as any other complex random models.

4. Preliminary Findings

Evidence from Table 31.1 suggests that the average DPS was much more stable over the period of study than the average EPS. The relative variability of EPS was more than twice that of DPS. The Mann-Whitney U test confirms (at 0.001 level of confidence) that the average DPS is more stable than average EPS. This implies that Malaysian firms only change dividends based on their perceived change in the ability to pay the dividends in the long term from earnings changes. This is consistent with the theory that management will only change dividends when it is confident of maintaining the

Table 31.1 EPS, DPS and Payout Ratios of Malaysian Listed Firms by Year

Year	EPS in cents			DPS in cents			Payout Ratio
	Mean	S.Dev.	C.V.	Mean	S.Dev.	C.V.	Mean
1975	22.19	27.10	1.22	6.88	18.94	2.75	0.31
1976	26.09	45.88	1.76	5.64	12.04	2.21	0.21
1977	30.57	55.94	1.83	8.42	15.56	1.85	0.28
1978	32.82	68.42	2.08	11.24	27.91	2.45	0.34
1979	35.66	51.53	1.45	12.54	30.55	2.44	0.35
1980	34.33	37.80	1.10	15.37	49.57	3.23	0.45
1981	28.86	41.24	1.43	11.51	29.83	2.59	0.39
1982	24.63	40.57	1.65	8.54	17.74	2.08	0.35
1983	33.98	79.76	2.35	14.55	42.54	2.93	0.42
1984	17.36	27.34	1.57	3.92	5.68	1.45	0.23
1985	11.24	27.71	2.47	2.82	7.81	2.77	0.25
1986	11.05	48.80	4.40	2.34	5.54	2.37	0.21
1987	1.18	34.52	29.25	1.22	7.08	5.80	1.03
1988	11.15	23.22	2.08	3.65	8.70	2.38	0.33
1989	9.47	24.85	2.62	3.19	5.96	1.87	0.34
Average							
1975-1989	22.04	11.05	0.50	7.46	4.68	0.63	0.33

changed dividend rate in the future. The mean coefficient of variation for EPS over the 15-year period is lower (0.50)than the mean coefficient of variation for DPS (0.63). The average payout ratio over the period was slightly more than 33 per cent.

The relative constancy of mean DPS over the study period does not imply that listed firms did not change dividends, since about 55.5 per cent of all dividend announcements were dividend changes compared to the dividends declared in the previous period (see Table 31.2). Of the 55.5 per cent dividend changes, 28.3 per cent were dividend decreases while 27.2 per cent were dividend increases. In the Singapore market, 32 per cent of announcements are dividend changes; it is under 20 per cent in the U.S.A.

This may be related to the rapid growth of earnings of firms in the local market. The average payout ratio for the test period was 33 per cent per year. Payout showned only a slight increase from 31 per cent during the first year to 34 per cent at the last year of the test period. This is consistent with the assumption of relatively constant payout ratio in the valuation literature (Fama and Babiak 1968). Further, consistent with the rapid growth opportunities of firms in this local market, the firms appear to retain more of their earnings unlike the firms in the more mature economies such as the U.S.A., where the payout is twice this rate, perhaps because of lack of high positive net worth projects.

Dividend Behaviour

The results on dividend behaviour are presented here. We examined the relationship between the changes in the dividends and the changes in earnings (E_{it}) in both current and past periods. The summary of results in Table 31.2 shows the distribution by the sign of D_{it}, conditioned on the signs of the per share earnings changes over the current and two prior periods, that is E_{it}, E_{it-1} and E_{it-2}. In Panel A of Table 31.2, when E_{it} is > 0, 51.5 per cent of the cases have $D_{it} > 0$, whereas only 5.8 per cent have $D_{it} < 0$, with the rest maintaining the dividend payments. In Panel B, when both E_{it} and E_{it-1} are positive, the proportion of positive dividend changes is 70.3 per cent, whereas when E_{it} is positive and E_{it-1} is negative, there is a 48.2 per cent dividend increase. When there are three consecutive increases in annual profits, the proportion of positive dividend changes is 66.7 per cent. When there are two successive earnings increase preceded by a decrease, 64.9 percent of the cases have an increased current dividend.

These findings provide evidence of a lagged relationship between current and past earnings changes and dividend changes. Table 31.2 also shows that the effect of a change in earnings on dividends declines over time, which provides further evidence for a lagged relationship. For example, if two or three profit changes are negative, the proportion of negative dividend changes for the sequence (- - +), is higher than for the sequence (- + -) which in turn is higher than for the sequence (+ - -).

The results from an empirical test of Lintner's model are reported in Table 31.3. The speed of adjustment, c_i, is approximately 0.08. The implied target payout ratio, r_i, is 0.34, which is below those reported for developed economies. This could be due to several plausible reasons in the local context, one of which is that EPS used in the analysis is not a good measure of a firm's ability to pay dividends. Possibly, the ability to pay dividends is better measured by cash flow estimation.

Another reason for the low estimated target payout ratio may be certain characteristics of the local equity market, which encourages firms to adopt low target payout ratios.

Table 31.2 Distribution by Sign of D_t, Conditional on E_t, E_{t-1}, E_{t-2}

Panel		D_t							
		-		0		+		Total	% Total
E_t E_{t-1} E_{t-2}		No.	% of row total	No.	% of row total	No.	% of row total		
A	+	18	5.78	133	42.77	160	51.45	311	49.36
	-	160	50.16	148	46.39	11	3.45	319	50.64
Total		178	28.25	281 4	4.60	171	27.15	630	100.00
B	+ +	7	5.07	34	24.64	97	70.29	138	21.90
	+ -	11	9.82	47	41.96	54	48.22	112	17.78
	- +	83	56.85	48	32.88	15	10.27	146	23.17
	- -	77	32.91	152	64.96	5	2.13	234	37.14
Total		178	28.25	281	44.60	171	27.15	630	100.00
C	+ + +	4	8.33	12	25.00	32	66.67	48	7.62
	+ + -	4	5.41	22	29.73	48	64.86	74	11.75
	+ - +	4	5.48	27	36.99	42	57.53	73	11.59
	- + +	40	51.28	29	37.18	9	11.54	78	12.38
	+ - -	12	13.19	53	58.24	26	28.57	91	14.44
	- + -	39	44.32	41	46.59	8	9.09	88	13.97
	- - +	43	51.81	34	40.966		7.23	83	13.17
	- - -	32	33.68	63	66.32	0	0	95	15.08
Total		178	28.25	281	44.60	171	27.15	630	100.00

For example, large shareholdings by institutions may be for strategic reasons rather than to obtain dividends as income. Due to inter-company shareholdings or cross-holdings, the parent companies are likely to retain the earnings of their subsidiaries for expansion and therefore favour a low dividend payout ratio. The differences in the Malaysian tax system and that of developed economies is another possible reason. In the U.S.A., for example, dividend income is subjected to double taxation. The dividends are paid to shareholders at net amount and are taxed at the corporate tax rate. Net dividend income received by shareholders is further taxed at their own personal income tax rate. In Malaysia, when shareholders receive cash dividends, they benefit from a tax credit equivalent in the limit to the amount of tax paid by firms under the Malaysia s imputation tax system, a system of tax that only taxes the earnings stream once. Furthermore, to encourage the public to invest, tax incentives are offered to investors in the form of tax exemptions and a minimum level of taxable dividend income.

Hence, though Malaysian firms adopt a lower dividend payout ratio, actual after-tax dividend payout ratios may not be much lower than for firms in the developed economies. This suggests that Malaysian firms need not adopt a dividend payout ratio as high as firms in developed economies with different tax systems.

The estimated equation in Table 31.3 suggests that about 22 per cent of change in current dividends are explained by changes in current earnings and last period's dividends. Therefore Lintner's model only *partially* describes dividend behaviour of Malaysian firms.

Table 31.4 provides a summary of findings from other markets. It can be seen that the speed of adjustment and target payout ratios in the developed capital markets are larger than those obtained for the local market. This is consistent with the emerging nature of the market as well as the opportunities for greater growth, which should encourage greater retention in earnings as it also generates greater variability in earnings experience.

Randomness of Earnings Changes

Table 31.5 shows the expected and actual percentage of earnings changes. These were estimated using the historical frequencies of the changes of earnings of each firm across the market and estimating the conditional probabilities of the sequences of runs in earnings. If the actual earnings sequences are close to expected sequences, this suggests that earnings occurrences or changes follow the normal sequence expected in a run.

Table 31.3 Lintner's Partial Adjustment Model using Malaysian Data

Time Period	a_i	cr	-c	R^2
1975-1989	-0.002	0.0276	-0.08	0.22

Table 31.4 Speed of Adjustment (c) and Target Payout Ratio (r): Selected Economies

Study	Country	Mean Estimate of c	Mean Estimate of r
Lintner (1956)	USA	0.25	0.60
Brittain (1966)	USA	0.23	0.66
Fama & Babiak (1968)	USA	0.34	0.49
Watts (1973)	USA	0.32	0.71
Fama (1974)	USA	0.27	0.57
Roy & Cheung (1985)	USA	0.29	0.82
Chateau (1979)	Canada	0.30	0.31
Ryan (1974)	UK	0.18	1.01
Shevlin (1982)	Australia	0.51	0.42

Source: Ariff and Johnson (1990)

Table 31.5 Calculated Percentages of Earnings Sequences

Panel	E_t	E_{t-1}	E_{t-2}	Relative Frequencies	Calculated %	Actual %
	+	+		P(+).P(+)	24.36	21.90
X	+	-		P(+).P(-)	24.99	17.78
	-	+		P(-).P(+)	24.99	23.17
	-	-		P(-).P(-)	25.64	37.14
				Total	100.00	100.00
	+	+	+	P(+).P(+).P(+)	12.03	7.62
	+	+	-	P(+).P(+).P(-)	12.34	1.75
Y	+	-	+	P(+).P(-).P(+)	12.34	1.59
	-	+	+	P(-).P(+).P(+)	12.34	12.38
	+	-	-	P(+).P(-).P(-)	12.66	14.44
	-	+	-	P(-).P(+).P(-)	12.66	13.97
	-	-	+	P(-).P(-).P(+)	12.66	13.17
	-	-	-	P(-).P(-).P(-)	12.99	15.08
				Total	100.00	100.00

The overall observed relative frequencies in terms of the signs (+ indicating earnings increases and - indicating earnings decreases) are 0.49 and 0.51. This suggests that there is an equal probability of earnings increases and decreases occurring, a condition one would expect of a random time series.

The expected percentages of earnings sequences as the weighted average of the observed sequences are computed: column 2 in Table 5. The probability of earnings increase over three consecutive periods [P(+)*P(+)*P(+)] is 0.1203 or 12.03 per cent. Columns 2 and 3 show that the expected percentages for different combinations of earnings sequences are very close to the actual observed sequences. For both the panels X and Y, a Chi-square test at 5 per cent level confirms this.

The Relative Frequencies of the Earnings Sign are given as P(+)= 0.4936; P(-)=0.5064 earnings changes are random. This suggests that earnings changes (or at least their signs) are independent over subsequent annual periods. These findings are consistent with those of the developed capital markets (Ariff and Johnson 1990).

5. Conclusions

This study attempted to assess the economic behaviour of firms with respect to two very important variables in accounting and finance, namely earnings and dividends. The findings, using Lintner's model, provide evidence that the dividend decisions of Malaysian firms are partially dependent on their current earnings and partly on the past period's dividends. The sequence of earnings increases is found to be associated with the decision to increase dividends while dividends decreases are likely to occur when the sequence of earnings is showing a declining trend. These findings can only be obtained if the long-term target dividend are conditional upon the firm's earnings ability.

There is also evidence that earnings changes (or at least their signs) of listed firms are random (independent) and there is an even chance for a firm to report earnings increases or decreases in any particular accounting period: given business cycles, this finding is expected. This implies that earnings forecasts by analysts might be of no economic significance. However, these findings are based on average values over a large sample of firms and not any particular firm. As such, a superior analyst may still be able to reward himself for his/her efforts to forecast earnings changes of a specific company.

PART

7

Capital Market Research Framework in Emerging Economies & Conclusions

Pertinent lessons from carefully designed studies reported in this book would have us believe that there is an urgent need to study the fundamental behaviour of emerging capital markets. The 1997 Asian currency crisis makes it a top priority. While the underlying behaviour of firms listed in emerging markets conforms with the predictions of most, if not all, the financial economics insights given by powerful theories briefly summarised in Chapter 3, it is found that *emerging markets exhibit variations in behaviour that are significantly different from the behaviour of matured markets*. Should we therefore suggest a framework for research in these markets now that there are 60 emerging markets at different stages of development, and more such markets are being organised? Our answer to this question is that we should since there is a need to understand what fundamentals are affecting capital markets as these expand rapidly during their early phases of development. Further, several public policies are being pursued by economic planners to develop capital markets in Asian and other developing economies in the face of dwindling foreign direct investment (FDI) inflows since FDI peaked in 1983 and the growth rate of FDI going to developed countries is faster in the 1990s. Worse still, there has been a relative increase in FDI to developed economies starting in 1996. A lion s share of FDI is now heading towards the developed countries attracted by better-trained but unemployed workforce, cheaper land, better infrastructure, tax concessions, etc. Hence, domestic mobilisation of long-term capital through efficiently organised capital markets holds a key to sustainable growth in emerging economies.

Chapter 3 in Part I gave a quick and broad-based description of emerging markets in the world. In Chapter 32 that follows, we provide first a set of research issues that should be the focus of finance research in these emerging markets. Capital puts labour into motion, said Adam Smith and it takes an average of $3.75 of capital investment to generate a dollar of GDP in developing countries while the capital-and-technology-rich developed economies use only $2.50 to generate a dollar of GDP! This is the crux of the efficiency and factor-productivity based development through capital and technology, which would ensure sustainable long run growth in emerging economies. We believe that the emerging markets need to quickly travel a path to greater transparency, market openness, and efficiency. The suggested framework for studying emerging markets is deeply embedded in modern financial economics theories. The reader will find in the concluding section of Chapter 32 a summary of salient findings that have emerged on the accounting, financial, and economic behaviour of Malaysia's Main Board listed firms. It is our fervent hope that serious students of financial economics, the professionals and others formulating practical policies for financial sector development will find our findings useful in their work.

CHAPTER

32

Research Framework for Developing Markets and Conclusions*

Abstract

This book documented carefully researched empirical evidence to suggest that a modified research framework is needed for the analysis of developing/emerging markets. Studying such markets is far more complex than studying well-developed markets. In this chapter, we outline some critical research issues to point the direction in which research may proceed as more good quality research becomes essential to address the question of whether mainstream finance ideas and theories can be applied in developing/emerging markets. After discussing what we consider to be a relevant research framework for the Asia Pacific region, we provide some salient conclusions that are suggested by the evidence documented in this book on Malaysia's capital markets.

1. Introduction

This book introduced in Chapter 1 the core ideas in finance that guide research undertaken for this book. These ideas are (i) institutional finance, (ii) pricing efficiency, (iii) discounting approaches to valuation, (iv) equilibrium asset pricing theories in spot markets and (v) futures price discovery. While these topics may form one method of organising the core ideas in finance, one may also suggest other methods of organising finance ideas using a different perspective, as for example, from the perspectives of professionals practising accounting, financial analysis and financial economics. Suffice to say now that the grouping of topics adopted here is in line with the teaching of finance in mainstream institutions in conformity with the accepted paradigm. This grouping may be used to develop some ideas to build a research framework.

The discussion on research framework in this chapter will closely follow the structure adopted in Chapter 1 using the above five topic areas. The following section will elaborate on the specific research issues in each of the topic areas. In Section 3, we discuss the role of information and databases in improving the quality and quantity of research in the region; some pointers are given as to how this can be advanced in Malaysia. The main findings on Malaysia's capital market behaviour are summarised in Section 4. In brief, we suggest a modified finance research focus on the Asia Pacific region. Also, Malaysia's capital market behaviour is closer to the behaviour of developing markets rather than newly-emerging markets. It is an empirical fact that the Kuala Lumpur

* This chapter was written by M. Ariff after completion of the review process of the book.

share market (more than its bond market) has evolved itself to become a large and liquid market with sufficient depth to be another regional financial centre in the Asia Pacific. It is among the top 24 markets in terms of size in 1998 thought it was ranked before the 1997 Asian currency crisis as being the 15th largest.

2. Research Framework

Market Microstructure or Institutional Finance

In its short 12-year history, institutional finance research has come a long way to have its own agenda guiding research in many parts of the World. Asia Pacific capital markets are organised in ways that are somewhat different in view of the recency of their development, their lower liquidity, and regulations to restrict foreign ownership of domestic firms. There have not been any studies on price effects arising from switches to screen-trading in Australia, Malaysia, Hong Kong and Singapore. Further, in some countries (Australia and Hong Kong), several markets were consolidated into one central market with electronic linkages to trading points situated in several locations. These two changes in the organisation of markets are reported in the financial press as having contributed to improving liquidity and of course also lowering exchange costs of securities trading. To-date these issues have not been carefully studied especially considering that such changes are likely to take place soon in other markets, for example in India, Jakarta, Bangkok, etc.

Another issue of concern is the segmentation of the markets for the purpose of trading. Stocks that are less liquid are often traded in separate sections of an exchange with similar order execution procedure as the liquid stocks, as in Tokyo and Osaka (Lamba and Ariff 1997). In other countries, order execution procedures differ in that the settlement for the less liquid stocks is done over periods greater than the standard number of days (for example, greater than t+5 in Malaysia right up to 1989). Another way in which markets are segregated is to trade different securities, one designated for foreign ownership and another designated for locals (Singapore's foreign vs local shares, Thailand's alien board stocks vs other stocks and China's B- and A-shares, etc.) (Ariff and Khan 1997). These arrangements are based on liquidity and ownership status of scrips. Pricing of these shares of different status can provide useful knowledge towards understanding the economics of market organisations. The Asia Pacific provides a rich environment to do such research.

Finally, high-frequency interval data, if made available to researchers, can be used to look at the order processing and order arrival patterns in these developing/emerging markets. No published work on this area exists though papers are already available in respect of Tokyo and Sydney shares. Patterns in trade are important for securities trading just as patterns in factory order arrival determines the efficiency planning needs in production areas. The method of organising the order execution based on order arrival in all but Japanese markets must have developed for good economic reasons. This aspect is still not studied yet.

The procedures applied to IPO market-makings differ in the region in a number of ways as documented in this book . Firstly, a number of countries (Malaysia has permitted market-driven price formation for IPOs since 1996) are re-regulating IPO rules to return pricing to the market. Further innovations have been made in terms of public auction as the only type of IPO issues. These regulatory and institutional changes must be affecting the manner in which prices evolve. Studying the price effects of institutional changes in the IPO market may confirm the financial economics of the new ways of making the IPO markets.

Thus, institutional finance is an area of importance in the Asia Pacific because there are better opportunities to examine these issues systematically in this region than in any other. Hence, an agenda for research, particularly in collaboration with the exchanges and securities commissions in the region may provide knowledge for policy makers and market organisers. Knowledge can be gained about the best options for the institutional arrangements that will give investing public low-cost investment opportunities.

Pricing Efficiency

Of the 16 share markets in the Asia Pacific, only five have been shown to satisfy the criteria to qualify as Fama-efficient markets. Continuing studies suggest that most of the markets have still not reached the second degree of efficiency. The reasons for this are still unknown. Further, other studies cited in the book have shown two prominent features of price formation in Asia Pacific markets. First, there appears to be significant over-reactions to information. Second, the speed of adjustment to information is so slow that it takes as long as 10 days or more for information to be absorbed in most markets, except those in Hong Kong and Tokyo. Given the lack of speed in price responses to new information, it behoves well to examine the reasons for the impediments to efficient formation of prices.

For example, it is likely, given the rather poor quality of accounting standards in some markets that accounting information about profits, dividends, etc. may be inaccurate or even too skimpy for investors to gauge the truth of the information made available to the market. Thus, it is plausible that prices react with fuzziness initially such that the initial prices are revised as more accurate information is released or when investors have had time to examine the accounts to decipher a more accurate picture of initial releases. That means that researchers have to examine the sequence of information arriving rather than treat each earnings or dividend report as discrete information. Such an approach may shed light on why over-reactions to information appear to be a standard feature of markets in the Asia Pacific region. If indeed the reasons are due to accuracy of information, it would suggest that a reason for inefficient prices may be due to institutional reasons and not pricing efficiency.

Of the 16 markets, 8 are weak-form efficient, 5 are semi-strong form efficient, but all of them have some degree of over-reaction. Further, it appears that the Jakarta stock exchange has recently become weak-form efficient, but then the newly-created Shanghai and Shenzen markets are still not efficient in the first degree. This suggests that markets appear to gain efficiency over time after a period of learning. But there is no prior information on how long markets may take to become efficient to learn. This is a very relevant issue in the Asia Pacific and particularly for emerging markets.

Further, there are markets such as options markets which have taken time to become efficient. The question of maturing of markets can be conveniently studied in this region as there are markets at various stages of growth. This has implications for public policy, investment practices and pricing efficiency. Such a research agenda may provide useful priors that can be used across the world as there are 60 emerging spot markets and about 20 new futures markets, all with characteristics similar to those in this region with regard to maturing of markets from inefficient ones to Fama-efficient markets.

Discounting Approach to Valuation

The valuation paradigm suggests a broad-based principle that the value of a financial asset is the present value of expected future cash flows from an asset, discounted at the risk level appropriate for the asset. We use this idea in valuing almost all securities, particularly spot securities. Hence William's and Makeham's Bond Valuation and Gordon-Shapiro's Dividend Valuation are widely used in applied finance. These valuation models assume that the fundamentals incorporated in the valuation theorems ought to price securities cross-sectionally in any market. If the idea is true, then we should be able to test if indeed the fundamentals incorporated in the valuation models are driving the security prices in the Asia Pacific capital markets. There have been limited attempts to examine this issue as a research agenda. Answering this question is very complex indeed. Nevertheless, two studies cited elsewhere in this book suggest that developed markets such as Tokyo appear to price securities as modelled by the valuation theorems. However, less developed market prices are priced more by factor(s) not included in the pricing models. Then what are these unknown or missing factors?

This raises fundamental questions about the validity of the prices revealed in market places! For example, if typical stocks in Malaysia are priced on average by less than 25 per cent by fundamental factors, then it behoves us to ask the question why? What are the factors that account for the 75 per cent of price changes? This line of reasoning is critical to separate the factors that may actually be outside the pricing models used in practice or advocated by professionals.

Similar questions may not be asked of securities that have finite lives as in fixed-income assets. In these cases, the fundamentals incorporated in the valuation models may explain a large portion of the pricing of these finite-lived securities such as bills, papers, notes, bonds and derivatives. However, there has been very little study of the pricing of these securities in the Asia Pacific. It is likely that notes are priced by the fundamental factors of earnings of firms, coupons offered, term of notes, age of firm (proxy for quality) and rating of the firm. These factors have been shown to price bonds in developed markets, where 85 per cent of price changes in bonds are due to variations in these fundamental factors. But such studies have not covered bond pricing (nor bills, nor derivatives) in the Asia Pacific capital markets. This framework for valuable practice-oriented research is quite relevant for the region.

Equilibrium Asset Pricing Models

In addition to the discounting approach to valuing securities, finance theoreticians have developed equilibrium pricing theories using the classical approach of supply-demand analysis. These can be found in the CAPM, APT, Multi-index Model, Single Index Model, Consumption-based CAPM, to examine pricing in the spot markets. For the derivative markets, there are several pricing models based on the original two options (binomial and continuous) and cost of carry models. These theories form the core ideas of finance, and are widely applied in professional practice and academic training.

However, these ideas have not been tested in the Asia Pacific market places except in a few cases, as documented in the book.

While the testability of CAPM has been questioned, nothing stands in the way of testing if the systematic risk measure of the CAPM is a pricing factor. Studies in the 1990s have cast doubt on the usefulness of systematic risk as a pricing factor in the developed market of New York. It is not known if that is also the case with any of the Asia Pacific markets. Pursuing this line of research would also justify testing the CCAPM as an alternative to testing the CAPM. Or of testing the relevance of APT to identify the factors associated with pricing of securities in the region.

Therefore, a useful agenda for research is to examine the relevance of the theory-suggested factors for the pricing of securities in this region. It could be argued that the factors pricing securities in Singapore may have something to do with international trade (consistent with Singapore's position as an international trader) whereas pricing in Tokyo is more likely to be associated with industrial outputs while pricing in China may be associated with consumer outputs, etc. This line of reasoning, and its subsequent testing, may help finance researchers in Asia to build a menu of factors that are relevant in total for the region, but may be irrelevant to a particular economy. This can help to make the finance paradigm more comprehensive to include developing/emerging markets.

Advent of Derivative Markets

There is a clamour to introduce more and more derivative securities in the Asia Pacific capital markets. This is despite the very bad losses of large enterprises dabbling in futures (in China, Malaysia, United States, Germany, United Kingdom and Indonesia) and the failures of futures contracts in many exchanges (Hong Kong and Singapore excluding SIMEX). The push for introduction of derivatives actually comes from institutions and foreign investors as risk-management instruments. Should the spot market's price risk increase, they could hedge their position by entry in the futures markets. It makes good economic sense from their point of view to justify futures markets.

In practice, rushing into the creation of derivative markets is not clearly a win-win situation in the light of the danger of spectacular losses from bad decisions and market failures. There are three key issues in the feasibility of futures instruments: demand, underlying market resilience in price discovery, and overall contribution to risk management. It is a foregone conclusion in financial economics that a viable demand for derivatives require (a) speculative demand to reveal prices and (b) hedge demand to create opposite positions. Except in Australia and Japan, demand for shares is from individuals, which is about 80 per cent in Malaysia. This is the reverse in Japan and Australia where the demand is from institutions. Given sufficient capture of trade by institutions, there will be a natural demand for futures to reduce basis risk in the spot positions of these institutions. Speculators will help reveal prices, and be willing to bear the losses if their futures price predictions go wrong.

Thus, it appears at the outset that the advent of futures markets is conditional on a well-developed institutional demand for securities. Shifting demand to institutions as the major players in the market requires private mutual fund markets to be developed as the main sources of individual investments. In some countries, large pension houses encourage the individual investors to invest on their own (Singapore) with predictable consequences. Institutional investment is a small portion of the total investment, thus making it unlikely to develop the much needed hedge interests for futures securities to survive. The Hang Seng Index Futures contract did not take off for the simple reason that institutional interests in equity in Hong Kong are a fraction of individual interests.

On the other hand, there is demand for these instruments as risk management tools. There has been no study that could shed light on the link between demand for futures and institutional presence. The Asia Pacific has few countries with successful derivative contracts, and the successful ones also have large well developed mutual fund industries. It is worthwhile to study the macro factors in the finance sector that facilitate successful introduction of futures contracts. Any finding from such studies will help in reducing the failures of futures markets.

This brief review of useful areas of research for the Asia Pacific suggests a number of topics on which practical and academic research can be initiated to yield knowledge that could guide the future development of capital markets. At the same time, these efforts may address the question of whether the core ideas of mainstream finance need to be amended before these can be applied in the different Asia Pacific context.

3. Resources for Asia Pacific Focus in Research

Demand in the Asia Pacific for personnel trained in finance has increased over the last two decades. There is a critical mass of trained personnel in the relevant industries as well as in institutions of higher learning. It follows then that demand for good quality research in finance will increase as more and more personnel are likely to address practical issues of how to manage financial industries in the local settings. A similar demand for research occurred at appropriate points in the development of the developed economies; for example, in the 1950s in the United States, which led to the founding of the finance discipline.

A critical mass of trained manpower is a key resource for further development of research focus. There are other resources needed. Demand for good-quality higher degrees in finance will provide the focal point for doing research. This is just beginning, with many universities offering specialised graduate studies in finance and in the professions. Next in importance is the ready availability of databases of information on securities traded in an economy. This is beginning to occur at commercial levels with the PACAP database, the universities databases (NUS Financial Database), and a few private vendors of data. There is a need for the institutions producing the data to provide them free to universities for research purposes. It is, for example, impossible to get data from the Shenzen exchange for research, whereas the same data set once in the Datastream created in London can be got for a small fee. The institutions should provide the data free to public institutions so that students and researchers could get the data readily at no cost to do useful research. Good quality research in finance is basic science research, which has no payoffs except in enhancing knowledge.

Further down the line of encouraging research, there is a need for professional associations. There is now an Asia Pacific Finance Association which focuses on a limited number of countries, which leaves most parts of Asia out! There is now a PACAP/FMA conference. Individual countries have their associations (Nippon Finance Association, Malaysian Finance Association etc.). This augurs well as such organisations will provide forums for research in the future. Certainly, there is a need to establish an institute for financial research in each country so that such institutes in several countries could link up to form a regional body to provide a forum for good quality research. Journals are appearing fast in several countries (*Capital Markets Review, Finance India, Review of Financial Markets*, etc. are new ones) adding more to the established finance journals *(Pasific Basin Finance Journal)* such as *Accounting and Finance*. These developments augur well for future research.

4. Conclusions

The subject of this book is Malaysia's capital market behaviour. The focus of research reported herein uses mainstream ideas in finance. Since the field is very wide, we have placed emphasis on what we consider to be of key interest by including research findings on the core ideas of finance. These core ideas are generally the ones that get the attention of text books, and professors teaching finance. So, this is a volume that should, for many years to come, provide a reference point on the applicability of ideas central to finance in the Malaysian financial sector. What are the main findings?

Development of Markets: The capital markets in Kuala Lumpur developed over several decades and, therefore, have the benefit of adapting international practices to the local context very well. Though KLSE officially started trading in 1960 in Kuala Lumpur, it had its beginning in the Stock Exchange of Malaya going back several decades earlier, but located in Singapore. Thus, the first finding is that, unlike other emerging markets in the region, Malaysia's capital markets developed over a long period. As a regional financial centre, capitalisation-to-GNP was 283 per cent in 1996, compared with the world average of 73 per cent. Its depth is, therefore, twice that of a typical developed market. (It has suffered a sharp decline following the 1997 Asian Currency Crisis.)

Reward Rate: The reward rate in the share market (and to some extent in the bond markets) is reflective of the long-established history of the market. It had a moderate risk of about 32 per cent and return rate of 21 per cent over 1983-1996 (though its 20-year history indicates a much lower return of about 20 per cent and higher risk of 31 per cent). Thus, its risk-return is much lower than that of emerging markets, but slightly higher than that of developed markets.

Market Structure: The bond and share markets are set up as public auction markets. Trading has been screen-based since 1989, and liquidity is rather high at US$277 per firm per year compared to the Asia Pacific emerging market average of US$137 (or the US$ 777 in New York) Transactions are driven by orders, and there are no market makers to smooth trading. This is one market where volume is high, though in value terms, trading is moderate compared with developed markets, which trade US$321 per firm per year, on average. This suggests KLSE's inherent emerging status.

Pricing Efficiency: Prices formed in the markets are Fama-efficient in that prices pass the tests of weak form and semi-strong form efficiency. Strong-form efficiency is debatable, as indicated by tests over 1980-1989. Nothing is known of the speed of adjustment coefficient, nor of the reasons for over-reactions to information. Of special importance is the finding that any investor following chartists will not be able to make profits consistently after adjusting for transaction costs! This is great news in a country with thriving chartists.

Primary Market-making: Malaysia has one of the highest growth rates in the addition of stocks to the boards. They have grown from a list of under 300 in the mid-1980s to almost 700 listings in the two boards, and a planned third board, MESDAQ. Primary markets have been made by regulatory intervention in price setting under its National Economic Plans: since 1996, prices of new issues have been permitted to be set by market forces. The primary market yields the highest reward of 135 per cent but it is equally difficult to get an allotment of shares since the over-subscription rate is about 35 times the offered lots. Given the close scrutiny of regulators on the forecast earnings of IPOs, the actual earnings of newly-listed firms are very close to the forecasts in the prospectus.

Valuation Theories: Tests on whether share price changes are driven by fundamental factors show that very few of the price changes are correlated with fundamental prices. Key variables found associated with price changes are payout ratio, earnings, debt-asset ratio and size of firms. A surprising result was obtained from a test of Gordon's DVM; this result needs to be verified as it is contrary to other results.

Asset Pricing Theories: A test of CAPM suggests that risk is the relevant variable for pricing of shares in the market. However, the size of the intercept is too large, suggesting that the test measures have errors. However, an APT test suggests that the pricing factors may be unique to the nature of the economy.

Systematic Risk and Thin Trading: The Malaysian market is a typically thinly-traded securities market. As such, measured parameters are inaccurate as there is non-synchronous trading effects on prices. We showed a correction procedure to correct for the errors created by this process. This should become established prior to the market.

Mutual Funds: There are 80 unit trusts in Malaysia, of which the PNB holds 90 per cent of the assets. Some of these units accept new issues, and therefore, the returns generated are not only from alleged stock-picking expertise but also from underpricing values picked up in new issues. On the whole, the unit trust performance is at best modest, and there is no evidence that the fund managers are able to consistently outdo the market.

Agency Problem and Management Control: The Malaysian market is an ideal setting for testing the performance of owner-managed firms versus manager-managed firms. This sheds light on agency costs issues important for accounting. We found that there is good evidence that owner-managed firms are more profitable. Further, changes in the board of directors attract little attention of investors, leading to only some minor changes in prices.

Evidence is also produced to show that target firms gain in value in acquisitions when acquiring firms offer to takeover target firms. This is consistent with the synergy effect theorem that suggests that the value of target firms must increase, reflecting the expected higher performance of the targets by the superior managers from the acquiring firms.

Usefulness of Financial Statements: The evidence of market efficiency would have us believe that unexpected information (surprises) in financial releases of firms lead to permanent price changes of firms. But historical information in past financial statements used as ratios was found to be not very useful. This flies in the face of the very entrenched practice of extensive financial analysis. It is perhaps the only way to describe the state of the firms using financial ratios, but the values of these ratios have been incorporated in prices at the time when they were first released.

Capital Structure: For the first time, we produce evidence on the behaviour of capital structure of Malaysian companies. Capital structure of Malaysian firms suggests that the firms have low debt to asset ratios (relative to most countries in the region). Capital structure is stable over time, but the capital structure of industries differs significantly from one another and over time.

Dividend Behaviour: Dividends behaviour was examined using the lagged dividend adjustment theory. Results suggest that there are long-term target dividend payout ratios adopted by firms, and that current dividend changes are determined by current and expected changes in earnings of the firms. The speed of adjustment of dividends to current earnings is very low, which may arise from the demand for internal funds for investment in a generally growing economy.

We hope these findings reported in this book are useful as source documents for professional practices, for teaching in tertiary institutions, and for financial economics research in financial institutions. We would be well-rewarded if some of the readers of this book are motivated to pursue further research in the near future to add more carefully researched knowledge to the growing body of findings on Asia Pacific finance.

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