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Edited by
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CONTENTS

PREFACE

This book contains a collection of articles about the Malaysian economy and finance written by scholars in Malaysia and abroad. The articles consist of some which have been already published in the **South East Asian Economic Review** and others commissioned recently.

This collection is divided into five parts. Part I consists of articles dealing with national economic policy and industrialization strategy. Here Jomo K. Sundaram examines Malaysia's New Economic Policy (NEP) in relation to income distribution and national unity and suggests a new interpretation of the official New Economic Policy. He also makes broad suggestion for an alternative Malaysian national economic strategy. Ozay Mehmet then critically examines current Malaysian industrialization strategy with particular reference to the NEP's poverty redressal objective.

Part II deals with monetary analysis of the Malaysian economy. Sritua Arief tests the nearness of time deposits to money and examines the monetary policy implications of his findings. Bernhard Fischer then proposes a "demand for money" model for Malaysia, while Muthi Semudram examines to what extent the monetary approach to the balance of payments is applicable to the Malaysian economy.

Analysis of taxation and external trade are provided in Part III. Here Ismail Muhd. Salleh discusses the performance of various taxes in Malaysia by source and the distribution of the burdens of these taxes to various income groups. He examines whether taxation has been an effective redistributive instrument. Then, John Hutton specifically examines the relationship between income tax elasticity and income distribution. Sritua Arief's rigorous analysis of Malaysia's external trade contrasts with previous studies on Malaysia's external trade which have largely been descriptive; the pattern of Malaysia's trade preferences is statistically analyzed by applying Savage-Deutsch's probabilistic model.

Part IV of this collection of papers deals with studies of Malaysia's agricultural sector and related industries. Raymond Wells examines to what extent some of Malaysia's agricultural products are nominally and effectively protected in order to detect the effects of agricultural price distortions that may have taken place. Zulkifly Hj. Mustapha discusses land development schemes in Malaysia and analyzes their impact on agricultural production, income distribution and poverty alleviation. The extent of exploitation of smallholders is examined, in relation to the process of price determination in the domestic rubber market in Peninsular Malaysia, by Paul Chan. Two studies of the rice processing industry in Peninsular Malaysia are then presented. The first one by Richard Vokes deals with public investment in the rice processing industry, while the second one by Raymond Wells and Leo Fredericks deals with choice of technique in this industry. The merits or demerits of public investment in the rice processing industry and choice of technique in large government-owned rice processing mills are examined in these two studies.

Part V, the final part of this collection, consists of studies of employment, industrial wages and household consumption. The pattern of underutilization of labour in Malaysian agriculture is examined by Chamhuri Siwar and Mohammad Hj. Allias. Raj Kumar analyzes the employment effects of changes in output, exports and home demand in the rubber and forest-based industries; the output-employment elasticity, export-employment elasticity and home consumption-employment elasticity are estimated. Osman Rani Hassan tries to explain the great variation of industrial wages among industries in Peninsular Malaysia by proposing a model of inter-industry wage differentials. The final study in this volume is a study of household consumption patterns in Peninsular Malaysia by Sritua Arief which comes out with estimates of expenditure elasticities of various goods and services consumed.

The studies presented in this collection are largely policy-oriented. The policy implications of the findings are clearly presented and should be useful to Malaysian economic policy-makers. Others interested in the Malaysian economy will also benefit from these studies since they enhance understanding of the Malaysian economy.

We wish to express our appreciation to the publishers of the **South East Asian Economic Review** who have granted permission to reproduce some of the articles already published in that journal. We also wish to extend our gratitude to the authors of the commissioned articles.

Kuala Lumpur
September 1983

Sritua Arief
Jomo K.S.

Part One
NATIONAL ECONOMIC POLICY AND INDUSTRIALIZATION STRATEGY

1

MALAYSIA'S NEW ECONOMIC POLICY AND 'NATIONAL UNITY': DEVELOPMENT AND INEQUALITY 25 YEARS AFTER INDEPENDENCE

JOMO KWAME SUNDARAM

On 31st August 1982, the Malaysian government celebrated the 25th anniversary of attaining independence. On that day 25 years ago, formal political authority was officially handed over by the British to the local elite represented by the Alliance Party led by Tunku Abdul Rahman. The changes that have occurred in the past quarter century, especially rapid economic growth, can no longer be denied; the annual growth rate of the Gross Domestic Product (GDP) in Peninsular Malaysia rose, on the average, by 5.8% during 1957-70 (Rao, 1976), while the GDP for the whole of Malaysia rose by 7.8% per year, on average, between 1971 and 1980 (Malaysia, 1981).

There have been several especially important changes. Post-colonial industrial development has involved two stages, i.e., import substitution from the late fifties to the mid-sixties, and export-oriented industrialization since the late sixties. Rural development efforts directed at the peasantry contrast with British colonial neglect. Initially, such efforts were aimed at strengthening the yeoman peasantry, but since the late seventies, more attention has been given to the development of capitalist agriculture, i.e. on large farms and involving a faster rate of capital accumulation. The government's efforts to diversify the economy have not only involved efforts to diversify agriculture (e.g. with the introduction of oil palm, cocoa, etc.) but also the growth of various kinds of industries — import substituting as well as export-oriented, including industries based on local primary resources.

However, this kind of economic development — considered praiseworthy in several regards — has not only maintained, but even widened existing gaps in income distribution between rich and poor. Moreover, it can no longer be denied that economic development in the post-colonial era has widened the income gaps within each major ethnic group in Peninsular Malaysia, and especially among the Malays. Not surprisingly, however, inter-ethnic tensions have also increased. Among the important reasons for this are the common Malay misperception that the Chinese commmunity controls the country's economy and the equally erroneous non-Malay belief that the Malays as a whole control the government. In fact, only a small group from each of the two major ethnic groups concerned enjoy significant control in these spheres. Nevertheless, both these misperceptions have influenced the thinking and consciousness of the majority of people in this country. This, in turn, influenced, for instance, the atmosphere as well as the outcome of the May 1969 elections, which ignited an inter-ethnic conflict soon after. This bloody incident provided the opportunity for the so-called 'Young Turks' within UMNO to take over the reins of government, leading eventually to the announcement of the New Economic Policy (NEP) in 1970. The NEP has become the primary yardstick in discussions of the country's economic development policies. Thus, we should examine whether and to what extent the NEP has overcome problems of economic injustice and achieved 'national unity' as declared by the government.

Poverty Reduction

Table 1 summarizes official data on the incidence of poverty by sector for the years 1970, 1975 and 1980. It suggests an overall percentage reduction of poverty incidence from 49.3% in 1970 to 43.9% in 1975 and 29.2% in 1980. In absolute terms, the number of poor households rose from 791,800 in 1970 to 835,100 in 1975 before dropping to 666,100 in 1980. The credibility of such data has been questioned on several grounds, e.g. the non-disclosure of the official poverty line in recent plan documents has raised doubts about the possibility of poverty eradication by statistical manipulation. However, I do not wish to pursue such lines of argument here and will accept this data at face value for the purposes of this paper.

It is nevertheless pertinent to remind ourselves here of the official conception of poverty. Simply put, the government views poverty in absolute rather than relative terms and claims to monitor the incidence of poverty in relation to a (publicly undisclosed) poverty line. With such a conception of poverty operative, it is conceivable that income inequality could grow while the poverty rate goes down if economic growth rates are sufficiently high. Evidence from the 4MP suggests that this was the case during the 1970s. Unlike the period 1957-70, when income inequality grew as the lower income groups suffered declining real incomes

(Treasury, 1974) — i.e. a situation of the rich getting richer and the poor getting poorer — during the 1970s, it appears that the real income of the bottom forty per cent increased on average (Malaysia, 1981, p. 37, Table 3.3) while overall income inequality continued to grow.

In the absence of more definitive indicators, the growing ratios between mean and medium incomes between 1970 and 1979 for the Peninsular Malaysian population as a whole, as well as for Malay, Chinese, urban and rural sub-groupings — shown in Table 2 — point to growing income inequality over the last decade when taken into consideration with the income distribution situation in 1970 and trends suggested by various sample studies since (see Ishak Shari & Jomo K.S., 1981). Table 2 also shows that the average annual growth rate of mean income between 1971 and 1979 for the lowest four income deciles was lower than that for all households; this was also true for Malay, Chinese and Indian households separately considered. In other words, rising incomes all around and poverty eradication in the 1970s have apparently been accompanied by growing income inequality.

Looking more closely at Table 1, we find that much of the reduction in poverty incidence was achieved in the latter half of the 1970s. To see why this was so, let us take a closer look at the significance of commodity prices for poverty reduction among rubber smallholders and padi farmers, two of the largest poverty groups.

According to the 4MP (pp. 18, 37-38), the unit value of rubber rose from 128 cents per kilogram in 1970 to 139 cts. per kg. in 1975 and 300 cts. per kg. in 1980. The average annual growth rate in the rubber price was therefore 1.7% for 1971-75 and 16.6% during 1976-80. Over the same period, estimated yield per hectare rose from 750 kgs. in 1970 to 1,069 kgs. in 1975 and 1,105 kgs. in 1980. It appears therefore that the favourable rubber price in 1980 had a lot to do with the dramatic drop in the incidence of poverty among rubber smallholders from 59.0 per cent in 1975 to 41.3 per cent in 1980, compared to the negligible decline in the preceding half decade from 64.7 per cent in 1970, despite the 42.5% improvement in productivity during 1970-75 compared to only 3.4% during 1975-80. Temporary commodity price upswings, however cannot be relied upon for sustained poverty reduction in the long run as the effects of the recent downward trend in the rubber price dramatize.

TABLE 1:
PENINSULAR MALAYSIA:
INCIDENCE OF POVERTY BY SECTOR, 1970, 1975 AND 1980

	Total house- (000)	Total poor holds (000)	Inci-dence poverty (%)	Per-centage poor (%)	Total house- (000)	Total poor holds (000)	Inci-dence poverty (%)	Per-centage poor (%)	Total house- (000)	Total poor holds (000)	Inci dence poverty (%)	Per-centage poor (%)
Agriculture:												
Rubber small-holders	350.0	226.4	64.7	28.6	396.3	233.8	59.0	28.0	425.9	175.9	41.3	26.4
Oil palm small-holders	6.6	2.0	30.3	0.3	9.9	0.9	9.1	0.1	24.6	1.9	7.8	0.3
Coconut small-holders	32.0	16.9	52.8	2.1	34.4	17.5	50.9	2.1	34.2	13.3	38.9	2.0
Padi farmers	140.0	123.4	88.1	15.6	148.5	114.3	77.0	13.7	151.0	83.2	55.1	12.5
Other agriculture	137.5	126.2	91.8	16.0	157.4	124.1	78.8	14.9	172.2	110.5	64.1	16.6
Fishermen	148.4	59.4	40.0	7.5	127.0	59.7	47.0	7.1	112.5	39.5	35.2	5.9
Sub-total	825.9	582.4	68.3	73.6	915.1	576.5	63.0	69.0	963.2	443.7	46.1	66.6
Non-Agriculture:												
Mining	32.4	11.1	34.3	1.4	31.8	10.1	31.8	1.2	32.6	11.1	34.0	1.7
Manufacturing	150.2	48.5	32.3	6.1	206.9	59.6	28.8	7.1	301.1	55.4	18.4	8.3
Construction	35.0	12.8	26.6	1.6	44.0	13.4	30.5	1.6	56.3	21.0	21.3	1.8
Transport and utilities	74.1	27.1	36.6	3.4	108.1	29.0	26.8	3.5	137.2	31.5	23.0	4.7
Trade and services	461.4	109.9	23.8	13.9	595.5	146.5	24.6	17.6	793.6	112.4	14.2	16.9
Sub-total	753.1	209.4	27.8	26.4	986.3	258.6	26.2	31.0	1,320.8	222.4	16.8	33.4
Other rural industries	305.5	123.5	35.2	15.6	433.3	153.4	35.4	181.4	546.4	124.8	22.8	18.7
RURAL Sub-total	1,203.4	705.9	58.7	89.2	1,348.4	729.9	54.1	87.4	1,509.6	568.5	37.7	85.3
URBAN Sub-total	402.6	85.9	21.3	10.8	553.0	105.2	19.0	12.6	774.4	97.6	12.6	14.7
TOTAL	1,606.0	791.8	49.3	100.0	1,901.4	835.1	43.9	100.0	2,284.0	666.1	29.2	100.0

Source: 4MP: p. 33, Table 3.2.

Note: 1. The calculations took into consideration the effects of programmes implemented during 1971 – 80 as well as changes in other factors, such as prices costs.

2. Data from studies conducted by Economic Planning Unit and Socio-Economic Research Unit in the Prime Minister's Department, Ministry of Agriculture, Department of Statistics and other agencies were used in the computations.

TABLE 2: PENINSULAR MALAYSIA: RATIO OF MEAN AND MEDIUM INCOMES, 1970—79
($ per household per month)

		constant 1970 prices				Annual growth rate, 1971—9	current prices			Annual growth rate, 1971—9	Annual growth rate (1971—9) mean income of bottom 4%
		1970	1973	1976	1979	(%)	1973	1976	1979	(%)	(%)
Malay	mean	172	209	237	309	6.7	242	345	513	12.9	10.6
	Median	120	141	160	200	5.8	163	233	332	12.0	
	ratio	1.43	1.48	1.48	1.55	1.16				1.08	
Chinese	mean	394	461	540	659	5.9	534	787	1,094	12.0	8.4
	median	268	298	329	383	4.1	343	480	636	10.1	
	ratio	1.47	1.55	1.64	1.72	1.44				1.19	
Indian	mean	304	352	369	467	4.9	408	538	776	11.0	9.9
	median	194	239	247	314	5.5	277	360	522	11.6	
	ratio	1.57	1.47	1.49	1.49	0.89				0.95	
Others	mean	813	1,121	870	1,152	3.8	1,299	1,268	1,881	9.8	14.8
	median	250	306	270	331	3.2	355	394	550	9.2	
	ratio	3.23	3.66	3.22	3.42	1.19				1.07	
All	mean	264	313	353	459	6.3	362	514	763	12.5	10.5
	median	166	196	215	270	5.6	227	313	449	11.7	
	ratio	1.59	1.60	1.64	1.70	1.13				1.07	
Urban	mean	428	492	569	675	5.2	570	850	1,121	11.3	
	median	265	297	340	368	3.7	345	495	611	9.7	
	ratio	1.62	1.66	1.67	1.83	1.41				1.16	
Rural	mean	200	233	269	355	6.6	269	392	590	1.28	
	median	139	159	180	230	5.8	184	262	382	11.9	
	ratio	1.44	1.47	1.49	1.54	1.14				1.08	

Source: **4MP:** p.37 Tables 3.3
p.56, Table 3.9

Derived from Post Enumeration Survey of 1970 Population and Housing Census, Household Income Survey 1973, Labour Force Survey 1974 (reference 1973), Agriculture Census 1977 (reference 1976) and Labour Survey 1980 (reference 1979).

In the case of padi, the purchase price per pikul under the government's Guaranteed Minimum Price scheme was increased from \$16 in 1970 to \$24-\$28 in 1975, \$28-\$32 in 1979 and \$36-\$40 in 1980. The official estimate is that poverty incidence among padi farmers was reduced by 9.6 percentage points to 55.1% as a result of the increase in 1980 alone. The poverty incidence rate for this group dropped from 88.1% in 1970 to 77.0% in 1975. Although a variety of factors (including off-season and off-farm incomes, as well as rising production costs due to increased reliance on machine, fuel and chemical input elements of the Green Revolution package) affect padi farmers' net incomes, it appears that the government's padi price support scheme, and probably its input (eg. fertilizer) subsidy scheme as well, have been crucial to the reduction in the incidence of poverty among padi farmers. Conversely, it can be argued that unsubsidized productivity gains have not been all that significant. In other words, the reduction of poverty among padi farmers has been largely due to government support, presumably at the expense of the rest of the (non-rice-producing) population. This implies limits to such support and, of course, has ominous implications for the future welfare of padi farmers. In this connection, it might be noted that big farmers who produce large rice surpluses for sale and large land owners who qualify for larger input subsidies on the basis of land owned tend to gain proportionately greater benefits from such government intervention.

The significance of favourable rubber prices and considerable government subsidies for padi farmers is underscored when we contrast this with the official rhetoric about eradicating poverty by increasing productivity. The hollowness of this rhetoric becomes apparent when we consider the productivity of the mining sector. According to the 4MP, the mining and quarrying sector registered the highest average annual growth rate for value added per worker by sector for the period 1976-80 (Malaysia, 1981, p. 86, Table 4.7). However, despite achieving an 8.6% annual growth rate, the mining sector was also the only sector to register an absolute as well as relative increase in poverty incidence during this period. While the total number of poor households in the group grew from 10,100 in 1975 to 11,100 in 1980, the incidence of poverty in this group rose from 31.8% to 34.0%.

These developments become especially significant when we note that the price of tin rose in the same period from \$15,075 per tonne in

1975 to $35,717 per tonne in 1980, i.e. at an average annual growth rate of 18.8% (Malaysia, 1981, p. 18: Table 2.3). Thus, we find that despite the tremendous increase in productivity in the mining and quarrying sector as a whole and the considerable increase in the tin price between 1975 and 1980, the incidence of poverty among mine workers rose in the same period. (While many other factors may also have affected these trends, there is no way to determine the relative significance of various factors without more detailed information.)

These trends also suggest that commodity price movements have different income effects on different categories of producers. Whereas the incomes of petty (usually self-employed) commodity producers tend to be directly linked to price movements of the relevant commodity — favourably or unfavourably as the case may be — incomes of wage earners are not. For example, the impact of upward price movements of rubber and tin between 1975 and 1980 on the incidence of poverty was different among primarily self-employed rubber smallholders and wage-earning plantation and mine workers. (The welfare of estate workers who earn a wage with a variable component based on prevailing commodity prices would be intermediate.) In an increasingly capitalist economy where a growing proportion of the productive population are wage-earners (even the management of Felda settlers is moving in this direction), this has great significance since productivity increases or even favourable product prices do not necessarily improve the economic welfare of wage-earning producers.

The fate of those who control their own means of production is different. Because they control their own means of production, they usually also control the products of their own labour. Hence, they also benefit from the productivity increases. Those who control the products of their own labour are therefore more directly affected by the rise and fall of the prices of the commodities they produce. However, the primary factor which determines — and hence also differentiates — the income of all individual producers in this group is the productive assets that they control. Hence, for the peasantry, the size of land that they own and work is of utmost importance in influencing their own and their families' income and welfare.

From Table 3, we see that in Peninsular Malaysia in 1977, though the average size of rubber smallholdings was 2.65 hectares, 48.8 per cent of all rubber smallholders owned less than 2 hectares (i.e. under 4.96

acres) each, while the total area owned by them was only 20.7 per cent of all land owned by rubber smallholders. On the other hand, 14.1 per cent of all rubber smallholders, who owned at least 4 hectares each, owned 41.5 per cent of all land belonging to rubber smallholders. The Gini coefficient of inequality for distribution of rubber smallholding land ownership was found to be very high, i.e. as high as 0.412 for all rubber smallholders, and even higher (0.424) for Bumiputra smallholders considered by themselves. This means that inequality in the distribution of rubber smallholding land ownership is very great, especially among Malay smallholders. It was also found that although there was no correlation between poverty and sex, age or family size, poverty among rubber smallholders was strongly correlated to the small size of holdings. The average size of holdings owned by poor rubber smallholders was 1.82 hectares, with half owning less than 1.70 hectares each (RISDA, 1982: Table 3.9).

Table 4 shows that in 1977, only 74.8 per cent of the 490,460 rubber smallholders cultivated all the land they owned. The owners of small holdings are all officially considered smallholders, regardless of whether their land is cultivated by themselves or by others. Hence 22.6 per cent of all smallholders surveyed did not directly cultivate their own land, while 2.6 per cent of the rest only cultivated a portion of their land holdings with others cultivating the remainder. These three groups own 68.9 per cent, 26.9 per cent and 4.2 per cent of the total rubber smallholding land respectively. RISDA estimated that, in 1977, approximately 130,000 others — not officially included in the survey of rubber smallholders — worked on rubber smallholdings (RISDA, 1982).

Table 5 shows that the average size of padi land cultivated in the sixties was only 3.1 acres, i.e. approximately 1.25 hectares. 54 percent of all owners of padi land owned less than 3 acres, while only 7 per cent owned 7.5 acres or more.

Table 3
Number Of SmallHolders By Land Owned (Hectares) And Ethnic Group, 1977

ETHNIC GROUP	BUMIPUTRA				CHINESE				INDIANS				OTHERS				TOTAL			
SIZE CATEGORY (hectares)	Number	%	Size	%	Number	%	Size	%	Number	%	Size	%	Number	%	Size	%	Number	%	Size	%
0.01 – 0.49	23515	6.4	7952	0.9	604	0.5	215	0.11	209	5.6	66	0.4	106	2.8	32	0.4	24254	4.9	8263	0.6
0.50 – 0.99	63019	17.3	47752	5.58	4672	4.0	5659	0.9	481	4	571	2.2	469	12.7	543	5.9	98641	14.0	52105	4.0
1.00 – 1.49	71179	19.5	87047	10.1	11951	10.3	14876	3.5	785	13.7	952	5.6	915	24.9	1131	12.9	84810	17.3	104006	8.0
1.50 – 1.99	46431	12.7	79087	9.20	14385	12.4	25050	6.0	675	11.8	1152	6.7	380	10.3	644	7.4	61871	12.6	105915	8.1
2.00 – 2.99	88166	24.2	211552	24.6	55021	50.1	81744	19.7	1832	31.9	4267	25.1	1073	29.2	2610	29.9	126092	25.7	300195	23.1
3.00 – 3.99	34474	9.5	116655	13.6	20401	17.5	70654	17.0	692	12.0	2557	15.8	288	7.8	999	11.4	55855	11.4	190664	14.7
4.0	38171	10.4	309172	36.0	29274	25.2	219421	52.7	1064	18.6	7921	46.2	448	12.3	2982	34.1	68957	14.1	539497	41.5
	(55.4)		(57.3)		(42.5)		(40.7)		(1.5)		(1.5)		(0.6)		(0.5)		(100.0)		(100.0)	
TOTAL	364735	100.0	859217	100.0	116288	100.0	415577	100.0	5738	100.0	17106	100.0	3679	100.0	8741	100.0	490460	100.0	1300641	100.0
	(74.4)		(66.1)		(23.7)		(32.0)		(1.2)		(1.3)		(0.7)		(0.6)		(100.0)		(100.0)	
Average			2.35			2.57			2.98			2.38						2.65		
Median			2.03			2.75			2.39			2.41						2.04		
Standard Deviation			2.36			2.40			1.35			1.20						1.34		

1. 3.7% of smallholders do not have information on all land. They have been divided according to the pattern of smallholders who have this information.
2. 3.4% of smallholders have information on land but not with regards to size. The size of their land is cultivated based upon the average size of those who have this information.

Source: RISDA, 1982: Table 2.7.

TABLE 5
Peninsular Malaysia: Distribution of Padi Farms By Size

State	Average Size (acres)	% Padi Farms By Size (acres)							
		< 1	1 – 1.99	2 – 2.99	3 – 3.99	4 – 4.49	5 – 7.49	7.5 – 9.9	10 and more
Johore	1.5	5	60	27	3	3	2	0	0
Kedah	4.0	8	19	19	12	10	20	6	6
Kelantan	2.3	8	26	32	16	10	7	1	0
Melaka	2.1	21	32	24	7	6	7	2	1
Negeri Sembilan	1.1	38	36	19	4	3	0	0	0
Pahang	1.7	16	38	26	11	5	3	1	0
Penang and Province Wellesley	2.5	9	31	23	13	11	11	2	0
Perak	2.6	14	26	19	12	9	15	4	1
Perlis	4.1	3	11	19	16	13	25	8	5
Selangor	3.6	3	14	5	40	13	18	5	2
Trengganu	2.3	14	23	29	11	10	10	3	0
Peninsular Malaysia	3.1	10	23	21	14	10	15	4	3

Source: S. Selvadurai (1972)

Table 6 shows that 27 per cent of all padi cultivators then were tenants, 25 per cent were tenant-cum-owner operators and 48 per cent were owner-operators. Land ownership definitely influenced land use, including area cultivated, as well as the net incomes of those involved in padi cultivation. The effects and implications of the Green Revolution in the Muda padi growing area – i.e. the rice bowl of Malaysia – highlight the importance of the questions of land ownership (Gibbons et al. 1983).

Table 7 shows that in 1975/76, the average size of land owned in that area was 4.6 relong (3.3 acres), while half of padi land owners owned less than 2.7 relong (1.9 acres). 61.8 per cent of all owners owned less than 4 relong each – i.e. only 21.7 per cent of all padi land in the Muda area – while only 11.1 per cent of all owners owned more than 10 relong, i.e. 42.0 per cent of all padi land. The average size of padi land cultivated there was 5.6 relong (4.0 acres). However, 50 per cent of all padi farmers cultivated less than 4.1 relong (2.9 acres), 46.7 per cent of all cultivators cultivated less than 4 relongs (i.e. on 17.1 per cent of all padi land) while 14.6 per cent cultivated more than 10 relong, covering 39.9 per cent of all padi land in the Muda area.

From Tables 8, 9 and 10, it can be seen that the concentration of padi land ownership apparently decreased over the 1955-1975/76 period, probably because of the increased number of farms, perhaps due to land inheritance practices among Malays. However, it seems that the trend towards concentration of cultivated land – i.e. in terms of farm size – decreased initially between 1955 and 1965, but increased subsequently between 1965 and 1972, continuing up to 1975/76, at least. During 1972/76, while the proportion of big farms increased, the proportion of small farms also increased even though the total acreage of small farms did not increase. Between 1955 and 1975/76, the area of land cultivated by owner-operators increased, while the area of land cultivated by pure tenants decreased (in terms of both the proportion and area of padi land). Meanwhile, a larger proportion of padi land came to be cultivated by 'owner-tenants' over the same period.

Table 6
Peninsular Malaysia: Number Of Padi Cultivators
By Ownership Status

State	Total Padi Farms	%Padi Cultivators By Ownership Status		
		Owner-Operator	Owner-Tenant	Tenant
Johore	4,000	70	20	10
Kedah	81,000	45	20	35
Kelantan	56,000	25	55	20
Melaka	12,000	52	18	30
Negeri Sembilan	19,000	87	7	6
Pahang	20,000	70	14	16
Penang and Province Wellesley	16,000	44	17	39
Perak	44,000	50	13	37
Perlis	12,000	45	24	31
Selangor	13,000	60	25	15
Trengganu	19,000	55	23	22
Total	296,000	48	25	27

Source: S. Selvadurai (1972)

Table 7
Distribution Of Farms By Size Of Land Owned
In Muda Irrigation Project Area, 1976[1]

Padi Farm Size (all parcels) in relong	Number of Padi Farms In Each Size Category	% of Total of Padi Farms	%Cumulative	Total Area of Padi Farms In Each Size Category	% of Total Area of Padi Farms	% Cumulative
(0.01 – 0.49)	(4864)	(10.7)	(10.8)	(1261)	(0.6)	(0.6)
(0.50 – 0.99)	(4806)	(10.7)	(21.4)	(3522)	(1.6)	(2.3)
0.01 – 0.99	9670	21.4	21.4	4783	2.3	2.3
1.00 – 1.99	8065	17.9	39.3	11687	5.6	7.9
2.00 – 2.99	6104	13.5	52.8	14895	7.1	15.0
3.00 – 3.99	4059	9.0	61.8	13984	6.7	21.7
4.00 – 4.99	3549	7.9	69.7	15929	7.6	29.3
5.00 – 5.99	3008	6.7	76.4	16259	7.8	37.1
6.00 – 6.99	1849	4.1	80.5	11947	5.7	42.8
7.00 – 7.99	1429	3.2	83.6	10701	5.1	47.9
8.00 – 8.99	1186	2.6	86.3	10060	4.8	52.7
9.00 – 9.99	1177	2.6	88.9	11200	5.3	58.0
≥ 10.00	5019	11.1	100.0	88027	42.0	100.0
10.00 – 10.99	(942)	(2.1)	(91.0)	(9832)	(4.7)	(62.7)
11.00 – 11.99	(670)	(1.5)	(92.4)	(7683)	(3.7)	(66.4)
12.00 – 14.99	(1211)	(2.7)	(95.1)	(16144)	(7.6)	(74.0)
15.00 – 19.99	(1037)	(2.3)	(97.4)	(17761)	(8.5)	(82.5)
20.00 – 49.99	(1060)	(2.4)	(99.8)	(29279)	(14.0)	(96.5)
50.00 – 99.99	(89)	(0.2)	(100.0)	(5879)	(2.8)	(99.3)
≥ 100.00	(10)	(0.0)	(100.0)	(1449)	(0.7)	(100.0)
Total	45115	100.0	100.0	209472	100.0	100.0

Average size = 4.64 relong and Standard deviation = 6.47 relong. Median size = 2.73 relong. [1]Does not include 14,381 Relong government owned padi land, 3300 Relong owned by banks/private companies and 137,170 Relong owned by individuals whose identity and numbers are not available.

Source: Gibbons et. al. (1981), p. 22 Table 7.

Source: Gibbons et. al. (1981), p. 22 Table 7.

Table 8
Distribution Of Farm Size In Muda Irrigation Project Area.
1955 — 1975/76

Padi Farm Area (relong)	1955		1966		1972/73		1975/76	
	% Padi Farms	% Area	% Padi Farms	% Area	% Padi Farms	% Area	% Padi Farms	% Area
< 4	32.5	10.1	38.1	17.3	39.5	16.8	46.7	17.0
$\overline{X}$	2.2	—	2.5	—	2.4	—	2.0	—
4 – 9.9	49.6	46.9	46.4	44.9	48.5	52.8	38.9	43.2
$\overline{X}$	6.8	—	5.4	—	6.2	—	6.3	—
⩾ 10	17.9	43.0	15.3	37.8	12.0	30.4	14.6	39.8
$\overline{X}$	17.3	—	13.9	—	14.4	—	15.3	—
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Total Number of Padi Farms	46,547		49,772		43,921		61,164	
Total Area Cultivated (relong)		333,738		280,980		249,432		344,353
$\overline{X}$		7.17		5.65		5.68		5.63
Gini Index	.396		.354		.360		.445	

$\overline{X}$ = Average Size (in Relong).

Table 9
Padi Cultivators And Farm Land In Muda Area By Status, Ownership And Size

Group of Padi	% of Padi Cultivators			% of Farm Land		
Cultivators	1955	1975/76	Change	1955	1975/76	Change
Tenant	42.1	24.5		29.1	22.7	
	(100.0)	(100.0)	− 17.6	(100.0)	(100.0)	− 6.4
Small (≤4 relong)	(34.9)	(50.9)	+ 16.0	(11.3)	(23.3)	+ 12.0
medium (4.1-10 relong)	(49.1)	(39.6)	− 9.5	(48.6)	(49.2)	+ 0.6
big (> 10 relong)	(16.0)	(9.5)	− 6.5	(40.1)	(27.5)	− 12.6
Owner-operator	37.6	56.1		30.9	45.3	
	(100.0)	(100.0)	+ 18.5	(100.0)	(100.0)	+ 14.4
small	(41.3)	(60.2)	+ 18.9	(15.3)	(27.2)	+ 11.9
medium	(47.6)	(31.2)	− 16.4	(53.4)	(43.7)	− 9.7
big	(11.1)	(8.6)	− 2.5	(31.3)	(29.1)	− 2.2
Tenant-Owner	20.3	19.4		40.0	32.0	
	(100.0)	(100.0)	− 0.9	(100.0)	(100.0)	− 8.0
small	(11.4)	(19.5)	+ 8.1	(3.2)	(5.8)	+ 2.6
medium	(54.3)	(46.6)	− 7.7	(37.5)	(34.5)	− 3.0
big	(34.3)	(33.9)	− 0.4	(59.3)	(59.7)	+ 0.4
TOTAL	100.0	100.0		100.0	100.0	

Source: Gibbons et. al. 1981

Table 10
Padi Cultivators And Farm Land In Muda Area By Size And Ownership Status, 1955 And 1975/76

Group of Padi Cultivators	% of Padi Cultivators			% of Farm Land		
	1955	1975/76	Change	1955	1975/76	Change
Small (< 4 relong)	32.5	50.1	+ 17.6	10.1	19.5	+ 9.4
Tenant	(14.7)	(12.5)	− 2.2	(4.5)	(5.3)	+ 0.8
Owner-Operator	(15.5)	(33.8)	+ 18.3	(4.7)	(12.3)	+ 7.6
Owner-Tenant	(2.3)	(3.8)	+ 1.5	(0.9)	(1.9)	+ 1.0
medium (4.1-10 relong)	49.6	36.2	− 13.4	46.9	42.0	− 4.9
Tenant	(20.7)	(9.7)	− 11.0	(19.5)	(11.2)	− 8.3
Owner-Operator	(17.9)	(17.5)	− 0.4	(16.5)	(19.7)	+ 3.2
Owner-Tenant	(11.0)	(9.0)	− 2.0	(10.9)	(11.1)	+ 0.2
big (< 10 relong)	17.9	13.7	− 4.2	43.0	38.5	− 4.5
Tenant	(6.7)	(2.3)	− 4.4	(16.0)	(6.2)	− 9.8
Owner-Operator	(4.2)	(4.8)	+ 0.6	(9.7)	(13.2)	+ 3.5
Owner-Tenant	(7.0)	(6.6)	− 0.4	(17.3)	(19.1)	+ 1.8
TOTAL	100.0	100.0		100.0	100.0	

Source: Gibbons et.al., (1981)

According to the Muda land survey (Gibbons et al. 1981), it appears that pure tenants have been increasingly replaced by owner-operators, who have taken back land to cultivate themselves or to be given to close kin who are not charged rent. Furthermore, according to the study, in view of developments since 1975/76, it is likely that the number of poor people in the Muda area has continued to increase due to land inheritance practices, population increase, increase of large padi farms on the one hand, and increase of small padi farms on the other, increase in cultivation by owners (and hence a decrease in tenancy), and the increased use of machines (and hence displacement of agricultural wage labour). Also, the provision of subsidies by the government, as well as the introduction of agricultural machinery, have encouraged land owners to cultivate their own land, however large this may be. These developments clearly show that rural development efforts, specifically the Green Revolution that is currently being carried out, have — by increasing productivity (as well as production expenses) of the padi cultivators involved — succeeded in widening the gap between:
(i) padi cultivators able to practise double cropping and those who are not; (ii) land owners and those who do not own land; (iii) those who produce a large marketable padi surplus and those who are unable to do so. It is clear that such efforts cannot eradicate the root of poverty among padi cultivators, i.e. the lack of land and other productive assets for padi farming.

Restructuring Ownership

The restructuring prong of the NEP usually refers to two or three aspects of the economy, namely distribution of corporate stock ownership, employment, and education, with the latter two sometimes considered together. A great deal of attention has been paid to ownership of the modern corporate sector although only a small minority of the population is actually involved. The first thing that must be said about this is that such inordinate concern implies the continued paramountcy of 'bourgeois interests' in influencing and defining supposedly ethnic or communal interests.

Table 11 summarizes the data on past and projected distribution of ownership by ethnicity and residence in the corporate sector between 1970 and 1990. The 4MP document reveals two new developments compared to previous trends in this area. First, while the original target of 9.0% Bumiputra ownership by 1975 (Malaysia 1973, p. 84: Table 4.8) was exceeded, by 1980 only 12.4% of the corporate sector was in Bumiputra hands instead of the targetted 16.0%. Achievement of the 30% target for 1990 will thus require a faster rate of capital accumulation, implying more aggressive policies.

The **Third Malaysia Plan 1976-1980** (p. 86: Table 4.16) projections for the 30% Malay share of the corporate sector in 1990 anticipated 7.4% for 'Malay individuals' and 22.6% for 'Malay interests'. The 4MP, however, has revised these projections and anticipates 'Bumiputra individuals' to take up only 5.2% and 'Bumiputra trust agencies' to account for 24.8%. The agencies/individuals ratio for 1990 has thus risen from 3.05 to 4.77, a considerable increase with important implications for the composition and nature of the Malay bourgeoisie and the character and role of the Malaysian state. The likely increase in aggressiveness of the Malay bourgeoisie mentioned above is therefore likely to be expressed through the state and its Bumiputra trust agencies.

Table 11

Malaysia: Ownership And Control Of The Corporate Sector 1970-90 (million ringgit)

	1970		1971		1975		1980[1]		1980 3MP Target		1990 3MP Target		1990 4MP Target		Annual growth rate %	Annual growth rate %
	$ mill.	%	$ mill.	%	$ mill.	%	$ mill.	%	$ mill.	%	$ mill.	%	$ mill.	%	1972-80	1981-90
Malaysian residents[2]	1952.1	36.7	2512.8	38.3	7047.2	46.7	13817.8	52.5	11574.8	56.4	56022.6	70.0	52193.9	70.0	20.9	14.2
Bumi total	125.6	2.4	279.6	4.3	1394.0	9.2	3273.7	12.4	3284.3	16.0	24009.7	30.7	22368.8	30.0	31.4	21.2
Bumi individuals[3]	84.4	1.6	168.7	2.6	549.8	3.6	1128.9	4.3	695.4	3.4	5914.2	7.4	3891.4	5.2	23.5	13.2
Bumi trust agencies[4]	41.2	0.8	110.9	1.7	844.2	5.6	2144.8	8.1	2588.9	12.6	18095.5	22.6	18477.4	24.8	39.0	24.0
Other residents[5]	1826.5	34.3	2233.2	34.0	5653.2	37.5	10544.1	40.1	8290.5	40.4	32012.9	40.0	29825.1	40.0	18.8	11.0
Foreign residents	3377.1	63.3	4051.3	61.7	8037.2	53.3	12505.2	47.5	8952.2	43.6	24009.7	30.0	22368.8	30.0	13.3	6.0
	5329.2	100.0	6564.1	100.0	15084.4	100.0	26323.0	100.0	20527.0	100.0	80032.3	100.0	74562.7	100.0	16.7	11.0

Sources: **3MP**, p. 86: Table 4.16
4MP, p. 62: Table 3.14
4MP, p. 176: Table 9.7

Derived from Annual Ownership Survey of Limited Companies conducted by the Department of Statistics (1971-76) and records of the Registrar of Companies (1977-79).

Notes:

1. Estimated.
2. Classification is by residential address of shareholders, not by citizenship. It includes foreign citizens residing in Malaysia. Steps have been taken to enable classification of ownership group by citizenship status.
3. Includes institutions channelling funds of individual Bumiputra such as Lembaga Urusan dan Tabung Haji, Amanah Saham MARA and cooperatives.
4. Shares held through institutions classified as Bumiputra trust agencies such as PERNAS, MARA, UDA, SEDCs, Bank Bumiputra, BPMB, FIMA and PNB. Previously this item was classified as Bumiputera interests.
5. Includes shares held by nominee and other companies.
6. Excludes government holdings other than through trust agencies.

Though non-Malay (i.e. primarily Chinese) Malaysian capital achieved a ratio of 40.1% for 1980, falling only very slightly short of the 3MP target of 40.4% for 1980, it should be recognized that this was achieved despite the considerable decline in the growth of such investment attributable to the Industrial Coordination Act, higher interest rates abroad, and the desire to invest overseas because of uncertainty about the future of Chinese capital in Malaysia. While the strength of Chinese capital should not be under estimated, the decline in its access, as a class, to state power compared with the 1960s has necessitated new strategies — which vary with the particular interests involved — to cope with the situation.

It should also be noted that despite its sizeable share of the economy, Chinese capital — and it should not be considered monolithically — has little control over the financial (banking, etc.) sector and the monopolized 'commanding heights' of the traditional capitalist sectors (international trade, primary production) which have been moving from the hands of foreign, especially British, capital to the state, ostensibly on behalf of the Bumiputra community.

It might be added that achievement of the 1990 target of 30% Bumiputra ownership is feasible since international, including British, monopoly capital — which is dominated by industrial interests — is unlikely to intervene very strongly to prevent merchant capital interests in trade and primary production in the former colonies from being bought over by local interests. Furthermore, modern transnational industrial enterprises generally do not view ownership as necessary for control and profits given their control over technology, marketing and other key organizational aspects as well as the availability of techniques, such as transfer pricing, for disguised profit transfers.

Turning to Table 12, we find that since the NEP's inception, the state's commitment, as reflected by expenditure allocation, has shifted increasingly away from poverty eradication towards restructuring. As can be seen in the table, the ratio of allocations for restructuring compared to poverty eradication has risen steadily from 0.216 under the 2MP to 0.373 under the 3MP and 0.472 under the 4MP. In considering the significance of these ratios, it can be assumed that at most only about 5 per cent of the Bumiputra population are in a position to benefit from restructuring-oriented expenditure, given its nature, compared to the 46.4% of the

Malay population still officially considered poor in 1976 (Malaysia, 1981: p. 46). We should not, of course, forget that all allocations for poverty eradication do not necessarily benefit the poor most (e.g. the price support programme referred to earlier primarily benefits big farmers with larger marketable grain surpluses).

Table 13 shows that the percentage of the labour force in the agricultural sector fell from 58.5 per cent (1,244,800) in 1957 to 49.6 per cent (1,359,100) in 1970 and 40.2 per cent (1,468,700) in 1976. The percentage of workers in the manufacturing sector rose from 6.4 per cent (135,700) in 1957 to 9.2 per cent (125,900) in 1970 and 16.0 per cent (584,500) in 1976; the rapid expansion in manufacturing employment during 1970-1976 and thereafter reflects the switch from import-substitution to more labour-intensive export-oriented industrialization. The percentage and number of workers in the construction industry also fell from 3.2 per cent (67,800) in 1957 to 2.2 per cent (59,900) in 1970, but grew rapidly to 4.9 per cent (179,000) in 1976, while the percentage of commercial and service i.e. unproductive workers — rose from 24.2 per cent (515,000) in 1957 to 27.3 per cent (747, 200) in 1970 and 32.6 per cent (1,191,000) in 1976.

Table 12
Allocations For The Eradication Of Poverty And The Restructuring Of Society Under The 2MP (1971-5), 3MP (1976-80) & 4MP (1981-5)
(million ringgit)

Sector	Poverty	%	Restructuring	%	Overlapping	%	Total	%
			Second Malaysia Plan, 1971-5[3]					
Agriculture & Rural Development	2,127.4	23.8	—	—	—	—	1,641.1	23.8
Commerce & Industry	—	—	362.1	4.0	—	—	362.1	4.0
Social	112.9	1.3	146.2	1.6	3.4	—	262.5	2.9
Infrastructure	109.7	1.2	—	—	—	—	109.7	1.2
TOTAL	2,350.0	26.3	508.3	5.6	3.4	—	2,861.7	31.9
			Third Malaysia Plan, 1976-80[4]					
Agriculture & Rural Development	4,442.7	14.3	117.1	0.3	83.6	0.3	4,643.4	14.9
Commerce & Industry	175.9	0.6	1,924.1	6.2	58.4	0.2	2,158.4	7.0
Social	781.2	2.5	334.8	1.1	7.0	—	1,123.0	3.6
Infrastructure	973.6	3.1	—	—	—	—	973.6	3.1
TOTAL	6,373.4	20.5	2,376.0	7.6	149.0	0.5	8,898.4	28.6
			Fourth Malaysia Plan, 1981-5[5]					
Agriculture & Rural Development	6,245.5	15.9	250.1	0.6	218.3	0.6	6,713.9	17.1
Commerce & Industry	274.7	0.7	3,455.0	8.8	—	—	3,729.7	9.5
Social	1,157.9	2.9	692.5	1.8	82.2	0.2	1,932.6	4.9
Infrastructure	2,127.4	4.2	—	—	—	—	1,641.1	4.2
TOTAL	9,319.2	23.7	4,397.6	11.2	300.5	0.8	14,017.3	35.7

Source: (1) **4MP**, p. 127: Table 6.3
(2) **4MP**, p. 245: Table 13.2

Notes:
1. Includes both direct and indirect effect of the particular NEP objective.
2. Programmes/projects contributing to both poverty eradication and restructuring.
3. Based on the Federal Allocation of $8,950 million for the **2MP**.
4. Based on the Federal Allocation of $31,147 million for the **3MP**.
5. Based on the Federal Allocation of $39,330 million for the **4MP**.

Table 13

Peninsular Malaysia: Labour Force By Primary Ethnic Group And Employment Activity, 1957, 1970, 1976.

Employment Activity	1957[1] Malay 000	%	Chinese 000	%	Indian 000	%	Total 000	%
1. Agriculture	459.8	45.8	100.9	13.3	4.5	1.5	572.8	26.9
2. Agricultural Products Requiring Processing (eg. Rubber, Coconut, Oil Palm, etc.)	289.5	28.8	209.5	27.6	170.0	55.3	672.0	31.6
3. Mining & Quarrying	10.3	1.0	40.0	5.3	6.8	2.2	58.5	2.8
4. Manufacturing	26.6	2.6	97.5	12.8	10.1	3.3	135.7	6.4
5. Construction	21.8	2.2	32.6	4.3	12.3	4.0	67.8	3.2
6. Public Utilities	3.8	0.4	3.0	0.4	4.2	1.4	11.6	0.5
7. Commerce	32.0	3.2	127.1	16.7	32.8	10.7	195.2	9.2
8. Transport & Communication	26.9	2.7	29.2	3.8	16.1	5.2	74.8	3.5
9. Services	127.6	12.7	110.0	14.5	48.1	15.7	319.8	15.0
10. Miscellaneous Activities	5.9	0.6	9.4	1.2	2.4	0.8	18.1	0.9
TOTAL	1,004.3	100	759.2	100	307.2	100	2,126.5	100

Employment Activity	1970[2] Malay 000	%	Chinese 000	%	Indian 000	%	Total 000	%
1. Agriculture	495.2	34.5	100.9	10.2	6.0	2.1	611.3	22.3
2. Agricultural Products Requiring Processing (eg. Rubber, Coconut, Oil Palm, etc.)	427.1	29.8	192.9	19.5	125.7	43.9	747.8	27.3
3. Mining & Quarrying	13.3	0.9	37.1	3.8	4.5	1.6	55.3	2.0
4. Manufacturing	73.1	5.1	164.5	16.6	13.3	4.6	251.9	9.2
5. Construction	15.0	0.9	43.1	4.4	3.6	1.3	59.9	2.2
6. Public Utilities	9.5	0.7	3.6	0.4	6.4	2.2	19.8	0.7
7. Commerce	64.3	4.5	179.8	18.2	29.1	10.2	274.6	10.0
8. Transport & Communication	41.5	2.9	39.1	3.9	16.7	5.3	98.0	3.6
9. Services	223.9	15.6	173.5	17.5	66.3	23.2	472.6	17.3
10. Miscellaneous Activities	74.1	5.2	55.6	5.6	14.3	5.1	145.2	5.3
TOTAL	1,435.0	100	990.0	100	286.1	100	2,736.4	100

Employment Activity	1976[3] Malay 000	%	Chinese 000	%	Indian 000	%	Total 000	%
1. Agriculture	471.3	25.1	92.2	6.8	8.9	2.3	588.2	16.1
2. Agricultural Products Requiring Processing (eg. Rubber, Coconut, Oil Palm, etc.)	522.1	27.8	201.9	14.9	154.1	40.0	880.5	24.1
3. Mining & Quarrying	11.5	0.6	20.9	1.5	3.1	0.8	36.6	1.0
4. Manufacturing	210.3	11.2	327.9	24.2	41.1	10.6	584.5	16.0
5. Construction	62.0	3.3	101.7	7.5	16.6	4.3	179.0	4.9
6. Public Utilities	26.3	1.4	4.1	0.3	14.3	3.7	45.8	1.2
7. Commerce	157.7	8.4	323.8	23.9	42.5	11.0	526.1	14.4
8. Transport & Communication	71.4	3.8	55.5	4.1	21.7	5.6	149.8	4.1
9. Services	345.5	18.4	227.6	16.8	84.3	21.8	664.9	18.2
10. Miscellaneous Activities	0	0	0	0	0	0		
TOTAL	1,877.9	100	1,355.4	100	387.3	100	3,653.4	100

Source: (1) 1957 Population Census of the Federation of Malaya, Report No. 14, Department of Statistics, Kuala Lumpur, 1980.

(2) 1970 Population Census.

(3) Report on the Labour Force, 1976, Department of Statistics, Malaysia, August 1980.

Taken together with other evidence on the Malaysian economy, it appears that capitalism — including modern industries — has developed considerably since independence. This does not at all imply that the Malaysian economy is on it's way through the various 'stages of growth' previously experienced by the 'developed' economies of today, to establishing an integrated advanced industrial economy, as argued by Warren (1980) and others. This is reflected, for instance, by the sizeable expansion of labour involved in the (unproductive) tertiary sector; a significant portion of this involves 'marginalized' people eking out a living in the so-called 'informal sector', i.e. outside the modern capitalist sector. On the other hand, the prophets of 'underdevelopment' (eg. Frank, 1969) — who argue that integration into world capitalism necessarily brings about unchanging economic backwardness and stagnation — have been disproved by Malaysia's impressive record of sustained growth.

Table 14 shows that the percentage of the labour force holding 'administrative and managerial' positions remained at 1.2 per cent in both 1957 and 1980. Professional and technical personnel may be identified as members of the new petty bourgeoisie, or 'middle class', while 'clerical and related', or white-collar workers are often socially identified as part of the 'lower middle class', i.e. also as part of the petty bourgeoisie. Hence, it is clear that this new petty bourgeoisie or middle class has expanded from 5.7 per cent in 1957 to 9.8 per cent in 1970 and 12.8 per cent in 1980, with professional and technical personnel increasing from 2.8 per cent in 1957 to 4.8 per cent in 1970 and 5.6 per cent in 1980 while the clerical group grew from 2.9 per cent in 1957 to 5.0 per cent in 1970 and 7.2 per cent in 1980. Meanwhile, the percentage of the labour force doing agricultural work fell from 56.4 per cent in 1957 to 44.8 per cent in 1970 and 34.6 per cent in 1980; of these, about 11.7 per cent worked (for wages) on estates (**Fourth Malaysia Plan**; 163), while some of the others working on agricultural smallholdings (of less than 100 acres) and in fishing also earned wage incomes. Meanwhile, the percentage of 'production workers' — defined as those "engaged in or directly associated with the extraction of minerals, petroleum and natural gas from the earth and their treatment; processing, assembly and shaping various substances to manufacture articles or produce goods; the construction, maintenance and repair of various types of roads, structures, machines and other products, manufacturing glass and clay products, handling materials, operating transport and other equipment; and performing other labouring tasks requiring primary physical efforts" — rose from 18.9 per cent in 1957 to 27.3 per cent in 1970 and 33.1 per cent in 1980. Hence, those engaged in productive labour — including agriculture — fell from 75.3 per cent in 1957 to 72.1 per cent in 1970 and 67.7 per cent in 1980.

It appears then that since independence, the percentage of peasants has fallen, while productive workers, as well as 'unproductive' wage-earners and the salaried middle class or petty bourgeoisie have all increased both absolutely and relatively. These important changes reflect the capitalist development path of an increasingly diversified, but no less 'open' or 'dependent' economy. The exports share of the Gross Domestic Product (GDP) changed from 47.1 per cent in 1957 to 44.5 per cent in 1970 and 51.8 per cent in 1980, while the ratio of imports rose from 37.5 per cent in 1957 to 39.3 per cent in 1970 and 53.8 per cent in 1980 (Rao 1976; Treasury 1982). Although the growth and diversification of the economy has been rapid since independence, changes in economic structure have been consistent with those in the so-called 'dependent capitalist' economies.

One unusual feature of Malaysian economic development strategy, of course, is it's pronounced aim — since 1970 — to 'restructure society' (ostensibly to abolish the identification of ethnicity with economic function), especially the effort to create, expand and consolidate a Malay bourgeoisie and petty bourgeoisie by using public funds and the state machinery on a massive scale. In practice, restructuring efforts are largely aimed at increasing the share of Bumiputra capital as well as the number of Bumiputra businessmen and professionals within the context of the 'dependent capitalist' development mentioned earlier. 'Restructuring' — as officially interpreted — is not intended to change the socio-economic relations between classes or strata; in practice, it only aims to increase Bumiputra ownership and personnel shares in certain more attractive occupations.

It should be clear from Table 14 that 'restructuring' is not really an issue anymore — if it ever was — among production workers; management is not overly concerned with workers' ethnicity as long as they work hard and do not threaten management's interests. In the agricultural sector, there do not appear to be significant efforts at restructuring among ethnic groups since Bumiputras comprise a large majority in this sector and the state is reluctant to intervene to resolve the land question in a fundamental way. The ethnic percentages in professional and technical occupations on the whole also generally reflect ethnic proportions in the Peninsular Malaysian population, though Bumiputra percentages in specific professions have received considerable attention. By 1980, Bumiputras were significantly under-represented in only two major occupational categories, namely at the 'administrative and managerial' level and in sales-related occupations. Nevertheless, Malay representation has greatly increased since independence in these occupations, though the Chinese proportion still significantly exceeds it's share of the population.

In short, restructuring of the occupations has been largely achieved, especially at lower levels of employment. Of course, the sales-related occupations coveted by some Bumiputras are primarily marketing business. Hence, it is clear that the source of tension as far as employment restructuring is concerned is really over businesses — especially trading enterprises and enterprise management, which necessarily involve questions of ownership and control — and access to professional occupations — which largely concern the petty bourgeoisie. In short, educational, employment, business and promotional facilities and opportunities are the primary sources of inter-ethnic rivalry and hence conflict, especially among the so-called middle class.

Invoking slogans of historically-justified and socially desirable 'affirmative action' on the one hand, and 'meritocracy' on the other, and having few common interests and grounds for cooperation and collaboration (unlike the bourgeoisie), the Malay and non-Malay middle classes experience inter-ethnic conflict most acutely. Hence, it is not surprising to find significant middle class leadership and support for communal or 'narrow nationalist' movements and activities. Relatively uninhibited by the class considerations and interests of the bourgeoisie, the middle class leaders make aggressive demands on behalf of their particular ethnic communities, but often inadvertently serve bourgeois interests (of whom they may even be contemptuous). The recent public polemics over the United Malayan Banking Corporation issue, for instance, was most aggressively articulated by Malay and Chinese politicians with no direct stake in the matter, predictably in the name of their respective communal interests. Perhaps more significant is that the very nature of 'middle class' concerns (education, jobs, promotions, etc.) has broader popular appeal than the narrower concerns of the bourgeoisie (eg. the 30% target or the

Industrial Coordination Act). I am not, of course, implying that these middle class elements are conscious servants of their respective bourgeoisies, but only that, using slogans of communal interests and unity, they advance particular class interests as the interests of the entire ethnic community.

Finally, and most ominously, these rival communal trends actually justify each other's existence, by claiming to defend and protect the communal interests they purport to represent against allegedly agressive encroachments and threats by other ethnic communities, and thus willy-nilly serve each other's interests. This, of course, can only lead ultimately to greater ethnic conflict since the interests involved are fundamentally irreconciliable. Let me emphasize that I am not predicting an inevitable racial war or even a conflagration of the May 13 variety, though present trends do not give much promise to the contrary. It is quite conceivable that ethnic tensions and conflict will remain of the 'cold war' type, that is, without necessarily erupting, and thus become the 'way of life' even more so than it is now. But it is obvious that in such a situation, a single spark will be enough to set off an explosion.

Nor are the country's leaders necessarily consciously contributing to this situation. Many sincerely believe they are caught in a situation not of their own doing and some may even desire an amicable solution acceptable to most parties. Most, however, also genuinely believe that the ethnic interests they advocate are legitimate — which they may well be — and need to be acted upon.

The choices available at this stage of Malaysia's history, it seems to me, are very limited, and there appears to be no place for a mass and genuinely national (hence multi-ethnic) movement to provide an alternative. I would like to think otherwise. In any case, the alternatives for the 1980s, it seems to me, are ultimately very simple: racial barbarism or justice through liberation.

It might seem strange for an academic analyst to say so, but I wish that the scenario I have just outlined is wrong; unfortunately, I fear the contrary would be the case. I stress this because I do not consider this a mere academic exercise. As pretentious as this may sound, our futures and the future of the nation are at stake. Let me try now to present some concrete proposals for popular consideration.

Table 14
Peninsular Malaysia: Labour Force By Ethnic Group And Work Category, 1957, 1970, 1980 (in%)

Category of Workers	1957[a]				1970[b]				1980[b]			
	Malay	Chinese	Indian	Total	Malay	Chinese	Indian	Total	Malay	Chinese	Indian	Total
1. Professional And	2.1	3.3	2.4	2.8	4.3	5.2	4.9	4.8	5.3	5.6	5.8	5.6
Technical Workers	(35.1)	(41.9)	(12.1)	(100)	(47.0)	(39.5)	(10.8)	(100)	(50.0)	(36.9)	(11.4)	(100)
2. Administrative And	.4	2.0	1.0	1.2	0.5	1.9	.8	1.1	0.7	1.9	0.7	1.2
Managerial Workers	(17.5)	(62.3)	(12.3)	(100)	(24.1)	(62.9)	(7.8)	(100)	(31.6)	(57.0)	(6.1)	(100)
3. Clerical And Related	1.7	3.8	4.0	2.9	3.4	6.3	8.1	5.0	7.7	7.1	4.6	7.2
Workers	(27.1)	(46.2)	(19.9)	(100)	(35.4)	(45.9)	(17.2)	(100)	(23.1)	(36.2)	(7.6)	(100)
4. Sales And Related												
Workers	2.9	15.9	10.0	8.6	4.7	15.3	9.5	9.1	4.5	19.2	7.1	10.1
5. Service Workers	7.3	8.0	7.6	8.6	(26.7)	(61.7)	(11.1)	7.9	(23.1)	(69.2)	8.8	8.2
	(39.7)	(33.3)	(12.8)	(100)	(44.3)	(17.3)	(14.6)	(100)	(47.9)	(39.9)	(11.6)	(100)
6. Agricultural Workers	74.2	38.3	50.2	56.4	62.3	21.2	41.0	44.8	45.2	18.6	38.1	34.6
	(62.1)	(24.3)	(12.8)	(100)	(72.0)	(55.9)	(9.7)	(100)	(67.7)	(19.7)	(11.9)	(100)
7. Production, Transport	10.6	28.3	24.6	18.9	18.0	41.6	24.7	27.3	29.0	38.6	34.9	33.1
Other Workers	(26.5)	(53.5)	(18.9)	(100)	(34.2)	(55.9)	(9.6)	(100)	(45.4)	(42.6)	(11.4)	(100)
Total Workers (000)	1,023.7	772.0	313.0	2,126.2[1]	1,477.6	1,043.6	301.4	2850.3	2211.5	1558.0	460.7	4264.4
	(48.2)	(36.3)	(14.7)	(100)[1]	(51.8)	(36.6)	(10.6)	(100)	(51.9)	(36.5)	(10.8)	(100)

Value in brackets show percentage by ethnic group.
[1] Includes workers who cannot be classified.

Source: a. Department of Statistics (1960).
b. Fourth Malaysia Plan, table 3.1?.

The NEP: An Alternative Interpretation

Since there is general agreement that the two prongs of the NEP respond — in a particular fashion — to some of the major sources of socio-economic conflict in contemporary Malaysian society, let me suggest alternative interpretations of the NEP goals.

First, poverty eradication measures should address the roots of income inequality, rather than be guided by some arbitrarily defined poverty line. A more equitable distributive principle would be one based on work effort rather than property ownership. Existing gaps in the wage structure should be reduced considerably as well, while income derived from title, position, privilege, corruption and property (including capital and land) should be minimized. (Reference here is to income-generating wealth or property rather than personal property 'for consumption'). Those with property worked by others should not enjoy handsome incomes from the effort of others, while industrious people without much property should enjoy better living standards. Such changes would favour the hard-working and would necessarily threaten the interests of rentiers who live well off others. However, public facilities should be made available to those less capable of being productive, such as children, the aged, the sick, the handicapped and other destitutes of society.

It should be emphasized that absolute equality of incomes is not feasible in the short run and should not be the immediate goal of such measures. Income differentials will exist and cannot be completely eliminated quickly in view of continuing differentials in the social value of individual work and the continued need for material work incentives, whether of an individual or collective nature. Nevertheless, existing income inequalities are neither necessary for economic development nor socially just by any ethical criteria, including religious principles that favour justice.

For the peasantry, land continues to be the primary means of production and in the Malaysian situation, two measures are important in this regard. Development of new agricultural land — on less economically burdensome terms to settlers than Felda's — for land-hungry peasants is greatly needed. Contemporary land hunger is actually the outcome of colonial land law and policies pertaining to land ownership. In addition, new arrangements affecting cultivated land are needed to overcome land tenancy problems and other problems related to it which persist due to the lack of commitment to fundamental agrarian institutional reform — exemplified for instance, by the virtual non-implementation of the various laws affecting tenancy on padi land. 'Restructuring' in this area should recognize long-term considerations, including land distribution and peasant productivity. Measures which can be considered include, for instance, collective or cooperative agriculture on relatively larger farms which are as productive and efficient as estates and large farms.

Large enterprises, especially foreign-controlled ones, should be run by the workers on a cooperative basis, perhaps along lines of 'economic democracy'. With such measures, nationalization will not merely benefit the new managers and others in charge, as under 'state capitalism'. If absolute equalization of the wage scale is undertaken immediately, it is likely that many technicians, professionals and skilled workers would no longer earnestly contribute to the enterprise's progress; however, existing differentials in a particular enterprise can be reduced considerably as part of a series of similar measures undertaken on an economy-wide basis. New enterprises organized on a genuinely cooperative basis should be encouraged; in this regard, we should understand the reasons for the fiascos in the contemporary cooperative movement, including the difficulties of developing such enterprises in a capitalist economy which encourages individual greed while discouraging group cooperation for collective need.

A great many other initiatives will, of course, be necessary to develop a just and self-reliant economy. These measures should be coordinated through a comprehensive and decentralized planning process, i.e. planning will have to be undertaken at all levels of the economy and involve all parties (especially the productive classes), and not merely be the exclusive responsibility of a clique of planners. Efforts to develop a self-reliant economy should take into account the country's economic heritage, including the strengths and weaknesses of uneven development processes under colonialism. In this connection, it must be recognized that the path to self-reliance is a difficult one, especially in an open and dependent economy. Hence, the planning task becomes especially difficult and crucial. However, by identifying and understanding the main weaknesses of our economy (e.g. the weak links between agriculture and industry, or the disparities between padi and export-oriented agriculture, or those between the West and East Coasts), the measures necessary to overcome them can be found.

By way of conclusion, it needs to be emphasized that while the road to economic liberation and justice is fraught with difficulty, the alternative is continued inequality, and perhaps more ominously, heightened and unresolvable ethnic conflict. While the alternative, the elements of which are outlined above, does not claim not to threaten certain privileged interests, it offers a means for the resolution of the most pressing and fundamental economic problems facing the country today through genuine restructuring, and hence liberation, of our society by establishing a just and self-reliant new national economic order acceptable to the vast majority of our population, especially its productive members.

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MANAGED INDUSTRIALIZATION AND POVERTY REDRESSAL POLICIES IN MALAYSIA

OZAY MEHMET

I. INTRODUCTION

One of the most disturbing trends revealed in the recently published **Mid-Term Review of the Third Malaysia Plan, 1976-1980** is that, over the period 1970-76, household income distribution has become more unequal, even though (i) Malaysia has already one of the highest Gini coefficients in the developing world[1], and (ii) poverty redressal has been a key government objective under the New Economic Policy (NEP). This trend, however, should be of little surprise since a close scrutiny of the Third Malaysia Plan (TMP) allocations of public expenditures reveals clearly that relatively low priority has been assigned to social sector projects, including public education, health, low-cost housing and community development. Even in agricultural and rural development sector, the major allocation is for plantation projects developed by such authorities as FELDA. Most of the planned expenditures are for infra-structural projects calculated to benefit the enclave sector linked to world markets. This type of planning strategy, of course, reflects the force of the age-old policy, inherited from colonial days, which views Malaysia as a model of export-led growth, and the confidence of the planners and policy-makers in the "trickle-down" theory of development, according to which the benefits of growth are expected to seep through the entire society automatically as part of the process of drive toward self-sustained development.

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1 For a comprehensive study of past income distribution trends in Malaysia, see D.R. Snodgrass, "Trends and Patterns in Malaysian Income Distribution, 1956-70" in D. Lim editor, **Readings on Malaysian Economic Development,** Oxford University Press, Kuala Lumpur, 1975. See also L.L. Lim, "Income Distribution in West Malaysia" in **Income Distribution, Employment and Economic Development in South East and East Asia,** The Japanese Economic Research Center, Tokyo, 1975 (2 vols.).

The Malaysian version of the "trickle-down" growth, however, is actually a case of **managed industrialisation**[2], based on an active and expanding state participation in the economy. This strategy is based on a two-pronged approach: (i) the growth of a para-statal sector, consisting of public enterprises, to spearhead socio-economic restructuring; and (ii) reliance on a dynamic private sector based on foreign investment. Thus, in recent years Malaysia has witnessed a rapid proliferation of all kinds of public enterprises in every major sector of the economy, with doubtful efficiency. In the private sector, generous tax and investment incentives have attracted "footloose"[3] branch-plants of multinational corporations in search of cheap, unskilled labour. As a result, there has developed a **secondary** labour market[4] dominated by low-wage female workers and rural migrants, a significant proportion of which earn incomes not much higher than the official poverty level. While the Malaysian Industrial Development Authority's investment incentives encourage large capital-intensive firms[5], relying on imported technology, youth unemployment in particular remains at alarmingly high levels, with graduates typically having to wait up to two or three years before obtaining jobs.

Thus, the performance of managed industrialisation under NEP is not generating the anticipated drive toward greater economic equity in Malaysia. This paper will argue that poverty redressal in Malaysia requires a **direct** policy intervention based on large-scale public investment in human and physical formation in poverty target regions themselves. This would require a substantial transfer of public expenditures into poverty areas to start **in situ** employment and income-generating

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2 A stronger version of this concept is the strategy of **Forced Industrialization** discussed in Douglas S. Pauuw and John C.H. Fei, **The Transition in Open Dualistic Economy, Theory and Southeast Asian Experience,** Yale University Press, New Haven, 1973.

3 C.K. Helleiner, "Manufactured Exports from Less Developed Countries and the Multinational Firms" **Economic Journal,** March, 1973, pp. 21-47.

4 P. Doeringer and M. Piore, "Unemployment and the 'dual' labour market" **Public Interest,** vol. 38, winter 1975, pp. 67-69.

5 N.D. Karunaratne and M.B. Abdullah, "Incentive Schemes and Foreign Investment in the Industrialization of Malaysia" **Asian Survey,** vol. XVIII, no. 3, March 1978, pp. 261-74.

projects designed to raise the economic wellbeing of rural communities, not through welfare payments or relocation to large-scale plantations expected to function as "growth poles"[6], but by stimulating development of rural communities **in situ.**

The paper is organized in five parts. In the next part recent evidence of growing income inequality in Malaysia will be examined. Part III will discuss the growth of the manufacturing sector based on cheap labour in order to assess its contribution toward poverty eradication. In Part IV the role of para-statal bodies as agents of restructuring will be discussed. Finally, in Part V, there is an analysis of the revised TMP expenditures to determine the relative priority for anti-poverty projects, particularly in the east-coast states where the incidence of poverty is highest.

II. Worsening Intra-Racial Income Inequality, 1970-76

Since the inauguration of NEP, in the wake of May 1969 riots, there has been some important shifts in income distribution in Malaysia. In particular, while there has been a narrowing down of **inter**-racial income disparities, **intra**-racial distribution has become more unequal. These results are based on data in Tables I and II, computed from the **Mid-Term Review of the Third Malaysia Plan.** Thus, during 1970-76 the ratio of Chinese/Malay median monthly household income (in constant 1970 prices) declined from 2.23 to 2.10, and similar declines occured in the Indian/Malay, and All Races/Malay ratios, suggesting that the Malays have been catching up to the other races in this period. However, the rural/urban income ratio remained virtually the same, a clear indication of the fact that only the urban Malays have gained.

Looking at income distribution **within** specific racial groups, shown in Tabel II, it is evident that there has been increased inequality, with the richer households gaining relative to the lower-income families. Thus,

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6 For a critical assessment of a large-scale land development scheme, which has not achieved its original aim of serving as a growth pole, see, Benjamin Higgins, "Perils of Perspective Planning: Pahang Tenggara Revisited" UNCRD Working Paper, 79-15, December, 1979, United Nations Centre for Regional Development, Nagoya, Japan.

TABLE I

INCOME DISTRIBUTION TRENDS AMONG RACES AND AREAS IN PENINSULAR MALAYSIA, 1970-76

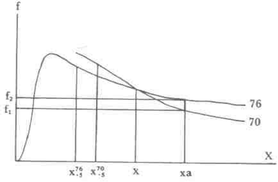
	Ratio of Median Monthly Household Incomes[1]	
	1970[2]	1976[3]
Chinese/Malay	2.23	2.10
Indian/Malay	1.62	1.57
All Races/Malay	1.38	1.33
Urban/Rural	1.906	1.888

1 In constant 1970 prices
2 Post Enumeration Survey of 1970 Census
3 Preliminary results of the Agricultural Census 1976

SOURCE: **Mid-Term Review of the TMP,** Table 3-1, p. 44.

during 1970-76 the ratio of mean to median incomes[7] have increased significantly for the Chinese and Malays as well as for All Races. Among

7 An increasing ratio of mean to median incomes implies that for a standardized mean, $\bar{x}$, the 1976 median, $x^{76}_{.5}$, lies to the left of the 1970 median, $x^{70}_{.5}$. Therefore at higher levels of income (e.g. x_a) there would be more household (i.e. f_2 instead of f_1) in 1976 relative to 1970 indicating greater income concentration at the top during this period. Available data does not permit a comparison between the 1970 and 1976 distributions at lower income levels, beyond the fact of increasing positive skeweness.



the Indians and Others there was a reverse trend toward greater equality. In both the rural and urban areas, too, the data indicate a growing inequality, at a significantly faster pace in urban than in rural areas.

TABLE II

INCOME DISTRIBUTION TRENDS WITHIN SPECIFIC RACIAL GROUPS AND AREAS IN PENINSULAR MALAYSIA, 1970-76

	Ratio of Mean to Median Monthly Household Incomes[1]		
	1970[2]	1976[3]	%Change
Malay	1.43	1.57	9.8
Chinese	1.47	1.85	25.9
Indian	1.57	1.54	− 1.9
Others	3.25	2.45	−24.7
All Races	1.59	1.79	12.6
Urban	1.62	1.90	17.3
Rural	1.43	1.59	11.2

For Notes and Source, see Table I.

The data in Tables I and II should be of major concern for the Malaysian planners and policymakers since it implies that past trends of income concentration for the rich and poverty for the masses apparently have continued unabated, despite policy declarations to the contrary. The 1976 data are based on the preliminary results of the 1976 Agricultural Census and, therefore, may be subject to change. However, there is supporting evidence of growing inequality between the rich and poor from other sources as noted by the **Mid-Term Review,** for example, the 1973 Household Income Survey.

Growing income inequality at a time when the Malaysian government is committed to poverty eradication and socio-economic restructuring has far-reaching implications for the kind of economic strategy which has been adopted under NEP. In particular, it requires a very careful, critical reappraisal of the policy of managed industrialisation. If this strategy is not promoting economic equity, especially for poor regions, it would be both timely and necessary to consider alternative policy options and strategies in order to avoid the social costs of future conflict in the country between the haves and have-nots.

III. The Growth of Cheap-Labour Manufacturing Industries

The manufacturing industries of Malaysia registered impressive overall gains over the last decade, both in output and employment terms. In fact, according to the **Mid-Term Review,** the value added in manufacturing grew by 14.3% p.a. in real terms during 1976-78, exceeding the Third Malaysia Plan target of 12.0%[8]. The share of this sector in the Gross Domestic Product rose from 16.4% in 1975 to 19.0% in 1978 and accounted for almost a third of the aggregate output growth in the entire economy. Employment in the manufacturing sector increased from 159,259 in 1973 to 296,378 in 1979 or by an overall 86%[9]. Likewise average real monthly earnings increased at about 3% annually during 1973-79 (measured in 1973 prices).

However, when one looks behind the overall trends and aggregated sectoral performance rates, it becomes apparent that manufacturing sector's growth was heavily concentrated in a relatively few export-oriented industries, principally textiles, clothing and electronic assembly plants. In fact, these three industries accounted for no less than 39.4% of total manufacturing employment in June 1979 as can be seen from Table III. More significantly, they accounted for 58% of total employment growth in the manufacturing sector.

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8 **Mid-Term Review, op. cit.,** p. 145.

9 These employment figures are based on the Establishment Survey of the Department of Statistics, as reported in the **Monthly Industrial Statistics, Peninsular Malaysia.** They exclude East Malaysia and also most of the small scale sector. According to independent sources, the latter account for about 1/3 rd of manufacturing employment in Malaysia. See Chee, P. Lim, "A Study of the Pattern of Employment and Wages in Small Industry in Malaysia" **Developing Economies,** vol. XVI, no. 1, March 1978, pp. 34-53.

TABLE III

EMPLOYMENT AND EARNINGS IN SELECTED MANUFACTURING INDUSTRIES, 1973-79

Industry	1979 (June)			1973 (June)		
	Employment (No.)	Average Monthly Earnings (M$)	%	Employment (No.)	Average Monthly Earnings (M$)	%
Total Manufacturing	159,259	189.70	100.00	296,378	320.24	100.0
Electronics	12,316	165.56	87.3	65,949	295.46	92.3
Textiles	17,425	126.89	66.9	34,533	243.48	76.0
Clothing	7,846	104.00	54.8	16,307	191.82	59.8

Source: For 1979: **Monthly Industrial Statistics, Peninsular Malaysia,** July 1979, Department of Statistics, Kuala Lumpur, The 1973 data is from the same publication for June 1973, converted to a comparable basis with the 1979 data using the conversion table at the end of the July 1979 **Monthly Industrial Statistics.**

These industries possess some interesting and important common features. They were attracted to Malaysia by MIDA's incentives programme; they are branch-plant operations producing for world markets; they employ unskilled, low-paid (mostly female) labourers in conjuction with automated techniques of production. Low wages and lack of career prospects result in high volumes of turnover, and in recent years an increasing number of Malaysian workers have been migrating to Singapore where wages are far superior.

Are these the kind of industries to transform the Malaysian economy and to modernize and restructure it along the lines of government policy? It is highly doubtful. These branch-plant industries tend to be "footloose" moving from one country to the next in search of plentiful supply of cheap labour[10]. Some years ago, they were dominant in Singapore, but economic growth and land shortage there have forced the Singaporean authorities to become increasingly selective and dependent on

10 See the **Internationalist** of March, 1980 devoted to the role of multinationals.

labour-saving high-technology. Malaysia has reaped some spill-over benefits from this, but now there are signs that these firms are moving into Thailand and Sri Lanka and other sources of cheap labour.

By their very nature, "footloose" industries are not agents of skill transfer; they are rather agents of technology transfer. They do not invest in skill training and manpower development because they do not require large numbers of skilled workers, and attempt to obtain such workers by pirating them away from other firms or rely on public training institutions. Their principal labour requirement is for unskilled workers with little or no educational qualifications, capable of manning automated machines and assembly-line operations. Although these workers possess low levels of human capital, they cannot be described as low-productivity workers since the firms they work for are characterised by high capital-labour ratios, and hence high ratios of output per worker. But in view of low levels of human capital possessed by the unskilled workers, labour compensation rates tend to be relatively low, i.e. most of the value added accrues to the investors and capitalists in the form of profits and dividends. While some of these profits and dividends may be re-invested in Malaysia for expansion, a high proportion is transmitted abroad.

Table III provides some useful information about average monthly earnings in the manufacturing sector with special reference to the textile, clothing and electronics industries. It will be seen that earnings in these industries have consistently been below the sectoral average – in the case of clothing by as much as 40%. Thus, the three largest employing industries are far from playing a leading role in the equalisation of incomes. In fact, the same appears to be true for the entire manufacturing sector. Given the fact that the median is virtually one-half of the mean incomes, as noted in Part II above, it appears that a substantial majority of workers in the manufacturing sector earn a monthly income well below the national income per capita of M$217 per month[11] This is a clear demonstration that the manufacturing sector as a whole is not a leading sector in promoting a more equitable socio-economic balance. While there is a strong "pull effect" attracting rural migrants into urban

11 This estimate is based on a per capita income of M$2600 for 1978 calculated by dividing the 1978 GNP at purchasers' value (**TMP**, Table 1-8, p. 16) by the Malaysian population for that year (**TMP**, Table 4.4, p. 63).

centres, the typical migrant ends up in the secondary labour market earning a level of income not significantly different from the poverty level.

What is especially disturbing about this type of industrial growth is its limited contribution toward the employment and income distribution objectives of public policy. It is evident that by encouraging the inflow of cheap-labour manufacturing industries by its tax and investment incentives and free trade zones policies, Malaysia has actively promoted the growth of secondary labour markets, in which low-status jobs (typically held by transitory and marginal workers) predominate while career-oriented positions requiring a high level of schooling and training are in short supply. The phenomenon of secondary labour market is linked to the problem of the "working poor" — workers whose earnings are so low that in some cases they are actually below the official poverty lines of income, while in others they may not be significantly higher. In the past, Malaysia, unlike most other LDCs, has been relatively free of urban ghettos and poverty slums, but the case of "working poor" as a by-product of labour-intensive manufacturing industries using cheap labour, should serve as a warning signal that there is a limit to urbanisation and quality of work, and beyond this optimal limit, such growth generates increasing net social costs. When secondary workers are obliged to obtain employment at poverty levels of income in order to support their families, social and kinship values may be disrupted and irreparable damage inflicted on the children, while, of course, the income earned may be too inadequate to move the family out of the poverty trap.

The growing secondary labour market is counter-productive both on social and economic grounds. As manufacturing sector's shares of GDP and total employment rise, the Malaysian economy may indeed become more diversified with a corresponding decline in its dependence on primary products. But there is a danger of a new form of dependence: should dependence on cheap labour manufacturing industries be allowed to increase unchecked, even when the net social benefit of such industries is negative? As argued above, the contribution of such industries toward Malaysia's poverty eradication and socio-economic restructuring objectives appear to be far more limited than originally anticipated. Therefore, a careful reappraisal of public policies, in particular the program of investment incentives administered by MIDA, encouraging the growth of cheap labour industrialisation, would be both timely and highly desirable. There needs to be far more emphasis on skill transfer and human capital formation in the private sector than has been the practice in the past so that the earnings of Malaysian workers would increase with increased quality and level of human capital.

IV. Public Enterprises and the Restructuring Strategy

While relying on foreign investment to promote labour intensive industries in the private sector, the Malaysian government, especially in the aftermath of the May 1969 race riots, has adopted an increasingly active state role and participation in the economy. The chief control strategy for this active role has been the growth and proliferation of para-statal bodies which now constitute a separate sector of the Malaysian economy under a new Ministry of Public Enterprises. Theoretically, public enterprises have been designed to facilitate and regulate the process of managed industrialisation. They are expected to spearhead and accelerate the participation of Malays in commerce and industry in accordance with the 30-40-30 racial distribution of equity ownership of fixed assets in the corporate sector targeted for full attainment by the end of the NEP time frame in 1990[12].

In addition to older para-statal bodies such as MARA, FELDA, FAMA, MIDA, etc., many new ones have been created, especially in banking (e.g. Bank Bumiputra), finance (MIDF), manufacturing (FIMA), petroleum and gas (PETRONAS), transportation (MAS, MISC), urban development (UDA) state level development (SEDCs) and many others. One particular holding company (PERNAS) in mid-1970's controlled eight wholly-owned subsidiaries in engineering, construction, mining, real estate, insurance and commerce, with a total paid-up capital of over M$100 million up from just M$16 million in 1971[13]. It is not the purpose here to offer an inventory of para-statal bodies, nor to document their aims and functions; that would be a major undertaking in its own right. Rather the purpose is to raise and discuss the question of the effectiveness of state enterprises as appropriate and

12 **TMP**, pp. 189-98. The equity ownership targets are in **TMP**. Table 4-16, p. 86.
13 **ibid.**, p. 195.

efficient vehicles for the achievement of such key public policy objectives as racial balance and poverty eradication.

State enterprises are generally highly labour-intensive requiring large cadres of highly trained and educated manpower. To the extent that such manpower is diverted from more productive employment in the economy, the staff requirements in state enterprises would generate resource misallocation and decelerate the aggregate growth rate. Furthermore, if state enterprises are insulated from the competitive forces of the market, their operating efficiency would decline, and they would have to be subsidised increasingly out of the public purse at even greater sacrifice in terms of productivity and aggregate growth. Far from contributing to poverty redressal and racial economic balance, inefficient state enterprises may actually become a drain on the economy surviving on state subsidies.

However, even when state enterprises are efficiently run, requiring no annual budgetary subsidies from the state, it is not certain that resource allocation in such enterprises will always be in line with public policy aims. Profitable state enterprises (e.g. national petroleum and gas enterprises) have a habit of "empire-building" preferring to reinvest their surplus revenue in their own expansion (e.g. the case of petroleum enterprise moving into petrochemical industry) rather than turning the surplus over to other sectors. Such socially undesirable consequences can be avoided by a dynamic and dedicated political leadership. If, however, the political system is itself inefficient it is more than likely that profits and rewards in state enterprises will be allocated wastefully as a result of political considerations. Corrupt practices, nepotism and favouritism may well replace the rules of operational efficiency, ultimately leading to economic mismanagement.

In Malaysia public holding companies and joint-ventures have been extensively used as a device for increasing the Malay equity of commercial and industrial assets. While this method may be justified as a strategy of achieving the target Malay equity share as quickly as possible, it is nevertheless an indirect and artificial strategy, since ownership and control of assets are not actually distributed among the Malay community, but merely held "in trust" for it or on its behalf by the public agencies, banks, and financial houses. Poverty redressal in this top heavy approach can only come about gradually over time in much the same manner as the now-discredited "trickle-down" development theory. In the meantime, however, the indirect, managed equity acquisition strategy tends to concentrate wealth in the hands of the advantaged, bureaucratic elite controlling the holding companies, joint ventures and the state enterprises.

V. Poverty Redressal and Expenditure Priorities

A look at the composition of TMP expenditures shows where the actual priorities in development policy in Malaysia lie. They lie (as they always did before and after **Merdeka**) in the growth and perpetuation of the dual economy[14], featuring a dynamic enclave sector linked to foreign markets, and a large, underdeveloped rural sector. The growth and perpetuation of the dual economy is carried on, notwithstanding NEP objectives regarding poverty eradication, with the lion's share of planned expenditures going to finance enclave sector projects such as plantation development and industrialisation, concentrated in west coast states, based on foreign investment. Thus, over two-thirds of total revised TMP allocations are earmarked for "economic sectors" (see Table IV), whereas the share of "social sectors" is a mere 17%. In fact, the three east coast states[15] with the highest incidence of poverty (i.e. Pahang, Trengganu and Kelantan) are allocated only M$0.7 billion or 14% of the total "social sector" allocation. In other words, their share amounts to just 2.5% of total TMP revised budget. Since most of the "social sector" expenditures are actually earmarked for public education at all levels, and housing projects in the Federal Territory and other west coast states, it is evident that the revised TMP contains relatively little actual anti-poverty expenditures.

Of course, it cannot be denied that FELDA land developments, rubber replanting schemes, and infrastructural projects such as road transportation and electrification, do help rural communities as well.

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14 For a brief historical account of the evolution of the Malaysian dual economy, see Ozay Mehmet, **Economic Planning and Social Justice in Developing Countries,** Croom Helm, London, 1978, chap. 5 pp. 95-122.

15 Officially, 86% of total poor households (i.e. 684,000) lived in rural areas (**TMP,** p. 161) and the incidence of poverty on the east coast of Peninsular Malaysia was 95%. (**TMP,** p. 164).

TABLE IV
REVISED THIRD MALAYSIA PLAN ALLOCATIONS, BY MAIN SECTOR, 1976-80

Sector		Revised Allocation (M $ billion)	%
Economic (a)		21.5	67.0
Social (b)		5.6	17.4
of which in Pahang	0.3		
Trengganu	0.2		2.5
Kelantan	0.2		
General Administ. & Security		5.0	15.6
Total		32.1	100.0

(a) Includes Agriculture and Rural Development, Mineral Resources Development, Commerce and Industry, Transportation, Communications and Utilities.

(b) Includes Education and Training, Health and Population, and Social and Community Services.

Source: **Mid-Term Review,** Appendix I.

However, the benefits that trickle down to regions of highest poverty incidence are relatively small since, by definition, the extent of participation of these regions in main-stream economy is peripheral.

Persistent underdevelopment in the poverty regions require **direct** anti-poverty programs, based on large-scale infusion of public expenditures to undertake **in situ** income-generating, labour-intensive projects of immediate benefit to the inhabitants of these regions[16]. The idea is not simply to provide welfare payments, but to stimulate the productive participation of regions and inhabitants left out of the past development process and who are caught in a poverty trap. The emphasis should be on income generation and productive job creation in the poverty regions

16 **The Mid-Term Review** (e.g. pp. 82-92) recognizes the importance of **in situ** development strategy, but the revised TMP expenditures do not reflect any significant shift in budget priorities in favour of low income regions.

themselves, relying on local labour and inputs, in an effort to maximize local value added. Malaysia is in a relatively favourable position to finance such a large-scale direct anti-poverty program. It should be feasible to divert some of its substantial export earnings into poverty regions to stimulate food production, build low-income housing, launch rural industries, improve physical infra-structure and invest in human capital formation in those regions. In the long-run, this would be the most socially efficient way of solving Malaysia's poverty problem.

Part Two
MONEY AND MONETARY POLICY

3

THE SUBSTITUTABILITY OF TIME DEPOSITS FOR MONEY IN MALAYSIA: AN EMPIRICAL STUDY

SRITUA ARIEF

I. Introduction

As economic growth of a country proceeds, the economy usually becomes rich in financial assets. At the initial stage of growth, the expansion of financial institutions and monetization of the economy may cause the public's shift of preference from currency to demand deposits. However, at the latter stage of growth the increasing demand for time deposits may also occur which will be due, among others, to three important factors:

(1) the increasing rate of savings of individuals and the attractive rates of interest paid on time deposits;
(2) the banks' drive for more savings accounts and fixed deposits and the extension of banking facilities to wider segments of the population;
(3) changes in savings habits of the population.

Thus the increasing trend toward time deposits relative to currency and demand deposits at the latter stage of growth is the product of three distinct effects[1]: the income effect as a result of the increase in rate of savings, the substitution effect as reflected in the shift in public preference towards time deposits, and the institutional effect which is a consequence of changes in savings habit of people who come to place their savings in the banks instead of channelling them into the unorganized sector of the money market.

A growing role of time deposits in households' assets and the practice to consider them as liquidity component had created a controversy among economists over whether to include time deposits in the definition of money. The empirical aspect of this controversy concerns the inclusion of time deposits in money supply.

1 G. Subramanyam, "On The Nearness of Time Deposits To Money: An Empirical Study", **The Indian Economic Journal**, vol. 24, nos. 4 — 5 (April/June 1977).

The purpose of this paper is to examine the degree of substitutability of time deposits for money in Malaysia by applying the model of consumer behaviour as developed by Chetty[2]. The model which is derived from a utility function in the context of consumer choice can be used to perform a direct test of the substitutability among assets held by households. It is hoped that the results of this study would be useful for economic policy formulation and economic prediction in public as well as private sectors.

II. The Model

Let the utility for holding various assets be

$$U = f(A_1, A_2, A_3, \ldots\ldots\ldots\ldots, A_n) \tag{1}$$

where A_j = j-th asset

Adopting the generalized CES function, the utility function can be written as

$$U = (\Omega_0 M^{-\pi} + \Omega_1 A_1{}^{-\pi}1 + \ldots\ldots + \Omega_n A_n{}^{-\pi}n)^{-\frac{1}{\pi}} \tag{2}$$

where M = currency + demand deposits

$\Omega_n > O$ = constants

$-1 < \pi < \infty$ = substitution parameter

Specifying the budget constraint as

$$M_0 = \Theta(M, d_1, d_2, \ldots\ldots, d_n)$$

$$= M + \sum_{j=1}^{n} \left(\frac{A_j}{1 + d_j}\right) \tag{3}$$

where d_j is the yield on A_j in the next period.

The marginal conditions for maximization of the utility function U will be

$$\frac{\partial U}{\partial M} - \lambda = O = -\frac{1}{\pi} U^{-1}(-\pi \;\; \Omega_0 M^{-\pi-1}) - \lambda$$

2 V.K. Chetty, "On the Measuring the Nearness of Near Money", **American Economic Review**, vol. LIX, June 1969, pp. 270 – 281.

$$\frac{\partial U}{\partial A_j} - \lambda \Big/ (1 + d_j) = 0$$
$$= -\frac{1}{\pi} U^{-1}(-\pi_j \Omega_j A_j^{-\pi_j - 1}) - \frac{\lambda}{(1 + d_j)} \quad (5)$$

where λ = Lagrangian multiplier.

Dividing equation (4) by equation (5) we obtain

$$(\pi \Omega_0 M^{-\pi - 1}) \Big/ (-\pi_j \Omega_j A_j^{-\pi_j - 1}) = (1 + d_j)$$

$$\frac{-\pi \Omega_0 M^{-(\pi + 1)}}{(1 + d_j)} = (-\pi_j \Omega_j A_j)^{-(\pi_j + 1)}$$

$$\left(\frac{\pi \Omega_0}{\pi_j \Omega_j}\right)(M^{-(\pi + 1)}\left(\frac{1}{1 + d_j}\right) = A_j^{-(\pi_j + 1)} \quad (6)$$

Taking logarithms of both sides of equation (6) we get

$$\mathrm{Log}_e A_j = -\frac{1}{\pi_j + 1}\left[\log_e\left(\frac{\pi \Omega_0}{\pi_j \Omega_j}\right) - (\pi + 1)\log_e M + \log_e\left(\frac{1}{1 + d_j}\right)\right] \quad (7)$$

Equation (7) then will be used as the regression equation to estimate the parameters π, π_j and Ω_j after normalizing Ω_0.

For the purpose of this study, Chetty's method is simplified to a two-variable case for money and time deposits. The utility function[3] can be expressed as follows,

$$U = (\beta_0 M^{-\alpha} + \beta_1 Q^{-\alpha})^{-\frac{1}{\alpha}} \quad (8)$$

3 This is the normal CES function as popularized by Uzawa. See H. Uzawa, "Production Functions With Constant Elasticities of Substitution", **Review of Economic Studies**, October 1962.

where Q = time and savings deposits in the banking system in the next period

$\beta_0, \beta_1 > 0$ = constants

$-1 \leqslant \alpha < \infty$ = substitution parameter

Denoting i as the weighted rate of interest paid on time and savings deposits, the budget constraint will be

$$M_0 = M + \frac{Q}{1+i} \tag{9}$$

Maximizing the utility function as given in equation (8), we get

$$-\frac{1}{\alpha} U^{-1} \left[-\alpha \ \beta_0 M^{-(\alpha+1)} \right] = \lambda \tag{10}$$

$$-\frac{1}{\alpha} U^{-1} \left[-\alpha \ \beta_1 Q^{-(\alpha+1)} \right] = \frac{\lambda}{1+i} \tag{11}$$

Dividing equation (10) by equation (11) we obtain

$$\left(\frac{\beta_0}{\beta_1}\right)\left(\frac{M}{Q}\right) - (\alpha + 1) = (1 + i) \tag{12}$$

The logarithmic form of equation (12) in the form of a regression equation will be

$$\log_e \frac{M}{Q} = \frac{1}{1+\alpha} \log_e \frac{\beta_1}{\beta_0} + \frac{1}{1+\alpha} \log_e \frac{1}{1+i} + u \tag{13}$$

where u = error term

Equation (13) can be fitted to data relating to M, Q and i in order to obtain an estimate of the elasticity of substitution of Q for M. By making use of the normalized utility function with $\beta_0 = 1$, the estimate of β_1 can be derived from the regression coefficients. M and Q are perfect substitutes if $\alpha = -1$ and $\beta_1 = 1$.

If it is found that there is a significant substitutability between M and Q, then the adjusted quantity of money (M_{adj}) can be derived from the following relation:

$$M_{adj} = (M^{\alpha} + \beta_1 Q^{-\alpha})^{-1/\alpha} \tag{14}$$

III. Results and Conclusions

Using the data for Malaysia over the period 1959 to 1980, equation (13) was fitted by the OLS technique. The estimated regression is as follows:

$$\log_e \frac{M}{Q} = \underset{(0.0306)}{4.1808} + \underset{(0.2462)}{2.3084} \log_e \frac{1}{1+i}$$

$$R^{-2} = 0.8129$$

$$D.W. = 0.9513$$

$$F = 87.9139$$

Numbers in parentheses beneath the regression coefficients are the respective standard errors.

Although the coefficient of $\log_e \frac{1}{1+i}$ is statistically significant, the elasticity of substitution between M and Q is not large. A value of 2.3084 for the elasticity of substitution implies that $\alpha = -0.5668$. Using the normalization rule that $\beta_0 = 1$, the value of β_1 can be determined as follows,

$$\beta_1 = \exp(-4.1808 / 2.3084)$$
$$= 0.1635$$

with $\alpha = -.0.5668$ and $\beta_1 = 0.1625$, we may conclude that the degree of substitutability of Q for M is relatively low. Hence, time deposits are not a close substitute for money in Malaysia. This indicates that time deposits have been more in the nature of "investment" rather than transaction balances. The findings are in contrast to those obtained in other developing countries e.g. Thailand and India. The following are the values of the significant elasticity of substitution of Q and M_1, α and β_1 for Thailand and India[4].

Parameter	Thailand	India
elasticity of substitution	188.99	24.10
α	−0.9947	−0.9585
β_1	1.066	0.9183

The results for Thailand and India indicate that time deposits are a very close substitute for money which implies that they are largely used to support transactions.

To check the reliability of the preceding formulation and results as an accurate description of the behaviour of wealth-holding units in Malaysia, the following regression to test indirectly the substitutability of time deposits for M_1 was also run[5]:

$$\Delta Y = a_0 + a_1 (\Delta M) + a_2 (\Delta Q)$$

This test also attempts to compare the power of time deposits against M_1 in explaining variations in a real sector variable such as income. M and Q are perfect substitutes if $\frac{a_2}{a_1} = 1$.

The following are the regression coefficients obtained.

Coefficient	Result
a_0	162.3799
a_1	3.1156
a_2	0.7733

4 See Sathit Uthaisri, "Monetary Policy In Thailand: A Test Of Its Effectiveness", Ph. D. thesis, University of Illinois, 1973, p.73 and G. Subrahmanyam, op. cit.

5 This test was developed by Timberlake and Fortson. See R.H. Timberlake and J. Fortson, "Time Deposits in the Definition of Money", **The American Economic Review**, March 1967.

The ratio of the regression coefficient of ΔM to that of ΔQ is 0.2482 which is far below unity. It indicates that Q is not a perfect substitute for money.

The findings reported here are in agreement with those reported by Bank Negara Malaysia. The study conducted by Bank Negara Malaysia[6] on the relationship between changes in money (variously defined) and changes in the aggregate output for the period 1960 – 1975 shows that M_1 appeared to be the most appropriate measure of money. However, Bank Negara Malaysia has been taking two alternative definitions of money (M_1 and M_2) into consideration in evaluating policy options.

The results reported in this study may call for a better approach to monetary action on the basis of the narrow definition of money rather than on the broader one which includes time deposits.

We wish to point out here the limitation of this study. It is confined only to examining the substitutability between M_1 and time deposits. In reality, it is likely that the preferences of the wealth-holding units would be shifting between different forms of money and near-money assets. In such a case, changes in $\frac{M_1}{Q}$ need not necessarily reflect a substitution between M_1 and Q only. If necessary data related to various forms of near-money assets are available, the simultaneous introduction of all the likely substitutes for M_1 into the utility function[7] could be made.

6 Bank Negara Malaysia, **Money And Banking in Malaysia**, Kuala Lumpur: Bank Negara Malaysia, 1979, pp. 335 – 336.

7 A set of different utility functions were recently developed by James Barth, et.al. Their models produce the same results as Chetty's. See James Barth, Arthur Kraft and John Kraft, "The Moneyness of Financial Assets", **Applied Economics**, 9, 1977, pp.51 – 61.

Table 1 Money Supply, 1959 — 1980
($ million)

Year	M_1 (Currency + Demand Deposits)	Change
1959	$ 1,110.8	$ —
1960	1,170.3	59.5
1961	1,196.9	26.6
1962	1,253.7	56.8
1963	1,341.8	88.1
1964	1,417.2	75.4
1965	1,514.0	96.8
1966	1,652.0	138.0
1967	1,524.6	− 127.4
1968	1,697.0	172.4
1969	1,882.3	185.3
1970	2,032.5	150.3
1971	2,120.4	87.9
1972	2,715.5	595.1
1973	3,735.2	1,019.7
1974	4,055.3	320.1
1975	4,348.8	293.5
1976	5,257.0	908.2
1977	6,127.4	870.4
1978	7,242.8	1,115.4
1979	8,486.0	1,243.2
1980	9,756.8	1,270.8

Source: Bank Negara Malaysia.

Table 2 Time and Savings Deposits,
1959 — 1980
($ million)

Year	Amount	Change
1959	$ 374.5	$ —
1960	483.7	109.2
1961	569.5	85.8
1962	621.5	52.0
1963	712.6	91.1
1964	804.1	91.5
1965	942.9	138.8
1966	1,083.5	140.6
1967	1,299.5	216.0
1968	1,567.8	268.3
1969	1,842.3	274.5
1970	2,098.2	255.9
1971	2,553.5	455.3
1972	3,055.7	502.2
1973	3,837.5	781.8
1974	4,674.1	836.6
1975	5,652.6	978.5
1976	7,514.2	1,861.6
1977	8,733.6	1,219.4
1978	10,223.7	1,490.1
1979	13,176.8	2,953.1
1980	17,890.7	4,713.9

Source: Bank Negara Malaysia.

Table 3 Weighted Rate of Interest
On Time and Savings
Deposits, 1959 — 1981

Year	Weighted Rate of Interest
1959	3.38
1960	3.55
1961	4.25
1962	3.90
1963	3.90
1964	4.25
1965	4.40
1966	4.40
1967	4.93
1968	5.08
1969	5.25
1970	5.38
1971	5.38
1972	4.25
1973	4.38
1974	5.37
1975	6.70
1976	6.90
1977	6.20
1978	6.28
1979	6.40
1980	8.10
1981	8.60

Source: Computed from figures released by Bank Negara Malaysia.

Table 4 Gross National Product At Current Market Prices ($ million) 1959 — 1980

Year	Amount	Change
1959	$ 5,517	$ —
1960	6,096	579
1961	6,524	428
1962	6,916	392
1963	7,354	438
1964	7,822	468
1965	8,593	771
1966	9,177	584
1967	9,651	474
1968	10,068	417
1969	10,973	905
1970	11,617	644
1971	12,592	975
1972	13,842	1,250
1973	17,963	4,121
1974	21,861	3,898
1975	21,606	−255
1976	27,033	5,368
1977	31,074	3,877
1978	34,826	3,752
1979	42,834	8,008
1980	49,633	6,799

Source: Department of Statistics.

4

CREDIT RESTRAINT AND THE DEMAND FOR MONEY IN MALAYSIA

BERNHARD FISCHER

I. Introduction

Empirical estimates of money demand function are based either on variants of the Keynesian liquidity preference theory or on modified versions of the (Neo-) Quantity Theory as formulated by Friedman[1]. The empirical applicability of these models of money demand for developing countries, must however, be questioned. Against the Keynesian liquidity preference theory one must argue, that the observable interest rates in these countries usually do not reflect real money market conditions because in many cases they are institutionally pegged below their equilibrium level[2]. Additionally, the so-called speculative demand for money is negligible as frequently, there are only few alternative assets available to wealth holders.

In so far as money is considered as being held mainly for transaction purposes, one might conclude that the Quantity Theory, assuming income is the principal explanatory variable for the demand for money, is more realistic for those countries than the Keynesian liquidity preference theory. However, one must also doubt the applicability of the Quantity Theory in describing the demand for money in developing economies, because this theory assumes that income velocity is stable. Since there is empirical evidence that the income velocity of money is more subject to short-run variations in developing countries than in industrial ones[3] the Quantity Theory also becomes less conclusive in explaining the demand for money.

The purpose of this paper is to provide some empirical evidence for an alternative form of a demand for money function in developing countries where the observable interest rates do not reflect money market conditions. Section II contains an explanation of why the degree of credit res-

1 For a discussion of the various money demand theories see Laidler (1977).

2 See f.e. Fischer (1980, 1981).

3 Park (1970) and Cassuto (1973).

traint can be treated as a proxy for the interest rate variable in the demand for money function and Section III presents the model for the estimation of the demand for money. Estimation techniques and empirical results for Malaysia are reported in Section IV and some conclusions are drawn in the final section.

II. Interest Rates, Credit Restraint and the Demand for Money

As in many other developing countries, interest rates in Malaysia have been administered rather than market determined in the organized sector[4]. The regulation system adopted in Malaysia involved the setting of minimum lending rates for bank loans and ceilings on interest rates for bank deposits[5]. The directives have been effective in the Malaysia context particularly because many important domestic banks have government shares[6]. Since October 1978, Bank Negara has liberalized the interest rates of banks, but it continues to require special low interest rates for bumiputera, small business, housing, export and other priority sectors. Although in Malaysia, institutional rates nowadays are not constrained by legal ceilings, loan rate schedules seem to be regulated by a banking cartel[7]. Additionally, preferential rediscount facilities produce subsidized loan rates for priority borrowers[8]. A consequence is that credit has to be rationed by the government and/or by the banks. Given the institutional pegging of interest rates, observed interest rates are unlikely to be the linkage variables between holdings of alternative assets.

In financially repressed economies, the volume of available credit rather than its costs seems to be the crucial constraint on private economic activity. If a stringent monetary policy is pursued, there will be a greater tendency towards economising on available money balances and to de-

4 Usually governments tend to peg the nominal interest rate below the equilibrium level. Faced with high and unstable inflation rates the real interest rate frequently becomes negative. This was the case in most of the Latin American countries during the seventies (Galbis [1979a]). The negative effects of such a policy on financial savings and economic growth are discussed by Fischer (1982).

5 Bank Negera Malaysia (1979, pp. 129-132).

6 Lee, Jao (1982).

7 Fry (1982, p. 18).

8 A subsidized or concessional rate is defined here as an interest rate set below the effective market rate facing the specific borrower.

pend more on money lenders in the unorganized money market to meet the target expenditures. This will push up the interest rates in this market above the official rates[9] reflecting the degree of credit restraint. However, since on the one side the unorganized financial market in not functioning perfectly[10] and on the other side interest rates in these markets are not easily observable, the degree of credit restraint itself — if appropriately measured — can be used as a proxy for the interest rate in the demand for money function, if interest rates are administered on the organized money and credit markets.

III. The Demand for Money Model

A simple model reflecting the importance of credit restraint for the demand for money function in developing countries can be specified as follows:

$$(1)\quad M^D_t = f((\Delta P_t/P_{t-1})^e_t, Y^e_t, CR_t, u_t),$$

$$(2)\quad M_t = M_{t-1} + \delta (M^D_t - M_{t-1}) + v_t,$$

$$(3)\quad M_t = g(RM_t, M_{t-1}, w_t),$$

where

M^d_t	=	long-run demand for money in period t,
M_t	=	average stock of money in period t,
Y_t	=	nominal income in period t,
$\Delta P_t/P_{t-1}$	=	inflation rate in period t,
RM_t	=	reserve money in period t,
$u_t\ v_t\ w_t$	=	disturbance terms

9 In developed countries, such a situation will lead to an expansion of financial securities and a rise in interest rates. The demand for money will thus tend to fall.

10 It has been argued that on the supply side, the informal interest rate could be determined by the risk premium, administrative costs, opportunity cost and the degree of monopoly power of the money lenders (Bottomley [1971]).

δ = adjustment coefficient

e indicates the anticipated value of the corresponding variable.

The demand for money function (eq. 1) includes the degree of credit restraint as an explanatory variable. This variable is intended to replace the interest rate in the demand for money function for economies where the observable interest rates cease to be the key linkage variables between holdings of alternative assets. An inverse relationship is expected between the credit restraint and desired demand for money.

The explanatory variable Y^e reflects the transactions motive for holding money. The variable $(\Delta P_t/P_{t-1})^e$ seeks to capture the opportunity cost of holding money. The justification is that asset choices of wealth owners in developing countries are often restricted to holding either money or real goods (land, houses, consumer durables etc.). Under these circumstances, the expected rate of inflation becomes a more appropriate proxy for the opportunity cost of holding money, than the expected nominal interest rate which would be more relevant when substitution between money and other financial assets is a realistic option.

The long-run demand for money as specified in eq. (1) is not observable from statistical data. What can be observed is the actual money balance in each period. Equation (2) admits the possibility that there exists a lag in the adjustment of the actual money balance to money demand and thus resolves the measurement problem. The expression reflects the disequilibrium in the money market due mainly to the lagged response of money supply to money demand and the existence of credit rationing. Substituting eq. (1) into the adjustment equation (2), we receive the short-run demand for money function which expresses the actual money balance as a function of the expected rate of inflation, the expected income, the degree of credit restraint and the lagged money balance. Thus

$$(4) \quad M_t = (\Delta P_t/P_{t-1})^e_t, Y^e_t, CR_t, M_{t-1}, v_t^1)$$

where v_t is the disturbance term.

Equation (3) is a money supply function depending mainly on reserve money. Reserve money is in turn affected by the magnitude of the government deficit to be financed through the central bank by variations in net foreign assets of the central bank and by central bank lending to the commercial banks. Equations (1) to (3) show that the degree of credit restraint is like M_t^D and M_t an endogenous variable in the simultaneous equation model, as the credit restraint variable is related to the amount of net domestic credit, and is thus interacting with the supply of money through the balance sheet constraint[11].

IV. Empirical Test

Proxy Variables for the Degree of Credit Restraint

The degree of credit restraint is not directly observable. Proxy variables for the degree of credit restraint are suggested by Wong (1977)[12]. Some of them are listed below:

(5) $CR1_t = -DC_t/Y_t,$

(6) $CR2_t = 1 - DC_t/Y_t,$

(7) $CR3_t = -\Delta DC_t/DC_t,$

(8) $CR4_t = \Delta Y_t/Y_{t-1} - \Delta DC_t/DC_{t-1},$

(9) $CR5_t = \Delta RM_t/RM_{t-1} - \Delta DCB_t/DCB_t,$

where: DC = net domestic credit of the banking system; DCB = net domestic credit of banks; RM = reserve money; Y = national income.

The negative ratio of domestic credit to income (CR1) expresses the degree of credit restraint in relative terms against economic activity. The use of the negative rate of domestic credit expansion (CR3) has the ad-

11 At all times, the sum of money supply and supply of quasi-money must be equal to the sum of net domestic credit and net foreign assets of the banking system.

12 For a discussion of these and other indicators for the credit restraint see also Jaffee (1971).

vantage that the picture of credit conditions is not distorted when variations of income are caused by some political, institutional or other non-economic factors in an economy. However, both measures may not be significantly related to the observed value of money which could be affected by the degree of openness, the performance of the external sector and the non-organized money markets in an economy. The expressions of CR2 and CR4 are refined versions of expression CR3 both of them express the degree of credit restraint relative to the growth of income. Expression CR2 is feasible if the demand for money function is expressed in logarithmic terms. Referring to expression CR4, presumably the degree of credit restraint is not changed when the difference between the growth rates of income and of net domestic credit in the banking system stays the same. Both proxies suffer the same shortcomings as expressions CR1 and CR3. Expression CR5 represents the difference between the rate of growth in reserve money and the rate of growth in net domestic credit of banks.

The Formation of Expectations

The price and the income variables enter the demand for money function with their expected values. For the formation of expectations, three main hypotheses are available: the adaptive, the partial rational, and the rational expectation hypothesis[13]. Since rational expectations are derivable only by using a macroeconomic model, and the partial rational expectation hypothesis in its general formulation[14] is only applicable if numerous observations are available, we will use an extended form of the adaptive expectation model. In most of the empirical investigations for the demand for money, the expected values are expressed by weighted averages of past observations, whereby the weights diminish exponentially and are transformed via a Koyck (1954) transformation. Against this method one must argue, that the a priori assumption, of a predetermined weighting structure is rather arbitrary. A procedure allowing for direct estimation

13 Overviews of the various expectations hupotheses are provided by Nunn, Elliott (1975), Fackler (1977) and Chan-Lee (1980).

14 The so-called ARIMA ('auto-regressive integrated moving average') models provide the most efficient predictions of inflations rates if no other than the past inflation rates are considered (Feige, Pearce [1976]).

of the weights of the distributed lags by the Lagrange polynomial interpolation method was developed by Almon (1965)[15]. Using the method in the empirical analysis, it was assumed that a second degree polynomial is sufficient to capture the weighting structure over four lags.

Estimation Techniques and Data

The statistical experiments are made in several stages. At the first stage, the proxy variables for the degree of credit restrained are tried along with the income variable in both linear and log-linear single-e quation Ordinary Least Squares (OLSQ) regressions for nominal and real money balances. The equations with the best fit for the data are then selected, and additional variables are introduced in the second stage. At the third stage, the final single-equation regressions are obtained and attempts are made to deal with the problems of autocorrelation, multicollinearity and simultaneity.

Annual data were obtained from the IMF, International Financial Statistics. The estimation period covers the year after independence (1958) until 1978, thus excluding the last four years when a more liberalized policy towards the financial sector could be observed. We use money (M1 and M2) and income (GDP) at 1975 constant prices and the consumer price index for the price variable. The unit of the variables, except for P dan CR's is millions of ringgits.

Regression Results

The results for the first experiment are reported in Table 1. The equations with CR2 as an explanatory variable are excluded from Table 1 as the only difference between these estimates and those of CR1 is in the constant term. Only the CR2 variable for the degree of credit restraint is feasible for log-linear regressions since the other variables become negative for some or all observations.

As shown in Table 1, the best proxy for the degree of credit restraint in the demand function for nominal and real money in the narrow definition (M1) is the negative of domestic credit to income ratio (CR3) for the linear form and CR2 for the log-linear form. In the demand function for

15 For the empirical application of this procedure in the context of the estimation of demand for money functions see Dickson, Starleaf (1972).

money in the broader definition (M2), the best proxies for the degree of credit restraint remain the same, although CR5 also has the right sign and is statistically significant. Nevertheless, we will use for the further experiments, CR3 for the linear and CR2 for the log-linear estimates of the demand for money fuction.

At the second stage of the statistical experiments, the co-efficients for expected income and the inflation rate were determined together with the parameters for the degree of credit restraint and the lagged money variable. Since the inclusion of both nominal income and the rate of inflation as independent variables in the demand for money function may cause the problem of collinearity in a linear multiple regression, the income variable and the money variable enter the money demand in real terms. For the estimation of the short-run demand for money function (eq. 4) we employ Ordinary Least Squares (OLSQ). For the identification of serially correlated residuals another estimation was carried out using the Generalized Least Squares (GLS) method[16]

The results — presented in Table 2 — appear to be quite reasonable[17]. Our proxy variables for the degree of the credit restraint have the right (negative) sign in all estimated equations and proved to be significant with the exception of equation III. In 5 of the 8 regression results the lagged stock of real money balance is a significant explanatory variable in the demand for money fuctions. At first glance, this seems to support one of the hypotheses concerning partial demand adjustment and lagged response of money supply to money demand or the existence of credit rationing. But one has to be careful in drawing such conclusions as the intercorrelations between the lagged real money balance and other explanatory variables are high in the equations.

16 Cochrane, Orcutt (1949).

17 F-statistics, the adjusted coefficient of determination (R^{2}) and the Durbin-Watson statistics must be interpreted with caution because of the inclusion of lagged dependent variables and the employed estimation techniques and therefore should be used only as crude criterion for the statistical quality of the estimation.

18 The underlying assumption is that the banking system is willing and efficient enough

Table 1: Regression Results for Demand for Money Functions with Various Proxies for the Degree of Credit Constraint, Malaysia (1958-78)[a]

Estimated equations	Constant	Y_t	$\ln Y_t$	$CR1_t$	$CR3_t$	$CR4_t$	$CR5_t$	$\ln CR2_t$	$\bar{R}^2$	F Statistic	Durbin Watson Test
$M1_t = a_o + a_1Y_t + a_2CR_t$	−145.645* (−1.559)	0.206*** (18.446)		10.766 (0.976)					0.99	1412.95	1.919
	−277.283*** (−3.651)	0.197*** (50.120)			−2.083** (−1.979)				0.99	1298.14	1.885
	−212.872*** (−2.975)	0.196*** (46.755)				61.482 (1.004)			0.99	1116.46	1.734
	−260.144*** (−3.220)	0.198*** (46.248)					−210.499* (−1.393)		0.99	1174.68	1.806
$\ln M1_t = b_o + b_2\ln Y_t + b_2\ln CR_t$	−0.335 (−0.264)		0.829** (5.487)					−1.006* (−1.360)	0.98	577.34	0.655
	Constant	**$(Y/P)_t$**	**$\ln(Y/P)_t$**	**$CR1_t$**	**$CR3_t$**	**$CR4_t$**	**$CR5_t$**	**$\ln CR2_t$**			
$(M/P)_t = c_o + c_1(Y/P)_t + c_2CR_t$	−207.114** (−1.863)	0.196*** (7.218)		*−0.687 (−0.048)					0.98	338.806	1.098
	−316.320*** (−3.216)	0.202*** (28.793)			−2.161** (−2.168)				0.98	434.774	1.539
	−235.560** (−2.367)	0.199*** (26.595)				67.688 (1.163)			0.98	366.393	1.405
	−303.046*** (−2.690)	0.202*** (25.742)					−222.191* (−1.501)		0.98	384.776*	1.479
									0.97	506.414	0.913
$\ln(M1/P)_t = \ln d_o + d_1\ln(Y/P)_t + d_2\ln CR_t$	1.777* (1.364)		0.590** (3.921)				−1.503***	0.97 (−3.005)	357.332	1.112	

	Constant	Y_t	$\ln Y_t$	$CR1_t$	$CR3_t$	$CR4_t$	$CR5_t$	$\ln CR2_t$	$\bar{R}^2$	F-Statistic	Durbin Watson Test
$M2_t = e_0 + e_1 Y_t + e_2 CR_t$	−1768.45***	0.547***		32.177					0.99	1244.06	2.008
	(−7.679)	(16.627)		(1.166)							
	−2107.80***	0.521***			−4.580*				0.99	1342.61	1.765
	(−10.681)	(50.910)			(−1.675)						
	−1971.00***	0.519***				160.770			0.99	1225.12	1.686
	(−10.918)	(48.976)				(1.040)					
	−2104.08***	0.525***					−584.263*		0.99	1514.58	1.788
	(−10.422)	(48.947)					(−1.547)				
$\ln M2_t = \ln f_0 + f_{1}\ln Y_t + f_2 \ln CR_t$	−1.483**		1.000***				−1.772***	0.99	2889.02	1.147	
	(−1.991)		(11.252)				(−4.076)				
	Constant	**$(Y/P)_t$**	**$\ln(Y/P)_t$**	**$CR1_t$**	**$CR3_t$**	**$CR4_t$**	**$CR5_t$**	**$\ln CR2_t$**			
$(M2/P)_t = g_0 + g_1(Y/P)_t + g_2 CR_t$	−2406.55***	0.546***		−11.382					0.98	444.217	0.881
	(−8.621)	(8.013)		(−0.317)							
	−2711.81***	0.578***			−5.388**			0.99	562.825	1.504	
	(−10.612)	(32.687)			(−2.140)						
	−2521.52***	0.573***				197.334*			0.98	490.896	1.384
	(−10.286)	(30.787)				(1.365)					
	−2756.44***	0.584***				−738.411**		0.99	556.749	1.564	
	(−10.232)	(31.069)					(−2.068)				
$\ln(M2/P)_t = \ln h_0 + h_1 \ln(Y/P)_t + h_2 \ln CR_t$	−1.512*		1.003***					−1.761***	0.99	1676.45	1.145
	(−1.709)		(9.810)					(−5.182)	0.99	1676.45	1.145

[a] t-statistics in parantheses: ***denotes significance at the 1 percent level, ** denotes significance at the 5 percent level, * denotes significance at the 10 percent level.

Source: IMF, International Financial Statistic, Washington, various issues; own calculations.

Table 2: Regression Results for the Short-Run Demand for Money Function[a], Malaysia (1958-78)

Estimated equations:

I $(M1/P)_t = a_0 + a_1 (\Delta P/P)^e_t + a_2 (Y/P)^e_t + a_3 CR3_t + a_4 (M1/P)_{t-1})$

II $\ln(M1/P)_t = \ln b_0 + b_1 (\Delta P/P)^e_t + b_2 \ln (Y/P)^e_t + b_3 \ln CR2_t + b_4 \ln(M1/P)_{t-1}$

III $(M2/P)_t = c_0 + c_1 (\Delta P/P)^e_t + c_2 (Y/P)^e_t + c_3 CR3_t + c_4 (M1/P)_{t-1})$

IV $\ln(M2/P)_t = \ln d_0 + d_1 (\Delta P/P)^e_t + d_2 \ln(Y/P)^e_t + d_3 \ln CR2_t + d_4 \ln(M1/P)_{t-1}$

Equation number	Estimation method[b]	a_0	a_1	a_2	a_3	a_4	Rho	$\bar{R}^2$	F-Statistic	Durbin-Watson-Test
	OLSQ	−111.670	−0.005	0.883***	−1.832*	0.164		0.98	194.532	2.005
		(−1.066)	(−0.0521)	(4.321)	(−1.524)	(0.656)				
I	GLS	−219.045*	−0.011	0.869***	−7.400**	0.189	−0.147	0.98	208.931	1.818
		(−2.034)	(−0.132)	(4.682)	(−2.246)	(0.815)	(−0.646)			
		b_0	b_1	b_2	b_3	b_4				
	OLSQ	2.030**	0.016	0.490***	−1.146**	0.196		0.98	227.304	1.519
		(1.901)	(0.188)	(3.520)	(−2.293)	(0.964)				
II	GLS	2.211***	−0.011	0.988***	−1.763**	−0.326**	0.168**	0.99	424.379	1.939
		(3.472)	(−0.184)	(7.999)	(−5.905)	(−2.389)	(4.051)			
		c_0	c_1	c_2	c_3	c_4				
	OLSQ	−145.825	−0.021	0.451**	−2.000	0.658***		0.99	355.453	2.034
		(−0.809)	(−0.347)	(2.059)	(−0.743)	(2.684)				
III	GLS	−302.138*	−0.021	0.462***	−10.084	0.648***	−0.135	0.99	334.884	1.855
		(−1.410)	(−0.354)	(2.127)	(−1.229)	(2.651)	(−0.594)			
		d_0	d_1	d_2	d_3	d_4				
	OLSQ	1.833***	−0.031	0.522***	−1.345***	0.255*		0.99	890.702	1.501
		(2.628)	(−0.769)	(4.018)	(−2.909)	(1.345)				
IV	GLS	1.899***	−0.032	1.102***	−1.728***	−0.355***	0.707***	0.99	1778.56	1.717
		(4.656)	(−1.082)	(9.271)	(−6.867)	(−2.685)	(4.362)			

[a] t-statistics in parantheses: *** denotes significance at the 1 per cent level, ** denotes significance at the 5 per cent level, * denotes significance at the 10 per cent level. – [b] OLSQ = Ordinary Least Squares; GLS = Generalized Least Squares indicates OLSQ estimates corrected for autocorrelation;

Source: IMF, International Financial Statistics, Washington, various issues; own calculations.

Table 3: Regression for the Short-Run Demand for Money Function[a], Malaysia (1958-78)

Estimated equations:

$$\text{I} \quad (M1/P)_t = a_o + a_1 (\Delta P/P)^e_t + a_2 (Y/P)^e_t + a_3\, CR3$$

$$\text{II} \quad \ln(M1/P)_t = \ln b_o + b_1 (\Delta P/P)^e_t + b_2 \ln (Y/P)^e_t + b_3 \ln CR2$$

$$\text{III} \quad (M2/P)_t = c_o + c_1 (\Delta P/P)^e_t + c_2 (Y/P)^e_t + c_3\, CR3$$

$$\text{IV} \quad \ln(M2/P)_t = \ln d_o + d_1 (\Delta P/P)^e_t + d_2 \ln (Y/P)^e_t + d_3 \ln CR2$$

Equation number	Estimation method[b]	a_o	a_1	a_2	a_3	Rho	$\bar{R}^2$	F-Statistic	Durbin-Watson-Test
	OLSQ	−115.980	0.020	1.008***	−2.189**		0.98	268.796	1.841
		(−1.098)	(0.252)	(14.529)	(−2.081)				
I	GLS	−228.188**	0.021	1.011***	-8.033**	(−0.135)	0.98	284.805	1.656
				(15.693)	(−2.477)	(−0.595)			
	TSLS	-260.953*	-0.028	1.080***	-5.848**				
		(-1.517)	(-0.254)	(10.333)	(-2.027)		—	—	1.841
		b_o	b_1	b_2	b_3				
	OLSQ	2.565***	0.061	0.563***	-1.405***		0.98	304.089	1.152
		(2.815)	(0.828)	(4.819)	(−3.326)				
II	GLS	1.901***	−0.049	0.759***	−1.331**	0.573***	0.99	434.744	2.556
		(2.882)	(−0.749)	(7.392)	(−4.601)	(3.050)	—	—	
	TSLS	4.373**	0.008	0.353*	−2.287**				1.490
		(7.373)	(0.087)	(1.597)	(−2.581)				
			c_1	c_2	c_3				
	OLSQ	−237.050	.001	(1.021)***	−5.783**		0.99	359.821	1.263
		(−1.137)	(−0.007)	(16.354)	(−2.141)				
III	GLS	−145.912	−0.087*	1.102***	−2.160	0.193***	0.99	438.602	2.320
		(−0.426)	(−1.357)	(15.311)	(−0.524)	(2.809)			
	TSLS	−531.517*	−0.044	1.083***	−14.283**		—	—	1.656
		(−1.623)	(−0.462)	(12.145)	(−2.191)				
		d_o	d_1	d_2	d_3				
	OLSQ	2.417***	−0.014	0.675***	−1.743***		0.99	1124.440	0.966
		(4.256)	(−0.349)	(9.892)	(−4.711)				
IV	GLS	1.647***	−0.045	0.808***	−1.545***	0.625***	0.99	1698.740	1.905
		(3.811)	(−1.308)	(12.759)	(−5.435)	(3.487)			
	TSLS	3.419***	−0.041	0.562***	−2.427***		—	—	1.572
		(3.545)	(−0.856)	(5.047)	(−3.758)				

[a] t-statistics in parantheses: *** denotes significance at the 1 per cent level, ** denotes significance at the 5 per cent level, * denotes significance at the 10 per cent level. — [b] OLSQ = Ordinary Least Squares; GLS = Generalized Least Squares indicates OLSQ estimates corrected for autocorrelation; TSLS = Two-Stage Least Squares.

Source: IMF, International Financial Statistics, Washington, various issues; own calculations.

In the final step we therefore excluded the lagged real money balances from the regression equations[18]. Additionally to the OLSQ and GLS estimates the two-stage least squares (TSLS) method is applied in order to avoid the possible inconsistency in the parameter estimates stemming from simultaneity. As shown in Table 3 the coefficients to the degree of credit restraint variables have the expected (negative) sign and become highly significant in all of the estimated equations.

The estimated parameters for the (real) income variable have the expected (positive) signs and explain — according to the highly significant values of the t-statistic — a high percentage of the changes of the dependent variable.

The regression results for the influence of price variable on the demand for money in the narrow definition (M1) show that all parameters are statistically insignificant and have the expected (negative) sign in only two cases. The estimated coefficients for money in the broad definition (M2) all have the expected signs but are statistically significant in only one case[19]. The poor performance of price variable reflects the situation of relatively low and stable inflation rates (except in 1973 and 1974) in Malaysia during the estimation period.

IV. Conclusions

The results of the empirical analysis of demand for money functions for Malaysia support the hypothesis, that under conditions of financial repression, the degree of credit restraint is an important and hitherto rather neglected determinant of the demand for money[20]. With the recently enforced policy towards financial deepening and liberalization of financial markets, interest rates may become more important as determinants of the demand for money function in Malaysia. However, for countries where the interest rate is not determined freely in the money market but institutionally pegged below its equilibrium level, the degree of credit restraint

to adjust money supply to money demand within the same period.

19 The poor performance of the inflation rate as an explanatory variable for the demand for money has also been found in other empirical investigations. Galbis (1979b), f.e., found only for 4 of 9 Latin American countries a statistically negative co-efficient for the price variable.

20 Further empirical evidence for other Asian and Latin American countries is provided by Fischer (1983).

should be used instead of the interest rate in explaining together with the income and the price variable the movements of the money stock. Since the volume of credit and income frequently are used as targets in financial programs of developing countries, the inclusion of variables to capture credit restraint in the demand for money functions will not only facilitate the prediction of the demand for money but also help to formulate a more consistent financial program.

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5

MONETARY POLICY AND THE BALANCE OF PAYMENTS IN THE MALAYSIAN ECONOMY*

MUTHI SEMUDRAM

I. Introduction

The conventional view assumes (Mundell 1968) that high growth rates lead to a balance of payments deficit. This view holds that with the growth in the economy, the imports must grow pari passu. This growth in the economy and imports may lead to a deficit if exports do not grow at the same rate. The growth of exports depends on the domestic economy as well as on the external demand. If capital flows are not forthcoming to supplement any fall in export receipts, then there is a possibility that the rate of growth leads to a balance of payments deficit. Another version of this view is found in the literature on 'dual gap' (Chenery and Strout, 1966).

The monetarists' (Johnson, 1972) view of the balance of payments is that a balance of payments disequilibrium is essentially a monetary phenomenon. This is a long run dynamic theory which assumes that there is a link between domestic money supply and the balance of payments flows. That is to say, balance of payments surplus has an expansionary impact upon the domestic money supply and vice versa. In other words, the demand for and supply of money play a fundamental role in the determination of balance of payments. If a country is small (e.g. Malaysia) and there is perfect capital mobility and goods arbitrage (a law of one price) domestic prices and interest rates are determined exogenously. In this situation any excess demand for money balances must be satisfied either from domestic sources or from abroad. Since prices and

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interest rates cannot change, and if the domestic component of money stock is constant, this excess demand will result in an increase in the international reserves. This increase in international reserves may come about through an improvement in trade balance or capital balance or both.

The short run theory of balance of payments is essentially a Keynesian theory. This theory assumes that the influence of the balance of payments on domestic money supply is 'sterilised' severing the link between money supply and the balance of payments. The conventional view disregards monetary factors in their analysis of growth in income and its relation to the balance of payments.

Section II of this paper discusses money supply and balance of payments in the Malaysian economy. Section III discusses briefly the monetary approach to balance of payments and derives some testable hypotheses which have been developed for developed countries and the LDCs (Aghevli and Khan, 1977). Section IV discusses the results. While section V provides the conclusions.

II. Money Supply and the Balance of Payments in the Malaysian Economy

Malaysia had a fixed exchange rate system up to June 1973 when the Malaysian dollar was floated due to renewed pressures from the weakened U.S. dollar. Even if the Malaysian dollar was allowed to float, it was kept to a minimum by the intervention of the Central Bank. Therefore, to study the relationship between money supply and balance of payments during 1959 to 1977, we assumed that the exchange rate is fixed.

It is apparent from the data in Table 1 that there exists a close relationship between the money supply and the balance of payments (represented by the change in the net external reserves of the banking system). The influence of the external sector shows up clearly in 1969, 1972, 1974 and 1976. The money supply increased sharply as a result of surplus in the balance of payments. Contractions in the money supply in 1963, 1967 and 1977 were also influenced by the balance of payments situation.

TABLE 1
DETERMINANTS OF CHANGES IN MONEY SUPPLY

Year	Net External Reserves	Net Public Sector Lending	Net Private Sector Lending	Miscel-laneous*	Total Change in Money Supply
1960	71	−105	39	64	+59
1961	−97	−65	121	14	+27
1962	68	−105	155	−175	+57
1963	−15	−45	206	−234	+88
1964	62	−112	259	−284	+75
1965	211	−104	179	−383	+97
1966	33	11	186	+8	+138
1967	−232	85	106	+168	−127
1968	63	207	122	−220	+172
1969	435	29	−1	−278	+185
1970	84	30	147	−110	+151
1971	135	150	18	−216	+87
1972	403	437	−41	−203	+596
1973	318	566	749	−614	+1019
1974	400	959	504	−1661	+320
1975	272	1313	424	−1715	+294
1976	2258	822	−4	−2168	+908
1977	298	1213	237	−878	+807

Source: Quarterly Economic Bulletin, Bank Negara Malaysia. Vol. 11, No. 4, December 1978.

*Other domestic influences not captured by 'Public Sector' and 'Private Sector'.

III. Monetary Approach to Balance of Payments as Applied to LDCs

In a closed economy the emphasis of monetary approach to balance of payments is placed on the effect of changes in the money supply on output. The money supply or monetary base is regarded as a monetary policy instrument and monetary approach focusses on the effects of changes in this instrument on output, domestic prices and interest rates.

In an open economy under fixed exchange rates, the supply of money can no longer be regarded as exogenous because changes in money supply can be brought about by balance of payments surplus or deficit (if not sterilisation). Thus it is the relationship between the domestic component of the money stock (or the monetary base) prices, output, interest rates and the balance of payments that the monetary approach is concerned with. In a small country with a fixed exchange rate and perfect international mobility of goods and financial assets, the monetary approach to balance of payments implies that domestic prices and interest rates will equal their respective world values and will be determined exogenously. It is also assumed that output is determined exogenously. In these circumstances any disequilibrium in the money market is reflected in the balance of payments.

In the developing countries the conditions of perfect capital mobility and free trade may not be satisfied. There may be various lags and adjustment and domestic prices and interest rates may have to be much higher than world rates before complete adjustment takes place. The role of interest rate in terms of capital mobility is questionable in the economic framework of the LDCs. Many LDCs depend on foreign borrowing (long and short term) and very little private capital flows in on the basis of interest rate differential between domestic and foreign interest rates.

Testing the monetary approach to balance of payments involves the money market and therefore the specification of demand for money and supply of money is necessary. A simple monetarist model can be represented as follows (Argy, 1978):

1. $MO = m(R + D)$
2. $MO/p = \alpha_1 Y - \alpha_2 rd - \alpha_3 \Pi$
3. $rd = r f$
4. $P = P f . E$

where D = net domestic assets of the Central Bank

E = exchange rate (Malaysian dollars per US$)

MO	=	volume of money (currency in circulation + demand deposits + time depostis and savings deposits at commercial banks)
m	=	money multiplier
P	=	domestic price level (consumer price index, 1970 = 100)
Pf	=	foreign price level
R	=	international reserves or net foreign assets of the Central Bank
rd	=	domestic interest rate (Treasury bill rate — 3-monthly)
rf	=	foreign interest rate
Y	=	domestic real output
Π	=	rate of inflation, defined as ${}^{dP}/_{dt}\cdot\frac{1}{P}$

Equation 1 defines the supply of money as depending on the product of the money multiplier and the monetary base. The monetary base consists of international reserves and domestic assets of the Central Bank. Equation 2 is the demand for real money balances. The arguments in this function are real output, interest rate and the rate of inflation. There are a very few financial assets available in the LDCs and as such interest rate could be the proxy for substitution between money and very limited financial assets. There are also real assets such as goods and services, houses and jewellery which can be substituted for money. Therefore the rate of inflation can be a proxy for the implicit return on goods and other real assets. Equation 3 represents the assumption of perfect financial market integration and can be deleted from the model in the case of some LDCs. Equation 4 represents the assumption of perfect goods arbitrage (law of one price).

Converting Equation 1 to 4 into rates of growth we obtain: —

$$\frac{\dot{MO}}{MO} = \frac{\dot{m}}{m} + \frac{R}{(R + D)}\cdot\frac{\dot{R}}{R} + \frac{D}{(R + D)}\cdot\frac{\dot{D}}{D} \tag{5}$$

$$\frac{\dot{MO}}{MO} - \frac{\dot{P}}{P} = \alpha_1 \dot{Y}/Y - \alpha_2 \frac{\dot{rd}}{rd} - \alpha_3 \dot{\Pi}/\Pi \tag{6}$$

$$\frac{\dot{rd}}{rd} = \dot{rf}/_{rf} \tag{7}$$

$$\dot{P}/_{P} = \dot{PfE}/_{PfE} \tag{8}$$

The dot over a variable denotes a time derivative, $\frac{d}{dt}$.

Equation (5) can be rewritten in terms of rate of growth in international reserves as follows: —

$$\frac{\dot{R}}{R} = \frac{(R + D)}{R}\left[\frac{\dot{MO}}{MO} - \frac{\dot{m}}{m}\right] - \frac{D}{R}\cdot\frac{\dot{D}}{D} \tag{9}$$

Assuming that $MO^d = MO$, and substituting (6) and (8) into (9) we have

$$\frac{\dot{R}}{R} = \frac{(R + D)}{R}\left[\frac{\dot{PfE}}{PfE} + \alpha_1\frac{\dot{Y}}{Y} - \alpha_2\frac{\dot{rd}}{rd} - \alpha_3\frac{\dot{\Pi}}{\Pi} - \frac{\dot{m}}{m}\right] - \frac{D}{R}\cdot\frac{\dot{D}}{D} \tag{10}$$

or

$$\frac{\dot{R}}{(R + D)} = \frac{\dot{PfE}}{PfE} + \alpha_1\frac{\dot{Y}}{Y} - \alpha_2\frac{\dot{rd}}{rd} + \alpha_3\frac{\dot{\Pi}}{\Pi} - \frac{\dot{m}}{m} - \frac{\dot{D}}{(R + D)} \tag{11}$$

Equation (11) states that with real output, interest rate and prices given as exogenous, any increase in domestic assets will leak out in the form of overall balance of payments deficit.

IV. Results

This section discusses the estimates of equation (6) and (11). These equations and others that are discussed below are estimated for the Malaysian economy using the annual data from 1959 to 1976.[2]

The first test we employed was to determine whether the demand for money is homogenous of degree one in prices so that the demand for money function can be estimated either in nominal or real terms. The results of the estimation of equation (6) are as follows: —

$$\frac{\dot{MO}}{MO} = .0754 + .9113\frac{\dot{Y}}{Y} + .2571\frac{\dot{P}}{P} + .0194\frac{\dot{\Pi}}{\Pi} - .2453\frac{\dot{rd}}{rd} \tag{12}$$
$$(1.8975) \quad (2.2148) \quad (1.4194) \quad (1.5162) \quad (2.8131)$$

$$\bar{R}^2 = .614 \quad DW = 1.5372, \quad SEE = .056$$

$$\left(\frac{\dot{MO}}{MO} - \frac{\dot{P}}{P}\right) = .0100 + 1.0716\frac{\dot{Y}}{Y} - .0109\frac{\dot{\Pi}}{\Pi} - .3562\frac{\dot{rd}}{rd} \tag{13}$$
$$(.1817) \quad (1.6278) \quad (.6865) \quad (2.8218)$$

$$\bar{R}^2 = .491 \quad DW = 2.467, \quad SEE = .085$$

$$\frac{\dot{MO}}{MO} = .0486 + .9616\frac{\dot{Y}}{Y} + .4159\frac{\dot{P}}{P} - .2404\frac{\dot{rd}}{rd} \tag{14}$$
$$(1.2987) \quad (2.2271) \quad (2.6719) \quad (2.6201)$$

$$\bar{R}^2 = .533, \quad DW = 1.5734, \quad SEE = .059$$

The values in parentheses are t values, $\bar{R}^2$ is the corrected coefficient of determination and SEE is the estimated standard error of regression.

It can be seen from the results that income and interest rates are highly significant variables in the demand for money equation. The coefficient of inflation indicates that the assumption of homogeneity in prices is rejected. The rate of growth of inflation has become insignificant (equation 12 and 13) with wrong sign in Equation 12. This insignificant can be explained by the fact that inflation has become a problem only in the 70's. Prices have been very stable until 1972. The problem of multicollinearity between inflation and rate of growth of inflation may have reduced its significance. Removing the rate of growth of inflation variable gave improved results for the other variables in the demand for money function (equation 14).

Using the varying parameter technique (Cooley and Prescott 1973), it was found that money demand function in Malaysia has been stable (Semudram 1980) during this period.

Two versions of equation 11 are estimated and the results are as follows: —

$$\frac{\Delta NFA}{MB} = .0778 + .4482\frac{\dot{Y}}{Y} + .2632\frac{\dot{P}}{P} - 1.1480\frac{\Delta NDA}{MB} - 1.2952\frac{m}{m} - .1326\frac{rd}{rd}$$

$$(2.5909)\,(1.3657) \qquad (2.3524)\,(11.3295) \qquad (6.0615)\,(1.8471)$$

$$\bar{R}^2 = .9586, \; DW = 2.0472, \; SEE = .041 \qquad (15)$$

$$\frac{\Delta NFA}{MB} = .0359 + .5142\frac{\dot{Y}}{Y} + .8980\frac{\dot{WP}^{(a)}}{WP} - 1.0716\frac{\Delta NDA}{MB} - 1.3445\frac{\dot{m}}{m} - .1480\frac{\dot{rd}}{rd}$$

$$(1.2539)\,(1.9305)\;(3.7217) \qquad (12.4032) \qquad (7.9967) \quad (2.5793)$$

$$\bar{R}^2 = .9730, \; DW = 1.8378, \; SEE = .033 \qquad (16)$$

The difference between equation 15 and 16 is that equation 15 has domestic prices and domestic interest rates while equation 16 has world prices and domestic interest rates. In both equations money multiplier is derived from broad definition of money.

All the coefficients in equation 15 and 16 have the right signs and apart from the coefficient of real income (equation 15) all are significantly different from zero at 5 per cent level. Inclusion of world price level has not altered the results considerably other than the coefficient of the world price level. The coefficients of both domestic and world price level **are different** and therefore these results do not appear to support that the monetarist conclusion that given goods arbitrage, the domestic prices will rise by the same amount of the increase in foreign prices (devaluation) thus resulting in an increase in reserves.

As expected the coefficients of the net domestic assets and the money multiplier are not significantly different from unity implying that the increase in net domestic assets (given interest rates and prices) will leak out in the balance of payments. This is in contrast to the results obtained

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a. Description and method of calculation of world price level is given in the Appendix.

for other developing countries (Aghevli, Khan, 1978).

Even constraining the coefficients of net domestic assets and money multiplier to be equal, we obtained similar results:

$$\frac{\Delta NFA}{MB} = .0699 + .3818\frac{\dot{WP}}{WP} + .2920\frac{\dot{Y}}{Y} - 1.1272\left[\frac{NDA}{MB} + \frac{\dot{m}}{m}\right] - .0834\frac{\dot{rd}}{rd}$$

$$(3.6423) \qquad (1.4033) \quad (2.0299) \quad (10.824) \qquad\qquad (1.3689)$$

$$R^2 = .928 \quad SEE = .0410$$

Although the model appears to support the monetarists' view of the balance of payments theory, there are some severe limitations in the approach adopted. First of all the assumption of goods arbitrage has to be questioned particularly in terms of LDCs. The law of one price assumes that all goods are traded goods which are perfect substitutes for foreign goods. This is very likely in LDCs in terms of exports of the primary commodities. But there are other traded goods such as clothing, footwear and tobacco, prices of which may not equal world prices due to very low domestic labour unit costs. Hence domestic prices should perform equally if not better than world prices. The results indicate otherwise.

Secondly, the assumption of the presence of perfect integration in financial markets between LDCs and the rest of the world is questionable. In the LDCs the conditions for perfect capital mobility and free trade would generally not be satisfied.

Apart from econometric problems associated in estimating an equation of this form (Magee 1976) there is the problem of disregarding the possibility of sterilisation which biases the coefficient on domestic assets upward, and the possibility of reverse causation from changes in reserves to some of the independent variables (Argy 1978). There is also the possibility of the omission of other variables such as exchange rate adjustments which will lower the expected coefficient on domestic assets.

V. Conclusions

The results of monetary approach to the balance of payments indicate that an increase in the domestic component of the base money will all leak out in the balance of payments. Another interesting result was the positive relationship between economic growth and the balance of payments. This result appears to contradict the view that LDCs depend largely on the availability of foreign exchange to achieve their growth objectives. This would be true if the initial increase in economic growth is achieved without the availability of foreign reserves. This appears unlikely when you look at the historical development of many LDCs.

Although the results support the monetarists' view of the balance of payments, there are some shortcomings in the analysis and empirical results particularly relating to LDCs.

Appendix
Data Definitions and Sources

All data are annual observations for the period of 1959 to 1976 and are taken from the following sources:

1. R.W. Hayes, 'Towards a Macromodel of the Malaysian Economy', Research Department, *Reserve Bank of Australia*, 1979.
2. International Monetary Fund, *International Financial Statistics*, Various issues.
3. Quarterly Economic Bulletin, *Bank Negara Malaysia*, Several Issues.

All data are expressed in domestic currency units ($ Malaysian).

WP World price level — Trade weighted index of consumer prices in major import-origin countries (1970 = 1.00). Indices of consumer prices in major import-origin countries are taken from various issues of *International Financial Statistics* and proportionately weighted according to Malaysian import composition.

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Part Three
PUBLIC FINANCE AND EXTERNAL TRADE

6

SOURCES PERFORMANCE AND INCIDENCE OF TAXATION IN MALAYSIA

ISMAIL MUHD. SALLEH

The experience of Malaysia during the last twenty-one years has been one of growth in the public sector. This growth is evident not only in an absolute sense which is expected in an enviroment of growing population, output and complexity in economic activity, but, also on a relative basis. In other words, the resource allocation division between the public and the private sectors has moved towards a higher proportion of total resources being channelled and allocated through government.

The objectives of this paper are first, to examine the sources and performance of Malaysia's tax system during the last twenty-one years, 1960-1980. Secondly, the paper presents the estimates of the distribution of the tax burdens borne by households at the different income levels for the period 1968, 1970 and 1973. This comparison would indicate the re-distributive effects of taxation in Peninsular Malaysia over time. Finally, the paper discusses how the pattern of the distribution of the tax burdens for 1973 has been altered by shifts in the relative importance of various taxes since 1973.

I. Sources and Performance of Malaysia's Tax System, 1960-80

During the twenty-one year period, 1960-80, the federal government tax collection increased from approximately 13% to more than 25% of Gross National Product.[1] (See Table I). According to one study, using a sample of forty-seven countries for the period 1972-76, Malaysia ranked fifth in terms of the ratio of tax to GNP[2] This high ratio was the result of

1. Federal government revenue accounting for more than 85% of the public sector consolidated budget in 1980.
2. See International Monetary Funds Staff Paper, March 1979.

Table 1
MALAYSIA: Percentage Ratio of Taxes to GNP 1960-1980

Year	Total Revenue	Total Tax	Direct Taxes	Indirect Taxes			
				Total[b]	Excise Taxes	Export Taxes	Import Taxes
1960[a]	16.08	13.28	2.87	10.41	0.12	3.91	5.43
1961[a]	16.18	13.08	3.53	9.55	0.12	2.87	5.48
1962[a]	15.56	12.49	3.45	9.04	0.13	2.51	5.29
1963	15.31	12.17	3.19	8.98	0.49	2.42	5.16
1964	18.34	13.18	3.22	9.97	1.12	2.52	5.76
1965	17.98	13.75	3.73	10.02	1.16	2.74	5.68
1966	17.65	14.20	4.13	10.07	1.42	2.36	5.45
1967	18.72	14.94	4.69	10.25	1.53	1.98	6.28
1968	18.33	14.33	4.72	10.16	1.60	1.91	6.44
1969	18.99	18.70	4.89	10.81	1.65	2.53	6.42
1970	19.74	16.45	5.77	10.69	2.05	2.21	4.58
1971	19.20	16.53	5.66	10.86	2.44	1.83	4.62
1972	21.10	17.30	5.79	11.51	2.64	1.68	4.26
1973	18.93	16.95	5.51	12.00	2.27	2.43	4.15
1974	21.90	19.90	6.33	13.39	2.02	2.31	4.08
1975	23.68	21.18	9.35	11.83	2.08	2.89	3.71
1976	22.78	20.31	8.02	12.30	2.03	3.74	3.62
1977	24.97	22.75	9.48	13.27	2.24	4.47	3.67
1978	25.30	22.91	9.51	13.40	2.41	4.19	3.79
1979	24.54	22.21	9.08	13.13	2.24	4.53	3.53
1980	28.22	25.93	11.48	14.45	1.97	5.20	4.18

Sources: Treasury Economic Reports.

a: Refers to Peninsular Malaysia only.

b: Totals do not add because indirect taxes other than excise, export and import taxes are included in this column.

high level of domestic income and the importance of export to GNP, two factors contributing to the lending capacity to any country.

As indicated in Table 1, throughout the period considered, the share of direct taxes to GNP, in general, increased in relative importance. On the other hand, indirect taxes were subject to substantial annual fluctuation, and the fluctuation was extremely violent in the case of the share of export taxes to GNP. The pattern of growth of the share of the tax revenue to GNP in Malaysia is closely related to the openness of the economy. However, in recent years, there has been a reduction in the overdependence of Malaysia's economy on external sector. Corresponddingly, relative importance of indirect taxes in the total tax structure continued to decline and the relative importance of direct taxes continued to increase. Thus a rough pattern in the tax structure emerges whereby there was a continuous shift from a heavy reliance on indirect taxation at the onset of development to the rapid growth, during much of the development, of direct taxation which became predominant by mid 1970s. Several factors helped to explain this changing pattern:

(a) The reduction in the overdependence on two primary commodities, rubber and tin resulting from the government diversification policy led to the decline in the relative importance of export earnings from these commodities and correspondingly their contribution to the tax revenue.

(b) Government's emphasis on import substitution policy in the sixties similarly led to the relative decline in the importance of revenue from import duties, while increasing the importance of excise taxes to the total tax revenue.

(c) The rapid growth in the revenue from direct taxes in the middle seventies due to the improvement in the administrative tax machinery, expansion of the tax base, upward adjustments in the rates structure of the individual and the company income taxes and the discovery of the new tax sources.

Having examined the growth of tax revenue since 1960, it is important to consider the relative importance and compositional pattern of the different types of tax revenues in Malaysia'a tax structure during the 1960-80 period. The relative contribution of the different types of taxes to the total tax revenue for selected years are given in Table 2.

Direct Taxes

In early sixties, the contribution of direct taxes to the total tax revenue was quite small. However, its relative importance increased steadily over the twenty-one year period. In 1960, its share to the total tax revenue was about 22% and increased to about 46% in 1980. The major component of the direct taxes is the income tax which comprises the individual, company and the more recently the petroleum income taxes. For the period 1960-80, the share of income tax to the total tax revenue increased

Table 2
Tax as a Percent of Federal Tax Revenue

Years	Total All Taxes	Direct Taxes						Indirect Taxes									
			Income Tax						Export Duties								
		Total Direct Taxes	Total Income Tax	Companies	Individuals	Petroleum	Petroleum Royalties/ Cash Payments	Total Indirect Taxes	Total Export Duties	Rubber	Tin	Palm Oil	Import Duties and Surtax	Excise	Sales tax	Road tax	Gambling tax
1960	100%	21.6	21.1	15.8	5.3	—	—	78.4	29.4	22.2	6.2	—	40.0	0.9	—	6.2	0.2
1965	100%	27.1	25.0	17.5	7.5	—	—	72.8	19.9	8.4	9.7	—	40.5	0.8	—	7.3	0.5
1970	100%	35.0	32.9	24.5	8.4	—	—	65.0	14.3	4.0	6.5	0.9	27.9	12.5	—	8.5	2.0
1975	100%	44.2	42.1	25.5	9.6	7.0	1.7	55.8	13.7	2.6	4.3	6.2	17.5	9.3	5.9	5.3	2.1
1979	100%	40.9	38.6	18.1	11.9	8.7	1.7	59.1	20.4	11.8	5.7	2.5	15.9	10.1	5.7	3.6	1.9
1980	100%	45.8	43.0	19.1	10.5	13.4	2.5	54.2	20.3	8.7	3.9	1.9	14.1	8.3	5.4	3.2	1.6

Source: Ministry of Finance Malaysia — Economic Report Various Years.

from 21% to 43%. However, this increase was not without interruptions. The variability in the income tax revenue to a large extent due to the fluctuation in the company income tax. Since the company income tax largely originated from rubber and tin industries, whose profitability is subject to external conditions, revenue collected from this tax fluctuated from year to year particularly in the sixties and the early seventies.

On the other hand, revenue from individual income tax experienced less fluctuation. One interesting feature of Malaysia's tax structure is that the share of the individual income tax to the total tax revenue showed a decreasing trend begining in mid-seventies due primarily to the significant increase in the contribution of the pertroleum income tax which in 1980 exceeded the collection from the individual income tax.

Fluctuation in the trends of the share of the company income tax to the total tax revenue has been moderate somewhat in recent years with an increase in the establishment of locally-owned companies and the subsequent decline in the number of foreign-owned companies. The locally-owned companies are largely manufacturing and processing industries and are less affected by this fluctuation compared to the foreign-owned companies which are closely related to rubber and tin industries which are normally affected by cyclical pattern in external demand.

Besides income tax, direct taxes also include estates duty, petroleum royalty etc. However, their contribution to the total tax revenue is relatively insignificant.

Indirect Taxes

In the early sixties, indirect taxes provided more than three-quarter of the federal tax revenue in Malaysia. However, by 1980, its share in the total tax revenue declined to 54%. Indirect taxes consist of a number of major taxes in varying importance. These include export taxes accounting for about 20% of the total tax revenue in 1980, import duties and surcharges 14%, excises 8% and salestax 5%.

Export Taxes. Since Malaysia is an export oriented economy, export taxation has long been a significant source of revenue. In 1960, it contributed nearly 30 per cent to total tax revenue. However, over the years its relative importance has declined and by 1980 it accounted for only about 20 per cent of tax revenue. Since export are subject to sharp fluctuations, so are revenues from export taxes. The significant decline in export tax revenue in the 1960s was due mainly to a fall in the relative and absolute contribution of the rubber export taxes. Though export revenue from tin increased somewhat, it was not sufficient to offset the fall in revenue from rubber.

A feature of Malaysian export tax revenue has been its heavy dependence on rubber and tin. Any change affecting the demand for these products caused large changes in export tax revenue. However, this has been mitigated somewhat during the 1970s with the increasing diversifications of Malaysian exports. From 1968 timber and palm oil began to be important in Malaysian exports, and these commodities have proved less subject to fluctuations in external demand.

Apart from their value as a source of revenue, the Government has also used export taxes to regulate the production of export commodities. Thus high rates were imposed on exports of unprocessed timber and palm oil, and lower rates for the processed goods, thus providing incentive for the products to be processed locally.

Import taxes. Import taxes are not of the principal sources of revenue in the Malaysian tax structure. During the 1960s and 1970s, revenue from import taxes increased every year except for 1975. A significant feature of the import tax has been that, despite the steady increase in its absolute value, its relative importance as a share of total tax revenue declined considerably over this period. In the early 1960s, it contributed slightly over 40 per cent of total tax revenue, but this declined to about 14 per cent by 1980. A major portion of the revenue from import taxes came from three categories of products: petroleum, alcohol and tobacco. The relative importance of petroleum and tobacco as sources of import tax revenue has been declining since 1960. This is partly due to import substitution. Production of these products has been encouraged by the combination of protective tariffs and investment allowances. However, since excise taxes have been imposed on locally produced petroleum and tobacco, this has helped to offset the revenue lost through the reduction in import taxes.

During the late 1970s there has been a steady increase in the relative importance of import taxes on commodities other than alcoholic beverages, petroleum and tobacco. Three categories of such commodities are significant: processed foods, consumer durables, and luxury goods. Both extension of coverage and expansion of demand have increased the relative importance of these commodities as sources of import tax revenue.

Excise Taxes

As a source of revenue, excise taxes were insignificant in the early stage of Malaysia's economic development. In the early sixties, revenue derived from excises was less than 1% of the total tax revenue. However, since 1963 there has been a steady increase in its relative share of the total tax revenue accounting for about 11% in 1980. This increase was mainly attributable to a continuous expansion of the manufacturing sector. Excise taxes were imposed on locally-grown tobacco, locally-manufactured liquor, locally refined petroleum and heavy oils, locally refined sugar and other locally produced products such as consumer goods and light machinery.

The period 1960-80 witnessed a steady decline in the relative importance of the revenue from import taxes. On the other hand, the relative importance of excise taxes in the total revenue continued to increase. Two factors may have accounted for this phenomenon. First, the policy of import substitution had led to a steady growth in the number of new consumer goods industries and these industries provided a new source of excise taxes thus broadening its tax base. Secondly, during this period, there had been several adjustments made to the excise tax rates resulting in an increase in excise collection.

Sales Tax

Sales tax was introduced in Malaysia in 1972 levied on the sales of domestically and imported manufactured goods and services. In 1972 revenue collected from sales tax amounted to $115 mil. and in 1980, it increased to $592mil. or 5.4% of the total tax revenue. It can be expected that revenue from sales tax will continue to increase in future. As the economy develops and the tax administrative machinery gains experience, the base for the tax should grow correspondingly.

In addition to these taxes, there are other taxes collected in Malaysia. Among the important ones, are taxes on road and motor vehicles fees, gambling taxes, stamp duties etc. It is expected that motor vehicles fees and the road taxes would continue to remain significant in the future.

Tax Revenue Prospects for 1981-85

To forecast future tax revenue, an estimate is required for the built-in tax elasticity of the different types of taxes[3]. The built-in elasticity pro-

3. In estimating the built-in elasticity for the personal income tax the appropriate base used was Nominal GDP lagged by one-two years. For company income tax the proxy used export of manufactured goods and services. On the other hand Indirect taxes were related to GNP and the price level.

vides the relationship of tax revenue to the tax base[4] Table 3 presents the

Table 3
Elasticities of Revenue, Estimates for 1964-76

Item	Proxy for tax base	Average built-in elasticities	R^2
Personal Income Tax	GDP	1.55	0.98
Company tax[a]	Exports	1.45	0.97
Indirect taxes[b]	GNP	0.88	0.99

Sources. Elasticities from John P. Hutton, "Income Tax and the Distribution of Income in Malaysia"
(Kuala Lumpur: Ministry of Finance, 1977; processed)

a: Excludes oil revenue.

b: Excludes Export taxes.

estimates of built-in elasticies for a number of taxes in Malaysia for the period 1964-76.

The elasticity of personal income tax is estimated to have been at 1.55 indicating that revenue from this source could be projected to grow at 1.55 times faster than GDP. On the other hand, the long-run elasticity of company income tax is estimated to have been at 1.45 and for the indirect taxes the elasticity in relation to real GNP to have been 0.88. These results indicate that the revenue from company income tax should more than keep up with the growth of export and income. In contrast, if revenue from indirect taxes is to maintain the relative yield, increases in the tax rates would be necessary.

For the period 1981-85, The World Bank projects that the tax revenue from direct taxes, export taxes and petroleum taxes would continue to increase significantly. This increase would more than offset the expected decline in revenue from indirect taxes (See Table 4).

Having examined the sources and performance of the different types of taxes for the period 1960-80, it would be instructive to find out how the burdens of these taxes were distributed at the different income levels.

4. See John, P. Hutton, "Income Tax and The Distribution of income tax and the distribution of income in Malaysia" Kuala Lumpur, Ministry of Finance, processed, proceed, 1977.

Table 4
Tax Revenue, Projections for 1981-1985

Item	Millions of Malaysian dollars	Percentage of gross national product
	1981-85	1981-85
Federal Revenue	90,437	26.6
Personal income tax	10,182	3.0
Corporate income tax	25,500	7.5
Oil[a]	9,751	2.9
Export taxes	12,362	3.6
Other Indirect taxes	28,894	7.9

Sources: John Tillman "Stabilization and Public Finance", Malaysia: Growth and Equity in a Multiracial Society — A World Bank Country Economic Report, published by The Johns Hopkins University Press 1980.

a: Income tax on oil.

II. Intertemporal Distribution of Tax Burden in Peninsular Malaysia.

Table 5 presents the patterns of tax burdens distribution Peninsular Malaysia for the years 1968, 1970 and 1973. It must be admitted that there are numerous shortcomings and pitfalls in making intertemporal comparisons. However, despite its limitations, intertemporal comparison may give some idea of how tax policy has changed over time. Further such comparison may be useful in appraising the extent to which tax policy has achieved its redistributive goal..

The average effective rates i.e. the tax to income ratios, for the total taxes in Peninsular Malaysia had been increasing over these three periods, from 25% in 1968, 28% in 1970 and 35% in 1973 thus over these periods, an increasing fraction of household incomes had been absorbed by the government via taxation. The increase in the average effective rates reflects both the upward adjustments of the tax structure, and the imposition of new taxes over this period. In addition, higher average tax to income ratios could have also resulted from improvement in the machinery of tax collection and expansion of the tax base. An interesting feature in table 5 was that the effective tax rates for the three years for the

Table 5

Summary of the Estimated Distribution of Tax Burdens by Income Groups: West Malaysia 1968, 1970, 1973. (Tax as a Percent of Household Income Under Benchmark Assumptions)

Taxes	Below 1200	1200—1800	1800—2400	2400—3000	3000—4800	6000	6000—7200	7200—8400	8400—12000	Above 12000	Total
1. Total Direct Taxes											
1968	3.58	1.50		2.43		3.33			6.18	21.45	6.2
1970	3.48	2.95	3.32	3.62	4.42	5.57	5.31	5.99	8.28	18.64	7.85
1973	4.80	4.08	3.89	3.76	3.75	4.23	4.78	5.15	7.14	16.82	7.94
2. Total Export Duties											
1968	3.42	0.69		0.74		0.50			0.54	13.78	2.83
1970	2.05	1.88	1.57	0.91	1.25	1.57				8.72	3.08
1973	5.69	5.24	3.71	1.89	2.25	2.40	2.60	2.80	3.10	8.03	5.93
3. Total Sales, Tax, Excises and Import Duties.											
1969	27.39	10.64		15 01		17.64			21.02	17.53	16.59
1970	21.16	16.38	17.68	18.62	19.51	22.78	20.02	20.90	19.59	11.41	17.29
1973	33.15	23.75	24.64	23.25	71.55	21.75	22.37	22.82	21.57	13.71	20.71
4. Total All Taxes											
1968	34.39	12.83		18.18		21.47			27.74	52.96	25.62
1970	26.70	21.21	22.57	23.15	25.18	29.92	25.33	26.89	27.87	37.77	28.21
1973	43.63	35.93	32.24	28.90	27.55	28.38	29.75	30.77	31.81	38.54	34.09

Source: Ismail Muhd. Salleh: Tax Incident and Income Redistribution in West Malaysia. Phd thesis. University of Illinois — 1977.

total tax structure in Peninsular Malaysia exhibit a U-shaped pattern. For 1968, the overall rates schedule appears to be regressive only when moving from the first to the second income bracket and becomes smoothly progressive thereafter. However, the overall effective rates for 1970 and 1973 show regressivity over a large segment at a lower end of the income scale, with progression appearing much earlier in the case of 1970 tax structure than that of 1973. Throughout these three periods, tax burdens in Peninsular Malaysia continued to be distributed much more regressively than commonly believed, especially for those households in the lower income brackets. On the other hand, the tax burdens borne by the higher income groups continued to decline over these three periods. Regressivity at the lower end of the income scale is attributed primarily to export duties and most of the indirect taxes. The progressivity at the upper end of the income scale is mainly due to the burdens of the tin export duties and the mildly progressive structure of the personal income tax.

Taking each of the major groups of taxes separately, the following generalizations can be made:

(a) The average percentage of households' income absorbed by the government in the form of direct taxes, export duties and indirect taxes continued to increase over these three periods.

(b) In the case of export duties, the increase in the average effective rates was due to increased revenue derived from rubber export surcharge. Further, export duties on timber and palm oil, which were introduced in 1968, contributed a large share to the total revenue from export duties over these years.

(c) Since there were no substantial adjustments in the rates structure of the individual income tax, and the corporation income tax during these periods, the increasing trends of the average effective rates of the total direct taxes was perhaps attributable primarily to the improvement in the administrative tax apparatus. Furthermore over these periods, Malaysia experienced an unprecedented rate of inflation and some households had been placed in higher income brackets, thus paying a greater share of their income in taxes.

(d) Changes in the rate structure of indirect taxes occured quite frequently during these periods. These changes include a substantial increase in the import duties on tobacco products, an extension of the excise taxes to homegrown tobacco and locally manufactured cigarrettes, a sharp increase in the duty on petroleum products and an upward adjustment of motor vehicle registration fees. Furthermore, in 1970, excise duty on motor vehicle was imposed, subsequently in 1972, Malaysia for the first time introduced a national sales tax. The introduction of these taxes and the upward adjustments in their rate structures helped to contribute to the increasing trends in the average rates of indirect taxes.

Turning now to the patterns of the effective tax rates, the following conclusions can be drawn:

(a) The effective tax rates for all direct taxes for the three periods exhibited a similar U-shaped Pattern.

(b) The effective tax rates for export duties for the three periods showed slight regressivity at the lower end of the income scale were more or less proportional for the middle income ranges and turned somewhat progressive at the upper end of the income scale. In 1973, households in the upper income class on the average paid about 8% of their income as export duties substantially lower than the 13% in 1968. In contrast, households in the lower income brackets borne heavier burdens for export duties than in the previous two periods.

The effective rates of indirect taxes are regressive at the two extreme ends of the income scale, and this pattern has become more pronounced over time. Thus households in the lower income groups paid relatively more in indirect taxes over these three periods while the reverse was true in the case of households at higher income levels.

From the above, we may conclude that the distribution of the tax burden in Peninsular Malaysia have been more regressive between 1968 and 1973. Thus the strong redistributive intent of the second Malaysian Plan through taxation has done little to improve the after-tax distribution.

Next we consider the distribution of the tax burdens for the different types of taxes. These are presented in Table 6.

Individual Income Tax. As indicated on line 1, the individual income tax is mildly progressive over most of the income ranges and turns sharply progressive at the upper income bracket. Progression at the upper end is understated somewhat because all brackets above $12,000 are combined. The effective rates schedule for the individual income tax also reveals that the burden distribution of the lower and the middle income ranges are negligible. This reflects a rather high level of exemptions and deductions allowed under the Malaysia's individual income tax structure.

Corporation Income Tax. The burden distribution of the corporation income tax is distinctly regressive throughout the lower end of the in-

Table 6

Estimated Distribution of Tax Burdens by Income Groups for Peninsular Malaysia: 1973. (Taxes as a percent of household Income Under Benchmark Assumptions)

Taxes	Below—1200	1200—1800	1800—2400	2400—3600	3600—4800	4800—6000	6000—7200	7200—8400	8400—12000	Above 12000	Total
I. Direct Taxes:											
(1) Individual Income Tax	—	—	—	0.07	0.17	0.53	1.01	1.19	1.97	8.38	2.71
(2) Corp. Income Tax (a)	4.80	4.08	3.89	3.69	3.58	3.70	3.77	3.96	5.17	7.09	4.86
(3) Estates Duty and Other	—	—	—	—	—	—	—	—	—	1.34	0.37
(4) Total Direct Taxes	4.80	4.08	3.89	3.76	3.75	4.23	4.78	5.15	7.14	16.81	7.94
II. Export Duties											
(5) Rubber	4.80	4.43	3.13	1.60	1.90	2.02	2.10	2.10	2.20	2.31	4.00
(6) Tin	—	—	—	—	—	—	—	—	—	4.46	1.23
(7) Other Export	1.89	0.82	0.58	0.30	0.35	0.37	0.50	0.70	0.90	1.25	0.70
(8) Total Export Duties	5.69	5.24	3.71	1.89	2.25	2.40	2.60	2.80	3.10	8.03	5.93
III. General Sales Tax											
(9) Total Sales Tax	3.46	2.86	2.68	2.55	2.37	2.38	2.32	2.39	2.22	1.43	2.21
IV. Excises, Import Duties, Surcharge and Road Tax											
(10) Tobacco Products and Alcoholic Beverages	5.67	4.58	4.08	3.96	3.05	2.93	2.46	2.30	2.03	1.24	2.75
(11) Heavy and Fuel Oils	2.66	1.95	1.71	1.56	1.50	1.40	1.37	1.54	1.30	1.01	1.42
(12) Petroleum, Road Transport and Motor Vehicle Fees	9.09	7.31	7.00	6.59	6.53	6.73	7.81	7.95	7.90	4.88	6.56
(13) Sugar	1.52	0.88	0.67	0.48	0.36	0.28	0.22	0.21	0.14	0.05	0.34

(14) Textiles	1.31	0.96	0.82	0.82	0.71	0.72	0.74	0.72	0.62	0.35	0.68
(15) Other Excises and Import Duties	9.47	8.06	7.68	7.28	7.06	7.31	7.45	7.81	7.35	4.77	6.76
(16) Total Excises, Import Duties, Surcharge and Road Tax	29.73	23.75	21.96	20.70	19.22	19.37	20.04	20.43	19.34	12.29	18.51
(17) Total Indirect Taxes	38.84	31.85	28.35	25.14	23.80	24.15	24.97	25.62	24.67	21.74	26.64
(18) Total All Taxes	43.63	35.93	32.24	28.90	27.55	28.38	29.75	30.77	31.81	38.54	34.09

(a) See Table 8

Source: Data provided by the Department of Treasury. For Method of Estimation see: Ismail Muhd. Salleh "Distribution of Tax Burden in West Malaysia for 1973." **Journal Ekonomi Malaysia,** Jilid I, Bil. I June, 1970.

come scale up to $3,600-$4,800 income range and becomes distinctly progressive thereafter. This reflects our incidence assumption which assumes that one-half of the tax is shifted to consumers and the remainder borne by shareholders.

Rubber Export Duty. In 1973 about 54% of the total rubber production in Peninsular Malaysia was produced by smallholders and on the average, their monthly income was around $150-$200. Therefore the majority of them would fall in the first three income brackets.

The effective tax rates for rubber export duty exhibit distinct regressive pattern at the lower end of the income scale and becomes somewhat proportional both for the middle and the upper income ranges.

On the other hand, the tin export duty burdens mainly the upper income class. The burden distribution of the "other" export duties is regressive at the lower end and progressive at the upper end of the income scale. However, revenues from these taxes in 1973 were not substantial.

Sales tax contributed about 6% to the total tax revenue in Peninsular Malaysia in 1973. The burdens distribution of the sales tax are regressive for the lower income households and reaching almost a plateau after the $3,600-$4,800 income bracket and turning regressive again at the upper end of the income scale.

The final groups of taxes to be considered are excises and import duties. These two groups of taxes together constituted about 50% of the total tax yields in Peninsular Malaysia in 1973. Line 16 of Table 6 presents the burdens distribution of the composite excises and import duties. The tax to income ratios for the first four income classes are distinctly regressive and these income ranges constituted about 78% of the total households in Peninsular Malaysia in 1973. The tax to income ratios then turn proportional and finally sharply regressive for the upper income brackets.

Among the major elements of import and excise duties, the burdens distribution for the tobacco products, alcoholic beverages, heavy and fuel oils, sugar and textiles are distinctly regressive for the entire income scale. On the other hand, the effective tax rates for the petroleum, road transport and motor vehicle fees and "other" excise and import duties are regressive at the lower end and slightly progressive for the middle income brackets. Since these two tax components accounts for a substantial share of total yields from excise and import duties, they both carry greater weight in determining the overall pattern of the burden distribution for the total excise and import duties shown on line 16.

In summary, the crucial elements in determining the degree of progression in the Malaysia's tax structure are the individual income tax, the corporation income tax and export duty on tin. However, since more than 50% of the total tax revenue are derived from indirect taxes whose burdens distribution are regressive, they have greater effect on the relative burdens distribution of the total tax system in Malaysia.

III. Extention of the Estimated Burdens Distribution

The estimates of the effective tax rates presented in the previous Section are for the periods 1968, 1970 and 1973. Since more recent data on income distribution and expenditure patterns are not available, therefore, one way to update the information developed thus far is to ask how the tax system in Peninsular Malaysia has changed since 1973 and using this information to extrapolate the distribution of the tax burden in recent period.

Table 7 compares the revenue patterns for 1973 with those of 1979. The most important features of the change in the patterns of taxation since 1973 are:

(a) The marked increase in the relative importance of the direct taxes contributed primarily by a substantial increase in the revenue collected from income tax on petroleum.

(b) Similarly, there had been a concomitant increase in the relative and absolute importance of duties on exports. During this period, Malaysia's export commodities commended strong external demand and stable prices. In addition, export of palm oil also grew in importance thus generating increased revenue from export duties.

(c) The fall in relative importance of revenue from import and excise taxes and the sales tax although some of these taxes have increased in their absolute value.

The increased reliance upon direct taxes would result in augmenting progressivity at the upper income classes. However, an increase in export duties would offset the increase in the direct taxes in the lower income levels and thus increased regressivity at the lower end of the income scale.

The decrease in the relative importance of indirect taxes reduced the regressive tendencies and thus helped to reduce regressivity of the tax system in the lower income levels.

Table 8 presents the estimated burdens distribution adjusted for the changing patterns in the tax structure in Peninsular Malaysia from 1973 to 1979. However, readers are causioned in interpreting these results since

Table 7
The Changing Pattern of Taxation in Peninsular Malaysia

TAXES	1973		1979	
	Tax Revenue (m)$ mil.	Percent of Revenue	Tax Revenue (m)$ mil.	Percent of Revenue
Individual Income Tax	218.4	8.1	870.4	10.3
Corporation income tax[a]	509.6	18.1	2,453.5	29.1
Estate Duty and Other Direct Tax	27.4	1.0	55.0	0.7
Total Direct Tax	746.4	27.6	3379	40.1
Rubber Export Duties	223.3	8.3	1,081.8	12.8
Tin Export Duties	130.1	4.8	545.1	6.5
Other Export Duties[b]	65.3	2.4	206.3	2.5
Total Export Duties	418.7	15.5	1,833.2	21.8
Total Sales tax	164.0	6.1	503.4	5.9
Alcoholic Beverages & Tobacco Product	204.6	7.6	407.5	4.8
Heavy and Fuel Oil	105.4	3.9	67.5	0.8
Petroleum, Road Transport and Motor Vehicle Fees	487.9	18.0	943.0	11.2
Sugar	25.5	0.9	28.7	0.3
Textiles	50.3	1.9	68.5	0.8
Other Excises and Import Duties[c]	502.9	18.6	1,187.0	14.1
Total Excises, Import Duties and Road tax	1,376.6	50.9	2,702.2	32.1
Total All Taxes	2,705.7	100	8,419.3	100

Note: (a) Includes petroleum incometax and petroleum cash payment.
(b) Include Export duties on palm oil, iron ore, bauxite, timber etc.
(c) Include import surchage, turn over tax, radio and TV licenses, film renter tax, other taxes on imports and excise, lottery, belting sweepstakes, stamp duties, business registration fees, royalties and others.

Source: Economi Report — Ministry of Finance Malaysia.

Table 8

Comparison of Estimated Distribution of Tax Burdens by Income Groups for Peninsular Malaysia for 1973—79 (Taxes as a Percent of Household Income Under Benchmark Assumptions)

	Taxes		Below—1200	1200—1800	1800—2400	2400—3600	3600—4800	4800—6000	6000—7200	7200—8400	8400—12000	Above 12000	Total
I	I. Direct Taxes:												
	(1) Individual Income Tax	1973 (1.27)				0.07	0.17	0.53	1.01	1.19	1.97	8.38	2.71
		1979	—			0.09	0.22	0.67	1.28	1.51	2.50	10.64	3.44
	(2) Corp. Income Tax (a)	1973 (1.61)	4.80	4.08	3.89	3.69	3.58	3.70	3.77	3.96	5.17	7.09	4.86
		1979	7.73	6.57	6.26	5.94	5.76	5.96	6.07	6.38	8.32	11.11	7.82
	(3) Estates Duty and Other Direct Taxes	1973 (0.7)		—								1.34	0.37
		1979										0.94	0.26
	(4) Total Direct Taxes	1973	4.80	4.08	3.89	3.76	3.75	4.23	4.78	5.15	7.14	16.81	7.94
		1979	7.73	6.57	6.26	6.03	5.98	6.63	7.35	7.89	10.82	22.99	11.52
II	II. Export												
	(5) Rubber	1973 (1.54)	4.80	4.43	3.13	1.60	1.90	2.02	2.10	2.10	2.20	2.51	4.09
		1979	7.39	6.82	4.82	2.46	2.93	3.11	3.23	3.23	3.39	3.56	6.16
	(6) Tin	1973 (1.35)	—	—	—				—			4.16	1.23
		1979		—	—				—			6.02	1.66
	(7) Other Export	1973 (1.04)	0.89	082	0.58	.50	0.55	0.57	0.50	0.70	0.90	1.25	0.70
		1979	0.95										
	(8) Total Export Duties	1973	5.69	5.24	3.71	1.89	2.25	2.40	2.60	2.80	3.10	8.05	5.93
		1979	8.32	7.67	5.42	2.77	3.29	3.49	3.75	3.96	4.33	10.88	8.55
III	III. General Sale Tax	1973(0.97)	3.46	2.86	2.68	2.88	2.37	2.38	2.32	2.39	2.22	1.43	2.21
	(9) Total Sale Tax	1979	3.36	2.77	2.60	2.47	2.30	2.31	2.25	2.32	2.15	1.59	2.14
IV	IV. Excises, Import Duties, Sur Charge and Road Tax												
	(10) Tobacco Products and Alcoholic Beverages	1973 (0.63)	5.67	4.58	4.08	3.96	3.05	2.93	2.46	2.30	2.03	1.24	2.75
		1979	3.57	2.89	2.57	2.49	1.92	1.84	1.55	1.45	1.28	0.78	1.75
	11) Heavy and Fuel Oils	1973 (0.21)	2.66	1.95	1.71	1.56	1.50	1.40	1.37	1.54	1.30	1.01	0.30
		1979	0.56	0.41	0.36	0.33	0.32	0.29	0.29	0.32	0.27	0.21	.30
	12) Petroleum, Road Transport and Motor Vehicle Fees	1973 (0.62)	9.09	7.31	7.00	6.59	6.53	6.73	7.81	7.95	7.90	4.88	5.56
		1979	5.64	4.53	4.34	4.09	4.05	4.17	4.84	4.93	4.90	3.03	4.07
	13) Sugar	1973 (0.33)	1.52	0.88	0.67	0.48	0.36	0.28	0.22	0.21	0.14	0.05	0.34
		1979	0.50	6.29	0.22	0.16	0.12	0.09	0.07	0.07	0.46	0.17	0.11
	14) Textiles	1973 (0.42)	1.31	0.96	0.82	0.82	0.71	0.72	0.74	0.72	0.62	0.35	0.68

	1979	0.55	0.40	0.34	0.34	0.30	0.30	0.31	0.30	0.26	0.15	0.29
15) Other Excises and Import Duties	1973 (0.76)	9.47	8.06	7.68	7.28	7.06	7.51	7.45	7.81	7.35	4.77	6.76
	1979	7.20	6.13	5.84	5.53	5.37	5.56	5.66	5.94	5.59	3.63	5.14
16) Total Excises, Import Duties, Surcharge and Road Tax	1973	29.73	23.75	21.96	20.70	19.22	19.37	20.04	20.43	19.34	12.29	18.51
	1979	18.02	14.65	13.67	12.94	12.08	12.25	12.72	13.01	12.76	7.96	11.64
17) Total Indirect Taxes	1973	38.84	31.85	28.35	25.14	23.80	24.15	24.97	25.62	24.67	21.74	26.64
	1979	29.70	25.09	21.69	18.18	17.69	18.05	19.22	19.29	19.24	20.23	22.33
18) Total All Taxes	1973	43.64	35.93	32.24	28.90	27.88	28.38	29.75	30.77	31.81	38.54	34.09
	1979	37.43	31.66	27.95	24.21	23.53	24.68	26.57	27.18	30.06	43.22	33.85

a) Regressivity at the lower end of the income scale is somewhat over stated while progressivity at the open end is understated due to the inclusion of the petroleum income tax whose burden falls mainly on the higher income group.

Source: 1973 Figures from table 6. Figures for 1979 are obtained by Multiplying 1973 figure by the ratio of the percentage revenue for 1979 and 1973 as given in the brackets.

these estimates were not being adjusted for the changes in the economic conditions, the relative size of government in the economy, the composition of taxes within the broad groups, etc.

Following generalizations can be made regarding the distribution of the tax burdens for Peninsular Malaysia's tax structure for 1979.

(a) On the average the percentage household's income absorbed by government via taxation in 1979 was about the same to that of 1973 i.e. 34%. Thus an increase in the burden imposed by the increased in the direct taxes and export duties was more or less offset by the corresponding reduction in the burdens of excise, import duties and the sales tax.

(b) It seems that the U-shaped pattern of the effective tax rates of the total tax structure for Peninsular Malaysia in 1979 had not changed significantly from that of 1973 except for a slight steepening at the upper income level.

(c) Except for the upper income class, on the average in 1979, there was a slight drop in the tax burdens borne by the entire income ranges. Thus we may infer from these results that the after-taxes income distribution in 1979 could have improved marginally from that of 1973.

7

INCOME TAX ELASTICITY AND THE DISTRIBUTION OF INCOME, WITH AN APPLICATION TO PENINSULAR MALAYSIA*

JOHN P. HUTTON

Introduction

In developing countries, the individual income tax yields a comparatively small proportion of total tax revenue, but it is of interest because its progressive structure is both an important instrument of redistribution of income and the source of the tax's elasticity: a high elasticity tends to relax the government's budget constraint and to increase the share of income tax in total revenue. If the elasticity is variable over time, however, the revenue forecasting problem becomes more difficult, and so it is natural to enquire into the determinants of the elasticity. Recent studies by Hutton and Lambert [1980a, 1980b] indicate how the structure of allowances and marginal rates of the income tax, together with the distribution of income, determine the revenue elasticity; but a special case exists, of great relevance to developing countries, in which the distribution of income is of paramount importance in explaining the elasticity and showing how it can appear quite unstable. We develop this case below, and demonstrate the surprising result that, so long as the tax threshold is sufficiently high up the income distribution, the progressivity of the tax may not affect the elasticity.

*This study arose out of work done in the Federal Ministry of Finance in Malaysia, while the author was Tax Research Adviser under the Technical Assistance Program of the International Monetary Fund. The author is grateful for assistance in compiling necessary data from Miss Chan Lai Har of the Ministry of Finance, and for comments from Vito Tanzi of the I.M.F. and from Peter Lambert.

I. Progressivity and Income Distribution in the Conventional Model

Let us start by considering the simplest elasticity model, the basis for most empirical applications, in order to highlight its special features and draw attention to the role of the income distribution in this model. The tax function is exponential, viz.

$$t(x) = ax^b \tag{1}$$

is the tax paid on an individual income of x, and a and b are both positive. If b exceeds unity, the system is progressive. This is, in fact, not a very satisfactory model of an income tax system for a variety of reasons discussed further below, but it does provide quite satisfactory empirical fits for the middle range of income. The special feature of (1), first pointed out by Mishan and Dicks-Mireaux [1958], is its ease of aggregation if all incomes grow at the same rate: whatever the distribution of income, in these circumstances it remains true that

$$R = AX^b \tag{2}$$

where R is total tax revenue and X is total income, and A is a constant if the number of taxpayers and the distribution of income do not change, and if the parameters of (1), a and b, do not change.

The attractive feature of this model is therefore that b is both a measure of the progressivity of the tax function and the aggregate revenue elasticity; and if discretionary tax changes are confined to the parameter a, then A will change by the same proportion. Population changes are accommodated by deriving (2) in terms of revenue and income per capita:

$$\frac{R}{P} = A_1 \left(\frac{X}{P}\right)^b \tag{3}$$

where P is population (or number of income recipients) and

$$A = A_1 P^{1-b}$$

Now the constant A depends both on the parameters of the tax function (1) and on the form of the income distribution. Suppose, for example, that income is lognormally distributed, so that $\log x \sim N(\theta, \sigma^2)$, with mean $\mu = \exp(\theta + \frac{1}{2}\sigma^2) = X/P$. Then mean tax payment (R/P) is

$$\begin{aligned} E(t(x)) &= aE\,(x^b) \\ &= ae^{\frac{1}{2} b(b-1)\sigma^2} \mu^b \ . \end{aligned}$$

The constant in (3) is therefore

$$A_1 = ae^{\frac{1}{2} b(b-1)\sigma^2} \tag{4}$$

and the growth rate of revenue per capita is, for fixed b,

$$\frac{\dot{R}}{R} - \frac{\dot{P}}{P} = \frac{\dot{a}}{a} + \tfrac{1}{2}b(b-1)\frac{d\sigma^2}{dt} + b\left(\frac{\dot{X}}{X} - \frac{\dot{P}}{P}\right) \tag{5}$$

Growing inequality of income is therefore another source of revenue growth, and increases in progressivity increase the effect of changes in inequality.

In the context of this model, the method of "proportional adjustment" (see Chand [1975]) amounts to making prior estimates of $\dot{a}/a$ by comparing pre- and post-budget estimates of revenue, obtaining an adjusted revenue series R* such that

$$\frac{\dot{R}^*}{R^*} = \frac{\dot{R}}{R} - \frac{\dot{a}}{a}$$

and obtaining an estimate of the elasticity by regressing log R*− log P on log X− log P. Clearly if inequality growth has been a source of revenue growth, an overestimate of the elasticity b will be obtained, and vice-versa for decreasing inequality. Alternatively, if an estimate of b has been obtained, in the manner of Pechman [1973] or Mishan and Dicks-Mireaux (op. cit.) for example, revenue forecasts based on (5) will be in error to the extent that σ^2 is changing.

II. The Relation between Revenue Elasticity and the Distribution of Income

The importance of the model discussed above rests on the fact that tax function (1) is the **only** form of tax function which yields directly an aggregate revenue elasticity independent of the form of the income distribution. A more surprising result is that the elasticity may be completely independent of the form of the tax function under conditions which correspond more closely to the real world than the model described above. The elasticity may instead depend solely on the shape of the income distribution, so that elasticity estimates based on studies of the tax function may be quite irrelevant. In the general case, the elasticity depends both on the nature of the income distribution and of the tax function, and this of course recognised implicitly in the typical Inland Revenue model of individual income tax, in which the consequences for revenue of changes in the tax code are worked through by evaluating the changes in tax liabilities in each of a range of income brackets. This latter process is laborious, however, and one of the purposes of formulating elasticity models is to provide a reliable short-cut, and particularly a method suitable for use in developing countries short of skilled tax analysts and computational facilities.

Instead of the exponential tax function, then, which is a very special case, let us consider a typical real world tax function. This will have a threshold income below which no tax is levied, and above which is a structure of marginal rates increasing in steps of unequal length and height, with a maximum marginal rate less than unity. The initial threshold will vary according to personal and family circumstances, but in the interests of simplicity we will suppose that the threshold is the same for everyone although the model may easily be generalised. Particularly in a developing country, this threshold will lie fairly high up the income scale, so that the distribution of **tax-payers'** income will constitute the upper tail of the complete income distribution.

A wide variety of types of frequency distributions has been investigated for their goodness of fit to both complete income distributions and parts of income distributions (see e.g. Pen [1971]): the distribution which is still most commonly fitted to upper tail distribution is, however, the Pareto, which has the form

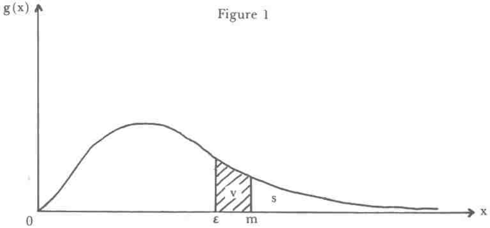
$$f(x) = \alpha\varepsilon^{\alpha}x^{-\alpha-1} \qquad \text{for } x \geq \varepsilon \tag{6}$$

where $f(x)$ is the frequency density at x, α is a positive constant greater than unity and ε a value of x above which the distribution applies. An important feature of this distribution, for our purposes, is that if (6) applies for $x \geqslant \varepsilon$, the distribution of x above some other value greater than ε is also Pareto with the same parameter α: thus if $m \geqslant \varepsilon$,

$$f^{*}(x) = \alpha m^{\alpha}x^{-\alpha-1} \quad \text{for } x \geqslant m\,. \tag{7}$$

Suppose, then, that income is Pareto above $x = \varepsilon$, and that the tax threshold occurs at $x = m \geqslant \varepsilon$, so that (7) describes the distribution of tax-payers' income. Figure (1) illustrates the income distribution,

Figure 1



with the tax threshold at m, and g(x) the frequency density of the complete income distribution such that

$$g(x) = s.f^*(x) \text{ for } x \geqslant m. \tag{8}$$

where s is the proportion of tax-payers. If $m = k\varepsilon$, and all incomes are multiplied by k, the proportion of taxpayers will increase to s + v, where v is the shaded area in Figure (1), and now

$$g_1(x) = (s+v)f^*(x) \text{ for } x \geqslant m. \tag{9}$$

To find the effect on tax revenue of multiplying all incomes by k, we express initial total revenue per capita of the population as

$$\frac{R_o}{P} = \int_o^\infty t(x)g(x)\,dx \tag{10}$$

$$= s\int_m^\infty t(x)f^*(x)\,dx \tag{11}$$

since $t(x) = 0$ for $0 \leqslant x \leqslant m$. After multiplying all incomes by k, (11) becomes

$$\frac{R_1}{P} = (s+v)\int_o^\infty t(x)f^*(x)\,dx$$

$$= \frac{s+v}{s}\,\frac{R_o}{P} \tag{12}$$

Thus $\frac{R_1}{R_o} = \frac{s+v}{s}$. Since incomes are distributed as Pareto above ε,

$$\frac{s+v}{s} = \left(\frac{m}{\varepsilon}\right)^{\alpha} = k^{\alpha} \tag{13}$$

so that

$$\begin{aligned} R_1 &= R_o k^{\alpha} \\ &= R_o \left(\frac{X_1}{X_o}\right)^{\alpha} \end{aligned} \tag{14}$$

where X_o and X_1 are total incomes before and after multiplying all incomes by k. Hence **the elasticity of tax revenue with respect to total income is the parameter of the Pareto distribution, irrespective of the form of the tax function above the threshold.** (15)

Notice that tax revenue rises through the increase in the number of taxpayers: if the tax system is constant, the mean income and mean tax of taxpayers remains constant, and the average tax rate remains constant for each income[1].

The result we have just obtained is proved more rigorously in Hutton and Lambert [1980 (a)], and provides further insights into the determination of the elasticity. The greater is α, the more equal is the distribution of tax-payers' income, so we would expect higher tax elasticity to correspond to more equal distributions of all income. There are, of course, many different ways of measuring inequality (see e.g. Cowell [1977]), but it seems worth making the general conjecture that, apart from the special case of the exponential tax function, the more unequal the distribution of income, the more sensitive is income tax revenue to growth in aggregate incomes.

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[1] This feature of the model goes some way towards explaining what Goode termed the "somewhat peculiar" constancy of the average tax rates on taxable income at constant statutory rates for the U.S. from 1954 to 1960, and Tanzi's similar

III. The effect of a Variable Pareto Parameter on the Elasticity

We know that if α is constant, the rate of growth of revenue is

$$\frac{\dot{R}}{R} = \alpha \frac{\dot{X}}{X} \tag{16}$$

and that, if the average tax-rate of taxpayers is w,

$$\frac{\dot{R}}{R} = \frac{\dot{w}}{w} + \frac{\dot{Y}}{Y} \quad \text{where Y is taxpayers' income.} \tag{17}$$

Hence, if α is variable, we can write

$$\frac{\dot{R}}{R} = \left[\frac{\alpha}{Y} \frac{\partial Y}{\partial \alpha} + \frac{\alpha}{w} \frac{\alpha w}{\partial \alpha} \right] \frac{\dot{\alpha}}{\alpha} + \alpha \frac{\dot{X}}{X} \tag{18}$$

and the "overall elasticity" - the rate of growth of revenue divided by the rate of growth of income - is

$$e = \alpha + \frac{r(\alpha)}{r(X)} \left[\frac{\alpha}{Y} \frac{\partial Y}{\partial \alpha} + \frac{\alpha}{w} \frac{\partial w}{\partial \alpha} \right] \tag{19}$$

if $r(\alpha)$ and $r(X)$ represent the rates of change of α and X respectively.

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finding for a cross-section of U.S. states in 1963 (see Goode [1964], p. 291, and Tanzi [1969], p. 107) : although **total** per capita income in different years and in different states was widely variable, the distribution of **tax payers'** income must have had approximately the same shape in each year and state. If the shape of this distribution remains constant - not necessarily Pareto as in the text - the average tax-rate will remain constant, with richer states or years having a higher proportion of total income included in tax-payers' income and hence a higher proportion of tax-payers.

To illustrate how a changing α affects the elasticity e through equation (19), we shall make two assumptions:

(i) that the number of taxpayers depends on X but not on α, so that a fall in α "stretches" the income distribution of tax-payers with fewer than before paying low rates of tax and more paying high rates;

(ii) that the form of the income tax is that proposed by Musgrave and Thin [1948] above the threshold, i.e. $t(x) = 0$ for $x < \varepsilon$ $t(x) = x - Ax^b$ for $x > \varepsilon$, with $A > 0$ and $0 < b < 1$.

Using assumption (i) we can evaluate the first term in square brackets in (19). Since income is distributed as Pareto above the threshold ε,

$$Y = \frac{N\varepsilon\alpha}{\alpha - 1}$$

where N is the number of taxpayers, and hence

$$\frac{\alpha}{Y} \cdot \frac{\partial Y}{\partial \alpha} = -\frac{Y}{\alpha(\alpha-1)} \cdot \frac{\alpha}{Y} = -\frac{1}{\alpha-1} \quad . \tag{20}$$

Thus an increase in α reduces the total income of taxpayers. Secondly, using assumption (ii), we find that the average tax rate of taxpayers is

$$w = \frac{1-b}{\alpha-b}$$

so that the second term in square brackets in (19) is simply

$$\frac{\alpha}{w^*} \cdot \frac{\partial w}{\partial \alpha} = -\frac{\alpha}{\alpha-b} \tag{21}$$

Thus an increase in α reduces the average tax of taxpayers, in line with their reduced total income.

Substituting (20) and (21) into (19),

$$e = \alpha - \frac{\alpha^2 - b}{(\alpha - b)\ (\alpha - 1)} \cdot \frac{r(\alpha)}{r(X)} . \tag{22}$$

Using equation (22), we can now illustrate numerically the time path of e for different rates of change of α. We set $\alpha = 2$ initially, corresponding closely to the estimate for Malaysia in Anand [1973]; and from the 1973 Inland Revenue **Report** for Malaysia we calculate a value of $b = 0.9$. The results are shown in Table (1), from which it is clear that when $r(\alpha)$ is constant, the elasticity e is approximately constant, but that changes in $r(\alpha)$ induce substantial shifts in e. Notice that for this example the rate of change of α is only $\pm 1\%$, whereas recent studies of income distribution indicate that α can be more volatile (see, for example, the recent study of upper income distribution for the U.K. by the Royal Commission on the Distribution of Income and Wealth [1976]).

Table (1)

t	$r(\alpha)$	α	$r(X)$	e
0	-0.01	2	0.05	2.56
1	-0.01	1.98	0.05	2.55
2	-0.01	1.96	0.05	2.54
3	-0.01	1.94	0.05	2.53
4	-0.01	1.92	0.05	2.51
5	0.0	1.92	0.05	1.92
6	0.01	1.94	0.05	1.35
7	0.01	1.96	0.05	1.38
8	0.01	1.98	0.05	1.41
9	0.01	2.00	0.05	1.44
10	-0.01	1.98	0.05	2.55

Though this example may be slightly artificial, it serves to illustrate clearly that the elasticity may exhibit discrete jumps, and in the empirical work in the next section we investigate this possibility in the context of Peninsular Malaysia.

IV. The Empirical Application

Expressing the revenue equation in **per capita** terms, and introducing the variable D_t to allow for the revenue effects of discretionary changes in the tax schedule (see the Appendix for details), we have

$$\log R_t - \log P_t = \log D_t + e_t[\log X_t - \log P_t] + \text{constant}. \qquad (23)$$

As the previous section has indicated, the elasticity e_t (and hence also the 'constant') may be subject to discrete or continuous change.

Since population growth in Peninsular Malaysia was a fairly constant 2.6% per annum throughout our period, we can replace $\log P_t$ by $0.026\,t$ in equation (23). In principle X_t is the base of the tax at time t: in practice we must make two adjustments. First, data on total personal income is not available, so we will use gross domestic product (GDP) at current prices as a proxy; in any case, for forecasting purposes, GDP is a more useful variable, and we would expect total personal income to be a fairly constant proportion of GDP. This is, however, a possible source of error over the business cycle in particular: if corporate income is more variable over the cycle, GDP will also be more variable than total personal income; and if the inequality of income is also related to the cycle, our choice of GDP as proxy may obscure some of the effects of inequality change for which we are looking.

The second adjustment is two-fold: since income tax in Malaysia is levied on previous year's income, we use GDP lagged one period; and since in practice some proportion of taxes due is always in arrears, we also introduce into the equation GDP lagged two periods to pick up the effects of delayed payments. For any period of virtually constant elasticity, then the estimating equation is

$$\log R_t - 0.026t = \log D_t + e_1[\log GDP_{t-1} - 0.026t]$$
$$+ e_2[\log GDP_{t-2} - 0.026(t-1)] + \text{constant} \qquad (24)$$

When fitted to the data for Peninsular Malaysia for the period 1960-1976, the estimated version of equation (24) is (with t-ratios in brackets):

$$\begin{aligned} \log R_t - 0.026t = {} & \underset{(3.5378)}{1.0966} \log D_t + \underset{(3.0462)}{0.9815} \log[GDP_{t-1} - 0.026t] \\ & + \underset{(2.2943)}{0.7948} [\log GDP_{t-2} - 0.026(t-1)] - \underset{(11.7337)}{11.3192} \end{aligned}$$

$R^2 = 0.9793$; $\bar{R}^2 = 0.9745$; D.W. $= 2.04$; S.E. $= 0.0889$.

The elasticity is 1.77. Thus, the equation appears quite satisfactory, with a coefficient for log D very close to unity.

Where taxpayers' income is not distributed as Pareto, one expects the elasticity to decline with growth in the tax base (see, e.g., Hutton and Lambert, **op. cit.**) so it is natural to test this hypothesis by assuming

$$e_t = \theta_0 - \theta_1 (\log X_t - \log P_t),$$

which, when substituted into (23) leads to a quadratic equation, an estimated version of which (suppressing the less significant squared term in GDP_{t-2}) is

$$\begin{aligned} \log R_t - 0.026t = {} & \underset{(1.8688)}{0.7432} \log D_t + \underset{(2.1576)}{16.2216} [\log GDP_{t-1} - 0.026t] \\ & - \underset{(1.9347)}{0.8148} [\log GDP_{t-1} - 0.026t]^2 - \underset{(2.2485)}{75.2260} \qquad (25) \end{aligned}$$

$R^2 = 0.9774$; $\bar{R}^2 = 0.9722$; D.W. $= 1.65$; S.E. $= 0.0929$. The elasticity evaluated at the mean is 1.98, but decreasing throughout the range of the data. The quadratic term has the expected sign, supporting the idea of a variable elasticity, but a more appropriate specification may also yield evidence of an unstable elasticity.

Accordingly, we hypothesise that at some point in the period of observation, 1960 to 1976, a discrete drop in the elasticity occurred, of the kind illustrated at the end of the previous section by numerical example. The obvious date to investigate is around 1970, since 1969/70 was a watershed in Malaysian political and social affairs. In a study of income differentials in Peninsular Malaysia in the 1960's, Lim [1971] concludes: "The data seem to point to a widening of income differentials in Malaysia over the years, but the increases were slight.

It is felt that the pattern of income differentials in Malaysia shows some conformity to the general notion of increasing inequalities with economic growth . . .". In 1969, serious rioting occurred, followed in 1970 by the announcement of the New Economic Policy, whose main objectives included the "elimination of poverty" and the reduction of major disparities of income, not least between the racial groups. Thus a conscious policy of promoting greater income equality was adopted at that time.

We therefore consider fitting a version of equation (24) with different elasticities for the 1960's and 1970's. The usual technique for this purpose is that of the "shift and slope dummy variable". A simplified version of equation (24) is

$$y_t = a + b_1 x_{t-1} + b_2 x_{t-2} \tag{26}$$

We wish to allow the constant to change in 1971 from a to $a + a^1$; and the sum of the b's (corresponding to the long-run elasticity of equation (24)) should be allowed to change from $b_1 + b_2 = b$ to $b + b^1$. Since, however, there is no reason to suppose that the lag structure will change, we will constrain the coefficients of x_{t-1} and x_{t-2} to have a constant ratio to one another. Thus, if in the 1960's,

$$\frac{b_1}{b_1 + b_2} = \frac{b_1}{b} = c, \text{ and } \frac{b_2}{b} = 1-c,$$

in the 1970's the different b's should be such that

$$\frac{b_1 + b_1^1}{b+b^1} = c, \text{ and } \frac{b_2 + b_2^1}{b+b^1} = 1-c.$$

We therefore re-write equation (26) as

$$y_t = a + b[cx_{t-1} + (1-c)x_{t-2}] \tag{27a}$$

for the 1960's, and

$$y_t = (a + a^1) + (b + b^1)[cx_{t-1} + (1-c)x_{t-2}] \tag{27b}$$

for the 1970's. (27a) and (27b) can be combined to form a single equation by introducing the dummy variable D70 which takes the value 0 from 1960 to 1970, and 1 from 1971 to 1976. Thus

$$y_t = (a + a^1 D70) + (b + b^1 D70) \left[c x_{t-1} + (1-c) \; x_{t-2} \right] \qquad (28)$$

applies to the whole time-period.

Adapting equation (24) in this way, we obtain

$$\log R_t - 0.026t = a + a^1 D70 + (e + e^1 D70) \left[c(\log GDP_{t-1} - 0.026t) + (1\text{-}c) \; (\log GDP_{t-2} - 0.026(t\text{-}1) \right] + b \log D_t \qquad (29)$$

Using the non-linear least squares procedure in the TSP programme suite, the following values were obtained for the parameters of equation (29).

Coefficient	**Estimate**	**t-ratio**
a	−18.4008	6.5625
a^1	7.6350	2.3631
e	2.6172	7.8399
e^1	− 0.8858	2.3903
c	0.5941	4.1670
b	0.5704	1.6459

R^2: 0.9874 S.E.: 0.0754
$\bar{R}^2$: 0.9784 D.W.: 2.20

Comparing the results of estimating equations (24) and (29), the hypothesis that $a^1 = e^1 = 0$ can be rejected at the 10% level using a likelihood ratio test, although the t-ratios associated with a^1 and e^1 are quite high.

As expected, e^1 is significantly negative, indicating a reduced elasticity after 1970; and a^1 is significantly positive, indicating a compensating upward shift in the revenue function. The elasticity in the 1960's is estimated to be 2.62, and in the 1970's to be 1.73. In the light of Table (1), these results suggest a value of α around 2, as indicated in Anand (**op. cit.**), and a change in $\frac{\dot{\alpha}}{\alpha}$ of about 0.02 around 1970, from -0.01 to 0.01. The coefficient of log D_t is less than unity, but not significantly so, and the coefficient c indicates that 59% of assessments are paid in the year of assessment, the balance in the following year.

Experiments indicated that splitting the equation between 1970 and 1971 gave the smallest residual sum of squares, compared with 1969/70 and 1971/72 (see Quandt [1958] for a discussion of this procedure). Given that revenue lags behind income, the change in the rate of change of the income distribution parameter seems to have occurred around 1969, coinciding with a time of social upheaval. It is interesting to note that the elasticity estimate for the 1970's from equation (29), i.e. 1.73, is only slightly less than the estimate obtained for the whole period from equation (25), i.e. 1.77: the rapid income and revenue growth in the 1970's has tended to dominate the regression results. One slightly disturbing feature of the estimates from equation (29) is the poorer performance of the discretionary variable log D_t, which has an estimated coefficient below unity, but not significantly so. Constraining the coefficient b to equal unity be preadjusting the revenue series makes no substantial difference to the results, so we do not report this exercise in detail.

V. Summary and Conclusions

In section I we show how the form of the distribution of income determines the scale factor in the simplest model of revenue elasticity, and the special assumptions required to identify the elasticity as a measure of progressivity. In sections II and III we develop a model based on a more realistic form of tax function, and exploiting the properties of the Pareto distribution of upper incomes. The elasticity is shown to depend on the level and rate of change of the parameter of this distribution: in general, the more equal is the distribution, the higher is the elasticity; and the greater is the growth of inequality, the higher is the elasticity. Qualitatively similar results can be obtained for other forms of income distribution, though the independence of the elasticity and the progressivity of the tax is specific to the Pareto distribution.

In section IV the empirical application to Peninsular Malaysian data is reported. Evidence of a substantial drop in the elasticity is presented, consistent with the hypothesis that around 1969 a reduction occurred in the rate of growth of inequality of incomes of taxpayers; further, using Anand's extraneous estimate of the Pareto parameter, the elasticity estimates obtained suggest that after 1969 the distribution of income in Peninsular Malaysia was becoming more equal. This latter conclusion follows from the fact that our elasticity estimate of 1.73 is considerably less than Anand's estimate of 2.07 for the Pareto parameter. If this process of redistribution of income ceases or is reversed in future, we can expect a substantial increase in the revenue elasticity of the income tax.

In principle, by studying the distribution of income one could detect trends in inequality and use these as a guide to current or future values of the elasticity. In practice, however, since comparatively small changes appear to have large effects on the elasticity, it may prove impossible to obtain sufficiently accurate inequality measures to provide more than qualitative guidance. Revenue projections over the medium to long term should, however, take account of possible distributional changes, since the tendency has been noted for the development process to be associated with an increasing followed by a decreasing measure of inequality: Ahluwalia, in Chenery et al. [1974], quotes evidence from cross-section studies that the share of the top 20% of the income distribution tends to increase sharply up to a level of per capita GNP of about $450 (1971 US $), and thereafter to decline gradually. It is interesting to note that in 1970 per capita GDP for Peninsular Malaysia was $412 (1971 US $), thus lending further support to the hypothesis of this paper that a turning point was experienced around that time-period. The implication is that the elasticity will continue to be lower after 1970 than it was before 1970, and therefore that to maintain the buoyancy of income tax revenues a more active discretionary policy will be required in the future.

Maintaining buoyancy by discretionary action, however, will require raising the average tax rate. It is clear from the analysis of this paper that making the tax system more progressive by raising marginal rates above the threshold cannot be expected to raise the elasticity: indeed, such actions may reduce the elasticity if tax-shifting tends to increase the inequality of pre-tax incomes. To maintain buoyancy, the appropriate policy is therefore to allow the tax threshold to grow less fast than per capita income, thus gradually raising the average rate and bringing more of the population into the scope of the tax.

APPENDIX

Gross Domestic Product at Current Prices for Peninsular Malaysia

(Malaysian $'million)

1955	4756
1956	4842
1957	4948
1958	4758
1959	5316
1960	5866
1961	5822
1962	6127
1963	6505
1964	6968
1965	7590
1966	7977
1967	8229
1968	8512
1969	9811
1970	10609
1971	11071
1972	12139
1973	15754
1974	19069
1975	18523

Sources:
(i) **National Accounts of the States of Malaya, 1955-1963**, Dept. of Statistics.
(ii) **National Accounts of Peninsular Malaysia**, 1960-1971, (latest issue Dec. 1975). Department of Statistics.
(iii) **Preliminary National Accounts of Peninsular Malaysia, 1970-1974**, unpublished, Department of Statistics.
(iv) **Economic Report**, Ministry of Finance.

Net Collections of Income and Supplementary Income Taxes for Peninsular Malaysia, by Companies and Individuals, 1960-1976

	Total	Companies	Individuals
1960	186.1	139.6	46.5
1961	232.8	172.4	60.4
1962	237.5	180.5	57.0
1963	233.1	175.0	58.1
1964	231.4	171.0	60.4
1965	262.5	189.5	73.0
1966	320.2	224.0	96.2
1967	360.9	241.8	119.1
1968	360.9	248.7	112.2
1969	405.8	280.5	125.3
1970	539.0	382.9	156.1
1971	554.1	396.0	158.1
1972	619.9	444.0	175.9
1973	710.1	498.0	212.1
1974	1,100.1	818.0	282.1
1975	1,700.0	1,356.0	344.0
1976	1,820.0	1,354.0	466.0

This table is the result of an attempt to reconcile the available information on collections of income and supplementary income taxes for Peninsular Malaysia, split by companies and individuals. The totals in column (1) from 1960 to 1974 are taken from Inland Revenue Reports on net collections; the totals for 1975 and 1976 are based on figures supplied by the Inland Revenue, subsequently adjusted judgmentally to take account of the average discrepancy between this source of data for earlier years and Inland Revenue **Report** data. An alternative source for column (1), up to 1970, is the Accountant-General's **Report**, but in the late 1960's a change in accounting conventions meant that the figures reported were on a gross-of-repayments basis and therefore not comparable. In any case, this series stops in 1970.

From 1970 to 1976, the figures in columns (2) and (3) are based on figures supplied by Inland Revenue, and adjusted subsequently to be consistent with published totals for 1970 to 1974, and adjusted totals for 1975 and 1976 (see previous paragraph). For 1960 to 1969 no records exist of actual collections split between companies and individuals, but Chand [1975] provides estimates based on monthly aggregate collections and assesment data. Chand's figures, however, add up to the Accountant-General's totals rather than the Inland Revenue **Report** totals as recorded in column (1) for 1960 to 1969.

The resulting table therefore represents a number of compromises and a fair amount of guesswork. When final Inland Revenue figures are available for 1975 and 1976, from Inland Revenue **Reports,** columns (2) and (3) for these years should be adjusted appropriately.

A similar breakdown can be provided for Sabah and Sarawak for 1970 to 1976, subject to similar problems of reconciliation.

The Discretionary Variable D

As explained in the text, revenue may grow by more or less in any year partly as a result of changing the structure of income tax rates and thresholds. The proportional change expected at the time of the annual Budget is given by

$$d_t = \left(\frac{R^1 - R^o}{R^o} \right)$$

where R^o_t and R^1_t and pre- and post-Budget estimates of revenue for the forth-coming year. If the revenue elasticity is constant (e.g. if the distribution of tax payers' income is Pareto, or approximately so) then d_t is clearly independent of the accuracy of the forecast of the level of R^o or R^1, since each of the latter would differ from the actual outcome by equal proportions.

The variable D_t, introduced in equation (23) in the text, represents the cumulative effect on the level of revenue of a sequence of discretionary changes. Thus, if in year 0, revenue is determined by $\log R_o = A + e \log X_o$, where A is a constant, discretionary action in year 1 such that $d_1 = 0.1$, say, will yield

$$logR_1 = (A + elogX_1) + log(1.1)$$

i.e. $\log R_1 = A + e \log X_1 + \log (1 + d_1)$.

A further discretionary change in year 2, of $d_1 = -0.05$, say, will yield

$$logR_2 = (A + elogX_2) + log(1.1) + log(0.95)$$

i.e. $\log R_2 = A + e \log X_2 + \log (1 + d_1)(1 + d_2)$.

In general,

$$\begin{aligned} \log R_t &= A + e \log X_t + \log (1+d_1)(1+d_2)(1+d_3)..(1+d_t), \\ &= A + e \log X_t + \log D_t \end{aligned}$$

where $D_t = \log (1+d_1)(1+d_2)(1+d_3)....(1+d_t)$

$$= \sum_{i=1}^{t} \log (1+d_i).$$

Thus $\log D_t$ appears in the revenue equation (23) and subsequent equations with an expected coefficient of unity.

Another way of thinking of D_t is as the ratio of actual revenue R_t to adjusted revenue R_t^*, where R_t is derived in the manner described by Chand (**op. cit.**). The advantage of including $\log D_t$ as a regressor, rather than specifying as dependent variable $\log R_t^* = \log R_t - \log D_t$, is that in the case of income tax where little or no short-run shifting of the tax is to be expected, the occurrence of an estimated coefficient of $\log D_t$ significantly different from unity would indicate a probable error of specification or measurement: since we argue in this paper that the problems of correctly specifying the revenue function may be considerable, this check is valuable.

The Discretionary (or Tax Rate) Measure, D

1960	1.23
1961	1.14
1962	1.14
1963	1.13
1964	1.13
1965	1.13
1966	1.13
1967	1.39
1968	1.39
1969	1.39
1970	1.39
1971	1.39
1972	1.38
1973	1.38
1974	1.37
1975	1.37
1976	1.40

The basic source is the annual **Estimates of Federal Revenue**, published by the Ministry of Finance. To assign budget changes to Peninsular Malaysia was quite straightforward prior to 1970, when Sabah and Sarawak were not fully integrated into the Federal tax system. When a change applied to Malaysia as a whole (e.g. after 1970), the ratio of assessments was used to assign a proportion of the revenue change to Peninsular Malaysia, and the same ratio was used to estimate the total predicted revenue for Peninsular Malaysia for each year.

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8

MALAYSIA'S TRADE FLOWS: AN APPLICATION OF THE PROBABILISTIC MODEL*

SRITUA ARIEF

I. Introduction

One of the approaches used more often in the literature in explaining trade flows of countries is along the lines of an elasticity substitution model. The basic underlying assumption of this model is that the commodity analyzed is homogeneous, and thus, price differentials are the major determinants of trade flows. However a number of empirical studies on commodity trade have shown that price differentials explain only part of trade flows among countries, whereas traditional trade patterns, quality preferences, and institutional and political factors explain the most[1].

As alternatives to the conventional price models, several scholars have employed different approaches in explaining trade flows among countries. These approaches are constant-market-share models[2], Markov

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* This is part of a bigger study by the author covering five countries of Southeast Asia.

1 See, interalia, R.E. Capel and L.R. Rigaux, "Analysis of Export Demand for Canadian Wheat", **Canadian Joural of Agricultural Economics**, vol. 22, no.2, 1974, pp. 1–14; P.R. Johnson, **Studies in the Demand for U.S. Exports of Agricultural Commodities**, Economics Research Report No. 15, North Carolina State University, 1971

2 See, for example, P.A. Konandreas and R. Green, "A Constant-Market-Shares Analysis of the United States Export Growth", **The Journal of Economics**, vol.3, 1977, pp. 42–48, Proceedings of the 13th Annual Conference, Missouri Valley Economic Association; J.D. Richardson, "Constant-Market-Shares Analysis of Export Growth", **Journal of International Economics**, vol. 1, no.2, 1971, pp. 227–239; L.R. Rigaux, "Market Shares Analysis Applied to Canadian Wheat Exports", **Canadian Journal of Agricultural Economics**, vol. 19, no.1, 1977, pp. 22–34; and H. Tyszynski, "World Trade in Manufactured Commodities, 1899–1950", **The Manchester School of Economic and Social Studies**, 1951.

models[3], and probabilistic trade models[4].

The main purpose of this paper is to investigate Malaysia's trade preference by applying the probabilistic trade model as advanced by Savage and Deutsch[5] and later modified by Goodman[6]. The period covered is 1970 – 1977.

This paper is organized as follows. Section II describe the probabilistic trade model used in this exercise. Section III presents the empirical results and conclusions on the structure of Malaysia's trade preference during the period under study. Malaysia's trade relations studied are those with the other member countries of ASEAN i.e. Indonesia, the Philippines, Singapore and Thailand, and those with countries or group of countries outside ASEAN i.e. Japan, the United States and the European Economic Community.

II. The Probabilistic Trade Model

Consider the imports and exports among a group of K countries for a single year. Let a_{ij} denotes the monetary value of the export from i to j. Assume that $a_{ii} = o$, i.e. a country does not trade with itself. The data can be presented in an import-export matrix.

$$A = [a_{ij}] = \begin{bmatrix} a_{11} & a_{12} \cdots\cdots a_{1K} \\ a_{21} & a_{22} \cdots\cdots a_{2K} \\ \vdots & \\ a_{K1} & a_{K2} \cdots\cdots a_{KK} \end{bmatrix}$$

3 H.L. Hurtado and P.A. Konandreas, "Export Demand for U.S. Grains in the European Community: A Markov Approach", Catholic University of Chile, Santiago, Chile, 1978; and J.G. Kemeny, et. al., **Finite Mathematics with Business Applications**, second edition, Englewood Cliffs, New Jersey: Prentice-Hall, 1972.

4 I.R. Sacage and K.W. Deutsch, "A Statistical Model of The Gross Analysis of Transaction Flows", **Econometroca**, vol. 28, no. 3, 1960, pp. 551 – 572; L.A. Goodman, "Statistical Methods for the Preliminary Analysis of Transaction Flows", **Econometrica**, vol. 31, no.1, 1963, pp. 197 – 208; and S.C. Schmidt and R.J. Vandenborre, "Preference Patterns in the World Coarse Grain trade", **Canadian Journal of Agricultural Economics**, vol. 18, no.1, 1970, pp. 6 – 19.

5 I.R. Savage and K.W. Deutsch, **op. cit.**

6 L.A. Goodman, **op. cit.**

When considering a subset of the countries in the world, the K – th country in A is an artificial country called "the rest of the world". The a_{iK} and a_{Ki} will be respectively the total exports of i to, and the total imports of i from, countries other than those considered.

The total exports of i, X_i, are $X_i = \sum_{j=1}^{K} a_{ij}$, and the total imports of j, M_j, are $M_j = \sum_{i=1}^{K} a_{ij}$. The total exports (which is necessarily equal to the total imports) of the world, T, are

$$T = \sum_{i=1}^{K} X_i = \sum_{j=1}^{K} M_j = \sum_{i=1}^{K} \sum_{j=1}^{K} a_{ij} \qquad (1)$$

To construct a null model for the trade flows, two assumptions are postulated:

(1) The trade of the world in a year is made up of consignments with monetary values $B_1, \ldots\ldots, B_n$. Consignments move independently from one country to another, i.e. the event of a consignment moving from i to j is not affected by, and does not affect, any other consignment movement. The movement is also independent of the consignment value.

(2) The probability of a consignment moving from i to j is given as

$$P_{ij} = \begin{cases} SP_iQ_j & \text{for } i \neq j \\ O & \text{for } i = j \end{cases}$$

where $S = (1 - \sum_{i=1}^{K} P_iQ_i)^{-1}$, $P_i \geqslant O$, $Q_j \geqslant O$,

$$\sum_{i=1}^{K} P_i = \sum_{j=1}^{K} Q_j = 1.$$

P_i in equation (2) is the i–th country's "theoretical tendency" to export, and Q_j in equation (2) is the j–th country's "theoretical tendency" to import. Equation (2) and its explanation imply that the event of a consignment coming from a particular country does not affect the probability of its being received by another country, excluding the possibility of a country receiving its own exports. This is the assumption of origin-destination independence. S is a constant defined to compensate for the fact that self-trade from any country to itself may not occur.

A numerical example will clarify the idea. The following table presents the exports and imports of four countries according to the model. It is seen that the import-export figures as prescribed by the model are proportional to the P_i as well as the Q_j, apart from the zeros along the diagonal. The total trade, T, together with P_i and Q_j determine the trade values between pairs of countries, and also the total exports and total imports of the individual countries.

EC \ IC	Q \ P	1	2	3	4	X
		.2	.3	.4	.1	
1	.1	0	3	4	1	8
2	.3	6	0	12	3	21
3	.1	2	3	0	1	6
4	.5	10	15	20	0	45
M		18	21	36	5	80

IC = importing country. EC = exporting country.

Conversely, the size of trade, i. e. the imports and exports presented as M and X in the table, determines the theoretical tendencies to import and export and hence the theoretical tendency to trade. It is in this sense that the model prescribes preference-free trade values between pairs of countries. To estimate the parameters P_i and Q_j (the estimated values of

P_i and Q_j are respectively denoted by $\hat{P}_i$ and $\hat{Q}_j$), the following set of equations are used.

$$X_i/T = \hat{S}\,\hat{P}_i\,(1 - \hat{Q}_i) \quad (i = 1, 2, \ldots, K) \qquad (3)$$
$$M_j/T = \hat{S}\,\hat{Q}_j\,(1 - \hat{P}_j) \quad (j = 1, 2, \ldots, K)$$

where $\sum_{i=1}^{K} \hat{P}_i = \sum_{j=1}^{K} \hat{Q}_j = 1$

$$\hat{P}_i \geqslant O, \qquad \hat{Q}_j \geqslant O$$

$$\hat{S} = (1 - \sum_{i=1}^{K} \hat{P}_i\,\hat{Q}_i)^{-1}$$

The values of $\hat{P}_i$ and $\hat{Q}_j$ obtained are the maxium likelihood estimates of P_i and Q_j since X_i/T and M_j/T are maxium likelihood estimates of $\sum_{j=1}^{K} P_{ij}$ and $\sum_{i=1}^{K} P_{ij}$, respectively. $\sum_{j=1}^{K} P_{ij}$ is equal to $S\,P_i(1 - Q_i)$ and $\sum_{i=1}^{K} P_{ij}$ is equal to $S\,Q_j\,(1 - P_j)$. To determine the estimates of the parameters P_i and Q_j of the model, the system of equation (3) should be solved. Methods for doing this have been presented by Savage and Deutsch[7], Alker[8] and Goodman[9]. We adopt the procedure introduced by Goodman in this study for the simple reason that the procedure is simpler and superior. The method proposed by Goodman (1964) is presented as follows,

7 I.R. Savage and K.W. Deutsch, **op. cit.**

8 H.R. Alker, "An IBM 709 Program For The Gross Analysis of Transaction Flows", **Behavioral Science,** 7, 1962, pp. 498 – 499.

9 L.A. Goodman, "A Short Computer Program For The Analysis of Transaction Flows", **Behavioral Science,** 9, 1964, pp. 176 – 186.

Notations

a_{ij} is the entry in the i-th row and j-th column of a K × K table or matrix (i, j = 1, 2, ..., K).

A specified set of these a_{ij} are known a priori to be blank, the remainder are not

k, m are dummy indices for summation.

Σ^i_j is the summation over all values of j (for fixed i) where a_{ij} is not blank.

$\bar{\Sigma}^j_i$ is the summation over all i (for fixed j) where a_{ij} is not blank.

Σ^* is the summation over all i, j where a_{ij} is not blank.

Equation (2) can be generalized by assuming that for cells (i, j,) with entries which are not blank, the probability P_{ij} that a "consignment" is classified as (i, j) is of the form

$$P_{ij} = \sigma P_i Q_j \qquad (4)$$

where $\sigma^{-1} = \Sigma^* P_i Q_j$

As the first step, take

$$U_i^o = X_i \qquad (5)$$

where $X_i = \Sigma^i_j a_{ij}$. As the 2m-th step (m ⩾ 1), take

$$V_i^{2m-1} = M_i / \bar{\Sigma}^i_k U_k^{2m-2} \qquad (6)$$

where $M_i = \bar{\Sigma}^i_k a_{ki}$

$\bar{\Sigma}^i U_k^{2m-2}$ denotes the summation of U_k^{2m-2} over all value of k for which a_{ki} is not blank.

As the (2m + 1)th step, take

$$U_i^{2m} = X_i / \Sigma_k^i V_k^{2m-1} \qquad (7)$$

$\Sigma_k^i V_k^{2m-1}$ denotes the summation of V_k^{2m-1} over all values of k for which a_{ij} is not blank. The iterative steps are continued for m = 1, 2, ..., until the desired accuracy is obtained.

The estimated value of A_{ij} for those cells where a_{ij} is not blank is given as

$$\hat{A}_{ij} = U_i^{2m} V_j^{2m-1} \qquad (8)$$

The U_i^{2m} and V_j^{2m-1} estimate the "primary effects" or the "theoretical tendencies" associated with exports and imports (i-th row and j-th column), respectively, for those i and j that do not correspond to cells having blank entries.

Since $\Sigma^* U_i^{2m} V_j^{2m-1} = \sum_{i=1}^{K} X_i = T$, which indicates that $\Sigma^* \hat{A}_{ij} = T$, and $\Sigma^* a_{ij} = T$, the $\hat{A}_{ij}$ then indicates the expected value of trade flow from country i to country j as estimated by the model. Deviations from the model which are of primary interest, are measured by

$$D_{ij} = \frac{a_{ij} - \hat{A}_{ij}}{\hat{A}_{ij}} \qquad (i \neq j)$$

$$\infty > D_{ij} \geqslant -1$$

D_{ij} is called the coefficient of relative acceptance for country i exporting to country j.

The $\hat{A}_{ij}$ may be thought of as taking into account the size effects of trade as determined from the total exports X's and the total imports M's. In the formulation of D_{ij} where $\hat{A}_{ij}$ is subtracted from a_{ij} and then dividing this difference by $\hat{A}_{ij}$ is, in a sense, eliminates the effects of size variable. What is left behind may be regarded as effects "other than due to the size variable". The D_{ij} thus measures the "trade interaction" (preference or otherwise) of the countries considered.

The expected trade flows will not, in general, equal to the actual trade flows due to the existence of natural and artificial factors that favour or disfavour trade among countries. The natural factors include cost of transportation, economic horizon of a country[10], and psychic distance[11] between countries. The artificial factors may take the form of quantitative restrictions, import tariffs, export subsidies, exchange control or some combination of these. The "relative acceptance index" is a measure which can summarize all of these factors.

III. Emprical Results

Malaysia's, trade pattern is studied using the Savage-Deutsh trade model of transaction flows as described in the previous section. In such an analysis a model is constructed where the trading countries are completely indifferent regarding the choice of trading partners.

Expected trade is then determined from this model, and by comparing the actual trade with the expected trade, a measure of trading partner preference is formed (D_{ij}). The model tries to answer the question : "Given the set of total exports and the set of total imports, what is the expected trade for each pair of countries assuming complete absence of preference in the choice of countries as trading partners? "Such a model is described as a null model, and the model trade values are determined entirely by the set of actual total imports and exports, how these are allocated among the trading countries playing no part in the determination of the expected model values.

The coefficient of relative acceptance (D_{ij}) or the relative acceptance index is corrected for the absolute size of trade, since the deviation from the expected trade value is measured as a proportion of the expected trade value, thus eliminating the size effects. This index is sensitive to changes in the trading relationship between countries, and therefore is particularly well suited for analyzing changes over time. In particular, it is interesting to apply the index to any country or group of countries during a period of time when factors encouraging or inhibiting trade have been introduced.

10 H. Linnemann, **An Econometris Study of International Trade Flows**, Amsterdam: North-Holland Publishing Co., 1966, p. 28.

11 W. Beckerman, "Distance and the Pattern of Intra-European Trade", **The Review of Economics and Statistics**, vol. 38, no.1, 1956, p.30.

There are, of course, weaknesses. If the export of counrty i and import of country j are small relative to the total trade, there is a tendency for the index D_{ij} to exaggerate the effect of the interaction. This is because the base for comparison in D_{ij}, the expected trade, becomes small, and its estimate is relatively unstable. In addition, the actual trade A_{ij} in such a case is also subject to relatively large statistical errors.

The structure of Malaysia's trade preference with her trading partners in the ASEAN region, with the United States, Japan, the EEC countries, and the major economies (the United States, Japan and the EEC countries grouped together) measured by the relative acceptance index for the period 1970 — 1977 are reported in Tables 1 — 16. The following are the summary of the findings:

a. Malaysia — Indonesia
Indonesia — Malaysia

The Malaysian trade with Indonesia was 2.7 times higher than expected in 1970, but in 1977 the actual volume of this trade declined to only 10 per cent greater than the expected volume. In 1970, the Indonesian trade volume with Malaysia was 13.3 times higher than expected, but in 1977 the actual volume was 20 per cent lower than would be expected under the null model. This indicate a remarkable restructuring of economic relationships between these two countries.

b. Malaysia — Philippines
Philippines — Malaysia

The Malaysian trade with the Philippines had been consistently strong over the period 1970 — 1977 although the preference index dropped from 7.1 in 1970 to 5.0 in 1977. The Philippines actual trade volume with Malaysia was 90 per cent lower than would be expected in 1970 indicating a week Philippines — Malaysian trade relationship. In 1977 the trade relationship between Malaysia and the Philippenes turned out to be strong (D_{ij} = 5.0, 3.0).

c. Malaysia — Singapore
Singapore — Malaysia

The Malaysian — Singapore trade relationship had been consistently strong during the period under observation. The relative acceptance indices for both directions of trade, however, show declining trends. The relative acceptance indices for Malaysia – Singapore and Singapore – Malaysian trade relationships were respectively 56.7 and 91.6 in 1970. The indices for 1977 were respectively 30.4 and 61.7.

The findings show that the closeness of Malaysia and Singapore to each other geographically had produced a relatively high degree of trade preference between these two countries. However, this closeness did not seem to guarantee the stability of trade preference between these countries.

d. Malaysia — Thailand
Thailand — Malaysia

The Malaysian – Thailand trade relationship had been strong during the period under study. The relative acceptance index of Malaysian trade with Thailand increased substantially between 1970 and 1977 i.e. from 3.6 in 1970 to 5.7 in 1977. At the same period, Thailand's relative acceptance index for trade with Malaysia slightly declined, from 23.3 in 1970 to 22.1 in 1977. The findings show that Thailand had been more dependent on Malaysia for her imports but not the other way around.

e. Malaysia — U. S. A.
U. S. A. — Malaysia

The Malaysian trade with the United States had consistently shown a rather strong position judged by the preference index. The actual volume of the Malaysian trade with the United States which was 90 per cent higher than would be expected under the null model in 1970 jumped to 150 per cent greater than expected in 1977. However, the United States trade with Malaysia only showed a strong position in 1974 onwards. In 1970, the United States accepted Malaysian imports in volume 40 per cent lower than expected. This figure jumped to 90 per cent greater than expected in 1977.

f. Malaysia — Japan
Japan — Malaysia

Although the Malaysian — Japanese trade relationships had been consistently strong during 1970 — 1977, a decrease in the acceptance of Malaysian imports by Japan is observed. On the other hand, the Malaysian acceptance of Japanese imports in volume increased from 2.8 times greater than expected in 1970 to 3.6 times greater than expected in 1977.

g. Malaysia — E E C
E E C — Malaysia

There had been no indication of preference to each other in the Malaysia — E E C trade relationships during the period under study. The actual volumes in both ways (Malaysia — E E C and E E C — Malaysia) had been lower than would be expected under the null model.

h. Malaysia — Major Economies
Major Economies — Malaysia

The acceptance of the Malaysian imports by the major economies had been rather strong during 1970 — 1977. On average, the major economies accepted Malaysian imports in volumes 52.5 per cent greater than expected during this period. In the Major Economies — Malaysian trade, all years with the exception of 1971, have positive relative acceptance indices. The Malaysian — Major Economies trade relationships grew slightly stronger between 1970 and 1977 (D_{ij} = 0.6, 0.1 in 1970 and D_{ij} = 0.7, 0.3 in 1977).

The following conclusions emerge from this study:

(1) There had been a declining trading preference shown by Malaysia towards its two neighbouring countries, Indonesia and Singapore. The same situation had occurred in trading preference of Indonesia and Singapore towards Malaysia. Changes in the internal structure of the economies of these countries and new trade policies which favour direct trade as adopted by Malaysia and Indonesia may constitude the major factors that determine this situation.

(2) With regard to Malaysia's trade relationships with Thailand and the Philippines, the findings show that the latter two countries had turned out to be more dependent on Malaysia for their imports and exports respectively.

(3) Among members of the major economies, only the United States that had turned out showing preference to trade with Malaysia which was followed by a similar response from Malaysia. Malaysia's preference to import from Japan had substantially increased while Japanese preference to import from Malaysia deteriorated considerably. Malaysia had not shown any preference to trade with the European Economic Community. Neither did the European Economic Community towards Malaysia.

Table 1 Relative Acceptance Index
(Malaysia — Indonesia)

Year	Index
1970	2.7
1971	1.8
1972	2.5
1973	1.0
1974	0.9
1975	1.1
1976	0.5
1977	0.1

Table 2 Relative Acceptance Index
(Indonesia — Malaysia)

Year	Index
1970	13.3
1971	8.9
1972	6.9
1973	3.4
1974	2.8
1975	2.9
1976	0.2
1977	−0.2

Table 3 Relative Acceptance Index (Malaysia — Philippines)

Year	Index
1970	7.1
1971	8.3
1972	7.2
1973	2.6
1974	2.8
1975	6.5
1976	6.0
1977	5.0

Table 4 Relative Acceptance Index (Philippines — Malaysia)

Year	Index
1970	— 0.9
1971	— 0.6
1972	— 0.7
1973	0.2
1974	— 0.3
1975	— 0.1
1976	— 0.2
1977	3.0

Table 5 Relative Acceptance Index
(Malaysia — Singapore)

year	Index
1970	56.7
1971	51.2
1972	52.6
1973	45.7
1974	39.3
1975	39.0
1976	36.8
1977	30.4

Table 6 Relative Acceptance Index
(Singapore — Malaysia)

Year	Index
1970	91.6
1971	88.6
1972	93.0
1973	74.1
1974	60.9
1975	73.0
1976	66.1
1977	61.7

Table 7 Relative Acceptance Index (Malaysia — Thailand)

Year	Index
1970	3.6
1971	7.3
1972	3.2
1973	1.5
1974	3.7
1975	6.8
1976	5.9
1977	5.7

Table 8 Relative Acceptance Index (Thailand — Malaysia)

Year	Index
1970	23.3
1971	15.3
1972	21.3
1973	23.9
1974	17.2
1975	19.0
1976	17.6
1977	22.1

Table 9 Relative Acceptance Index
(Malaysia — U.S.A.)

Year	Index
1970	0.9
1971	0.6
1972	0.8
1973	0.5
1974	1.0
1975	1.8
1976	1.3
1977	1.5

Table 10 Relative Acceptance Index
(U.S.A. — Malaysia)

Year	Index
1970	— 0.4
1971	— 0.4
1972	0.1
1973	— 0.1
1974	0.3
1975	0.5
1976	0.9
1977	0.9

Table 11 Relative Acceptance Index (Malaysia — Japan)

Year	Index
1970	6.1
1971	5.9
1972	5.3
1973	4.3
1974	3.5
1975	3.4
1976	5.6
1977	5.6

Table 12 Relative Acceptance Index (Japan — Malaysia)

Year	Index
1970	2.8
1971	2.3
1972	3.1
1973	3.9
1974	3.6
1975	3.3
1976	3.5
1977	3.6

Table 13 Relative Acceptance Index (Malaysia — E E C)

Year	Index
1970	— 0.2
1971	— 0.3
1972	— 0.2
1973	— 0.2
1974	— 0.1
1975	— 0.0
1976	— 0.1
1977	— 0.1

Table 14 Relative Acceptance Index (E E C — Malaysia)

Year	Index
1970	— 0.2
1971	— 0.3
1972	— 0.4
1973	— 0.4
1974	— 0.3
1975	— 0.4
1976	— 0.4
1977	— 0.4

Table 15 Relative Acceptance Index
(Malaysia — Major Economies)

Year	Index
1970	0.6
1971	0.3
1972	0.4
1973	0.3
1974	0.5
1975	0.7
1976	0.7
1977	0.7

Table 16 Relative Acceptance Index
(Major Economies — Malaysia)

Year	Index
1970	0.1
1971	− 0.1
1972	0.0
1973	0.1
1974	0.2
1975	0.2
1976	0.3
1977	0.3

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Part Four
AGRICULTURE AND RELATED INDUSTRY

9

NOMINAL AND EFFECTIVE PROTECTION OF MALAYSIAN AGRICULTURE

RAYMOND J.G. WELLS

It is noted that in order to promote import substitution of food crops and to influence the exports of primary commodities Malaysia has employed a range of instrumental variables including import duties, quotas, export taxes and producer price support. To measure the incentive impact of such policies on agricultural producers, Nominal and Effective Protection Coefficients (NPCs and EPCs) for three importables (milk, beef, rice) and for four exportables (cocoa, pineapple, oil palm, rubber) were computed. The results indicate that the exportables were generally negatively protected while the importables were the recipients of a relatively high degree of protection for most of the period under review.

Introduction

It might be thought pedestrian to observe that international trade in agricultural commodities has long been subject to a variety of distortions[1] The Common Agricultural Policy (CAP) of the European Economic Community (EEC) is perhaps the most widely quoted example of a tool used to regulate extra-regional trade and for maintaining the internal price level of key agricultural products. The CAP is certainly "big business" for as observed by Marsh (1977) total payments from the European Agricultural Guidance and Guarantee Fund (EAGGF) absorbed about 74 per cent of the Community's budget in 1977.

In many countries protection is provided to producers of import substitution crops and less commonly export subsidies are paid to producers of exports to induce them to increase their share of international commodity trade. In general, the overall effects of protective measures do appear to differ between developed and presently developing countries (PDCs):

1 Distortions encompasses all trade distortions so defined as to incorporate tariff and non-tariff restrictions and policies which artificially lower or raise agricultural commodity prices.

usually the agricultural sector in the latter countries have been heavily taxed while that in the developed countries have received substantive price protection (Bale and Lutz 1979).

The traditional protective device for most agricultural products in the now developed countries (DCs) was the tariff. A number of plausible explanations for the heavy reliance on the tariff can be advanced. It was a relatively easy form of taxation to impose and collect, it raised revenue, it helped increase demand for domestic production and it tended to reduce the real costs of imports to the extent that suppliers in the rest of the world might absorb some of the tax. The lower imports might also cause foreign suppliers to reduce their prices which would help improve the terms of trade of the country imposing the tariff. The protection provided against imports by the use of the tariff also seemingly promoted the goal of self-sufficiency (Josling 1974).

Non-tariff barriers, however, have tended to become a more significant means of agricultural protection than tariffs ever since the latter were found to be mainly ineffective during the great depression of the 1930s. The domestic market for agricultural produce, it was realised, could be more adequately protected through the use of controls and multiple exchange rates. An extensive 'arsenal' of protective devices were 'discovered' including import quotas, exchange controls, export taxes, export subsidies and it was realized that multiple exchange rate systems could exercise protective (or anti-protective) effects. The latter have been demonstrated to be equivalent to sets of tariffs, import and export subsidies, and export taxes (Corden 1980). If, for example, they are used to favour import-competing industries they can be regarded as equivalent to import tariffs or export taxes; if used to favour export commodities then they are equivalent to export subsidies. It might also be noted that the proliferation in recent years of non-tariff restrictions on trade in agricultural commodities shows very little sign of being on the wane.

Trade distortions have also been a common feature in many presently-developing countries (PDCs) with the deliberate aim of import substitution of strategic food crops being among the policies favoured in their agricultural sectors. Little, Scitovsky and Scott (1970) in their monumental study on protection did, however, observe that the heavy protection accorded the nascent manufacturing industries in the seven PDCs studied produced a bias against the agricultural sector and generally negative protection were given to agricultural (and other primary product) exports. They did suggest that overall agriculture was probably marginally protected in most of the PDCs, but in all cases the effective rate of protection was low when compared to industry.

Malaysia provides an interesting case study in that it has espoused a policy of import substitution of food crops such as beef, milk and rice through the imposition of protective measures such as quotas, tariffs and producer price support and, at the same time, allegedly encouraged (or not actively discouraged) the retention of resources in sub-sectors such as rubber, oil palm, pineapple and cocoa, where it has a demonstrated comparative advantage. The country is the world's largest single producer and exporter of natural rubber and oil palm and an important pineapple and cocoa producer. These commodities together with tin and timber provide about two-thirds of the Malaysian population with their economic livelihood; they also provide the Exchequer with more than 50 per cent of its export revenue.

Since Independence, Malaysia has also attempted to promote agricultural diversification and to expand food production; rice, livestock, fruit and vegetable production having been especially favoured for a combination of political, strategic and nutritional reasons[2]. A wide array of intervention measures have been used including import duties and licensing, input subsidies — involving subsidies on irrigation water, agrochemicals and credit — and intervention in produce markets. The implementation of a three-tier price support system for rice has also been resorted to as a means of boosting rice output.

The conventional wisdom seems to be that while export promotion of agricultural commodities such as natural rubber, oil palm, pineapple and cocoa, in which an actual comparative advantage has been clearly demonstrated on world markets, could be considered as an optimal policy, import substitution of food crops such as milk, beef and rice, in which countries such as Australia and Thailand have demonstrated comparative advantages, is highly questionable at least in economic terms. Thus Young, Bussink and Hassan (1980) consider "The economic justifi-

2 An additional rationale for the setting of sectoral priorities which aim to discriminate in favour of smallholder agriculture in Malaysia is a poverty redressal component of a development strategy of growth with redistribution.

cation for import substitution in beef and dairy products through the operation of large-scale farms is questionable, however, because substantial increases in production may involve high costs and sizeable subsidies." While it is not doubted that increased output can be secured if enough financial and material resources are transferred into these sub-sectors, output-stimulation programmes would involve substantial resource costs, necessitate the imposition of further trade restriction and require the disbursement of sizeable subsidies[3]. Such assertions, plausible though they may be, however, have not received much convincing empirical support, since there have been few policy-oriented studies in Malaysia which have attempted to examine the magnitude of the effects of the range of protective measures on domestic activity related to exportable or importable agricultural commodities.

The Nominal and Effective Protection Coefficients are useful analytical methods, which in spite of conceptual and empirical limitations, provide a framework for assessing the magnitude of the effects of protection — whether positive or negative — on commodity production. The degree of protection provided by trade restrictions on importables, for instance, can be measured by the resulting percentage increase in the prices at which imported commodities are sold in the domestic market, or the nominal protection rate; in such instances it indicates by what percentage the price of the agricultural commodities produced domestically can exceed what they would have to be if no restrictions were imposed on imports. In the first part of this paper background data on the agricultural sector of Malaysia is provided especially as regards four export crops, viz, natural rubber, oil palm, pineapple and cocoa and three import-substitution food commodities, milk, beef and rice. The next section summarises the general concept and method of measurement of nominal and effective protection. The effects of agricultural price distortions over a five-year period, 1973-1977, are then analysed by computing these Protection Coefficients for the seven crops in question. The results of the analysis are then examined and compared with the results of other recent studies; some policy conclusions are then deduced and the usefulness of the

3 A study by Wells (1981), which involved the computation of Producer Subsidy Equivalents (PSEs) for the dairy industry in Malaysia, provided evidence which showed that the industry was heavily subsidized. Overall the producer subsidy per unit of output was nearly M$1.00 per gallon of milk in 1979, while the percentage subsidy given the parastatal ranch sector exceeded 100 per cent.

methodology is briefly assessed.

The Malaysian Agricultural Sector

In absolute terms the Malaysian agricultural sector is still the single largest sector, although over the past decade its share of Gross Domestic Product has declined from nearly 31 per cent to around 22 per cent (see Table 1). Exports of agricultural products have long constituted a major "engine of growth" and in 1980 agricultural commodities provided some 36 per cent of total export earnings. Agricultural commodity exports grew at an average rate of 14.8 per cent over the decade 1970-80 and over the period 1976-80 increased at an annual rate of 19.7 per cent. Economic growth in Malaysia has also been fuelled by a rapid expansion of the land frontier due to the substantial resource support accorded land development. Some 41 per cent of the employed population work in agriculture, far more than sectors such as manufacturing (15.8 per cent), mining and quarrying or even the services sector. Employment in agriculture is still growing (at about 1.9 per cent per annum), although less rapidly than in the manufacturing or services sector and, it should also be noted, that a considerable volume of employment in services and other sectors are dependent directly or indirectly on activities in the agricultural sector.

Although Malaysia has achieved substantial success in promoting growth in its agricultural sector and in extending basic services to a fairly significant proportion of its rural population (Rondinelli and Mandell, 1981), it nevertheless is plagued with the problem of rural poverty. In spite of heavy investment in agriculture and agro-industrial development and the pursuit of policies aimed at reducing intra-rural and urban-rural exploitation, in 1980 some 46 per cent of agricultural households were officially regarded as being in poverty. Among the major economic sectors, agriculture's proportion of the total poor population is far and away the largest (Schlegel, 1981) and unsurprisingly a prime policy objective is the elimination or at least redressal of such poverty. Poverty elimination or amelioration is one of the major stated goals of the last three five-year plans.

Stimulation of food output is another declared policy goal. Increased food output is required to accomodate the growth in population and help raise levels of nutrition to higher standards. In fact, sectoral growth rates of agriculture in Malaysia have exceeded both prior expectations

Table 1
GDP BY SECTOR OF ORIGIN, MALAYSIA
1970-1980

Sector	GDP ($ Million) (1970 Prices)			Share of GDP (%)		
	1970	1975	1980	1970	1975	1980
Agriculture, forestry and fishing	3,797	4,804	5,800	30.8	27.7	22.2
Mining and quarrying	778	792	1,214	6.3	4.6	4.6
Manufacturing	1,650	2,850	5,374	13.4	16.4	20.5
Construction	475	654	1,186	3.9	3.8	4.5
Electricity, gas and water	229	365	502	1.9	2.1	2.3
Transport, storage and communications	581	1,071	1,696	4.7	6.2	6.5
Trade, hotel and restaurants	1,633	2,219	3,295	13.3	12.8	12.6
Finance, insurance and business services	1,036	1,468	2,155	8.4	8.5	8.2
Government services	1,367	2,210	3,398	11.1	12.7	13.0
Other services	306	478	657	2.5	2.8	2.5

Source: Fourth Malaysia Plan, 1981-1986, p. 11.

and performance levels in most other presently developing countries (Hainsworth, 1979). A high growth rate has been sustained in agriculture as a result of productivity increases, commodity diversification and land development. Details of the growth of agricultural output over the period 1970-80 are shown in Table 2. The most rapid average annual growth rate was secured by oil palm: production increased at an average 19.6 per cent from 431,000 tonnes in 1970 to 2,590,000 tonnes in 1980. The share of oil palm in agricultural value added rose from less than 10 per cent in 1970 to 25 per cent in 1980 and its export earnings increased from M$264 million in 1970 to M$2,576 million at the end of the decade. Rubber production increased more sluggishly at 2.3 per cent per annum although total output grew from 1,270,000 tonnes in 1970 to 1,600,000 tonnes in 1980. This was the result mainly of increased acreage in the smallholder sector which offset a decline in estate acreage[4]. Cocoa, another important export commodity, saw a rapid increase in the production of dry beans by more than eightfold to 33,000 tonnes in 1980. Much of the increase in output is attributable to increased acreage estimated at 68,700 hectares in 1980 in contrast with only 7,400 hectares in 1970.

The situation with regard to the import substitution crops such as rice and livestock products was more mixed. While rice (paddy) output rose from 1,434,600 tonnes in 1970 to 1,913,200 tonnes a decade later, droughts caused substantial fluctuations in output in intervening years. Increased output was partly attributable to expanded acreage — acreage rose from 533,400 hectares to 595,600 hectares over the period — but yields per hectare also rose by about 19 per cent. Livestock production exhibited a sluggish and erratic trend and the average rate of growth was only 2.2 per cent over the decade. Much of the expansion in the first half of the decade took place in poultry and pig production and full self-sufficiency was maintained in pork, poultry, meat and eggs. Beef and milk production, however, was badly affected by the prevalence of foot and mouth disease particularly during the later part of the decade.

During the period, the cultivation of fruits and vegetables under-

4 Planted acreage under corporate estate ownership is estimated to have declined from 647,200 hectares in 1970 to 507,100 hectares in 1980 primarily due to conversion to oil palm and because of sub-division of estates. The reduction in margiginal estate enterprises were, however, more than offset by the expansion in smallholder cultivation, Rudner (1981).

Table 2

GROWTH OF AGRICULTURAL OUTPUT, MALAYSIA 1970-80

(1975 = 100)

Commodity	1970	1976	1977	1978	1979	1980	Average Annual Growth Rate (%)		
							1971-75	1976-80	1971-80
Rubber	85.9	111.3	109.2	108.7	108.3	108.3	3.1	1.6	2.3
Palm oil	34.3	110.5	128.2	141.0	173.8	205.8	24.0	15.5	19.6
Rice (paddy)[a]	83.4	101.8	95.0	71.6	104.8	111.5	3.7	2.2	2.9
Livestock[b]	77.1	103.8	103.9	109.6	91.0	95.6	4.2	−0.9	2.2
Miscellaneous[c]	79.5	120.7	123.6	124.7	132.6	138.2	4.4	6.7	5.5
Aggregate Production	75.9	116.1	120.5	121.9	128.7	133.3	5.7	5.9	5.8

Notes: (a) Data refers to unmilled form, i.e. paddy.

(b) Livestock includes beef (buffalo and oxen), pork, mutton, poultry, meat and eggs.

(c) Miscellaneous includes cocoa, fresh fruits, beverages and other minor crops.

Source: Fourth Malaysia Plan, 1981-1986, p. 264.

went expansion as the result of the provision of subsidies and marketing incentives. The acreage under fruits rose from 68,500 hectares in 1970 to about 86,600 hectares in 1980. Similarly, the acreage devoted to vegetable cultivation increased from 7,700 hectares in 1970 to some 9,000 hectares in 1980. Overall, food availability in the country more than matched population growth and the country's average dietary energy supply of around 2,460 calories per capita per day is one of the highest in Asia.

Nominal and Effective Protection Coefficients: Theory and Measurement

A Nominal Protection Coefficient (NPC) is an analytical method which can be used in the measurement of tariff (and other) distortions and thereby help assess the incentive (or disincentive) impact of government trade policies on agricultural producers[5]. Price distortions are typically caused by tariffs, quotas, export taxes, input subsidies and producer price supports. Such distortions will generate disparities between domestic and border prices. The NPC of an agricultural commodity is the ratio of its domestic producer price to its border price, worked back to appropriate producer points, viz. fully adjusted to take account of internal transport and distributive margins. It can be defined as:

$$NPC_i = \frac{P_i^d}{P_i^b} \quad \ldots\ldots (1)$$

where P_i^d = domestic price of good i

P_i^b = border price of good i. The border price being its foreign price multiplied by the official exchange rate.

The prime purpose of the derivation of NPCs is to provide quantitative measures of the differentials between domestic prices and world

5 The analysis is equally applicable in instances where imports are subsidised or where exports are taxed. NPCs, however, only reflect the extent of protection given to the *final* product whereas effective protection rates measure not only the nominal tariff levied in a commodity but also the tariffs which affect the inputs which are used in the production of the commodity, i.e. on *value added*. It is measured by the ratio of value added expressed in domestic market prices to value added expressed in border prices. Effective protection rates, in other words, examine the vertical relationship between tariff rates derived from the input-output relationships between products.

prices of an agricultural commodity that exists as a consequence of protection. If it were to be assumed, for instance, that the only impediment to free trade in the commodity was an *ad valorem* import duty, then the NPC could be computed:

$NPC_1 = 1 + ti$ where t_i = the nominal *ad valorem* import duty on i

i.e., $NPC_1 = t_i$ .... (2)

This relationship, however, would only be valid, in cases where producers had raised domestic prices of their produce to the full extent afforded by the import duty. If this necessary condition is not fully satisfied it then is imperative that direct price comparisons between domestic and world prices be undertaken, if the true price differential is to be measured. Direct price comparison is even more crucial in instances where the import levy is not the sole obstruction to free trade; quantitative restrictions might be employed as well in which case domestic producer and border prices must be related directly.

In essence computation of NPCs involves two basic processes, viz. the estimation of domestic prices and the measurement of appropriate border prices[6]. Domestic produce prices are those which relate to the producer viz. farmgate prices, while border prices are based on either the c.i.f. or f.o.b. price depending upon whether the agricultural commodity being investigated is an importable or exportable. For export commodities, the f.o.b. price must be adjusted to the farm-gate, i.e. inland transportation and distribution costs have to be subtracted. The farm-gate domestic price then has to be divided by the adjusted f.o.b. price to obtain the NPC. For non-exportables, both the farm-gate and c.i.f. prices have to be adjusted to the appropriate market point.

A complication arises if there are differential indirect taxes. In such an instance, the differential tax rates, expressed as percentages of c.i.f. prices, have to be applied to the tariff rates. To exemplify, if the tariff is, say 20 per cent of the c.i.f. price and the indirect tax is the same for both the domestically produced and imported commodity, the NPC will be = 1.20. If, on the other hand, the indirect tax is levied at the rate of 10 per cent on the domestically produced commodity and 25 per cent on the im-

6 Border prices are employed as the reference point in NPC computations since they may be regarded as broadly indicative of the opportunity cost of the traded agricultural commodities.

ported commodity, the NPC will be $\frac{1.20 \times 1.25}{1.10} = 1.36$.

In this study, the EPC of any agricultural commodity is defined to be:

$$EPC_i = \frac{VA_d}{VA_b} \qquad (3)$$

where VA_d = value added in domestic market prices
VA_b = value added in border prices

The EPC is, incidentally, related to the effective rate of protection thus:

$$EPC_i = ERP_i + 1 \qquad (4)$$

The EPC measures the excess of domestic value added, arising from tariffs and other protective measures on the commodity and its inputs, over foreign or world value added. All subsidies and inputs are accounted for. An analogy to this measure is the comparison of value added obtained during "policy on" and "policy off" periods. During a "policy off" period, the value added is approximated by the valuation of inputs and outputs at world or border prices, and we assess the value added that is derived by the producer when the product and its inputs are freely traded.

The actual estimation of the EPC involves:

(a) calculating value added in domestic market prices;
(b) adjusting both output and input costs from domestic market prices to border prices;
(c) calculating value added in border or accounting prices.

Outputs are adjusted to world prices using the NPCs computed in this study. Traded inputs are adjusted to border or accounting prices using appropriate conversion factors (Veitch, 1976; Kelim, 1980) (see Table 6 for the conversion factors used). Non-traded inputs present a problem as their border prices have to be approximated. In this study, non-traded goods have been decomposed into their tradeable and non-tradeable components wherever possible. The tradeable components are then deflated by the appropriate conversion factors. The residuals, after extracting the traded elements, was treated as part of the value added. Subsidies have been deducted from value added in border prices while depreciation has been treated as an input cost.

A NPC > 1 means that nominal protection measures provide potential positive incentives to produce the commodity while a NPC < 1 indicates that nominal protective measures potentially discriminate against the commodity under review. A similar interpretation applies to the effective protection coefficient measure. Whilst they are not a comparative advantage investment criterion, they provide a crude measure of the extent of incentives (or disincentives) accorded commodity production by trade policies. Thus, in instances when domestic prices exceed border prices, i.e. when NPC > 1, it is important to ferret out the reasons for the divergence in prices. Domestic prices could conceivably be above world prices as a result of X-inefficiency, i.e. avoidably high costs; additionally and/or alternatively, because of protection the domestic commodity producer might still able to tolerate high costs and inefficient farm-firm management and yet remain privately profitable. Theoretically, domestic prices might exceed border prices as a consequence of the domestic commodity producer exploiting his monopoly power to secure supranormal profits[7]. The normative conclusion that an economic justification for protection might exist in cases where the differential in prices was attributable to a current comparative disadvantage, but which could in time be transformed into a comparative advantage, would require the use of more sophisticated techniques of analysis. The Domestic Resource Cost method, for instance, can be used as an *ex ante,* measure of comparative advantage, assuming that data is available for its accurate measurement.

Empirical Results

The calculation of NPCs requires the comparison of domestic producer prices with border prices; prices have to be those pertaining to ap-

7 Social profitability can, given certain assumptions, be measured by the domestic resource cost (DRC) method; this measures the opportunity cost of net foreign exchange by activity. The DRC is a mechanism for computing the social profitability of producing a commodity domestically rather than importing it, or alternatively it can be used for estimating the social profitability of production for export. If the official rate of exchange is also the equilibrium rate then a DRC of 1.0 represents the dividing line between commodity production which is socially profitable, having ratios below one, and commodity production which is socially unprofitable, having ratios above one. Conceptual clarification of the DRC method is provided by Bruno (1972) while an example of an empirical study is Oxtoby (1979).

propriate producer points, i.e. they have to be adjusted to reflect internal transport and distributive margins. Table 3 shows the domestic prices (DP) and the border prices (BP) used in the study.

In Table 3 the NPCs for the seven agricultural commodities are also detailed. The data shown is for three importables, milk, beef and rice for which import substitution is a declared policy objective and for four exportables, rubber, oil palm, canned pineapple and cocoa[8]. The validity of *a priori* reasoning and casual empiricism which led to the presupposition that the highest rates of nominal protection would be afforded the import-substitution commodities was validated because, on the average, these crops were nominally positively protected since NPCs for all years for milk and for three out of five for beef and rice were > 1.

Over the study period, the computed NPC for milk was consistently greater than unity and even exceeded two in 1976 and 1977. This very high rate of apparent nominal protection, in large measure, reflects the diffferent markets covered by domestic output and imports; most milk imports into Malaysia are in tinned or powdered form whereas domestic output consists of fresh milk and condensed milk. There is also the natural protection that liquid milk producers receive because of the intrinsic attributes of their product which means that fresh milk is rarely traded internationally. There is also evidence of a considerable degree of inefficiency in the Malaysian dairy industry. This is manifest in the low yields per lactation, even from imported exotics, and in poor cattle management practices which result in high costs of production although it should be noted that elements of cost differences in dairy farming arise because of 'natural' disadvantages.

In the case of beef, the NPC exceeded unity for the three years 1975-77 but the level of apparent nominal protection was lower than that facing milk producers. Indeed, for 1973-74, the NPC was below one, indicating apparent negative nominal protection of Malaysian beef producers. Selective government price support introduced in 1975 partly accounts for the change and a further factor is the sluggishness in response of the domestic market to changes in world prices and the imposition of quantitative restrictions in the form of import controls in the latter part of the period on beef imports from Thailand.

8 Targets have been set for levels of self-sufficiency for these commodities, viz. 100% (rice), 100% by 1990 (beef) and 20% by 1990 (milk). They are extensively discussed in Wells and Fredericks (1979).

Table 3
BORDER PRICES AND NOMINAL PROTECTION COEFFICIENTS (NPCs) FOR SELECTED COMMODITIES, MALAYSIA, 1973—1977

Commodity	Unit	Border Prices					Nominal Protection Coefficients				
		1973	1974	1975	1976	1977	1973	1974	1975	1976	1977
Importables											
Milk	gallon	1.45	1.99	1.79	1.33.	1.34	1.99	1.45	1.60	2.16	2.14
Beef	tonne	6099	4919	3536	3707	3767	0.62	0.96	1.41	1.26	1.24
Rice	tonne	408	640	612	328	320	1.00	0.75	0.73	1.38	1.44
Exportable											
Cocoa (Beans)	tonne	—	—	2645	4475	8576	—	—	0.68	0.92	1.00
Pineapple (Canned)	tonne	692	810	1036	1078	1158	0.85	0.85	0.88	0.88	0.89
Oil Palm	tonne	550	1259	1131	928	1298	0.89	0.70	0.73	0.79	0.69
Rubber (RSS3)	lb	0.71	0.73	0.59	0.86	0.92	0.73	0.74	0.73	0.73	0.66

Sources of Price Data:

Milk and Beef

Domestic price data and data on marketing margins from **National Livestock Development Authority**. Border prices estimated from data supplied by private trade sources.

Rice

Domestic price data from the **Lembaga Padi dan Beras Negara** (LPN) (National Padi and Rice Board: border prices estimated from data supplied by LPN and from trade sources.

Cocoa

Domestic price and border price data derived from **Malaysian Agricultural Research and Development Institute** (MARDI)

Canned Pineapples

Data on domestic and border from **Malaysian Pineapple Industry Board.**

Oil Palm

Data on domestic and border prices obtained from the **Monthly Statistical Bulletin**, various issues.

Rubber

Data on domestic and border prices obtained from the **Monthly Statistical Bulletin**, various issues.

There were significant variations in the value of the NPC for rice over the period primarily because of movements in the border price of rice. Malaysian rice prices remained stable as a result of price and import control policies but fluctuations in world prices meant that in 1974-75 domestic rice prices were less than border prices. The Malaysian Industry thus underwent the highly unusual experience of receiving negative nominal protection. For the period 1976-77, however, when world prices fell, the computed NPC exceeded unity and the nominal protection provided the Malaysian rice sector was around 40 per cent. This was still markedly less than the level of protection accorded Japanese rice producers since the nominal protection given to them was an estimated 103 per cent in 1976 [Bale and Lutz (1979)]. The exportables were all negatively protected. In the case of rubber (RSS3), the NPC varied from a low of 0.66 to a high of 0.74 over the study period, mainly as the result of the imposition of export duties. In Malaysia, natural rubber producers are subjected to an export duty at a progressive rate which is related to the prevailing price; a replanting cess and a research cess are also levied.

Palm oil also received negative nominal protection over the five-year period under study. The NPC varied in value from 0.69 to 0.89; in 1977, for instance, the NPC for palm oil was 0.69 which means that domestic prices were 31 per cent lower than border prices. Until 1977 there was both an export duty and surcharge on the export of palm oil, which constitutes negative price support, since practically all the palm oil produced is exported (in crude, refined or fractioned form).

Canned pineapple, similar to palm oil and rubber, received consistently negative protection over the period under review. This was a direct consequence of an export levy that is imposed on canned pineapples[9]. In

9 An appraisal of competing countries trade policies would be interesting. Market shares are sometimes influenced by the use of export subsidies by large competitors. Leung (1973) has developed the concept of the effective rate of subsidy and applied it to flour the largest traded commodity in world agriculture. He concluded that Canada had negative effective rates of subsidy (ERS) and the United States positive ERS over the period 1960 to 1970 and this, in part, was a cause of Canada's decline in share of the world flour market. In addition to the possibility of competitors using export subsidies, Malaysia membership of the Association of Natural Rubber Producing Countries (ANPRC), may erode Malaysia's comparative advantage in natural rubber production and lead to a reduction in market share. ANPRC's supply restrictions could impede technological innovations and enable non-members such as India, Nigeria, the Phillippines, Papua New Guinea and Liberia to increase their market share. This is well explored in Rudner (1981).

each of the five years in question the NPC for canned pineapples was below 0.90.

The computation of the NPC for cocoa was restricted to the years 1975-77 because reliable data on ex-farm prices were not available for earlier years. The computation for these three years show cocoa as a border-line case in that by 1977 domestic prices and border prices are equalised; policies were neutral in terms of their protective effect. In the two earlier years there was apparent negative nominal protection, not due to government measures but probably reflecting *inter-alia*, high dealer margins. Cocoa was only recently introduced into Malaysia and there is believed to be considerable scope for improved efficiency both in cocoa production and cocoa marketing.

In Table 4, NPCs for six traded agricultural commodities imported or exported by a small sample of countries — developed and developing — are presented for comparative purposes. There would appear to be considerable differences in the agricultural pricing policies of developed and developing countries. The agricultural commodity prices in the developed nations all have positive rates of nominal protection, while most of the agricultural commodity prices of the developing countries are negatively protected. As noted by Bale and Lutz (1979), what this means in effect is the levels of agricultural production in the former countries are greater than they would be in the absence of intervention whereas agricultural output in the developing nations are below the levels that would pertain without intervention. Exports of developing countries are reduced (for commodity export items with NPC below 1) and for developed nations imports are lowered (for imported agricultural commodities with NPCs greater than 1).

What may appear to be very surprising, given the existence of the Common Agricultural Policy (CAP) of the European Economic Community (EEC), are the differences in the levels of protection of the three EEC member countries. This can be explained, however, by the fact that member states are, in practice, able to maintain nationally preferred agricultural price support levels by the use of, firstly, Monetary Compensatory Amounts (MCAs) and, secondly, "green" currencies. This results in the EEC exchange rates in agriculture diverging from official exchange rates and the protective mechanisms in use exercise differential impacts on commodities [Swinbank (1980)]. In any event, harmonisation of price levels within the CAP would, it has been argued by MacLennan (1978), require harmonisation of inflation and growth rates by member states an eventuality which at present seems rather remote.

Table 5 summarises the estimates of the Effective Protection Coefficients for the same groups of selected importables and exportables for 1977. At Table 6 the estimated low Effective Protection Coefficients for the exportables, excepting pineapple and cocoa, generally concur with the negative nominal protection discussed earlier. The major explanation for the low EPCs for rubber and oil palm is due to the imposition of the high export tax on the two crops. This has created a large disincentive inspite of the subsidised replanting by means of the replanting grant (Chan, 1976). The result for cocoa tallies with the estimated NPC for 1977. Cocoa growing will receive further incentives in the years to come and will emerge as an important primary crop for Malaysia.

Among the importables, the beef and milk sectors have the highest EPCs. Indeed some of our more detailed estimates for milk production among the small farmers rearing cross-bred cows have an EPC of up to 8.6. There is no doubt that milk production is highly subsidised in Malaysia.

Similar high EPCs have been derived for beef production. Disaggregated estimates for smallholding production in certain areas, notably in the states of Kelantan and Kedah, have an astronomical EPC of 33.7. Of course, this high rate of protection was largely sustained by the high differential between the domestic and border prices of beef. It is possible to obtain very high EPCs when the value added is very small in border prices and which thus exaggerates the effect of protective measures. In the case of rice, the EPC indicates positive protection as is suggested too by the NPC value discussed earlier. Among the more efficient producers, for instance those in the Tanjung Karang rice bowl in the state of Selangor, the protection has created a large value added for their produce.

Table 4
NOMINAL PROTECTION COEFFICIENTS (NPCs) FOR SELECTED COMMODITIES OF VARIOUS DEVELOPED AND DEVELOPING COUNTRIES, 1976

	Beef	Rice	Sugar	Maize	Rubber	Wheat
Developed Countries						
France	1.27	-	1.35	1.31	-	1.26
West Germany	1.42	-	1.77	1.57	-	1.49
United Kingdom	1.17	-	1.39	1.28	—	1.15
Japan	1.30	2.03	1.36	-	-	2.81
Developing Countries						
Argentina	0.72	0.81	-	0.49	-	0.54
Egypt	-	0.35	—	0.52	-	0.48
Pakistan	-	0.57	-	0.94	-	0.78
Thailand	-	0.74	1.65	1.02	0.49	-
Malaysia	1.26	1.38	-	-	0.73	-

Source: Adapted from data in Bale and Lutz (1979) and Kelim Sdn. Bhd./ECL (1980).

Table 5
EFFECTIVE PROTECTION COEFFICIENT ESTIMATES FOR SELECTED COMMODITIES, MALAYSIA, 1977

Importables	EPC
Milk	4.4
Beef	4.8
Rice	1.46
Exportables	
Cocoa (beans)	1.05
Pineapple (canned)	1.48
Oil palm	0.68
Rubber (RSS3)	0.68

Sources of data: Detail of estimates and assumptions used are elaborated in Kelim (1980). Also see footnotes in Table 3 of this study.

Table 6
TRADEABLE COMPONENT OF NON-TRADEABLE INPUTS (GENERAL FACTORS)

Non-tradeable Input	Tradeable Component Market Prices (%)	Accounting Conversion Factor*
Electriticy	42	0.76
Construction	53	0.96
Trade (retail & wholesale)	17	0.86
Transport & storage	24	0.86
Public utilities (water supply & communication)	23	0.91
Banking & finance including business services)	17	0.94
Government services (including social services)	21	0.95
Other services**	39	0.85
Real estate	6	0.93

*For conversion of tradeable component from market to accounting prices.

**Hotels and restaurants, recreational and cultural services, motor vehicles repair, other personal and household services, "private non-profit" services, domestic services.

Sources: Tradeable component derived by "decomposing" non-tradeable services into tradeable and non-tradeable elements, through three "rounds" of decomposition. Veitch accounting price factors used in calculating conversion factors. Data from Veitch, Vol. III (especially Tables 18, 19, 21 dan 23) and Input-Output Tables, 1970.

Policy Conclusion

The coefficients for the seven commodities shown in Tables 3 and 5 do display a basically consistent pattern in conformity with both *a priori* reasoning and the conventional wisdom. For two of the exportables, rubber and oil palm, the commodities in question were thus negatively protected. Nominal coefficients were also below unity for pineapples and for cocoa (except in 1977). Such evidence implies that their level of output and export is smaller than would be the case if there were no such distortions. On the other hand, the coefficients for the three import-substitution crops show a relatively high degree of protection; although, it might be observed, the fragmentary evidence detailed in Table 4, provides support for the assertion that rates of protection are higher in developed countries than in developing countries.

In the case of Malaysia, milk consistently received the highest measure of protection, beef was positively protected for three out of five years and coefficients were of unity or above for three out of five years for rice. It is reasonable to infer that imports of these commodities were reduced from the level that would have prevailed if there had been no distortions. That import-substitutes received higher rates of nominal and effective protection than exportables is not surprising. Several Domestic Resource Cost (DRC) studies also clearly indicated that import substitutes receive much higher rates of protection than exports; DRC studies measure effective protection and a study carried out in Israel by Michaely (1968) and one in Turkey by Krueger (1966) both showed higher rates of protection for import substitutes than for exportables. Bulmer Thomas (1976) in carrying out an Effective Rate of Protection (EPC) study in Costa Rica also found an anti-export bias and further observed that a bias towards protection of consumer goods existed. Kirkpatrick (1971) also reported that consumption — good production in India also received higher rates of effective protection than other sectors.

If intra-crop comparisons are undertaken between the four exportables it can readily be observed that rubber was for most years more heavily discriminated against than oil palm, pineapple or cocoa. This may well, at least in part, be a causal factor in explaining the twenty per cent reduction of the estate acreage under rubber that took place during the 1970s. It is pertinent to note that in an effort to stimulate investment in rubber, the Malaysian Government recently announced that rubber exports duties are to be restructured and rubber replanting grants are to be increased (Fourth Malaysia Plan, 1981).

It is also significant to note the comparative position of the agriculture sector vis-a-vis that of industry. A comparative study by the Economic Planning Unit, Malaysia (1974) has some useful estimates on this question.

The estimates in Table 7 demonstrate that generally the manufacturing sector has been more heavily protected than agriculture. Indeed, the great majority of manufacturing industries were protected. This is no small part due to the industrial import-substitution programme of the government.

All told, therefore, it would appear that the Malaysian government discriminates against agriculture as a whole in favour of other sectors. The picture is somewhat more complex at the intra-agriculture sectoral level when one disaggregates by producer groups. Smallholders obtain more assistance than plantation producers and, on the whole, the smallholder producers (rice, beef and milk) have received some degree of protection.

While we are acutely conscious of the conceptual and measurement difficulties associated with the use of nominal and effective protection concepts — which are expertly explored in Corden (1975) — nevertheless, the study provides useful of broad orders of magnitudes of the effects of trade distortions.

Table 7
EFFECTIVE PROTECTION COEFFICIENTS FOR SELECTED COMMODITIES AND INDUSTRIES MALAYSIA, 1973

Commodities and Industries	EPCs
Rubber	1.01
Oil palm	1.01
Coconunt	1.02
Livestock	1.17
Agriculture (foods)	1.29
Total Primary Industry	
— mean	1.05
— median	1.02
— range	0.92 — 1.29
Total Manufacturing Sector	
-- mean	1.60
— median	1.27
— range	0.92 — 11.11
	(3 industries with negative VA) (1974)

Source: Economic Planning Unit, **Effective Protection and Industrialization Policies, Report on a Research Project**, Kuala Lumpur, 1974

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10

PUBLIC INVESTMENTS AND THE DEVELOPMENT OF MALAYSIAN AGRICULTURE

ZULKIFLY HJ. MUSTAPHA

Introduction

Like all developing countries, Malaysia's agriculture and its growth and development has become a direct responsibility of the government, viz. the public sector. This can be observed through the substantial allocation of public development expenditure, fiscal and other measures as well as direct and active public sector participation in agriculture. It is also clearly evident from policies and strategies outlined in the country's five-year development plans where agricultural development programs fall into two basic categories: those assisting traditional farmers on their existing smallholdings and those developing additional land for agriculture.

Public expenditure has been the main source of investments in Malaysian agriculture. Since Independence, the agricultural sector has been allocated a large and increasing share of the country's development expenditure, reflecting in part the high priority that the government has given to improving the welfare of the rural poor. Coincidently, this is in line with the socio-economic objectives of the overall national policy, i.e. the New Economic Policy (NEP), in particular, to reduce the persistently high incidence of poverty in the agricultural and rural sector and to increase the economic prosperity of the farming population through improved farm productivity, greater employment opportunities and increased rural and agricultural incomes.

The economic, social and political consequences of such public investments in agriculture are said to be far-reaching. It has enabled the agricultural sector to increase total output and aggregate sectoral income, and hence growth and development in agriculture, but has also created greater economic disparities within the agricultural sector. This has given rise to controversy and has implications on the relationships between growth and development on one hand and distribution and equity on the other in the process of agricultural development. This paper reviews and assesses the development of Malaysia's agricultural sector in the above context.

I. Agriculture and the Malaysian Economy

Malaysian agriculture is basically dualistic comprising of the commercial, large-scale and relatively capital intensive estate sub-sector, and a traditional small-scale sub-sector. Within the former, there is a further division between the government-organised smallholders, such as those in land development schemes, and the estates.

Estate-type agriculture accounts for more than 30% of the total cultivated area in Malaysia and concentrates primarily on a few commercial crops like rubber, oil palm, and, on a smaller scale, coconut, cocoa, tea and pineapple. The smallholdings, accounting for about 60% of the agricultural land, also produce 'estate-type' crops, in addition to padi as the major activity. Land development schemes, concentrating mainly in the production of rubber, oil palm and recently, cocoa, constitute about 10% of the agricultural acreage, largely in Peninsular Malaysia.

Agriculture occupies a dominant position in the Malaysian economy and is of very great economic and social importance to the country. Taken together with forestry, fishing and animal husbandry, agriculture has been and is still the main foundation of Malaysia's economy. This can be seen by the fact that in 1981, the agricultural sector still accounted for about 22.2% of the Gross Domestic Product (GDP), contributed approximately 38% of total exports and provided employment for nearly 40% of the country's labour force.

In recent years, however, the relative importance of agriculture has been eroded by the rapid growth and performance of other productive sectors of the economy. Looking at agriculture's share of the GDP in constant 1970 prices over the last decade, it has declined from 30.8% in 1970 to 22.2% in 1980 as against that for manufacturing and service sectors whose shares have increased over the same period from 13.4% to 20.5% in the case of the former and from 22.0% to 23.7% for the latter (see Table I). There has also been a relative decline in the contribution of the agricultural sector to employment from 53.3% in 1970 to 40.6% in 1980 (see Table II). The manufacturing and service sectors, on the other hand, have shown an increasing contribution from 8.7% 1970 to 15.8% in 1980 for the former and from 16.0% in 1970 to 19.2% in 1980 for the latter. The discovery and fast expansion in the development of petroleum industry, and more recently the liquified natural gas (LNG), was also an attribute to the declining trend in the relative importance of the agricultural sector. However, this does in no way imply that development in agriculture, measured in absolute term, has dclined over time. Agriculture, over the last decade, still maintained a reasonably respectable growth with average annual rates of growth in output at 4.8%, 5.5%, 5.7% and 6.0% for the 1961-65, 1966–70, 1971–75, and 1976–80 period respectively.

The principal factor in agricultural growth has been the expansion of production of oil palm and rubber through sharp increase in acreage under oil palm and as a result of new planting and replanting of rubber with technologically improved varieties. Oil palm and rubber now account for about half the agricultural output. The doubling of rice production through double-cropping with the use of modern inputs and adoption of high yielding varieties was another source of growth, even though rice now accounts for less than a tenth of the value added in agriculture. The high rate of forest exploitation also contributed significantly.

The economic strength of the agricultural sector has been closely related to its links with international market. Traditionally, agricultural products have been predominant among the commodity exports of Malaysia (see Table III). Their earnings have significantly contributed to the development of the agricultural sector and the economy as a whole, despite their steadily declining share of total export receipts and instability in prospects as they are easily subjected to price fluctuations in response to world demand. Rubber was initially the principal export, but during the last decade crude and processed palm oil and timber began to constitute the greatly increased shares in agricultural exports, at the expense of rubber. With the expected growth of exports of these commodities in nominal terms, particularly for rubber and oil palm, they will continue to be the force behind most of the development of the agricultural sector as in the past, although their share in commodity exports has declined from 52.1% in 1970 to 35.8% in 1980.

Agriculture is also of basic importance in the political and social context of Malaysia. The sector has been largely dominated by the Bumi-

TABLE I: SECTORAL CONTRIBUTION TO GROSS DOMESTIC PRODUCT (GDP) ($ MILLION IN 1970 PRICES)

Sector	1965	1970	1975	1980	Average Growth/Year (%) 1971—1980
Agriculture, Forestry and Fisheries	2,066	3,797	4,804	5,809	4.3
Manufacturing	682	1,650	2,850	5,374	12.5
Services	2,656	2,709	4,156	6,210	11.7
Total GDP	6,552	12,308	17,365	26,188	7.8
Argiculture as % of GDP	31.5	30.8	27.2	22.2	—
Manufacturing as % of GDP	10.4	13.4	16.4	20.5	—
Services as % of GDP	40.5	22.0	23.9	23.7	—

Source: Malaysia, (1966, 1971, 1976, 1981)

TABLE II: EMPLOYMENT BY SECTOR

Sector	1965		1970		1975		1980	
	Employ-ment ('000)	Share (%)	Employ-ment ('000)	Share (%)	Employ-ment ('000)	Share (%)	Employ-ment ('000)	Share (%)
Agriculture	1,350	52.1	1,786	53.5	1,915	47.6	2,067	40.6
Manufacturing	217	8.4	290	8.7	448	11.1	803	15.8
Services	463	17.9	557	16.0	773	18.2	979	19.2

Source: Malaysia, (1966, 1971, 1976, 1981)

putra, particularly the Malays. In Peninsular Malaysia, 66% of the agricultural workforce were Malays in the late 1970s, and in Sabah and Sarawak, an even larger proportion, ie. about 80% and 90% respectively, were bumiputra. Moreover, the sector, or at least the traditional smallholder components, such as padi, coconut and rubber smallholders, has always been economically backward relative to the advanced agricultural sector and the non-agricutural sectors. Also, and rather unfortunate, the smallholder sector is beset with many inherent and complex sosio-economic problems, among others, including a high incidence of poverty. This, directly or indirectly, contributes to make the sector

TABLE III: MALAYSIA'S GROSS EXPORTS BY MAJOR COMMODITIES

Items	1970		1975		1981	
	$ million	%	$ million	%	$ million	%
Agricultural Products including Forestry and Fisheries	3,111	60.2	5,013	54.2	11,012	42.8
Rubber	1,724	33.4	2,040	22.1	3,708	14.4
Logs	644	12.5	685	7.4	2,378	9.2
Sawn Timber	208	4.0	422	4.8	1,115	4.4
Palm Oil	264	5.1	1,318	14.2	2,834	11.0
Palm Kernel	11	0.2	109	1.2	298	1.2
Others[1]	260	5.0	420	4.5	679	2.6
Minerals	1,357	26.0	2,133	23.0	9,324	36.2
Tin	1,013	19.6	1,206	13.0	2,137	8.3
Petroleum	202	3.9	869	9.4	6,911	26.8
Others[2]	142	2.9	58	0.6	276	1.1
Manufactured and Processed Products	631	12.2	2,006	27.1	5,051	19.6
Miscellaneous	64	1.2	100	1.1	351	1.4
Total	5,163	100.0	9,252	100.0	25,738	100.0

Source: Bank Negara, Annual Reports (1970, 1975, 1981)

1. Includes minor agricultural commodities such as pepper, coconut oil, copra, cocoa, fish and other sea foods, etc.
2. Includes iron ore, bauxite etc.

depressed or deprived when compared to other sectors of the economy. As the Bumiputra, and the Malays in particular, are politically dominant, but constitute the majority of the poor in country, it is imperative that the formation of any policy and allocation of investments for agricultural development must give as much attention to the effect of its policies and returns to investment on the welfare of the smallholders as to the effects on the general level of economic activity of the country as a whole. In other word, it is a political necessity that the development of agriculture should manifestly be to the advantage of the farming population in the smallholding or peasant sector.

II. Public Sector Investments in Agriculture

In support of the economic, social and political significance of agriculture, development policies (and strategies) outlined in the country's five-year development plans have given heavy emphasis to agriculture and to improving the socio-economic status of the rural population. A very large proportion of the country's resources has been used in direct support of this policy, whilst most of the remainder was applied to development of infrastructure of the economy as a whole. Under the Fourth Malaysia Plan period (1981–85), agriculture and rural development has been allocated with $8.3 billion, ie. 21.3% of total development budget, not to mention the equally substantial actual expenditure of $1.1 billion (26%), $1.79 billion (24%) dan $4.67 billion (22%) during the First (1966–77), Second (1971–75) and Third (1976–80) Malaysia Plans respectively (see Table IV). However, of the funds, there was very little direct government or public investment in support of the more advanced sectors of the agricultural economy: this being left almost entirely to private enterprise.

It can thus be seen that during the last few decades, investments in agriculture has come largely from public expenditure. It took mainly the form of capital investments in infrastructure, both physical and institutional, and input investments aimed at improving productivity. Over the same period, private investments in small-scale agriculture has not been significant. While public investments has filtered to all levels of the agricultural sector, most private investments were generally confined to the more lucrative sector of agriculture, namely the estate or plantation sector geared primarily for exports. Private investments in agriculture tend to be more selective; and small-scale agriculture, comprising the rubber smallholders, the padi cultivators, the 'small' fishermen, livestock rearers and a range of other small-scale agricultural activities, has not attracted private investments to any large degree, as this type of agriculture has often been considered the least productive and has a lower rate of return to capital as well as labour.

Public sector investments in agriculture can be conceptually classified under two main components, namely the Federal Government and the respective State Governments. Investments in agriculture by the Federal public sector come largely from four main Ministries — Agriculture, Primary Industries, Land and Regional Development and National and

TABLE IV: MALAYSIAN PUBLIC DEVELOPMENT EXPENDITURE, 1966—1985

	First Malaysia Plan 1966—1970*		Second Malaysia Plan 1971—1975*		Third Malaysia Plan 1976—1980*		Fourth Malaysia Plan 1981—1985*	
	($ bil.)	(%)	($ bil.)	(%)	($ bil.)	(%)	($ bil.)	(%)
Economic	2.71	64	4.96	67	13.57	64	22.76	59.9
Agriculture and Rural Development	1.10	26	1.79	24	4.67	22	8.35	21.3
Transport	0.53	13	1.23	17	2.84	13	4.11	10.5
Communication	0.09	4	0.17	2	1.15	5	1.52	3.9
Commerce and Industry	0.25	6	1.43	19	3.25	15	5.4	13.8
Feasibility Studies	—	—	0.03	0.4	0.06	0.3	0.03	0.1
Public Utilities	0.64	15	0.30	4	1.58	8	3.24	8.2
Social	0.67	16	1.29	17	3.64	17	6.38	16.2
Education and Training	0.26	6	0.70	9	1.55	7	2.99	7.6
Health and Family Planning	0.14	3	0.18	2	0.31	2	0.58	1.5
Social and Community Services	0.27	7	0.41	6	1.78	8	2.8 +	7.1
General Administration	0.14	3	0.15	2	0.47	2	0.8	2.1
Defence and Security	0.69	17	1.02	14	3.53	17	9.37	23.8
Total:	4.21	100.0	7.42	100.0	21.20	100.0	42.8	100.0

Source: Malaysia, (1971, 1976, 1981)

Note: *Figures for periods 1966—70, 1971—75 and 1976—80 represent actual development.

**Development expenditure for 1981—85 represents the total allocation for public sector development programs during the Plan period.

+ Including allocations for imformation and broadcasting, housing, sewerage, culture, youth and sports, local council, welfare and community services, community development, etc.

Rural Development — which, apart from the government departments under them, have statutory bodies entrusted with the responsibilities of providing basic infrastructure, research and development inputs and a wide range of other agricultural services. The State public sector investments in agriculture, on the other hand, were provided through the various state-level statutory bodies connected and associated with the promotion of economic and agricultural development.

The enormous public investment in agriculture has been directed primarily to the peasantry and smallholder sector. It involves the distribution of investment resources between programs for assisting traditional smallholders and those for developing new agricultural land.

Public investments in developing new agricultural land, viz. land development, involved not only the development of previously uncultivated land (for settlement and productive cultivation) by families with little or no land of their own to relieve population pressure on existing land, but also concentrate on rehabilitation, extension and consolidation of existing holdings to relieve land shortages among smallholders. These development programs are undertaken through various Federal land development agencies such as FELDA (Federal Land Development Authority) and FELCRA (Federal Land Rehabilitation and Consolidation Authority) and regional development authorities directly concerned with the opening up of new land development and settlement schemes as well as State statutory bodies such as SEDCs (State Economic Development Corporations), SLDBs (State Land Development Boards) and SADCs (State Agricultural Development Corporations). They concentrated on tree crop agriculture — rubber, oil palm and, more recently, cocoa — and took various forms which include FELDA—type of settlement schemes/Fringe Alienation and Rehabilitation Schemes, Youth Land Schemes, Public Estates and Group Replanting Schemes. Participation of the private sector in land development has also been quite significant, particularly through joint-venture projects with public sector agencies or as sole participant (on land alloted) by the State government. Of the various types of land development and settlement schemes cited, the FELDA-type of schemes and the Youth Land Development Schemes are settled by smallholder-participants.

Generally, those land development programs organised and managed by Federal and State agencies other than FELDA were on a smaller scale and were only partially financed by the public sector. FELDA schemes were larger and were fully financed by public funds. A typical FELDA land settlement serves about 400 — 500 families, and given the normal share of about 4.1 hectares of cropland per family and allowing land for the village area, access roads, unplantable areas etc., the size of each scheme comes in the region of 1600 — 2000 hectares as against smaller land development by other agencies where, often, no new settlement were required.

TABLE V: ACREAGE DEVELOPED FOR LAND DEVELOPMENT PROGRAM (in hectares)

Agency/Program	Target 1971—80	Achievement 1971—80 (acreage (%))		Target 1981—85
Federal Programs:				
FELDA	365,587	373,705	(102.22)	149,798
FELCRA[1]	60,729	50,710	(83.50)	32,662
RISDA[2]	101,215	31,463	(31.08)	15,409
State Programs:				
Peninsular Malaysia[3]	75,911	155,662	(205.05)	143,872
Sabah[4]	67,611	57,816	(85.51)	56,680
Sarawak[5]	90,202	76,655	(84.98)	16,599
Joint-venture/private sector[6]	134,615	120,047	(89.18)	128,441
Total:	895,870	866,058	(96.67)	543,461

Source: Malaysia, (1981)

1. Excluding rehabilitation schemes and existing kampungs (villages) in consolidation schemes.
2. Block new planting schemes only.
3. For programs of regional development authorities, SLDBs, SADCs, SEDCs, and others such as Department of Agriculture and District Offices.
4. For programs of SLDB, SRFB and Cooperative Development.
5. For programs of SLDB and Department of Agriculture (rubber new planting only).
6. For joint-venture projectss between public sector agencies such as SADCs, FIMA, regional development authorities with the private sector and private sector sole participation for Malaysia as a whole.

Investments in new land development, particularly the large-scale and extensive FELDA areas, have been significant in terms of public development expenditure allocation and land utilization. Up to the end of 1980 about 866,058 hectares of land has been developed for land development and settlement programs (see Table V), out of which 43.15% or 373,705 hectares were developed by FELDA alone (see Table VI). In terms of public investment expenditure in agriculture, land development over the last two decades has taken up a sizeable proportion of the development expenditure for agricultural programs as indicated in Table VII.

In the early years after Independence, when the policy prescription to meet rural aspiration for land was to open up large tracts of land for

TABLE VI: FELDA: AGRICULTURAL ACREAGES, NUMBER OF LAND SETTLEMENT SCHEMES AND NUMBER OF SETTLERS SETTLED, 1961 — 1980

Crop	1961—65	1966—70	1971—75	1976—80
Rubber:				
Acreage (ha.)	35,353	18,561	45,319	54,966
Scheme (no.)	37	5	22	34
Oil Palm:				
Acreage	11,092	53,897	116,574	126,691
Scheme	9	25	60	69
Sugar Cane:				
Acreage	—	—	3,546	1,123
Scheme	—	—	1	1
Cocoa:				
Acreage	—	—	991	10,717
Scheme	—	—	1	10
Coffee:				
Acreage	—	—	—	533
Scheme	—	—	—	1
Total (ha.)	46,445	72,458	166,430	194,030
Scheme (no.)	46	30	84	115
No. of Families Settled	6,083	11,863	13,779	29,566

Source: FELDA, Annual Reports (1966, 1971, 1976, 1981)

public sector development, and during the First and Second Five-Year Malaya Plans and the First Malaysia Plan periods, the expenditure on land development was modest at \$16.7 million, \$139.4 million and \$375.9 million or 7.3%, 29.3% and 32.6% of total public development expenditure for agriculture respectively. The increase in the public investments for land development especially in the First Malaysia Plan period (1966—70) was due largely to the expansion of land development programs and, in part, because of the emergence and participation of other public agencies, in addition to FELDA, to undertake land development

TABLE VII: PUBLIC DEVELOPMENT EXPENDITURE FOR AGRICULTURAL PROGRAMS 1966—1985

Programs	First Malaysia Plan 1966 — 70		Second Malaysia Plan 1971 — 75		Third Malaysia Plan 1976 — 80		Fourth Malaysia Plan 1981 — 85	
	$ million	%	$ million	%	$ million	%	$ million	%
Assisting Traditional Smallholders:	608.3	54.6	460.13	25.65	1,278.12	27.39	3,033.59	35.24
Pineapple Replanting	—	—	4.09	0.22	12.39	0.26	20.00	0.23
Coconut Replanting	19.6	1.76	28.02	1.56	31.20	0.66	49.83	0.58
Rubber Replanting	168.9	15.16	145.62	8.12	198.23	4.25	316.66	3.68
Crop Diversification	17.6	1.58	24.48	1.36	54.71	1.17	64.46	0.75
Extension and Services	19.7	1.77	39.71	2.21	20.95	0.45	79.92	0.92
Drainage and Irrigation	342.6	30.75	217.81	12.14	554.84	11.89	860.33	9.99
Integrated Agricultural Development Project	—	—	—	—	198.23	4.25	892.00	10.36
Other programs associated with agricultural development (DOA)	8.7	0.78	—	—	92.42	1.98	189.39	2.20
Input subsidies	31.2	2.80	—	—	101.80	2.18	500.00	5.81
KADA	—	—	—	—	7.63	0.16	28.00	0.32
MADA	—	—	0.40	0.02	5.72	0.12	33.00	0.38
Land Development:	363.6	32.63	988.18	55.09	2,744.65	58.81	3,979.37	46.23
FELDA	248.4	22.29	678.41	37.83	1,732.71	37.13	2,040.96	23.71

FELCRA	25.4	2.28	50.96	2.84	192.80	4.13	472.08	5.48
Other Development	89.8	8.06	258.81	14.43	819.14	17.55	1,466.33	17.03
Other Programs:	142.2	12.76	345.22	19.25	589.7	12.83	1,592.94	18.50
Forestry	14.9	1.34	8.85	0.49	25.61	0.54	63.00	0.73
Livestock	18.5	1.66	57.04	3.18	127.22	2.73	241.00	2.79
Fisheries	9.0	0.81	31.78	1.77	105.84	2.27	434.62	5.05
Agricultural Research	13.0	1.17	25.07	1.40	69.33	1.49	93.00	1.08
Credit and Marketing	29.6	2.66	139.00	7.75	269.68	5.78	761.32	8.84
Others	57.2	5.134	83.48	4.65	1.02	0.02	—	—
Total:	1,114.1	100.00	1,793.53	100.0	4,666.20	100.0	8,608.60	100.0

Source: Malaysia, (1971, 1976, 1981)

schemes. A tremendously high and sizeable increase in expenditure on land development was in the 1970s when land development accounted for \$988 million or 55.09% and \$2,745 million or 58.8% of total public investments for agricultural development respectively during the 1971 – 75 and 1976 – 80 periods. This was in line with the government's efforts to mobilise and develop the physical and human resources towards creating greater employment opportunities, increase productivity and improve the incomes of the rural population through poverty eradication in the rural areas. However, comparable figure under the Fourth Malaysia Plan period, 1981 – 85, indicated a decline in the share of land development program expenditure to 46.23% or \$3,797 million of the total public development expenditure for agriculture as against the increasing share of expenditure on agricultural programs for assisting traditional smallholders from 25.65% in 1971 – 75 to 27.39% in 1976 – 80 and 35.24% for 1981 – 85. This change in emphasis was largely due to the fact that land development, although a necessary and a major means of reducing rural poverty, had affected only a small percentage of the rural population in relation to the proportion of non-beneficiaries who had been heavily dependent on agriculture.

Public investments for assisting traditional smallholders were largely aimed at correcting the defects in the agricultural infrastructure uneconomic-sized holdings, poor farming methods etc. The priority has been in **in situ** development in drainage and irrigation, particularly for padi, replanting of rubber, coconuts and pineapples, intensification of on farm development and diversification of crops, and in the provision of essential agricultural support services. Generally, **in situ** development has involved capital investment, the spread of new technology through high-yielding varieties and the use of improved cultivation practices involving chemical fertilizers, pesticides and other modern inputs. They were complemented by the provision of special incentives, including input subsidies and other forms of financial and technical assistance.

The share of public investment in **in situ** development of agriculture over the 1970 – 80 period have shown a tremendous increase, accounting \$460.13 million or 25.65% to \$1.2 billion or 27,39% of the public development expenditure for agriculture in 1971 – 75 and 1976 – 80 respectively. During the 1981 – 85 period, \$3.0 billion or 35.24% has been allocated. The main items of investment expenditure has been in rubber replanting, irrigation and drainage projects to extend the area of double-cropping and otherwise improve and expand the cultivation of padi and other crops, rehabilitation and crop diversification programs, and expanded programs of agricultural research and services in order to improve existing practices of production and develop new production possibilities. Irrigation and drainage and rubber replanting were given the most substantial allocation (see Table VII). The high investment expenditure in the former was the result of the provision of new and improved drainage and irrigation facilities for padi and other crops: the two largest irrigation schemes, ie. MUDA in Kedah and Perlis and KEMUBU in Kelantan, being for padi. They provided access to irrigation facilities for both single and double-cropping of padi and improved drainage facilities for other crops such as coconut intercropped with cocoa and coffee, oil palm and pineapple. In the case of rubber replanting, substantial investment was due partly to increases in the size of the grants given to smallholders to cover the costs of replanting. Intensification of agricultural diversification through the provision of crop subsidies, and rehabilitation of programs involving improvement of agricultural holdings through the adoption of modern agricultural practices and the provision of basic infrastructural facilities and support services, have also incurred high investment expenditure.

Public development expenditure for other agricultural programs, such as in credit and marketing, agricultural research, forestry, fisheries and veterinary etc., also received considerable emphasis. Credit and marketing and agricultural research provided essential complementary facilities in the development of agriculture, whilst forestry and fisheries, in particular, represented the other sectoral components in agriculture with equal importance as crop production in the development of the Malaysian agricultural sector, in terms of social and economic contributions.

The trend in public investments in agriculture indicated the heavy commitment by the public sector in the development of agriculture. The initial thrust of public policies and investments in the mid – 1950s was largely towards strengthening of the rural infrastructure so as to improve living conditions and development in the rural areas. In the 1960s, emphasis, was increasingly placed on providing land to the rural poor to reduce high man – land ratio and widespread unemployment in the rural areas and raising the productivity of small-scale farmers and the smallholder sector in general. An allocation of substantial public resources in support of the 'backward sector' was with the hope to alleviate the symptoms of poverty. However, there is little evidence that there has been a reduction in poverty, at least during the 1960s. The incidence of poverty remained high in the rural and agricultural sector, particularly among the small-scale farmers. In 1970, it was estimated that 49% of households in Peninsular Malaysia had incomes below the poverty line and 86% of those households were in the rural areas. As such, the need to accelerate the process of eradicating poverty continued in the 1970s, and again involving extensive programs of public investments.

During the period 1971–80, the public sector investments in the agricultural sector continued to be important, especially when poverty eradication calls for expanded efforts to raise overall employment, productivity and income levels. This has become a prime consideration for substantial allocation of public sector investment in agriculture even in the 1981–85 period under the Fourth Malaysia Plan. Consistent with the NEP 'to eradicate poverty among all Malaysians and to restructure Malaysian society, both objectives being realized through rapid expansion of the economy over time', the focus has been on development programs for the poor towards attaining growth and development and distribution and equity.

III. Productivity and Structural Change

An important development accompanying public sector participation and investments in agriculture has been increases in the rate of growth in output. Much of the increases in growth can be attributed to rapid expansion in land development, the adoption of high yielding varieties and the use of modern inputs. Significant contributions have been primarily from increased productivity in the rubber sector comprising of estates, smallholdings and land development schemes — increases that helped maintain the country's share in the world rubber market despite declining prices, rapid expansion of oil palm through land development programs and replanting programs by estates and the extraction of timber. There was also large increases in output of rice and a number of other smallholder crops.

Land development under FELDA and other related agencies were largely responsible for the incremental increase in the output of principal agricultural crops — rubber and oil palm. With remarkable transformation in land development, particularly in the case of FELDA programs since the 1960s and 1970s, about half a million hectares of land were developed through the federal public sector investments and around 0.2

million hectares under the state public sector investments. It brought about an increase in the total production of rubber and palm oil from about 825,000 and 144,000 tonnes respectively in 1965 to 1,528,000 and 2,033,000 tonnes respectively in 1979. This represents an average annual growth rate to the order of 5.6% for rubber and 87% for palm oil. The public sector investments in land development, especially in the now very extensive FELDA areas, had extended beyond agricultural technology to group organization. This included management inputs and raising the efficiency and productivity of smallholder-settlers to the general level of many estates. In fact, the FELDA schemes have been organised along the estate agricultural and production pattern in terms of management and provision of services to combine the efficiency of a highly capitalised plantation system with small-scale individual ownership of holdings. This provided the smallholder-settlers with economies of scale, both in the cultivation and processing of the crop; thus contribute to the substantial increase in output.

Significant increases in output was also observed for rubber smallholders outside the land development schemes. The growth in output during the 1960—80 period has been at an average annual rate of more than 5%, considerably faster than the rate of growth of around 3% on estates. This was accompanied by increases in yields. From a mere 473 kg/ha obtained in 1960, the yield had increased by more than two folds to some 1,107 kg/ha in 1981. The improvement in yields was as a result of replanting, and rehabilitation and land consolidation programs, whilst increase in total output has been greatly influenced by the new planting and expansion in smallholder acreage. In addition, there has been significant technological improvement with the use of high-yielding varieties or new clones, improved husbandry and in processing and marketing. Technical progress comprising agricultural innovations and other forms of public sector assistance have also helped. All these have enhanced productive efficiency.

Large increases in output has also been recorded in rice. During the last two decades, rice output rose at an average rate of about 4% a year. In terms of average annual rate of increase in per unit of yield, growth has been rather modest averaging about 1.6% and 2.8% per annum for the main and off season crops respectively. Looking at 1970—80 period, the production of rice increased from 1.4 million tonnes in 1970 to 1.9 million tonnes in 1980, whilst yield per hectare increased from 1,055 gantang to 1,260 gantang. The main source of the increase in output was the substantial increase in the proportion of rice land that is double-cropped from a negligible level in 1960 to 56% in 1980.

Major drainage and irrigation based projects, such as MUDA, KEMUBU and BESUT projects, has contributed to the considerable yield improvement and also made possible increased double-cropping in rice. To complement the economic transformations in rice production and improved irrigation, there were widespread use of modern short-term-maturity rice varieties with increased fertilizer use and cropping intensity and the adoption of mechanized farming.

The public sector investments also have a positive impact on improved output and yield of the many other smallholder crops, particularly coconut. The increase in production was the result of a combination of a higher proportion of acreage planted being replanted with high-yielding MAWA variety; this new variety has yield two to three times those of 'tall

TABLE VIII — GROWTH OF AGRICULTURAL OUTPUT IN MALAYSIA, 1971—1980 (1975 = 100)

Crops	1970	1971	1976	1977	1978	1979	1980
Rubber	85.9	89.6	111.3	109.2	108.7	108.3	108.3
Palm Oil	34.3	46.8	110.5	128.2	141.9	173.8	205.9
Logs	92.5	94.2	136.7	148.2	147.6	140.1	128.6
Padi	83.4	90.2	101.8	95.0	71.6	104.8	111.5
Pepper	94.9	84.1	113.8	85.0	94.9	n.a.	107.2
Fish	62.6	67.2	109.3	131.1	145.1	157.7	159.3
Livestock[1]	77.1	81.5	103.8	103.9	109.6	91.0	95.6
Miscellaneous[2]	79.5	91.0	120.7	123.6	124.7	132.6	138.2
Aggregate Production index	75.9	81.5	116.1	120.5	121.9	128.7	133.3

1. Includes beef of buffalo and oxen, mutton, pork and poultry meat and eggs.
2. Includes sago, tapioca, cocoa, coffee, sugar cane, groundnuts, maize, fresh fruits, tabacco, tea, spices, food crops and other minor crops.

Source: Malaysia, (1981)

varieties'. Rehabilitation and intercropping, primarily with cocoa, have also helped increase the yields of existing coconut stands. In the case of other crops, the increases in output and yields have been the result of diversification, provision of research, extension and other services, including credit and subsidy facilities. An indication of increases in output and productivity of smallholder production is shown in Table VIII.

Particularly in rubber and oil palm, and also in irrigated rice as well as other smallholder crops, public sector intervention has enabled the extension of new technology and improved materials to much of the smallholder sub-sector. The impact has gradually modernized and structurally transformed a considerable part of the traditional agricultural sector.

Concomitant with improvements in production and productivity is the increasing share of the national crop production capacity of the smallholders. This seems to be the case of particularly rubber where the share of the smallholder sector in the total national production has grown from 48.9% in 1970 to about 60% in 1980. Smallholders are also now responsible for cultivating a major share of the country's agricultural land, ranging from 44.3% for oil palm smallholders to 70.2% for rubber smallholders and 93.1% for coconut smallholders. Structurally, rubber areas under estates have declined from 753,000 hectares in 1965 to 507,000 hectares in 1980, mainly as a result of a switch from rubber to oil palm, whereas the acreage under smallholdings has increased from 1 million to 1.2 million hectares in 1980. In the case of oil palm, the share controlled by smallholder-type of organization has increased to almost on par with that to their estate counterpart. Padi production has also undergone phenominal structural changes, especially with growing emphasis on double-cropping. They come about, among others, as a result of the high public investments in irrigation and drainage facilities, research and agricultural extension as well as institutional development.

Another area of remarkable transformation has been in the rapid expansion of the cultivation of cocoa which, though only recently introduced, has become an increasingly important export crop contributing about 1% of the total world output. Its suitability for intercropping with coconuts has further stimulated interest in growing it as a monocrop. Between 1970 and 1980, the acreage under cocoa has increased frm 7,400 to 38,000 hectares resulting in an output of 32,000 tonnes of cocoa beans in 1980, representing an eight-fold increase. Coconuts and other crops, however, have shown only very slight changes, primarily due to rehabilitation and diversification programs.

IV. Income Distribution and Poverty

The focus of public investments and development programs on agricultural sector, in addition to contributing to rapid growth, has helped greatly the reduction of poverty and the distribution of income amongst agricultural households. Accordingly, the main agricultural programs such as large-scale land development and settlement schemes, extensive irrigation schemes for the double-cropping of rice, and rubber replanting schemes, have been significant in the public sector efforts to reduce rural poverty.

The problem of poverty has been essentially viewed as a rural (agricultural) problems with its incidence being more widespread and concentrated among the Malay peasantry and smallholders. Indications in the late 1950s have shown that the average monthly income per rural Malay household ranged from $60 to $120, and using the income line of $300 monthly household income to define poverty, a significant proportion of them were below the poverty line. This included largely the rubber and coconut smallholders, padi farmers and fishermen. A general common cause of poverty has been low productivity and small and inadequate size of holdings. The incidence of poverty has remained high in the 1960s, and in 1970 it was estimated that 49% of households in Peninsular Malaysia has incomes below the poverty line and that 86% of those households were in rural areas. Over the last decade, however, the incidence of poverty in the agricultural sector declined from 68.3% in 1970 to 46.1% in 1980 reflecting, in part, improvements in farm productivity (see Table IX). Within the components of the agricultural sector, the incidence among the rubber smallholders fell from 64.7% in 1970 to 41.3% in 1980, padi farmers from 88.1% to 55.1%, coconut smallholders from 52.8% to 38.9% and fishermen from 73.2% to 45.3% over the same period.

Related to the declining of poverty is improvements in incomes. In response to and because of the intensive development efforts carried out by the government, the income levels of most of the smallholders had improved. Indications are that the incomes of the agricultural population are increasing with significant decreases in the incidence of poverty.

TABLE IX: PENINSULAR MALAYSIA: INCIDENCE OF POVERTY IN AGRICULTURAL SECTOR

	1970		1975		1980	
	Incidence of Poverty (%)	Percentage among poor (%)	Incidence of Poverty (%)	Percentage among poor (%)	Incidence of Poverty (%)	Percentage among poor (%)
AGRICULTURE:						
Rubber smallholders	64.7	28.6	59.0	28.0	41.3	26.4
Oil palm smallholders	30.3	0.3	9.1	0.1	7.8	0.3
Coconut smallholders	52.8	2.1	50.9	2.1	38.9	2.0
Padi farmers	88.1	15.6	77.0	13.7	55.1	12.5
Other agriculture	91.8	16.0	78.8	14.9	64.1	16.6
Fishermen	73.2	3.5	63.0	3.1	45.3	2.9
Estate workers	40.0	7.5	47.0	7.1	35.2	5.9
Total:	68.3	73.6	63.0	69.0	46.1	66.6

Source: Malaysia, (1981)

Note: 1. The calculations took into consideration the effects of programmes implemented during 1971 – 80 as well as changes in other factors, such as prices and costs.

2. Data from studies conducted by Economic Planning Unit and Socio-Economic Research Unit in the Prime Minister's Department, Ministry of Agriculture, Department of Statistics and other agencies were used in the computations.

Income improvements were observed amongst the rubber smallholders. The mean monthly income of this group, one of the largest agricultural group of smallholders in Malaysia, has indicated increases from $228 in early 1970s to $450 in the late 1970s. The main reason for the improvement in their income, among others, was the increased use of high-yielding trees in subsidized replanting programs and in new planting on settlement and block-planting schemes. The accompanying extension work to improve husbandry and management of the crop was also important. Further benefits are yet to be realised in view of the expanded efforts in replanting of old rubber trees by new, technologically improved varieties in rubber smallholdings in the 1970s and 1980s.

For padi farmers, representing the main poverty group, the improve-

TABLE X: AVERAGE MONTHLY INCOME AMONG FELDA SETTLERS

Year	Nett Settler Income ($)	
	Rubber	Oil Palm
1976	340	514
1977	370	573
1978	398	804
1979	482	831
1980	472	709
1981	492	643
Average	426	679

Source: FELDA, Annual Report, various issues.

ment in income was from $110 in 1970 to about $154 in 1979. In irrigated areas like the extensive MUDA irrigation scheme, it was estimated that average farm income has experienced an increase of about 2.4 times in real terms for the 1966 – 75 period; this being due to increase production. With continued emphasis on irrigation and double-cropping, the potential effects would be greater. Also significant to income improvement amongst padi farmers had been the guaranteed minimum price (GMP) which is in effect a subsidy, the cost of which are borne by the entire urban as well as rice purchasing rural population.

Like rubber smallholders and rice farmers, the income levels of the other major poverty groups, ie. coconut smallholders, fishermen, and other categories of rural households had also improved. However, income improvements amongst these groups were only marginal ranging from $100 to $200. For coconut smallholders, the increase has been the result of replanting and rehabilitation with emphasis on inter-cropping mainly with cocoa, while in the case of fishermen the increase was largely due to increasing catch. As for other categories of rural households, it has been due to increases in employment.

The most spectacular improvement in income, however, has been among the smallholder settlers, particularly in FELDA schemes. As shown in Table X, the nett monthly income for FELDA settlers indicated an average of $426 for settlers in rubber schemes and $679 for oil palm settlers. The latter, as a whole, received a higher income. The higher income levels among the FELDA settlers was anticipated with improvement in management, accessibility to inputs and concentration on the more viable crops despite fluctuations and instability in prospects. The better incomes among FELDA settlers, ie. higher than the average rural Malay households, had induced the expansion in the capacity of various land development agencies to open up and develop more land particularly for oil palm.

The overall contribution to income distribution and poverty redressal in the agricultural sector, in addition to the above, came from the increase in employment. Employment growth has been an important source of poverty alleviation. The considerable changes occuring in the agricultural sector, particularly in the 1970s, such as the wider adoption of double-cropping, rapid progress in new land development and settlement, and the general improvement of the sector, had enabled greater opportunities in employment. This has significantly relieved poverty in some parts of the agricultural sector. Through double-cropping of rice, and extensive irrigation in the rice sector as a whole, it has reduced considerably seasonal unemployment and underemployment, while in land development schemes with an ownership of economic-size holdings there was productive employment. All these provide a capacity to earn better and higher income.

Although the rate of growth in agricultural output and the incomes amongst agricultural households are generally increasing, the growth in real agricultural incomes during the last two decades had increased in the range of 2 to 3 percent. The per capita real incomes of smallholders were at least 25% higher in the late 1970s than in 1970, reflecting in part the payoff of past investment. Despite apparent success, the income disparity between the traditional agricultural sector and the rest of the economy still remains. The incidence of poverty among the smallholders, despite significant decreases, also remained persistently high.

V. Distributional Effects of Public Investment

The distribution of public resources for programs on new land development and on large-scale irrigation and drainage, replanting, land rehabilitation and consolidation etc., for assisting traditional smallholders have all enhanced productive efficiency in the smallholder sector. There has been substantial increase in farm productivity and total output, both in output per unit of land and labour, particularly in rubber, rice and coconuts. Significant progress has also been observed in improvement in incomes among the smallholders. The effectiveness of the agricultural programs towards attaining productivity and income objectives, however, varies considerably, depending, for example, on the rate of public support and investments provided. It is also apparent that the rate of support differs between activities and groups of beneficiaries, and it is this differential rate that often generate regional and economic disparity within the components of the smallholder sector. This added a new dimension to the structure of growth and equity in the agricultural sector. It has created economic disparity both between the estate and smallholder segments, which was already prevailing, and within the latter.

Progress in agricultural development has been quite remarkable. The average growth rate of about 6% a year in agricultural output has been high compared to many other developing or developed countries. This fairly constant trend in agricultural output growth over the last two decade reflected in part the success of public sector policies and investments in agriculture. However, the degree of success varies from region and between activities as well as within similar activities. For example, despite apparent success in output growth in rice, whose total production in Peninsular Malaysia at 1.1 million tonnes in 1980 was twice that of 1960, the performance varies considerabiy between main producing regions. Output and yields per hectare has been markedly higher in the West coast and in irrigated areas than on the east coast and in unirrigated areas respectively. While accepting the fact that this is partly due to soils, climate and locational problems and differential rate of adoption of technology, it cannot be denied also that varying public sector investments, including support and subsidy, has been a significant, if not the main, contributing factor. The public investments in large-scale irrigation, particularly for MUDA dan Kemubu areas, enabled the double-cropping of rice on some 150,823 hectares and 22,257 hectares respectively and made possible the use of new and modern technology; thus stimulating growth in output and yield. However, with only 56% of the total rice acreage under double-cropping, the single-cropped rice producing areas, representing the remainder 44%, served by smaller irrigation projects and receiving lesser rate of support, have lagged behind in output and yield. This has impeded growth in these areas and, as result, it created economic disparity within the rice sector. It has implications on equity as substantial proportion of padi farmers, particularly under single-cropping, has yet to share the benifits of public investments. It also tends to create adverse economic, social and political consequences when there prevails a high incidence of poverty and the persistence of depressed incomes among the rice farmers.

The relatively high rate of double-cropping in the MUDA and Kemubu regions has helped in the economic distribution as these areas have been previously poor and lesser developed. The beneficiaries include about 65,000 farm households with approximately 400,000 person. The rice sector, however, supports the livelihood of about 300,000 families, and inasmuch as all rice farmers, including those in single-cropping regions, stand to gain from increased output and yield. Public sector efforts to increase production and productivity, including drainage and irrigation facilities, should be effectively extended to the single-cropping areas.

Similar patterns of growth was observed in smallholder rubber and oil palm where total output and productivity vary not only between the government-organised smallholders in land development schemes and the independent unorganised smallholders, but also within the former. Again, this reflects the discriminatory allocations of public investment and support in addition to agronomic and related problems. The smallholders in FELDA land development schemes, having access to better technology and capital and management inputs, have higher output and productivity compared to other smallholders, including those in land development schemes other than FELDA, who were on a smaller scale and receiving a much lower rate of support and subsidy. The number of families benefited has been about 62,000 and with still a larger proportion of rural population and farming communities needing economic improvement, it has created a greater demand for land development programs and the need for improved facilities and greater investment and support for smallholder outside land development schemes.

The apparent increases in the rate of growth of output and productivity have brought about general improvement in income of the smallholder farming communities. However, again, the gain varies from region and between activities as well as within the same activity. As mentioned earlier, the remarkable improvement in farmers' income have been amongst smallholders in large-scale land development, i.e. FELDA schemes. They received substantially higher incomes well above the average agricultural or rural households compared to their counterparts in other such land development areas operated by the Federal and State public sector agencies or the unorganised smallholders. This achievement reflects the benefits from higher rate of growth of output and productivity and, in part, due to the favourable prices over the last decade and the economies of scale, both in the cultivation and processing of the crops. It also reflected income inequality among and between rubber and oil palm smallholders.

The incomes of rice farmers also indicated similar pattern. The income benefits of public investments and support to certain categories of rice farmers has been quite marginal. The improvement in income among rice farmers in the East coast and in unirrigated areas is far from impressive compared to those farmers in the West coast and in irrigated areas, reflecting the income disparity in rice farming. It has been estimated that the groups of rice farmers in the former generally saw marginal change in their income, whereas for the latter the increase has been almost doubled. Apart from regional differences, income inequality also exists within the affected region, especially between large and small or non-landowning groups and betweem those farming under conditions of good water control and those subject to poor water controls. The pattern in income inequality bears unhealthy economic, social and political implications.

The apparent economic disparity and regional differences in growth and income benefits reflecting, in part, the differential rate of public investment and support to different agricultural activities and groups of beneficiaries carries some allocative implications. In terms of allocative efficiency, there has been indications of a misallocation of public resources. In rice production, although output has increased and incomes improved, the allocation of public investment resources leads to the widening of income inequality between rice farmers in double — and single-cropping areas as well as between irrigated and unirrigated areas. For rubber and oil palm, there has already been inequality in incomes between smallholders in government-organised land development schemes and in unorganised smallholdings. In addition, the success of land development programs, especially those of FELDA, has created demand for land under FELDA schemes, especially in the oil palm schemes. This will cause greater divergence in income benefits between various land development programs and between the organised and unorganised smallholder; thus reflecting further misallocation of investment resources.

In terms of distributive implications, the differential rate of allocation and support already reflects the unequal distribution. In addition, the allocation of public investment to new land development programs has created a relatively wealthy class of farmers on lands opened up with larger farms and higher productivity and income than the average agricultural households. The percentage of households so benefited was still small in relation to the number of agricultural households below the poverty line — about half a million: thus indicating inequality. In the case of rice, with the pattern of ownership and operation of rice land being unevenly distributed, and the majority of the rice farmers only owning and operating small-sized holdings, the benefits accrued has been more to the advantage of large land-owning farmers, implying divergence in incomes.

Generally, however, public investments has yet to promote extensive modernization in the smallholder sector. There still remain large smallholder areas where little has been achieved, and where the traditional low-productivity activities has not yet been modernized to any useful degree. With the incidence of poverty still high, and increasing inequality becoming a serious issue, the prevailing differential rate in the allocation and distribution of public investment resources between activities and groups of beneficiaries is neither an efficient nor an equitable policy.

VI. Policy Issues and Future Development

Comparing the beneficiaries of public development expenditure in relation to the larger number of non-beneficiaries, it is pertinent that various policy issues be taken into consideration in allocating and utilizing public investment resources. This is important as there exists scope for further agricultural development, at least for the smallholders.

Generally, uncertainly will continue, as always, to be the major factor in agriculture, and its future development will be affected largely by the unstable world for primary commodities, especially rubber and oil palm. This, is turn, affect the revenue and consequently the availability of public investment resources. Under this circumstances, there is then a need and scope for the wider participation from the private sector in agricultural investments towards a balance between social needs and economic returns, if not for lucrative gains, in the smallholder sector. Private investments provide a useful supplement to the public sector investments and support in the provision of gains to a wider range of the rural population.

In view of fluctuations and instability in prospects of the major export crops, an expansion in the production of food, which has often been neglected, offers an alternative to the present structure. The expanded cultivation of food crops carries social and economic implications in addition to being strategic. With the greater proportion of the small farmers engaged in food crop production, the channeling of extensive capital and input investments both from public and private sectors provides an opportunity to improve output and income among these poorer rural population. It will help to reduce overdependency on food imports and further improve income distribution and reduce the inequalities.

The improvement on existing pattern of small-scale production provides another avenue for growth and equity. Large-scale production is important because uneconomic-sized holdings, inadequate access to capital, input and technology, poor husbandry etc., has been the cause of low productivity and low income among the traditional smallholders. As indicated in land development programs, large-scale agricultural production provides an advantage of economies of scale besides large capital inputs, better management and organised production. This effort will demand greater investment resources and public support, but can benefit the half million or more smallholders.

Inasmuch as the need and scope for further structural change, the economic development of agriculture should also continue with the current emphasis on tree crop agriculture. They still provide the force behind most of the development in the agricultural sector as in the past although remaining unstable. They will also continue to support the livelihood of most Malaysians and provide an important source of government revenue.

A vigorous and prosperous agricultural sector is essential as it has always been fundamental to the economic, social and political development of the country. Moreover, social and political stability has always been, and continue to be given priority over other policy commitments. There is, however, a danger that a continuing substantial public investment and support in smallholder agriculture could lead to long-term dependency of the farming communities on the public sector support.

VII. Conclusion

Public investments in agriculture has not transformed the sector structurally but, more significantly, it has improved the productive efficiency of smallholder agriculture. It also contributed significanly to overall growth and economic development in smallholder agriculture. Consciously or otherwise, however, it has also created a new dimension in the agricultural sector by dividing the smallholder component between the middle-class and poor farmers. This resulted in greater inequality within the smallholder sector, in addition to the already existing economic disparity between the estate and smallholder segments.

The existing agricultural programs and extensive investments in agriculture has yet to make a significant impact on rural poverty, at least at the macro level. As such, the future development of agriculture, in addition to maintaning the present structure, need an expanded programs in large-scale agriculture, including food-crop production, and an increased public and private sectors participation. Ceteris paribus, agriculture will remain and continue to be the long-term base of the Malaysian economy.

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11

A STUDY OF PRICE DETERMINANTS IN THE DOMESTIC RUBBER MARKET IN WEST MALAYSIA

PAUL CHAN

INTRODUCTION

This paper will examine the main determinants of domestic rubber prices which are paid by rubber dealers to rubber estates and smallholders in West Malaysia. As both economic and non-economic factors exert a different impact on the prices received by estates and smallholders a comparative analysis of these two groups of producers will be carried out.

In analyzing the above problem the market structure and pricing process in the domestic rubber industry are first explained. Then a dummy regression model is developed to help quantify and to measure the influence of various qualitative factors which are hypothesized to affect the domestic rubber price structure. This is supplemented by a study of the marketing practices of the rubber producers and rubber buyers.

All the data and information which are subsequently used in this study are derived from a sample survey of 100 smallholders, 50 estates, and 25 rubber dealers. The survey was carried out during May 1973 — January 1974 in the state of Selangor in West Malaysia[1]. Data on prices and information on other variables used in this paper were collected by survey questionnaires and interviews of the selected rubber producers and rubber dealers.

Domestic Marketing Structure

Though Malaysia is an important producer of rubber it is not an important consumer of the raw product. Local consumption of rubber

1. The original purpose of the survey was to collect information on a study of "The Effects of Export Taxation in the Rubber Industry in West Malaysia." (Ph.D. Thesis submitted to Australian National University Canberra 1976). Readers who are interested in the various details of the survey are referred to this thesis.

is negligible. The major reason for this is the relatively low level of industrialization in the country. A second reason is that the producers cannot consume or use this product in any way. Essentially it is a raw material for manufacturing purposes. Rubber is not a food crop like paddy which can be part consumed on the farm and the surplus sold in the market. These two reasons explain the insignificant domestic absorption of the Malaysian rubber output. Rubber producers must export and sell abroad to the foreign buyers who would utilize it in their manufacturing.

A typical system commonly used by smallholders in their rubber marketing is depicted in Fig.1. The present system for smallholder rubber in West Malaysia has been mainly influenced by developments within the rubber industry and by the complexities of smallholder operations. The marketing system is characterized by a multi-tierred framework and a multiplicity of operators. Marketing activities at the primary, secondary and tertiary levels by the dealers, remillers, packers and exporters closely interact to form a highly integrated system. Through the provision of a range of services such as credit, warehousing, transportation, processing and grading, the marketing system has been effecting the movement of rubber from scattered sources to the foreign consumers.

There are basically three intermediary economic units between the rubber producer and the consumer: the first or primary level dealer, the intermediate or secondary level dealer, and at the tertiary level the packer and exporter. Though each provides different services they are not mutually exclusive. In fact, some of them may function at more than one level in the marketing chain.

The smallholder's first point of contact with the marketing side of his production is the first level dealer. The first level dealer is found predominantly in the village close to the smallholders. It is quite uncommon for him to be located at large urban centres. As the term implies, the first level dealer's main trading activity is with the smallholders. He does not buy from other dealers and only occasionally buys from some small estates.

These dealers can be subdivided into three broad categories. The first is the independent buyer. He uses his own capital and decides his own buying and selling policy. The second is the integrated buyer. While like the first category he is independent in his buying policy he may not be that independent when it comes to selling. For instance, because of contractual agreement with another dealer, usually the intermediate dealer, he is obliged to sell to the latter. The third is the agent buyer. While nominally he may be doing his own business in effect he is a buying agent for a larger dealer. The buying and selling policy in this case is controlled by the larger dealer who pays the former a commission.

Besides these three sub groups there are also the unlicensed dealers. The unlicensed dealer is really a tout. He moves around the villages in search of rubber. This itinerant buyer and his buying activity is an illegality in respect of the law regulating the internal trade of rubber in the country.

The Rubber Supervision Enactment[2] stipulates that all those who deal in rubber in one way or another must be licensed. One of the stipulations is that only licensed dealers are allowed to buy, store or treat rubber. Any other person or firm not so licensed is subject to prosecution. In practice this may be flouted as the enforcement of the law is not very strict.

One significant function of the first level dealer is to provide assembly points for the collection of smallholders' rubber. Without him, the smallholders would find it difficult to sell their individual small lots of rubber each time to the intermediate dealers who only buy in large quantity. Another function of the first level dealer is the dissemination of price information. This helps smallholders to know the condition of the rubber market. This, however, does not guarantee that smallholders will be given competitive prices. In addition to the above functions, the first level dealer performs the tasks of grading, weighing and smoking rubber. One by product of his trading activity is the provision of loans and credit to smallholders who need them. If he is in addition a grocery shop-owner he might also provide goods on credit.

2. Rubber Supervision Enactment, No. 10 of 1937. F.M.S., Gazetted Notification No. 4288/38.

The intermediate level dealer is found between the first level dealer and the packer/exporter. He is the major outlet for the first dealer and is also the main source of rubber to the packer/exporter. There is a close analogy between the smallholder/first level dealer relationship and the first dealer/intermediate dealer relationship. Just as the smallholders would find it difficult to sell each small lot of rubber directly to the intermediate buyers or to consumers abroad, the first level dealer would also find it difficult to sell direclty to packers/exporters or foreign consumers. For the latter deal only in large bulk, It is difficult for small first level dealers to accumulate stocks for this purpose, for it is physically inconvenient and financially beyond them. The intermediate dealer thus performs the functions of collecting from smaller dealers the small scattered amounts of rubber. The intermediate dealer may grade or re-grade the rubber if necessary and also does smoking if required. The intermediate dealer is generally located in the larger urban centres. Besides buying from the first level dealers he also buys from estate producers. Generally, there is little direct transaction between him and the smallholders.

Except for latex and scrap rubber, all other types of rubber are smoked, and smoked rubber has to be graded and packed for export at some stage in the marketing chain. This is mainly the job of the packer/exporter. Usually the functions of packing and exporting are performed by one firm. Being at the end of the internal marketing chain he is also the connecting liñk with overseas consumers. He is also at the beginning of the pricing process for the internal marketing system. The packer/exporter is located at or near the major ports in the country.

One of the several types of rubber output is scrap and cuplump rubber. This is the lowest grade rubber produced in West Malaysia and is un-processed in this stage. It is the job of the remiller to convert this raw material into various types of crepe rubber like 2X Thin Brown Crepe, Flat Bark Crepe and Thin Brown Crepe. As shown in Fig.1 this scrap rubber follows a slightly different path through the marketing system .

Mention must be made of the role of public agencies in the marketing system for rubber, particularly smallholder rubber. The unorganized and unsophisticated manner in which smallholders market their rubber exposes them to trading malpractices. It is to remedy these drawbacks and to strengthen the smallholders' bargaining position that various public agencies have been started.

The principal public agencies which play an important role in the marketing of smallholder rubber include the Malaysian Rubber Development Corporation (MARDEC) which concentrates on the processing and marketing of rubber mainly from individual smallholders; the Federal Land Development Authority (FELDA) which organizes the marketing of rubber for smallholders in such land schemes; and the Rubber Industry Smallholders Development Authority (RISDA) which markets the rubber of individual smallholders who use the group processing centres. These three agencies work in a coordinated manner. For instance, since MARDEC is involved in both processing and marketing it thus provides an outlet for FELDA's latex and RISDA's sheet rubber through its factories which are strategically located.

Smallholders who use this marketing system of public agencies are paid a price for their products based on the daily official price issued by the Malaysian Rubber Exchange and Licensing Board. This price is net of the relevant export tax and various cesses, and also the processing and overhead costs. Generally, this price is expected to be slightly better than that offered by the traditional traders since the sole aim of these public agencies is to upgrade the income of the smallholders. Consequently, some degree of competition is introduced into the traditional marketing system by the existence of such agencies.

However, their impact in the national marketing network is still not very significant. This is confirmed in Table 1. It can be observed that the traditional marketing sector of private dealers, remillers, and exporters still control as much as 84 per cent of the smallholder rubber in 1974. MARDEC's share is only a modest 7 per cent. The other two agencies, RISDA and FELDA, are respectively responsible for 6.3 and 2.8 per cent of the marketed smallholder rubber. It is envisaged that by the end of the Third Malaysia Plan (1980) the share of MARDEC, FELDA, and RISDA in the marketing of smallholder rubber would rise to 30, 11, and 3.3 per cent respectively. Whether these targets could be realized depend obviously on the efficiency of these agencies. At the moment, despite government support, they are not in a position to compete effectively with the traditional dealers. One explanation for this is that these agencies are burdened with bureaucratic red tape.

Fig.2 shows the marketing system of the estate producers. It will be noticed that the role of the first level buyer is not important. Few estates sell to first level buyers. Most deal directly with the other dealers. Some larger estates even by pass the intermediate buyers and sell directly to exporters or even to consumers abroad. Most of the direct and indirect functions, like provision of loans, of the dealers in the case of the smallholders' marketing system are absent in the estate marketing system.

Fig.2 needs some elaboration since it does not reveal in full the marketing details of the estate section. There are in fact five possible ways for estate rubber to reach the consumer. The output can be in the form of

1) untreated field rubbers which are sold locally to the processing factories, direct or through dealers,
2) semi-processed and processed rubbers which are sold locally to dealers and processors for further processing, sorting, grading, packing, and final export
3) prepared rubbers which are export-packed and then sold by the estates themselves, with or without broker intermediary, to local dealers and local consumers
4) prepared rubbers which are export-packed and then sold by the estates themselves, with or without broker intermediary, to dealers and consumers abroad
5) prepared rubbers which are export-packed and then sold in London by London Head Offices of estates, with or without London Selling Agents and London Brokers, to dealers and consumers.

The above channels of supply may also involve the services of a Malaysian-based Agency House intermediary acting for the estate producer, or a manufacturer's buying agent intermediary acting for the consumer. This is quite a common practice among the larger estates which use the auxiliary services of Agency Houses.

The Pricing Process

The price which is paid by the first level dealer to the rubber producers is reached in the following manner[3]. Each day the rubber dealer contacts a few of the intermediate dealers to obtain a quotation of the price for the various grades of rubber. The normal communication method is by telephoning the intermediate buyer. This may be done more than once a day. When there is no quote, for instance during the early part of the morning, the previous day's price may be used. This is done at a risk since the price will change up or down during the day. From the quoted price, in local monetary units and weights, the dealer makes the necessary deductions to cover his marketing cost and profit margin. Then this is used as the basis for the determination of the price to be paid for a given grade of rubber. The actual decision process to arrive at the final price to be paid to the smallholder or estate is also influenced by other variables which will be discussed later.

The intermediate buyer who provides the price quotation to the first dealer is in his turn dependent on the exporter for a price quote. He makes similar deductions to cover his marketing cost and profit margin. Then this is used as the basis for price quotations to other dealers.

The world price is determined by supply and demand factors which in turn are influenced by other variables like world politics, stockpiling policy of the United States, competition from synthetic producers, the buying policy of large consumers, and the like. This is the price from which the exporter gets his basis to arrive at the price given to the intermediaries below him in the marketing chain.

Besides the deductions made for marketing cost and marketing profit the exporter also deducts the export tax and various cesses he has paid to the customs on the date of shipment of the rubber. Through the price transmission process the final payer of the export tax and cesses is the rubber producer. It is more in the nature of administra-

3. Obtained by discussion with dealers during survey.

tive convenience that the exporter pays the export tax and cesses first[4].

In general, the pricing process for both estates and smallholders can be summarized thus:

1) world price minus export tax and cesses equals exporter's price
2) exporter's price minus marketing margin[5] of exporter equals intermediate dealer's price
3) intermediate dealer's price minus his marketing margin equals first dealer's price
4) first dealer's price minus his marketing margin equals price received by rubber producers.

For any given world price, the price received by the producer is thus influenced by the export tax and the marketing margin of the dealers. The amount of the export tax is determined by the world price according to the tax schedules[6]. The marketing margin is dependent on not only the marketing cost but also on the marketing practices of the dealers and the rubber producers. What determines the marketing margin will determine the price received by the rubber producers. Ceteris paribus, they vary inversely with each other.

As usually understood, farm gate price is the price received by the producer on his farm. For rubber this means the price given by the rubber dealer to the smallholder or estate producer. However, this is actually a misnomer in the rubber case. There is, strictly speaking, no official record of the farm gate price in rubber marketing. The term dealer's price is therefore used. To understand this requires a brief explanation of the laws governing the internal marketing of rubber within the country.

The various stipulations in the Rubber Supervision Enactment were mainly to protect the interests of the estate producers. In the past estates had alleged that some of the rubber sold to rubber dealers had been purloined from the estates. To stop the thefts they urged the government to legislate all rubber transactions on a licensed basis.

4. For details on the export taxation system and its effects refer Lim Chong Yah [1960], Tan B.H [1967] and author's thesis mentioned in footnote 1.
5. Include transport cost.
6. See studies in footnote 4.

Thus all who deal in rubber are licensed. Furthermore, rubber dealers are not allowed to buy rubber outside their premises. The trading hours are restricted to between 6.30 a.m. and 6.30 p.m. at the dealers' premises. This piece of legislation outlaws dealers from looking for business amongst rubber producers. Legally speaking therefore the dealer is precluded from buying at the farm gate.

In practice, it is known that dealers, particularly the smaller ones, do violate the regulations. The extent of the breach is, however, not known. It is suspected that it is more common in the transaction of smallholder rubber than in the case of estates. During the survey the dealers were questioned on this issue. None would admit any breach of this rubber regulation — which is hardly surprising. However, little effort seems to be made to enforce these rubber regulations strictly.

A Model of Price Determinants

In this section, a simple model of price determinants is constructed. The analytic technique used in the study may be described as the general regression model using dummy variables in the regression equation. The use of dummy variables in regression analysis provides a method of quantifying otherwise non-quantifiable variables and also affords a way of measuring their net effects. The technique requires assigning a dummy variable to certain variables. For instance if the variable belongs to a certain category it is given 1, and 0 otherwise.

Dummy variables may be used as dependent or independent variables in a regression model when the data are logically divisible into mutually exclusive classes or groups.

As an illustration the hypothesis to be tested may be $DP = f(G)$ where DP is the dealer's price and G represents one of the following grades of rubber: RSS 1, RSS 3, USS. If g_1, g_2, g_3 represent these grades in the order named, the model becomes

$$DP = a + b_1g_1 + b_2g_2 + b_3g_3 + u$$

The g's in the model take the value 1 or 0 depending on whether the observation is in that category.

The g's in the model take the value 1 or 0 depending on whether the observation is in that category.

The method of least squares cannot be used unless certain constraints are imposed. This is because of the existence of linear dependence in the dummy variable model among the g's. Three constraints could be used[7]:

1) setting the constant term to zero
2) setting one of the coefficients in a factor group to zero
3) setting the sum or the weighted sum of the coefficients of a group to zero.

In this study the third constraint is used.

The main hypothesis of the study may be stated algebraically as follows:

$$DP = f\ (G_i,\ S_j,\ D_k,\ F_l,\ I_m,\ R_n,\ N_o,\ E_p) \qquad \ldots (1)$$

where:

DP = price offered by dealer and received by producer	
G_i = grade of rubber	i = 1, 2, 3, 4.
S_j = size of holding	j = 1, 2.
D_k = distance from dealer	k = 1, 2.
F_l = frequency of sales	l = 1, 2, 3.
I_m = price information	m = 1, 2.
R_n = relationship with dealer	n = 1, 2.
N_o = number of dealers sold to	o = 1, 2, 3.
E_p = ethnic ownership	p = 1, 2.

Eq. 1 states that the dealer's price is influenced by the dependent variables listed. These are qualitative variables which are believed on a priori ground to be important determinants of dealers' prices.

A brief explanation of each term will be done here. DP, the dealer's price, is the quantitative dependent variable. The data cover the period May to July 1973, 300 observations on prices were collected during the survey for this period for smallholders and 150 for estates. Other details on the qualitative variables were collected using various questionnaires. The grade variable refers to RSS 1, 2, 3 and USS. The size of holding is divided into two groups, viz, below 10 acres and above 10 acres for smallholders; and below 1000 acres and over 1000

7. See J. Kmenta [1973, pp. 409-430 and pp. 431-450] and D.B. Suits [1957, pp. 548-551].

acres for estates. Distance is divided into two groups: less than 2 miles from the dealer and more than this distance. The frequency of sales refers to the number of times marketing is done per month by the producer. Relationship with dealers refers to whether loans or credit has been taken by the smallholders from the dealers. This variable is used only for smallholders since estates do not obtain such benefits from dealers. They get their finance and credit elsewhere. The number of dealers refers to the number of dealers the producers transact with.

Results

Price was regressed on all the listed variables separately for the smallholders' and the estates' data. The least squares estimates and other statistical properties of the equation are given in Table 2. P is measured in cents per pound. The coefficients measure the amount of deviation of each variable. The coefficient of determination, R^2, is 76 per cent for smallholders and 58 per cent for estates.

Price and Grade

The statistical results in Table 2 confirm the close relationship between the price and grade of rubber. Producers of better grades of rubber managed to fetch a higher price for their output. For instance, it can be seen that RSS 1 rubber could get a price which was higher than the average by 4.3 cents per pound. Lower grade rubber, on the other hand, fetched prices which were below the average figure. Thus, USS sellers were given 6.7 cents below the average price. The coefficients for the grade variable are all significantly different from zero at the 5 per cent level of significance.

Price and Size of Holding

Smaller producers as defined by the size of their acreage seemed to get lower prices. However, we must not be misled into thinking that size per se was the cause of the low dealers' prices offered to small rubber producers. It is the associated factors like the poorer quality of the rubber and the weaker bargaining position of these producers because of their small sales volume, and such like factors, which caused the lower prices. Size did not appear significant to the estate sample.

In the case of smallholdings, the coefficient for those below 10 acres was significant and indicated that they obtained a price which was 2.3 cents below the average price.

Price and Distance

None of the coefficients were significant for this variable. Distance did not appear to be a significant variable in determining dealers' prices. There are two possible explanations for this. First, it is the economic distance which really matters. That is, given the geographical distance could the producers cover it in an efficient way and do they have the transportation facilities to do so. Economic distance[8] was a more serious constraint to smallholder producers than to estate producers. During the survey it was found that 54 per cent of the smallholders still relied on bicycles to transport their rubber to the dealers. 29 per cent used motorbikes and 10 per cent used motor vehicles. The remaining 7 per cent reported that their rubber was sold to itinerant buyers. From this information it could be deduced that smallholders were rather restricted in their choice of dealers, especially if they were scattered, because of the lack of efficient transportation facilities. One corollary of this is the consequent weakened bargaining power of the smallholders vis a vis that of dealers. The estates are in a different position. During the survey it was found that all the estates owned at least one lorry which could be used to transport the rubber. This gave them a larger degree of freedom compared to smallholders. Secondly, no transport cost was deducted from the dealer's price since the sellers provided their own transport. For instance, when an estate delivered rubber to the buyer's godown the former undertook the loading, transport, and unloading of the product[9].

Price and Sales Frequency

In the case of the smallholders, those who sold three or more times per month had a slightly lower average price: (0.59 cents per pound lower) than the others who sold at less frequent intervals. This was probably due to downgrading when sales were made frequently in

8. Economic distance is determined not only by geographical distance but also by availability of and accessibility to transport.
9. See James Ong [1975]

small lots. The higher frequency of sale of the smallholders was due to the need for income, which was required to pay for the daily expenditure. In contrast, the estates which sold less frequently and which were well informed of the prices did not suffer any such loss.

Price and Price Information

The result shows that those who were ignorant of the price situation obtained lower average prices. Smallholders who did not try to find out the prevailing price could be more easily cheated than those who were more knowledgeable. Thus the former got 1.2671 cents less than the average price. The estates being better informed, faced a more competitive market and could thus obtain better prices.

Price and Relationship with Dealers

Smallholders who were indebted in one way or another, viz, loans or credit, got 2.1671 cents per pound less than the average. Those who were not got 1 cent above the average. Perhaps the latter were not bound by the relationship as the former were and could sell to dealers offering better prices. During the survey it was found that the relationship between estates and dealers was one of equal footing. The former were not bound in any to dealers by way of loans or such like services. In fact, dealers were found to be quite obligatory in giving the "best" price to estates as the large business of any particular estate was something to be valued in the long run. A rash move by a dealer to "exploit" any estate would mean the loss of a profitable customer.

Price and Number of Dealers

It appears that smallholders who sold to more than one dealer obtained a higher price than those who sold to only one dealer. This fact seems to substantiate the section analysed immediately above. Thus those who sold to three or more than three dealers obtained 0.87 cents more than the average and those who sold to only 1 got .0612 cents less than the average. The coefficients are significant. For the estate case they are not significantly different from zero though estates selling to more than 3 dealers or to 3 got 1.3 cents more than the others. In contrast to smallholders, estates could obtain access to as many dealers as they wished and they were therefore in a better position to obtain the best competitive price for their rubber.

Price and Ethnic Ownership

For smallholders it is clear that Malays got a lower price (-3.67 cents per pound) and Chinese got 4.06 cents per pound above average. The reason is that generally Malays produce lower grade rubber whilst the Chinese produced better ones. Similarly, European estates fetched a better price, 2.6 cents above average. But the coefficients for the estate situation are not significantly different from zero.

Marketing Practices and Pricing

The above analysis has established that grade of rubber has been the most important determinant in pricing rubber. A better grade of rubber is sold at a premium in the world market. Some average differentials for various grades of rubber are given in Table 3.

Normally whereas estates produce better grade rubber like RSS 1 and 2, the majority of smallholders' output is still of grade RSS 3 and below. The quality of smallholders' products is uneven. This has created a situation whereby the dealer's price can be reduced deliberately by the dealer's pricing policy.

Before pricing the rubber of the smallholders' sheet rubber the dealer takes into considerations factors like its grade, weight, and for unsmoked sheets moisture content. No scientific method is used by dealers in determining the quality of sheet rubber. Visual inspection is still the most common method. Table 4 shows some of the ways commonly used in assessing the quality of sheet rubber purchased from smallholders. Slightly more than half of the dealers assessed the quality of sheet rubber by checking the batch as a whole. Few examined every sheet. It would be too laborious a task unless only a few sheets are sold at any one time. From a practical viewpoint, it is hardly feasible to examine every sheet especially if the amount transacted is a larger one. It is time consuming and laborious.

But whichever method is used the smallholders are still in a disadvantageous position. Unless a mistake is made no dealers would give a grade higher than necessary. Frequently the grade is deliberately downgraded. This serves two purposes. The first is a safeguard against wrong assessment. When this happens he suffers a loss when the rubber is re-sold to another dealer as the latter is quite likely to grade the rubber accurately. This is thus an insurance against risk. Secondly, downgrading the smallholders' rubber increases his marketing margin since he can re-sell it as a better grade. This is a sort of 'hidden' price erosion. Table 5 shows that most sheet rubber was classified as a grade 3, and more than three-quarter of unsmoked rubber was classified as grade 3 and 4. Lim has confirmed that a large proportion of this downgraded rubber was re-sold as higher grade rubber[10].

Another way to erode the price paid to smallholders is to make a gain during the weighing of the rubber. Table 6 shows that 60 per cent of dealers rounded the weight to the nearest half kati. Dealers did not round up to the smallholders' favour. They rounded down to benefit themselves. Smallholders who sell in small quantity each time will thus lose more by this practice. The loss will be greater the more frequent they sell in small amount each time.

The sale of unsmoked sheet rubber has a third disadvantage facing the smallholders. In assessing the quality of unsmoked sheets the moisture content has to be gauged. Again, no scientific method is used. It is based on thickness of the unsmoked sheets and the length of time after the processing of the rubber. A rule of thumb policy, very arbitrary in nature, is used. Dealers reported that generally they would deduct about 10 per cent for moisture if the sheets were thin and one or two weeks old and as much as 40 to 50 per cent for thick sheets which were sold immediately after processing.

Estates are in a different position. The grade of rubber produced is normally RSS 1. Dealers, from their past dealings with estates, know the standard quality of estate rubber. Besides, the fact that estates have their own assessment made of the rubber for checking against that of dealers' grading and weighing make exploitation difficult. For any given grade this ensures that a better price is given to any estate producer.

Another variable which needs a little elaboration is the smallholders' relationship with the dealers. Dealers do not only buy rubber from smallholders. Many of them also provide loans, credit, and services

10. Lim S.C. [1968]

like processing and smoking facilities. Lim's conclusion is that marketing deductions were not made because smallholders borrow from the dealers[11]. Probably the reason for this is that dealers use this as a means to secure the patronage of the smallholders. Besides, deductions need not be made from the dealer's price to increase the marketing margin. 'Hidden' price erosion in the form of downgrading and such-like practices can be carried out once the customer-buyer relationship is firmly established.

During the survey it was found that most smallholders preferred to sell to only 1 or 2 dealers (Table 7). The common answer given to this was that they found the dealers reliable and'a good friend'. A 'good price' was also mentioned as one of the reasons but not as frequently as the first two. Probably reliable and friendly dealers give 'good prices' and this factor is subsumed under the other two reasons. On the other hand this preference for a reliable and friendly dealer may be a genuine one. It is a very rational behaviour. From the 'good' relationship a smallholder can obtain access to loans and credit which are not easily available to a 'small' man in a kampong. This preference to deal with a reliable and friendly dealer is double-edged. It can be a source of benefits to smallholders in terms of loans, etc. It can also be used against him if the dealer 'exploits' the relationship by hidden price erosion.

If the latter occurs and if the smallholder knows and still continues the relationship it is because he values it more than the slight loss in price. One possible interpretation is given in Fig.3. Assume two dealers A and B. Assume that dealer A's price is higher than dealer B's price by the amount shown, given the world price. Also assume that the smallholder involved can sell to either A or B and he knows the price differential. If the smallholder is still willing to accept the lower price from dealer B and suffers a slight loss it is because he considers the imputed value of the benefits deriving from his relationship with B more than compensates or is equal to the loss he suffers from the smaller price given. However, this equilibrium relationship will be

11. Ibid.

disturbed if the smallholder feels the loss is greater than the benefits. He will then ask for a better price or try another dealer. Both, however, presume that the smallholder could do so, i.e. that he has a strong bargaining position, and that he has access to other dealers. For most, both may be absent.

The dealer's price received by the estates and smallholders thus depends not only on the world price and the export tax but also on institutional variables and marketing practices of the dealers and rubber producers.

Conclusion

By using dummy variables in a regression model the influence of certain qualitative variables was assessed. The results indicate that the various variables, which were hypothesized to be important in affecting price differentials, explained 76 per cent of the variation in smallholders' prices and 58 per cent for estates' prices. Of all the hypothesized variables grade appeared to be the most significant in determining price differentials amongst smallholding producers. The obvious advice seems to be the suggestion that they should produce better grade rubber.

However, this by itself does not guarantee that smallholders will be given a price befitting the grade they produce. This is because the various marketing practices of the rubber dealers and smallholders could create "non-competitive" situations for "hidden price erosion." To remedy this therefore requires a massive educational programme on both production and marketing practices. The extension services of institutions involved in the rubber industry like the Rubber Industry Smallholders Authority (RISDA) should widen and intensify their work among rubber smallholders. At the same time if the government really cares for the smallholders it cannot afford to allow the various quasi-government bodies involved in the marketing of rubber to be competitively inferior to rubber dealers in the private sector. The aim should be to make the market for smallholding rubber as competitive as that existing in the estate sector. If reforms and changes are necessary to achieve this then they should be carried out so that a large segment of the rural populace in the country will benefit from a more competitive market and from the efficient services of the government and other quasi-government institutions.

Such problems of the smallholding sector are not experienced by estate producers. The government policy towards them should therefore be directed at other issues, viz, the use of high-yielding materials, optimal replacement, etc.

TABLE 1

ESTIMATED SHARE OF PUBLIC AGENCIES IN THE PRODUCTION/PROCESSING/MARKETING OF SMALLHOLDER RUBBER, 1975

Agency	Production/ Processing/ Marketing (Tonnes)	Per Cent of Total
MARDEC	55,000	7.0
FELDA	50,100	6.3
RISDA	22,000	2.8
PRIVATE	661,200	83.9
TOTAL	788,300	100.0

SOURCES: FLDA
MRDC
RISDA
RRI

TABLE 2 ESTIMATES OF THE DUMMY VARIABLE MODEL OF PRICE DETERMINANTS

Group Variable	Specific Variable		Smallholders		Estates	
			Regression Coefficient	t Statistic	Regression Coefficient	t Statistic
Grade	Grade 1	g_1				
	3	g_2	−2.1000	(− 7.8672)*	−1.7821	(−11.6121)*
	USS	g_3	−6.7210	(−10.2316)*		(−10.8121)*
Size of Holding	<10 Acres	S_1	−2.2763	(− 7.652)*		
	>10	S_2	.0612	(.0718)		
	<1000	S_1			.171	(− .2671)
	>1000	S_2			.17621	(.3681)
Distance from Dealer	>2 Miles	D_1	.0711	(.6716)	+ .0026	(.1021)
	<2 Miles	D_2	− .0271	(− .7891)	+ .0171	(1.021)
Frequency of Sales Per Month	1 Month	F_1	.1617	(9.8671)*	.0613	(.2671)
	2 Month	F_2	.1131	(6.2311)*	.0581	(.7816)
	3 Month	F_3	− .5912	(−10.7112)*	.0621	(4.6721)*
Price Information	Present	I_1	1.021	(10.6816)*	2.000	(9.1891)*
	Absent	I_2	−1.2671	(− 9.2451)*	− .0700	(− 8.1342)*
Relationship with Dealer						
	Present	R_1	−2.1671	(−10.7121)*		
	Absent	R_2	1.0020	(7.6610)*		
Number of Dealers Sold to	1	N_1	− .0612	(− 5.3161)*	.8921	(.7121)
	2	N_2	.6710	(4.7231)*	1.000	(1.1261)
	3	N_3	.8671	(7.6672)*	1.2671	(1.0211)
Ethnic Ownership	Malays	E_1	−3.6710	(−12.6123)*		
	Chinese	E_2	4.0671	(− 8.1121)*		
	European	E_1			2.671	(1.2671)
	Malaysian	E_2			1.871	(1.0211)
R^2			.76		.58	

* Significant at 5 per cent level.

TABLE 3 AVERAGE PRICE DIFFERENTIAL BETWEEN VARIOUS GRADES OF RUBBER FOR THE PERIOD 1960-1973

Difference Between RSS 1 and RSS 2 Prices (Cents)	Difference Between RSS 1 and RSS 3 Prices (Cents)	Difference Between RSS 1 and USS Prices (Cents)
.72	2.10	6.51

Source: Rubber Statistical Bulletin.

TABLE 4 NUMBER OF DEALERS USING VARIOUS METHODS TO ASSESS GRADE OF SMALLHOLDE RSS AND USS

Method	Number
1) Examine every sheet	1
2) Examine a few sheets	8
3) Examine batch as a whole	13
4) Rely on past knowledge of products of smallholders	6
Total	28

Source: Survey.

TABLE 5. PROPORTION OF SMALLHOLDER RSS AND USS ASSESSED BY DEALERS AS PER CENT

RSS 1	RSS 2	RSS 3	USS 1	USS 2	USS 3/USS 4
10	25	65	10	15	75

Source: Survey.

TABLE 6 NUMBER OF SMALLHOLDER DEALERS REPORTING ROUNDING OF WEIGHTS TO NEAREST

Tahil	Half Kati	One Kati	Total No.
2	7	4	13

Source: Survey.

TABLE 7 NUMBER OF SMALLHOLDERS SELLING TO

One Dealer	46
One or two dealers	30
More than two dealers	24
	100

Source: Survey.

FIGURE 1.
THE TRADITIONAL MARKETING SYSTEM OF SMALLHOLDERS

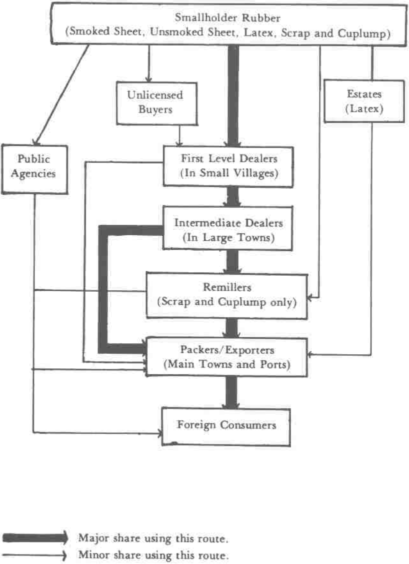


FIGURE 2.
THE TRADITIONAL MARKETING SYSTEM OF ESTATES

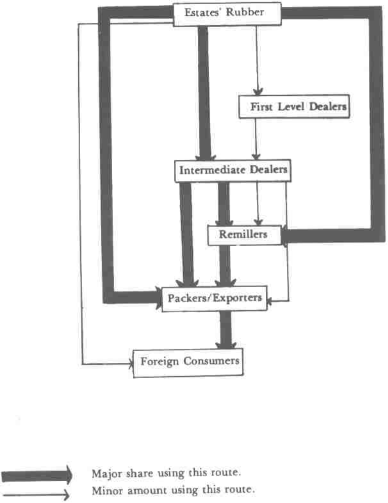
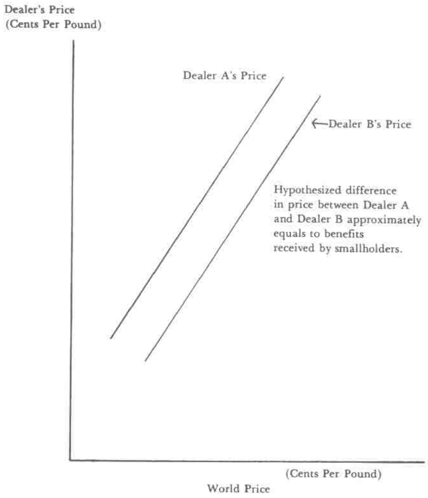


FIGURE 3. A CASE OF PRICE COMPENSATION



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12

GOVERNMENT INVESTMENT IN RICE PROCESSING CAPACITY IN WEST MALAYSIA*

RICHARD W.A. VOKES

Introduction

Since 1969 the Malaysian government has undertaken extensive direct investment in modern rice processing capacity. This investment has primarily been undertaken with the aim of preventing the emergence of 'second generation' problems within the rice processing sector which, it was anticipated, would follow the introduction and dissemination of the modern rice production technology and the rapid expansion of double cropping. The National Paddy and Rice Authority (NPRA)[1], which since 1971 has held overall responsibility for the development of the paddy and rice sector, now operates a total of 28 rice processing complexes, 26 of which consist of modern complexes (18 integrated milling and drying complexes and 8 drying complexes) with the other two consisting of older milling complexes.[2] The capital cost of this investment, somewhat in excess of M$ 90 million, [Vokes, 1978 : 136] has absorbed a significant share of government development expenditure for the paddy sector.

However, considerable controversy surrounds this investment programme. There is evidence that much of the government's processing

* This paper is based on research undertaken by the writer while at the University of Hull, England and at the Asian Institute of Technology Bangkok. Financial support for this research was provided by both the University of Hull and the Canadian International Development Agency, though the views expressed are those of the author alone.

1 In Malaysia, the NPRA is normally referred to as LPN, these initials being derived from its Malays name, Lembaga Padi dan Beras Negara.

2 In fact, two of the 'modern' integrated complexes in Kedah and Perlis consist of older conventional mills that have been upgraded and fitted with modern artificial drying units.

capacity has been underutilized, while the necessity for such an extensive investment programme has been challenged in the light of subsequent investments made by the private sector [RACNOM, 1974 : 17]. At the same time, serious technical problems have been encountered in operating the 'modern' complexes, especially with the bulk handling and storage facilities [Shamsuddin, 1979a : 176; 1979b : 442], and this, coupled with the relative factor scarcities prevailing in the country, has led to a questioning of the appropriateness of investment in highly capital intensive technology [Wells, 1980 : 136-138; Wells and Fredericks, 1980 : 260-261].

This paper therefore presents an analysis of government policy and planning in respect to public sector investment in the rice processing industry. It examines the rationale for public sector investment, the relationship between public and private sector involvement in rice processing, and the problems experienced in operating the public sector complexes, focusing in particular on the question of capacity utilization, and the question of the choice of technology in the public sector. Special attention is paid to the investment in processing capacity undertaken by the government in the Muda Irrigation Scheme, the country's major rice bowl area spanning the northwestern states of Kedah and Perlis. Seventeen of the total 26 modern complexes operated by the NPRA are located in the Muda area, and this is also the area where the most significant problems in relation to the planning of government investment have been experinced.

The Rationale for Government Investment in Rice Processing

The Malaysian government's investment in modern processing complexes has formed part of a larger programme aimed at raising the level of rice self sufficiency, thereby saving foreign exchange, isolating consumers from the volatile world market and raising the incomes of paddy farming households. An expansion in the area served by controlled irrigation, permitting the use of high yielding varieties and an expansion in double cropping, has been the major strategy adopted by the government to raise domestic production.

Between 1966 and 1975, M$ 540.73 million was spent by the government on new and improved drainage and irrigation facilities. Most of the expenditure has been directed towards the major paddy producing areas in the northwest and northeast of the peninsula, and has included two major new irrigation schemes, Muda in Kedah and Perlis and Kemubu in Kelantan. This extensive investment in drainage and irrigation has been supported by new policies in the fields of agricultural credit, extension, marketing and by the operation of a paddy price support mechanism.[3] Between 1965 and 1975 paddy production rose by 67 per cent, while in the same period, the off-season acreage grew by 486 per cent, accounting for 36 per cent of the total paddy acreage and 40 per cent of total production in 1975 [Selvadurai, 1972 : 8; Padi Statistics, 1975 : 3, 5]. Efforts to improve drainage and irrigation facilities have continued since then, with a further M$ 554.84 million being spent between 1976-1980 [Fourth Malaysia Plan, 1981 : 290] so that paddy production amounted to 1,853, 131 tons in 1980 [BNM, 1980 : 118], 10 per cent above the 1975 level.[4]

However, well before these major increases in production occurred, concern was expressed in government circles over problems within the processing sector which might develop as a result of the rapid increase in, and changing pattern of, domestic production. Thus, in an effort to prevent the emergence of possible 'second generation' problems, a nation wide survey of the rice processing industry was commissioned by the government and was carried out between November 1967 and September 1968 under the guidance of U. Thet Zin, an FAO rice processing expert. In the context of the government's self sufficiency policy, three major aspects had to be examined.

(i) The potential for reducing processing losses through the use of modern, technological efficient equipment.

(ii) The means of improving the quality of domestically produced rice so as to facilitate a smooth transition from high quality imported rice to domestic supplies.

(iii) The need for increased processing capacity.

In fact, at least in the case of milling technology, the study found that considerable modernisation within the industry had already taken place. Almost all of the large rice mills (LRMs), which undertake most of the

3 For a discussion of these policies see Vokes [1978].

4 However, the goal of complete self-sufficiency continues to illude the country, which was estimated to be only 89 per cent sel-sufficiency in 1980, compared with 95 per cent in 1975. In fact, while an increase in domestic paddy production is generally acknowledged to be both socially and economically desireable, the desireability of the goal of complete self-sufficiency has been questioned in view of Malaysia's comparative disadvantage in rice production. See Goldman [1975].

country's commercial milling, had already shifted away from the use of stone disc hullers to the technically more efficient rubber roller hullers, while in the case of small rice mills (SMRs) which mill paddy primarily for farmers on a hire charge basis, there had been a significant shift away from investment in primitive steel hullers toward investment in improved milling systems using both rubber roller, and stone disc huller [U. Thet Zin, 1969 : 11].[5]

Inspite of this, there were at this time no mills capable of producing superior quality rice comparable to high grade imported rice. However, according to the survey report. only comparatively small investments in additional milling equipment, notably improved graders and cleaners, were necessary to overcome this problem. While U. Thet Zin recommended that the government use its licensing powers to encourage millers to make such investments, it is likely, given that the process of modernisation had already begun, that millers would make the necessary investment as the demand for high quality domestic rice expanded.[6]

In fact, it was in the area of shortage rather than milling that the most serious problems were identified at this time. Although there was adequate storage capacity at most mills, storage facilities were found to be "lacking in cleanliness" and inadequately damp proofed, while no measures were taken to control pests, and, as a result, unnecessary losses occurred [U. Thet Zin, 1969 : 30]. Again U. Thet Zin urged that efforts be made by the government to encourage millers to make the necessary improvement.

It was, thus, the provision of adequate processing capacity that became the major focus of the study, and in this context it was the provision of drying rather than milling capacity that became the key issue. In the case of milling the survey revealed that there was, in fact, considerable excess

5 In Malaysia context LRMs may be classified as those mills with average milling capacity of two tons per hour (TPH) or more of paddy throughput, while SRMs have a capacity below two TPH, and generally below one TPH [Vokes, 1978 : 137]. For a more detailed discussion of milling technologies as they relate to Malaysia see Wells and Fredericks, [1981].

6 In fact, even with the shift to local supplies, it would only be necessary for a few mills to be capable of turning out such rice, since the demand was limited. It should also be emphasised that the quality of rice outturn does not only depend on the processing technology used but also on the variety and quality of the paddy input.

capacity in almost all of the major paddy producing areas.[7] Although there was insufficient excess capacity within the commercial milling sector to absorb all of the expected increases in marketed production, investment in new milling capacity by the private sector was to be expected. By contrast, there was an almost total lack of artificial drying capacity. The concern over the availability of artificial drying capacity stemmed from the fact that with double-cropping the off-season crop is harvested and marketed in the monsoon season, and as wet paddy deteriorates rapidly, considerable losses, both in terms of quality and quantity could be expected in the absence of artificial driers.

The feasibility study of the Muda scheme, completed in 1965, had not discussed the need for public sector investment in artificial driers, largely it seems, because of a belief that any necessary investment would be undertaken by the private sector. However, inspite of significant improvements in milling equipment, only 7 LMRs, of which only 3 were in Muda, had invested in driers by 1968 [U. Thet Zin 1969 : 46]. A number of reasons account for the lack of investment in driers at this time. The installation of a large scale drier represented a major capital outlay for such mills. While the cost of a locally produced 36 inch polishing cone was approximately M$ 3,750, in 1969, a continuous flow drier with a capacity of 8 tons per hour (TPH) would cost M$60,000, excluding investment in holding and tempering (cooling) bins, or buildings. [U. Thet Zin, 1969 : 46-49]. In addition, the millers who had installed driers were unhappy with their performance, complaining of a high percentage of broken grains when artifically dried paddy was milled. Althc gh this problem was ascribed by U. Thet Zin to either technical deficiencies or incorrect usage of driers, it nonetheless reinforced a view held by millers that the use of artificial driers would not be economic, at least in the main season when drying could be carried out more cheaply, and with a less detrimental impact on milling quality, by sun-drying. This, therefore, implied a

7 For a detailed examination of the problem of excess capacity at this time, including an analysis of regional variations, see Vokes [1978 : 143-164]. Excess capacity is, in fact, a common feature of rice processing industries in most countries, and is due, primarily, to the fact that for mills engaged in commercial milling, the optinum level of capacity utilization may occur at comparatively low levels of throughput since, while fixed costs decline as the level of utilization increases, this can only be achieved by incurring a significant increase in variable costs both in milling and in the purchase, storage and transport of paddy.

lengthy pay-back period for such an investment, since the driers could only be used profitably in the immediate post-harvest period of the off-season crop.

Furthermore, new credit and marketing policies introduced by the government after 1966, with the aim of eliminating the exploitation of farmers, also acted as a disincentive to private sector investment. These policies centred on the provision of new sources of institutional credit to farmers, a strengthening of the role of farmers' organisations in both credit and marketing, and the introduction of extensive new regulatory controls over the operations of paddy market functionaries. These measures had significant implications for the operations of millers and their agents, who at this time played a dominant role in the provision of credit and marketing services to paddy farmers.[8]

Lastly, it was to be expected that there would be a time-lag in private investment, as millers waited to see to what extent off-season cropping was successfully introduced, and to what extent there was a real demand for artificial drying, particularly as such units had not been found to be essential in the existing double-cropped areas in Penang, Selangor and Perak where in 1967, a total of 108,940 acres were planted with an off-season crop, accounting for almost 70 per cent of the country's off-season acreage at that time [Padi Statistics, 1969/70 : 9]. This appears to have been due to the fact that the deductions millers were permitted to make for moisture content more than offset the costs of sun-drying and any losses sustained. Furthermore, since the off-season acreage was limited, the level of purchase by individual mills in the off-season was insufficient to justify such costly investment.

For the government, however, the real costs of crop losses in the new scheme areas were high,[9] while the size of the off-season acreage, and thus the potential extent of the drying problem was larger than in the existing double-cropped areas. At the same time the government could not afford to adopt a 'wait and see' attitude and risk large crop losses, and a possible detrimental impact on farm prices, a view reinforced by the off-season drying problems experienced in the Philippines in 1967 and 1968 [FAO,

8 In fact, at least in the case of marketing, these new policies were not very successful. For an analysis of the problems encountered in implementing these new policies see Vokes [1979 : 202-222].

9 The capital costs alone of the Muda Scheme, for instance, amounted to M$874 per acre.

1971 : 27]. Thus, as most of the existing mills in the Muda and Kemubu areas were not in a position to carry out the cleaning, drying and storing operations necessary in the off-season, U. Thet Zin recommended that these functions be undertaken by integrated processing complexes set up by the government.

Public Sector Investment and the Response of the Private Sector

In outlining the need for public sector investment, U. Thet Zin suggested that the government set up 8 complexes on a pilot basis, of which 5 should be located in Muda and 3 in Kemubu [U. Thet Zin, 1969 : 52; 1970 : 8]. It was envisaged that each of the complexes should be able to handle between 9,000-12,000 tons of paddy per annum, serving an area of between 8 - 10,000 acres. No Paddy was to be rejected at such centres due to quality deficiencies. The milling capacity of the complexes was to be in the range of 10,500-15,000 tons per annum, equivalent to 3½-5 TPH.

Structured in this way, the processing complexes would be greared primarily to processing the marketed production from the off-season crop. This would be cleaned and dried during the immediate post-harvest period and then stored and milled throughout the year. The complexes would not, therefore, be competing directly with the existing operations of private millers, but only with their potential operations in the off-season. This latter point was significant since, although there had been some pressure on the government to increase its direct involvelment in paddy marketing and processing, especially following the setting up of the Paddy and Rice Marketing Board (PRMB) in 1967,[10] the government was reluctant to compete directly with the predominantly Chinese owned, private LRMs, since the Chinese millers were an important source of support for the government through their membership of the Malayan Chinese Association, at that time a major coalition partner in the Alliance government.

10 The PRMB was the first of the new parastatal marketing boards set up by the Federal Agricultural Marketing Authority (FAMA), itself set up in 1965. The PRMB was given the responsibility of operating paddy marketing schemes in all of the major producing areas. Both regulatory and trading schemes were envisaged, but until the completion of the new government complexes, its trading activities were confined to Tanjong Karang in Selangor, where it took over the operation of an earlier co-operative marketing scheme.

In fact, even these limited plans for increased government involvement in the processing of the off-season crop unpopular with the private millers and pressure was put on the government to amend its investment plans. The millers were against government investment in milling because they were less convinced of the need for extensive investment in artificial drying capacity, and therefore saw the possibility of purchasing off-season production as a means of increasing the utilization of existing milling capacity. At the same time, the government, though convinced of the need for driers, was reluctant to provide assistance, such as investment grants towards the cost of driers, to the Chinese millers for fear of arousing opposition from Malay interests within the Alliance.

In the end, a compromise was reached. In Kelantan, where there was only one Chinese owned private commercial mill and only a few LRMs, the government went ahead with its plans to build 3 integrated complexes.[11] By contrast, in Muda, where private miling interests were at their strongest, the decision was taken to set up drying complexes rather than integrated complexes. However, by early 1970 due to the continued lag in private sector investment in artificial driers, plans had been finalised for the construction of a total of 15 large scale drying complexes, each with a capacity of 10,000 tons per season [MADA, 1970 : 3]. Some of the paddy dried at these complexes was to be sold to private mills, and some sent to the government stockpile or milled at the two existing government mills in the area.

The 15 complexes were to provide sufficient capacity to dry half of the expected off-season production when the scheme was fully operational. The government still hoped that the private sector would meet the additional capacity requirement. However, the conflict over the correct policy on investment had caused delay, so that the first five complexes could not be ready in time for Muda's first off-season harvest in 1970. Thus, 3 temporary driers were set up at the two existing government mills in the Muda area, with a combined capacity of 30,000 tons per season, well below the expected harvest of 100,000 tons from the first off-season crop. In 1970 and 1971 a total of M$ 17 million was spent in Muda, on the construction of the temporary complexes and five complexes planned under Phase 1 of the PRMB's investment programme [FAO, 1975].

11 Subsequently, two of these were built by the State Co-operative Department in a move to strengthen the role of co-operatives in the state. The new co-operative comlexes were somewhat smaller than those planned by the government.

However, while public sector investment in artificial drying capacity in Muda expanded rapidly, private sector investment continued to grow only slowly. By early 1972, the capacity of artificial driers in the private sector was estimated to have increased to only 17,000 tons per season, and the newly formed NPRA, which had by then replaced the PRMB, again expressed concern over the private sector's lack of investment [NST, 1972, 15 Feb. : 5]. Inspite of the success of Muda's first two off-season crops, the private millers still did not give such investment the same priority as the government. Indeed, ironically, the government's decision to set up drying complexes had reduced the need for investment by private millers. Besides their own purchases of off-season paddy, the private mills could now also purchase dry paddy from the NPRA's complexes; indeed, most of the NPRA's purchase in Muda in 1972 was sold to private mills [BNM, 1972 : 17].

However, the situation had changed dramatically by 1975, after the government's investment plans for the rice processing sector were revised in the light of the events of the 1973-1974 rice crisis. Although this crisis occurred against the backdrop of a major upheaval in the world rice market, the Malaysian government was reluctant, in view of the country's high rate of self-sufficiency, to accept that this was the major cause of the price increases and shortages that developed. Instead, it regarded the manipulation of the market by private traders, who were accused of hoarding, profiteering and other market malpractices, as the major cause.[12] Thus, both during and immediately after the crisis new measures were introduced to give the government more effective control of the rice market, as a means of ensuring that there was no repetition of the crisis. New regulatory controls over the operations of all rice traders were introduced, while in May 1974 rice price control was introduced. The government was, however, also keen to increase the level of its direct participation in the paddy and rice market, both as a means of ensuring effective rice price control, and effective implementation of a new paddy rice support policy.[13]

12 For a detailed discussion of the events of the rice crisis and the factors contributing to it see Vokes [1978 : 224-236].

13 A new three tier price support policy was introduced at this time to encourage the production of higher quality paddy. The new support prices were well above the previous guaranteed minium price, reflecting the rapid increase in paddy production costs which followed the rise in world oil prices.

The rice crisis therefore acted as a spur to greater investment in processing capacity. By the end of 1973, plans had been finalised and tenders awarded for the construction of 4 new integrated complexes, 2 more in Kelantan, one in Trengganu and one in Perak. In addition, it was decided that eight drying complexes under construction in 1973 (6 in Muda and 2 in Tanjong Karang) would be turned into integrated complexes. In 1974 the decision was also made to add a milling unit to one of the existing driers in Muda. As before, each of the complexes were to have a drying capacity of 10,000 tons per season, while all of the milling units were to have a capacity of 5 TPH. The shift to integrated complexes also reflected the fact that the operation of the drying complexes alone had proven uneconomic, because of the high cost, but low value added of the drying operations. Officials of the NPRA also indicated that without mills of their own they had been placed in a weak bargaining position when arranging sales of dry paddy to private mills.

The government therefore now intended to compete more directly with private sector and would no longer confine itself to operating in the off-season. This change of policy, coupled with the continuing increase in domestic paddy production, thus prompted new investments in artificial driers by the private sector in an effort to maintain its share of the market. By 1975, all but two of the 36 Chinese owned commercial mills which were members of the Kedah and Perlis Rice Millers' Association had invested in artificial driers, these mills by then having a combined drying capacity of 70,000 tons per season. In addition, even some of the SMRs in the Muda area, whose commercial milling activities were in many cases illegal,[14] had invested in artificial driers. Private sector investment has continued to grow slowly since then, millers representatives placing the current drying capacity of the private sector mills in the Muda area at around 100,000 tons per season.

The Problem of Capacity Utilisation in the Public Sector

It was noted earlier that one of the factors limiting private sector investment in artificial drying capacity in the early 1970s was the millers'

14 SRMs are normally only licensed to undertake service milling but because of the rapid growth in their numbers and resultant excess capacity in the service sector many mills also engage in commercial milling. Such illegal milling activities have been a significant feature of paddy and rice marketing in Malaysia during the 1970s, see Vokes [1978, p. 275-280].

belief that the 'drying problem' was not as serious as the government thought, and the early experience in Muda lends support to this belief. In the first off-season in Muda in 1970, when the PRMB's artificial drying capacity was limited to only 30,000 tons, it had expected to purchase 50,000 tons of paddy, most of the estimated market surplus of the first off-season crop [FAMA, 1970 : 2]. In fact, it purchased only 20,000 tons of the wettest paddy, inspite of the fact that the production was 27 per cent higher than expected [BNM, 1970 : 79-80]. Thus, inspite of their 'unpreparedness', most of the off-season market surplus was purchased by the private mills. Since the total capacity of artificial driers in the country's private sector mills at this time was reported to be only 10,000 tons per season [NST, 28 Sept., 1970 : 7] there is no doubt that most of the 1970 off-season crop in Muda was processed without recourse to artificial drying.

Although some losses must have occurred at this time, the lack of artificial drying capacity did not apparently act as a constraint on the scheme's further development. Production increased to 180,000 tons and 270,000 tons in the 1971 and 1972 off-seasons respectively, as new areas began double - cropping for the first time [BNM, 1972 : 117]. Yet the government's paddy purchase in the area still remained low. In 1972 the newly formed NPRA purchased only 25,400 tons of paddy in the Muda area, even though its drying capacity by the end of 1972 amounted to 120,000 tons per season [BNM, 1972 : 117].

Indeed, although most of the government's processing capacity was concentrated in the Muda area, the Authority's paddy procurement was concentrated in the paddy areas in Tanjong Karang and Kemubu. These were both areas where the public sector, working through co-operatives and farmers' organisations, had a monopoly on paddy purchase, although even here its operations were affected by the illegal commercial milling operations of SMRs. The NPRA's purchase in these areas in 1972 was just over 100,000 tons, and in both areas the Authority was short of both milling and drying capacity.

During the period of the rice crisis in 1973 and 1974, the Authority's procurement fell, its total purchase in those two years amounting to just under 142,000 tons.[15] This was due both to the continued illegal milling

15 Unless otherwise indicated details on the level of purchase by the NPRA and on its drying and milling capacity after 1973 are based on data obtained from the NPRA.

operations of SRMs and to an expansion in the off-season puchasing activity of private mills in Muda, reflecting the growth in private sector drying capacity. In 1974, for example, the NPRA's purchase in Muda was only slightly above 11,000 tons.

However, in 1975, with the Authority now more geared to purchasing in both seasons, there was a significant increase in the level of the Authority's purchase, its total purchase reaching almost 142,000 tons, while for the first time its purchase in Muda, at 90,500 tons exceeded its total purchase in all other areas. Yet this was still far below its operational milling and drying capacity in Muda at this time; the NPRA's complexes in the area having sufficient capacity to mill 129,000 tons paddy per annum, and to dry 180,000 tons per season. Even if the Authority's purchasing activities had been confined to the off-season this still implies that there was some excess capacity.

In fact, the operations of the NPRA in Muda, including an assessment of its investment plans, was made as part of a special study of the development of the paddy and rice sector in the northwest states, carried out towards the end of 1974. This study concluded that there was no overall shortage of either milling or drying capacity in the Muda Area, and that given the increased level of investment by the private sector in artifical drying capacity, as much as 83 per cent of the Authority's drying capacity was surplus to requirements and thus the installation of additional capacity should be suspended [RACNOM, 1974 : 5, 17]. These findings were, however, challenged by the NPRA which, indeed, argued that there was still a shortage of drying capacity in the area. The Authority stressed that the level of investment by the private sector was well below the 162,500 tons per season which the government had originally estimated would be set up by 1974 [RACNOM, 1974 : 111]. Equally the Authority stressed that estimations of the level of excess capacity, and indeed of the level of capacity required, depended greatly on the assumptions made concerning the level of production, the level of purchase by the private sector, the amount of paddy that could be sundried,[16] the duration of harvesting, and thus the purchasing period, and the level of moisture content of the paddy purchased [RACNOM, 1974 : 111-115].

16 Although the off-season crop is harvested in the monsoon season, some sun drying is still possible, since rainfall is concentrated in the evening and night-time hours and there are thus many rain free days.

The moisture content of the paddy is a particularly important factor since, as the level of moisture content increases, drying time is also increased and thus capacity is reduced, since more passes through the drier are necessary to bring the moisture content down to the level of 14 per cent considered safe for storage.

According to NPRA officials these arguments were supported by a subsequent independent study on post harvest problems in the Muda area in the 1975 off-season completed by the United Kingdom's Tropical Products Institute, which found the NPRA's drying facilities to be overstretched even though 1975 was a comparatively dry year. However, NPRA officials also acknowledged that the 'shortages' of drying capacity experienced at this time partly reflected the failure to utilize existing facilities fully and efficiently, primarily as a result of technical problems and a shortage of sun drying capacity. Serious problems have occurred with the cleaning and handling equipment installed at the NPRA complexes, which become clogged if paddy is very wet [Shamsuddin, 1979a : 176]. Similarly, within the public sector there has been an overriding emphasis on artificial drying and a resultant neglect of sun drying, even though the effective capacity of artificial driers can be increased, and drying operations improved, if artificial and sun drying are carefully integrated, in particular by sun drying very wet paddy before channelling it into artificial driers.

However, the pressure on the NPRA complexes in Muda in 1975 also reflected its record purchase there in that year. In the following years, while its purchase in other areas remained fairly stable, its purchase in Muda fell below the 1975 level, to 69,000 tons in 1976, 79,000 tons in 1977 and only 38,500 tons in 1978, although the dramatic fall in 1978 primarily reflected a significant fall in production in Muda due to a serious drought.[17]

In the other major producing states the NPRA's capacity was more fully utilized, although with the opening of a number of new complexes in 1977 and 1978 there has certainly been some excess capacity. For example, during its first year of operation in 1977, one of the new integrated complexes milled only 4,206 tons paddy whereas its effective milling

17 The drought led to the suspension of planting in the 1977/78 off-season.

capacity was 15,000 tons[18] and its drying capacity 10,000 tons per season [Wells, 1980 : 118, 121]. In Kelantan, the NPRA's capacity was more fully utilized. For example in 1978, 70 per cent of the effective milling capacity of the three modern complexes was utilized and slightly under 50 per cent of the seasonal drying capacity.[19]

Since 1979, however, the Authority's capacity, particularly in Muda, has been more fully utilized. Partly this reflects the recovery in production following the 1978 drought, and its continued increase to record levels [BNM, 1980 : 118]. However, more importantly it reflects a cut back in the purchase activities of the private mills, reflecting the squeeze on their margins as a result of government price policy. Since the introduction of rice price control in May 1974, government support prices for paddy have been raised twice, in November 1974, and in January 1979, without any increase in the ex-mill rice price. Furthermore, the NPRA's actual purchase price has normally been $2 per picul[20] above actual support prices. The 1979 price increase in particular put serious pressure on millers' margins, and with many private mills reducing their intake, the NPRA was forced to purchase record quantities of paddy, with its 1979 purchase in Muda totalling about 112,000 tons. Unable to cope with such large quantities of often very wet paddy, the Authority was forced to introduce a subsidy scheme in January 1980 whereby, instead of purchasing at $2 per picul above support prices, the NPRA introduced a coupon subsidy scheme so that farmers received a coupon valued at $2 for each picul of paddy sold, whether at its own complexes or at any of the licensed private mills, thus effectively lowering the mill gate

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18 In Malaysia, effective capacity is normaly calculated as 'Hourly Capacity x 3,000 hours per year'. This was the method used by U. Thet Zin in his study. This is, however, fairly conservative, especially for the new public sector mills [Wells, 1980 : 114] and thus tends to understate the extent of excess capacity.

19 However, as noted earlier, the exact degree of utilization of drying capacity depends greatly on how wet the paddy is when received at the complex. This is a more serious problem in Kelantan than in Tanjong Karang because of the more pronounced monsoon season.

20 One picul = 133 lbs.

paddy purchase price by $2.[21] This move benefited the licensed private millers in two ways, first by reducing pressure on mill margins, and second by checking illegal commercial milling by SRMs, since only those mills licensed for commercial milling were included in the subsidy scheme.

Inspite of these moves, however, the large private millers remain generally pessimistic about their long-term involvement in the industry. Their margins are again being squeezed due to rising processing costs, with the government still showing no sign of being willing to raise rice prices. In addition, there is a widespread belief amongst the millers that besides a desire for greater control of the market, the government is seeking to end the dominance of the rice processing industry by Chinese interests, thereby paving the way for greater participation by Malay interests in both processing and marketing, in line with the objectives of the country's New Economic Policy (NEP).[22] In this context, it is significant that plans have just been announced for the construction of 11 new integrated complexes [NST, 20 Oct., 1981 : 6][23] Given this situation, significant new investment by the large private mills in additional or improved processing capacity is unlikely. With less competition from the private mills, the NPRA will obviously continue to reveive larger supplies and should thus be able to maintain higher rates of capacity utilization, but at the expense of a growing excess capacity in the private sector, amongst both LRMs and SRMs. However, the shift from private sector to public sector processing also has wider implications. In particular, it implies a shift from labour intensive to capital intensive techniques within

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21 The fact that the subsidy was given to farmers rather than directly to the millers again reflects the political constraints on direct assistance by the government to the Chinese owned millers. Officers from the NPRA are now based at all licensed commercial mills to pay out the subsidy to the farmers. The subsidy was raised from $2 to $10 per picul in 1981.

22 The NEP was launched in the aftermath of the 1969 race riots and is designed to eradicate poverty among all Malaysians irrespective of race and to restructure the economy to ensure greater participation by Malays and other indigenous groups - collectively referred to as bumiputras - in the modern sectors of the economy and a greater share of the benefits of development, these goals to be achieved over a 20 year period, 1971-1991.

23 Six of the new complexes will be in the northwest states, where the Chinese millers still play a dominant role. However, only three more will be set up in Muda.

the industry, since the public and private sectors have followed significantly different policies with regard to the choice of technology.

The Choice of Technology in the Public Sector

While the report completed by U. Thet Zin was crucial in influencing the government's decision on the need for public sector investment, it did not provide definitive guidelines concerning the choice of technology. While it is clear from his recommendations that U. Thet Zin favoured large scale complexes, incorporating bulk handling and storage facilities, he indicated the need for further studies of the technical aspects of the proposed complexes [U. Thet Zin, 1969 : 57].

By November 1969, a preliminary report on paddy drying and storage in the Muda area was completed by a Japanese consultant. This report also came out in favour of larger complexes with a capacity of about 10,000 tons, which were regarded as more economic than smaller complexes. The report went on to recommend investment in continuous flow type driers, since it was argued that multipass driers were cheaper to operate and had a less detrimental impact on paddy quality [Ashizawa, 1969 : 4, 6]. These recommendations were subsequently incorporated into the first phase of the government's investment plans in both the Muda and Kemubu areas.[24]

However, a year later, a design report for the complexes in Muda (prepared by a team of Japenese consultants) came out in favour of investment in smaller scale, batch type driers, with a capacity of about 2,000 tons per season [Nagai et al, 1970 :1]. This recommendation was based on a number of factors. First, since roads and transportation facilities in the area were poorly developed, it was argued that a larger number of small complexes would minimise the risks of deterioration that would result from delays in moving paddy to the complexes. Second, batch driers provide the flexibility necessary to handle paddy lots with a variable moisture content, or containing a mixture of grain qualities. Third, it was stressed that the setting up of a larger number of small complexes would maximise the impact of the investment on farmers, by providing them with additional marketing outlets. Lastly, it was emphasised that since it was in fact extremely difficult to estimate accurately the

24 These recommendations were also followed in setting up the three temporary driers in Muda in 1970.

future level of production, and thus the amount of paddy needing drying, and the level of utilization of the complexes by farmers, it was safer "to establish complexes of a moderate size initially and plan for gradual expansion of their capacity in the future" [Nagai et al, 1970 : 3].

Not suprisingly, the completion of this second report sparked off a controversy over the question of the appropriate size and choice of drying technology for the government complexes. As a result, a subsequent study was prepared by the Danish company Cimbria, which had supplied much of the equipment, including the cleaning, handling and drying equipment used in the complexes completed under Phase 1 of the government's investment programme. The Cimbria study set out to compare the investment and operating costs of the two alternative investment strategies using data contained in the Japanese design report and data on the Phase 1 complexes operated at this time by the PRMB.

The Cimbria Study argued that while investment in smaller scale batch driers would provide some limited advantages in terms of flexibility, and some savings in transport costs, these would be more than offset by the higher investment and operating costs involved in adopting such a strategy. Thus for the same 10,000 tons seasonal capacity it was stated that the capital costs of the batch type system would be approximately 80 per cent higher than one using a continuous flow drier, while the operating costs for the batch system estimated in the Japanese study were 59 per cent higher than the actual costs incurred in operating the Phase 1 complexes. In addition, it was argued that in view of the serious shortage of trained personnel with experience in paddy drying, it was preferable to invest in the larger scale complexes, since fewer technical staff would be needed. The salaries of such technical staff would also be spread over a higher volume of throughput, and thus personnel costs per unit handled would be lower [Cimbria, 1971 : 2-5].

The strong arguments put forward in the Cimbria study, and the government's own belief that larger scale complexes would be easier to operate and administer, led to the decision to continue investment in the larger-scale complexes using continuous flow driers. Again most of the equipment was to be supplied by Cimbria, much of it under bilateral foreign aid.[25]

25 Even in the modern complexes, most of the milling equipment is locally manufactured, although the hullers are normally imported from Japan.

However, in contrast to the public sector, most private mills have invested in more labour intensive, small scale batch or bin type driers. These were considered more suitable by private millers for a number of reasons. As noted earlier, the private millers placed a lower priority on artifical drying, prefering whenever possible to sun dry paddy. Furthermore, the choice of such driers also helped to minimise investment costs, an important concern for the private millers given the uncertainty of government policy throughout this period. Small scale driers could be housed in existing mill buildings and did not necessitate further investments in mechanical handling and cleaning equipment. They were also easier to operate and maintain.

Indeed, in this context it is significant that the adoption of artificial drying by the private sector has occurred inspite of the low level of technical knowledge on drying amongst the millers, indicating that, contrary to the arguments put forward by Cimbria, it is the larger scale automated plants used in the public sector that place undue demand on the country's scare supplies of skilled manpower; indeed, there is no doubt that the efficient operation of the NPRA's complexes has been undermined partly by the lack of suitably trained managerial and technical staff.[26] Another significant factor is that most of the driers set up by the private sector have been locally manufactured, reflecting the rapid response of the local capital goods industry to the new demands of the rice processing sector.

In the case of storage, too, the public and private sector have followed different policies with regard to technological choice. The private sector continues to rely almost exclusively on horizontal bag storage, while bulk storage is employed in all of the NPRA complexes. In fact, technical problems have been experienced with the bulk storage facilities at the modern complexes, especially following the decision in 1973 to shift from horizontal bulk storage to vertical storage in concrete silos, following the recommendation of local consultants involved in the construction of the last 5 complexes in Muda. Paddy stored in these silos has been found to

26 This is not to suggest that there is no room for improvement in the private sector mills. In fact, the study conducted by the Tropical Products Institute revealed considerable quality losses due to over-drying and inadequate 'tempering' (cooling), which were valued at M$6.6 million for an average year [Calverley et al, 1977 : 321]. Clearly on this basis a case can be made for providing technical assistance to the private mills.

deteriorate rapidly, primarily because of condensation problems, so that they are now only used for short-term storage [Shamsuddin, 1979b : 442].[27] A shift back to horizontal bulk storage can thus be expected in the new complexes planned by the NPRA.

However, though horizontal bulk storage is technically superior to silo storage, at least under the environment conditions prevailing in Malaysia, it is still questionable whether it represents a more appropriate choice of technique when compared with horizontal bag storage, given the prevailing factor scarcities in Malaysia. Al hough storage losses, especially from rodents and pests can be cut by using horizontal bulk rather than bag storage, the capital costs of the former are greater, while grain stored in horizontal bulk must be aerated by mechanical means, which is not necessary with horizontal bag storage [Tester, 1981 : 10]. Furthermore, horizontal bag storage is highly labour absorptive and also generates additional employment in the production of gunny sacks, the manufacture of such sacks being an important industry in most paddy producing countries. While arguments have been made against horizontal bag storage because of the high and increasing cost of gunny sacks, such arguments ignor the indirect employment effects of such storage[28] and also usually ignore the fact that such sacks can be used a number of times and can also be recycled to make new ones. At the same time, there is no doubt that if horizontal bag storage is well managed losses can be kept extremely low.

From this discussion, it will be clear that neither the full range of technologies nor the wider implications of choice of technology were taken fully into account in the studies prepared for the government. Indeed, just as the initial decision to invest in new processing capacity was based primarily on the government's belief in the need for artificial drying capacity, so the issue of choice of technology in the public sector cen-

27 Similar problems have been reported in India, See Harriss [1976 : 171]. Although efforts are now being made in Malaysia to find ways of overcoming the problems of silo storage, the high power demand needed to aerate paddy stored in vertical silos means that they are unlikely ever to be economically attractive [Tester, 1981 : 8].

28 Wells [1980 : 131] quoting a ILO study, gives an example from Kenya where employment in the manufacture of sisal/jute sacks for the bagged storage of maize represents between 1% - 2% of total wage earning employment in the manufacturing sector. Further employment, effects would be felt in the agricultural sector in countries where sisal/jute are grown.

tred on the question of the type and size of the drier. Even in this context, no real attempt was made to examine the potential for setting up driers at farm or village level, even if only as a supplement to more centralised facilities, although more recently efforts have been made to improve drying facilities, especially for sun drying, at farmers' co-operatives. In the case of storage, the initial recommendation made by U. Thet Zin to opt for bulk facilities was simply adopted without any efforts to compare the costs and benefits of alternative policies. In the same way, the scale of the milling plant used at the government complexes was determined essentially by the decision concerning the capacity of artificial driers, rather than on the basis of the optimum size of mill given prevailing production and marketing conditions, or, more importantly, the optimum size of the integrated milling and drying units.[29]

Although no attempt has yet been made to compare the full range of choice of technology in rice processing in Malaysia, the evidence that is available lends support to the view that the more labour intensive, conventional technologies utilised in the private sector mills do represent a more appropriate choice of technology for Malaysia. Thus Wells [1980 : 123-124] in comparing the performance of two public sector mills, one modern and the other an older, conventional unit to which artifical driers had been added, found that, inspite of the lower milling efficiency of the latter, operating costs per ton were considerably lower than in the modern complex.[30] Again it is worth stressing that while a large proportion of the equipment in the modern complex was imported, most of the equipment in the older complex had been locally fabricated [Wells, 1980 : 177].

Furthermore, given the rapid improvement in the technology used in SRMs, and thus in the quality of outturn they can produce, it is possible that the SRMs, which are considerably more labour intensive than conventional LMRs, may represent the most appropriate choice of technique. This view is suggested by the preliminary results of a recent study comparing the operation of LRMs with both private and co-operatively

29 In the case of milling technology, it is the scale rather than the choice of technology that is at issue at least in Malaysia, since, as noted earlier, the conventional LRMs and many of the SRMs have already changed over to the technically more efficient rubber roller hullers.

30 Depreciation was ignored in making this comparison.

owned SRMs, where it was found that in terms of net returns, the SRMs were economically more viable at both market and shadow prices [Vokes et al, 1981]. In fact, studies undertaken on the choice of technology in rice processing in Indonesia [Timmer, 1973 : 64-72] and India [Harriss, 1977 : 241-278] found SRMs to be the most appropriate choice of technology. In the case of Malaysia, a further factor in favour of SRMs is that they are predominately owned by Malays. A policy which encourages the growth of SRMs would therefore also be consistent with the objectives of the NEP.

It should, however, be emphasised that the issue of the correct choice of technology is not a simple matter, and is furthermore usually most difficult in older established industries, such as rice processing, where a large number of alternative techniques with different capital/labour ratios exist. Furthermore, we are dealing with a dynamic situation. In this context, it may be noted that labour shortages have begun to emerge in Malaysia, a problem not simply confined to urban industrialised areas. Within the Muda area, a labour shortage in paddy farming had become evident by the mid - 1970's and was one of the factors prompting the introduction of combine harvesters there. Similarly, private millers in Muda have indicated that it is now harder to obtain labour, especially for less pleasant jobs such as sun drying, with a result that they are now beginning to make greater use of artificial driers throughout the year. However, labour shortages are still partly seasonal, and may also reflect an increase in disguised underemployment or unemployment rather than a real tightening of the labour market.[31]

Nonetheless, even if labour shortages do become more acute in the rice processing industry, a gradual increase in capital intensity through, for example, investment in mechanical handling and drying equipment, and a possible mixture of horizontal bulk and bag storage is likely to be the most appropriate course of action rather than the wholesale adoption of MRMs. In this regard, the major improvements in the design of locally fabricated batch and continuous flow driers incorporating mechanical loading and unloading equipment, and the use of wooden silos in some of the private mills in the Muda area may be noted.

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31 For example, the shortage of labour that has developed in paddy farming partly reflects the reluctance of better educated youths to engage in farming work.

Thus, whatever the primary reasons for the government's decision to continue to expand its own processing facilities, much greater emphasis needs to be given to the wider implication of the choice of technology in the public sector complexes.

Conclusions

It will be clear from the above analysis that inspite of the Malaysian government's timely efforts to plan the development of the rice processing industry in line with the requirements of its self-sufficiency policy, it has encountered many problems, particularly with respect to its efforts to set up and operate efficiently its own processing units. To a considerable extent these problems have resulted from the lack of any clearly defined long term policy with regard to increased direct government intervention in the rice processing industry. This, in itself, is indicative of a conflict between those in the government who saw the public sector's role as being one of essentially supplementing private sector investment and operations and those who saw increased participation as part of a policy of increasing the degree of government control over the processing and marketing operations of the private millers.

The lack of any long term policy increased the degree of uncertainly within the industry thereby undermining the potential for private sector investments and furthermore prevented the effective co-ordination of public and private sector investment plans. The resulting complex interplay of public and private sector interests served only to complicate still further the problem of planning developments within the industry, especially with respect to provision of adequate drying capacity, and ensuring that processing capacity was effectively utilized.

Although long-term policy remains undefined, it is clear that since 1974, the primary motivation for further government investment in rise processing capacity has stemmed from its desire to exert greater control over the paddy and rice market by competing directly with the private sector. Although the NPRA is now in a strong position to influence the pattern of paddy procurement and the respective level of processing operations by the public and private sectors, recent increase in the level of capacity utilization in the public sector have been primarily at the expense of the private sector. While this is the inevitable result of current government policy, this shift has wider implications for the economy both because of the different policies followed by the public and private sector with respect to the choice of technology, notably the bias in the public sector towards more highly capital intensive imported technology, and because of the adverse impact current policies have on the operations of SRMs which are predominately Malay owned.

Given these findings and the government's intention to increase further its investments in the industry, a strong case for a review of government policy with respect to public sector investment in the rice processing industry can be made.

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A SECTORAL CASE STUDY OF MODERNISATION: THE RICE PROCESSING INDUSTRY IN PENINSULAR MALAYSIA*

R.J.G. WELLS and L.J. FREDERICKS

I. INTRODUCTION

A sectorial case study of modernisation, especially of the rice processing industry, is of intrinsic interest for several reasons. Rice processing is an important industry in the majority of rice producing countries and it is a truism that padi cannot be consumed, eaten, cooked or fed to animals in its unprocessed form. A decade ago, the FAO noted that the annual global value of padi processed was in excess of US$20,000 million and the volume was increasing at an average annual rate of 3% per annum[1]. The rice growing industry offers distinct economic benefits in the early states of industrialization: the raw material is a basic dietary staple of considerable nutritional significance; the milling process allows the adoption of a wide array of techniques with substantial variations in their factor intensities; the industry is often the most widely spatially dispersed rural-based industry; and, rice processing has usually offered an apparently profitable outlet for private capital and the entry requirements to a range of commercial activities. The processing of agricultural commodities, including rice processing, is also commonly one of the most important sources of rural industrial employment in developing countries: it was estimated, for instance, that more than 22% of employment in rural manufacturing in Peninsular Malaysia in 1970 was accounted

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The authors gratefully acknowledge the assistance of Mr. Chong Yoke Choy and the paper has also benefitted from helpful suggestions from 'practitioners' in the rice processing industry.

1 FAO, "Rice milling in developing countries: case studies and some aspects of economic policies", **Commodity Bulletin Series No. 45,** Rome, 1965.

for in food processing . It has been noted by Timmer, that the employment effects of the choice of technique in rice processing, are, moreover, far from trivial[3]. Another factor which causes special interest to be accorded to the rice processing industry is that it frequently involves the operation of parastatal marketing in a fixed price monopoly environment. This, in the opinion of a number of observers, tends to lead to a reduction in allocative and redistributive efficiency[4].

A study of the Malaysian rice processing industry might also be considered timely as with the introduction and diffusion of modern rice production technology, the government has created new drying, storage and milling facilities using upgraded technology as a means of alleviating 'second generation' problems. **Inter alia,** this resulted in the introduction of large rice mills (LRM's) to supplement "traditional" technology used in small rice mills (SRM's). SRM's were mostly under co-operative or private ownership while LRM's, particularly of the most modern type, were either under private or LPN ownership. Currently, some 28 LPN complexes are in operation and although precise data on their investment costs is not available, it has been estimated to be of the order of M$90 million[5].

"Modern" rice processing technology in Peninsular Malaysia has been introduced on the basis of several premises as follows:

(i) Modern capital-intensive technology is needed to handle the increased marketed surplus produced by the new rice production technologies;

(ii) Increased off-take of padi during the off-season necessitates centralized storage and drying facilities. Such facilities improve the quality of domestically produced rice and reduce post-harvest losses;

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2 World Bank, **Rural Enterprise and Non-Farm Employment,** Washington, 1978, p. 25.

3 C.P. Timmer, "Choice of Techniques in Rice Milling in Java", **Bulletin of Indonesian Economic Studies,** Vol. 9, No. 2, July 1973, pp 57-76.

4 See, for instance, Barbara Harris, "Allocation, location and dislocation in non-market rice distribution" **The Journal of Development Studies,** Vol. 15, No. 1, October 1978, pp. 87-105.

5 R.W.A. Vokes, "State marketing in a private enterprise economy: The padi and rice market of West Malaysia, 1966-1975". Unpublished Ph.D. thesis, University of Hull, 1978.

(iii) Investment in improved milling technology augments total rice availability since it facilitates increased quality, yield and head rice (unbroken grains) recovery.

The objectives of this paper are to provide a brief profile of the Malaysian rice processing industry and to examine the modernization process within this sector. An examination of its rationale and economic effects with special reference to the problem of the choice of appropriate technology will be made.

II. PROFILE OF THE MALAYSIAN RICE PROCESSING INDUSTRY

Structural characteristics

Harvested padi is sold by farmers either direct to nearby mills or through licensed agents or farmers' organizations to mills. In Malaysia, rice mills can be divided basically into two types: large rice mills (LRM) which are run privately or by the government, and small rice mills (SRM) which mill padi mainly for home consumption and are run on a private or co-operative basis. Large rice mils (LRM) may be classified as those with an average milling capacity of two tons and above per hour (tph) while small rice mills (SRM) have an average milling capacity of less than two tph and generally below one tph. Rice mills may also be categorised by the grade and quality of rice they are capable of processing:

Category A: mills capable of milling superior quality rice comparable to the quality of high grade imported rice;

Category B: mills capable of milling above average quality marketable rice;

Category C: mills capable of milling average quality marketable rice;

Category D: mills capable of milling only low quality rice.

For the purpose of this study, however, the classification into SRMs and LRMs shall be used throughout.

Table I presents the regional distribution of rice mills and the tonnage milled per LRM by regions and states. The largest concentration of mills (537 large and small mills) is in the north-western region followed by the north-eastern region and the southern states of Johore and Selangor. Given the production capacity of Kedah, it is not unexpected that it has more rice mills than all the southern states and not much less than those

TABLE I
REGIONAL DISTRIBUTION OF RICE MILLS AND TONNAGE MILLED PER LARGE RICE MILLS 1974

States	No. of Rice Mills		Total No. of rice mills	Available tonnage of padi (tons)	Tons per LRM
	SRM[1]	LRM			
N.W. States	422	115	537	692631	6022.9
i) Kedah	251	55	306	416160	7566.5
ii) Perlis	35	8	43	73142.5	9142.8
iii) Perak	94	23	117	143658.5	6246.0
iv) Penang	42	29	71	59670	2057.6
N.E. States	315	17	332	173876	1114.6
i) Kelantan	89	15	104	111375.5	7425.0
ii) Trengganu	139	1	140	35827.5	35827.5
iii) Pahang	87	1	88	26673	26673
Southern States	88	7	95	122774	17539.1
i) Johore	26	3	29	6086	2028.7
ii) Malacca	7	—	7	118564	—
iii) N. Sembilan	27	—	27	19703	—
iv) Selangor	28	4	32	78421	19605.3
TOTAL	825	139	964	989281	

Source: **Survey of Manufacturing Industries,** Peninsular Malaysia, 1974. Department of Statistics, Kuala Lumpur.

Note: [1]The figures for SRM pertain to 1973.

in the north-eastern region. This indicates the extensive and modern state of development rice production in the area. Also, despite the fact that Penang is not an important rice production area, it has a considerable number of mills (including LRMs) indicating that its service hinterland is quite extensive. LRM's are not very commonly found in the other regions, despite the importance of these areas in terms of rice production capacity. In large measure, this reflects the limited extent to which modern milling technologies have penetrated into the area and the prevalence of SRM's especially in Trengganu and Kelantan. It also indicates that the role of LPN in these areas, at least in terms of providing rice milling facilities, is less than in the north-western states of Kedah, Perlis, Perak and Penang.

TABLE II

EMPLOYMENT, OUTPUT AND VALUE ADDED IN THE RICE PROCESSING INDUSTRY, PENINSULAR MALAYSIA

Categories	No. of plants	No. of workers[1]	Gross Value of output (M$'000)	Cost of input (M$'000)	Value added (M$'000)	Value added as a % of gross value of output	Value added per Employee (M$)
Small rice mills	825	1,340	10,331	4,733	5,598	54.1	4,177
Large rice mills	142	2,656	245,966	214,495	31,471	12.8	11,849
Total rice mills	967	3,996	256,297	219,228	37,069	14.5	9,276
Food manufacturing	3,052	36,238	1,892,237	1,527,826	364,412	19.2	10,056
Total rice mills: (%)	31.7	11.0	13.5	14.3	10.2	—	—

Source: **Census of Manufacturing Industries**, Peninsular Malaysia, 1973.

Note: [1]Employers include both full-time and part-time workers; the latter have been assumed to represent the equivalent of one full-time employee.

Economic aspects

The rice processing industry is important as one of the staple foods in Peninsular Malaysia is rice. It is also the most geographically dispersed industry concentrated primarily in the rural areas and providing employment to many village households. In terms of gross value of output, it contributes the greatest amount among the various food manufacturing industries. If value added per employee is used as a proxy for capital intensity (see Table II) then the large rice mills are markedly more capital intensive than the small rice mills; the value added for SRM's was only M$4,177 in contrast to the M$9,276 for LRM's. The value of investment intensity in the latter is quite close to the average for the food manufacturing industry while SRM's are clearly labour-intensive if judged against the industry average.

As can be seen from Table II, nearly 32% of all plants in the food manufacturing industry comprise rice mills and these in turn account for 11% of the total employment in the industry. The industry contributes

13.5% of the gross output of the food manufacturing sector. It is also a substantial purchaser of other inputs such as fuels and lubricants, packing materials and electricity which create indirect employment opportunities through these linkage effects. Value added – a measure of the value of economic activity added by the processing function itself – is another commonly used criterion for assessing economic importance. In this respect, the rice processing sector contributes in excess of 10% of the total value added in the food manufacturing industry.

III. THE MODERNIZATION OF THE RICE PROCESSING INDUSTRY

The traditional rice milling technology employed in the rice growing areas of the country was the hand and foot operated pounders or the **lesong tangan** and **lesong kaki**. Hand pounding was a traditional and widespread method of processing rice (especially for home consumption)[6] in most Asian rice producing countries. Although this method produces rice of a relatively low yield and quality, it nevertheless required few capital inputs and was highly labour absorptive. Manual methods of rice processing were closely associated with subsistence production and as the marketed surplus of padi was expanded in response to a growing internal market, it was not surprising that mechanical milling, including small-scale village hullers, began to replace traditional hand-pounding with pestle and mortar[7].

The first major change took place through the development of commercial milling in the main producing areas in the north-west; by as early as 1921, there were already 37 Chinese-owned mills operating in areas such as Kedah, Penang and Krian. By the mid 1950's, there were 68 commercial mills and three other large mills owned by the government which, by the late 1960's, increased to some 100 commercial

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6 It also appears to have been the most widespread form of processing in the few African rice producing countries. See, Dunstan S.C. Spencer, I.I. May-Parker and F.S. Rose, "Employment, efficiency and income in the rice processing industry of Sierra Leone", **African Rural Economy Paper**, No. 15, Michigan State University, 1976.

7 For a historical study of rice-cultivation and post-harvest practices including husking in Malaysia, see, R.D. Hill, **Rice in Malaya: A Study in Historical Geography**, Oxford University Press, Kuala Lumpur, 1977.

mills[8] Even today the majority of commercial mills are located in the north-western area of the country: the latest available data indicates that 115 out of a total of 139 LRM's are situated in Kedah, Perlis, Penang and Perak. Such mills contribute the bulk of value added by the rice processing industry, although their relative direct contribution to employment is relatively small since they are much more capital-intensive than SRM's. Stone disc hullers were the main traditional form of milling technology used but many LRM's now use the more modern and efficient rubber roll shellers; the latter have increasingly been used in LRM's in many padi-producing countries as they generally lead to better recovery of head rice, with less breakage, better shelling efficiency and product quality than stone, under-runner disc hullers[9].

SRM's are of much more recent origin than LRM's. It is true that a few Planters' mills had been established by estate owners in the 1920's to mill padi but when international rice price declined in the 1930's, these mills were forced out of existence. In the 1950's, however, SRM's were introduced by Co-operative Rice Milling Societies (CRMS's) and, by 1956, some 210 CRMS's had been established. Although simpler and much smaller in capacity than the commercial mills, they reflected a significant technological advancement as they were usually electrically or diesel powered and their output was better quality rice of higher yield than that produced by normal methods. They were also able to separate the husks from the bran, thus greatly improving the quality of this by-product which is an important input for the animal feed industry.

These innovations by the rural co-operatives were soon replicated since private capital was quickly attracted into the rice processing sector. In fact, the latest available data indicates that 63% of SRM's are under private ownership while the remainder are operated by co-operatives. The normal charge for service milling is about M$1 per pikul of padi milled and the usual practice is that the miller retains all the by-products of milling. While the fixed case charge per pikul is not high, the fact that the mill retains the by-product tends to lead to overmilling in order that the quality of by-products be maximised. Another recent feature of the

8 Vokes, op.cit., p. 137.

9 See, Uma. J. Lele, **Food Grain Marketing in India, Cornell University Press,** London, 1971.

SRM's has been the changes in milling technologies employed: simple Planters' type mills have been replaced by large, more efficient, Thai and Japanese-type mills. The former consists of a huller which effects husking and rough whitening in a single run and their average milling capacity rarely exceeds 180 kg/hr. The Thai-type mills or **Kilang Siam** employ stone disc hullers, have a milling capacity which ranges from ½ ton – 1 ton/hr. and are capable of producing marketable quality rice. The Japanese-type mills are mainly of Kyowa manufacture, use rubber roller huskers and typically have a milling capacity of about ½ ton/hr. Not only do the Thai and Japanese-type SRM's have a larger milling capacity than the Planter's type SRM's, they are also capable of milling better quality rice and by-products as a result of improvements in separation techniques.

The most significant technological changes in rice processing were, however, initiated by the public sector. Apart from the creation and operation of three government-owned mills, the public sector had traditionally not played a significant role in padi processing although efforts had been made to secure improvements in padi and rice marketing especially at the primary buying level[10]. The onset of the so-called "Green Revolution" in the late 1960's was to drastically change that situation. The government was determined to ensure that post-harvest problems resulting from intensified rice production were minimised and, to that end, an extensive survey was carried out between November 1962 and September 1968. In the context of the rice self-sufficiency policy, three major problems required examination; firstly, ways of upgrading the quality of domestically produce had to be found; secondly, the magnitude of the increased milling and drying capacity had to be assessed, and, thirdly, the potential for reducing post-harvest losses through the use of modern technologically efficient equipment had to be

10 The relative neglect of agricultural marketing and the higher priority accorded agricultural production is certainly not unique to Peninsular Malaysia. As noted by Barbara Hariss, "Improvements in the organisation and technology of agricultural marketing have, historically, (in South Asia), been given lower priority by Government than those in the technology of agricultural production". See, Barbara Hariss, "Paddy processing in India and Sri Lanka: a review of the case for technological innovation", **Tropical Science**, Vol. 18, No. 3, 1976, pp. 161-186.

appraised. It was as a result of this survey that the government decided to play an active role in the provision of new rice processing capacity and thus avoid, or at least ameliorate, the so called "second generation" problems of the "Green Revolution"[11]. This eventually led to the construction or improvement of 28 complexes under LPN ownership. These complexes were subsequently equipped with modern milling, drying, storage and handling facilities of both local and imported fabrication[12].

A number of interesting questions revolve around the decision to greatly enlarge public sector participation in rice processing. In the first instance, it might be thought that the demand for improved rice processing facilities would have elicited private sector participation. The crucial requirement following rice production intensification was for drying facilities but the private sector possessed very limited mechanical drying capacity and was unable or unwilling to invest in these facilities. The need for artificial drying facilities was of vital importance since the traditional method of drying padi, sun drying, could not be used to dry the off-season harvest which would occur during the rainy season. Mechanical drying was then necessary to dry the wet padi likely to be produced in the off-season to minimise the risks of substantial post-harvest crop losses and adverse effects on farm-gate prices, especially since rice millers would be reluctant to purchase padi of a high moisture content (MC)[13]. In the off-season, the MC of newly-harvested padi typical-

11 An analysis of government policy as it relates to rice processing is contained in R.J.G. Wells, "Choice of techniques in rice processing: some empirical evidence from Selangor, Malaysia." Paper presented to the **ILO Symposium on Choice of Technology and Employment Generation in Asian Countries**, Bangkok, June 1979.

12 See Regional Action Committee for North Peninsular Malaysia (RACNOM), **Report of the Padi and Rice Industry Sub-Committee,** Implementation, Coordination and Development Administrative Unit, Prime Minister's Department, Kuala Lumpur, November 1974.

13 It should be noted that the Guaranteed Minimum Price (GMP) scheme permits padi buyers to make deductions from gross weight if the MC of padi offered for sale exceeds 18%. The bulk of padi purchased during the off-season is of at least 18% MC. Some plausible reasons for the apparent neglect of drying practices at the farm gate include the absence of incentives for on-farm storage which would require on-farm drying and the difficulties in implementation of price variations for quality differences under the GMP scheme.

ly ranges from 18% to 28%[14], so mechanical drying facilities are needed to prevent grain deterioration, generate higher outturns of milled rice and assist in the reduction of post-harvest crop losses, the potentiality for which have intensified with the widespread adoption of combine harvesting.

The MC of padi is an index for determining safe storage and for milling with maximum possible recovery. If harvested padi is not dried within about 48 hours after harvest, rapid bio-deterioration will occur as padi with a high MC is likely to germinate unless it is dried to below 20% MC as a temporary measure. Also, mould occurs within several days and respiration will cause loss of nutrients and weight; the principal causes of deterioration are degradation by insects, mould growth, and, with a sufficiently high MC, even fermentation. To ensure maximum recovery from milling and as a threshold for safe storage, the optimum MC for padi is considered to be 14%: for prolonged storage of six months and above, a lower MC of about 13% is optimal. Under normal conditions, the maximum storage period for milled rice is six months, but this can be extended to at least 12 months with appropriate applications of methyl bromide gas.

Effective artificial drying through suppressing the biological deterioration of padi is believed to result in better quality grain and potentially higher milling recovery rates. At a MC of 13% – 14%, the grain is relatively dormant and can be stored for relatively lengthy periods under appropriate environmental conditions. That is not to say there is no place for traditional sun drying methods; indeed, a key feature of modern rice processing technologies is the combined use of mechanical and sun drying. During the main season, padi is sun or shade-dried on the large concrete drying yards located in large mills.

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14 MC is normally determined as a percentage of the total weight of grain and can be expressed in the following manner:

$\% MC_{wb} = Wm \times 100\ Wt = Wm\ Wm - Wdm \times 100$

Where, wb = wet basis.
Wm = weight of moisture in the grain.
Wt = total weight of the grain.
Wdm = weight of dry matter in the grain.

Another relevant question relates to the type and size of padi driers. In the LPN complexes, the LSU continuous flow type drier was selected in preference to batch type driers although the latter have been claimed to offer greater flexibility as it is mobile and can treat more padi varieties than continuous flow driers [15]. On the other hand, the continuous flow type driers can dry at 3% per hour as opposed to the 1% per hour of batch driers and, for a similar capacity, they are believed to have lower operational costs. Multiple pass continous driers with tempering (cooling) offers greater safety to padi qualities, i.e. by having padi continously flowing against heated air at a regulated temperature, the padi will be assured of similar MC. It was thus decided that the LPN padi processing complexes be equipped with continuous flow driers with a capacity of 20 tons per hour (tph) per pass. The drier was to be supported by 20 aerated tempering bins, each of a 20 ton padi capacity.

In contrast, the private sector has generally shown a preference for small-scale batch type driers. A larger number of smaller drying facilities tends to result in a saving in transportation costs and, anyway, private millers relied greatly on sun and shade drying of padi. Not only is this less expensive than artificial drying but the outturn of sun and shade dried padi is often considered to be greater than that of padi artificially-dried[16]. Although public sector investment in large-scale, centralised drying facilities can be justified to avoid large-scale crop losses, the recent experience of the private sector suggests that small-scale drying facilities of a labour-intensive nature might prove to be a useful supplementary source in the future. Small padi husk combustors with a high degree of efficiency in heat utilisation and farm or field driers are being developed in several countries such as India and the Philippines. It thus

15 Government of Japan, Overseas Technical Co-operation Agency, **Paddy Drying and Storage Complexes, Muda Irrigation Scheme, Design Report,** November 1970.

16 The experience of the LPN, however, appears to differ from that of the private sector since trials show that artificially dried padi led to a higher rice recovery than sun-dried padi: the differential was 1.3%, i.e., a recovery rate of 64.1% compared to 62.8%. Total milling recovery from the artificially dried padi was 79.4% and from sun-dried padi was 79.3%. See, Ismail Shamsuddin, "Technical performance of processing facilities at the integrated complexes in Malaysia". Paper presented at the **Grains Post-Harvest Workshop,** Jakarta, 16-18 January 1979.

appears that inexpensive husk-burning drying systems suitable for rural environments are technically feasible[17]. The utilisation of rice husks as an energy source, even if not efficient at current market prices, might well prove to be so at social prices as it would utilise a resource which at present is a source of pollution in the rice growing areas[18]. Such drying facilities at farm or village level would not only help arrest the rapid bio-deterioration of off-season padi, but it could utilise indigenously produced fuel sources and facilitate the creation of rural employment opportunities. On farm or village level drying could also be encouraged by paying premia for quantitative (including MC) differentials in harvested padi. The close proximity of drying units to farms would enable padi to be brought for drying in good time and thus reduce the prospects of crop losses. As noted by RACNOM[19],

"........... the setting up of small and medium size dryers at the right location which can best serve the interest of farmers and the padi and rice industry as a whole should not be deterred. In order that artificial drying units be well dispersed to bring the facilities to the farmers, it is recommended that units of medium capacity of about 10 tons of padi per pass or less should be considered .... It is observed that home padi dryers which operate on kerosene are available on the market but the farmers are less attracted to the gadget because of the price which is about M$2,000 per unit, and the seasonal utility of the machine. The machine can dry 10 pikuls within 3 – 4 hours using one gallon of kerosene per hour".

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17 Estimates of comparative costs of fuels for artificial drying of padi are contained in R.J.G. Wells, L.J. Fredericks and F.A.K. Gul, "A study of productivity in padi processing plants in Tanjung Karang, Selangor" in U. Kaloo (ed.), Proceedings of the **Workshop of Productivity in Manufacturing Industry,** 11-13 May, 1978, Kuala Lumpur, 1978.

18 Moreover, if employment objectives are accorded a very high weighting, then labour-intensive drying techniques, even if they were not the least-cost ones in terms of market prices, might be socially justifiable. In short, techniques which might appear to be uneconomic on the basis of profitability analysis, might prove 'superior' to capital-intensive ones if evaluation was carried out using social benefit-cost criteria. See, A.S. Bhalla, "Technology and Employment: Some Conclusions", **International Labour Review,** Vol. 113, No. 2, March-April 1976, pp. 189-203.

19 RACNOM, op.cit., p. 43.

The range of grain-storage technologies used in the Malaysian rice processing industry includes horizontal bag storage (i.e., floor storage in gunny sacks), horizontal bulk storage and vertical silo storage. Provided they are managed in an appropriate way, each of these storage techniques can be equally effective in minimising storage losses[20]. Manual drying and microwave and fluidized heat treatment has resulted in safe bag storage of rice in excess of seven months and with methyl bromide fumigation, safe storage of rice over two years has been achieved. The latter method is considered the most promising since it is relatively inexpensive (M$0.05 per lb of rice) and feasible under the common storage conditions existing in Malaysia[21]. Unfortunately, storage technologies are not always optimally exploited since tests have shown that losses during storage through pest damage are often as high as 8% and other storage losses up to 1.68%[22]. While not all storage losses are technically recoverable or their full reduction economically worthwhile, partial reductions from such levels would appear to be feasible and cost effective[23].

The intensification of rice production did necessitate some degree of storage centralization, bulk handling and storage of grain. Storage facilities create time-utility and they are an important aspect of orderly marketing; efficient storage programmes also tend to reduce the amplitude of price fluctuations. Storage capacity also needs to be sufficient to handle future increases in rice production and marketed surplus of rice. The supply of centralised storage facilities exceeds the current demand, although in adopting a "supply leading" policy, LPN may help stimulate

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20 ILO, **Appropriate Technology for Employment Creation in the Food Processing and Drinks Industries of Developing Countries,** Report III, Geneva, 1978.

21 Lim Guan Soon, "Problems and control of insects in rice packing". Paper presented to the **Field Workshop for Prevention of Post-Harvest Rice Losses,** Alor Setar, Malaysia, 1977.

22 RACNOM, **op.cit.,** p. 6.

23 The difficulty, however, is that while it is widely believed that fairly substantial losses of paddy and milled rice do occur during storage, the crucial policy factor, the degree of variability in the form and incidence of such losses is not known with any real accuracy. Even the few estimates that have been made are more prudently best regarded as "guesstimates" and there is, undoubtedly, an urgent need for a systematic, comprehensive study of storage losses in Peninsular Malaysia.

an expansion of demand, possibly at the expense of the small-scale, decentralised storage facilities in small mills. As regards the types of storage, empirical evidence from India indicates that both the initial costs and maintenance expenses of silo storage of padi are much higher than for flat storage; the differential narrows in the case of wheat[24].

There is a reported serious condensation problem in the concrete silo form of storage technology and a FAO rice milling expert[25] has cautioned against excessive enthusiasm for "modern" silo storage:

"The flat storage type is contrary to the idea prevalent in some circles that the installation of vertical concrete silos represents the ultimate improvement. Large-scale bulk storage is only feasible when there are sufficient quantities of one variety of padi in uniform condition. The condensation problems which may arise in a closed concrete silo resulting from high humidity and temperature variations, and practical difficulty to make any large structure sufficiently air-tight and the importance of ensuring that the grain is evenly dried to a safe moisture content, i.e., 12% are some of the technical problems which require careful study in planning new storage structures."

These observations receive support from an empirical study carried out under the auspices of the ILO[26]. This study provides estimates of employment and annual storage costs for horizontal bag storage, steel silos and concrete silos at two different levels of storage capacity. Horizontal bag storage was found to have marked advantages over both concrete and steel silo storage in terms of lower costs and in directly generated employment. Furthermore, the study indicated that the initial investment costs for horizontal bag storage was much lower than for either concrete or steel silos, although the latter were less costly than the former.

Horizontal storage is more labour absorptive than silo storage, additional employment is also generated for the manufacture of sisal/jute

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24 S.K. Majumder, "The effects of different types of storage structures on quality and condition of grain in storage". Paper presented to the **Field Workshop for Prevention of Post-Harvest Rice Losses, Op.cit.**

25 U. Thet Zin, **"A Preliminary Study on the Situation of Post-Harvest Processing and Storage of Rice in Thailand,** FAO, Rome, 1974.

26 ILO, **op.cit.,** p. 45.

bags for bagged grain storage[27] and further indirect employment opportunities can be created if the savings accruing from lower investment costs are optimally invested in other sectors of the economy which have high social rates of return. Observations carried out in the Malaysian rice processing industry have shown that grains keep better in horizontal bulk storage than in vertical silos. In the former, no heat damage of padi was observed during storage of one year or more whereas damage of about 1 – 2 per cent was noted in padi stored in vertical silos after approximately four months of storage. The percentage was increased by about 2 per cent for every two months of storage, thereafter[28]. We are led to conclude that technically efficient, labour-intensive, horizontal storage is a more appropriate choice of technique than vertical silo storage in the environmental conditions prevailing in countries such as Malaysia.

IV. CONCLUSIONS

From our analysis above, the padi processing industry in Malaysia being significant from several perspectives, deserves more serious investigation and consideration than hitherto given. In the light of the structural features of the industry and given the labour-capital resource situation in the rural economy, a mixture of technologies in processing padi should remain one of its more enduring features. Although government intervention on social grounds has resulted in the dissemination of highly capital-intensive and sophisticated milling technology, the case for labour-intensive processing technologies using local or regionally fabricated machinery remains highly relevant. Other policies which would induce the establishment of smaller processing plants and utilisation of

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27 The significane of storage sack manufacture in large grain producing countries should not be underestimated. In Kenya, for instance, employment in the manufacture of sisal/jute sacks for bagged storage of maize represents between 1 and 2% of total wage-earning employment in the manufacturing sector. See, ILO, **Op.cit.**, p. 44.

28 Ismail Shamsuddin, "Bulk storage and handling of paddy in Malaysia". Paper presented at the **Grains Post-Harvest Workshop,** Jakarta, 16-18 January 1979.

appropriate technology[29] may also need to be activated and implemented. Given that desirable attributes for an appropriate technology include not too high a capital/labour ratio requirement, relative independence from foreign materials and simplicity of operation and maintenance[30], then policies which stimulated the development of small-scale processing facilities would appear to be more relevant than the further provision of large, capital-intensive, processing plants.

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29 Appropriate technology may broadly be regarded as the set of techniques which provide optimum use of available resources in a particular environment. It is considered by Morawetz that "For each process or project it is the technology which maximises social welfare if factor prices are shadow-priced". D. Morawetz, "Employment Implications of Industrialisation in Developing Countries: A Survey", **Economic Journal**, Vol. 84, Sept. 1974, pp. 491-532.

30 F. Stewart, **Technology and Underdevelopment**, Macmillan, London, 1977, Ch. 10.

Part Five
EMPLOYMENT, WAGES AND CONSUMPTION

14

UNDERUTILIZATION OF LABOUR IN AGRICULTURE: A SURVEY OF CONCEPTS AND EMPIRICAL MEASURES FOR MALAYSIA*

CHAMHURI SIWAR and MOHAMMAD HJ. ALIAS

Introduction

With the prospect of rapid increase in the labour force, the problems of unemployment and underemployment and the urgency of creating job opportunities, is an important development problem facing Malaysian policy makers. This increasing concern with the unemployment problems is related to the increasing realization that a substantial number of people are underemployed and thus without adequate income.

With the labour force growing at an annual growth rate of 3.3% during the Third Malaysian Plan period, the average annual growth rate of employment creation need to grow at about the same rate just to maintain the unemployment rate of about 7% of the labour force.

Although the employment generating potential of the agricultural sector through its traditional avenues of land development will not be as promising as in the past, the modern sector, particularly the manufacturing sector is neither able to absorb the bulk of the growing labour force. In the face of the low absorptive capacity of the increasingly capital intensive manufacturing sector, the burden of providing fuller utilization of the underemployed labour force, especially within the agricultural sector may well fall to the agricultural sector itself.

Concepts of Labour Underutilization

Most of us are familiar with the concepts of employment, underemployment and unemployment. While full employment may be

*This paper draws heavily from our earlier paper entitled "Some Aspects of Rural Development with Underutilized Labour: A Case for Multiple Cropping", presented at the Forth Malaysian Economic Convention, Kuala Lumpur May 1977. Some of the figure were updated. The authors acknowledge valuable comments from Dr. H. Yamauchi of the University of Hawaii. The usual disclaimer applies.

synonymous to adequate utilization, unemployment and underemployment may be synonymously related to inadequate utilization of the work force. The Malayan 1962 Report on Employment, Unemployment and Underemployment (REUU, [1962]) defined unemployment as "actively seeking employment and capable of taking a job if offered". Unemployment constitutes a relatively minor part of the larger problem of underutilization of human resources. On the other hand, underemployment which appears in various forms represents some considerable degree of underutilization of productive potential. (Blake,[1975]).

Underemployment can be further classified into visible and invisible underemployment. Visible underemployment involves persons involuntarily working part time or for shorter than normal periods of work, willing to do more work but cannot find any. Invisible underemployment or popularly known as disguised unemployment exists when there is a difference between the amount of work performed and that required to produce the same output without increased capital investments and institutional change. The (REUU, 1962) refers this phenomenon as less than full utilization of the persons skill or capacity which ultimately results in low productivity and earnings.

The phenomenon of disguised unemployment which is rampant in agriculture is often said to be related to the concept of zero or negative marginal productivity of labour or surplus labour. The concept of surplus labour which has been featured prominantly in the literature on economic development of a labour surplus economy, stresses the need for capital formation as a means for initiating/accelerating the employment of rural labour. (Lewis[1954] Fei & Ranis [1964]). A brief summary of literature and evidence of this phenomenon is provided in Kao, Anchel and Eicher [1964]. However the validity of the above theory was heavily criticized and reviewed. Paglin [1965] reviewed several strategic assumptions regarding labour productivity and employment in the face of some available data on Indian Agriculture. Oshima [1963, 1971, 1973] commented on several basic conceptual problems which need further clarification and support by empirical research. He argued that the Ranis-Fei model failed to take account of the seasonal nature of labour surplus especially in Monsoon Asian countries. In the face of the low absorptive capacity of the capital intensive technology in the capitalist sector, he proposed a labour intensive strategy based on multiple cropping which does not emphasise the transfer of labour from rural to urban, nor from the agricultural to the industrial sector, but utilization of the surplus labour within the agricultural sector by increasing the absorptive capacity of the sector itself.

Measurement of Labour Utilization

The controversies mentioned above are partly an issue of definition and involve some complex problems of measurement. The often known "labour force" or "active population" approach failed to accommodate the measurement of diverse forms of underutilization such as disguised unemployment or invisible underemployment (Hauser [1974]). Labour force surveys carried out using the labour force framework failed to provide adequate data on various types and nature of labour utilization. For example, it is sad to note that after much deliberation and at high costs, the Malaysia REUU 1962, and Socio-economic Sample Survey of Households – 1967–68 (SSSHM, 1967–68], frameworks were not able to accommodate measures on disguised unemployment. This deficiency certainly has serious implications on attempts to formulate manpower policy and programmes, especially when the nation concentrates so much attention on uplifting the rural sector where disguised unemployment is rampant.

To remedy some of the deficiencies in the labour force approach, Hauser [1974] developed the labour utilization framework (LUF) designed to measure the various types of labour utilization, including visible and invisible underemployment. The proposed framework which can be used together with the standard labour force framework will provide supplementary information such as income or a proxy for income, education and training. If the standard labour force approach only provides information about the work force on these functional groupings, total labour force, employed and unemployed, the LUF permits further analysis based on the following functional categories:

Total work force
  Utilized adequately
  Utilized Inadequately
    by unemployment
    by hours of work
    by income level
    by mismatch of occupation and education.

Implications

The implications attached to each of the various functional groupings are different. The unemployed clearly needs a policy of job creation. For the inadequately utilized by hours of work a policy of providing additional work opportunities to obtain the desired level of employment need to be designed. For those inadequately utilized by income level, the policy consideration should be to increase productivity and income through increased investment in human resources, increased capital inputs in technology and structural changes in the economy. For those inadequately utilized by mismatch of occupation and education there is a need for some reallocation of human resources with respect to job assignments and structural changes in the economy.

Hauser further observed that policy and programmes of labour absorption and utilization need not be based singly on the component elements of inadequate utilization but also aggregately based on macro-analysis of the data. Thus a complete manpower policy should include policies towards full employment, uplifting the income level, providing opportunities for fuller utilization by hours of work and providing as best as possible the appropriate allocation of human resources to match education and training.

Empirical Evidence

In Malaysia an attempt was made by the Department of Statistics to retabulate data from the SSSHM 1967—68 to suit the LUF (Khoo & Palan, [1974]). Subsequently in their labour force survey of 1974 the department adopted the LUF by expanding the standard labour force approach to include questions on both income and possession of consumer durables (Khoo & Kwok [1976]).

The retabulation by Khoo and Palan was designed to look into labour utilization in terms of households and individuals. The household was viewed as being fully utilized, partially utilized or totally underutilized, defined as fully utilized, if the total number of persons in the labour force within the household is equal to the number of persons adequately utilized (i.e. using the criteria of unemployment, hours of work, income level, skill and 'passive' activity). A household is partially utilized if the total number of persons in the labour force is more than those who are adequately utilized. A household is totally underutilized if the number in the labour force is equal to those who are inadequately utilized. The analysis of individuals was based on the standard LUF.

Again, focusing on the rural and agricultural sector, the labour utilization survey of 1974, as reported in Khoo and Kwok's study revealed the expected pattern of higher inadequate utilization as shown in Table 1 below:

Of the rural labour force a 13.4% incidence of inadequate utilization was recorded the most prevalent by level of income. A similar pattern was recorded for the agricultural sector as a whole and also by occupational categories.

Table 1: Labour Utilization Pattern in Rural and Agricultural Sector, 1974
(in %)

	RURAL	AGRICULTURE			
		Total	Employer	Employee	Family Helpers
Total	100.0	100.0	100.0	100.0	100.0
Adequately Utilized	86.6	87.9	86.1	94.9	78.3
Inadequately Utilized	13.4	12.1	13.9	5.1	21.7
by unemployment	4.0	—	—	—	—
by hours of work	1.9	2.0	2.0	1.8	2.6
by level of income	7.1	9.9	11.7	3.1	19.1
by mismatch	0.3	0.2	0.3	0.1	0.1

Source: Khoo & Kwok, [1976]. Adopted from various tables.

Our main interest is to see evidences on the pattern of labour utilization in the rural and agricultural sector. Khoo and Palan observed a grim picture of the rural sector where only 24% of all households in the rural areas are adequately utilized, 15% utilized partially and 61% totally underutilized. Among those households which are inadequately utilized by educational groups, a higher percentage are found in those with no formal education (68%), religious education (63%) and primary education (51%). In Malaysia it is safe to assume that a larger proportion of these educational groupings are found in the rural sector.

In terms of occupational groups, agricultural occupations show the lowest percentage of adequate utilization (44%), and the highest percentage of inadequate utilization (56%). Among the inadequately utilized 25% are inadequately utilized by hours of worknd 31% by income level.

In terms of industrial groups, the agricultural group which includes agriculture, forestry, hunting and fishing, once again has the lowest percentage of adequate utilization (35%), and the highest percentage of inadequate utilization (65%). Among the inadequately utilized, 30% are by hours of work and 34% by income level. For the other related industrial group, agricultural products requiring substantial processing, 52% are adequately utilized, 48% inadequately utilized, 21% by hours of work and 27% income level.

Hauser [1974], using a higher cut-off of 40 hours for labour input and M$100 for income noted that the rate of underutilization for West Malaysia as a whole were on the higher side. The labour force categories inadequately utilized were 73%, 7% by unemployment, 17% by hours of work, 49% by income and 0.3% by mismatch.

It could easily be noted that the results obtained from the retabulation of the SSSHM 1967–68 were on the higher side, compared to the labour utilization survey (LUS) of 1974. The difference in the cut-off points for the various measurements partly explain the variation.

With regard to hours of work, the SSSHM 1967–68 fixed a 40 hours of work per week, while the 1974 LUS maintained 25 hours per week as the cut-off point for determining the inadequately utilized by hours worked. The 1974 LUS while claiming that the cut-off point used was more realistic, admitted that the average hours worked to vary considerable between industries and occupations. In agriculture 25 hours of work per week is quite unrealistic. Studies by Purcal [1975] and Afifuddin et. al [1974] assume an eight-hour day for an average of 5 days a week, even during the slack season. During peak season farmers are known to have worked extra hours and days to meet the tight schedule of the cropping activity. As pointed by Khoo and Palan a more moderate cut-off point of 35 hours per week would be a much more realistic picture of the labour force utilization. To our minds the results for the inadequately utilized in the rural and agricultural sector, as shown from the 1974 LUS, especially by hours of work, seriously understate the actual pattern of labour utilization. Another study of this nature, but in an urban setting shared the same view (Cheong & Kok, [1976]).

Snodgrass [1976], noted that the average working hours by males as well as females in 1962 and 1967 in the agricultural industry are well above 35 hours a week, as can be seen from Table 2.

Purcal's study of four villages in Province Wellesly, comparing actual working time with time available for work indicated a higher rate of underemployment or inadequate utilization by hours of work (see Table 3). As expected the result showed seasonal utilization of labour. Even that except for the months of July and January which recorded a low percentage of underemployment, the rates of underemployment were on the higher side for the rest of the months for both the single and double cropping areas. The average rate of underemployment was 33% and 36% for the double and single cropping respectively.

One distinct feature of labour utilization in the agricultural sector is its seasonal nature. In this respect one major criticism with such LUF which tries to look into the pattern of labour utilization based on a specific reference week is that it failed to take into account the seasonality of labour utilization, unless periodc surveys are undertaken.

Table 2: Average Weekly Hours of Work by Industry, 1962 and 1967

Industry	1962	1967		
	Males Only	Males	Females	Both sexes
Agriculture, Forestry, Fishing	46.3	46.9	38.0	41.2
Agricultural products requiring substantial processing.	40.9	41.0	39.9	40.5

Source: Snodgrass, [1976]. Adopted from REUU [1962] and SSSHM [1967—68]

Table 3: Underemployment Among Men in Single and Doubles Cropping Areas

MONTHS	No of hours available		No of hours worked		Hours worked as % of hours available		Underemployment (%)	
	SC[a]	DC[b]	SC	DC	SC	DC	SC	DC
May	200	200	71	96	36	46	64	52
June	184	184	110	114	60	62	40	38
July	184	184	169	180	92	98	8	2
August	176	176	162	136	92	77	8	23
Sept.	200	200	152	130	76	65	24	35
Oct.	176	176	112	129	64	73	36	27
Nov.	184	184	116	123	63	67	37	33
Dec.	200	200	110	111	55	56	45	44
Jan.	176	176	181	163	103	93	−3	7
Feb.	152	152	76	73	50	48	50	52
March	184	184	74	104	40	57	60	43
April	184	184	71	104	39	57	61	43
TOTAL	2200	2200	1404	1463	63	67	36	33

[a]SC = single cropping
[b]DC = double cropping
Source: Purcal, [1975]. Adopted from Table V, and XI.

We are in agreement with the argument that, due to the seasonal nature of the cropping activities (especially for padi) the time reference for any survey which intends to look into the nature of labour utilization in the agricultural sector would have to be obtained periodically for the year round, by months as in the case of Purcal's or by activity, as in the case of Afifuddin's. Another such study by Hayami, et. al [1976] summarizes the results of one-year record keeping in the utilization of labour in a rice village in Southern Luzon. Since farmers often do not keep records, they have to depend on their memories. This is why the interviews will have to be conducted throughout the year, preferably after each activity, while their memories are still fresh. Of course, one major disadvantage of this approach is that it is more appropriate in reflecting the seasonal variations in the labour utilization.

The implication of the seasonal labour utilization is obvious. The question of how to utilize rural labour at times of underemployment is the subject of discussion of another paper [Chamhuri & Mohammad, 1977].

Another controversial issue is the cut-off point for income level, especially if a country has no officially recognised figure for the 'poverty line'. The Malaysian official definition of poverty line income just states the income that takes account of minimum nutritional and other non-food requirements of each household to sustain a decent standard of living [TMP, 1975]. Khoo and Palan's retabulation study used M$100 per month as the cut-off-point for low productivity and claimed that it was too high to be realistic. They then suggested a more reasonable cut-off point of M$50 a month. Khoo and Kwok defined low income households as households with per capita incomes of $13.08 and below per month. They believed this amount represents the income level below which the lowest 10% of the population fell. Here again, we believe that the figure underrepresents the defination of poverty line income.

Faced with complex problems of serious under-reporting of income information and a high rate of refusal to answer questions pertaining to income, one sometimes suspect the validity of income information. But the Department of Statistics maintained that from their experience in canvassing income questions in household surveys, the cooperation and response rate have not been reduced. Still, with other in depth single study on poverty, alternative and better data on income distribution will render the category of inadequate utilization by income unnecessary especially if the studies use different cut-off points for income level. For example, the TMP quoting the 1970 Post-Enumeration Survey of the Population Census, noted the highest incidence of poverty in the agricultural sector (68%). Hence we cannot but agree with the assumption that the category inadequately utilized by income of 7.1% as shown by Khoo and Kwok only aimed at persons with incomes in the lowest 10% of the income distribution, and hence only indicative of the extent to which poverty exists in the agricultural sector in the context of the total labour force.

Conclusion

Because of the prevalence of underutilized labour and poverty in the agricultural sector, rural development strategies ought to be designed and formulated with employment and income creation as their main objectives. A more intensified cropping pattern based on food crop and more profitable cash crops should be evolved and adopted. The main aims of this multiple cropping strategy are to bring about a more efficient use of labour and land besides providing greater potential for increased income.

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15

EMPLOYMENT EFFECTS OF CHANGES IN OUTPUT, EXPORTS AND HOME DEMAND — A MALAYSIAN CASE STUDY*

RAJ KUMAR

Introduction

The relationship between employment and output has been a subject of considerable interest in both the literature of developed countries, and less developed ones. The experience of developed countries, particularly in the manufacturing sector, is explored by Fair (1969), Killingsworth (1970), Roberts (1972) and Briscoe and Peel (1975) in their surveys of cost minimising and profit maximising models to determine the 'optimal' labour input for particular levels of output, while those concerning less developed countries by Stewart and Streeten (1971), Morawetz (1974) and Kumar (1979). The labour input is treated in quite similar lines as capital, and employment functions have been formulated and applied to study the mechanism of adjusting actual labour levels to 'optimal' ones to meet desired levels of output of a firm, industry or sector.

A useful extension of this problem, particularly in the context of less developed countries, is to split up the output on the basis of exports and home consumption, and determine their individual effect on employment. This essentially is the aim of the present study which is geared at formulating a model and applying it in respect of the rubber and forest-based industries of Malaysia. During the last 5 years rubber has been contributing about 20% of the foreign exchange earnings while forest products about 15 to 20%. Rubber is already an important employment avenue while forestry has been earmarked as an important candidate for new job generation. Putting it more formally, the objectives of the study are:

(a) to measure the output-employment elasticity, the export-employ-

* The author wishes to thank Dr. Colin Roberts of the Department of Economics, University of Edinburgh, for his useful comments during the course of research on the subject.

ment elasticity and the home consumption-employment elasticity;

(b) to measure the speed of labour adjustment of the industries concerned.

The employment-output elasticity may be defined as the percentage change in the number of workers employed in comparison with the corresponding change in physical output or the real value added. In a similar fashion, the export-employment elasticity could be expressed as the ratio of the percentage change in volume of exports to that of the number of workers employed for the industry concerned. Likewise, the home consumption-employment elasticity can be put as the proportionate change in employment as a result of a proportionate change in home consumption.

The estimates could be a useful aid in guiding export strategies and manpower planning. We will be using a model which is tailor-made to the circumstances of a country where statistical information may never satisfy the meticulous scholar. We are aware that the theoretical literature is rich in the formulation of sophisticated models that integrate employment and investment functions and thus measure both labour and capital utilization as well as those that try to explain short-term demand for labour in terms of long term needs. At least for the circumstances of a developing country, we reckon that a simple uncomplicated model can sometimes bring out more clearly some of the salient issues than a semi-complete, highly sophisticated model combining various interlocking decisions. It is in this spirit that we will approach the present study.

I. A Short Note on the Malaysian Employment Issue and Some Past Studies[1]

As for most free enterprise-based economies, employment generation is an important issue in Malaysia, more so when a large part of the unemployed are below 25, and when population growth is relatively high at 2.8% per annum. Experience of the 1970's suggests that the 7-8% real growth rates achieved by Malaysia, one of the highest in the Asia-Pacific region, have not guaranteed full employment. Indeed, the open unemployment rate has ranged between 5 and 8 percent during the last

1. All the statistics used here are extracted from official government publications. A comprehensive review of the employment situation can be found in the various development plans, the latest being in the Fourth Malaysia Plan (1981-85) p. 71-98.

decade despite a net increase of about 1.7 million jobs. The pattern of demand during the same period indicated a shift in employment demand away from agriculture to manufacturing and services sectors. Agricultural employment increased only by about 1.9% per annum compared to 7.6% for manufacturing and about 6% for services. In agriculture and forestry, the main concern of this study, the bulk of new employment came from state supported land development schemes in rubber and oil palm and wood-based industries like logging, saw milling and wood panels. Despite the excess labour supply, there were reports of locational labour shortage in agriculture.

Despite the critical nature of the employment issue in Malaysia, studies in this area have been few and far between. Most of them (Snodgrass, 1980, Anand, 1980) have been geared to the income distribution issue, and others like those concerning commodity studies (Khera, 1976 and Thoburn, 1977) have treated the issue peripherally. One early study by Oshima (1971) used simple year to year percentage change comparisons between output and employment for agricultural, manufacturing and services sectors of six East Asian countries, including Peninsular Malaysia. For Peninsular Malaysia Oshima came out with an employment-output elasticity of 0.3 for agriculture compared with 0.56 and 0.71 respectively for manufacturing and services for the post independence period, 1957-1967. Lim (1975), using the Ball and St Cyr-type of model with some variations, noted very low employment elasticities for 11 industry groups in Peninsular Malaysia for the period 1959-1970. Since Lim used **value** of output rather than **volume** of output as an indicator of productivity, one is not exactly sure of the reliability of the estimates as values, when not expressed in real terms, might disguise price changes affecting value without any physical change in output.

A review of the literature on studies of employment and output relationships in less developed countries is taken up in Kumar (1979) while that concerning employment implications of industralization are taken up competently by Morawetz (1974).

II. The Model

As mentioned above, there are broadly two ways of approaching the formulation of neoclassical employment functions, profit maximising and cost minimising. The profit maximising models such as those by Dhrymes (1969) and Nadiri (1968) explain the labour input in terms of output and the real wage and the rent of capital, ignoring the cost of adjusting the labour input, whereas the cost minimising approach postulates a two-stage decision process in the short-run: the first involving the determination of desired employment levels, E*, dictated by the production function, and the second part concerns choosing a level of hours, h*, that would minimise wage costs. This study will use a cost-minimising model of the type formulated by Brechling (1965) and Ball and St Cyr (1966) which appears most convenient for empirical testing and at the same time theoretically cogent.

Their approach is to estimate an optimal level of employment so as to minimize a specified function of the various costs involved in the labour input decision, given the state of technology and capital equipment. This is essentially a short period or cyclical employment decision as opposed to a long-run plan which might involve changing the capital-labour mix. The labour input in the short run is acknowledged to have at least two dimensions: the number of people employed, E, and the number of hours worked per person per week or per month or per year, h. When a firm or industry wishes to change employment, it could either alter the number engaged or the hours worked, or both. (This is analogous to the recognition that the capital input has two dimensions — the total stock and its rate of use.) An underlying assumption is that output, capital and technology are assumed to be exogenous, although realistically this may not be the case, as will be pointed out later.

Both Brechling and Ball and St Cyr begin by postulating a short-run Cobb-Douglas production function, a technical equation that represents the most efficient relationship between inputs and output a firm or industry can achieve in equilibrium when adjustment among the inputs is complete:

$$Q_t = Ae^{\rho t}(Eh)_t^{\alpha} \tag{1}$$

where Q_t is the net output or value added, E, the number of persons employed, h = productive hours worked and $Ae^{\rho t}$, the shift parameter, which takes into account the influence of capital and technical progress and is assumed to grow exponentially. α is the parameter for (Eh_t).

The employment function is simply an inversion of this production function:

$$Eh_t = A^{1}e^{\rho t/\alpha}Q^{1/\alpha} \tag{2}$$

The next step is to establish a relationship between the effective wage rate and the number of hours worked. Ball and St Cyr approximate this relationship by a quadratic:[2]

$$W_h = a - bh + ch^2 \tag{3}$$

where W_h is the average wage paid per productive hour. There will be an average level of hours at which this function is minimised. The cost function which the firm or industry attempts to minimise with respect to Eh is:

$$C_t = W_h(Eh)_t + F_t \tag{4}$$

where F_t is the fixed cost of hiring and training while $W_h(Eh)_t$, the variable costs of production relating to the labour input.

Given the above production function, h_t can be expressed as a function of Q_t and E_t:

$$h_t = \frac{Q_t^{1/\alpha} e^{-\rho t/\alpha}}{A^{1/\alpha} E_t} \tag{5}$$

Substituting (5) for h_t in the cost function (4) above, and minimising the resulting expression with respect to E_t, gives the firm or industry's desired employment level, E*:

$$E_t^* = \frac{2c}{A^{1/\alpha} b} e^{-\rho t/\alpha} Q^{1/\alpha} \tag{6}$$

This expression outlines the level of employment which minimises costs subject to both the hours cost function and the production function. Implicit in the expression is that the normal hours worked remain constant, otherwise 2c/b will not be constant. Brechling incorporates in his wage equation overtime which is useful if one had data on it to measure the effect of overtime on output and employment.[3].

2. When actual hours of work exceed normal or standard hours of work, the effective hourly wage rises above the straight-line hourly wage due to the premia payment for overtime (i.e. in the excess of normal hours). When actual work is below the normal hours, costs are still incurred in terms of fixed costs of employing workers. When these hourly wage rates are plotted against actual hours worked per man, the function is thus roughly U-shaped and may therefore be approximated by a quadratic.

3. See Brechling (1965), p. 192.

Our next question is the speed of labour adjustment, i.e. how quickly the firm or industry adjusts its employment to meet desired levels, which can be denoted by E^* along the lines as (6). A gap between E_t^* and the actual level of employment, E_t, may be due to several reasons, the most important being the cost of labour adjustment. Labour may be regarded as a quasi-fixed factor with costs of hiring, firing and training besides non-monetary obligations to unions or workers directly.[4]. This may involve labour hoarding, a situation when labour that is not fully used is kept on for transitional variations in output or in the light of legal and moral constraints on dismissals. Another reason could be the difficulty in carrying out a concurrent adjustment of other inputs like capital stock in the short-run. We can incorporate this adjustment behaviour by using a simple first-order adjustment, more commonly known as the Koyck adjustment process, which may be expressed as:

$$\frac{E_t}{E_{t-1}} = \left(\frac{E_t^*}{E_{t-1}}\right)^{\lambda} \text{ where } O < \lambda \leq 1 \tag{7}$$

where λ measures the speed of labour adjustment between t and $t-1$. This means that if the estimated value of λ is 0.27, and if logarithms are used, 27% of the difference between the logarithms of desired and actual levels is made up during t and $t-1$.[5]

Adding this adjustment process, and taking natural logarithms, the Ball and St Cyr formulation becomes:

$$\log E_t = a_0 - \frac{\rho\lambda}{\alpha} + \frac{\lambda}{\alpha}\log Q_t + (1-\lambda)\log E_{t-1} \tag{8}$$

where $a_o = \frac{2c}{A^1 b}$. From (8), we can derive estimates of the structural co-

efficients of $\hat{\lambda}$ the speed of labour adjustment, $\hat{\alpha}$, the returns to labour, and ρ, the time trend effect on employment. We can also work out the employment-output elasticity, $\hat{\beta}$, which is simply the inverse of $\overline{\alpha}$. It can

4. For a discussion of the notion of treating labour as a quasi-fixed factor, see Oi (1962).

5. If $\hat{\lambda}$ is negative, it may imply that either the data is inaccurate or that market participants are not behaving in the rational sense as assumed by classical economic theory. A similar reasoning may also be used if $\hat{\lambda}$ is '>O

be noted that (8) is in the multiplicative form which implies that whilst the average and marginal propensities to absorb labour will change, the employment-output elasticity will remain constant.

It will now be useful to formally list out the main assumptions of the model we will be using. The realism of some of these assumptions will be discussed in the analysis of the results. The assumptions are:

(i) the model is essentially a demand model ignoring labour supply constraints essentially because of a lack of data of labour supply determinants such as unemployment and vacancy rates for the industry concerned; for simplicity quality of labour is assumed to be homogenous, i,e., there is no distinction made between varying skills.

(ii) The desired hours of work, h^*, remain constant over time, i.e., the working week remains the same, not unrealistic for Malaysia where the average hours worked per day in the industries under study have not varied since independence in 1959.

(iii) The industry is on the production function, i.e., it is in an equilibrium positions with its inputs fully adjusted to particular levels of output. Realistically, this may not be so but we are not aware how far each industry deviates from the production frontier.

(iv) As mentioned earlier, output is assumed to be exogenous to the industry although realistically, an industry could adjust output, or plan output and employment jointly, rather than merely tinkering employment to output levels.

(v) Likewise, capital is also assumed to be exogenous, although in the long run is likely that the firm will alter its capital-labour mix depending on the wages-rent ratio. Such a substitution is likely as shown by Western experience, but unreliability of wage data as well as the changes over time makes it difficult for empirical verification. Likewise, data on capital usage is unreliable. A usual way to overcome this would be to use a time trend, either arithmetic (representing constant growth) or a logarithmetic (which allows for both increases and decreases) or even a quadratic. Since economic theory is silent on this, the most convenient way would be to experiment with various formulations of the time trend to learn which gives the plausible results.

(vi) We will assume that the economic theory at the micro level holds, to some extent, at the macro level.

Given the above assumptions, for estimation purposes, equation (8) could be written as:

$$\log E_t = a_0 + a_1 \log Q_t - a_2 t + a_3 \log E_{t-1} + u_t \tag{9}$$

where $a_1 = \frac{\lambda}{\alpha}$; the output-employment elasticity (the percentage change in output as a result in the increase of an additional unit of labour employed, assuming other factors remaining constant), $\hat{\alpha}$, is measured as $\frac{1 - a_3}{a_1}$; $a_2 = \frac{\rho\lambda}{\alpha}$ and $a_3 = 1 - \lambda$ and the speed of adjustment is measured by $(1 - a_3)$. The employment-output elasticity, $\hat{\beta}$, is implicitly calculated as $\frac{a_1}{1 - a_3}$

Equation 9 above will give us estimates of the employment elasticity with respect to output only. The next step is to evaluate the individual effects of exports and home consumption on employment.

The problem will be easy to solve if we know which portion of the labour force in the industry concerned is devoted to producing for exports, and which for home demand. All then we have to do is to estimate equation (9) separately to determine the demand for labour stemming from changes in exports and home consumption.

$$E^*_{1_t} = A_1 Q_{1_t}^{\beta_1} e^{\beta_3 T} \tag{10}$$

and
$$E^*_{2_t} = A_2 Q_{2_t}^{\beta_2} e^{\beta_4 T} \tag{11}$$

where, E_1 and E_2 are employment for exports Q_1 and home demand, Q_2 respectively, β_1 and β_2 their respective elasticities, and β_3 and β_4, their corresponding time trend effects on employment proxying, among other things, changes in capital and technology.

However, E_1 and E_2 are not known separately, and very often the same labour force is engaged to produce both for export and home consumption. What statistics show is $(E_1 + E_2) = E$. Likewise output data is also usually in the form of $(Q_1 + Q_2) = Q$, but since figures for exports are available, a simple way will be to deduct from total output, exports, and the residual could be regarded as apparent home consumption.

A convenient way would be to add (10) and (11) together:

$$E_t^* = E_{1_t}^* + E_{2_t}^* = A_1 Q_1^{\beta_1} e^{\beta_3 T} + A_2 Q_2^{\beta_2} e^{\beta_4 T} \tag{12}$$

And taking logarithms:

$$\log E_t^* = \log (A_1 Q_1^{\beta_1} e^{\beta_3 T} + A_2 Q_2^{\beta_2} e^{\beta_4 T}) \tag{13}$$

We can assume that the coefficients with respect to the time trend for both exports and home production to be the same as it is likely that changes in capital and technology for both kinds of production processes are quite similar. Hence, β_3 will be equal to β_4. For simplifying estimation, we can also assume the constant terms A_1 and A_2 to be equal, although they are likely to be different. Equation (13) can now be re-written as:

$$\begin{aligned} \log E_t^* &= \log [A_1 e^{\beta_3 T} (A_1^{\beta_1} + Q_2^{\beta_2})] \\ &= \log A_1 + \log (Q_1^{\beta_1} + Q_2^{\beta_2}) + \beta_3 T \end{aligned} \tag{14}$$

As in the case of the earlier model, we can add a labour adjustment process, but only with some restrictions. This is because we have no a priori information on the process nor on the cost of labour adjustment with respect to changes in exports and home demand. To avoid complications, we can assume the adjustment process of labour to meet exports and home demand to be identical. As done previously, this can be approximated by a linear first-order Koyck adjustment process, and the implied speed of adjustment will again be measured by

$$\log E_t^* = A_1 + \lambda \log (Q_1^{\beta_1} + Q_2^{\beta_2}) + \lambda \beta_3 T + (1 - \lambda) \log (E_{t-1}) \tag{15}$$

As the parameters, β_1 and β_2 are non-linear, we cannot use the Ordinary Least Squares technique for estimation, but special non-linear methods explained in the next section.

For estimation purposes, we can write (15) as:

$$\log E_t = a_0 + a_3 \log(Q_1^{a_5} + Q_2^{a_6}) + a_3 a_2 T + (1\text{-}a_3) \log E_{t-1} + u_t \qquad (16)$$

where $\frac{a_5}{1 - a_3}$ measures the implied export-employment elasticity, $\hat{\beta}_1$, while $\frac{a_6}{1 - a_3}$, the employment elasticity with respect to home demand, $\hat{\beta}_2$. The interpretation of the other coefficients is: $(1 - a_3) = \hat{\lambda}$, i.e. the implied speed of labour adjustment, and $a_3 a_2 = \hat{\beta}_3$.

We have to be careful in comparing $\hat{\beta}_1$ and $\hat{\beta}_2$, for the respective "base" of exports and home consumption may differ. But this will be clariried when we interpret the results.

III. Data and Computational Problems

Data availability and quality variations among industries considerably narrowed the scope of the analysis.[6] As reasonably lengthy time series on employment figures were not available for the whole of Malaysia, we confined most of the estimation to data covering Peninsular Malaysia only, where there are relatively more reliable statistics. For logging, however, we used Sabah as a case study as time series data were available. Although the figures included other kinds of forestry workers, these do not pose too serious a problem as they are small in number. In any case, logging is a major industry in the state.

Demand for manual and non-manual workers is likely to differ, and separate estimates will be more appropriate, but disaggregated on this form is not available for the industries concerned. Even for rubber, statistics until 1975 were aggregative combining administrative staff and estate workers. Annual figures on a calendar year basis were used as data for shorter periods for the forest industries were not available. The use of annual figures to some extent eliminates seasonal influences, common in

6. All statistics in the computations come from various government publications too numerous for detailed listing here, but the interested reader can see Kumar (1979) for all the data used and their sources.

agriculture and forestry. Full-time workers are considered, as only discontinous figures are available for part-time staff. The latter are not used to facilitate comparability. In any case, to study job generation capacity, full-time employment figures are more meaningful.

The time trend was used to capture capital, cost and technology trends, as reliable figures on wages and capital usage are not forthcoming. To test the reliability of this variable, we used the linear, logarithmetic and quadratic time trends.

We drew up a correlation matrix of all the variables used in the study for each industry. Generally, all the variables had a strong positive correlation (more than 0.85) with current and past levels of employment in the industry concerned, except for rubber where a strong negative correlation is indicated. In other words, production, exports and home consumption levels of rubber moved in opposite directions of employment during this period. The correlation matrices gave us intitial clues regarding the relationship between employment with the other variables.

The functional form we chose was the loglinear one, assuming a multiplicative effect on the error term. Such a procedure, also used by the other studies, enable us to interpret coefficients in terms of elasticities. We also experimented with the linear and semi-log forms but the results were generally poor, and in most cases implausible.

Equation (9) was estimated by Ordinary Least Squares, while equation (16) was worked out by nonlinear iteration technique, based on the Gauss-Newton method. Heuristically for nonlinear econometric estimation there is the problem of testing whether the local maximum is in fact the global maximum. Initial starting values were either selected randomly or based on a prior information from results of the least squares technique. We experimented with differing starting values to increase the certainty that it is the only maximum. The biggest problem was encountered in respect of logging and rubber equations, particularly those having arithmetic and quadratic time trends, where convergence was not achieved.

There are other general observations of the results summarised below:

1. Autocorrelation did not appear to be a serious problem for nearly all the equations, when inspecting the Durbin-Watson statistic, the h-statistic (which takes into account equations with a lagged dependent variable) and the plots of the error terms. The single-

Table 1

	Rubber	Logging	Sawmilling	Plywood Manufacture
I. Employment-Output Equation				
(a) Employment-Output Elasticity	1.62	1.20	0.26	1.19
(b) Implied Speed of Labour Adjustment	0.21	0.30	0.77	0.31
(c) Time trend effect on Employment	−0.50	−0.78	0.11*	−0.11*
II. Non-linear Equation[a]				
(a) Export-Employment Elasticity	0.65	2.43	0.73	3.17
(b) Home Consumption-Employment Elasticity	2.13	1.75	0.43	1.79
(c) Implied Speed of Labour Adjustment	0.43	0.32	0.99	0.29
(d) Time Trend effect on Employment	−0.78	−0.33*	−0.01*	−0.11*

a based on equations tracing the separate effects of changes in exports and home consumption on employment

* not statistically significant at least at 90% level of confidence.

equation least squares technique, though biased in small samples, is consistent and asymptotically efficient when serial correlation is absent.

2. A prior , one could expect multicollinearity especially of the time trend with Q, Q_{t-1}, X, HC and E_{t-1}, but the variance-convariance matrices of all the results did not give any evidence of this, except those of the non-linear rubber equations where the variance-covariance values among the estimated coefficients of the arithmetic time trend, X and HC were higher. (X = output, HC = Home Consumption).
3. Most of the fits, except those of logging equations, were greater.

Analysis of Results

The detailed results, equation by equation, for each industry are in Kumar (1979). We will only present the summary of the key elasticities and speeds of labour adjustment and interpret them. Table 1 is the summary of the results being referred to.

(a) Employment Elasticities

A striking feature of the employment-output elasticities (I a) is that except for sawmilling, all of them are above unity, implying that employment in these industries has increased proportionately more than output, i.e. there is lower productivity per man in terms of volume of output. This appears surprising as the general belief is that productivity has gone up in these industries. If productivity has really gone up, then data quality might be the problem, i.e., output has been underestimated or employment figures overestimated. Even if an allowance is made for the error, the employment elasticity appears on the high side implying a strong propensity to employ.

If we were to examine the disaggregated effect on employment of exports and home consumption, the elasticity estimates appear to have magnified for all industries except for rubber. In all cases, except rubber, the export-employment elasticity is higher than that of home consumption changes, confirming the widely held view that exports boost employment more than catering for home demand alone. However, such comparisons might be questionable as the various industries have different bases. A 10% increase in output from a larger base is not the same thing as a 10% increase from a smaller base. One has therefore to be careful when translating them into numbers.

While we have some reservations in accepting these results, it would appear that on the basis of these estimates all the above industries, except sawmilling, suggest a rather optimistic picture regarding the propensity to employ.

(b) Implied Speeds of Labour Adjustment

While the employment elasticities appear to be on the high side for most industries, the estimated speeds of labour adjustment appear to be low for all industries except sawmilling. The low speeds could be due to employers resorting to paying over-time or using part-time staff, figures of which were not included in the estimation for reasons explained earlier. For logging and plywood mills, the estimated speeds are similar – i.e. about 0.30 (I b and II b); for rubber very low (0.21) for the employment-output equation and slightly higher (0.43) for the non-linear equation; for sawmilling there is almost complete adjustment in the non-linear equation (0.99) and a high adjustment (0.77) for the other equation.

How can we explain variations across industries? One reason could be wages. But the latest available survey of manufacturing industries (1972) indicated that wage levels for similar category of workers do not differ markedly for the industries under analysis although non-pecuniary benefits appear higher for rubber. If we had reliable time-series data on earnings per worker, this could have shed some light on the matter.

We can now even question the validity of assuming that there are no labour supply constraints, for variations across industries could be due to differences in their unemployment ratios. A tight labour market (measured by a low unemployment rate) causes an industry to hire less in the short-run (because workers are difficult and expensive to find) or fire less (because of the fear of not being able to hire the workers back when needed); and conversely, if the unemployment rate for an industry is high, hiring and firing are easier. The problem is more acute in terms of particular skills. Cases of rubber estates, for instance, of not being able to get labour are widely reported as Malaysian labour moves to other sectors such as construction in Singapore where wages are higher.

Other reasons for variations across industries could be attributed to the amount of specific training required, the degree of unionisation and the average wage level in the industry. In Malaysia, the unions of rubber estates are more established than those concerning forestry and forest-based industries, and the latter are better placed to adjust the labour force.

(c) Effect of Time Trend on Employment

One can expect the time trend variable to show a negative sign, indicating that over time factors such as capital stock and technology will increase labour productivity and therefore reduce the demand for labour. However, being a versatile variable, the time trend could also pick up the effects in the skill of labour, or the changes in the wages-rent ratio, that may increase or decrease the demand for labour. Experience of industralized countries suggest a trend towards labour displacement. This is indicated in most of the equations except for sawmilling, which in any case is not statistically significant.

IV. Conclusions and Possible Areas of Further Improvement

The general picture that emerges is the high propensity to employ of the industries under analysis but a low speed of labour adjustment. These results are only the first approximation of the situation, and point towards the way of the need for better quality data. After all, for a relatively new political state like Malaysia, it is valuable to test data and understand their shortcomings. The state of development of statistics is itself linked to the economic progress of the country. This study has tried to reveal its inadequacies. The rational of employment policy is the ability to combine quantitative estimates with institutional knowledge. It is in this spirit the results will have to be looked at.

Turning to the model itself, it can be improved in several ways. One is to incorporate capital services (e.g. electricity consumption, maintainance of equipment, etc.) so that labour substitution effects may be measured. Another way is to split up the employment demand in various grades of skills as elasticities are likely to be different; for instance, they will be higher for the unskilled category than for skilled ones. Wage rates for the respective skill groups will help to explain demand, and so would the interest rate for capital. The model should also deal with supply aspects with factors such as level of education, unemployment and vacancy rates, and other supply variable that could enlighten us further on employment behaviour.

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16

THE DETERMINANTS OF INTER-INDUSTRY WAGE DIFFERENTIALS IN PENINSULAR MALAYSIA

OSMAN RANI HASSAN

Introduction

An analysis of industrial wages in Peninsular Malaysia indicates that there is a wide dispersion among individual industries. The coefficient of variation, which is used to measure the dispersion of average industrial wages in 1973, defined at the 4-digit level of the 1972 revised Malaysian Industrial Classification (MIC), is 67 percent. This magnitude is high compared to other countries.[1] The implication is strong that significant distortions in factor allocation between manufacturing industries, and income distribution are being stimulated by the wage system. An understanding of the determinants of industrial wages is therefore important for sound rational wage policies.

This paper will examine some hypotheses with respect to the inter-industry wage variations in Malaysian manufacturing in 1973. The choice of this period was determined by the availability of relevant data. The method of analysis used is a crosssectional test of a regression model of wage determination. The first part of this paper presents briefly the specification of the model and the data base; the second part examines empirically the influence of selected independent variables included in the regression analysis; and in the last part we present the summary of the findings.

1. For example, the coefficients of variation (%) for industrial wages were 56 in Thailand, 24 in Burma, 21 in Pakistan, 13 in Taiwan, 29 in Mexico and 23 in Japan. For Thailand the reference year is 1973 and for others 1965. See Akrasanee, N. and Chutikul, S., "Wage Differentials in Manufacturing Industries", **CAMS Discussion Paper Series. No. 77-02.** It may be noted that these figures are not strictly comparable due to differences in data base.

I The Model

In an attempt to explain the wage variations, it might be hypothesized that the wage levels are influenced by a conglomeration of factors, including market imperfections, industrial structure and the labour characteristics. Unless otherwise stated, data from the census of manufacturing industry in Peninsular Malaysia for 1973 will be used in the testing of the hypotheses. The industrial wage rate is defined broadly as the amount of wages and salaries (in ringgit) per man-year. The nominator is the value of payments, including bonuses, cash allowances, etc. made to all paid employees during the year. The employees' contribution to Employees Provident Fund (EPF) is included but the employers' contribution is excluded. For the denominator, employment in terms of hours of work should be preferred. However, data inadequacies do not permit us to do so. We have treated two part-time workers as equivalent to one full-time worker in this analysis.

We apply a stepwise regression analysis and assume linear relations in our model. The model describes industrial wage rate as a function of variables approximating imperfections in the labour and product markets, industrial structure and the characteristics of an industry's labour force. The choice of specific variables is highly dictated by data availability.

Three market imperfection variables are chosen. They are the level of unionization (UN), the concentration index (CI), and the rate of protection (RP). For the industrial structure variables, we have capital-labour ratio (K/L), industry size (SZ), profit rate (PR), industrial location (LOC), degree of foreign-controlled (FOR), and industrial rate of growth (GR). The labour characteristic variables consist of percentage of male workers (MW) and the percentage of skilled labour (SM).

The rationale for including these variables is presented below.

(1) UN: The role of trade unions in the collective bargaining process has too often been argued as important in pressing for higher wages and other fringe benefits, especially under the circumstrances of rising productivity and cost of living. The rapid growth of labour

force in the manufacturing sector of Malaysia since 1960's has stimulated the growth of trade unions and activities in the industrial relations field. In view of the active participation of unions and the rapid expansion in the industry, conflicts between management and labour are difficult to avoid. In 1973, for example, the number of disputes and strikes in this sector surpassed that of all other sectors. This sector also topped the list in the number of collective agreements concluded. Of the total 66 strikes and 82 collective agreements concluded in the country, 25 and 38 respectively were from this particular sector.[2] Comprehensive data on the number of workers covered by the collective agreements are not available. However, it is expected that in the manufacturing industry the majority of employees in the managerial, professional, technical, skilled and semi-skilled grades received a wage increase of up to 10% and the unskilled grade up to 20% in 1973.[3]

In so far as the trade union barganing strength depends a lot on the backing of its members, it would follow that the union membership as a percentage of the labour force in an industry should have a positive correlation with wage differences between industries. The data on number of trade union membership are drawn from information compiled by the Ministry of Labour and Manpower. However, the information is available at the 2- and 3-digit MIC levels. Therefore for our analysis, we have to assume that the 2- or 3 digit industries reflect the 4-digit characteristics of unionization. In other words, we have assumed homogeneity of the underlying data.

(2) CI: In addition to the degree of unionization, many studies have also been carried out to ascertain the impact of industry concentration on wages.[4] At the theoretical level, we expect the higher the

2. **Annual Report of the Ministry of Labour and Manpower 1973**, pp. 41-42.
3. Ibid., pp. 9-10.
4. For more recent studies, see for example, Phlips, L., **Effects of Industrial Concentration**, North-Holland, Amsterdam, 1971; White, L.J., **Industrial Concentration and Economic Power in Pakistan**, Princeton University Press, New Jersey, 1974; Henley, J.S. and House, W.J., "The Changing Fortunes of an Aristocracy? Determinants of Wages and Conditions of Employment in Kenya", **World Development**, Vol. 6, January 1978; Haworth, C.T. and Reuther, C.J., "Industrial Concentration and Industry Wage Determination", **The Review of Economics and Statistics**, Vol. LIX, February 1978.

concentration of an industry, the fewer the firms in that industry and the more openly and easily they can coordinate their actions, hence the more likely they are to achieve results similar to those of a monopoly or an oligopoly. Industries with such market power are capable of earning excess profits and may be more prepared to pay wages above the opportunity cost of labour. This static allocative effects of a monopoly-oligopoly are well known and are as relevant to less developed countries as to developed countries. Oshima, for example, identified monopolistic and oligopolistic power as one of the major sources of high income in urban areas of Southeast Asia.[5] Our indicator of the product market imperfection is the familiar concentration index which is measured here in terms of 4-establishment percentage share of industry output. The choice of 4-establishment index is mainly because of convenience and minimum information requirements. This measure certainly has its defects in that it ignores distributional differences among the first four and also ignores information on the other establishments in the market. Furthermore, 4 may not be the most appropriate number,[6] and our establishment concentration may differ slightly from firm concentration as usually postulated in the traditional theory of the firm. Notwithstanding these, our measure shows that the output of four top establishments normally account for more than 60% of total industry output. This percentage is sufficiently high to indicate that in practice the manufacturing sector of the Malaysian economy could be characterized as having high level of concentration. One major factor contributing to this is the small size of domestic market.

There is also a possibility that the above two market imperfection variables (the first represents labour market imperfections and the second product market imperfections) are related. Therefore, to capture their possible joint effects on wages, the interaction between the degree of unionization and concentration level (UN.CI) is also included as an independent variable in our model.

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5. Oshima, H.T. "Income Inequality and Economic Growth: The Postwar Experience of Asian Countries", **Malayan Economic Review,** Vol. 15, October 1970.
6. Various formulae applied to the measurement of the degree of concentration have their drawbacks, and hence the choice between different methods is rather arbitrary.

(3) RP: In Malaysia, the political and legal barriers to market control are very limited. Trade associations normally act as a major vehicle to open collusion, price fixing and other anti-competitive acts. For monopoly-oligopoly profits to be sustained concentration by itself is insufficient. Barriers at both production and marketing stages are necessary. At the marketing stage, one important barrier is protection from competing imports. A protective tariff on a product raises its domestic price, for both imported as well as domestically produced varieties of the product, above the world market price. While the tax on imported varieties goes to the government, the tax on domestic varieties is transferred as a tariff subsidy to the factors (including labour) in producing them. Actually the net amount of tariff subsidy to factors of production in an industry cannot simply be determined from the tariff on output, but also tariffs on its inputs, excise taxes, export duties, quotas and other quantitative restrictions. This is related to the notion of effective rate of protection. An effective rate of protection of 40% for example, means that the income of its factors per unit of output is 40% higher at protected domestic prices than it could be at freely competitive world prices. According to a study made by the Economic Planning Unit (EPU), in 1973, the average rate of effective protection for the manufacturing sector in Malaysia came to around 60%.[7] An observation made by the EPU study is that there are wide dispersions in effective protections within manufacturing.

The data used for our analysis are the effective rates of protection, taken from the EPU study. But the data are available for only 53 manufacturing industries defined at the 3-digit SIC level, of which 3 industries have negative value added at world prices. Because of the problem of quantification, we have excluded these three industries, namely, motor vehicles, electrical appliances and petroleum refining. Since these estimates are essential for our analysis, the same technique of assigning 3-digit SIC to the 4-digit MIC was adopted. It may be noted that the SIC and the MIC methods may differ slightly in a few cases, but mostly the 3-digit SIC level is equivalent to the 4-digit MIC

7. Economic Planning Unit, **Effective Protection and Industrialization Policies: Report on a Research Project,** mimeograph, 1975.

level. Accordingly, our confidence in its empirical implications should be cautioned.

If there are only marketing barriers domestic firms could still keep on entering the industry until the super-normal profits are trimmed down. There should also be some form of production barriers in order to enable a monopolistic-oligopolistic firm to maintain its high profit. These barriers typically depend on the industrial structure, some of which are to be considered in the following.

(4) K/L: A high technical capital-labour ratio, which we have defined as the outlay on plant and machinery per worker, is one of the indicators of effective barriers to entry of new firms into an industry.[8] This variable is also often considered as a determinant of wages based upon the hypothesis that, given similar production functions, the marginal productivity of labour will be determined by the K/L ratio. Of course, this hinges on the assumption of inelastic supply curve of labour. A high K/L ratio also implies that labour costs are a small proportion of total costs. The smaller the proportion the more inelastic will the industry's demand for labour, hence making it more reasonable for workers to demand for higher wages, at least in the short run. It may also be hypothesized that this variable is closely related to other variables such as profitability, size, foreign ownership and skill-intensity. One would therefore expect a positive relationship between K/L ratio and wage rate.

(5) SZ: Relatively large enterprises tend to enjoy economies of scale which, together with freedom from competition, would allow them the opportunity to pay above average wages. In this study, variable SZ is measured by the percentage of workers employed in establishments with 50 or more full-time employees.

8. Bain, J.S., **Barriers to New Competition**, Harvard University Press, Cambridge, Mass., 1956; Bain, J.S., **Industrial Organization**, Wiley, N. York, 1968. Bain, in fact, identified four major barriers at the production stage, namely, scale economies, product differentiation, control of scarce resources, and absolute capital requirements.

(6) PR: In accord with the "ability to pay" hypothesis, the more profitable industries are likely more willing to pay higher wages as liberal wage policies can increase workers' goodwill, simplify recruitment and reduce costly turnovers.[9] As it is not easy to obtain direct information on profits, we simply measure an industry's profitability by taking its non-wage component of value added and deflate it by the value of capital. This is actually a gross profit rates inclusive of depreciation, taxes, insurance, rent, etc. and can be accepted as a proxy for the real profit rate.

(7) LOC: The location of industries tend to vary across regions. The higher cost of living in Kuala Lumpur and neighbouring Petaling Jaya is generally recognized. Therefore, we could expect the wage rates to reflect this differential. Since we do not have sufficient information on the local labour market, but we do have some information at state level, we have decided to use percentage of production in Selangor (inclusive of the Federal Territory of Kuala Lumpur) as the locational variable. On average, 37% of industry output were produced in Selangor in 1973.

(8) FOR: Percentage of workers employed in foreign-controlled establishments[10] is used as a variable. An earlier study tends to show that foreign companies in Malaysia do pay higher wages than their

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9. Brown, D.G., "Expected Ability to Pay and Inter-industry Wage Structure in Manufacturing", **Industrial and Labour Relations Review,** Vol. 16, October, 1962.

10. Foreign-controlled establishment is here defined as that where majority of the shareholders, i.e. above 50% of shares in terms of capital invested, are citizens of another nation. However, in cases of joint-ventures where each party held equal shares or in cases where there is no majority owned by any one nationality, the establishment is classified by the census under 'others'. Thus figures included under 'others' will denote not only ownership of establishment by non-Malaysians other than those specified elsewhere, but also include those in which no one nationality has a majority shareholding. In this study, establishment under 'others' are classified as foreign-controlled. This assumption may not be satisfactory, but that is the best we can do.

local counterparts for two main reasons: greater utilization of capital and imported wage structure (foreign companies pay wages more in line with what they practise in their home countries).[11]

(9) SM: Since industries vary in skill-mix amongst workers which they employ, some variation in earnings is also expected to arise from this. This variable is measured by the percentage of workers classified as skilled, which we have defined as the percentage of skilled technical, supervisory, administrative, professional and clerical employees to total employees. This measure may also pick up the state of technology which are not reflected in the technical capital-labour ratio, assuming capital and labour change by roughly equiproportional increments. In lieu of the shortage of skilled labour which tend to contribute to higher productivity, the payments to this group of workers are found to be higher than those of other workers.

Based on the foregoing theoretical considerations, our regression model will test the determinants of wages using cross-section data from a sample of 64 four-digit MIC industries. For each regression equation the following statistics are computed: coefficient of multiple determination adjusted for degrees of freedom ($\bar{R}^2$), F ratio, the values of components added to R^2 (unadjusted) at each step, and the t-values of regression coefficients. Superscripts a, b and c are used to indicate the levels of significance for the regression coefficients at 1%, 5% and 10% respectively.

II The Regression Results

With such many independent variables to work with, the statistical problem of multicollinearity is likely to be severe. As a consequence, some variables may have to be omitted. But if an omitted variable is related to some other independent variables included in the regression, a specification bias may then have been introduced into our estimates. In other words, the influence of the omitted variable may be captured by the independent variable that have been taken in, and hence the influence of the omitted variable cannot be detected. In

11. Lim, D., "Do Foreign Firms Pay Higher Wages Than Their Local Counterparts in Malaysian Manufacturing", **Journal of Development Economics,** Vol. 4, 1977.

order to see the possible effects of the variables under consideration, their relationships with wage rate will be explored separately in three sub-models each having independent variables representing market imperfections, industry structure and labour characteristics as described earlier. Finally, all the independent variables from each submodel retained in the study will be incorporated into one model so as to establish and distinguish the relationship the important variables have with wage rate.

Regression equations 1.1 and 1.2 comprise those independent variables that are relevant to market imperfections. The figures in the parentheses are the t values of the regression coefficients and those in the squared brackets underneath are the unadjusted successive coefficients of determination.

$$(1.1)\quad W = 316.207 + \underset{\substack{(5.426)^a \\ [0.327]}}{59.500\,TU} + \underset{\substack{(3.339)^a \\ [0.411]}}{0.584\,RP} + \underset{\substack{(3.025)^a \\ [0.489]}}{18.098\,CI}$$

$$\bar{R}^2 = 0.463$$
$$F = 19.114$$

$$(1.2)\quad W = 1393.605 + \underset{\substack{(8.590)^a \\ [0.549]}}{99.958\,(TU.CI)} + \underset{\substack{(2.590)^b \\ [0.594]}}{0.403\,RP}$$

$$\bar{R}^2 = 0.581$$
$$F = 44.617$$

Equation (1.1) reveals that all the three independent variables are positively and significantly related to wage rate (W). They explain 46% of wage variations. However, when we introduced (TU.CI) as an additional variable the influence of both TU and CI separately diminished and their coefficients ceased to be significant (hence not reported). But equation (1.2) shows that (TU.CI) and RP are significant at 1% and 5% respectively and they have also increased the explanatory power of the model. The insignificance of TU and CI may be brought about by high correlation between (TU.CI) and TU ($r = 0.85$) and between (TU.CI) and CI ($r = 0.49$), and yet the relationship between TU and CI is low ($r = 0.16$). The results therefore may suggest that the influence of unionization and concentration have been complementary in nature. But, the protection variable is still able to retain its independent effect on wages.

In the second sub-model, we attempt to examine the impact of six independent variables, each of them relevant to industry structure. Of the six variables only four came out to be significant as shown in equation (2), with K/L as the most powerful, followed by PR, LOC and SZ in that order. The addition of the other two variables, GR and FOR, could only contribute marginally by less than one percentage point to R^2. The insignificance of these two variables may be due to specification problem as they are quite closely related to the other independent variables, particularly PR and K/L. In other words their explanatory power may have been 'captured' by the other variables.

$$
\begin{array}{lllll}
(2)\ W = 132.611 & +\ 67.859\ K/L & +\ 6.400\ PR & +\ 13.456\ LOC & +\ 4.775\ SZ \\
 & (18.012)^{a} & (3.210)^{a} & (3.444)^{a} & (1.394)^{c} \\
 & [0.769] & [0.834] & [0.858] & [0.873]
\end{array}
$$

$\bar{R}^2 = 0.854$

$F = 92.869$

In the third sub-model, the two variables relevant to labour characteristics are examined. Equation (3) reveals that both the explanatory variables, skill-mix (SM) and sex-composition (MW) are positively and significantly related to industrial wages as we have earlier expected.

$$
\begin{array}{lll}
(3)\ W = -598.596 & +\ 153.887\ SM & +\ 11.975\ MW \\
 & (9.747)^{a} & (2.032)^{b} \\
 & [0.630] & [0.654]
\end{array}
$$

$\bar{R}^2 = 0.642$

$F = 57.584.$

Now all the independent variables discussed above will be brought together in the more fully specified multiple regression model in order to establish their total effects on wages and to reduce the bias in the coefficient that would have resulted from omitting some of them. The results are summarized in equations (3.1). Interestingly, all the independent variables which were found significant in the previous three sub-models still remained significant in this final model although the degree of significance may vary a little. Equation (3.1) points out that K/L seems to be the most important. The market imperfection variables, RP and (TU.CI), are significantly different from zero but only at 10% level. Other significant variables are skill-mix (SM), location (LOC), profit rate (PR), and size (SZ). These variables together explain about 90% of wage variations. A variable which has disappointingly been left out is the degree of foreign-controlled (FOR). This may give a warning of incorrect definition or specification. We suspected that it is more of the latter because of its close relation with profit rate, $r = 0.55$. When PR is taken out from the equation, the results, as shown in equation (3.2), prove that this is most likely so. The FOR variable came into the picture significantly. But the regression coefficient for other variable, GR, is extremely low and hence not reported. On this basis we may have to reject the growth-wage hypothesis which was mentioned earlier. But the problem may still lie in the aggregation and the structural content within each industry group.

$$
\begin{array}{llllll}
(3.1)\ W = -669.910 & +\ 48.198\ K/L & +\ 40.438\ SM & +\ 7.743\ LOC & +\ 4.244\ PR \\
 & (8.139)^{a} & (2.996)^{a} & (2.075)^{b} & (2.179)^{b} \\
 & [0.769] & [0.847] & [0.872] & [0.883] \\
 & +\ 9.752\ MW & +\ 6.494\ SZ & +\ 0.114\ RP & +\ 12.152\ (TU.CI) \\
 & (2.560)^{a} & (1.982)^{b} & (1.348)^{c} & (1.318)^{c} \\
 & [0.890] & [0.897] & [0.900] & [0.903]
\end{array}
$$

$$\bar{R}^2 = 0.889$$

$$F = 64.163$$

$$
\begin{array}{llllll}
(3.2)\ W = -122.404 & +\ 40.591\ K/L & +\ 43.368\ SM & +\ 4.922\ LOC & +\ 19.196\ (TU.CI) \\
 & (7.285)^{a} & (3.176)^{a} & (1.230) & (2.112)^{b} \\
 & [0.769] & [0.847] & [0.872] & [0.879] \\
 & +\ 9.041\ FOR & +\ 9.167\ MW & +\ 0.122\ RP & \\
 & (2.491)^{a} & (2.357)^{b} & (1.424)^{c} & \\
 & [0.884] & [0.894] & [0.898] &
\end{array}
$$

$\bar{R}^2 = 0.885$
$F = 70.339$

When we experimented by replacing variable (TU.CI) with TU and later with CI, we found from the equations derived that by itself labour unions may have some positive effect on wages, but the significance of the coefficient was not impressive. Nothwithstanding the weaknesses of our unionization index, this can be expected since hardly 15% of the industrial labour force was organized by the trade unions, and given the surplus of unskilled workers, wage increases may not be the highest priority of unions, instead other non-financial benefits like job security, medical and housing facilities. Similar results were shown by the concentration variable. The weakness of this variable may be attributed to our inability to obtain a more precise and reliable measure of market power.[12] There is also a possibility that wage rate determinants may vary according to the level of economic activity, which can then be related to the "spillover" hypothesis. The basis of this hypothesis is that in a period of high productivity and rapid price increases (as in 1973), concentrated industries fail to raise prices as rapidly as competitive industries so that the latter group's wages catch up with those in concentrated industries, i.e. wage increases tend to "spillover" from the concentrated to the competitive industry.[13] Nevertheless, it is too early to generalize from these empirical results. More in-depth studies are necessary to confirm the hypothesis.

Although not conclusive, the significance of the interaction variable (TU.CI) in our last model may able to indicate that TU and CI tend to reinforce each other in the way that in lowly concentrated industries unionization becomes more effectively linked to wages than in highly concentrated. Similarly, the influence of concentration tend to dominate in weakly unionized industries.

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12. Phlips, L., op. cit.

13. Haworth, C.T. and Reuther, C.J., op. cit.

III The Summary

Despite the limitations inherent in the data and methodology used, the empirical results of our econometric exercise generally tend to verify the suspected interactions in the wage determination process. The analysis presented here indicated that industrial wage rate is a function of multiple variables including those reflecting differences in industrial structure, market imperfections and the personal characteristics of the labour force. In general, certain economic as well as non-economic factors seem to be functioning simultaneously.

Of all the variables under consideration, capital-labour ratio seems to be the most consistent and crucial factor in the explanation of wage differentials between industries, followed by skill-mix and location. The other significant variables include profit rate, sex composition, industry size, and to some extent level of protection, interaction of unionism and concentration, and ownership. This study however failed to take account of the effects of growth, unionization and concentration independently on wages.

The capital-intensity may be acting as a proxy for a number of other inter-industry variations. The existence of the positive technology-earnings relationnship suggests that there are differences between capital-intensive and labour-intensive industries which lead to differences in labour payments. The analysis seems to suggest that capital-intensity of industries, which generally goes together with high productivity and greater efficiency in production,[14] including the possibilities of economies of scale or the discretionary behaviour of the management, are capable of attracting the best workers by offering more attractive wages. This conclusion also applies to foreign-controlled establishments which tend to be larger in size.[15]

As suggested by Sawyer and others, there are two alternative ways of viewing this: either larger establishments tend to cream the market by paying higher wages or they simply use a high-wage policy which

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14. Lim, D., " 'Sweet Labour' and Wages in Malaysian Manufacturing", **Economic Development and Cultural Change,** Vol. 27, October 1978.
15. It may be noted that the simple correlation coefficient between FOR and SZ is 0.55. With the collinearity between the two variables, although may not be so drastic, we cannot isolate the independent influence of each.

raises the net productivity of the whole labour force by the reduction of labour turnover.[16] Such institutional intervention in the labour market may have interesting implications for the modern sector in Malaysia. The former suggests that better quality labour is needed by these establishments to secure efficient capital utilization given the technical conditions of production they use, which are likely to differ from the local or small establishments.[17] The latter would indicate that high labour turnover, which is certainly not uncommon in Malaysia, can be very costly. Such a high wage is also accentuated by the protected domestic market, the monopolistic-oligopolistic character and the specific location of the enterprise.

On the supply side, there is the tendency in these establishments for various categories of workers to demand higher wages through their bargaining strength. This demand would be stronger during industrial prosperity reflecting in higher productivity and higher profits. High demand with high profits and high productivity tend to weaken employer resistence while raising union settlement expectations. Such a hypothesis can be applicable just as well to a developing country, at least in the modernized sector of its economy.[18] Our results give an implication that unionization and its interaction with concentration is a good predictor of industry wage differences, even if the level of unionization is still relatively low. Two factors, jointly or singly, may have contributed to the strength of unions in 1973. Firstly, it was a period of strong economic expansion and secondly, the boom was counter-balanced by increased prices of imported goods and materials, thus giving rise to domestic inflation and reduction in real earnings of workers. But unionization is presumably related to wages in weakly concentrated industries but not when concentration on the product market is relatively high.

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16. Sawyer, M.C., "The Earnings of Manual Workers: A Gross-Sectional Analysis", **Scottish Journal of Political Economy,** Vol. 20, June 1973; Harris, J.R., "Wage Rate Determination with Limited Supplies of Labour in Developing Countries", **Journal of Development Studies,** Vol. 7, January 1971.
17. Lim, D., 1977, **op. cit.**
18. Fonseca, A.J., **Wage Issues in a Developing Economy: The Indian Experience,** Oxford University Press, Bombay, 1975, pp. 201-202.

Workers were also found to receive widely different remunerations depending on their skills and sex. Wage differentials between skills in Malaysia may largely be affected by the forces of supply and demand, where the shortage of skilled workers and surplus of unskilled workers are readily apparent in the manufacturing sector. The existence of inter-skill wage differentials may be indicated by the presence of greater incentives for workers to acquire skills. Such an effect can be felt in Malaysia. Many young workers today take the trouble to acquire the skills that will reward them with higher pay than their previous jobs. The opportunities for acquiring these skills have been made possible by the increase in the number of technical, vocational and other professional institutions of learning all over the country.[19] The significance of sex-composition in wage determination may be brought about partly by market imperfections, as male workers are likely be paid more than female workers because of established institutional practice of discriminating against the weaker sex, and partly by sheer differences in productivity.

As it stands, the foregoing analysis presents a reasonably satisfactory model of wage determination for Malaysian manufacturing industries, at least in the 1973 situation. But 1973 may not be a good representative year as it is rather abnormal, characterized by inflation amidst prosperity. Otherwise the estimates could have gained greater confidence for generalization and reliability. Under the given situation, significant differentials in wages between industries and also in different parts of the labour market are not likely to be reduced by market forces alone. Institutional factors seem to be as paramount. This study is hoped to have helped to understand the network of dependencies within the modern sector which is important for predicting the dynamics of wage determination process and for formulating acceptable wage policies.

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19. A Study by the Administrative Modernization and Manpower Planning Unit (MAMPU) revealed that now the private sector has 300 training institutes producing about 22,000 skilled personnel a year in 140 different programmes. There are another 80 government-run training institutes with more expected to come in the Fourth Malaysia Plan (1981-85). **The Malay Mail,** December 17, 1979.

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17

CONSUMPTION PATTERNS IN PENINSULAR MALAYSIA: A HOUSEHOLD BUDGET STUDY

SRITUA ARIEF

Introduction

This study presents an investigation of the household consumption patterns in Malaysia based on the recent household budget survey conducted by the Department of Statistics. The results of the study might be useful to policy-makers in public as well as in private sectors since they offer an understanding of the market demand for various groups of commodities and services consumed in Malaysia.

Six alternative forms of the Engel function are considered in this study which can be listed as linear, semi-log, double-log, log-inverse, semi-log inverse and double-log inverse. The organization of the study is as follows: First, we outline the models considered and the procedure used for their estimation. Next, we present a description of data sources and the concepts and definitions used in the data base. It is followed by the presentation of the empirical results together with the intepretation of these results.

I. The Models and Estimation Procedure

The following six models of the Engel functions are chosen for the purpose of estimating the expenditure elasticities: —

1. **Linear**

$$Y_i = a_i + b_i X + u_i$$

2. **Semi-log**

$$Y_i = a_i + b_i \log_e X + u_i$$

3. **Double-log**

$$\log_e Y_i = a_i + b_i \log_e X + u_i$$

4. **Log-inverse**

$$\log_e Y_i = a_i + b_i \frac{1}{X} + u_i$$

5. **Semi-log inverse**

$$Y_i = a_i + b_i \log_e X + c_i \frac{1}{X} + u_i$$

6. **Double-log inverse**

$$\log_e Y_i = a_i + b_i \log_e X + c_i \frac{1}{X} + u_i$$

Where Y_i denotes the expenditure on i-th – item, X is the aggregate household consumption expenditure and u_i is the residual error terms. a_i, b_i and c_i are the parameters to be estimated.

Since the observations used are household budget data of household belonging to various expenditure (income) classes, and the fact that the sample size taken from each class is rather different from each other, the weighted least squares technique is used. The weights are the proportion of sample size of the total sample size taken from each class of household. Transforming the original data into the weighted data is done by multiplying each class expenditure by the square root of the corresponding relative frequency of households in the class.

The arithmetic means within each expenditure class are used as proxy for the geometric means. The fact that the six forms of the Engel functions considered here are not strictly comparable, the distance function rather than R^2 is used as a criterion for selecting the most suitable form of the Engel function for any commodity group. The distance function is expressed as follows: –

$$d_i^2 = \frac{1}{q - m} \sum_{j=1}^{q} f_i (Y_{ij} - \hat{Y}_{ij})^2,$$ where Y_{ij} is observed level of consumption expenditure on the i-th item in the j-th expenditure class, $\hat{Y}_{ij}$ is the corresponding expenditure estimated from a given mathematical form, q is the number of expenditure classes, m is the number of explanatory variable in the given function, and f_i is the relative frequency of expenditure on the i-th item in the j-th expenditure class.

The expenditure elasticities are derived using the following formulae:

Forms of the Engel Function	Expenditure Elasticity at Means
(1) Linear	$e_i = \frac{\overline{X}}{\overline{Y}_i} b_i$
(2) Semi-log	$e_i = \frac{b_i}{\overline{Y}_i}$
(3) Double-log	$e_i = b_i$
(4) Log-inverse	$e_i = \frac{-b_i}{\overline{X}}$
(5) Semi-log inverse	$e_i = \frac{b_i}{\overline{Y}_i} - \frac{c_i}{\overline{X}\,\overline{Y}_i}$
(6) Double-log inverse	$e_i = b_i - \frac{c_i}{\overline{X}}$

An item is classified as "**luxury**" if $e_i > 1$. Conversely, an item is an "**inferior**" item if $e_i < 0$. Between these two extremes, an item is the "necessicity" if $0 \leqslant e_i \leqslant 1$.

II. The Data

The Household Expenditure Survey of 1973, published by the Department of **Statistics, Malaysia,** is the basis for this study. This survey provides information on average consumption expenditure on various consumption items by household expenditure class and average household size for various households corresponding to various expenditure classes.

The following is the classification of household consumption expenditure class, according to average monthly household consumption expenditure in Malaysian dollars.

Expenditure Class	Average Monthly Consumption Expenditure (in M$)
1	49 and below
2	50 — 99
3	100 — 149
4	150 — 199
5	200 — 299
6	300 — 399
7	400 — 499
8	500 — 599
9	600 — 699
10	700 — 799
11	800 and above

This expenditure class applies to rural and urban areas, as well as to Malaysia a whole.

For the purpose of our analysis, the following groups of consumption items are used:

Group 1: Rice
Group 2: Bread and Other Cereals
Group 3: Meat
Group 4: Fish
Group 5: Milk, Cheese and Eggs
Group 6: Oils and Fats
Group 7: Fruits and Vegetables
Group 8: Sugar
Group 9: Coffee, Tea and Cocoa
Group 10: Other Foods
Group 11: Beverages and Tobacco
Group 12: Clothing and Footwear
Group 13: Rent, Fuels and Power
Group 14: Furniture, Furnishings and Household Equipment
Group 15: Medical Care and Health Expenses
Group 16: Transport and Communication

Group 17: Recreation, Entertainment, Education and Cultural Services.

Group 18: Miscellaneous Goods and Services.

Concepts and Definitions

The concepts and definitions adopted in Household Expenditure Survey, 1973, with regard to households, household members, consumption expenditure, location of household and consumption expenditure groups, are given below.

Household and Household Members. A household is defined as a unit where a group of persons normally live together, pool their financial resources and have common eating arrangements. Nonfamily members such as servants are included as members of the household. Persons are considered as members of a household if they have stayed in that household for more than 15 days in the month in which the household was surveyed.

Consumption Expenditure. All consumption expenditure data recorded in the survey are those on the acquisition basis. Goods on hire-purchase are considered to have been bought at the time when the hire-purchase contracts are signed; or where there are no contracts, when the goods are delivered.

Consumption expenditure includes items purchased as well as those produced on own account and used in final consumption. Imputed rentals of owner occupied dwellings, consumption from own production or stocks, goods and services as wages in kind and as gifts are included in the estimation of household consumption expenditure.

Purchase of goods and services by households from government bodies is also considered as consumption expenditure if there is a clear link between the payment and the acquisition of the services or goods and if the decisions to make payments are voluntary.

Items which are regarded as financial and capital transactions are not part of household consumption expenditure. The main items in this category are income taxes, disbursements in the nature of investments, gambling losses, cash grants and donations.

Location of Household. The designation of the place of residence as rural or urban in Peninsular Malaysia is based on population size and the occupations of the population. Urban areas have been defined as: —

(a) towns having a population of more than 75,000 in 1957;
(b) towns having a population between 10,000 and 75,000 in 1957;
(c) towns having a population of at least, 7,670 but under 10,000 in 1957.
(d) areas which do not fall into any of the above categories but have urban characteristics and where the population dependence on non-agricultural occupations is likely to be more than 60%.

All other areas are considered rural.

Consumption Expenditure Groups. The eighteen consumption expenditure groups mentioned earlier are defined as follows:

(1) **Rice**: rice of various qualities and types;
(2) **Bread and Other Cereals**: flour, biscuits, bread and bakery products, other cereals, and other cereal products;
(3) **Meat**: fresh meat, frozen meat and processed meat;
(4) **Fish**: shellfish, fresh fish, iced, chilled or frozen fish and processed fish;
(5) **Milk, Cheese and Eggs**: fresh milk and cream, condensed milk, milk powder, cheese and other dairy products and eggs;
(6) **Oils and Fats**: butter, prepared animal oils and fats, vegetable oils and prepared vegetables oils;
(7) **Fruits and Vegetables**: fresh fruits, frozen fruits, berries, nuts, preserved fruits, fresh vegetables, preserved vegetables, potatoes and other tubers;
(8) **Sugar**: various types of sugar;
(9) **Coffee, Tea and Cocoa**: coffee, tea, spices, chocolate, sugar confectionery, jam, marmalade, honey and other sweet ingredients;
(10) **Other Foods**: foods not elsewhere classified;
(11) **Beverages and Tobacco**: mineral water and other soft drinks, beer, wines, spirits and liquors, cigarettes, cigars, tobacco and other tobacco products;

(12) **Clothing and Footwear**: shirts, dresses, blouses, suits, jackets, trousers, underwear, stocking, socks, bathing suits, hats, rain coats, fabrics, yarns, sewing thread and other sewing articles, tailoring, knitting, leather footwear, nonleather footwear and repairs for footwear;

(13) **Rent, Fuels and Power**: imputed rent, rent of leased dwellings (including subsidized and free housing), water charges, electricity, gas, liquid fuel and other fuels.

(14) **Furniture, Furnishings and Household Equipment**: furniture, floor covering, sculptures, paintings and other art objects, household textiles, other furnishing, cooking appliances, room airconditioning units, washing machines, refrigerators and freezers, sewing machines, other electrical appliances, repairs, glassware, china ceramic tableware, other kitchen utensils, electric bulbs, tools, washing powder and other cleaning materials, laundry, dyeing, insurance of household property and domestic services;

(15) **Medical Care and Health Expenses**: medical and pharmaceutical products, therapeutic appliances and equipment, medical services, services charges on accidents and health insurance;

(16) **Transport and Communication**: cars, motocycles, bicycles, tyres, tubes, parts and accessories, repairs, petrol, motor oil, grease, insurance premiums, other expenditure in operation of personal transport equipment, railway fares, ship fares, air-line fares, bus fares, taxi fares, other expenditure on purchased transport, postal services, telephone and telegraph services;

(17) **Recreation, Entertainment, Education and Cultural Services**: boats and other major durables, television sets, radios, record players, tape recorders, cassettes, musical instruments, photographic equipment, sports equipment, playequipment and toys, gramaphone records, films, other recreational goods (semidurables), parts and repairs, other recreational goods (durables), cinemas, theatres and other public entertainments, television and radio licenses, lotteries and other gambling, books, newspapers, magazines and periodicals, school and study fees, boarding fees, and other recreational, education and cultural services;

(18) **Miscellaneous Goods and Services**: services of barbers, beauty shops, goods for personal care, jewellery, rings and precious stones, watches, other personal goods, writing and drawing equipment and

supplies, expenditure on food and beverages away from home, packages tours, expenditure abroad, financial services and other miscellaneous services.

III. Results and Conclusions

Tables 1 — 3 show the selected Engel functions for each commodity and their respective expenditure elasticities. We find out that the double-log inverse form is the most appropriate form of the Engel function for **Rice, Bread & Other Cereals, Fish, Milk, Cheese and Eggs, Oils & Fats, Fruits & Vegetables, Coffee, Tea & Cocoa, Other Foods, Beverages & Tobacco, Clothing & Footwear, Rent, Fuels & Power, Medical Care & Health Expenses,** and **Recreation, Entertainment, Education & Cultural Services** in Rural Malaysia, for **Rice, Bread & Other Cereals, Meat, Fish, Milk, Cheese & Eggs, Oils & Fats, Sugar, Beverages & Tobacco, Rent, Fuels & Power, Furniture, Furnishing & Household Equipment, Medical Care & Health Expenses,** and **Transport & Communication** in Urban Malaysia; and for **Bread & Other Cereals; Fish, Milk, Cheese & Eggs, Oils & Fats, Fruits & Vegetables, Coffee, Tea & Cocoa, Other Foods, Beverages & Tobacco, Clothing & Footwear, Rent, Fuels & Power, Medical Care & Health Expenses Recreation, Entertainment, Education & Cultural Services,** and **Miscellaneous Goods and Services** in Malaysia as a whole.

The double-log form is the most suitable form of the Engel function for **Meat, Furniture, Furnishings & Household Equipment, Transport & Communication,** and **Miscellaneous Goods and Services** in Rural Malaysia; for **Other Foods, Clothing & Footwear, Recreation, Entertainment, Education & Cultural Services, and Miscellaneous Goods and Services** in Urban Malaysia; and for **Meat, Furniture, Furnishing & Household Equipment,** and **Transport & Communication** in Malaysia as a whole.

The semi-log inverse form is found most suitable for **Sugar**, in Rural Malaysia, for **Fruits & Vegetables** and **Coffee, Tea, Cocoa** in Urban Malaysia, and for **Rice** and **Sugar** in Malaysia as a whole.

An examination of the calculated expenditure elasticities indicate that **Meat, Clothing & Footwear, Furniture, Furnishings & Household Equipment, Medical Care & Health Expenses, Transport & Communication, Recreation, Entertainment, Education & Cultural Services,** and **Miscellaneous Goods and Services** are considered as "luxuries" in Rural Malaysia. In Urban Malaysia the luxury items are **Clothing & Footwear, Furniture, Furnishings & Household Equipment, Medical Care Health Expenses, Transport & Communication, Recreation, Entertainment, Education & Cultural Services,** and **Miscellaneous Goods and Services.** They also fall under the category of luxuries" in Malaysia as a whole.

Since comparison of expenditure elasticities based on different types of the selected Engel functions may not be very meaningful for the reason that different Engel formulations make different assumption about marginal propensity to consume and about the behaviour of expenditure elasticity, we are constrained to choose a single type of Engel function. As double-log inverse form is more general than either double-log or semi-log inverse, for the purpose of our analysis, we show preference for the double-log inverse form to carry out comparisons. The elasticities based on double-log inverse form are presented in table 4.

A purusal of table 4 indicates the same conclusions as those derived from the perusal of tables 1 – 3 with regard to the classification of various items into "luxuries" and "necessities". Some rural-urban differentials are observed. **Meat** is considered a "luxury" in rural areas but a "necessity" in urban areas of Malaysia. **Miscellaneous Goods and Services** are also considered as "luxuries" in rural Malaysia whereas in urban Malaysia they are classified as "necessities". The expenditure elasticities for **Milk, Cheese & Eggs** and **Recreation, Entertainment, Education & Cultural Services** are substantially higher in rural areas of Malaysia compared to urban areas which imply that the demand for these items will be higher in rural areas than in urban areas as household income in both areas increases. Similarly, a substantially higher expenditure elasticities for **Sugar, Coffee, Tea & Cocoa,** and **Rent, Fuels & Power** in urban areas imply that the urban households in Malaysia will demand more of these items compared to their rural countreparts as their income rises.

Table 1: Selected Engel Functions and Expenditure Elasticities For Various Items in Rural Malaysia

Item	Selected Engel Function	Expenditure Elasticity
1	Double-log inverse	0.3480
2	Double-log inverse	0.7048
3	Double-log	1.3793
4	Double-log inverse	0.5655
5	Double-log inverse	1.0322
6	Double-log inverse	0.7343
7	Double-log inverse	0.8165
8	Semi-log inverse	0.2566
9	Double-log inverse	0.5700
10	Double-log inverse	0.8735
11	Double-log inverse	0.7991
12	Double-log inverse	1.2336
13	Double-log inverse	0.7817
14	Double-log	1.3873
15	Double-log inverse	1.3550
16	Double-log	1.6197
17	Double-log inverse	1.6506
18	Double-log	1.2173

Table 2: Selected Engel Function and Expenditure Elasticities For Various Items in Urban Malaysia.

Item	Selected Engel Function	Expenditure Elasticity
1	Double-log inverse	0.4471
2	Double-log inverse	0.6340
3	Double-log inverse	0.9406
4	Double-log inverse	0.6399
5	Double-log inverse	0.8017
6	Double-log inverse	0.7670
7	Semi-log inverse	0.8523
8	Double-log inverse	0.4351
9	Semi-log inverse	0.7961
10	Double-log	0.9537
11	Double-log inverse	0.7075
12	Double-log	1.3981
13	Double-log inverse	0.9196
14	Double-log inverse	1.4687
15	Double-log inverse	1.3742
16	Double-log inverse	1.5407
17	Double-log	1.3640
18	Double-log	0.9105

Table 4: Expenditure Elasticities Based On Double-log Inverse Form of Engel Function for Malaysia.

Item	Rural	Urban	Rural + Urban
1	0.3480	0.4471	0.2585
2	0.7048	0.6340	0.6633
3	1.3792	0.9406	1.2509
4	0.5655	0.6399	0.5813
5	1.0322	0.8017	0.9478
6	0.7343	0.7670	0.7018
7	0.8165	0.8369	0.7914
8	0.2489	0.4351	0.2007
9	0.5700	0.7975	0.6430
10	0.8735	0.9738	0.8744
11	0.7991	0.7075	0.7806
12	1.2336	1.3012	1.1576
13	0.7817	0.9196	1.1140
14	1.3137	1.4687	1.3286
15	1.3550	1.3742	1.3308
16	1.6714	1.5407	1.5716
17	1.6506	1.4152	1.5742
18	1.3136	0.9174	1.1555

Table 3: Selected Engel Functions and Expenditure Elasticities For Various Items in Malaysia.

Item	Selected Engel Function	Expenditure Elasticity
1	Semi-log inverse	0.2875
2	Double-log inverse	0.6633
3	Double-log	1.3167
4	Double-log inverse	0.5813
5	Double-log inverse	0.9478
6	Double-log inverse	0.7018
7	Double-log inverse	0.7914
8	Semi-log inverse	0.2195
9	Double-log inverse	0.6430
10	Double-log inverse	0.8744
11	Double-log inverse	0.7806
12	Double-log inverse	1.1576
13	Double-log inverse	1.1140
14	Double-log	1.3991
15	Double-log inverse	1.3308
16	Double-log	1.5752
17	Double-log inverse	1.5742
18	Double-log inverse	1.1555

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