IS THERE EVIDENCE OF POLARISATION IN MALAYSIA? AN APPLICATION OF WOLFSON'S POLARISATION INDEX

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This paper examines income distribution and the question of polarisation in Malaysia. Wolfson (1994, 1997) has shown that inequality measures such as the Gini index are unable to capture changes in the share of income held by the middle-income group. Thus, analysis that examines only the inequality aspect of an income distribution might have missed relevant aspects of how the distribution of income has really changed. Wolfson (1994) suggests that when examining a distribution of income, measures related to polarisation should be included. Therefore, besides investigating the question of how income is distributed, there is a need to investigate the question of polarisation, which is a new aspect that has emerged in the discussion of income inequality in recent literature. This question appears to be an aspect of distributional change that has been neglected in the study of income distribution in Malaysia. Here, the analysis on the question of polarisation is done by employing polarisation index that has been proposed by Wolfson (1994). The data used in this study is the Malaysian Family Life Survey (MFLS) data.

INTRODUCTION

A new aspect that has emerged in the discussion of income inequality in recent literature is on the question of polarisation, i.e. the "disappearing middle-class" phenomenon (Wolfson, 1994, 1997; Levy & Murnane, 1992; Jenkins, 1995). Initially the question of polarisation is examined in the US, where the proposition is that in the 1980s the US economy is producing fewer middle-class jobs, and thus, resulting in smaller middle-class of the population (Levy

& Murnane, 1992). It was also found that there is a widening of income inequality in the US in the 1980s. Thus, rising income inequality in the US in the 1980s was accompanied by a shrinking of the middle-class. Similar observation was found in the United Kingdom (Jenkins, 1995). Thus, polarisation was observed simultaneously with increasing income inequality. It seems that as if rising inequality goes together with polarisation. However, Wolfson (1994, 1997) argues that inequality and polarisation are two different concepts. It is possible to observe a declining income inequality, yet, having an increase in polarisation and versi-versa. Since polarisation could be observed regardless of the trend of inequality, Wolfson (1994:358) suggests that when examining the distribution of income, measures related to polarisation should be included. Therefore, besides investigating the question of how income is distributed, there is a need to investigate the question of polarisation.

Literature on polarisation mostly provides evidence from the experience of the developed countries such as the United States of America, United Kingdom and Canada (Levy & Murnane, 1992; Jenkins, 1997; Wolfson, 1994, 1997). Therefore, examination of income inequality and the question of polarisation in Malaysia would be a plausible undertaking, since, evidence from developing countries on this issue is still limited. But, more importantly, examination on the question of the growth or decline of the middle-income group in Malaysia would be an interesting undertaking in its own right due to the fact that there is a deliberate economic policy, i.e. the New Economic Policy, which is in essence aimed at enlarging the Malay middle-class.[1] The issue here is: is there any evidence of polarisation in Malaysia? Since literature on income distribution in Malaysia seems to escape discussion on this aspect of distributional changes, this paper attempts to bridge the existing gap. Here, the Wolfson index of polarisation (W) was used to examine the question of polarisation. The analysis is done using the Malaysian Family Life Survey (MFLS) data.

This paper proceeds as follows: Section II briefly describes the data used in the analysis and Section III discusses the concept and measures of polarisation. The results are reported in Section IV, and Section V concludes.

THE DATA

The present study employs household income data from the Malaysian Family Life Survey (MFLS), which was conducted in Peninsular Malaysia by the RAND Corporation, USA. There are two surveys – the MFLS1 and the

MFLS2.[2] The MFLS1 was fielded in 1976-1977, while the MFLS2 was fielded in 1988-89 as a follow-up survey to the MFLS1. The main purpose of the MFLS1 was "to provide data for estimating the magnitude of key economic and biomedical relationships affecting birthspacing, family size, and breastfeeding patterns of families in Peninsular Malaysia" (Terry Fain & Tan Poh Keong, 1982:1), while the purpose of the MFLS2 "was to enable study of household behaviour in diverse settings during a period of rapid demographic and socio-economic changes" (Haaga *et al.*, 1993:1). In both surveys, information was collected through interviews on fertility related events, marriage, employment, migration, income and wealth, attitudes and expectations regarding family size and composition, community characteristics, time-allocation and transfer of resources. Thus, the information gathered in both surveys seems not only suitable for demographic related studies such as fertility, family planning, marriage, and migration as the surveys intended, but also appropriate for studies on income distribution since information on income and wealth was also collected.

The household samples in both the MFLS1 and the MFLS2 were selected from a sampling frame designed by the Malaysian Department of Statistics. It should be mentioned that the household samples of the MFLS included only households with at least one ever-married woman aged 50 years or younger, i.e. one who had been married at least once, regardless of her present marital status. Therefore, the household samples of the MFLS were not fully representative of the entire population of Peninsular Malaysia. However, it is most likely that households that did not fall within the MFLS sampling criteria were small and insignificant. Therefore, even though the household samples of the MFLS might not be fully representative of the entire population of Peninsular Malaysia, nonetheless analysis of the MFLS data could still provide useful information on the distribution of income in Malaysia.

The relevant data used in the analysis is taken from the following questionnaires of the MFLS1: MF1 (Household Roster), MF4 (Female Time Budget), MF5 (Male Time Budget), and MF6 (Income and Wealth). On the other hand, the data from the MFLS2 is taken from these questionnaires: MF25 (Household Economy), MF21 (Household Roster), and MF26EB and MF27COMM (Community Level Data). There is a total of 1263 and 1512 households in the MFLS1 and MFLS2 samples, respectively. Households with incomplete data are omitted. The number of household samples left for analysis in the study totals 1245 for MFLS1 and 1507 for MFLS2. The household samples in the MFLS can be classified according to their location (i.e. rural or urban) and their ethnic groups. The ethnic groups considered in

this paper are the Malays, Chinese and Indians. "Other races" is omitted. "Other races" constitutes only about 0.1 percent of the total respondents.

The MFLS gathered information generally on all income received by the household – cash and non-cash income, which included the value of self-activities such as housework products and services for own consumption. Income data was collected on agricultural production, ownership of animals, businesses owned, services performed, gifts from non-household members, inheritance or dowries received, income from insurance, pensions, retirement programs and interest; income received from renting rooms, houses or land; ownership of land; and possession of durable goods. Thus, the concept of income used in the MFLS was fairly broad and the income data could also be classified according to its sources. Here household income, which refers to total annual income received by each household, is broadly grouped into the following sources: (i) paid employment – refers to income before tax received from work, which is mainly wages and salaries, including bonuses as well as payments in-kind; (ii) self-employment – refers to gross income from self-employment including income from agriculture and business activities; (iii) rent (from property such as housing and land), interest and dividends; (iv) pensions and employment provident funds (EPF); (v) remittances; (vi) welfare payment and zakat; (vii) inheritance, gifts and dowries; (viii) home produce and consumption, and (ix) others.

MEASURE OF POLARISATION

Wolfson (1994, 1997) demonstrates that inequality measures such as the Gini index are unable to capture changes in the share of income held by the middle-income group. Thus, analysis that examines only the inequality aspect of an income distribution might have missed relevant aspects of how the distribution has really changed. Therefore, there is a need to investigate the question of polarisation. Indeed, Wolfson (1994:358) suggests that when examining a distribution of income, measures related to polarisation should be included. It is important to examine polarisation alongside inequality since inequality measures such as the Gini index are unable to capture all the distributional changes that might have taken place, which might be of concern and important in policy making.

In general, the concept of polarisation is related to the degree by which the population is divided between the "haves" and the "have-nots" (Ravallion & Chen, 1997:366).[3] Technically, polarisation can be perceived as signifying two

aspects of distributional changes – "spreadoutness" and bimodality (Wolfson 1997:402). Spreadoutness signifies that there are fewer individuals or households with middle level income, i.e. the distribution is spreading out from the middle. Bimodality, a concept that is related to "spreadoutness", denotes the clustering of formerly middle level incomes at either higher or lower levels. Thus, polarisation is said to exist when income is largely concentrated at both ends of the distribution, with less in the middle. Distribution X is said to be more polarised than distribution Y if income distribution in X is more bimodaled in the sense that it contains more poor and rich, but fewer people in the middle. It is in this sense that the concept of polarisation is also known as the "disappearing middle-class" phenomenon.

It should be kept in mind that a more polarised distribution does not necessarily imply that the distribution is more unequal. This could happen if there is a transfer of income within the poorest half of the population as well as in the other richest half, such that the gainers are poorer than the losers. In this case, inequality will decrease, but polarisation might increase. To take an example given by Ravallion and Chen (1997:367), suppose there are four people with incomes RM1, RM2, RM3 and RM4. We take RM0.50 from the person with RM2 and give it to the person with RM1, and we take RM0.50 from the person with RM4 and give it to the one with RM3. Thus the new distribution is RM1.50, RM1.50, RM3.50 and RM3.50. Obviously inequality has fallen, because gainers are poorer than losers. However polarisation has increased, in the sense that the distribution is now more sharply divided into "rich" and "poor" than previously.

Here, a measure of polarisation developed by Wolfson – called the Wolfson index of polarisation (W) – is considered. Wolfson (1994, 1997) developed a measure of polarisation that is based on the Lorenz curve. His derivation of the polarisation measure begins with the demonstration that both the Lorenz curve and the polarisation curve could be derived from a cumulative density function for a distribution of income (Figure 1a). The derivation of the Lorenz curve shown in Figure 1c involves one intermediate step between the cumulative density function (cdf) and the Lorenz curve. This step involves exchanging the axes of the cumulative density function of Figure 1a so that population percentiles are ranged along the horizontal axis and income along the vertical axis, followed by dividing each individual income by the mean income. The result of this transformation is as in Figure 1b.

Integrating the curve in Figure 1b from the origin to the right will result in the Lorenz curve as in Figure 1c. The derivation of Wolfson's polarisation curve

also follows a similar and parallel path of graphical transformation of the cumulative density function (Figure 1a) as with the derivation of Lorenz curve. It begins with exchanging the axes of the cumulative density function (Figure 1a), so that population percentiles are ranged along the horizontal axis and income along the vertical axis, but then continues with the following order of operations:

i. individuals' income is normalised by dividing by the median (rather than the mean as in the derivation of Lorenz curve);

ii. the horizontal axis is then shifted up to touch the resulting median-normalised parade at the mid-point of the horizontal axis, the 50th population percentile, which is now equal to one as a result of the normalisation; and

iii. the curve for the 50 percent of the population with income below the median, i.e. the curve that now lies below the horizontal axis, is then flipped around the horizontal axis.

The result is a curve as shown in Figure 1d. For any population percentile along the horizontal axis, Figure 1d shows how far its income, expressed as a proportion of the median, is from the median. The curve in Figure 1d therefore indicates the degree of spread of income distribution from the middle (50th population percentile). A less spread-out distribution, i.e. one with a larger middle class, will have a curve that is lower.

Figure 1d however does not capture the second notion of polarisation, which is bimodality, since, a progressive transfer wholly on one side of the median will result in a second curve that crosses the first. To overcome this problem, Wolfson performed a simple transformation of Figure 1d that makes it simultaneously sensitive to both distributional attributes – "spreadoutness" from the middle and bimodality. This involves integrating the curve in Figure 1d out in both directions from the mid-point along the horizontal axis (where by construction the height of the curve is zero) to get the "cumulative spreadoutness" or polarisation curve shown in Figure 1e. The area under this polarisation curve, W, is the measure (index) of polarisation.

Both the Lorenz (Figure 1c) and polarisation curves (Figure 1e) can actually be brought together in one graph as shown in Figure 2. Figure 2 shows the usual Lorenz curve. The only addition here is that there is a tangent line to the Lorenz curve at the 50th population percentile, with the vertical axis extended

down to meet this tangent line. Wolfson demonstrated that, if the vertical axis of the polarisation curve in Figure 1e is renormalized by multiplying it by the ratio of the median to the mean, and then tilting the horizontal axis until it has the same slope as the tangent line to the Lorenz curve at the 50th population percentile, the transformed polarisation curve is identical to the Lorenz curve.

Figure 1
Graphical Development of Lorenz and Polarisation Curves
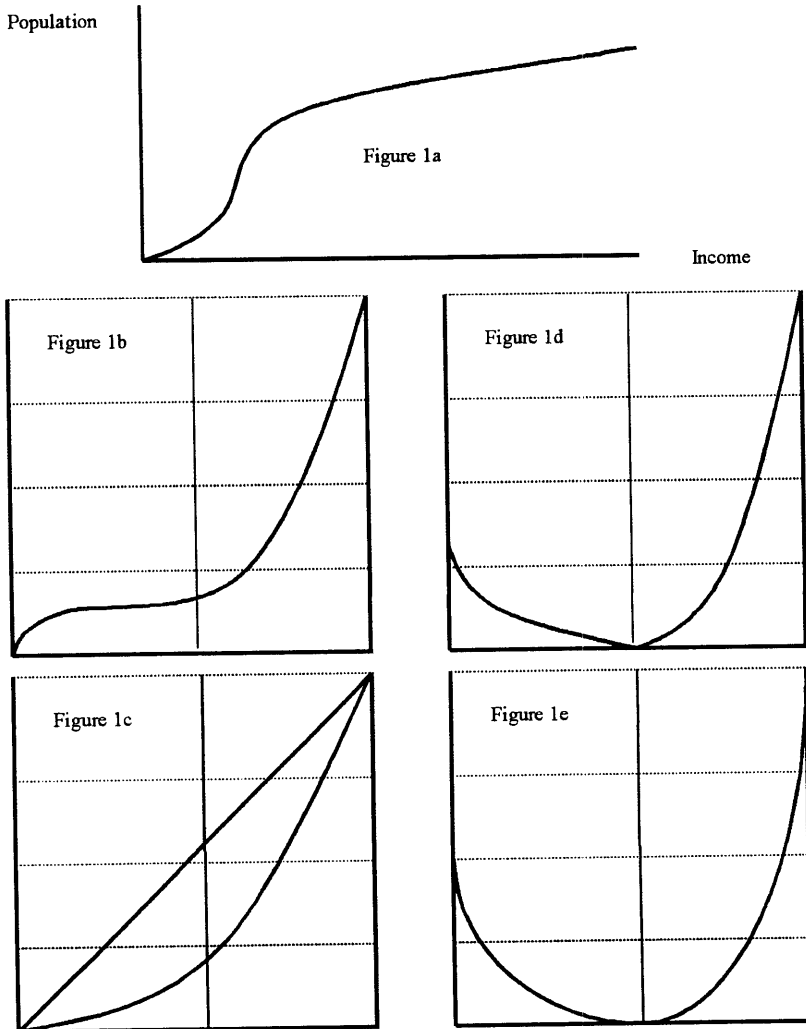
Source: Wolfson (1997:405)

It can be shown that, W, the area under the polarisation curve of Figure 1e, i.e. the scalar indicator of the extent of polarisation or the size of the middle class, is a simple transform of the lightly shaded area in Figure 2. The lightly shaded area in Figure 2 between the tangent line and the Lorenz curve is,

[1] $T - Gini/2$

The area under the polarisation curve of Figure 1e, W, is

[2] $W = (T-Gini/2)/(m/\mu)$

where m/μ is the slope of the tangent line to the Lorenz curve at the 50th population percentile; m is the median; u is the mean; and T is the area of the trapezoid defined by the 45 degree line and the median tangent. T in turn equals the vertical distance between the Lorenz curve and the 45-degree line at the 50th population percentile. This in turn is equal to the difference between 50 percent and the income share of the bottom half of the population, which is denoted by $0.5 - L(0.5)$. For a perfectly equal distribution of income, W has a value of zero, which is its minimum value. For a perfectly bimodal distribution, W has a value of 0.25, which means half of the population has zero income and the other half has 2μ (with the median being equal to μ in this case).

In order to have an index that has a similar range of values as the Gini, i.e. between 0 and 1, Wolfson arbitrarily defined W as having four times the area discussed so that the Wolfson polarisation index became as follows: [4]

[3] $W = 2(2T-Gini)/(m/\mu)$

Thus, Wolfson's index of polarisation (W), like the Gini index, has a value between 0 and 1. As mentioned above, the value 0 indicates that there is no polarisation, while the value 1 indicates a complete polarisation. Zero polarisation occurs in a situation where there is complete equality, while complete polarisation occurs when half of the population has zero income and the other half has twice the mean.

THE RESULTS

Previous studies on income inequality have shown that income inequality has risen in the period of 1957 to 1976, but declines thereafter until 1990. After 1990, it appears that income inequality has worsened again (see Table 1). Here, the Gini index of income inequality as well as income shares of various income group are calculated from the MFLS income data. The results are

reported in Table 2 Table 5 below. Since the MFLS data is only available for 1976/77 and 1988/89, this paper is only concerned with income inequality and polarisation between these two periods.

Figure 2
Wolfson Measure of Polarisation Based on the Lorenz Curve
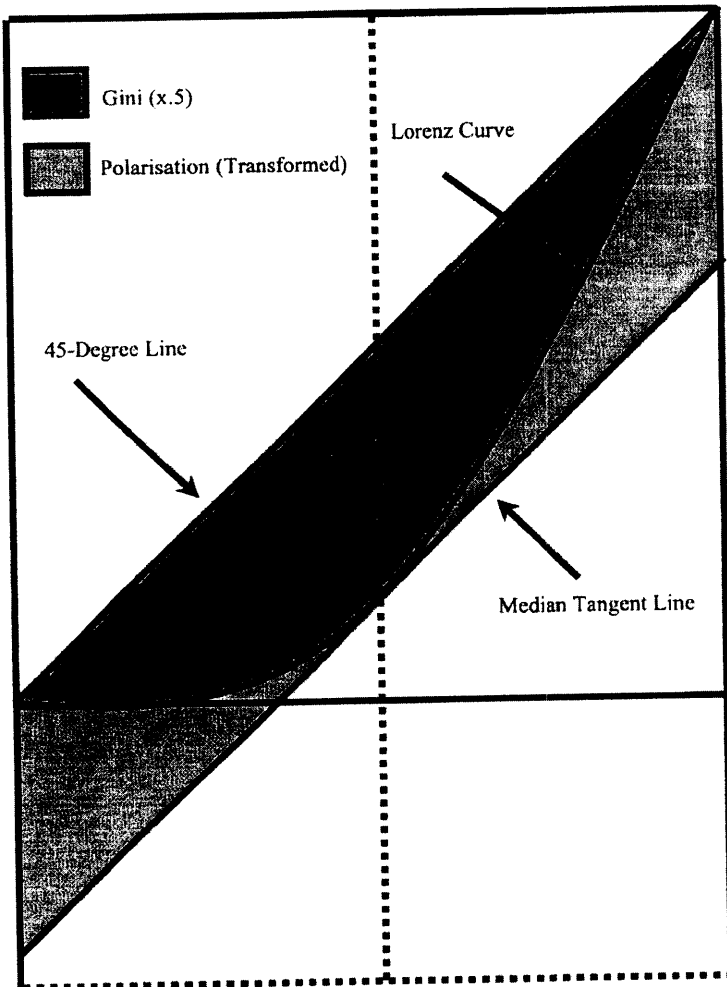
Source: Wolfson (1997, p.407)

Table 1
Overall Household Income Distribution in Peninsular Malaysia, 1957-1995

	Mean (RM per month)	Median (RM per month)	Gini Coefficient	Income Share of:		
				Top 20%	Middle 40%	Bottom 40%
1957/58	215	156	0.412	48.6	35.5	15.9
1967/68	140	154	0.444	51.3	34.4	14.3
1970	264	166	0.513	55.7	32.9	11.5
1976	524	313	0.529	57.7	31.2	11.1
1979	693	436	0.508	55.7	32.4	11.9
1985	1095	723	0.480	53.2	34.0	12.8
1987	1074	738	0.456	51.2	35.0	13.8
1990	1163	808	0.445	50.4	35.3	14.3
1993	n.a.	n.a.	0.459	n.a.	n.a.	n.a.
1995	2007	n.a.	0.464	n.a.	n.a.	n.a.

Note:

n.a. = not available

Source: Snodgrass (1980), Malaysia (1991, 1996) and Shari (2000).

Table 2
MFLS Data: Distribution of Household Income, 1976/77 and 1988/89

	1976/77	1988/89
Gini Index (G)	0.5418	0.4666
Income share of:		
Top 10%	41.76	35.65
Top 20%	57.88	51.77
Middle 40%	32.21	34.90
Bottom 40%	9.91	13.34
Mean (RM per year)	6232	13172
Median (RM per year)	3840	9000

Table 3
MFLS Data: Distribution of Rural and Urban
Household Income, 1976/77 and 1988/89

	1976/77		1988/89	
	Rural	**Urban**	**Rural**	**Urban**
Gini Index (G)	0.4824	0.5343	0.4708	0.4230
Income share of:				
Top 10%	34.81	41.37	36.86	32.66
Top 20%	51.65	57.79	52.47	48.41
Middle 40%	37.20	31.68	34.06	36.29
Bottom 40%	11.15	10.53	13.47	15.30
Mean (RM per year)	4139	9123	10910	17199
Median (RM per year)	3106	5425	7310	12738

Table 4
MFLS Data: Distribution of Household Income by Ethnic
Group in Peninsular Malaysia, 1976/77 and 1988/89

	1976/77			1988/89		
	Malay	**Chinese**	**Indian**	**Malay**	**Chinese**	**Indian**
Gini Index (G)	0.5009	0.5130	0.5146	0.4810	0.4249	0.3620
Income share						
Top 10%	36.43	39.77	46.52	37.54	32.68	27.07
Top 20%	53.91	55.70	58.00	53.72	48.65	43.07
Middle 40%	35.66	32.78	28.11	33.24	35.71	39.06
Bottom 40%	10.42	11.52	13.89	13.04	15.64	17.87
Mean (RM per year)	3795	8850	7411	11153	17300	13385
Median (RM per year)	2647	5747	4220	7200	12140	10465

Table 2 – Table 5 shows that between 1976/77 and 1988/89 household income increased, as indicated by the increase in the mean household income. The results also suggest that between 1976/77 and 1988/89, there was a reduction in the income inequality as indicated by the fall in the Gini index of inequality. It can be seen that lower income groups increased their income shares. The upper income group lost out, except for the rural households (see Table 3). The rising income share of the rural households comes from the rising income share of the upper income group of the rural Malay and rural Chinese

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Table 5.
MFLS Data: Distribution of Rural and Urban Household
Income by Ethnic Groups, 1976/77 and 1988/89

	1976/77			1988/89		
	Malay	**Chinese**	**Indian**	**Malay**	**Chinese**	**Indian**
Rural Households						
Gini Index (G)	0.4880	0.4254	0.3542	0.4878	0.4328	0.3419
Income share						
Top 10%	34.83	33.26	30.31	38.93	34.63	25.89
Top 20%	51.51	48.54	43.54	54.18	49.71	41.11
Middle 40%	38.02	36.50	35.63	32.68	35.51	39.29
Bottom 40%	10.47	14.96	20.83	13.13	14.79	19.60
Mean (RM per year)	3044	6351	4645	10142	14184	10586
Median (RM per year)	2202	4944	3447	6531	10200	8850
Urban Households						
Gini Index (G)	0.4589	0.5339	0.5574	0.4324	0.4042	0.3513
Income share						
Top 10%	33.98	41.05	50.20	31.20	32.31	26.84
Top 20%	51.03	57.16	63.64	48.89	47.35	41.14
Middle 40%	35.53	32.63	25.08	36.93	35.79	39.80
Bottom 40%	13.44	10.22	11.28	14.18	16.85	19.06
Mean (RM per year)	5890	10553	10372	14272	19913	15841
Median (RM per year)	4007	6545	5339	10102	14820	13414

households (see Table 5). In general, between 1976/77 and 1988/89, income inequality generally improved. It appears that the results on income inequality from the MFLS data analysis reported above fell within the longer trend of income inequality in Malaysia as shown in Table 1.

What we are really interested in is to know what happen to the "middle" of the distribution. Thus, examining the income share of the "middle" income group is indispensable. Here we calculated income share for three categories of "middle" income group – the middle 20%, middle 40% and middle 60%. Table 6 below shows the income share of the variously defined middle-income group by population subgroups. The results shown in Table 6 suggest that there might be a case of polarisation amongst the rural Malay and rural Chinese households. Between 1976/77 and 1988/89, the income share of the "middle" income group of these two rural ethnic groups declined. For instance, income share of the middle 20% of the rural Malay has declined from 14.45%

in 1976/77 to 13.09% in 1988/89, while for the rural Chinese the income share of their middle 20% has declined from 15.29% to 14.33%.

Table 6
MFLS Data: Income Share of the Middle Income Group,
1976/77 and 1988/89

	1976/77			1988/89		
	Middle 20%	Middle 40%	Middle 60%	Middle 20%	Middle 40%	Middle 60%
All Households	12.37	25.27	39.75	13.69	28.04	43.84
Rural Households	14.81	29.75	45.73	13.63	27.68	43.13
Urban Households	11.84	24.59	39.20	14.81	29.96	46.22
Malay Households	13.95	28.32	43.54	12.98	26.58	41.94
Chinese Households	12.89	26.15	41.25	14.64	29.82	45.97
Indian Households	11.82	23.29	36.68	15.87	32.26	50.40
Rural Households						
Malay	14.45	29.57	45.85	13.09	26.62	41.53
Chinese	15.29	30.95	47.01	14.33	29.00	45.32
Indian	15.21	31.06	48.85	16.54	33.08	52.73
Urban Households						
Malay	13.56	27.74	44.81	14.13	29.46	45.93
Chinese	12.46	25.50	40.35	14.99	29.74	46.63
Indian	9.95	20.31	32.05	17.12	33.21	51.79

Note:
Middle 20% = income share of decile 5 to decile 6 of the households; Middle 40% = income share of decile 4 to decile 7 of the households; Middle 60% = income share of decile 3 to decile 8 of the households.

Wolfson's polarisation index (W) calculated from the MFLS data is shown in Table 7 below. Between 1976/77 and 1988/89, Wolfson's polarization index (W) for all households decreased from 0.4836 to 0.4209. Thus, it seems that there is no evidence that the Malaysian society has become more polarised between the two periods under investigation. Therefore, generally speaking, between 1976/77 and 1988/89, the decline in overall income inequality

observed earlier is followed by a decrease in polarisation. Furthermore, the Wolfson's index of polarisation (W) also indicates that there is no evidence of polarisation amongst the rural and urban households, as well as amongst the three major ethnic groups.

Table 7
MFLS Data: Wolfson's Index of Polarisation (W), 1976/77 and 1988/89

	1976/77	1988/89
All Households	0.4836	0.4209
Rural Households	0.4255	0.4060
Urban Households	0.4976	0.3684
Malay Households	0.4795	0.4352
Chinese Households	0.4364	0.3706
Indian Households	0.3613	0.3380

The analysis is extended further to examine the question of polarisation amongst the three major ethnic groups by their location. The Wolfson index of polarisation (W) of each ethnic group by location is reported below in Table 8. The results show that there was no evidence of polarisation amongst the urban households of the three ethnic groups. However, the Wolfson index of polarisation (W) shows that there was evidence of marginal increase in polarisation amongst the rural Chinese and the rural Indian households. The Wolfson's polarisation index (W) for the rural Chinese increased from 0.3366 in 1976/77 to 0.3648 in 1988/89, while the Wolfson's polarisation index for the rural Indian increased from 0.2627 to 0.2898. Therefore, the rural Chinese and Indians became more polarised in 1988/89 than in 1976/77. In contrast with the rural Chinese and Indians, while there was no significant improvement of income inequality amongst the rural Malay, nevertheless the Wolfson polarisation index (W) shows that they did not become more polarised.

Table 8
MFLS Data: Wolfson's Index of Polarisation (W) by
Location and Ethnic Groups, 1976/77 and 1988/89

	1976/77	1988/89
Rural Households		
Malay	0.4863	0.4137
Chinese	0.3366	0.3648
Indian	0.2627	0.2898
Urban Households		
Malay	0.4507	0.4381
Chinese	0.4861	0.3315
Indian	0.4445	0.2936

It could be observed that the Wolfson index of polarisation (W) mostly agrees with the results shown in Table 6 above. For instance, Table 6 shows that the income share of the middle-income group for the total household increased between 1976/77 and 1988/89. This appears to be confirmed from the calculated Wolfson polarisation index (W), that there was no evidence of increase polarisation within the total number of households. It also confirms the results for the urban as well as for the Chinese and Indian households.

However, there are also conflicting results. Table 6 indicates that the income share of the middle 20%, middle 40% and middle 60% of the Malay and rural households fell between 1976/77 and 1988/89. The income share of the rural Chinese middle-income group also fell between the two periods, while the income share of the rural Indian middle-income group increased. These figures appear to be contrary to the results from the Wolfson polarisation index (W). While it did not indicate any increase in polarisation within the Malay (and rural) households, the income share of their middle-income group, i.e. another indicator for polarisation, indicated an increase in polarisation. On the other hand, while the Wolfson index (W) indicated an increase in polarisation within the rural Indian community, the income share of their middle-income group indicated this is not the case. The only consistent result is for the rural Chinese household, where both the Wolfson polarisation index (W) and the income share of their middle-income group showed an increase in polarisation. Thus, the findings on polarisation for the Malay and rural households, as well as for the Indian households were inconclusive. It seems that the Wolfson index of polarisation (W) missed one important aspect of intra-group changes amongst

the Malays: that the top and the bottom income group fared better than the 'middle' income group between 1976/77 and 1988/89.

CONCLUSION

The question of polarisation is a new aspect of income distribution that recently emerged in the development literature. However, examination on this aspect of distributional changes is still lacking in Malaysia. This paper shows that there is no evidence of polarisation within the total population in Malaysia. However, it seems that there is polarisation within ethnic groups of the population, i.e. the Chinese rural households. Since there is conflicting results between income shares of the "middle" income group with Wolfson polarisation index (W), it could be that the Wolfson index of polarisation (W) might not have captured all aspects of distributional changes as claimed. Thus, the shortcoming of Wolfson's index as a measure of polarisation needs further investigation.

ENDNOTES

[1] Tun Razak, the Prime Minister during which the NEP was launched, has stated on the desire to create "a society with a middle class, like in Switzerland, Holland and Japan", i.e. refering to the creation of a Malay middle-class society. See Torii (1997:225-226) and Milne (1976:259).

[2] The first Malaysian Family Life Survey (MFLS1) was funded by the U.S. Agency for International Development. The MFLS1 was conducted by the RAND Corporation in collaboration, initially, with the Department of Statistics of the Government of Malaysia, and subsequently, with Survey Research Malaysia Sdn. Bhd. For more information about the survey, *see* Butz & Da Vanzo (1978). The second Malaysian Family Life Survey (MFLS2) was a colloborative project between RAND and the National Population and Family Development Board of Malaysia, with the support from the National Institute of Child Health and Human Development (USA) and the National Institute on Ageing (USA). For more information about the MFLS2, *see* Peterson (1993).

[3] Therefore, the extent of polarisation, i.e. the changes in the share of income held by the middle-income group, might have significant political consequences (McCarthy, Poole & Rosenthal, 2001).

[4] Ravallion & Chen (1997:369) expressed Wolfson's index of polarisation, W, as follows: $W = 2(\mu^* - \mu^L)/m$; where μ^* is the distribution-corrected mean income (given by the actual mean times 1 minus the Gini index), μ^L is the mean income of the poorest half of the population, and m is the median income.

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