The Impact of Growth on Distribution of Income across Ethnic Groups: a Social Accounting Matrix (SAM) Approach

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Abstract

The present paper examines the impact of growth estimated in the Ninth Malaysia Plan on the distribution of income among various ethnic groups across regions by employing two types of SAM models. Besides typical approach of Pyatt and Round (1979), we provide an alternative approach by treating government as an endogenous in the model of multiplier. The latter approach however has to be modified by adopting a mixed endogenous-exogenous SAM multiplier for ensuring demand and supply derived are internally consistent. We find that both models show the growth has significant impact in improving the distribution of income especially to enhance income of low-income group. By introducing government sector into the model, the income inequality among ethnics reduced significantly by generating a large income effect through the inter-dependency effect. We are also observe that source of inter-ethnic inequality in the economy is largely explained by unbalancing in labour structure.

Keywords: Social Accounting Matrix (SAM), growth, income distribution, multiplier decomposition

1. Introduction

Study on the impact of growth on distribution of income had been widely covered in the literature. Studied by Adelman and Morris (1973) and Adelman and Robinson (1978) for instances had shown high growth rate tended to shift the income distribution in favour of a high-income group and against low-income group. As a consequence, distribution of income between the high-income and low-income groups deteriorated. Economic growth alone however is neither necessary nor sufficient for reducing poverty. Tanzi (1998) and Shari (2000) suggested that economic growth was necessary for poverty alleviation but it may not be sufficient to improve distribution of income. It is also clear that distributional issue has contributed to increase social tensions and created difficult policy choices for policy maker especially for multi-racial society. According to Thorbecke and Charumilind (2000) inequality in distribution of income is the crucial factor leading to social conflict and political instability. Empirical evidences revealed that income inequality had significant impact to the country's political stability and social conflicts i.e. riot and revolution as documented by Nagel (1974) and Muller (1988a,b).

Similarly, as a pluralistic[1] developing country, income inequality in Malaysia is not a new issue since it had been raised in the past four decades ago when the ethnic riot was took place in 1969. The 1969 riot highlighted the dangers inherent in the multi-racial society when ethnic prejudices are exacerbated by the economic disparities. Consequently, economic development policies in Malaysia since 1970 are being shaped by the government commitment to ensure that benefits of economic growth are equitably shared among all Malaysians. This commitment is built upon the realization that greater equity in the distribution of income and opportunities for wealth creation is essential for sustained economic growth as well as for the maintenance of social stability and national unity.

[1] The major ethnic groups in Malaysia comprise of the Malay (indigenous), Chinese and Indian. The composition of the Malaysian population shows that Malay is the dominant group (51 per cent), followed by Chinese (31 per cent), Indian (10 per cent) and Others (8 per cent)

Recently, under the current Ninth Malaysia Plan (2006-2010), the government will continue to pursue a development policy that emphasizes growth with distribution. Accordingly, distribution policies, programmes and projects will be better designed and carefully monitored in order to achieve greater economic growth as well as greater equality of income among all ethnic groups. With 6.0 per cent of annual growth rates estimates in the Ninth Malaysia Plan, one obvious question continues to be raised: how are the fruits of growth distributed equally across all Malaysians? Test of this empirical question is the subject of our study.

In addressing this issue, we shall examine the impact of growth estimates in the Ninth Malaysia Plan on distribution of income among major ethnic groups across regions by using a Social Accounting Matrix (SAM) model. The advantage of this approach is it provides a comprehensive framework, incorporating elements of growth and income distribution into one coherent accounting framework. In fact, most of the construction of SAMs in the developing countries were provided data framework for the quantitative analysis of combating poverty and income distribution. Therefore, for the purpose of this study, the SAM for Malaysia with special references to income distribution among various ethnic groups across regions is constructed.

There are two types of SAM models are applied. Besides typical approach of Pyatt and Round (1979), we provide an alternative approach by treating government as an endogenous component together with production, factor, household and company accounts. By introducing government as an endogenous account in the model of multipliers, we can capture the redistribution income effect through the instrument controlled by the government such as public expenditure and taxation. We however modify the latter approach by adopting a mixed endogenous-exogenous SAM multiplier in order to ensure demand or injection and supply or leakages derived are internally consistent. On the other hand, by decomposing SAM multiplier, we can simply examine the role of government in affecting distribution of income through the distributional and inter-dependency effects. The distributional is further decomposed into industrial, direct and transfer effects.

This paper is organised as follows; Section 2 briefly reviews growth performance and patterns of distribution of income achieved during the 1970-2002 period. Section 3 discusses in general, the source of growth estimates in the Ninth Malaysia Plan from demand side. Section 4 describes the general structure of the Malaysian SAM and its details disaggregation for the household, factor and production sectors. Section 5 outlines the analytical SAM framework associated in the study. Section 6 presents the result of the impact of sectoral growth on the distribution of income. Concluding remarks follow in section 7.

2. Economic Growth and Distribution, 1970-2002

Over the 1970-1990 period, the economy grew by an average rate of 6.7 per cent per annum. The growth was accompanied by considerable transformation of structure of the economy from resource based economic activities to non-resource based industrial activities, led by the expansion in the manufacturing sector. This sector grew annually by 10.3 per cent resulted in its share to the Gross Domestic Product (GDP) raised from 13.9 per cent in 1970 to 27 per cent in 1990. With higher growth rates in the manufacturing sector, share of the agriculture sector declined from 29 per cent in 1970 to 18.7 per cent in 1990. The high growth rate of the Malaysian economy during this period was a result of successfully implementation of the New Economic Policy (NEP). This policy was guided by the strategy of growth with distribution, and twin-pronged objectives of the eradication of poverty irrespective of race and the restructuring of society to correct the identification of race with economic function[2].

The growth and structural transformation of the economy during the NEP period had interesting implications to the income distribution pattern of all Malaysians. The gap in

[2]Identification of ethnic with economic function existed as a result of colonial labour policy of 'divide and order', introduced by British (1786-1942). When British took over Malaysia (Malaya), Chinese and Indian were put in the commercial and industrial activities areas and engaged in the high productivity modern sector whereas Malay were located in the Malay Belt and engaged in the low productivity traditional sector of peasant agriculture and fishing. Malay were only allowed to involve in the modern sector as civil servant i.e. police and military where the non-Malays were not attracted as income received from this sector was relatively low compare to the other modern sectors.

ethnic community incomes narrowed significantly and the size of distribution of income has become more equal during the NEP period. As shown in Table 1, mean income of Bumiputera[3] increased significantly from MR 172 in 1970 to MR 940 in 1990 with registered the highest growth rate compared to other ethnics by 8.9 per cent per annum. As a consequence, income inequality between Bumiputera-Chinese narrowed from 1:2.29 to 1:1.74 while Bumiputera-Indian improved from 1:1.77 to 1:1.29, respectively. Similarly, income gap between rural and urban reduced from 1:2.14 to 1:1.67.

During the 1990-2002 period, the economy was driven by the New Development Policy (NDP). The NDP seeks to maximise economic growth through policy that allow for free play of market mechanism and the active participation of the private sector. The implication of these liberalisation policies to the nation growth that the economy grew by an average rate of 7.0 per cent per annum higher than the NEP achievement with strong recovery in the demand of manufacturing products especially electric and electronics sub-sector. The growth of the manufacturing sector was accompanied by expansion in the export-oriented industries as well as greater diversification of its market. To support the expansion of the manufacturing sector, the government took steps to develop the services sector to be a new source of growth. This sector grew by an average rate of 8.3 per cent per annum. However, the agriculture which traditionally provided the impetus growth to the economy was continuously declined by 0.5 per cent per annum.

<Table 1>

The consequence of liberalisation and deregulation policies had different implication on growth and income distribution. Even though Malaysia has experienced catch-up rapid economic growth during the 1990-2002 period, income distribution patterns among ethnic groups and regions were deteriorated. While mean household incomes were

[3]Bumiputera which translated literally means *son of the soil*, is an official definition widely used in Malaysia, embracing Malay and other indigenous groups in the Peninsular Malaysia and the tribal peoples of the East Malaysia. On average, Malay constitutes 80 per cent of total Bumiputera population while the rest of 20 per cent is other indigenous groups

increasing for all ethnic groups as well as both rural and urban areas, the differential rates of income growth among them resulted in an increase in inequality. The growth rate of Bumiputera's income (8.0 per cent) is not only lower than Chinese and identical with Indian, but also lower than the growth rate of income that had been achieved by them during the NEP period. In 2002, mean income of Bumiputera constituted only 56 per cent of mean income of Chinese and 78 per cent of mean income of Indian. As a consequence, income inequality among Bumiputera, Chinese and Indian increased during the 1990-2002 period. Similarly, the differential in income growth between rural and urban household resulted in an increase in rural-urban inequality i.e. from 1:1.67 in 1990 to 1:2.11 in 2002.

Although economic growth has been a driving force for raising income and living standards, it does not by itself ensure that benefits of growth are equitably shared among all in society. Liberalisation of the economy by promoting high growth rates and rapid industrialisation tend to shift the income distribution in favour of the high-income group and deteriorated the low-income group i.e. Bumiputera. Besides economic liberalisation, supply side policies such as continuing to influx of migrant worker; limited expansion of flexible social corporatism; and declined in the agricultural sector which has made it lag behind other sectors are the another factors why the unfavourable trend in income distribution (Shari, 2000).

3. Source of Growth

Approaching the plan from demand side, the Economic Planning Unit (EPU) provides the estimated Gross Domestic Product (GDP) by category of demands for year 2005 and 2010. While Table 2 shows an aggregate demand, Table 3 (a) and (b) present sectoral demands estimates in year 2005 and 2010, respectively. Notice that figures in Table 2 show total demands which comprise of both domestic and import commodities whereas Table 3 (a) and (b) reflect only demand on domestic commodities.

<Table 2>

<Table 3(a)>

<Table 3(b)>

During the plan period, the Malaysian economy is projected to grow by 6.0 per cent per annum in real terms. The growth will be supported by domestic demand with strong recovery in private expenditure - investment and consumption. Private expenditure will continue to be the driving force of the economy, consistent with the overall policy of encouraging the private sector to spearhead economic growth. Private investment in the form of gross fixed capital formation is projected to grow by 11.2 per cent per annum and its share to the total investment is expected to be 51 per cent in year 2010. The rest of 49 per cent of investment will be contributed by the public sector (Economic Planning Unit, 2006). Sectorally, as shown in Table 3 (b), 76.7 per cent of the sectoral investment is expected to be invested in construction, 14.7 per cent in manufacturing, 5.8 per cent in services, and 2.8 per cent in agriculture.

With 6.9 per cent annual growth rate, private consumption is expected to be the second sources of growth of the domestic economy during the plan period. The growth in private consumption is expected as a result of an increase in household disposable income and continuing improvement in consumer confidence underpinned by sustained employment growth and favourable commodity prices. As revealed in Table 3 (b), demand on the services commodities is projected to contribute a large share of the domestic private consumption which recorded at 58.4 per cent. Demand from this sector is expected to be strongly supported by demand of financial, real estate & business services; wholesale & retail trade and hotel & restaurants; and transport, storage & communications commodities. On the other hand, with 10.7 per cent of annual growth rate higher than services sector (9.9 per cent) between 2005 and 2010, demand of the manufacturing commodities is expected to contribute significantly to the growth of private consumption patterns. For public consumption, it is projected to grow by 5.3 per cent per annum, and will contribute about 12 per cent to the GDP in year 2010.

In terms of external demand, an export of commodities is projected to grow by 7.1 per cent per annum as a result of improving competitiveness and better prospects in world trade. Export of manufacturing commodities is projected to contribute 80 per cent of sectoral exports which will expand by 8.2 per cent per annum (2005-2010). The high growth rate of manufacturing exports reflects the sustained expansion in demand from traditional countries i.e. America, Middle East and ASEAN, as well as non-traditional markets such as China, India and Western Europe. Export from services sector on the other hand is estimated to contribute 12.6 per cent of sectoral exports which largely demanded from the transport, storage & communication; and financial, real estate & business services commodities. The increasing usage of cellular and its related services, expansion of international trade and travel agency, and effort of placing Malaysia as an emerging advanced financial market are expected to be the major factors in contributing exports of these sub-sectors. Exports of the mining & quarrying commodity is expected to contribute 5.5 per cent of total sectoral exports which mainly driven by exports of crude oil. The share of agriculture commodity to the sectoral exports is expected to contribute 1.9 per cent during the plan period which is mostly contributed by the positive growth in the export of rubber, palm oil, cocoa and forestry commodities. To support the anticipated growth of the export especially the manufacturing sector, imports of commodities are estimated to grow by 7.9 per cent per annum, largely supported by import of intermediate commodities.

Overall, the sectoral demand in the Ninth Malaysia Plan as depicted in Table 3 (b) reveals that the structure of demand in the Malaysian economy is largely supported by demand from the manufacturing commodity – followed by services, construction, mining & quarrying, and agriculture commodities. Demand of the manufacturing commodity is expected to contribute 60.7 per cent to the sectoral demand in year 2010 which 84.2 per cent from its total demand contributed by export. Unlike the manufacturing sector, 50.5 per cent of total demand from services sector is largely demanded by private consumption and only 21.4 per cent by exports. Therefore, it is strongly infers that the economic activities in the year 2010 influenced significantly by the manufacturing sectoral linkages effect due to the highest sectoral demand is attributed from this sector than other sectors.

4. The Social Accounting Matrix for Malaysia

Development of an SAM in Malaysia can be traced as far back in 1978 when the first SAM was developed for the 1970 database. In collaboration with the government of Malaysia, the World Bank experts, Pyatt and Round (1984) constructed a large SAM which distinguished between national and regional SAM. They had done a great work to improve the macroeconomic data base for Malaysia in calendar year 1970. Based on the 1970 Malaysian SAM, several modifications suit to the purpose of the present study shall be made. Basic assumptions of analysis regarding to household sectors are: (i) household income by regions and ethnic groups is based on structure of income provided by the household income surveys (HIS), (ii) household expenditure by regions and ethnic groups is based on structure of expenditure available in the household expenditure surveys (HES), and (iii) production structure is based on the 2000 input-output table. In fact, year 2000 was selected as a baseline data for constructing SAM because the latest input-output table published by the Department of Statistics (2005) is 2000 base-year.

4.1 General Structure

A square matrix of accounting structure underlying the aggregative accounts for Malaysian SAM is presented in Table 4. In the SAM, incomings are indicated as receipts for the row (*i*) in which they are located while outgoings are indicated as expenditure for their column (*j*). The corresponding row and column totals of the matrix must be equal, consistent with the fundamental law of economics that for every income there is a corresponding outlay or expenditure. The major components of SAM accounts comprises factor of production, institutions (household, company and government), production activities, consolidated capital, current and capital for rest of the world and indirect tax. Factor of production, production activities and household sectors are disaggregated into 27, 92 and 9 categories, respectively, while the rest of the remaining accounts in the SAM are in the aggregate form. Thus, the total sum of all accounts in our SAM contains 134 x 134 dimensions of matrix.

<Table 4>

In this study, the SAM is constructed by using a *top-down* approach. Specifically, before estimating in details of the 134 by 134 accounts in the SAM, a highly aggregated SAM based on the country's national account statistics is built. To be more precisely, the 9 by 9 matrix of aggregate SAM is prepared first. Then, this value reacts as control value when detailed accounts of each sector in the SAM particularly household and factor accounts are estimated. Multi-purpose survey i.e. household income survey and household expenditure survey are used to construct detail accounts of the particular accounts

Table 4 shows also the relationships among sectors in the economy within the single accounting framework. We can trace the distribution of income from production sector to household by looking at the flows around the SAM. The mapping of distribution of income from production to household can be traced through three distributional mechanisms: (i) the structure of production activities, (ii) factorial distribution of value added from production, and (iii) distribution of institutional incomes i.e. household and company from factor market. Referring to the intersection between first row and second column of Table 4, it can be observed that the factorial income received by the various categories of labours and capitals from the production activities. Besides requiring the intermediate input from other production activities, production also consumes the primary input supplied by factors of production in the form of labour and capital. By providing factor services to production activities, labour receives payments in the form of compensation of employees[4] while capital receives operating surplus[5], depending on the level of endowment in the technological process. Then, from the total amount of income received by factors, they distribute to the various categories of household and company as shown in the intersection

[4]Compensation of an employee includes remuneration, in cash or in kind, payable by the production activities to employee in return for work done during the accounting period. The components of compensation of employees comprise of wages and salaries, allowances and other payments received in kind.

[5]Operating surplus measures the surplus accruing from production before taking account of any interest, rent or similar charges payable on financial or tangible non-produced assets borrowed or rented or owned by enterprise (company) and unincorporated enterprise (households)

between third and fourth rows, and first column of Table 4. This mapping is essentially to determine the distribution of wealth in the economy. Household receives income in the forms of compensation of employee and unincorporated business profit while company receives corporate business profit.

4.2 Disaggregation for Income Distribution Analysis

For the purpose of studying the distribution of income, the most important disaggregation is that of the household sector. Such a disaggregation is crucial in order to capture how changes in the production structures are transmitted to household through the factor market. The first distinction of household is made between citizen and non-citizen of Malaysian household. It is important to distinguish citizenship categories since recently, the number of foreign workers influenced significantly to the labour force which grew by 18.8 per cent per annum within 2000-2005 (Economic Planning Unit, 2006). Most of them are the Indonesian, Bangladeshi and Filipinos which engaged in the plantation and agriculture, and manufacturing sectors. The, the citizenship household is further disaggregated into several classifications.

The classification of citizenship household adopted here is centered on socioeconomic groups rather than by income levels as explained by Pyatt and Thorbecke (1976). As the pluralistic country, it is considered important to distinguish four major ethnic groups throughout the household sector – Malay, Chinese, Indian and Others[6]. In addition, those disaggregations are important since the recent government's development strategy include specific concerns for the distribution of income between the various ethnic groups. Besides focusing on income distribution between ethnicity, we also capture regional differences by disaggregating them into rural and urban areas. The regional criterion for disaggregation is useful since the urban and rural distinction captures many aspects of duality. Depending on this distinction, households with otherwise similar characteristics are quite likely to be paid different wages and generally to be subject to

[6] The others groups comprise of dozens of minority ethnic groups which are mostly located in the East Malaysia. These minority groups include for instance Iban, Kadazan, Bajau, Murut, Suluk and etc.

different sets of socio-economic behaviour. Table 5 summarizes details disaggregation of the nine categories of households in the SAM frame.

<Table 5>

Factor of production is distinguished between labour and capital. The former is further disaggregated into 25 categories of labours according to their citizenship status, region, ethnic group and education level as shown in Table 5. These aggregations are similar with respect to location and race of household except for education level. The education criterion[7] which complements location and race in defining labour types turns out to be important in explaining income differences. Assuming labours are homogenous irrespective ethnic groups, the wage rate received by labours from the production activities in which sector their employed are totally depend on education level. On the other hand, capital input is further distinguished between household and company in the form of unincorporated business profit and corporate business profit, respectively.

Another important sector in the SAM framework is production activities. Based on the 2000 input-output table published by Department of Statistics (2005), we take into account 92 production activities starting from agriculture sector to services sector. The 2000 input-output table was compiled by using new industrial classification, Malaysian Standard Industrial Classification (MSIC), following the latest International Standard Classification of All Economic Activities (ISIC). The rest of the remaining accounts in the SAM are in aggregate form.

4.3 Aggregation of the SAM

Following the macro planning framework in the Ninth Malaysia Plan, our analytical framework requires the production activities in the SAM frame to be aggregated into ten broad sectors. This aggregation need to be done because in the Ninth Malaysia Plan, the

[7]Education criterion is based on certificate obtained at school, college and university. Those who are did not have formal education and primary school certificate are categorised under none education category while L.C.E., M.C.E. and H.S.C. certificates are categorised under secondary education, and diploma, and degree (or above) certificates are considered as tertiary education.

EPU has provided only the estimates demand for the broad sector categories and there is no information available for the details sectors. Thus, our aggregated SAM version contains 52 by 52 matrix dimensions, reducing the production sector from 92 to 10 sectors.

5. SAM Modelling for Income Distribution

5.1 The Impact of Sectoral Growth on Household Income

The SAM framework is a useful starting point for economy wide analysis, which focuses on the demand side. By deriving multiplier, it can be used similarly with the obvious input-output model, but the difference that the SAM contains more variables and relationships. If a certain number of conditions are met – (i) the existence of excess capacity which would allow prices to remain constant, (ii) constant expenditure propensities of endogenous account and (iii) production technology and resource endowment are given, the SAM multipliers can be used to evaluate the potential impacts of demand changes on household groups by ethnics and regions. However, before deriving the SAM multipliers, it is important to understand the underlying methodology, determining the endogenous and exogenous accounts from the nine SAM accounts. The choice regarding subdivision into endogenous and exogenous accounts can be lengthy discussions on the logic and operational in the planning framework. Following the typical approach of Pyatt and Round (1979), production, factor, household and company are considered as endogenous accounts while the rest of the remaining accounts (government, consolidated capital, rest of the world and indirect tax) is considered exogenous. As a result of this manipulation, an economy-wide model in the form of Table 6 is produced.

<Table 6>

Determination of the endogenous accounts from the accounting relationship can be expressed in equation (1).

$$\mathbf{y} = \mathbf{A}\mathbf{y} + \mathbf{x} \qquad (1)$$

From Table 4, matrix **A** in equation (1) can be partitioned as;

$$\mathbf{A} = \begin{pmatrix} 0 & A_{12} & 0 \\ 0 & A_{22} & A_{23} \\ A_{31} & 0 & A_{33} \end{pmatrix} \quad (2)$$

Then, from equation (1), income for endogenous account simply can be obtained via the following expression;

$$\mathbf{y} = (\mathbf{I} - \mathbf{A})^{-1}\mathbf{x} = \mathbf{M}\mathbf{x} \quad (3)$$

where **I** is an identity matrix, **A** is (n x n) sub-matrices containing an average expenditure propensities, showing the income of endogenous account i received from endogenous account j as a proportion of the expenditure of endogenous account j. These average expenditure propensities can be derived simply by dividing a particular element in any of the endogenous accounts by the total income for the column account in which the element occurs. **M** is a (n x n) matrix of multiplier and **x** is a (n x m) vector of demand. Specifically, equation (3) indicates that endogenous income of y (factorial incomes, y_1; production incomes, y_2; household incomes, y_3; and company incomes, y_4) can be derived by multiplying injection, **x** by the multiplier matrix of **M**. It can be used to calculate the endogenous incomes associated with any given changes in demand (injection) of any production sectors. It captures both the Leontief production linkages and the consumption expenditure linkages induced by changes in production activities through their effect on household incomes.

Analytically, the estimated final demand components of private and government consumption, investment (gross fixed capital formation and change in stock), and exports for year 2005 and 2010 will be our exogenous variables. However, for analysis purpose, we only take into account the effect of investment, government consumption and exports as household (private) consumption is now treated as an endogenous sector that will interact in the economic system. Specifically, we can define the exogenous demand as,

$$\mathbf{y} = (\mathbf{I} - \mathbf{A})^{-1}\mathbf{x} = \mathbf{M}\,(\mathbf{x_g} + \mathbf{x_i} + \mathbf{x_e}) \quad (4)$$

Besides the above conventional criterion, we modify also the multiplier matrix in equation (3) by treating government as an endogenous component together with production, factor, household and company. The rest of the remaining accounts of consolidated capital, the rest of the world and indirect taxes are treated as exogenous accounts. By introducing government as an endogenous account in the model of multipliers, the redistribution income effect to household through public expenditure and public taxation when the government receives exogenous incomes can be captured. In particular, it can extent our knowledge of income distribution effects due to variables controlled by public institutions, such as taxes and transfers (Llop and Manresa, 2004). Hence, this alternative approach can be expressed via the following equation;

$$\mathbf{y} = (\mathbf{I} - \mathbf{A}^*)^{-1}\mathbf{x} = \mathbf{M}^*\mathbf{x} \qquad (5)$$

where $\mathbf{A}^*$ and $\mathbf{M}^*$ are (n+1 x n+1) sub-matrices containing the average expenditure propensities of endogenous accounts and (n+1 x n+1) matrix of multiplier derived after endogenousing government sector, respectively. Nevertheless, equation (5) cannot be directly applied in this study as supply (leakage) derived is not internally consistent with demand (injection). Inconsistency exists because besides treating government as an endogenous sector, its also considered as exogenous component together with investment and exports. Therefore, in addressing this issue, we employ a mixed type of SAM model - combination of endogenous-exogenous variables as applied from Miller and Blair (1985). Applying of this approach, output of government sector (revenue) will be treated as exogenous variable in the model. Specifically, output of government can be obtained indirectly from equation (4) as proportion of each endogenous variables (factor, production, household and company) which leaks out as expenditure into government sector in the form of direct and indirect taxes. This calculation is represented by equation (6)

$$\hat{\mathbf{y}}_g = \mathbf{g}\,(\mathbf{I} - \mathbf{A})^{-1}\mathbf{x} = \mathbf{g}'\mathbf{M}\mathbf{x} \qquad (6)$$

where $\mathbf{g}$ is a (1 x n) vector of average propensities leak by government sector. Taking the effect of government output as an exogenous, equation (5) therefore can be modified as

$$\mathbf{y} = (\mathbf{I} - \mathbf{A_g})^{-1}\mathbf{x^*} = \mathbf{M_g}\,(\mathbf{x^*_i} + \mathbf{x^*_e}) \qquad (7)$$

where matrix $\mathbf{M_g}$ is modified from original matrix $\mathbf{M}^*$ which contains mixed element of endogenous-exogenous variables and $\mathbf{x}^*$'s comprises of existing and the new level of demands generated as a result of an increase in output of government. Detail description of this approach can be referred in an Appendix.

5.2 Decomposition of SAM Multiplier

Conceptually, the size of multiplier of $\mathbf{M^*}$ is larger than $\mathbf{M}$ because it contains an additional endogenous variables of government sector while not for the former. Accordingly, household income generated by using the latter approach is greater than the former despite the level of demand applied in the latter approach is relatively lower than the former. However, one important question continues to be raised; does the government intervention gives more benefits to the low-income group in terms of income generation. If true, in what way it has improved income of this group. To understand the various mechanisms and linkages within the SAM frame, we can extent our analysis by conducting the multiplier decomposition technique. According to Pyatt and Round (1979), matrix of multiplier $\mathbf{M}$ (as well as $\mathbf{M}^*$) can be decomposed into three separate effects of (i) transfer effect – captures the effect of transfers within the economy i.e. transfers of income among production sector or among institutions, (ii) open loop effect – captures the cross-effects of multiplier process whereby an injection into one part of the system has repercussions on the other parts, and (iii) closed loop effect – captures full circular effects of an income injection going round the system and back to its point of origin in a series of repeated. According to this approach, matrix of multiplier $\mathbf{M}$ now can be decomposed as follows;

$$\mathbf{M} = \mathbf{M_3}\mathbf{M_2}\mathbf{M_1} \qquad (8)$$

where, $\mathbf{M_1}$, $\mathbf{M_2}$ and $\mathbf{M_3}$ represent transfer effect, open loop effect and closed loop effect, respectively. Specifically, $\mathbf{M_1}$, $\mathbf{M_2}$ and $\mathbf{M_3}$ can be derived as;

$$\mathbf{M_1} = (\mathbf{I} - \bar{\mathbf{A}})^{-1};\ \mathbf{M_2} = (\mathbf{I} + \mathbf{A}^* + \mathbf{A}^{*2});\ \mathbf{M_3} = (\mathbf{I} - \mathbf{A}^{*3})^{-1} \qquad (9)$$

By partitioning the matrix of **A*** and $\bar{\mathbf{A}}$, element of $\mathbf{A}^*_{ij}$ and $\bar{\mathbf{A}}_{ij}$ can be defined by the following equations;

$$\bar{\mathbf{A}} = \begin{pmatrix} 0 & 0 & 0 \\ 0 & A_{22} & 0 \\ 0 & 0 & A_{33} \end{pmatrix} \quad \text{and } \mathbf{A}^* = \begin{pmatrix} 0 & A^*_{12} & 0 \\ 0 & 0 & A^*_{23} \\ A^*_{31} & 0 & 0 \end{pmatrix} \qquad (10)$$

where; $A^*_{12} = A_{12}$; $A^*_{23} = (I - A)^{-1}A_{23}$; $A^*_{31} = (I - A)^{-1}A_{31}$ (11)

In addition to the above specification, we attempt to decompose the multiplier **M** into two separate effects, the distributional effects and interdependency effects as proposed by Thorbecke and Jung (1996) which can be shown in equation (12).

$$\mathbf{M} = \mathbf{R}.\mathbf{D} \qquad (12)$$

The distributional effects in addition can be further decomposed into three effects; (i) transfer effect – incomes accruing to the institutions from transfer and remittances from other institutions, (ii) direct distributional effect - translation from the factorial income distribution to the distribution of income of different household groups, depending on which groups own the factors, and (iii) industrial effect – inter-linkages among production sectors which represented by the input-output relation. Thus, the distributional effect can be derived as;

$$\mathbf{D} = (\mathbf{I} - \mathbf{A}_{33})^{-1}\mathbf{A}_{31}\mathbf{A}_{12}(\mathbf{I} - \mathbf{A}_{22})^{-1} \qquad (13)$$

where the $\mathbf{D_3}$ (m x m) = $(\mathbf{I} - \mathbf{A}_{33})^{-1}$ represents the transfer effect, $\mathbf{D_2}$ (m x n) = $\mathbf{A}_{31}\mathbf{A}_{12}$ denote direct distributional effect, and $\mathbf{D_1}$ (n x n) = $(\mathbf{I} - \mathbf{A}_{22})^{-1}$ for the industrial effect, or simply

$$\mathbf{D} = \mathbf{D_3}\,\mathbf{D_2}\,\mathbf{D_1} \qquad (14)$$

Equivalent to the closed loop effect, the interdependency effect reflects the full circular flows in the economy on both consumption and production sides as a result of an injection of other sectors. The more consumers and other institutions spend on domestic commodities, the more diversified their consumption patterns, the greater inter-industry linkages on the production side, the higher inter-dependency effect (Thorbecke and Jung,

1996). Therefore, both distributional and interdependency effects can be represented by matrix **R**,

$$\mathbf{R} = [\mathbf{I} - (\mathbf{I} - \mathbf{A}_{33})^{-1}\mathbf{A}_{31}\mathbf{A}_{12}(\mathbf{I} - \mathbf{A}_{22})^{-1}\mathbf{A}_{23}]^{-1} \quad (15)$$

Assuming $\mathbf{A}_{23} = \mathbf{E}$, equation (15) can be re-expressed given the definition of **D** in equation (13)

$$\mathbf{R} = (\mathbf{I} - \mathbf{DE})^{-1} \quad (16)$$

6. Result and Discussions

By using the SAM multiplier, this section primarily discusses the impact of sectoral growth estimated in the Ninth Malaysian Plan on household income distribution. There are two types of SAM multipliers are applied in this study; the one which endogenousing factor, production, household and company (designated as 'Model 1') and the other one modifies the former approach by endogenousing government sector together with factor, production, household and company (designated as 'Model 2'). By comparing these two models, we can examine the role of public sector in affecting the distribution of income. These analyses are carried out by assuming there are no changes in development policy and without policy interventions to change the pattern of income distribution. It is assumes therefore, the present economic structure and income distribution pattern will continue in the future. In addition, by separating the effect into distributional and inter-dependency effects, we shall examine in what ways government intervention has benefitted distribution of income. This analysis will be captured in the second part of this section.

6.1 Impact on Household Income Distribution

The impact of sectoral growth estimated in the Ninth Malaysia Plan on aggregate sectors is presented in Table 7. Our results show that introducing government in the economic system significantly improves the distribution of income. The results show that household and labour sectors have shown among the most benefitted as a result of government intervention. Specifically, at the end of planning period (2010), MR 152 billion of labour income is created, larger than amount of income generated from Model 1 (MR 147 billion)

and grow by 7.07 per cent. Since labour income is the primary source of household income which is expressed in terms of compensation of employees as they received when supplying input, thus, the large increase in labour income is expected to generate a large benefit to household through the mechanism of labour market. As a consequence, household income increase from MR 180 billion to MR 253 billion in 2010 higher than those estimated from Model 1. Despite improving the distribution of income, government intervention also on the other hand gives adverse effect to the other sectors compared to without its intervention. For instance, the growth rate of capital income estimates from Model 2 is lower than Model 1 by 7.06 per cent and 10 per cent, respectively. Similarly, income of agriculture and other private services sectors generated from Model 2 is lower than Model 1.

<Table 7>

Disaggregating household into different categories of ethnics and regions, Table 8 presents the impact of sectoral growth on household income distribution. Both models show that the improvement in income of all ethnic groups between 2005 and 2010 is largely explained by the increase in income of urban household. However, despite the urban household contributes significantly to the total household incomes, our results reveal that the growth rate estimates in the Ninth Malaysia Plan gives more opportunities to the rural household to increase their level of income. It is observed that the growth rate of income in the rural area is slightly higher than that in the urban area. Nevertheless, the gap between total incomes earned by the rural and urban households is still widening. Perhaps, the large income differential between rural and urban exist because most of the productive industrial activities are located in the urban area and tends to hire high wage rate than rural area which is later directly reflect the small size of multipliers for the rural household.

<Table 8>

Even though both models indicate the improvement in income for all ethnic groups, the growth rates of income among them are differs significantly. In between 2000 and 2005, both models indicate Chinese registers the highest growth rate of income, followed by Indian. The growth rate of the Malay's income on the other hand relatively register

among the lowest compared to Chinese and Indian for both rural and urban areas. In contrast, the sectoral growth rates estimates in the Ninth Malaysia Plan gives more opportunities to Malay to increase their income. The growth rate of Malay's income registers the second highest after Indian by 7 per cent (Model 1) and 7.11 per cent (Model 2) between 2005 and 2010. Relatively, Chinese income record among the lowest growth rate compared to Indian and Malay. Hence, the rate of sectoral growth estimates in the Ninth Malaysia Plan not only give more benefits to the low income group (mainly Malay), also create opportunities to rural household to increase their level of income.

In an absolute term, our results reveal that Malay's income register the highest impact than other communities as a consequence of growth. However, it does not imply that each of Malay receive the highest income among each of the rest of the ethnic groups. It is important to note that the exercise of calculating household income through SAM multipliers capture the effect on total income of each of the household groups, ignoring the number households[8] in the economy. Therefore, we continue our analysis by dividing the total household income with its respective number of households in the respective groups. This will give us the per capita or mean incomes received by each of the members of respective ethnic groups. In fact, this analysis also can be used to answer the crucial question of "who gets what out of national growth?" The number of household by each of the groups is obtained directly from the HIS survey. Due to unavailability data on number of household by employment status at ethnic and region levels, therefore, we assume that the growth rate of household among ethnic groups and regions are constant during the period of the study.

After obtaining mean household income, we can use those figures to calculate household income disparity ratio among ethnic groups and use it as an inequality indicator. Table 9 shows the household income disparity ratios for the base-year, 2005 and 2010, derived from the both models. Compare to the base-year inequality, the results indicate that

[8] Household can be distinguished according to their employment status (see Pyatt and Round, 1984). In this study, we take into account the number of household according to their employment status which comprise of employee, employer or self-employed and other (housewives, retired person, student, etc).

income inequality among ethnic groups estimated from Model 1 is larger than Model 2. For instance, income inequality estimated from Model 1 reveal that inequality between Malay and Chinese is increased from 1:1.7419 to 1:1.9227 in 2005 while in Model 2, inequality between these groups increased to 1:1.7665. These results imply that government intervention in the economic system has significant impact in reducing income inequality among household through the redistribution mechanism. Despite there is a small degree of changes in disparity ratios[9] are observed in Model 1 and Model 2 within 2005-2010, in general, both models tend to show the same patterns of income inequality. Take inequality between Malay and Chinese as an example, both models show that the income inequality of these groups increase between base-year and 2005, and reduce in between 2005 and 2010 periods. Similarly, the up ward trend of inequality is observed in both models for Malay and Indian. It can be verified that given fixed income coefficient and with the existing market mechanism, government intervention can only reduce overall inequality but not relatively reduce inter-ethnic inequality. Therefore, it is strongly suggests that effort to reduce income inequality can be more effectives if equality-enhancing redistributive policy is carefully designed to benefit the low-income group of household.

<Table 9>

The results also reveal that the sectoral growth rate estimate in the Ninth Malaysia Plan has significant impact on reducing Malay-Chinese income inequality, but not for Malay-Indian inequality. As indicated in Table 8, the higher rate of growth of Indian income than Malay contributes this upward inequality trend. On the other hand, it is observed that the major source of income inequality among ethnic groups is largely explained by regional inequality. Specifically, the income gap among ethnic groups is higher in rural rather than urban area. For example, Model 1 shows that each *ringgit* earned by rural-Malay in 2010 is equivalent to 1.9487 *ringgit* earned by rural-Chinese and 1.9106

[9] It was observed that there are small changes in disparity ratios within 2005-2010 for both models. For example, in Model 1, disparity ratio between Malay and Chinese improve by 0.0037 (1.9227-1.9190) while in Model 2, it improve by 0.0082 (1.7665-1.7583). Similarly, Model 1 estimates disparity ratio between Malay and Indian larger than Model 2 by 0.0061 (1.6141-1.6080) and 0.0026 (1.5371-1.5345), respectively.

ringgit by rural-Indian. In contrast, the income gap between Malay-Chinese and Malay-Indian in the urban lower than rural area by 1.4592 and 1.2209, respectively. Therefore, the distribution of income among the various income groups in both the rural and urban areas indicates that rural areas not only generate relatively smaller incomes for almost all ethnic groups but also exhibit more unequal distribution of income than in urban areas.

6.2 Decomposition Impact on Household Income

Our model allows to examine in details the role of government in affecting the distribution of income by disaggregating the impact into distributional and inter-dependency effects. The former is further decomposed into three separate effects, namely industrial, direct and transfer effects. The industrial effect captures the effect on output of production activities as a result of an increase in final demand through the inter-industry relationship. As a consequence, an additional factor input in the form of labour and capital is required to support the additional production output. This consequence is captured by direct effect - depending to factor endowment of the respective household groups. Transfer and remittances from other institutions i.e. company and government is captured by transfer effect.

Taking the difference in sectoral demands between 2005 and 2010 as an exogenous, our decomposition results in Table 10 reveal that the impact of growth on household income distribution is largely explained by distributional effect especially direct effect. More than 70 per cent of household income derived from Model 1 is generated from direct effect. In comparison, Model 2 estimates the share of direct effect decrease despite it still contributing the largest impact on household income. It can be verified that the decreasing share of direct effect mainly because the level of sectoral demands applied in Model 2 is relatively low than Model 1. Low level of demand implies low sectoral output generated and as a consequence, less amount of labour is required which then translated into income generation. Nevertheless, this effect shows only the first round effect and does not takes into account the full circular effects after considering other effects i.e. consumption effect as explained by the inter-dependency effect.

<Table 10>

With government interaction, it is observed that the inter-dependency effect significantly generates large impact to household income. This implies, the diversification of household and government consumption on commodities have greater inter-sectoral linkages on production side which later indirectly translated into household income through labour market. The other effects such as transfer effect does not only contribute small portion amount of income in both approaches but also not significantly variance among households. On the other hand, there is no industrial effect captured by household as this effect reflects only at inter-industry level.

Looking the impact across individual household group, the results show that all the effects derived from Model 1 reveal much smaller variances compared to Model 2. Thus, it is strongly suggests that government interaction in the market has influenced significantly on distribution of income especially to improve the low-income group household. As shown in Table 10, income of Malay and Other groups improve substantially, which is largely derived from the inter-dependency effect compared to Model 1. The share of inter-dependency effect contributes 40 per cent and 39 per cent of total income of Malay and Other groups, respectively, higher than Chinese and Indian. Contrary, it is observed that direct effect generates a large impact to Chinese and Indian compared to Malay and Other. This important result tends to explain why the only small changes in degree of inequality are observed in Table 9. Although overall inequality reduced significantly as a result of government intervention (Table 9), in relative the inter-ethnic inequality still does not much improve because of rigidity of labour market. As explained by direct effect in Table 10, Chinese and Indian generate large share of income from labour market whereas Malay and Other register among the lowest share. In fact, the large reducing in overall inequality estimated from Model 2 because government intervention has created large income effect from the inter-dependency effect rather than direct effect. Thus, besides showing labour market plays an important role in influencing distributional of income, it also observes that there is a labour imbalance among ethnic groups in the economy. Labour imbalances can

exist probably because of two reasons – skilled differential among races and wage differential between public and private sectors.

7. Conclusions

In this paper, we examine the impact of Ninth Malaysia Plan growth on household income distribution by employing two types of SAM models. Besides conventional approach of Pyatt and Round (1979), we introduce an alternative approach by treating government as an endogenous component together with production, factor, household and company. Unlike the former approach, this approach however cannot be applied directly as supply and demand derived is not internally consistent. To solve this issue, we modify the latter approach by employing mixed endogenous-exogenous variables to the SAM multiplier. By introducing government as an endogenous account in the model of multipliers, we capture the redistribution income effect through the public expenditure and transfer when the government receives additional revenues.

Assuming there are no changes in development policy and without policy interventions to change the distribution of income, we find that sectoral growth estimates in the plan period give better implication to the distributional of income. It shows that the sectoral growth rates estimates in the Ninth Malaysia Plan gives more benefits to the low-income group especially Malay to improve their level of income. Both models estimate the growth rate of income of Malay is higher than high-income group i.e. Chinese. The results also reveal inequality in income among ethnic groups is largely explained by regional income gap. The distribution of income among the various ethnic groups indicates that rural area not only generate smaller income for almost all ethnic groups but also exhibit more unequal distribution of income.

The government intervention has significant impact in reducing inequality among ethnic groups. By disaggregating the impact into distributional and inter-dependency effects, we observe that the latter effect generates large impact to improve low-income group especially Malay and Other. We are also find that source of inter-ethnic inequality in

the economy is largely explained by unbalancing in labour structure. Our results reveal the high-income group i.e. Chinese and Indian generate large share of income from labour market compared to the low income group. As labour income is the primary source of household income, therefore, from distributional planning point of views, the central focus for overcoming ethnic income inequality should be centered on the status and earnings in paid employment. Indeed, the effective way to reduce inequality is through formulating policy intervention on the supply side, i.e. restructuring sectoral employment by correcting the institutional imbalances.

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Appendix

In the SAM frame, demand (injection) into the endogenous accounts and supply (leakage) derived can be shown by the following accounting balance equations.

Table A: Accounting balance equations

	Expenditures					
Receipts	Endogenous accounts		Exogenous accounts		Totals	
Endogenous accounts	$\mathbf{N} = \mathbf{A}\,\mathbf{y}$	(A1)	$\mathbf{X}$		$\mathbf{y} = \mathbf{n} + \mathbf{x}$	(A3)
					$= \mathbf{A}\,\mathbf{y} + \mathbf{x}$	(A4)
Exsogenous accounts	$\mathbf{L} = \tilde{\mathbf{A}}\,\mathbf{y}$	(A2)	$\mathbf{R}$		$\hat{\mathbf{y}} = \mathbf{1} + \mathbf{Ri}$	(A5)
					$= \tilde{\mathbf{A}}\,\mathbf{y} + \mathbf{Ri}$	(A6)
Totals	$\mathbf{y}' = (\mathbf{i}'\mathbf{A} + \mathbf{i}'\tilde{\mathbf{A}})\,\mathbf{y}$	(A7)	$\hat{\mathbf{y}}' = \mathbf{i}'\mathbf{X} + \mathbf{i}'\mathbf{R}$	(A9)		
	$\mathbf{i}' = \mathbf{i}'\mathbf{A} + \mathbf{i}'\,\tilde{\mathbf{A}}$	(A8)	$\tilde{\mathbf{A}}\,\mathbf{y} - \mathbf{X}'\mathbf{i} = (\mathbf{R}-\mathbf{R}')\mathbf{i}$	(A10)	$\lambda'\mathbf{y} = \mathbf{x}'\mathbf{i}$	(A11)

where:
$\mathbf{A} = \mathbf{N}\mathbf{y}^{-1}$ = matrix of average endogenous expenditure propensities
$\tilde{\mathbf{A}} = \mathbf{L}\mathbf{y}^{-1}$ = matrix of average propensities to leak
$\mathbf{Ni} = \mathbf{n}$ = vector of row sums of $\mathbf{N} = \mathbf{Ay}$
$\mathbf{Xi} = \mathbf{x}$ = vector of row sums of $\mathbf{X}$
$\mathbf{Li} = \mathbf{l}$ = vector of row sums of $\mathbf{L} = \tilde{\mathbf{A}}\mathbf{y}$
$\lambda' = \mathbf{i}'\tilde{\mathbf{A}}$ = vector of column sums of $\tilde{\mathbf{A}}$ i.e. the vector of aggregate average propensities to leak.
$\mathbf{N}$ = matrix of transactions among endogenous accounts
$\mathbf{X}$ = matrix of injections from exogenous into endogenous accounts
$\mathbf{L}$ = matrix of leakages from endogenous into exogenous accounts
$\mathbf{R}$ = matrix of transactions among exogenous accounts.

Source : Adopted from Pyatt and Round (1979)

Consistency between supply and demand in the SAM model can be represented by equation (A11). It implies that, in aggregate, every injection into the system must equal leakages. To satisfy equation (A11), row and column sums of equation (A7) and (A4) must be equal to provided equation (A8) holds and similarly for row and column sums of equation (A9) and (A6). In our study, inconsistency exists because equation (5) does not satisfy equation (A11) condition. This condition does not satisfy because there is inconsistency in row and column sums between equation (A7) and (A4). Specifically, in equation (5), we treat government as an endogenous sector together with factor, production, household and company while at the same time, its also consider as exogenous component together with investment and exports. As a result of this specification, a row sum of equation (A7) is lower than column sums of equation (A4).

Therefore, to address this issue, the following approach is taken. Assuming three are only three sectors involve namely production (y_1), household (y_2) and government (y_3), the relationship between these sectors in matrix **M*** of equation (5) can be represented in the following equation.

$$\begin{aligned} (1-a_{11})\,y_1 - a_{12}y_2 - a_{13}y_3 &= x_1 \\ -a_{21}y_1 + (1-a_{22})\,y_2 - a_{23}y_3 &= x_2 \\ -a_{31}y_1 - a_{32}y_2 + (1-a_{33})\,y_3 &= x_3 \end{aligned} \qquad \text{(A12)}$$

Or in matrix form,

$$\begin{pmatrix} (1-a_{11}) & -a_{12} & -a_{13} \\ -a_{21} & (1-a_{22}) & -a_{23} \\ -a_{31} & -a_{32} & (1-a_{33}) \end{pmatrix} \begin{pmatrix} y_1 \\ y_2 \\ y_3 \end{pmatrix} = \begin{pmatrix} X_1 \\ X_2 \\ X_3 \end{pmatrix} \qquad \text{(A13)}$$

It shows that income of y_1, y_2 and y_3 are endogenously determined by exogenous variables of x_1, x_2 and x_3. Therefore, this matrix reflects a complete endogenous SAM multiplier.

To be consistent between demand and supply, we can consider output of government sector (y_3) is treated as exogenous together with other component of demands of investment and exports. Thus, equation (A12) needs to be re-arranged. Specifically, exogenous variables of x_1, x_2 and y_3 are put on the right-hand side and endogenous variables of y_1, y_2 and x_3 on the left side equation (A2).

$$\begin{aligned} (1-a_{11})\,y_1 - a_{12}y_2 + 0x_3 &= X_1 + 0X_2 + a_{13}Y_3 \\ -a_{21}y_1 + (1-a_{22})\,y_2 + 0x_3 &= 0X_1 + X_2 + a_{23}Y_3 \\ -a_{31}y_1 - a_{32}y_2 - x_3 &= 0X_1 + 0X_2 - (1-a_{33})\,Y_3 \end{aligned} \qquad \text{(A14)}$$

where capital letters represent the exogenous variables. In matrix form, equation (A14) can be re-expressed as

$$\begin{pmatrix} (1-a_{11}) & -a_{12} & 0 \\ -a_{21} & (1-a_{22}) & 0 \\ -a_{31} & -a_{32} & -1 \end{pmatrix} \begin{pmatrix} y_1 \\ y_2 \\ x_3 \end{pmatrix} = \begin{pmatrix} X_1 + a_{13}Y_3 \\ X_2 + a_{23}Y_3 \\ -(1-a_{33})\,Y_3 \end{pmatrix} \qquad \text{(A15)}$$

The solution of equation (A15) then can be expressed in the following matrix notation

$$\mathbf{y} = (\mathbf{I} - \mathbf{A_g})^{-1}\mathbf{x} = \mathbf{M_g x^*} \qquad \text{(A16)}$$

where matrix $\mathbf{M_g}$ is modified from original matrix $\mathbf{M}^*$ which contains mixed element of endogenous-exogenous variables and $\mathbf{x}^*$ comprises of existing and the new level of demands generated as a result of increase in output of government (y_3). Indeed, income of y_1, y_2 and x_3 are endogenously determined by exogenous variables of x_1, x_2 and y_3.

Table 1
Mean monthly households' income by ethnic groups and regions, 1970-2002

Household	Mean income (MR)				Annual average growth (%)	
	1970	1990	2000	2002	1970-1990	1990-2002
Mean income						
Bumiputera	172	940	1,984	2,376	8.9	8.0
Chinese	394	1,631	3,456	4,279	7.4	8.4
Indian	304	1,209	2,702	3,044	7.1	8.0
Other	813	955	1,371	2,165	0.8	7.1
Rural	200	957	1,718	1,729	8.1	5.1
Urban	428	1,606	3,103	3,652	6.8	7.1
Disparity ratio[a]						
Bumiputera : Chinese	1 : 2.29	1 : 1.74	1 : 1.74	1 : 1.80		
Bumiputera : Indian	1 : 1.77	1 : 1.29	1 : 1.36	1 : 1.28		
Bumiputera : Other	1 : 4.73	1 : 1.02	1 : 0.69	1 : 0.91		
Rural : Urban	1 : 2.14	1 : 1.67	1 : 1.81	1 : 2.11		

Source : Economic Planning Unit (various years)
Note: [a]Ratio of mean Bumiputera's income to mean non-Bumiputeras' income. It can be interpreted as for instance, in year 1970, each *ringgit* earned by Bumiputera equivalent to 2.29 *ringgit* earned by Chinese and so on.

Table 2
Aggregate demand by expenditure category (in current prices with 1987 prices in *italics*)

Expenditure	2005 (MR Million)[a]	2010 (MR Million)[b]	Average annual growth rate 2005-2010 (%)
Private consumption	215,876 *131,266*	340,376 *182,888*	9.5 *6.9*
Public consumption	64,592 *38,727*	88,277 *50,186*	6.4 *5.3*
Gross fixed capital formation	98,930 *70,175*	148,169 *102,512*	8.4 *7.9*
Change in stocks	-1,059 *-1,708*	126 *104*	- -
Exports of good and services	609,133 *316,959*	923,484 *445,625*	8.7 *7.1*
Imports of good and services	492,928 *293,391*	778,213 *430,018*	9.6 *7.9*
GDP at purchasers' value	494,544 *262,029*	722,219 *351,297*	7.9 *6.0*

Source : Economic Planning Unit (2006)
Note : Superscript ([a]) and ([b]) represent estimate and target, respectively.

Table 3 (a)

Sectoral final demands estimate for year 2005 (in current price)

Sector	Final Demands (MR Million)					
	Private consumption	Government consumption	Change in stocks	Gross fixed capital formation	Exports	Total
Agriculture	11,728		-3	1,256	6,005	18,986
Mining & quarrying			-146		31,599	31,453
Manufacturing	59,532			5,396	396,838	461,766
Construction	566			39,760	4,827	45,153
Government services		24,707			2	24,708
Electricity, gas & water	5,181				7	5,188
Transport, storage & communications	19,192		-1	161	25,960	45,311
Wholesale and hotel & restaurant	23,903		-6	2,343	12,948	39,188
Financial, real estate & business services	36,722				21,805	58,528
Other private services	16,381	22,596	-3		2,375	41,350
Total	173,205	47,303	-160	48,915	502,367	771,630

Table 3 (b)

Sectoral final demands estimates for year 2010 (in current price)

Sector	Final Demands (MR Million)					
	Private consumption	Government consumption	Change in stocks	Gross fixed capital formation	Exports	Total
Agriculture, forestry, livestock & fishery	16,400		1	1,806	8,123	26,330
Mining & quarrying			60		39,638	39,699
Manufacturing	98,911			9,393	575,213	683,517
Construction	781			49,010	5,656	55,447
Government services		33,722			2	33,724
Electricity, gas & water	7,563				11	7,574
Transport, storage & communications	31,342		1	280	37,580	69,204
Wholesale and hotel & restaurant	36,597		3	3,411	17,338	57,348
Financial, real estate & business services	59,909				31,856	91,765
Other private services	27,275	31,500	1		3,538	62,314
Total	278,777	65,221	66	63,901	718,956	1,126,921

Source: Economic Planning Unit (unpublished)

Table 4

Schematic SAM 2000

				Expenditure									
				1	2	3	4	5	6	7	8	9	
				Factors of production	Production activities	Institutions			Capital Account	Rest of the World Accounts		Indirect tax	Total
						Current accounts							
						Household	Company	Government		Current	Capital		
Income	1		Factor of production		Value added payment to factors					Net factorial income received from abroad			Total factor income
	2		Production activities		Raw materials purchases of domestic goods	Households consumption on domestic goods		Government consumption on domestic goods	Investment expenditure on domestic goods	Exports			Gross output (aggregate demand)
	3	Current accounts	Household	Compensation of employee and unincorporated business profit			Distributed profit	current transfer to household		Non-factor income from abroad			Total household income
	4		Company	Business corporate profit				current transfer to companies		Non-factor income from abroad			Total company incomes
	5		Government			Income tax	Corporate tax			Non-factor income from abroad		Indirect taxes	Total government revenue
	6		Capital account			Household savings	Companies saving	Government savings					Aggregate saving
	7	Rest of the world accounts	Current	Net factorial income paid abroad	Import of raw materials	Household consumption on imported goods	Non-factor income paid abroad	Government consumption imports	Imports of capital goods		Balance of payment of current account		Total imports
	8		Capital						Net investment abroad				Total capital paid abroad
	9		Indirect tax		Commodity taxes	Sales taxes			Taxes on imported capital goods	Exports levy			Total indirect tax
				Total factor payments	Gross input (total costs)	Total household expenditure	Total company expenditure	Total government expenditure	Aggregate investment	Total exports	Total capital received from abroad	Total indirect tax	

Table 5
Disaggregation of household and labour in the SAM

Household/labour	Region	Ethnic	Education
Household			
Citizen	Rural Urban	Malay Chinese Indian Other	
Non-citizen			
Labour			
Citizen	Rural Urban	Malay Chinese Indian Other	None education Secondary education Tertiary education
Non-citizen			

Table 6
Schematic representation of endogenous and exogenous accounts in the SAM

		Endogenous accounts				
		(*1*)	(*2*)	(*3*)	(4)	(5)
Factor of production	(*1*)	0	T_{12}	0	x_1	y_1
Production activities	(*2*)	0	T_{22}	T_{23}	x_2	y_2
Institutions i.e.household and company	(*3*)	T_{31}	0	T_{33}	x_3	y_3
Sum of other accounts	(4)	I'_1	I'_2	I'_3	t	y_x
Totals	(5)	y_1	y_2	y_3	y_x	

Note : *Italic* letters refer to the endogenous accounts.

Table 7
Effect of 2005 and 2010 sectoral growth on income of aggregate endogenous sectors

Endogenous sector	Model 1			Model 2		
	MR Million		Changes (%)[a]	MR Million		Changes (%)[a]
	2005	2010	2005-2010	2005	2010	2005-2010
Factor						
Labour	105,095	146,991	6.94	108,121	152,064	7.06
Capital	248,028	399,369	10.00	277,317	390,549	7.09
Production						
Agriculture	43,198	61,141	7.19	42,955	60,887	7.23
Mining & quarrying	49,616	65,467	5.70	49,528	65,360	5.70
Manufacturing	601,992	866,909	7.57	602,398	868,013	7.58
Electricity, gas & water	20,953	29,746	7.26	20,764	29,555	7.32
Buildings & constructions	49,450	61,516	4.46	49,122	61,076	4.45
Wholesale & trade and hotel & restaurant	88,205	124,059	7.06	88,078	124,087	7.10
Transport & communications	63,164	90,007	7.34	63,531	90,690	7.38
Financial, real estate & business services	103,932	147,228	7.21	103,869	147,490	7.26
Other private services	35,315	49,545	7.01	13,037	18,560	7.32
Public services	30,625	42,008	6.53	42,528	59,832	7.07
Household	174,501	244,603	6.99	179,886	253,132	7.07
Company	183,551	258,089	7.05	181,312	255,340	7.09
Government				54,904	77,242	7.07

Source: Model 1 and Model 2 are computed from equation (4) and (7), respectively.
Note : [a]Average annual growth rate
Notice that MR 54,904 and MR 77,242 billion of output of government sector are determined from Model 1

Table 8
Effect of 2005 and 2010 sectoral growth on household income distribution

Household	Base year (2000)	Model 1				Model 2			
		MR Million		Changes (%)[a]		MR Million		Changes (%)[a]	
		2005	2010	2000-2005	2005-2010	2005	2010	2000-2005	2005-2010
Malay[b]	65,910	70,122	98,347	1.25	7.00	75,466	106,399	2.74	7.11
Chinese[b]	57,521	67,546	94,556	3.27	6.96	66,789	93,731	3.03	7.01
Indian[b]	14,319	16,168	22,762	2.46	7.08	16,605	23,450	3.01	7.15
Other[b]	8,446	9,447	13,216	2.26	6.95	9,652	13,569	2.71	7.05
Rural household	**44,018**	**48,660**	**68,256**	**2.03**	**7.00**	**50,561**	**71,213**	**2.81**	**7.09**
Rural - Malay	25,396	27,205	38,170	1.39	7.01	29,071	40,989	2.74	7.11
Rural - Chinese	10,161	11,992	16,786	3.37	6.96	11,769	16,511	2.98	7.01
Rural - Indian	3,907	4,424	6,242	2.52	7.13	4,526	6,401	2.99	7.18
Rural - Others	4,554	5,039	7,058	2.04	6.97	5,195	7,312	2.67	7.08
Urban household	**102,178**	**114,623**	**160,625**	**2.33**	**6.98**	**117,951**	**165,936**	**2.91**	**7.07**
Urban - Malay	40,514	42,917	60,177	1.16	6.99	46,395	65,410	2.75	7.11
Urban - Chinese	47,360	55,555	77,770	3.24	6.96	55,020	77,219	3.04	7.01
Urban - Indian	10,412	11,743	16,520	2.44	7.06	12,078	17,048	3.01	7.14
Urban - Others	3,892	4,408	6,158	2.52	6.92	4,458	6,258	2.75	7.02
Non-citizen	9,844	11,218	15,723	2.65	6.99	11,374	15,983	2.93	7.04

Source: Model 1 and Model 2 are computed from equation (4) and (7), respectively.
Note : [a]Average annual growth rate
[b]The total household income for Malay, Chinese, Indian and Other groups are obtained by adding the rural and urban incomes for the respective groups.

Table 9
Household income disparity ratio as a consequence of 2005 and 2010 sectoral growth

Household	Base year	Model 1		Model 2	
		2005	2010	2005	2010
Malay : Chinese	1 : 1.7419	1 : 1.9227	1 : 1.9190	1 : 1.7665	1 : 1.7583
Malay : Indian	1 : 1.5151	1 : 1.6080	1 : 1.6141	1 : 1.5345	1 : 1.5371
Malay : Other	1 : 0.6274	1 : 0.6596	1 : 0.6579	1 : 0.6262	1 : 0.6244
Rural					
Rural - Malay : Rural - Chinese	1 : 1.7730	1 : 1.9533	1 : 1.9487	1 : 1.7939	1 : 1.7851
Rural - Malay : Rural - Indian	1 : 1.7974	1 : 1.8999	1 : 1.9106	1 : 1.8190	1 : 1.8246
Rural - Malay : Rural - Others	1 : 0.7061	1 : 0.7293	1 : 0.7281	1 : 0.7036	1 : 0.7024
Urban					
Urban - Malay : Urban - Chinese	1 : 1.3199	1 : 1.4616	1 : 1.4592	1 : 1.3390	1 : 1.3330
Urban - Malay : Urban - Indian	1 : 1.1467	1 : 1.2209	1 : 1.2249	1 : 1.1616	1 : 1.1629
Urban - Malay : Urban - Others	1 : 0.7126	1 : 0.7619	1 : 0.7591	1 : 0.7127	1 : 0.7097
Rural : Urban	1 : 2.2613	1 : 2.2947	1 : 2.2925	1 : 2.2726	1 : 2.2699

Source: Derived from Table 8 after diving the total income with the number of households of its respective ethnic groups.

Table 10

Decomposition of the impact on household income distribution as result of final demands changes, 2005-2010 (MR million)

Household	Model 1					Model 2				
	Distributional effects			Inter-dependency effect	Total	Distributional effects			Inter-dependency effect	Total
	Industrial	Direct	Transfer			Industrial	Direct	Transfer		
Malay	-	20,514 (73)	1,829 (6)	5,881 (21)	28,224 (100)	-	15,928 (51)	2,632 (9)	12,372 (40)	30,932 (100)
Chinese	-	19,906 (74)	1,339 (5)	5,764 (21)	27,009 (100)	-	17,604 (65)	1,491 (6)	7,847 (29)	26,942 (100)
Indian	-	4,920 (75)	300 (5)	1,375 (21)	6,595 (100)	-	4,275 (62)	438 (6)	2,133 (31)	6,845 (100)
Other	-	2,660 (71)	293 (8)	816 (22)	3,769 (100)	-	2,063 (53)	323 (8)	1,532 (39)	3,917 (100)
Rural household	-	**14,495 (74)**	**1,160 (6)**	**3,941 (20)**	**19,596 (100)**	-	**12,001 (58)**	**1,505 (7)**	**7,146 (35)**	**20,652 (100)**
Rural - Malay	-	8,155 (74)	650 (6)	2,161 (20)	10,966 (100)	-	6,491 (54)	936 (8)	4,491 (38)	11,917 (100)
Rural - Chinese	-	3,561 (74)	247 (5)	986 (21)	4,794 (100)	-	3,173 (67)	255 (5)	1,315 (28)	4,743 (100)
Rural - Indian	-	1,351 (74)	109 (6)	358 (20)	1,818 (100)	-	1,225 (65)	139 (7)	511 (27)	1,875 (100)
Rural - Others	-	1,428 (71)	154 (8)	437 (22)	2,019 (100)	-	1,113 (53)	175 (8)	829 (39)	2,117 (100)
Urban household	-	**33,505 (73)**	**2,601 (6)**	**9,896 (22)**	**46,002 (100)**	-	**27,869 (58)**	**3,378 (7)**	**16,738 (35)**	**47,985 (100)**
Urban - Malay	-	12,359 (72)	1,179 (7)	3,721 (22)	17,259 (100)	-	9,438 (50)	1,696 (9)	7,882 (41)	19,015 (100)
Urban - Chinese	-	16,345 (74)	1,092 (5)	4,778 (22)	22,215 (100)	-	14,432 (65)	1,236 (6)	6,532 (29)	22,200 (100)
Urban - Indian	-	3,569 (75)	191 (4)	1,017 (21)	4,777 (100)	-	3,050 (61)	298 (6)	1,621 (33)	4,970 (100)
Urban - Others	-	1,232 (70)	139 (8)	379 (22)	1,750 (100)	-	950 (53)	147 (8)	703 (39)	1,800 (100)
Non-citizen	-	3,374 (75)	257 (6)	873 (19)	4,504 (100)	-	3,038 (66)	305 (7)	1,266 (27)	4,609 (100)

Source: Computed from equation (13) and (15)

Note: [a]The total household income for Malay, Chinese, Indian and Other groups are obtained by adding the rural and urban incomes for the respective groups.
( ) indicates percentage of total household incomes.