PLANNING for EQUAL INCOME DISTRIBUTION in MALAYSIA

A General Equilibrium Approach

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28 DECEMBER 2007

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Universiti Putra Malaysia

Penerbit Universiti Putra Malaysia
Serdang • 2007
http://www.penerbit.upm.edu.my

First Print 2007

UPM Press is a member of the Malaysian Book Publishers Association (MABOPA)
Membership No.: 9802

Perpustakaan Negara Malaysia Cataloguing-in-Publication Data

Zakariah Abdul Rashid
Planning for equal income distribution in Malaysia : a general equilibrium approach / Zakariah bin Abdul Rashid.
(Inaugural lecture series)
ISBN 978-967-5026-38-6
1. Income distribution--Malaysia. 2. Distribution (Economic theory).
3. Equilibrium (Economics). 4. Speeches, addresses, etc. I. title.
II. Series.
339.209595

Design, layout and printed by
Penerbit Universiti Putra Malaysia
43400 UPM Serdang
Selangor Darul Ehsan
Tel: 03-8946 8855 / 8854
Fax: 03-8941 6172
http://www.penerbit.upm.edu.my

Contents

Introduction

Malaysia has undergone three decades of sound economic growth. While the 1960s and 1970s witnessed an easier phase of growth in the economy based on low labour cost and strong public sector support, the 1980s faced a little setback caused by the external shock of commodity price collapse, twice, once in 1980 and again in 1985 (Bureau of National Economic Policy Studies, 1994). The economic growth thereafter was not as remarkable as before, though some recovery took place in 1987. This was the time when the manufacturing sector for intermediate goods started to expand, which subsequently drove the economy forward. This established a new structural change from an economy merely focused on producing primary commodities to that of processing of basic manufacturing and advanced manufacturing products, including electronic semiconductors and components of electrical products. In mid 1997, the economy faced another economic disaster, the Asian financial crisis that began in Thailand and later spread to all the ASEAN countries. In fact exchange rate fluctuations affected most of the countries in the region badly. ASEAN countries inevitably had to liquidate their current assets in order to offset the losses resulting from currency devaluations. Slightly over a year later, the Malaysian economy recovered but all these events had changed the structure of its economy to what it is today.

General Equilibrium and Input-output Economics

The development of general equilibrium models goes back a long way in economics, both at a theoretical level and as a tool for empirical analysis. General equilibrium theory and modeling have proved to be relevant and useful for understanding economic interactions between markets and agents in complex modern economies and the determination of prices and quantities as a result of the latter interactions.

Analyzing aggregate economic phenomena from a general equilibrium perspective began with Walras's publication of *Eléments* in the late nineteenth century (Walras, 1874). The family of models termed computable general equilibrium (CGE) models focuses on issues related to resource allocation across different supply sectors, relative prices of goods and factors of production, and the welfare levels of different income groups. Economy-wide planning models—developed between the 1950s and 1970s—were predecessors to CGE models. Planning models used in countries with a large government role in determining sector prices and quantities combined macroeconomic (and particularly fiscal) policy analysis with aggregate and sector-level budgeting and planning. Multisector planning models were based on social accounting matrices (SAM), integrating fiscal, balance-of-payments and national accounts.

An input-output table, sometimes known as a transaction matrix, represents flows of economic activities among sectors in an economy. A simple input-output system can be described in terms of a set of simultaneous linear equations as follows:

$$(1) \qquad X_i = \Sigma_j x_{ij} + F_i \qquad (i = 1,2, \ldots ,n)$$

where *Xi* stands for the gross output of the i^{th} industry, x_{ij} the output of the i_{th} industry used as input in the j^{th} industry and F_i denotes the output of industry *i* available for final demand. If we postulate that every commodity is produced by only one given process and denote $x_{ij} = a_{ij}X_j$ *(i,j = 1,2, ... , n)* where a_{ij} stands for the amount of the *ith* good used to produce a unit of the j^{th} product we can rewrite Equation (1) as:

$$(2) \qquad X_i = \Sigma_j a_{ij}X_j + F_i \qquad (i = 1,2, \ldots ,n)$$

Row-wise addition of all the inter-industry demand $x_{ij's}$ and the final demand *Fi*, as shown above, gives the corresponding gross output X_i, for each row, thus, yielding the balance equation of an industry. Looked at column-wise we obtain the input structure of each of the industries. The basic input-output relations could then be written in compactly matrix algebra whose solution is to determine the gross output given the structure of the economy, i.e. :

$$X = (I - A)^{-1}F \quad (3)$$

where $(I - A)^{-1}$ is a Leontief inverse matrix. Both X and F are sectorally and categorically disaggregated such that: X_{kj} and F_{si}. A is the structural matrix (or a matrix of technical coefficients), X is a vector of gross output and F is a vector of final demand which is exogenously determined. The above model can be used to estimate the impact of an industry activity on the whole economy in terms of the amount of gross output, value-added, tax revenue and competitive import generated.

Input-output Multiplier

A multiplier analysis can be derived from the above matrix, which shows the direct and indirect effect of changes in the output of each sector, i.e. the total effect of a ringgit change in the delivery to final demand of the output of each sector. This could be a change in the level of final demand in any of the final demand categories. The model enables researchers to examine the second round effects which can be calculated simply by multiplying the A matrix by itself, i.e. obtaining the A^2 matrix, while the third and subsequent rounds' effects can be calculated by obtaining the A^3 matrix and so on. If we sum the matrices A^2, A^3, … A^n, we obtain the indirect, or production-induced, effects of a ringgit increase in sales on final demand of each sector. The term 'production-induced' has been applied to note that the increases are attributable only to production effects, and

exclude consumption-induced effects. If we sum the initially assumed ringgit increase in output, the direct coefficient matrix, and the various A^i matrices, we obtain a matrix representing the direct and indirect effects of output increases. This matrix, which can be obtained also by matrix inversion techniques, is usually termed the *open Leontief inverse*, the open general solution, or simply the open inverse. The term "open" is applied to indicate that the model includes only the production or intermediate sectors as defined, and that none of the final demand sectors have been included in the A matrices for the purpose of the analysis.

These multipliers, which show the sectoral impact of a stimulus, have an important role in applied economic planning since they allow estimates of the expected reaction of each and every sector in the economy to a proposed change in the final demand of one sector in the economy.

Consumption-Induced Effects

The open model outlined above expresses the situation when only the productive sectors of the economy are assumed to be endogenous to the system, i.e. when all final demand sectors are assumed to be determined by factors outside the productive system. If this assumption is considered to be unsatisfactory, the model can be fully or partially closed with respect to other factors. Most input-output analysts prefer to work on the assumption that the household sector is an endogenous component of an economy, i.e. that the level of production is important in determining levels of household income, which in turn will be spent to a large extent and therefore influence the level of consumption, and hence the level of output of each sector. In this case the input-output model can be closed with respect to households by bringing the household sector into the intermediate quadrant (Quadrant 1). A Household income row may be wholly incorporated into the closed model if it is reasonable to assume that virtually

all of the income can be identified. The new closed matrix, sometimes termed the augmented matrix, is termed here the A* matrix.

The augmented A* matrix is conceptually similar to the A matrix, except that each round of economic reaction now incorporates both an addition to the income of households as well as an increase in output of the local sectors to satisfy the requirements caused by local expenditure of this household income. Thus the inverse of the closed model is $I+A^{*2}+A^{*3}+\ldots A^{*n} = (I-A^*)^{-1}$ which includes an income multiplier and consumption effects.

The elements of the closed inverse which correspond to the open A matrix and inverse, namely the rows and columns representing the productive sectors, are similarly disaggregated output multipliers. They are larger than the elements of the open inverse because they include output levels required by local firms to meet the consumption-induced output effects included by closing the model with respect to households. Clearly each element of the closed inverse will be greater than the corresponding element of the open matrix by the amount of the consumption-induced output effect.

SAM Based Income Distribution

In the general equilibrium model of income equality, a Social Accounting Matrix (SAM)[1] will normally be constructed. It is a tool to organize economic and social data so that a comprehensive statistical basis of a country[2] can be provided and a criterion for a plausible model, showing its static image along with simulating the effects of policy interventions on the economy. It is a technique related to national income accounting, providing a conceptual basis for examining

[1] SAM is a means of logical arrangement of statistical information, concerning income flows in a country's economy within a particular time period, usually a year. Modelling an economy, it provides the whole algebraic specifications linking the various variables and subsystems and permitting the derivation of future equilibrium values and, consequently, future SAMs.

[2] In most LDCs economic planning suffers from a number of problems such as insufficient, unreliable and poor quality of data. The logical consistency in a SAM is useful in improving the quality of available data in LDCs.

both growth and distributional issues within a single analytical framework in an economy. It can be seen as a means of presenting, in a single matrix, the interaction between production, income, consumption and capital accumulation[3]. As a single entry accounting system whereby each macroeconomic account is represented by a column for outgoings (*j*) and a row for incomings (*i*)[4], it is represented in the form of a square matrix with rows and columns, which bring together data on production and income distribution as generated by different institutional groups and classes. In a SAM, incomings are indicated as receipts for the row accounts in which they are located and outgoings are indicated as expenditure for their column accounts, thus consistent with the fundamental law of economics where for every income there is a corresponding outlay or expenditure[5] and therefore corresponding row and column totals of the matrix must be equal.

As a data system encompassing both social and economic data for an economy, SAM data sources come from input-output tables, national income statistics and household income and expenditure statistics. Hence, it is not only broader than an input-output table and typical national accounts but also provides a basis for descriptive analysis and economic modeling to answer various economic policy questions[6]. We can undertake multiplier analysis[7] from a SAM, for instance the effects of exogenous increases in autonomous investments on the household sector, production sector as well as public sector.

[3] More detailed information about income distribution, tax structure, export and import and capital can be incorporated depending on the availability of the data

[4] Round, 1981

[5] Pyatt, 1988

[6] Pleskovic and Trevina, 1985

[7] estimating the effects of an increase in exogenous variables on endogenous variables and it is a short-term policy analysis

SAM and Income Distribution

When SAM incorporates data on income distribution, it provides a method by which national accounts can be transformed from a documentation of production statistics to a statement of the economy as a generator of incomes, thereby focusing not only on the living standards of the different socio-economic groups but also identifying the agents and the variables which are of particular interest.

If social accounts are to contribute to discussions on poverty and inequality of living standards, household accounts must be disaggregated into relevant socio-economic groups in line with the common conditions of the existence and life of society. Therefore stratification of households in ways that facilitate analyses of the impact of income redistribution will become a key characteristic of SAM and it will examine income distribution patterns not on the basis of individual earnings, but rather on per capita income calculated for the household unit. This is because the household rather than the individual is taken as the expenditure unit as there is a wide variation in the number of workers per household. Similarly, expenditure data for households rather than for individuals is the basis for constructing a SAM.

SAM for Malaysia's Income Distribution

As in any SAM construction work, the most critical factor in constructing Malaysian 2000 SAM is data availability and reliability and it is more so since the study focuses on regional and ethnic group income distribution where related data are compiled not only from different classification schemes but also for different purposes. Furthermore, since the work involves detailed disaggregation of household sectors it requires more extensive data on household incomes and expenditures which are gathered by the Malaysian Department of Statistics. The requirements for the study comprises:

(1) National Accounts Statistics – products, expenditure and income
(2) Input-output table
(3) Household Income Survey (HIS)
(4) Household Expenditure Survey (HES)
(5) Labour Force Survey
(6) Balance of Payments

In addition, data from Bank Negara Malaysia, the Malaysian Treasury and the International Monetary Fund are also sourced.

In constructing a SAM substantial amounts of information is required, which is normally compiled from national income statistics both in terms of expenditure as well as income approaches. As is always the case in developed countries, this data is rarely easily and sufficiently available as was experience with the Malaysian case, even for a highly aggregated SAM. We, therefore, have to resort to supplementary materials which takes a considerably longer time period to collate.

The typical approach in constructing a SAM is firstly to obtain two sets of primary account balances, i.e the commodity balance and income and outlay of institutions. The commodity balance or production account is simply the input-output table. However, as most input-output works require sectoral reclassification, constructing a SAM also involves similar tasks. Since the Household Income Survey (HIS), Household Expenditure Survey (HES) and savings data are available for the year 2000, the present work adopted the input-output table of the year 2000[8], and therefore it does not require the table to be updated . If, as in many occasions, an input-output table is not related to the year for which the SAM is being built, we have to adjust the transaction flow[9] of the input-output table to a year similar to that of the proposed SAM.

[8] The table has 94 sectors

[9] normally, many practitioners will use the RAS procedure in updating the transaction flows.

Utilizing data from household income and outlay accounts, which can be obtained from a multipurpose household survey such as HIS and HES, disaggregation of the household sector can easily be prepared. In some cases in addition to the two surveys it is also necessary to refer to the Labour Force Survey to ensure better mapping of factorial income between production activities and households. The present study does not have to construct detailed accounts for non-household institutions. If the need to do that is included in the study it will require income and outlay accounts for the non-household institutions, such as a detailed set of government accounts.

While data on factor and capital accounts are obtainable from national accounts, those on government accounts are sourced from the relevant government departments such as from the Ministry of Finance and the International Monetary Fund as well as from other unpublished materials. In most occasions, the necessary data is available in a not readily usable form. Similarly, a complete balance of payments account is needed to compile data on property income flows and transfers between the domestic economy and the rest of the world, which comprises both current and capital accounts. Data on property income flows is also needed, especially when disaggregation of the capital accounts requires estimation of flow of funds.

In the construction of SAM, both surveys and census materials have to be used. While survey materials will be subject to sampling errors, census materials will be subject to measurement errors. Indeed much estimates of SAM cells rely on a hybrid combination of different information sources. Beginning from the year 2000. and to conform with the UN system of classifying economic activities adopting the new SNA 1993, the Department of Statistics has amended the industrial classification in Malaysia from Malaysian Industrial Classification (MIC) to Malaysian Industrial Standard Classification (MISC).

Since estimates of private (household) consumption in input-output tables use MISC classification whereas those of the HES conducted in 1998/99 used

the MIC classification[10], SAM has to harmonize these different classifications. Though HIS indeed provides rich information on household income, in many instances it is not suitable for estimating household income in a SAM framework. In a few cases, HIS sectoral compensations of employees[11] estimates were found to be bigger than their respective value-added[12], which should not be the case, though the former is the biggest component in the latter. Perhaps, such problems arise because of sampling problems occurring in HIS and furthermore HIS uses household-based sampling procedures in estimating the compensation of employees while input-output tables use establishment-based sampling techniques. Nevertheless, HIS is invaluable in providing information about the income structure of different groups of households.

For the first time ever the Department of Statistics introduced an additional row, compensation of employee, as part and parcel of the existing value-added rows in its input–output tables for 2000. Certainly, this is a significant improvement in the Malaysian input-output table and has contributed significantly to the compilation of sectoral household income data because data on compensation of employees furnished is establishment-based data, thus providing a ready-made data on household income.

However, other remaining components of household income and household operating surplus, has to be estimated, which can be done indirectly, taken as a constant proportion[13] of the overall economy's operating surplus. Having estimated sectoral household income, which is part and parcel of value-added, the remaining portion will represent value-added generated by the non-household sector. Using HIS household income is further sub-divided into

[10] The process of unifying the two classification schemes is explained separately

[11] Includes salary and wages, allowances, bonuses and other in kind incomes.

[12] Radio, T.V. and Communication Equipment sector is one of the examples.

[13] Value-added – compensation of employee – taxes (domestic and import) = overall operating surplus. In publication of *Distribution and Use of Income Accounts and Capital Account 2001,* the Department of Statistics has indicated that household operating surplus took 24.6 percent of the overall operating surplus of the economy.

the five ethnic groups of Malay, Chinese, Indian, Others and Non-citizens, and further sub-divided into rural and urban categories. Thus, altogether, the SAM would have a 10 x 92 sub-matrix of value-added.

Modelling Income Distribution – Malaysia's SAM

Following Thorbecke, s schematic SAM would contain the following accounts (Table 1)[14].

(i) Factors of production accounts
(ii) Production activities accounts
(iii) Institutions accounts
    (a) Household accounts
    (b) Companies accounts

[14] The table shows that factors of production account receives income from various production activities, which are shown in the cell at the intersection of the first row and second column whose total value-added gives us the GDP. If we add the GDP to the factor income received from abroad (column 7) we shall obtain the national income. From the expenditures side, the total value generated from the employment of productive factors is essentially the total gross input of the economy, which is distributed to the household accounts as labour income, to the companies account as operating surplus and to the rest of the world accounts as income paid abroad.

Similarly, besides receiving intermediate demand among industries in the form of inter-industry flows of materials in the economy, the production accounts also receive income from the household accounts in the form of consumption on domestic goods and services, from the government accounts in the form of public sector current expenditure, from the capital accounts in the form of investment expenditure on goods and services and from the rest of the world accounts in the form of export expenditures. On the other hand, the production accounts must pay the income to the factors of production account (which is the added value of the economy) the purchase of domestic materials to the production accounts, the purchase of imported materials to the rest of the world accounts and the commodity taxes in the form of indirect taxes. The production activities are in fact made-up of 92 industries, comprising agricultural, manufacturing, construction and service industries while the household sector includes nine rows with different ethnic groups and regions. The remaining accounts are lumped together into a single account. SAM's classification, therefore, has a 108–order matrix.

(c) Government accounts

(iv) Consolidated capital accounts

(v) Rest of the world accounts

(a) Current

(b) Capital

(iv) Indirect taxes accounts

Denoting $T_{i.j}$'s which corresponds to each element or cell in the table where *i* refers to row and *j* to column, the Malaysian SAM would have 108 rows and 108 columns. Expressed in symbols, and noting that some cells may be empty, Matrix $T_{1.2}$ relates to the amount of value-added received by the factors of production from the production activities of the economy while Matrix $T_{1.7}$ refers to the amount of factorial income received from abroad. Summing these two elements up will give the total factorial income of the economy, or algebraically it can be expressed as,

$$(4) \quad t_1 = T_{1.2} + T_{1.7}$$

Since SAM accounts are represented by columns for expenditures (*j*) and rows for incomes (*i*), the total values in the SAM that are denoted by t_i and t_j' represent the total income and total expenditure for the particular accounts, respectively. Detailed references for each cell of the matrix are presented in the accompanying table. Beginning by compiling "control values" from aggregate national income data, the estimation of each of the detailed individual accounts, particularly the households sector, is carried out easily.

Notation for Table 1

$T_{1.2}$	Value added payments to factors	$T_{5.9}$	Indirect tax paid by production
$T_{1.7}$	Factorial incomes received from abroad	$T_{6.3}$	Household savings
$T_{2.2}$	Intermediate demands of raw materials	$T_{6.4}$	Company savings
$T_{2.3}$	Households consumption on domestic goods and services	$T_{6.5}$	Government savings
$T_{2.5}$	Government current expenditure on commodity	$T_{6.8}$	Capital transfer from abroad
$T_{2.6}$	Investment expenditure on domestic goods and services	$T_{7.1}$	Factorial incomes paid abroad
$T_{2.7}$	Exports (f.o.b)	$T_{7.2}$	Imports (c.i.f) of raw materials
$T_{3.1}$	Allocation of labour income to households	$T_{7.3}$	Households consumption on imports
$T_{3.3}$	Inter household transfer payment	$T_{7.4}$	Non-factor company's paid abroad
$T_{3.4}$	Distributed profit	$T_{7.5}$	Non-factor government paid abroad
$T_{3.5}$	Current transfer payment	$T_{7.6}$	Imports of capital goods
$T_{3.7}$	Non-factor income receive from abroad	$T_{7.7}$	Balance of good and services
$T_{4.1}$	Allocation of operating surplus	$T_{8.6}$	Net investment abroad
$T_{4.5}$	Current transfer from government	$T_{8.7}$	Balance of payment current account
$T_{4.7}$	Non-factor income receive from abroad	$T_{9.2}$	Commodity tax
$T_{5.3}$	Direct tax paid by household	$T_{9.3}$	Indirect tax paid by household
$T_{5.4}$	Direct tax paid by company	$T_{9.6}$	Indirect tax on imported capital goods
$T_{5.7}$	Non-factor income receive from abroad	$T_{9.7}$	Export levy

Table 2 Symbolic SAM for Malaysia

				Expenditure									
				1	2	3	4	5	6	7	8	9	10
				Factors of production	Production activities	Institutions current accounts			capital account	Rest of the Worlf account		Indirect taxes	Total
						Households	Companies	Government		Currents	Capital		
Receipts	1	Factors of production			$T_{1,2}$					$T_{1,7}$			t_1
	2	Production activities			$T_{2,2}$	$T_{2,3}$		$T_{2,5}$	$T_{2,6}$	$T_{2,7}$			t_2
	3	Institutions Current accounts	Households	$T_{3,1}$		$T_{3,3}$	$T_{3,4}$	$T_{3,5}$		$T_{3,7}$			t_3
	4		Companies	$T_{4,1}$				$T_{4,5}$		$T_{4,7}$			t_4
	5		Government			$T_{5,3}$	$T_{5,4}$			$T_{5,7}$		$T_{5,9}$	t_5
	6	Capital account				$T_{6,3}$	$T_{6,4}$	$T_{6,5}$			$T_{6,8}$		t_6
	7	Rest of the world accounts	Currents	$T_{7,1}$	$T_{7,2}$	$T_{7,3}$	$T_{7,4}$	$T_{7,5}$	$T_{7,6}$	$T_{7,7}$			t_7
	8		Capital						$T_{8,6}$	$T_{8,7}$			t_8
	9	Indirect taxes			$T_{9,2}$	$T_{9,3}$			$T_{9,6}$	$T_{9,7}$			t_9
				t_1'	t_2'	t_3'	t_4'	t_5'	t_6'	t_7'	t_8'	t_9'	

Impact Analysis and Multipliers

Presenting SAM in its standard form and rearranging Table 2, gives the result presented in Table 3. In analysing income distribution and treating *company, government, consolidated capital, the rest of the world (current and capital)* and *indirect taxes* accounts as exogenously determined, the remaining accounts, *factors, production* and *household*, become endogenous elements in the model. In a standard input-output analysis, an endogenous vector of sectoral output, X, can be predicted from a matrix of input-output coefficients, A, and a vector of exogenous final demand, F such that:

$$(5) \quad X = Ax + F = (I - A)^{-1} F = M_I F$$

where M_I is the Leontief inverse matrix.

Table 3 Simplified Schematic SAM

			Expenditures				
			Endogenous			**Exogenous**	
			Factors	**Production activities**	**Households**	**Sum of other accounts**	**Totals**
			1	**2**	**3**	**4**	**5**
	Factor	1	0	T_{12}	0	x_1	y_1
Exogenous	Production activities	2	0	T_{22}	0	x_2	y_2
	Households	3	T_{31}	0	T_{33}	x_3	y_3

Exogenous	Sum of other accounts	4	l'_1	l'_2	l'_3	t	y_x
	Total	5	y_1	y_2	y_3	y_x	

Assuming that there exist excess capacity in the economy, allowing prices to remain constant, the framework depicted in Table 3 and the above input-output model can be used to estimate the effects of exogenous changes and injections - such as an increase in demand for the output of a given production activity, government expenditure, investment or export - on the (i) income of factors, ii) household income, and iii) the income of production activities.

Expressing the transaction matrix in an average expenditure propensities[15] matrix, comprises i) the square matrix, A_n, of average expenditure propensities for the endogenous account (in the specific instance of our SAM, this would be a 20 x 20 matrix), and ii) the leakages, i.e. the proportion of each endogenous variable which leaks out as expenditure into any one of the five exogenous accounts (company, government, consolidated capital, rest of the world, and indirect taxes), enabling it to be used analytically. Denoting it by A_1, its dimensions would be the 20 endogenous columns and 5 exogenous rows (i.e. in our SAM it would embrace columns 1 to 20 and rows 21 to 26).

It can be shown that total income can be expressed as:

$$(6) \quad Y_n = A_n Y_{n+} x$$
$$Y_n = (I - A_n)^{-1} x$$
$$= M_a x$$

[15] These can be obtained 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.

Expressed in their partition matrices, the above equation can be written as:

$$(7) \quad \begin{pmatrix} Y_1 \\ Y_2 \\ Y_3 \end{pmatrix} = \begin{pmatrix} 0 & T_{12} & 0 \\ 0 & T_{22} & 0 \\ T_{21} & 0 & T_{33} \end{pmatrix} \begin{pmatrix} Y_1 \\ Y_2 \\ Y_3 \end{pmatrix} + \begin{pmatrix} x_1 \\ x_2 \\ x_3 \end{pmatrix}$$

where the exogenous component of final demand for each account is given by the vector x_1. Similarly, Y_n represents factor income Y_1, production incomes Y_2 and household income Y_3 while M_a is the multiplier matrix. The multiplier matrix is calculated from the SAM and not from the process by which they are generated. Equation 6 can be used to calculate the endogenous incomes associated with any constellation of total exogenous incomes, given M_a; and also, the effects on Y arising from any given changes in x, i.e. an exogenous income injection in any production sector or in any household group[16]. Each cell in the multiplier matrix, M_a indicates the total income change in the endogenous row account induced by an exogenous unit-income injection in the column account. It captures both the Leontief production linkages and the consumption expenditure linkages induced by changes in production activities through their effect on household incomes.

Employment Elasticity

Using the above framework, we can now calculate the impact of the Ninth Malaysian Plan expenditure on total income (Y_n) of factors (Y_1), production (Y_2) and households (Y_3) and subsequently on inter-ethnic and rural-urban income disparity. Following the usual approach of analyzing household income, analysis of income disparity would certainly, be in terms of per capita household income,

[16] In a recent study, the Ninth Malaysian Plan final demand was used and estimates by the EPU as our exogenous variables, $\boldsymbol{x}$. EPU furnishes the components of the GNP, comprising private consumption, investment, government and exports for years 2005 and 2010.

divided into nine household groups of ethnicity and region, such that:

$$(8) \quad v = (Y_3 / l^k)$$

where v represents per capita household income, Y_3 is column vector of household income (9 x 1), l the number of employment and superscript k denotes employment category by race and region. However, the weakness of this approach is that the ratio of employment, l, is fixed (or amounts to a restrictive assumption of constant returns to scale over time). While the constant returns to scale may be tolerated as an approximation to reality in the use of intermediate products[17]; it is unlikely to be so for physical employment inputs. To overcome this problem, the following expression can be used in estimating future employment for years 2005 and 2010:

$$(9) \quad l_i = \alpha_i x_i^{\beta i}$$

where l_i is employment in the i^{th} sector and β_i is the elasticity[18] of employment with respect to changes in value-added, x_i. The parameters of this expression can be estimated in the log-linear form as follows:

$$(10) \quad \log l_{i,t} = \log \alpha_i + \beta_i \log x_{i,t} + e_{i,t}$$

so, Equations 9 and 10 can be used to forecast the employment levels for years 2005 and 2010. Data on sectoral GDP and employment for 1982 until 2004 are provided by the DOS.

[17] (Ozaki, 1970)

[18] *Value of* β_i is greater than zero but less than unity

It has become a tradition, at the dawn of each decade, to predict the path or direction and magnitude of economic growth within the context of the challenges and prospects for the next 10 years or more. The 1980s were an enormously difficult and turbulent decade for the global economy. In fact in the 1990s, though expected by some to be somewhat less turbulent and difficult, the struggle should be quite different for Malaysia in her quest to become a newly-industrialized economy. Given the diverse structures of the economy, it has its own internal problems, with its own strengths and weaknesses. The main issue of the economy is that it is pluralistic society with a dualistic economic structure (Faaland et al., 1990).

While unique in having not only a pluralistic society but also a dualistic economic structure, Malaysia is a rapidly growing developing country. The Bumiputras (Malays and other indigenous people of Peninsular Malaysia and Sabah and Sarawak) represent the majority while the Chinese and Indians are dominant minorities of the population. Many of the Malays are engaged in traditional agriculture and fishing activities whereas the non-Malays, mostly inhabiting the rich West Coast of Peninsular Malaysia, are engaged in commercial and industrial activities. Table 4 shows that the Malays were the ones who earned the lowest income, reflecting somewhat their predominant involvement in traditional economic activities (agriculture, forestry, fishing and mining). It is interesting to note at the outset that it is in the agricultural sector that the disparities of income between Malays and non-Malays were the largest, perhaps reflecting the serious duality in the sector itself.

Table 4 Mean monthly gross household incomes by industry and ethnic group, 2002

Sector	Malay	Chinese	Indians	Others
Agriculture, hunting and forestry	1,284	2,483	2,085	1,232
Fishing	1,336	2,324	1,274	1,032
Mining and quarrying	4,089	4,323	2,809	1,532
Manufacturing	2,480	4,951	3,017	1,929
Electricity, gas and water	3,341	5,559	3,842	1,461
Construction	2,394	4,616	2,803	2,397
Wholesale and retail trade	2,370	4,659	3,119	2,684
Hotel and restaurants	2,267	3,450	3,297	1,186
Transport, storage and communication	2,848	4,332	2,775	3,703
Financial intermediation	5,078	6,910	3,646	3,765
Average	2,749	4,361	2,867	2,092
Disparity Ratio of Malays with others	1.00	1.59	1.04	0.76

Source: Department of Statistics, 2002

Despite her strong commitment towards having income equality and long-term sustainable economic growth, Malaysia's record of income inequality between the three major ethnic groups (Malays, Chinese and Indians) was seen to be worsening. It was reported that while income disparity between the major ethnic groups improved during the NEP period (1971-1990), it worsened during the NDP (1991-2000) and NVP (2001-2010) periods. Income disparity between Bumiputras (predominantly Malays) and the Chinese improved from 1:2.19 in 1970 to 1:1.70 in 1990 (but became worse in 2002) and to 1:1.80 in 2000, implying that the rate of growth in income of the Malays failed to catch up with that of the Chinese. This also implies that the non-Malays or non-Bumiputras, especially the Chinese, benefited more than the Malays from the countries' economic growth.

As noted in many earlier writings, the Chinese and Indians were mostly engaged in the high productivity modern sector of the economy as entrepreneurs, managers and employees in firms, estates and trading companies, while the Malays were mostly engaged in the low productivity traditional sector of peasant agriculture and fishing. The former forming an economic layer below the colonials in the modern sector were in a good position to take over from the foreigners immediately after Independence. On the other hand, the Malays or Bumiputras were trapped in the backward traditional rural sector of the economy, so losing out in the development of their country and destiny (Faaland et al., 1990).

In 2004, the number of poor and hard-core poor in Malaysia was estimated at about 238,600 and 36,400 households respectively (Table 5). About 89% of the poor households were Bumiputeras as compared to the Chinese and Indians who accounted for only 6.9% and 3.1%, respectively. Considering only the hardcore poor, Bumiputeras accounted for almost all of them, estimated at about 90.6% of the group. Similarly, the Bumiputras' average monthly income was the lowest compared with that of the Chinese and Indians. The Malays' average monthly income was about RM2,749 while those of the Chinese and Indians were RM4,361and RM2,867 respectively. The average monthly income disparity ratio in 2004 improved slightly from the ratio in year 2002 in terms of the Malay-Chinese and Malay-Indian ratios (estimated at about 1:1.59 and 1:1.04 respectively)[19].

[19] The disparity ratio figures were calculated based on the monthly mean income for only 10 sectors.

Table 5 Number of poor and hard-core poor households by ethnic group, 2004

Ethnic group	Poor		Hardcore Poor	
	Number	%	Number	%
Malaysia	238,600	100.00	36,400	100.00
Bumiputera	212,400	89.02	33,000	90.66
Chinese	16,500	6.92	1,600	4.40
Indians	7,500	3.14	1,600	4.40
Others	2,200	0.92	200	0.55

Source: Economic Planning Unit, 2005

To achieve long term sustainable economic growth in a pluralistic society and dualistic economic structure, the majority ethnic group of Malays or Bumiputera has to be given equal benefits from the process of economic development of the country. This has to be done, i.e. reducing the prevalent income disparity, by embarking on a comprehensive review and detailed study of the above phenomenon. The nightmare of the 13th May 1969 incident has taught an invaluable lesson on how important it is for the country to have and to maintain racial harmony and equality. A comprehensive macroeconomic model that integrates income distribution in its system is badly needed, to incorporate the economic structure of the country and its linkages to income distribution in a general equilibrium fashion.

Policy Discussion on the Income Parity Target

The present analytical framework enables discussion on income inequality and the setting of some kind of parity target, i.e. an equal amount of per capita household income for all the races, which can be approached from demand side and supply side approaches. The demand-side analysis, which assumes that the current broad development strategy as given, including that of income distribution, can be used to assess whether the 9MP's GDP growth forecast

can reduce ethnic income disparity. Given the present analytical framework income parity objective, can be more effective under the demand side approach if sectors of the economy favoring equal income distribution has already been ascertained. It is pertinent to note that the demand-side approach suffers from serious constraint as it merely shows the invariant economic structure of the country apart from those resulting from the uncertainties in both domestic and global market conditions.

It is also important to note that merely creating a market-driven agricultural sector, such as removing export duty and expanding investments, will have no relationship with achieving the parity target unless it is supplemented by other measures. The country's agricultural sector has its own inherent structural weaknesses with regards to the distribution of workers within its sub-sectors and their productivity. Sectorial dualism exists such that in terms of number of workers engaged in agricultural activities, although the Malays dominate the rural areas while Chinese dominate the urban areas, in terms of per capita household income, the Chinese earn the highest regardless of regional differences.

A supply side approach in addressing the income disparity which adjusts sectoral income coefficients of the races, in line with the aspirations of the NEP and Rukun Negara, is seen as a necessary condition in achieving the distribution target. It is important to note that although the total income that will be generated by each unit of expenditure in final demand for the Malays is large, in terms of per capita basis it was the lowest among all the major ethnic groups, implying that a large number of Malay workers engaged in overall economic activities does not ensure high per capita household income for the Malays. In other words, the relatively low labor productivity, i.e. inability to generate as much income per worker as that of other races, has become the root of the disparity problem.

Adjusting the household income coefficient is essentially the New Economic Policy and Rukunegara's technical interpretation of wealth and income transfer.

This approach involves redistribution of growing income such that inter-ethnic income proportions are adjusted while keeping the aggregate ratio of total household income to total output unchanged. Since the Malay income proportion was the lowest, its proportion will have to be increased while that of other ethnic groups will have to be decreased. It is important to note that such adjustment is not tantamount to a reduction in the absolute per capita income of any particular ethnic group.

Summary and Conclusion

The long run objective of the Malaysian development plan is to restructure the economy through wealth transfer, without creating loss and deprivation. This is to ensure that the benefits of the country's economic growth are equally shared among all ethnic groups and between the rural and urban populations. For the first time ever the country introduced the concept of parity among the households of different major ethnic groups and re-emphasized the New Economic Policy (NEP) in its pursuit to eliminate the identification of race with economic function. Under the current socio-economic setting, restructuring the society is tantamount to letting the Malays increase their participation in modern and high productivity activities and sectors so that their household income will grow at a faster rate than that of other ethnic groups. Given the forecasted output we could estimate the rate of income transfer necessary in order to achieve parity.

An increase in the proportion of Malay income will have to be followed by a decrease in that of other races. The Malaysian economic structure dicatates and produces household income multipliers which will determine whether it is for or against disparity. Generally, across all sectors in the economy, will have a definite pattern of income distribution, favouring or disfavouring certain races' household income. If the Malay income does not grow faster to that of other races, Malay will get the least benefits of an increase in final demand in any sector of the economy.

It seems that the objective of household income parity can be analysed under the general equilibrium setting and an appropriate policy can be designed, perhaps by combining both the demand and supply side approaches[20]. An increase in the proportion of Malay income does not imply that the absolute per capita household income of the Chinese and Indians will be reduced. In an environment of strong growth of aggregate per capita household income, the absolute per capita household income for all ethnic groups will grow but at a different rates, with that for the Malays being the fastest.

Considering their corparate social responsibility, GLCs are now being used as distributive instruments. Can GLC correct the income imbalance? There is no clear indicator of the actual size of GLCs except for those listed in the Bursa Malaysia but many observers believe that they can exert significant impact on the national economy and thus on income distribution. It has to be clear at the outset that whatever the final size of a GLC, its impact on the economy is subject to the structure of the domestic economy besides its main operational activities. These two factors will ultimately determine the size of multipliers they will be facing.

[20] It has to be noted that the aggregate household income of the economy represents 26 per cent of total output of the economy whose distribution across the sectors is shown in the SAM. This ratio will remain unchanged. Policy measure involves redistribution of the proportion for each of the major ethnic groups while keeping the above ratio fixed.

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BIOGRAPHY

Professor Zakariah bin Abdul Rashid was born on 6th January, 1954 in Paya Lebar, Singapore. He is the fourth child to Abdul Rashid Ahmad (an aircraft maintenance engineer) and Zainon Olit (a full time housewife). Zakariah who attended a Malay arts stream school in Singapore, had his early primary education at Guillemard Primary School from 1961 to 1966 before he moved to Teluk Kurau Integrated Secondary School from 1967 to 1970 and to National Junior College (for his pre-university education) from 1971-1972.

Zakariah obtained his Bachelor's degree in Economics (Hons), majoring in Statistics, in 1976 from the University of Malaya. He received his Master of Economics degree from the same university in 1979 and earned his PhD in 1989 from University College of Wales, Aberystwyth, U.K. He wrote the theses entitled "Economic Stabilisation in Malaysia – A Study of the Efficacy of Monetary Policy, 1966 – 76" as a partial fulfilment for the degree of Master of Economics and "Technological Obsolescence, Market and Price Structure on the 1968, 1974 and 1979 British Vintage Technologies – an Input-output Approach" for his Doctor of Philosophy degree.

His deep interest in general equilibrium economics began when he was appointed as UNIDO consultant to review the Malaysian Industrial Master Plan soon after he returned to Malaysia after his doctoral studies. Subsequently, he served as consultant to many research institutes (ASEAN Secretariat, ESCAP, ADB, UNIDO, MIER, EPU, UPEN Selangor, UPEN Pahang, UPEN Johor and UPEN Kelantan) and served several government agencies as a member of the governmental task force 'TWG' on Income distribution and poverty for the 9th Malaysia Plan (RMK9). In 2006, he was invited by the Economic Advisor to the Prime Minister, Tan Sri Just Faaland, to his institute, *Chr. Michelsen Institute* (CMI)*, Bergen*, *Norway* to finalise the SAM report. He undertook research works for EPU on the Construction of a Social Accounting Matrix (SAM) for Income Distribution *and* for UPEN Selangor on the Construction of a Selangor

Input-output Table. He also assisted Khazanah Nasional in research work assessing the contrbution of GLCs to the National Economy. He was awarded an Outstanding Consultant Award by Universiti Putra Malaysia.

He was appointed the Deputy Dean of the School of Postgraduate Studies (UPM) after serving as Head of the Economics Department. He is Senior Research Fellow at MIER and Research Associate at MDI. Besides Development Economics, Zakariah has great interest in Islamic Economics, teaching the subject, writing articles and giving public lectures. In addition to teaching Development Economics and Planning and Islamic Economics at both undergraduate and graduate levels, he publishes many articles and speaks at seminars and conferences, and has also edited academic journals. He was also the principal investigator for many research projects.

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