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Effect of Wage and Energy Price Change on Malaysian Industrial Development

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ABSTRACT

Many countries in the world depended on theirindustrial sectorsas impetus to rapid economic development.This is made possible by diversifying primaryresources such as labour and/or material inputsincreating value-added chains, mobility ofactivities in varying economic sectors, expand workers and capital capability as well asincreasingoutput and exportsof goods that resulted in enhancing economic development.In addition to diversifying production from agriculture to manufacturing activities, many countries rely on their own industries to develop their economic development rapidly by shifting production activities from a group of industries to another, which are considered as key sectors. The above process is essentially shifting the production activities in favor of those with higher value-added, skill level and export orientation. Current economic uncertainties nevertheless are pressured more by external uncertainties than the domestic demands whose changes have impacted industrial shifts in Malaysia. Exogenous changes particularly from rising world price of crude oil had certainly impacted the economy. The proposed paper will examine the impact of these exogenous changes on the macroeconomic variables such as growth, employment, inflation, private consumption and household's welfare and on industrial performances by employing MIER-CGE macroeconomic model. By simulating anominal wage and crude oil price increase, estimates on important macroeconomic variables are expected to assist in examining policy solutions towards overcoming issues that hinders towards rapid economic development.

Keywords: Computable General Equilibrium, industries, manufacturing, wages, energy prices, interest rates, productivity.

BACKGROUND

The economy of Malaysia is a growing and relatively an open state-oriented and newly industrialized market economy. The state plays a significant but declining role in guiding economic activity through macroeconomic plans. In 2007, the economy of Malaysia was the 3rd largest economy in South East Asia and 28th largest economy in the world by purchasing power parity with gross domestic product for 2008 of $222 billion with a growth rate of 5to 7 per cent since 2007. In 2010, GDP per capita (PPP) of Malaysia stands at US$14,700. In 2009, the nominal GDP was US$383.6 billion, and the nominal per capita GDP was US$8,100.

The economy's *labour market structure*has for a long time evolved in a distortionary manner with a complex structure of wages. In these complexities, the main objectives of labourpolicies under the imperfect labour market aimed towards correctingit. Under the existing act[1]only about 7 per cent of total workers incertain sub-sector and occupation is protected. Thus, the implementation of a national minimum wage is hoped to correct the remainder of distortion and returned to liberalize market system. This study aims to examine the ability of wages not onlyalleviate subsistence income of workers but also sufficient to expand workers and capital capacity towards a pro-growth strategy[2].Aligned to this, the minimum wage policy is aspired to achieve a high income advanced economy as embedded in the new economic model (NEM)[3].

In this light, the *structure of wages*imbalances since 1990 unveils that more than 35.5 percent of workers received income less than RM1,000[4] (Figure 8 in Appendix 2). Almost the same percentage or about one third of

[1] The previous Employment Act 1947 only covers about 7% of workers.
[2]Presented by authors at the Special Session at Corporate Economic Briefing on 17 April 2012.
[3] National Economic Model as prepared by the National Economic Advisory Council (NEAC) on 3rd December 2010
[4] Source from DOS reported in the Technical Working Group of The National Minimum wage in 2011

workers made up to the official PLI of RM800. There is another big gap to sufficiently cover a monthly average expenditure for urban household of RM2,465 and of rural household of RM1,599. In 2009, although the wage distribution structure had spread more towards equality, but there are still about 74.1 per cent of household still falls under the income of RM2,300 comprising the bottom 40 per cent at the lowest boundary of income distribution.

As many countries in the world over had implemented minimum wage policies hoping to elevate poverty or increase cost of living for the bottom poor, however, Malaysia has given emphasis on *promoting productivity and efficiency* where industry is required to move up the value chain by investing in higher technology and increased labour productivity. In addition, productivity in Malaysia grew faster than employment and more rapidly than the size of working population between 2000 and 2008. While annual wage had averaged only around 2.6 percent, real labour productivity had grew by about 6.7 percent. In addition, employment shifts more towards services sector and away from manufacturing and agriculture. The shift has implications on the structure of Malaysian labour market and workers being covered by the labor law.

In fact, as reported by the World Bank[5] (2011), there exist *structural differences* between labour markets in different regions and economic sector. As such, Sabah and Labuan for instance, have much younger and less educated labor force than Sarawak and Peninsular Malaysia. Fewer workers in Sabah and Labuan are in public employment, and a large share is self-employed or working in a family with no pay. In addition, heavy manufacturing and high-value added services are most important employment in the Peninsular providing more than 40 per cent of jobs compared less to other regions. Not surprising these variations and impediments between regions' labour market also reflected in the level and structure of compensation.

There are big differences in *labour productivity* across sectors. Workers with the lowest earnings are most likely to come from person/s who works in agriculture and resource-based industries. While workers in the services sector have the highest earnings and those in the manufacturing falls in the middle. The minimum wage in principle has the highest effect on in resource-based sectors since these jobs are the least well paid. This would depend however on whether these low wages were due to worker's low productivity or their limited market power.

The characteristics of the *high level of informal sectors* add more distortion to the labour market. It is estimated that 35 to 40 per cent of all workers, including salaried workers in unregulated firms as well as the self-employed. These differences are widened by gaps between low-skilled, young workers and women particularly in terms of compensation. Unfortunately, it is difficult to assess whether these differences reflect productivity or employer's market power. In either case, setting the minimum wage at a level too high relative to current average earnings for these workers could have negative effects on them.

A significant segment of *migrants workers* are young and employed in the low-skilled activities (mainly construction, manufacturing, plantations and agriculture) that actually earn the lowest wage levels in the labor market. Extension of minimum wage coverage to foreign workers will not only increase migrant inflow but also increase economic and social issues. However, discarding foreign workers could have adverse effect since they are internationally accorded the same treatment.

In rural areas or places with underdeveloped infrastructure, it may be difficult or costly for workers to move to other areas where more jobs are available. In addition, *workers mobility* is limited by geographical factors, it may be that skills available in that area are not appropriate for need of local employers thus further restrict worker's option. The issue is more critical when employees with limited information are likely having weaker position to bargain as well as have insufficient self-insurance and savings - if workers have no savings, then they are forced to accept low-paid employment. Thus, the above trade-off can be of advantage or disadvantage in terms of whether it can fail for many reasons, most of which are relevant to Malaysia.

The second issue is more exogenous in nature than the first. Crude oil price changes had recently becomes more critical from the aspect of material input since it gives pressure through input cost in almost any system of production. Despite energy has been for a long time a strategic commodity that has garnered importance over time, and its price is naturally unpredictable especially in a dynamic world of uncertainty, stands as one of the most important inputs in a production system. There are voluminous body of literature that recognized that neither a nation nor a region could fully isolate itself from the brunt waves of energy consequences or even insulate itself from the effect of an oil shock. The most immediate effects of energy price increase repercussed into even the most basic of activities i.e. in the production of food, agriculture etc., and ripples into any medium and dimension of food and non-food industries. Malaysia as an emerging market is fast expanding and becoming food producing hub with various capacities were also vulnerable to increase in energy price particularly to crude oil price hike.

In line with the increasing energy price, many countries are particularly very concerned on the competitiveness and efficiency of their production system. Increase cooperation and integration amongst industries is important so as to

[5] Study by the World Bank on "Optimal Design for a Minimum Wage Policy in Malaysia" coordinated by the Ministry of Human Resources.

optimize each other's productive efficiency particularly during the rise of oil price. In this light, some industry tend to be emphasizing on conventional labour–intensive and resource-based industry, whilst this is very much different from some successful developed EA countries that focusses on capital-intensive and non-resource-based food industry. Although, there are different vulnerability from oil shock that may be experience by EA countries, however, a more resilient country that is efficient and competitive will certainly be more stable than others in the midst of rising crude oil price.

In this light, recent events of oil price increase had impacted sectors that heavily depended on crude oil as inputs. These sectors that were directly affected; such as the transportation, refineries, agriculture sectors utilize high portion of oil in their inputs. It thus could ripple into other production system that lead to higher prices of products, and ultimately raised the general price level. Thus, these sectors need to be further re-aligned mainly during oil price increase. As such, this paper will examine the different management of inputs between industries in the production system in short and long-term so as to promote its cost competitiveness, interconnectedness and sustainability. The paper consists of five sections that will also cover methodology and data as well as followed by findings and conclusions.

Industries in Malaysia are guided by the Industrial Master Plan, a blueprint tostrategisedsectoral achievement in the New Economic Policy. Under the five-year Malaysian Plans it will play critical role in modernizing and restructuring the economy. Amongst these activities also include ways to eradicate poverty by expanding employment and create commercial and industrial community. Manufacturing is also important in developmentof new activities in areas now heavily dependent upon agriculture for employment and growth. In the New Economic Model (NEM), industrialization is aspires to pave the way towards a high income advanced economy by 2020.

Bearing on the above issues, the main objectives of this paper focusses on the following:

i. To construct a MIER-Computable General Equilibrium (CGE) model as a reliable model to measure changes in wages and oil price on industrialization;
ii. To develop a MIER-CGE model capable in measuring the Malaysian economy's industrialization;
iii. To analyze the impact of increase in wages and energy on the economy's short-run and long-run macro variables.

PREVIOUS STUDIES

As the objective of this study focusses on examining industrial employment, imports and oil price changes, our emphasis will be on examining the impact if these phenomena changes exogenously on the economy. In this light, studies on the structure of the industrialisation from the aspect of sources of growth will give some light on these phenomena. At the other hand, raising wages may give impact to slower economic growth that brings rising inflation and increase in unemployment rate, whereas higher import tariff and rising oil price temporarily or permanently, may have several consequences on the economic growth.

In this light, recent studies such as Rohana (2010) examine the decomposition in sources of growth in the Malaysian manufacturing sector and found that export-oriented strategy gave fresh impetus to the import-substitution to industrial growth. Whereas Khairul, et. al (2010) examine output and employment generated in the Malaysian manufacturing sector by employing the input-output (I-O) analysis found that trade changes have significant impact on output and employment.

In some studies on a given fixed nominal wage particularly using the CGE models, an increase in price level reduces the market real wage, which increases employment as the representative firm hires more labour. These results in more output being produced. Thus, a higher price level implies that more output is produced, which yields the upward sloping aggregate supply curve. Whereas, the rate of import duty varies according to the type of goods imported. The rate applicable to each category of goods is indicated in columns (4) and (5) of the "First Schedule to the Customs Duties Order of 1996." According to this schedule, the base of these duties basically is based on the theory of optimal level of consumption in goods and services purchases. In order to have a Pareto-optimality in consumption, it must be the case that;$MRS_A = MRS_B = P_x/P_y$.This implies that theeconomy must consume on the exchange contract curve. In addition, to have a Pareto-optimalityin production, it must be the case that; $MRTS_x = MRTS_y$= w/r. These points converged at the production possibility frontier (PPF) and rate of product transformation (RPT).This implies that the economy must produce on the PPF where the general equilibrium level is at: RPT = Px/Py =MCx/Mcy.

In some other studies, higher oil prices shift income from oil-importing countries to oil-exporting countries. This adverse change of trade for oil importers will reduce income, lower real consumption, cause deterioration in the balance of trade and exert downward pressure on the exchange rate (Khalid, pp.1.16, 2010).Thus, impacting to

slower economic growth, rising inflation and increase in unemployment rate. Abel and Bernanke (1998), in relating unemployment to oil prices shocks, proclaimed that, "A popular explanation for the productivity slowdown is the large increase in energy prices that followed the OPEC oil embargo in 1973. As companies responded to high energy prices by using less energy, the amount of capital and labour declined, reducing productivity showing generally negative effects on all major industrial countries".

Oil constitutes one of the most important and critical inputs for the production of a wide range of goods and services, and is used for transportation in businesses of all types. Thus, higher oil prices would directly mean increase in the cost of inputs. Further, if cost escalation is unable to be transferred onto consumers, economic inputs such as labour and capital stock may have to be reallocated. Therefore, higher oil prices can cause worker layoffs and the idling of plants, reducing economic output in the short term. Although there is wide agreement that high oil prices have negative effects on macroeconomic, but it causes varying degree of impacts depending the structure of an economy. An exporting country may not feel the big heat as it benefitted from increase in oil price, however, an oil importing country mayhave a dire consequences in its economy (Khalid, 1999).

ECONOMIC STRUCTURE

The Malaysian economy has tremendously changed since the 1960s having a GDP of RM6,249 million in 1960, then expanding over four decades and in 2002 reaching a GDP of RM234,050 million and recently to RM528,311 million in 2008 even after facing a financial crisis and recessions. The financial crisis of 1997, for instance, gave the hardest impact that was particularly felt in the Asean countries; from 2000 onwards Malaysia tries to recuperate its economy. The expansion of the economy has for many years been driven by oil, labour intensive and trade in various interindustry sectors. From the outset, the Malaysian economy and generally that of the world have experience more and more complex change and uncertainty.

Table 1 indicates that in terms of sectoral growth for the period of more than three decades, the Malaysian economy had undergone a period of rapid and sustained growth. In that period of time, between 1988 and 1997, it had experienced broad diversification and sustained rapid growth averaging 9 per cent annually. By 2000, total GDP had reached RM213,691 million, a more than three-fold increase over the GDP in 1960. The overwhelming growth of the Malaysian economy had been supported by new foreign and domestic investments that played a significant role in the transformation of the economy.

Wage structure

Although there is a gloomy economicoutlook after the recovery period in 2000s there arehopes for potential growth in replacing concerns on higher risk of possible recession that paved towards rapid growth of jobs and attainment of full employment in the economy. However, with the contraction of economy in 2003 to 2006, unemployment declining rate from 3.2 to 2.7 per cent in 2007 and 2009 respectively, this situation is moderated by returning migrant labour to their respective countries. Government also absorb some retrench workers to the sector that facing labor shortage instead of giving them training. This helped to keep the unemployment rate at a low level. The economic recovery during the 1999-2000 period contributed towards employment creation, thus lowering the unemployment rate to 3.1 per cent in 2000. The labor force in 2000 increased from 8.3 million in 1995 to 9.6 million. This figures contributed by 8.8 million of local workers and 0.7 million of foreign workers. 8,823,300 local workers and 749,200 foreign workers were employed in 2000 compared with 7,401,300 local workers and 852,700 foreign workers in 1995. This showed that numbers of local workers employed were increased while for foreign workers were decreased. Above all, the New Economic Model (NEM) predicted a creation of 3.3 million workers and gross national income of RM1.19 trillion in 2020.

The skill structure comprised of about 18 per cent of skilled workers whereas about 82 per cent are unskilled workers. If the condition of division of labour is less on the skill but heavy on the side of unskilled workers, the lingering cheap labour phenomena could hamper Malaysia's competitiveness.Concurrently the increase in wages had been trending at about 2.6 per cent and productivity had somewhat declined but higher than wages about 6.7 per cent.

As a likely reflection of the differences in productivity across sectors, it is clear that resource-based industries pay the least well of all sectors, while the services sectors pay the highest wages on average. Wages in the manufacturing sector are between those of services and resource-based industries, but jobs in this sector are much more likely to be formal than in the other sectors. Indeed, jobs in the resource-based sectors pay only slightly over RM1,000 per month on average, but only 15.3 percent of these jobs are formal. On the other hand, jobs in

manufacturing pay over RM1,450 per month, and over three-quarters of these jobs are formal. A final interesting point to note about the breakdown by sectors is that base compensation comprises 93 percent of total compensation in both the resource-based and manufacturing sectors, but only 85 percent in the services sectors. This suggests that, on average, commissions, tips, and other variable compensation are more important in the services sector than allowances appear to be in the resource-based and manufacturing sectors.

Manufacturing firms are the most important employer in Malaysia particularly in Peninsular Malaysia, and certain industries within manufacturing are more prominent in particular regions. Manufacturing represents a 40 per cent larger share of jobs in Peninsular Malaysia than in Sarawak and more than twice as many jobs, as a share of employment, than in Sabah and Labuan. With respect to earnings, workers in a competitive labor market with similar skills and working in similar jobs earn the same wage. However, as is the case in most countries around the world, labor markets in Malaysia are not perfectly competitive; one example is that on average men earn more than women on an hourly (13 per cent) and monthly basis (14 and 16 per cent, on base or total compensation respectively).

Inefficiencies stem partly from the fact that women are less mobile (caused by family responsibilities) than men and have a narrower set of employment options which negatively affect their earning opportunities and make them more vulnerable than men to the monopsony power of employers. A study for 17 Organisation for Economic Co-operation and Development countries (which include Korea and Japan) found that the average the wage gap for men and women working full-time is 16 per cent and the percentage is significantly higher (21 per cent, for workers in the lowest decile of the income distribution) in countries that have weak collective bargaining coverage and a low minimum wage level. This finding supports the argument that a well-regulated minimum wage policy can in fact affect women by reducing their vulnerability to low pay in the formal sector.

Crude oil price increase

Historically, Malaysia hadexperienced the 1973-74 crisis and as a country that depends heavily on exports of commodities goods, was faced with a low GDP (Gan, 1985), widespread and rapidly rising inflation, a high CPI around 13 per cent, as in OECD countries (Fong, 1986), over-dependence on traditional agriculture, inequitable income distribution particularly amongst local races, and small contributions from foreign direct investment (UNIDO, 1985).

The study tries to expand the general findings of Zakariah and Shahwahid (1994) who argued that Malaysia always has surpluses in oil trade but deficits in trading of petroleum products. The expansion suggests that the Malaysian economy's susceptibility to higher oil prices may offer some policy options on how to handle the imbalances in the interindustry's sectors as influenced by the oil price impact. This will directly relate to policies directed at the distribution of impacts and increased production costs that will likely fall on many segments of the economy. Khalid (2011) used comparatively new techniques, with extension of the most recent techniques of the joined econometric and I-O model, Leontief's price system and welfare distribution analysis to examine economy-wide impact.

The above studies had employedconventional methods in the area of I-O, particularly in Malaysia. Thus, this motivates us to examine oil impact phenomena in Malaysia in a way that differs from previous work with the hope to raise suggestions on policies related to oil price impact especially using the computable general equilibrium (CGE). The evident advantage of this study lies in the analyses of the effects on the production structure, growth and distribution of the oil impact on the economy concurrent with the wage, import tariff and oil price increase.

Organization of the Study

This study examines the impact of wages, import tariff and oil price escalations on the Malaysian economy's industrialization structure, growth and distribution. Detailed discussions on issues, problems, theories and concepts of oil price rise as well as the methodology used in this study are distributed over fivesections. The first section covers an introduction to the wages, import and oil industry's structure and what this study entails. The second section reviews the relevant literature which includes the chronology of studies relating to wages, import and oil price trends in a general equilibrium environment. It examines the conventional and state-of-the-art theories as events of employment, imports and oil shock surface in the modern economy highlighting its issues and impact.

The third section discusses the methodology that encompasses I-O and welfare distribution methods compared to the CGE. It explores the capability of CGE against the many methods of I-O models and explains the reason why it is more suitable to be used in this study compared with econometric and other models. The fourth sections focuses on the results and analysis of findings on aggregated and sectoral impacts, inflationary rates and

welfare distributions. Finally, the fifth section concludes with policy recommendations and the future course of the study.

METHODOLOGY

The MIER-CGE[6]model is classified as an applied general equilibrium (AGE) model of the Malaysian economyadopted from ORANI-G. The model has a wide potential to be used as a tool for practical policy analysis by academics and economists employed in government departments and in the private sector.

Initial versions of MIER-CGE were static, with applications confined to comparative-static analysis. Nonetheless it is possible to upgrade the model containingdynamic elements, arising from stock/flow accumulation relations: between capital stocks and investment, and between foreign debt and trade deficits.Other extensions to the basic model can include the systems of government accounts, and regional breakdowns of model results.

GEMPACK is the main software to solve AGE models. GEMPACK automates the process of translating the model specification into a model solution program. The GEMPACK user needs no programming skills, instead, by creating a text file, a list the equations of the model can be derived. The syntax of this file resembles ordinary algebraic notation. The GEMPACK program TABLO then translates this text file into a model-specific program which solves the model.

Model Structure

MIER-CGE model is built on a theoretical structure which is typical of a static AGE model. It consists of equations describing, for some time period:

- producers' demands for produced inputs and primary factors;
- producers' supplies of commodities;
- demands for inputs to capital formation;
- household demands;
- export demands;
- government demands;
- the relationship of basic values to production costs and to purchasers' prices;
- market-clearing conditions for commodities and primary factors; and
- numerous macroeconomic variables and price indices.

Demand and supply equations for private-sector agents are derived from solutions ofoptimization problems (cost minimisation, utility maximisation, etc.) which are assumed to underlie the behavior of the agents in conventional neoclassical microeconomics. The agents are assumed to be price-takers, with producers operating in competitive markets which prevent the earning of pure profits. Like the majority of AGE models, MIER-CGEis designed for comparative-static simulations. MIER-CGE is a replicating equation system of ORANI-G Model of Australian Economy (Horridge, Parmenter and Pearson, 1998). The detailed data structure of MIER-CGE can be diagrammatically summarized as in TABLE 2.

Database construction

Themain source ofdataemployedin the MIER-CGEmodelused the Malaysian 2005 I-OTables.To complementthesedata, elasticityanda fewother parameters were included. In this paper, wewill presenta summary of some of the processesand stepsin the construction ofthe model's database. The procedure of data processingbeginsfromthe determinationandclassificationof commoditiesandindustries. The classification itself refers to the 120 sectors ofthe 2005 Malaysian I-O tables.

Furthermore, classificationis alsomade based on sources of commodities(domesticorimported), type of laborandotherfactorinputs. In the final step, the databaseconstructedmust be balance as requiredbyanyCGEmodel. Figure 1prescribed schematic representation of the model's I-O database and shows the basic structure of the model. The column headings in the main part of the figure (an absorption matrix) identify the following demanders:

[6]The Malaysian CGE is constructed under the research collaboration between Malaysian Institute of Economic Research (MIER) and Department of Economics, Faculty of Economics and Management, Bogor Agricultural University (IPB), Indonesia.

(1) domestic producers divided into I industries;
(2) investors divided into I industries;
(3) a single representative household;
(4) an aggregate foreign purchaser of exports;
(5) government demands; and
(6) changes in inventories.

Entries in each column exhibit the structure of purchases made by agents identified in the column heading. Each of the C commodity types identified can be obtained locally or imported from overseas. The source-specific commodities used by industries as inputs to current production and capital formation consumed by households and governments, are exported, or are added to or subtracted from inventories.

Only domestically produced goods appear in the export column. M of the domestically produced goods are used as margins services (wholesale and retail trade, and transport) which are required to transfer commodities from their sources to their users. Commodity taxes are payable on purchases. As well as intermediate inputs, current production requires inputs of three categories of primary factors: labour (divided into O occupations), fixed capital, and agricultural land. Production taxes include output taxes or subsidies that are not user-specific. The 'other costs' category covers various miscellaneous taxes, e.g. municipal taxes or charges.

Each cell in the illustrative absorption matrix in Figure 1 contains the name of the corresponding data matrix. For example, V2MAR is a 4-dimensional array showing the cost of M margins services on the flows of C goods, both domestically produced and imported (S), to I investors.

In principle, each industry is capable of producing any of the C commodity types. The MAKE matrix at the bottom of FIGURE 1 shows the value of output of each commodity by each industry. Finally, tariffs on imports are assumed to be levied at rates which vary by commodity but not by user. The revenue obtained is represented by the tariff vector V0TAR.

The MIER-CGEmodel employed in thispaper analyzes the impacts of energy price policy on economic growth andincome distribution. MIER-CGE model is a non-linear simultaneous equations modelwhich accommodates price and quantity variables adjustment as input factormarket equalizer or commodity market equalizer in economic simulation. Inother words, MIER-CGE Model simulates the optimal condition of consumers andproducers in an economy. In addition, CGE model also simulates governmentrole as economic actor. Generally, this model comprehends all transactions inmoney cycle, commodity cycle and services cycle in economic mechanism(Lewis, 1991). If we add some dynamic equations which represent time factor,the equations will change from I-O model to MIER- CGE model.

Construction of model

MIER-CGE model is used because of several reasons i.e. (i) this model canaccommodate price variable adjustment which cannot be accommodated by the other models, such as I-O and SAM; (ii) CGE model has good ability toaccommodate structural changes in the economies; (iii) Dynamic CGE whichuses Malaysia SAM data can provide possibilities to substituteenergy input factor with capital factor and labor factor more accurately. As such, it canidentify economic impacts of price changes due to decreasing ofsubsidies, compensation of reducing the fuel subsidy or escalation of energy. Construction ofMIER-CGEmodel utilizes efficiency of economic growth and household incomes. Furthermore, MIER-CGE model approach for energy has yet to be used broadly. The MIER-CGE model for Malaysia is constructed from seven blocks, namely:

• Production Block: the equation in this block illustrates the structure and behavior of the production sector.
• Household Block: the equation in this block illustrates the behavior ofhousehold and other institutions.
• Government Block: the equation in this block illustrates the behavior of government as an economic actor in economy.
• Investment and Capital Block: the equation in this block simulates thedecision to invest in the economy and the demand for goods and servicesthatprovide new resources.
• Export-Import Block: the equation in this block shows the decision of anation/region to export or import goods and services.
• Market Clearing Block: the equation in this block shows the market clearingfor labor, goods and services in the economy. The national balance ofpayment is also included here.
• Inter-temporal Block: the equation in this block is the dynamic that connectsthe economy of the current year with past years.

Balancing the MIER-CGE Database

The GEMPACK program hasproducedtwo documents, namely MIER.har(database) andsummmary.har (check for database balancing). Beforethe next procescarried out, checking the database is crucial. Balancingat the sector levelindicatedby thesimilarityof totalinputandtotalvalue ofsales ineach industry(Dixon et al, 1991), whileat the aggregate levelthe balanceshown by theequalvalue ofGDPfromthe expenditure sideandrevenueside.This refers to the conceptof balance, i.e. adatabaseis calledbalancedif: (1)the aggregateGDPasthe expenditureto GDPincome side, and(2)the total costequal to the totalvalue ofsalesand profitsin each sectororindustryto bezero(Warr, 1998).

GDP from expenditure andrevenuesideas well as thetotalvalueof salesandcostsin eachindustryis shown inthe summary.harfile. On this file, expenditure sideof GDPis the sumofexpenditurecomponents ofeacheconomic agent, such as household consumption, private investment, government spendingandnetexportsamounting toRM539,196,037thousand (TABLE 3). This value isequal tothe valueoftheGDPthat is the sumofrevenuesearned incomeowners ofproductionfactors (land, labor, capital, subsidiesandindirecttaxes). The sales valueforeach sector is also in the summary.har. Thesales valueis the sumof thecomponents ofthe sales of eachsectorasintermediate andinvestmentgoods, sales tohouseholdsabroad (exports), and thegovernment. The sectoral total sales have to be equal with the costof eachsector. Totalcostsin eachsectoris the sumof several components,whichincludes the purchaseofdomesticgoods, intermediate goodsimports, spending on the margin, the payment of indirect taxes, labor costs (wages), capitalcosts(interest), land rent andtaxpaymentsproduction(value added tax). The identical value of sales and production costs in each sector implies a zero rate of return in accordance with the properties of perfect competition. This assumption is used in a CGE model. Once the database 120 is believed to be balanced on aggregate and sectoral level, the data processing can be utilized in the policy simulation process. The final constructed database (mier.har) is readily available for policy simulation as shown in TABLE 4.

RESULTS

There are several scenarios in this paper that can be grouped into threemain scenarios i.e. (i) price changing scenario due toescalation of wages and implementation of compensation program which is not followedby increase in energy utilization efficiency; (ii) price changing scenario owed tothe increase in import duties decreasing; and (iii) price changing scenario for the increasing in crude oil price escalation in cost of production in energy utilization by industry sector and household sector. Some preliminary findings on impact on the economy are as follows:

In summary, the results show that the government is having a perpetual overall budget deficit and a big proportion comes from subsidy. It is found that after 2009 the government has tried both to bring down the rate of inflation and the budget deficit, however it has remained around 5.5 per cent.

In terms of wages, unemployment rate has shot up in 2009 and has declined ever since with inflation is managed probably with the intention to stabilized the effects. As shown in Figure 2, private consumption had decrease post-2009 and hovering at a higher rate. Thus, it shows both input factors labour and crude oil plays an important role in influencing industrial developments.

Increase in nominal wage:

A series of simulations on 10, 20 and 30per cent increase in nominal wage was run and a series of results was derived. The initialsimulations were run employing an in-houseconstructed MIER-CGE model.Subsequent simulationsinsertedelasticities from Maisom-Rani's (1989) article *"A Translog Cost Estimation of Capital-labourSubstitubility in Malaysian Manufacturing Sector"*.

When wage was increased, there will be positive signs on nominal wage, however, negative signs of real wage particularly on macro variables. Nominal wage becomes positive in the short-term period as a result of wage increase. These confirms the structural differences between nominal wage and the real wage occurring the market supported by consumption in terms of expenditure and cost of production particularly from investment by producers. Output and employment generated by these simulations is highly dependent on export. Demand for export would depend exogenously on the international market demand. It also depends on the stability of the economy globally and the economic structure of the country and the trade structure especially exports. If the demand for export declines, the level of export will decline as well. When export decline, the effects will be on the output and employment. This is illustrated by the results obtained in FIGURE 3. Malaysia is a country that is highly depending on import from their neighbours to fulfill the country's demand. This is also the same reason why output and employment generated by Malaysia is the highest among the region in line with the highest demand for export from other country.

There is a great deal of differences between nominal and real wage. Real wage is negative since unit of labour cost becomes more expensive as price of nominal wage was amplified. A ***nominal wage*** is, basically, how much a worker get paid whereas a***real wage*** is, basically, how much he can afford. If a worker's wage had increased, but, he can only buys limited goods and services as the increased is compensated by the increased in oil price or inflation; he had a large nominal wage, but had a relatively small real wage. FIGURE 3 showsthe impact of wages increase.
Simulations of 10, 20 and 30 per centincrease in nominal wage in the economy result consumer price index to be positive 1.1 per cent showing households spends more goods and services due to increase in nominal wage. However, this CPI increase (1.1%) is more than the household production function (0%) showing real consumption is less or negative. Therefore, in the short-run, welfare effect is negative where the poor group is more burdened after the increase in nominal wage.

Sectorally, some industries are labour-intensive and some are not. Almost all sectors had the same increase and the lower boundary for all. A 10 per cent increase in labour-intensive industry may have different effect to a 10 per cent capital-intensive industry due to the different between substitution effects of labour and capital and also between low- and high-skilled labour. Figure 4 shows the impact of nominal wage increase on sectoral output. It shows that only own dwelling, R&D, Motor vehicle and non-resident is positive, others showsnegative results.
In addition, in order to diversify production from agriculture to manufacturing activities, many countries rely on their own industries to develop their economic development rapidly by shifting production activities from a group of industries to another, which are considered as key sectors. The above process is essentially shifting the production activities in favor of those with higher value-added, skill level and export orientation. Thus, industry with labour-intensive may have negative effects from the increase in wages. However, increase in higher skill and value added may increase its competitiveness in a longer term.

With the implementation of minimum wages or at a certain extent of the PLWS at early stages will increase nominal wages as simulated, to an extent it will not have an adverse effects to the industrial development overall but assist in building a more potential capacity particularly in expanding workers skills and technological capacity. Sectors like business services and manufacturing which is less labour intensive and more open to technological shift would in the long run increase income of workers and household in general.

Oil price increase

Crude oil price increases have direct and indirect effects on the economy. The impact on macroeconomic variables can be summarized as illustrated in FIGURE 5.

The most direct effect from increase in oil prices will be contractionaryeffects of macroeconomic variables. Negative consequences on aggregate revenue from indirect taxes on investment, real devaluation, ratio of consumption/GDP, payments to land, quantity, non-traditional export aggregate, government price index, and aggregate nominal value of inventories.

There are also some meager positive consequences from increase in percentage will be from rate of return of revenue from indirect taxes on export, exports, payments to capital, rental price of capital, nominal from income side, expenditure and price index expenditure side (Figure 6). However, in terms of sectoral effects oil related products will have a bigger effect than non-oil related sectors. In terms of welfare effects it is found that real variables such as real household consumption and expenditure have negatively affects households.

The current economic uncertainties nevertheless are influenced more by the external shocks rather than the domestic demands whose changes have impacted industrial shifts in Malaysia. Exogenous changes in wages, import tariff and world price of crude oil certainly will have an impact on the economy. The proposed paper has examined the impact of these two important changes on the macroeconomic variables such as growth, employment, inflation, private consumption and household's welfare and on industrial performances by employing MIER-CGE macroeconomic model.

CONCLUSION

This paper aims to show how CGE can measure changes in industry activities. The structure of economy changes mildly with erratically more adverse inwages and energy prices changes. Since there are varying sets of uncertainties these days, given the challenges of globalization, there are lessons for any country to be agile and flexible to match the challenging circumstances.

Government intervention in terms of types of degree and level of interventions can positively influenced business environment. A positive intervention will lead towards achieving the objectives whereas, in contrast will adversely affect the economy if it negatively affect in the long-run. The rapid speed of growth transformation may

be adversely affected if these uncertainties are not carefully managed. This will finally contributes towards the shortcomings of aspiration toward achieving the objectives of high income advance economy.

This is not to say that one is not entitled to expect good prediction performance from CGE models. On the contrary, they should be able to predict, conditional upon policy variables, trends in sectoral structural, intersectoral terms of trade, income distribution, trade performance, and government revenue and do so better and more consistently than linear models or more informal methods.

However, the problems facing development policy are inherently longer-run problems and the model thus naturally reflect an emphasis on the long run rather than on the short-run, on growth rather than stabilization and on trends rather than cyclical variation.

For wages wider policies such as the productivity link wages system (PLWS) should improvised the labour market system to encourage higher capacity in human capital and capital expansion. Interms of oil more efficiency and diversification should be promoted.

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FIGURE 1: The MIER-CGE Flows Database

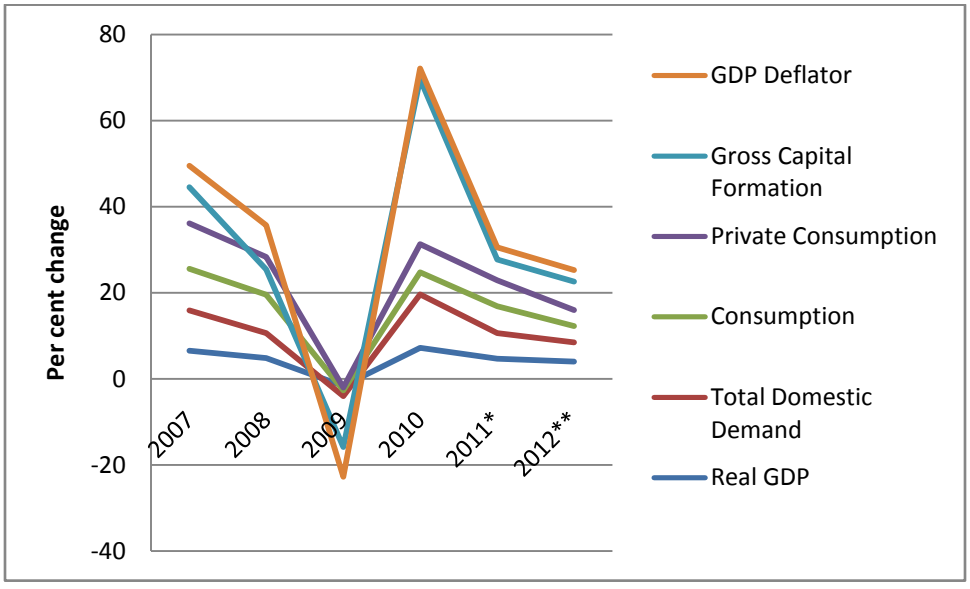
		Absorption Matrix					
		1	2	3	4	5	6
		Producers	Investors	Household	Export	Governme	Change in Inventories
	Size	□ I□	□ I□	□ 1□	□ 1□	□ 1□	□ 1□
Basic Flows	□ C□ S	V1BAS	V2BAS	V3BAS	V4BAS	V5BAS	V6BAS
Margins	□ C□ S□ M	V1MAR	V2MAR	V3MAR	V4MAR	V5MAR	n/a
Taxes	□ C□ S	V1TAX	V2TAX	V3TAX	V4TAX	V5TAX	n/a
Labour	□ O	V1LAB					
Capital	□ 1	V1CAP					
Land	□ 1	V1LND					
Production Tax	□ 1	V1PTX					
Other Costs	□ 1	V1OCT					

C = Number of Commodities
I = Number of Industries
S = 2: Domestic, Imported,
O = Number of Occupation Types
M = Number of Commodities used as Margins

	Joint Production
Size	□ I□
□ C	MAKE

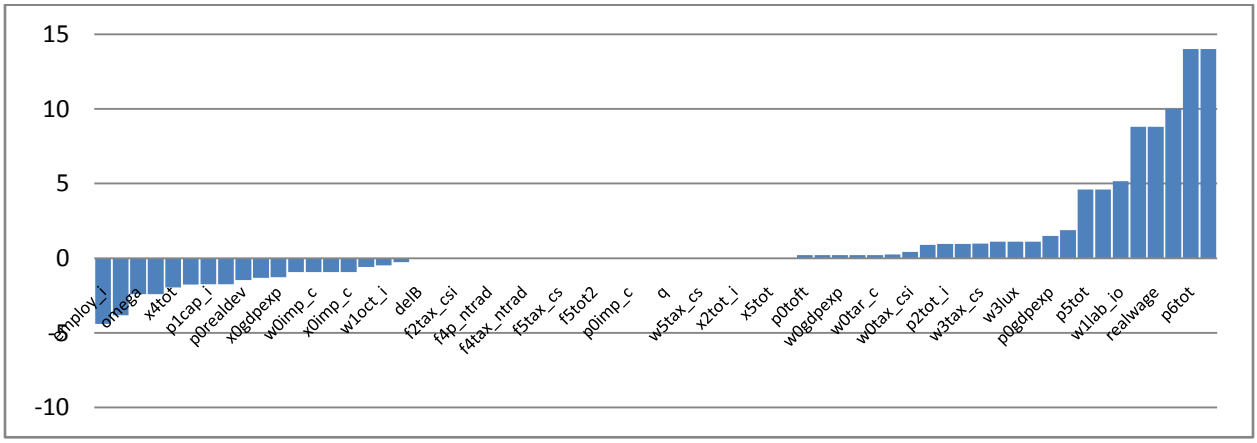
	Import Duty
Size	□ 1□
□ C	V0TAR

FIGURE 2:Effect of wages and energy price escalations on the Malaysian economy



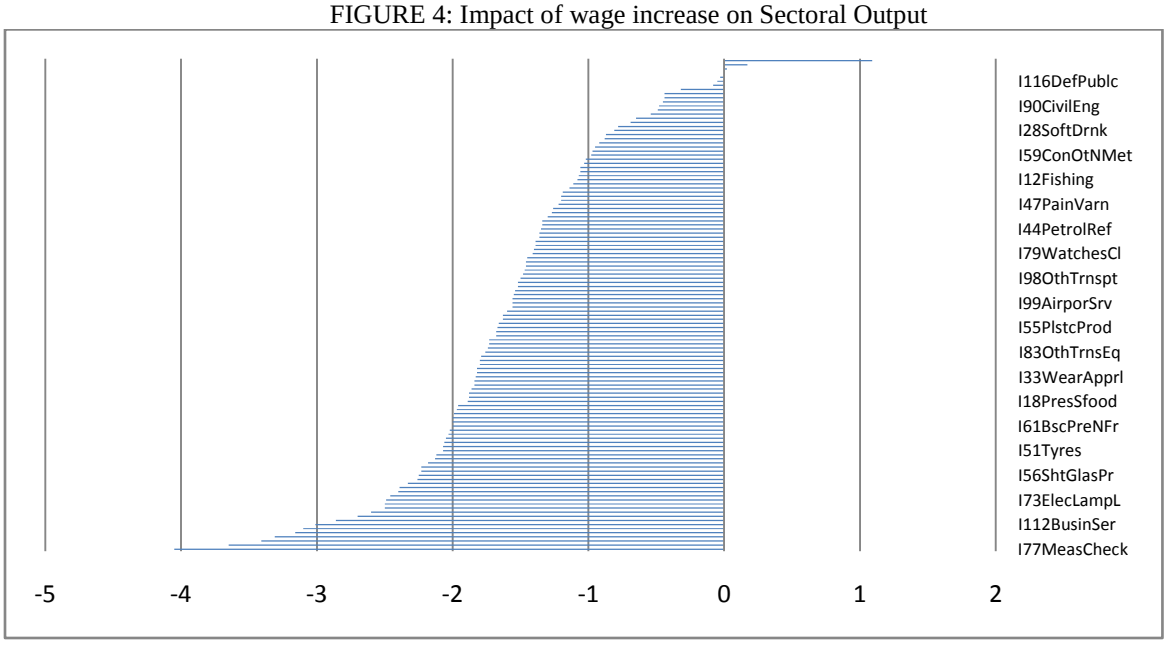
Source: MIER-CGE model

FIGURE 3: Nominal wage impact



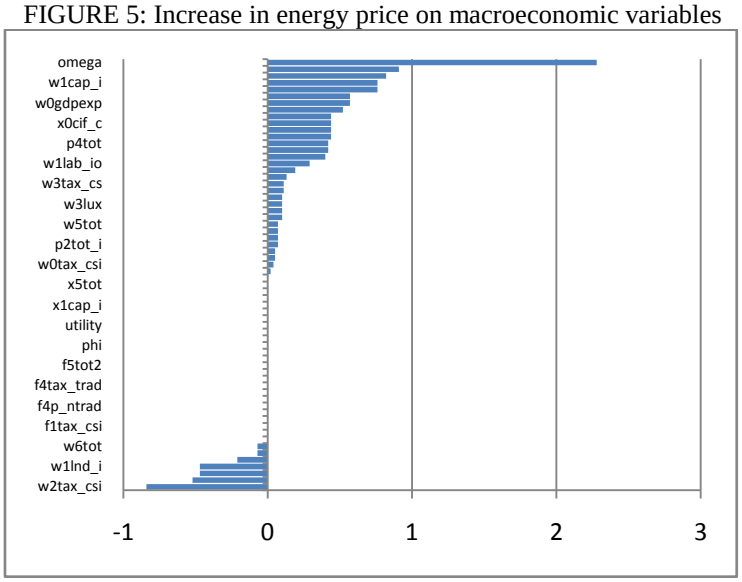
Source: Estimated from MIER-CGE model 2012.

FIGURE 4: Impact of wage increase on Sectoral Output



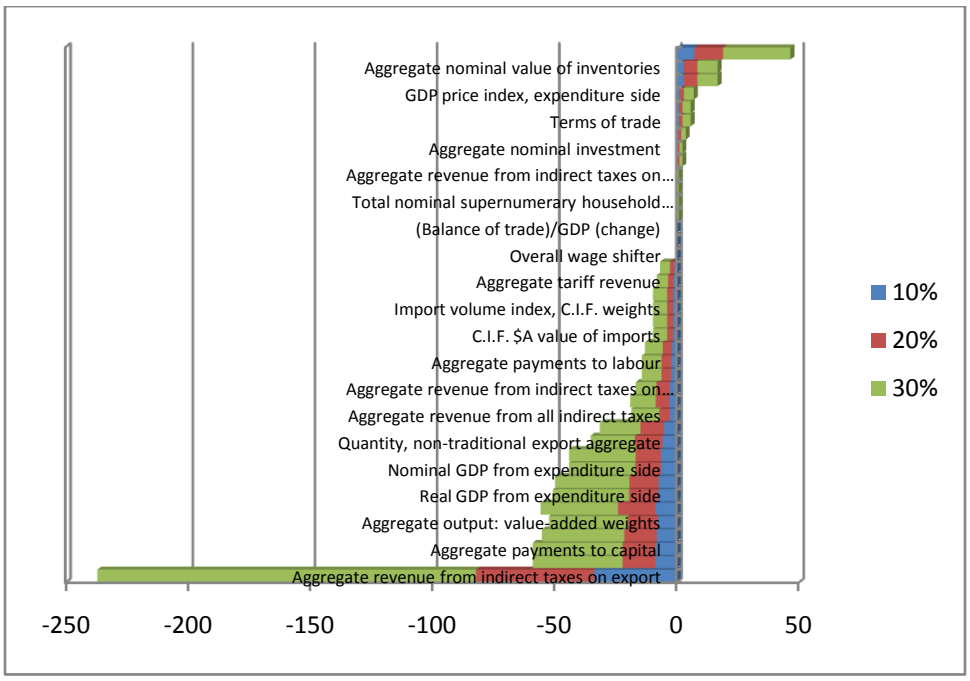
Source: Estimated from MIER-CGE model 2012.

FIGURE 5: Increase in energy price on macroeconomic variables



Source: Estimated from MIER-CGE model 2012.

FIGURE 6: Effects of oil shocks on Macroeconomic variables



Source: Estimated from MIER-CGE model 2012.

TABLE 1: Malaysia: GDP by industry of origin from 1960 to 2002

(1987 constant prices)	1960	1970	1980	1990	1995	2000	2001	2002
Agriculture, Livestock Forestry & Fishery	40.7	30.6	23.4	18.5	10.1	8.4	8.2	7.9
Mining & quarrying	6.1	6.5	10.3	9.7	8.1	7.3	7.1	6.9
Manufacturing	8.4	13.1	20.6	26.6	26.8	31.8	28.4	28.5
Construction	3.1	3.9	4.7	3.5	4.4	3.3	3.2	3.2
Electricity, gas & water	1.5	2.7	1.5	1.9	3.5	0.4	3.9	4.0
Transport, storage & communication	4.3	4.1	5.8	6.8	7.3	8.0	8.2	8.2
Wholesale &ret.trade, hotels& restaurants	15.3	14.5	12.4	10.9	15.0	14.4	14.2	14.1
Finance, insurance, real estate & business services	5.9	6.2	8.5	9.5	10.2	12.2	12.8	13.2
Government services	5.3	6.9	10.5	10.6	7.0	6.7	6.7	6.7
Other services	9.4	11.5	2.3	2.1	7.6	7.4	7.3	7.2
Total (in RM million)	100.0 (6,249)*	100.0 (20,924)	100.0 (44,512)	100.0 (80,284)	100.0 (168,691)	100.0 (213,691)	100.0 (223,619)	100.0 (234,050)

Source: Various issues of Economic Reports Ministry of Finance and Economic Planning Unit

TABLE 2: Sets, Subsets, and Disaggregation of MIER-CGE Model

Sets	**Subsets**	**Disaggregation**
Institutions		Producers, investors, households, aggregate foreign purchaser of exports;
Household		One representative household
Industries/Commodities		120 industries based on 2005 Malaysian Input-Output Table
Production Factors	Labour	Unskilled and Skilled Labour
	Capital	
	Land	
Source	Domestic	120 industries based on 2005 Malaysian Input-Output Table
	Import	120 industries based on 2005 Malaysian Input-Output Table
Margin		11 Industries

Source: MIER-CGE model.

TABLE 3: Malaysia GDP from Expenditure and Income Side, 2005 (RM'000)

No	Expenditure	Value	No	Income	Value
1	Consumption	246,838,400	1	Land	11,546,087
2	Investment	118,295,632	2	Labour	145,723,024
3	Government	64,246,340	3	Capital	352,003,072
4	Stocks	602,642	4	Other Cost	-28
5	Exports	578,133,888	5	Indirect	29,923,882
6	Imports	-468,920,864			
	Total	539,196,037		Total	539,196,037

Source: MIER-CGE model.

TABLE 4: Database Component of MIER-CGE

No	Header	Type	Dimension	Coeff	Total	Name
1	1BAS	RE	COM*SRC*IND	V1BAS	1.08E+09	Intermediate Basic
2	2BAS	RE	COM*SRC*IND	V2BAS	1.16E+08	Investment Basic
3	3BAS	RE	COM*SRC	V3BAS	2.33E+08	Households Basic
4	4BAS	RE	COM	V4BAS	5.77E+08	Exports
5	5BAS	RE	COM*SRC	V5BAS	63474631	Government Basic
6	6BAS	RE	COM*SRC	V6BAS	602642	Inventory Changes
7	1-Mar	RE	COM*SRC*IND*MAR	V1MAR	0	Intermediate Margins
8	2-Mar	RE	COM*SRC*IND*MAR	V2MAR	0	Investment Margins
9	3-Mar	RE	COM*SRC*MAR	V3MAR	0	Households Margins
10	4-Mar	RE	COM*MAR	V4MAR	0	Exports Margins
11	5-Mar	RE	COM*SRC*MAR	V5MAR	0	Government Margins
12	1TAX	RE	COM*SRC*IND	V1TAX	12160124	Intermediate Tax
13	2TAX	RE	COM*SRC*IND	V2TAX	1983080	Investment Tax
14	3TAX	RE	COM*SRC	V3TAX	13416654	Households Tax
15	4TAX	RE	COM	V4TAX	1592314	Exports Tax
16	5TAX	RE	COM*SRC	V5TAX	771710.3	Government Tax
17	1LAB	RE	IND*OCC	V1LAB	1.46E+08	Labour
18	1CAP	RE	IND	V1CAP	3.52E+08	Capital
19	1LND	RE	IND	V1LND	11546087	Land
20	1-Oct	RE	IND	V1OCT	-28	Other Costs
21	MAKE	RE	COM*IND	MAKE	1.6E+09	Multiproduct Matrix
22	0TAR	RE	COM	V0TAR	0	Tariff Revenue
23	SLAB	RE	IND	SIGMA1LAB	60	Labour Sigma
24	P028	RE	IND	SIGMA1PRIM	112.7	Primary Factor Sigma
25	1ARM	RE	COM	SIGMA1	353.1	Intermediate Armington
26	SCET	RE	IND	SIGMA1OUT	0.4	Output Sigma
27	2ARM	RE	COM	SIGMA2	240	Investment Armington
28	3ARM	RE	COM	SIGMA3	240	Households Armington
29	P021	RE	1	FRISCH	-2.88	Frisch Parameter
30	XPEL	RE	COM	EPS	107.03	Household Expenditure Elasticities
31	P018	RE	COM	EXP_ELAST	-649.45	Traditional Export Elasticities
32	EXNT	RE	1	EXP_ELAST_NT	-10	Non-Traditional Export Elasticities

Source: MIER-CGE model 2012.

TABLE 5: Impact of change in wages and energy price on the Malaysian economy

	2007	2008	2009	2010	2011*	2012**
Real GDP	6.5	4.8	-1.6	7.2	4.7	4.0
Total Domestic Demand	9.4	5.8	-2.4	12.4	5.9	4.5
Consumption	9.7	9.0	1.3	5.2	6.3	3.8
Private Consumption	10.5	8.7	0.7	6.5	6.0	3.7
Gross Capital Formation	8.4	-2.9	-13.8	38.3	4.8	6.6
GDP Deflator	5.0	10.3	-6.9	2.5	2.9	2.7
Saving and Investment (in Percent of GDP)						
Gross Domestic Investment	21.6	19.3	14.4	21.4	21.8	21.8
Gross National Saving	37.5	37.0	30.9	32.9	33.3	32.6
Fiscal Sector (in Percent of GDP)						
Federal Government Overall Balance	-3.2	-4.8	-7.0	-5.6	-5.5	-5.1
Revenue	21.8	21.5	23.3	20.8	22.2	21.3
Expenditure and Net Lending	25.0	26.3	30.3	26.5	27.7	26.4
Federal Government Non Oil Primary Balance	-9.2	-11.7	-14.5	-11.0	-11.1	-9.9
Consolidated Public Overall Balance	1.5	-5.6	-7.6	-2.1	-6.4	-6.8
General Government Debt	42.7	42.8	55.4	55.4	56.6	57.5
Inflation						
CPI Inflation	2.0	5.4	0.6	1.7	3.2	2.5
Unemployment Rate	3.2	3.3	3.7	3.4	3.2	3.1

Source: Estimates of MIER-CGE model from various Economic Report of MOF (2011).
*Estimate **Forecast

Appendix 1

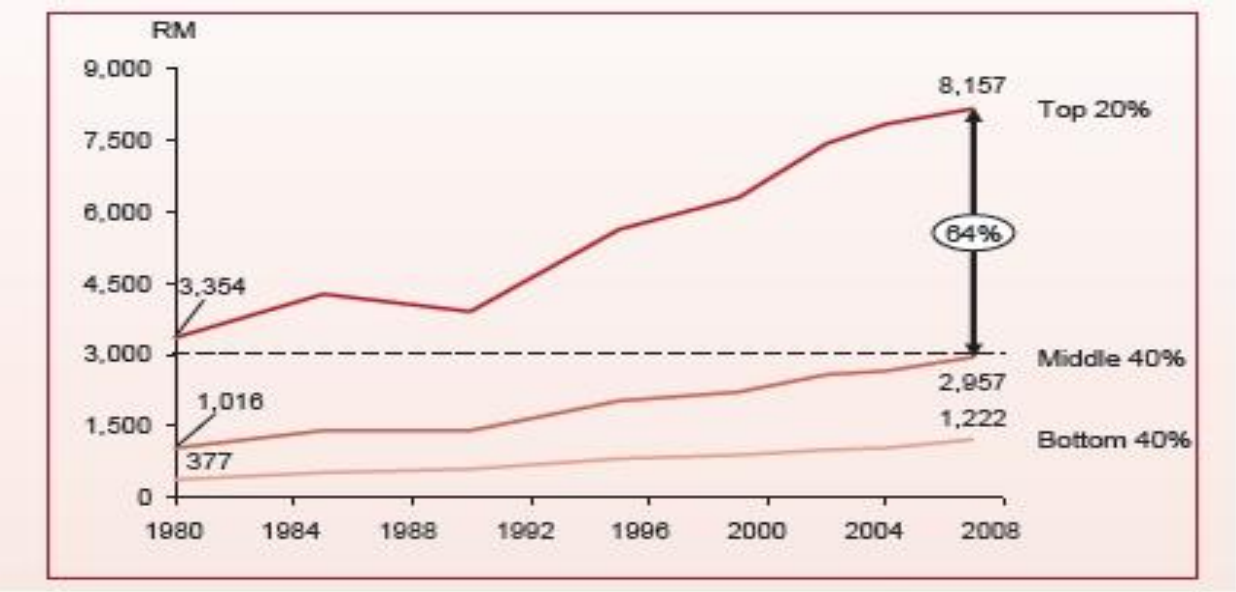
TABLE 6:Sectoral Classification: MIER-CGE Model

No	Commodities	No	Commodities
1	Paddy	61	Basic Precious and Non-Ferrous Metals
2	Food Crops	62	Casting of Metals
3	Vegetables	63	Structural Metal Products
4	Fruits	64	Other Fabricated Metal Products
5	Rubber	65	Industrial Machinery
6	Oil Palm	66	General Purpose Machinery
7	Flower Plants	67	Special Purpose Machinery
8	Other Agriculture	68	Domestic Appliances
9	Poultry Farming	69	Office, Accounting and Computing Machinery
10	Other Livestock	70	Electrical Machinery and Apparatus
11	Forestry and Logging	71	Other Electrical Machinery
12	Fishing	72	Insulated Wires and Cables
13	Crude Oil and Natural Gas	73	Electric Lamps and Lighting Equipment
14	Metal Ore Mining	74	Semi-Conductor Devices,Tubes& Circuit Boards
15	Stone Clay and Sand Quarrying	75	TV, Radio Receivers & Transmitters, Asso.Goods
16	Other Mining and Quarrying	76	Medical, Surgical and Orthopaedic Appliances
17	Meat and Meat Production	77	Measuring,Checking,Industrial Process Equipt
18	Preservation of Seafood	78	Optical Instruments & Photographic Equipment
19	Preservation of Fruits and Vegetables	79	Watches and Clocks
20	Dairy Production	80	Motor Vehicles
21	Oils and Fats	81	Motorcycles
22	Grain Mills	82	Ships, Boats Building,Bicycles& Invalid Carriages
23	Bakery Products	83	Other Transport Equipment
24	Confectionery	84	Other Manufacturing
25	Other Food Processing	85	Recycling
26	Animal Feeds	86	Electricity and Gas
27	Wine and Spirit	87	Waterworks
28	Soft Drink	88	Residential
29	Tobacco Products	89	Non Residential
30	Yarn and Cloth	90	Civil Engineering
31	Finishing of Textiles	91	Special Trade Works
32	Other Textiles	92	Wholesale and Retail Trade
33	Wearing Apparel	93	Accommodation
34	Leather Industries	94	Restaurants
35	Footwear	95	Land Transport
36	Sawmilling and Planning of Wood	96	Water Transport
37	Veneer Sheets,Plywood,Laminated,Particle Board	97	Air Transport
38	Builders' Carpentry and Joinery	98	Other Transport Services
39	Wooden and Cane Containers	99	Port and Airport Operation Services
40	Other Wood Products	100	Highway, Bridge & Tunnel Operation Services
41	Paper and Paper Products and Furniture	101	Communication
42	Publishing	102	Banks
43	Printing	103	Financial Institution
44	Petroleum Refinery	104	Insurance
45	Basic Chemicals	105	Other Financial Institution
46	Fertilizers	106	Real Estate
47	Paints and Varnishes	107	Ownership of Dwellings
48	Pharmaceuticals, Chemicals & Botanical Product	108	Rental and Leasing
49	Soap, Perfumes, Cleaning &Toilet Preparations	109	Computer Services
50	Other Chemicals Product	110	Research and Development
51	Tyres	111	Professional
52	Rubber Processing	112	Business Services
53	Rubber Gloves	113	Public Administration
54	Rubber Products	114	Education
55	Plastics Products	115	Health
56	Sheet Glass and Glass Products	116	Defence and Public Order
57	Clay and Ceramic	117	Other Public Administration
58	Cement, Lime and Plaster	118	Private Non-Profit Institution
59	Concrete & Other Non-Metallic mineral Products	119	Amusement and Recreational Services
60	Iron and Steel Products	120	Other Private Services
59	Concrete & Other Non-Metallic Mineral Products	119	Amusement and Recreational Services
60	Iron and Steel Products	120	Other Private Services

Source: 2005 Input-Output Table of Malaysia published by the Department of Statistics, Malaysia.

Appendix 2

FFIGURE 7: Distribution of Household by Income Class 1990 and 2009



Source:*Source: NEAC 2010 from Household Income Survey*

- Income growth has been strong only for the top 20% of income earners.
- Incomes of the bottom 40% has stagnated (the slowest growth of average income) for the past 28 years & earning an average of RM1,222 per month in 2008.
- Showing inequality remains a real challenge for Malaysia.

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