Malaysian Journal of Economic Studies 46 (2): 175-200, 2009 ISSN 1511-4554

Benchmarking Malaysia's Manufactured Exports Competitiveness

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***Abstract*:** The primary focus of this paper is to benchmark Malaysia's manufactured exports competitiveness. A medium-sized macroeconomic model is built and the two stage least squares (2SLS) method is used for estimation. The empirical results suggest that the inherent openness of Malaysia's economy benefits its manufactured exports competitiveness position in the East Asian region. The exchange rate also has a favourable influence. Malaysia's export dependency on foreign investment is not very high. Interest rate has a limited effect on private investment and the monetary variables.

Keywords: East Asia, export competitiveness, macro-econometric model, Malaysia, trade
JEL classification: F120, F140, E290

1. Introduction

From a country dependent on agriculture and commodities during the sixties, Malaysia has today emerged as a manufactured export-driven economy. The strong growth of the country's exports has been fuelled by the expansion of its manufacturing sector. The impact of the manufacturing sector on the Malaysian economy can be seen from the transformation of the economy. In 1980, the agricultural sector contributed a 21 per cent share to the GDP while the manufacturing sector's share was 17.2 per cent only. But in 2007, the latter's sectoral share was 30.1 per cent while the former was merely 7.6 per cent (Malaysia, Economic Report 1980/8; 2007/08). According to various indicators, such as share of GDP, investment and employment, the manufacturing sector is now the most important sector of the economy (Athukorala and Menon 1996). Among the manufactured export industries, Malaysia enjoy particular success in the electrical and electronics (E&E) industry (Table 1).

Since 1980, the share of the E&E has started to dominate Malaysia's manufactured exports. Since then, the E&E industry has emerged as the most dynamic element in the manufactured exports structure, growing at an annual compound rate of 30 per cent (1970-1985) and by 1990s, the share in the manufactured exports has reached nearly 60 per cent. The rising share of chemical and petroleum product exports in 2008 is contributed by the higher world fuel prices. However, one should not overstate the rapid growth and development of exports, given the increasing trade globalisation in the world economy. Countries are getting more integrated in order to sustain their position in the uncertain international trade landscape. The worsening of the global economic downturn in 2008 is another major factor that worries many trade-dependent economies.

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Table 1: Malaysia: composition of manufactured exports, 1970-2008(%)

	1970	1975	1980	1985	1990	2004	2008
Food, beverages and tobacco	18.0	13.0	8.0	6.0	4.0	2.4	3.9
Textiles, clothing and footwear	5.0	12.0	13.0	10.0	9.0	2.6	2.2
Wood products	15.0	11.0	7.0	3.0	3.0	2.7	2.0
Rubber products	3.0	2.0	1.0	1.0	3.0	1.6	2.5
Chemicals and petroleum products	32.0	10.0	6.0	13.0	7.0	10.6	14.7
Non-metallic mineral products	3.0	1.0	1.0	1.0	2.0	0.8	1.08
Iron, steel and metal manufacture	4.0	2.0	4.0	3.0	3.0	4.9	5.9
Electrical and electronic machinery and appliances	2.0	15.0	48.0	52.0	57.0	65.8	56.4
Other machinery and transport equipment	11.0	13.0	4.0	5.0	4.0	1.3	1.9
Other manufactures	7.0	23.0	8.0	7.0	8.0	2.2	2.6
Total manufactured exports (RM million)	615	1786	6319	12471	46833	390938	491930

Source: Bank Negara *Monthly Statistical Bulletin*, various issues.

Across Asia, trade-oriented economies including Malaysia are bracing for more trade competitive pressures. Further, Malaysia is surrounded by competitors with different comparative advantages. At one end of the spectrum, Malaysia faces the economies endowed with ample, cheap labour such as the People's Republic of China (hereafter China) and India while Taiwan and Korea, which are driven by strong productivity and innovations, are at the opposite end of the spectrum. Thus, Malaysia now worries about its capacity to compete internationally: whether the nation can improve the 'quality' of the exports sufficiently to compete, and whether it can cope with the costs pressure. There is a concern that Malaysia's manufactured exports may not be able to sustain long in the East Asia region. This brings us to the objective of this paper: to shed some light on the possible factors influencing Malaysia's manufactured exports competitiveness. It is important to look into this topic, given the importance of the manufactured exports to the Malaysian economy. The competitiveness topic is a timely issue in this globalised world. Furthermore, the emergence of China as an economic and industrial powerhouse in the Asian region is bound to have a significant impact on Malaysia.

No doubt, there is an extensive literature on Malaysia's manufactured exports' competitiveness. However, these studies only attempted to assess the shift in the specialisation or competitiveness patterns of manufactured exports. Different methods have been applied by the researchers. The main ones are the dynamic shift-share analysis (SSA) (Wilson and Wong 1999; Voon 1998; Chandran *et al*. 2004) and the revealed comparative advantage (RCA) (Das 1998; Mahmood 2000; Coxhead 2007). Basically, both the SSA and RCA methods are descriptive analyses. Wilson and Wong (1999) examined the manufactured export competitiveness of five members of ASEAN (Singapore, Thailand, Malaysia, the Philippines and Indonesia) exporting to the US and Japan between 1986 and 1995. By using the SSA analysis, they found that Malaysia was the main rival of Singapore in both the US

and Japanese markets. Singapore could only remain strong in the office and data machines category. In 1998, Voon did another export competitiveness study on the ASEAN-4 (Indonesia, Malaysia, Singapore and Thailand) plus China in the US market over the period 1989-1994. The same methodology was used. Nonetheless in this study, he confined his analysis to agricultural exports and the more labour-intensive sectors.

As for the RCA technique, it is more often used to analyse the changes in the pattern of a country's export specialisation with the other countries. For example, Mahmood (2000) investigated in depth the shifting of export specialisation and export competitiveness of the Malaysian manufacturing sector in the nineties. The readiness of our manufacturing sector to face trade liberalisation was also assessed. The Malaysian economy was found to have gone through great structural changes with export-oriented manufacturing growing at the expense of the agricultural sector. In a recent study, Coxhead (2007) used the RCA technique to examine the impact of China's growth on South-east Asia's trade. China's growth is found to affect most of those economies that have relatively large labour-intensive sectors and also relatively high comparative advantage in resources sectors such as Indonesia and Vietnam.

These methods may be simple, but they are still relatively efficient to compare the changes of an economy's export competitive position *vis-à-vis* a group of selected economies.[1] As such, both the SSA and RCA cannot identify the actual causes for the change in an economy's manufactured exports competitive position against its competitors. Furthermore, the competitiveness for an economy's exports depends on many economic variables which are inter-related. The variables can be both price and non price factors (such as product, quality, infrastructure and technology). In order to examine the potential factors influencing Malaysia's manufactured exports competitiveness, this paper will use a simultaneous equations system. In such a system of equations, the variables in one equation may affect other variables in another equation. In economics, most macroeconomic models are examples of the simultaneous equations specification such as the demand and supply equations. There are earlier studies on Malaysia's macroeconomic models by Cheong (1976), Semudram (1982) and many more studies done by the Malaysian Institute Economic Research (MIER). Generally these early works of econometric modeling, based on the Keynesian economics framework, evaluated the impact of government polices on the economy as a whole. The models are fairly large in order to incorporate various sectors of the economy. But to date, no econometric work has been found to develop a model of competitiveness and evaluate the parameters behind Malaysia's trade (manufactured exports) competitiveness. This research gap has motivated this study.

This paper contains four sections. After the introduction, the framework for evaluating Malaysia's manufactured exports competitiveness is presented in Section 2. This is followed by a description of the data and estimation technique, that is, the simultaneous equations system. Section 3 presents the specification and structure of the model. Section 4 explains the empirical findings. Finally the conclusion and some policy implications are summarised in Section 5.

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[1] The SSA shows how competitive a country is in terms of exporting a product to a destination compared to a group of countries. The RCA is a rough indicator of the strength of a product in terms of its comparative advantage in the world export market relative to the others.

2. Malaysia's Competitiveness Framework

There is a growing literature on competitiveness in economics and business studies. But, there is still no agreement on a standard definition for the term 'competitiveness' and what affects it. This inconclusive state has led to an approach where a wide and complex set of determinants need to be taken into account before any nation can benchmark its competitiveness. In other words, every nation uses diverse competitiveness strategies.

As there is still no agreement on the competitiveness issue, the framework of the present model is based on both the Classical and Keynesian theories. This means that the theoretical foundation of the model will not be based on a single theory, but on various economic theories. The market price is allowed to adjust accordingly while aggregate output is subjected to the limits of aggregate demand. Conventional and new international trade theories as well as past empirical studies will also serve as a guide to determine the parameters for the manufactured exports competitiveness function. It is basically an eclectic approach so that we can capture more related factors influencing the competitiveness function.[2]

2.1 Data and Estimation Technique

The model uses annual data, and the equations are estimated for the period between 1980 and 2006. The main data sources come from several government publications including the Bank Negara *Malaysia Monthly Statistical Bulletins*, *Annual Economic Reports*, *Annual Statistics of Manufacturing Industries* and the *IMF International Financial Statistics*.

In order to better capture the interlinkages among sectors of the macro model, this model is based on a simultaneous equations framework. A simultaneous equations framework is useful when an analysis involving more than one endogenous variable needs to be investigated simultaneously. And these endogenous variables affect one another such as feedback among prices, exchange rate and trade. Exogenous variables determined outside the system such as trading partners, further influence the feedback. Further, in investigating the competitiveness of Malaysia's manufacturing exports industries, several variables will be inter-related as trade leaves repercussion effects. This is especially true for Malaysia, being an open economy with a trade volume that is two times the size of its economy.

The most common method applied for a simultaneous equations model is the two-stage least squares method (2SLS). The ordinary least-squares (OLS) estimation cannot be used because the error terms are correlated with the endogenous variables. The use of the OLS may produce inconsistent and biased estimators. The 2SLS method involves two stages, that is, the creation of an instrument and a variant of instrumental-variables estimation (Pindyck and Rubinfeld 1991). This 2SLS method is useful in the case of over-identified equations, common in most simultaneous equations models. It can also be applied on an

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[2] Tham and Loke (2001) also took an eclectic approach to evaluate Malaysia's manufacturing competitiveness after the Asian financial crisis. This paper has listed three other ways to evaluate competitiveness. They are the 'engineering' approach, the environmental approach and the 'capital development' approach. The 'engineering' approach means ability to compete depends on the ability to use 'best-practices" of technical activities. The environment approach views competitiveness from the ability of the firm to optimise one's environment while the capital approach views competitiveness from the ability of an economy to accumulate technology and physical and human capital. Under the eclectic approach, various aspects of competitiveness are taken into account.

identified equation.[3] Though 2SLS may not be as efficient as the 3SLS method of estimation, it is less sensitive to specification errors (Pindyck and Rubinfeld 1991).

3. Specification and Structure of the Model

The objective of this paper is to examine the factors affecting Malaysia's manufactured exports competitive position *vis-a-vis* its neighbors. The model is a Classical-Keynesian type. According to Whitley (1994: 27), there are three ways to describe a model. A model can be explained by the different agents in the economy: the behaviour of different sectors in the economy, or by the interactions of demand and supply. In this paper, the model is explained according to the sectors of the economy, that is, the private, government, external trade and the monetary sectors. The labour market is not included because appropriate data are not readily available. The model has 27 endogenous variables of which 14 are explained by stochastic equations and the remaining 13 are identities, which are required to close the model. In addition, there are 21 exogenous variables. The fourteen behavioural equations in the model will be explained according to their respective sector, that is, the private, government, external trade and monetary sectors.

3.1 Private Sector

This consists of the behavioural equations explaining private consumption and private investment (Table 2: Equations a and b). To explain private consumption, we have theories such as Keynes' Absolute Income Hypothesis, Friedman's Permanent Income Hypothesis and Ando and Modigliani's Life Cycle Hypothesis.[4] For private consumption, we have modeled it to be a function of income, price and interest rate. Basically, we have used the conventional factors for consumption. However, there are additional factors influencing

[3] In a simultaneous equations framework, there is an identification rule called the 'order condition'. This condition states that if an equation is to be identified, the number of predetermined variables of the system excluded from the equation must be greater than or equal to the number of included endogenous variables minus one. Predetermined variables include exogenous variables and any lagged endogenous variables. The 2SLS method helps to obtain consistent estimates for parameters in the structural equations. Greene (1993: 594) also suggested a rule of thumb to check for the order and rank conditions of a model. According to Greene, if every equation has its own predetermined variable, the entire model will be identified.

[4] The Keynesian view of income is that it the main determinant of consumption. When income rises, consumption rises, but less than the rise in income. A key idea from the Keynesian theory is that of savings. This theory later led to other theories, notably Friedman's Permanent Income Hypothesis and Ando and Modigliani's Life Cycle Hypothesis which view consumption on a much longer timescale. According to the Permanent Income and the Life Cycle theories, households try to smooth out their consumption over their lifetime. People borrow when their income is low and save when their income is high in order to maintain a constant level of consumption over the years. Friedman's Permanent Income Hypothesis suggests that an individual's real wealth such as properties, shares or even education level is a more important determinant for consumption. When an individual's current income is below his/her wealth, the individual will borrow or draw from his/her savings. Under the Ando and Modigliani's Life Cycle Hypothesis, younger people tend to borrow against their future income and save for retirement. In other words, people plan their consumption taking into account various factors (such as price, interest rate, income fluctuations, etc.) in order to even out consumption over their lifetime.

household consumption such as past income, consumers' personal taste or credit facilities. For every nation, the factors differ.

Similarly for investment, there are several key theories namely the Keynesian investment theory, the Jorgenson's neo-classical investment theory and the Tobin-Q theory. Most of the theoretical investment theories revolve mainly around the rate of return and the cost of finance. For private investment, we postulate that it can be explained by interest rate, foreign direct investment (FDI) in manufacturing, domestic credit to the private sector and capital controls. It is an augmented investment equation. FDI has been playing a leading role in Malaysia's manufacturing sector and can be regarded as a 'conventional' determinant of Malaysia's private investment. Domestic credit represents a source of liquidity for both domestic and foreign investors in the Malaysian economy. Studies done by MIER and Semudram (1982) also included FDI and domestic credit in the investment function. The final explanatory variable, a dummy variable is to account for Malaysia's capital control measures in 1994, 1998 and 1999 aimed at insulating the economy from disruptive speculative capital flows.

3.2 The Government Sector

This model is not meant to provide a model of the government's behaviour. The equations are present only to link identified relationships (Table 2: Equations c, d, e, and f). Here, government expenditure is specified as an exogenous variable and tax revenues are assumed to grow in line with the national income. Taxes are disaggregated into direct taxes, export duties, import duties and other tax categories.[5]

3.3 The Trade Sector

The component of the model for this sector consists of equations for exports, imports and manufactured exports competitiveness.

3.3.1 Export Equations

Exports are disaggregated into manufactured and non manufactured exports. Manufactured exports include manufactured goods, machinery and transport equipment and miscellaneous manufactured articles (Table 2: Equations g and h). The non manufactured exports are the remaining items of aggregate exports such as consumer goods, mineral items and chemicals. Exports behaviour can be explained from the demand or supply side. For Malaysia, exports are supply-determined as it is a small trading nation and its trade volume cannot affect the world market. Thus, Malaysia is a price taker in the world market and is assumed that the economy supplies exports of manufactured goods and other exports at given world prices (see Semudram 1982). For the explanatory variables, we follow the standard model of export supply such as export prices, input prices and domestic income (Goldstein and Khan 1978).

[5] In Malaysia, the government derives a major part of its revenue from both direct and indirect taxes. Several types of direct taxes are imposed, namely income tax, stamp duty, real property gains tax and petroleum income tax. Indirect taxes comprises sales tax, service tax, excise duty, import duty and export duty. The non tax revenue is largely from investment income. In 2007, tax revenue constituted about 68 per cent of the federal government revenue, with 50 per cent from direct taxes and 18 per cent from indirect taxes (Malaysia Economic Report 2006/07).

Table 2: Equations and identities in the model

1. *Private Sector*

a) Private consumption

$$RCONS_t = \alpha_0 + \alpha_1 RGDP_t + \alpha_2 DPL_t + \alpha_3 RINT_t + \mu_{1t}$$

b) Private investment

$$RINV_t = \beta_0 + \beta_1 D(RGDP)_t + \beta_2 RINT_t + \beta_3 FDI_{t-1} + \beta_4 D(CREDITPRI)_t + \beta_5 CAP_t + \mu_{2t}$$

2. *Government Sector*

c) Direct tax

$$DTX_t = \chi_0 + \chi_1 GDP_t + \mu_{3t}$$

Indirect tax

d) Export taxes

$$EXDU_t = \phi_0 + \phi_1 EX_t + \phi_2 RPX_t + \phi_3 EXDU_{t-1} + \mu_{4t}$$

e) Import duties

$$IMDU_t = \gamma_0 + \gamma_1 IM_t + \gamma_2 RPM_t + \gamma_3 IMDU_{t-1} + \mu_{5t}$$

f) Other taxes and non tax revenue

$$OTHTAX_t = \delta_0 + \delta_1 GDP_t + \delta_2 OTHTAX_{t-1} + \mu_{6t}$$

3. *Trade Sector*

g) Manufactured exports supply

$$RMANUFX_t = \lambda_0 + \lambda_1 RGDP_t + \lambda_2 RPX_t + \lambda_3 FDI_{t-1} + \lambda_4 RMANUFM + \mu_{7t}$$

h) Other non manufactured exports supply

$$ROTHX_t = \omega_0 + \omega_1 RGDP_t + \omega_2 RPX_t + \omega_3 FDI_{t-1} + \omega_4 ROTHX_{t-1} + \mu_{8t}$$

i) Demand for imported manufactured goods

$$RMANUFM_t = \Pi_0 + \Pi_1 RGDP_t + \Pi_2 RPM_t + \Pi_3 REER_t + \Pi_4 RMANUFM_{t-1} + \mu_{9t}$$

j) Demand for imported investment goods

$$RIVM_t = \pi_0 + \pi_1 D(RINV)_t + \pi_2 RPM_t + \pi_3 REER_t + \pi_4 RINVM_{t-1} + \mu_{10t}$$

k) Demand for other imported items

$$ROTHM_t = \Omega_0 + \Omega_1 RDGP_t + \Omega_2 RPM_t + \Omega_3 REER_t + \mu_{11t}$$

l) Manufactured export competitiveness

$$COMPET_t = \eta_0 + \eta_1 OPEN_t + \eta_2 REER_t + \eta_3 INF_t + \eta_4 USGDP_t + \eta_5 CHIGDP_t + \mu_{12t}$$

4. *Financial Sector*

m) Money demand equation

$$M3_t = \rho_0 + \rho_1 RGDP_t + \rho_2 INT_t + \rho_3 D(DPL)_t + \mu_{13t}$$

n) Domestic price level

$$DPL_t = \psi_0 + \psi_1 MSS_t + \psi_2 IMDU_t + \psi_3 DPL_{t-1} + \mu_{14t}$$

Table 2: continued

Identities and Definitions

1. $GDP_t = CONS_t + INV_t + G_t + EX_t - IM_t + CSTOCK_t$
2. $Yd_t = GDP_t - DTX_t$
3. $EX_t = [(RMANUFX * PX/100)_t + (ROTHX * PM/100)_t]$
4. $IM_t = [(RMANUFM * PX/100)_t + (RINVM * PM/100)_t + (ROTHM * PM/100)_t]$
5. $RGDP_t = GDP_t / DPL_t$
6. $CONS_t = RCONS_t * DPL_t$
7. $INV_t = RINV_t * DPL_t$
8. $REER_t = NEER_t * WCPI_t / DPL_t$
9. $RPM_t = PM_t / DPL_t$
10. $MSS_t = NFA_t + CREDITPRI_t + CREDITPUB_t + NEXOP_t$
11. $NFA_t = EX_t - IM_t + NT_t + BALONGTC_t + BASHORTC_t + EO_t$
12. $BOP_t = EX_t - IM_t + KA_t$
13. $OPEN_t = (EX_t + IM_t) / GDP_t$

Note: The explanation for the equations and identities are given in Appendix 1, including a list of endogenous and exogenous variables.

In both the export equations, we have added FDI as independent variable as FDI flows have generally played an important role in the development of Malaysia's domestic economy, especially the manufacturing sector. In the manufactured exports equation, we also have included imports as an explanatory variable because Malaysia's electrical and electronics appliances have high import content, mainly import of semi-conductors and integrated circuits used by the transnational companies for their operations in Malaysia.

3.3.2 Import Equations

For imports, we have imported manufactured goods and miscellaneous manufactured articles, imported machinery and transport equipment with the remaining imports comprising consumer goods, mineral fuel and chemicals (Table 2: Equations i, j and k). The imports are explained by conventional variables, that is, relative price and real income (Goldstein and Khan 1978). We have added another related variable, the exchange rate, which plays an important role in Malaysia's economy. A one-period lag of imported investment goods and imported manufactured goods are added to the respective equations to take into account any lagged response. In the import demand function, a one-year lag of the dependent variable is included as an explanatory variable following Cheong (1976), Semudram (1982) and the MIER study (1980). These lags may be caused by delays in the execution of orders, long shipping journeys, etc.

3.3.3 Manufactured Exports Competitiveness Equation

In empirical studies, researchers have used indicators to present competitiveness as there is still no standard definition for the term. In a recent study on Malaysia, Yusoff (2005) applied the market share approach. He pointed out three measures of export competitiveness, that is, the trade balance approach, export market share approach and the real exchange rate approach. The first two approaches are simpler, while the exchange rate approach is more

commonly used in studies that assess competitiveness due to the forces of financial liberalisation.

In this study, the market share of Malaysia's manufactured exports' among the eight other East Asian economies will be used as an indicator for Malaysia's manufactured exports competitiveness (Table 2 - *Identities and Definitions*: Equation l). The export market share is a quantity measure. Unlike price or cost measures, Malaysia's trade data are more easily available for the quantity measure. The explanatory variables in this competitiveness equation include both internal and external factors. They are openness of the economy, the exchange rate, Malaysia's relative inflation, the US GDP and China's GDP. For the relative inflation variable, we utilised the discrepancy between Malaysia's and the EA economies average inflation rates as the dependent variable is a ratio.

3.4 The Monetary Sector

This sector will complete the model. The financial sector basically comprises the money market, government bond (securities) market and the foreign exchange market. The behavioural equations considered here are the price and money demand equations (Table 2: Equations m and n). Money supply will be defined from the supply-side of the Central Bank in the form of an identity. In total, there will be 14 behavioural equations and several identities to complete the model (refer to Table 2). The explanation for the equations and identities are given in Appendix 1, including a list of the endogenous and exogenous variables. Figure 1 shows a flow chart of this model. The bold ones refer to the behavioral equations. Most of the equations in the trade and government sectors are located in the center of the flow chart. The equations in the private and monetary sectors are mainly on the right side of the chart.

4. Discussion

This section hopes to shed some light on the issues pertaining to the relationship between manufactured exports competitiveness and the other sectors of the economy. The empirical results will be discussed according to sectors, that is, the private sector, government sector, trade sector and monetary sector. Discussions will focus on the trade sector. Tables 2a, b, c and d present the estimated variables of the individual variables of each equation in the model. Several diagnostic tests have been conducted on the equations in the model to ascertain the reliability of the results. The tests include the Breusch-Godfrey Lagrange Multiplier (LM) Serial Correlation Test, the White Heteroskedasticity Test, the Ramsey Regression Specification Error Test (RESET) and the Jarque-Bera Normality Test. The diagnostic tests results can be found in Appendix 2.

4.1 Private Sector

Table 2a shows that the estimates for both the private consumption and investment equations are in line with the theoretical expectations. In the consumption equation, the estimated

[6] The eight East Asian countries are Hong Kong, Taiwan, South Korea, Singapore, Thailand, the Philippines, Indonesia and China. The competitiveness indicator is defined as Malaysia's manufactured exports over the total manufactured exports of the East Asian (EA) economies.

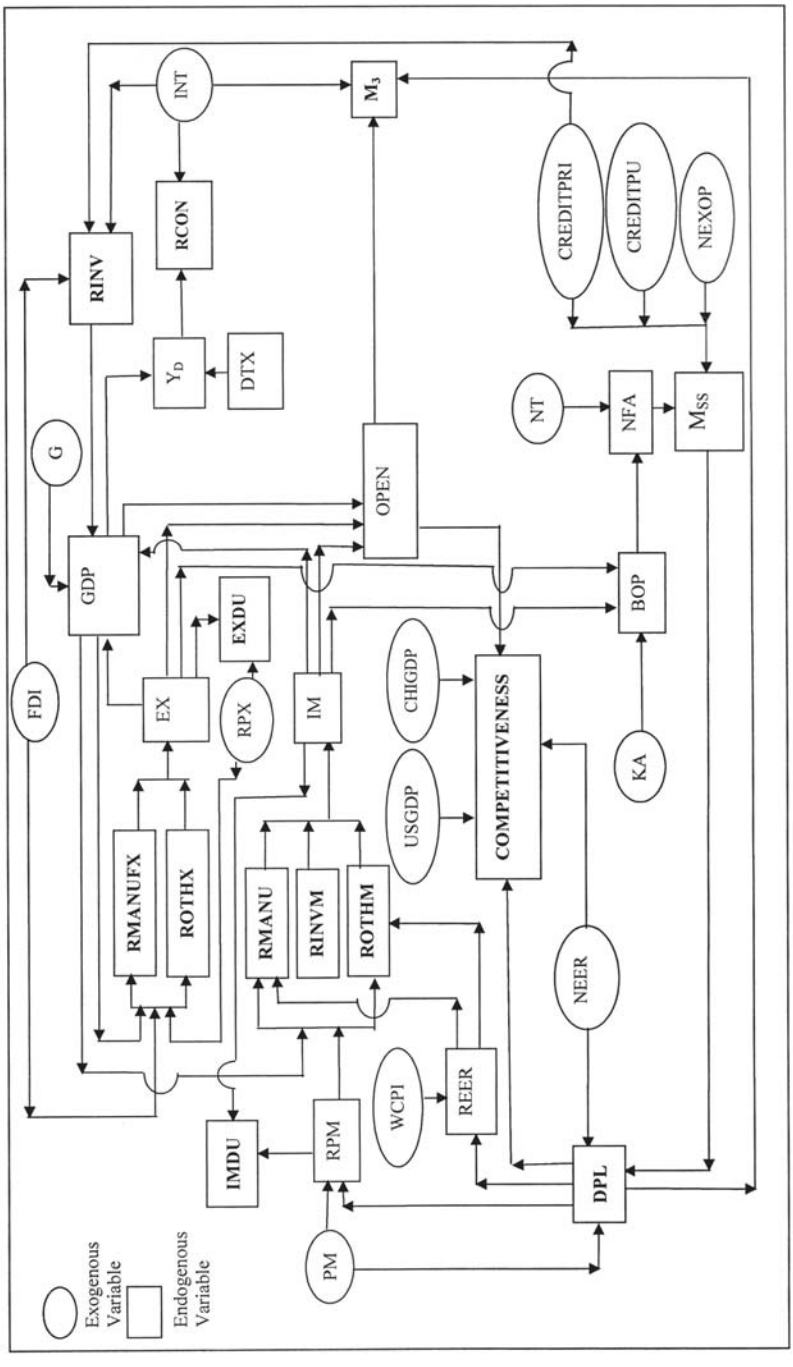

Figure 1: A *simplified flow chart of the manufactured exports competitiveness model for Malaysia*

Table 2a: Results of estimates with *t*-statistics, adjusted R^2 and *F*-statistics for the private sector

	Parameter	Coefficient	*t*-statistic
Private consumption			
Constant	α_0	667.18	3.49
$RGDP_t$	α_1	0.54	11.70***
DPL_t	α_2	21.42	-2.16**
$RINTEREST_t$	α_3	-11.93	-1.4
Adjusted R^2 =	0.99	*F*-statistic = 669.98	
Private investment			
Constant	β_0	446.39	2.46
$D(RGDP)_t$	β_1	0.406	-0.89
$D(INT)_t$	β_2	5.49	1.53
FDI_{t-1}	β_3	0.01	2.19**
$D(CREDITPRI)_t$	β_4	0.009	6.48***
$CAPCON_t$	β_5	345.77	4.16***
Adjusted R^2 =	0.81	*F*-statistic = 21.6558	

*** and ** indicate significance at the 1% and 5% levels respectively.

coefficient for disposable income (Yd_t) of 0.537 indicates the marginal propensity to consume (MPC) of Malaysians. Thus, this in turn, indicates a rather high marginal propensity to save (MPS). Findings of even higher MPS are found in past studies. In the MIER study done in the 1980s, the estimated coefficient for the income variable in the private consumption equation was 0.38, indicating a high MPS of 0.62. Semudram (1982) recorded an even higher MPS of 0.79. In terms of elasticity, the elasticity of consumption with respect to the real GDP at their mean values, is 1.15.[7] This means that a 10 per cent increase in the income level ($RGDP_t$) would lead to a 11.5 per cent increase in consumption. The interest rate is not a significant factor, even though it did record the expected sign.

In the investment equation, the interest rate variable is also found to be insignificant. This finding is parallel to that of other studies on developing countries that found private investment does not respond a great deal to interest rate (Rama 1990; Serven and Solimano 1992). In this analysis, our results underscore the importance of the availability of credit facilities for investment in Malaysia. The CREDITPRI variable is found to be highly significant at the 1 per cent level of significance which is similar to the findings of Semudram (1982) and MIER (1980). Capital control is also found to be highly significant and positively related to investment at the 1 per cent level. This indicates the Malaysian government's commitment

[7] It should be emphasised that all the elasticities referred to in this study are measured at their respective sample means. For example, the computed elasticity for consumption with respect to the real GDP is $(\Delta RGDP_t/\Delta RCONS_{t-1}) \times RCONS_{t-1}/RGDP_t$.

to provide a conducive investment environment for private investors. The one-period lag of the FDI variable is significant, but the response of investors in Malaysia to FDI is rather mild as only a low elasticity of 0.6 is found. No doubt, FDI flows come as a bundle of resources such as capital, technology and various other benefits; no country should depend on foreign investment completely as it may have unfavourable effects, especially on the nation's balance of payment in the future. Thus, the low computed elasticity for foreign investment may constitute good news for Malaysia.

4.2 Government Sector

As mentioned earlier, inclusion of the government sector is to link it to some relationships in the model. In Malaysia, direct taxes are the main source of revenue to the government. The coefficient 0.078 for GDP represents the marginal tax rate of Malaysians, which means that an annual increase of RM1 million in the GDP leads to an increase of RM 78,000 in direct taxes (refer to Table 2b). Malaysia is a nation that has been progressively liberalising its

Table 2b: Results of estimates with *t*-statistics, adjusted R^2 and *F*-statistics for the government sector

Equation	Parameter	Coefficient	*t*-statistic
Direct tax			
Constant	χ_0	-472.88	-0.55
GDP_t	χ_1	0.078	12.78***
Adjusted R^2 = 0.94		*F*-statistic = 373.28	
Export duties			
Constant	φ_0	-77.08	
EX_t	φ_1	0.0006	1.57
RPX_t	φ_2	158.46	-.37
$EXDU_{t-1}$	φ_3	0.85	6.68***
Adjusted R^2 = 0.69		*F*-statistic = 18.41	
Import duties			
Constant	γ_0	575.0	
$D(IM)_t$	γ_1	0.012	-4.72***
RPM_t	γ_2	5214.77	4.56***
$IMDU_{t-1}$	γ_3	0.42	3.22***
Adjusted R^2 = 0.86		*F*-statistic = 49.79	
Non tax revenue			
Constant	δ_0	-376.72	1.64
GDP_t	δ_1	0.05	2.58**
$OTHERTAX_{t-1}$	δ_2	0.70	
Adjusted R^2 = 0.97		*F*-statistic = 399.05	

*** and ** indicate significance at the 1% and 5% levels respectively.

trade regime. Thus, both export and import duties especially the former do not contribute a big share to the government's income.

4.3 Trade Sector

The trade sector consists of the exports, imports and competitiveness equations. As reported in Table 2c, the values of their adjusted R^2 vary between 46 and 95 per cent and the low probability of the *F*-statistics indicates that the right side variables have the explanatory power in explaining the dependent variable. In the manufactured exports supply equation, all the right side variables are statistically significant at the 10 per cent level of significance or better. Except for relative export price, the estimated coefficients for the income (RGDP), FDI lagged one period of and manufactured imports (RMANUFM) variables are all positive, indicating their favourable influence on the dependent variable.[8] The estimated coefficient of 0.1634 for the RGDP variable is found to be statistically significant at only the 10 per cent level.

A low marginal propensity to supply for manufactured exports is expected as Malaysia is still a developing country and its supply of manufactured exports is likely to be constrained by 'external' factors. In fact, both the lagged FDI and manufactured import variables are found to be significant. The computed elasticity of manufactured exports supply with respect to the lagged one-period FDI and imports at their mean values, are both inelastic with an elasticity of 0.1324 and 0.4393 respectively. The low elasticity especially for imports is encouraging as it is one of the objectives of the government to encourage the use of local materials and components. A high reliance on imports only leads to low local value-added and less foreign exchange earnings for the economy.

As in the case of manufactured exports, the income coefficient for the non manufactured exports is also small. The reason for the smaller marginal propensity to supply for the non manufactured exports is that petroleum and its related products are basically natural-based resources. The pace of the economy is not a dominant factor affecting the non manufactured exports. Lagged effects are unavoidable for such natural-based exports. In addition, exogenous factors for instance, the global oil crisis has certainly put a restraint on the supply of all oil exporters. We found a weak negative coefficient for the FDI variable in the non manufactured exports equation. This may be due to the fact that the distribution of FDI in Malaysia's economic sectors has been rather diverse. In the 1960s, foreign direct investment inflows were concentrated in the agriculture and mining sectors, but they are now largely in the manufacturing sector, especially the electronics and electrical industry.

As for the import demand equations, the results vary. The manufactured imports equation recorded a rather high adjusted R-square. The insignificance of the income (RGDP) and price (RPM) variables indicates the dependence of Malaysian exports on these imported items. The positive coefficient for the REER index means a rise in the index (a weakening currency), leads to a rise in imports. This sounds theoretically inconsistent. Nonetheless, the 'incorrect' sign may underscore the dependence of Malaysia's exports on imported

[8] The relative export price variable has an incorrect negative sign. Nonetheless, this variable will not be dropped as price plays an important role in a standard supply function. Moreover, a general export price is used here which may not have sufficient variability to produce precise estimates. Dropping a relevant variable may also lead to biased estimates for the other coefficients.

Table 2c: Results of estimates with *t*-statistics, adjusted R^2 and *F*-statistics for the trade sector

Equation	Parameter	Coefficient	*t*-statistic
Manufactured exports			
Constant	λ_0	1821.95	4.28***
$RGDP_t$	λ_1	0.16	1.87*(17.8556)
RPX_t	λ_2	1342.13	-4.0***(0.8577)
FDI_{t-1}	λ_3	0.02	2.30**(0.1324)
$RMANUFM_t$	λ_4	0.90	4.38***(0.4393)
	Adjusted R^2 = 0.95	*F*-statistic = 114.69	
Non manufactured exports			
Constant	ω_0	-153.03	-0.93
$RGDP_t$	ω_1	0.04	1.77*(6.4563)
RPX_t	ω_2	308.38	2.07*(0.285)
FDI_{t-1}	ω_3	-0.008	-1.86*(0.07)
$ROTHX_{t-1}$	ω_4	0.82	9.26***(0.8084)
	Adjusted R = 0.94	*F*-statistic = 100.02	
Manufactured imports			
Constant	Π_0	-852.57	-1.73*
$RGDP_t$	Π_1	0.20	1.09
RPM_t	Π_2	693.29	-1.24
$REER_t$	Π_3	10.92	1.85*(1.7116)
$RMANUFM_{t-1}$	Π_4	0.80	4.97***(0.8184)
	Adjusted R^2 = 0.87	*F*-statistic = 43.42	
Investment imports			
Constant	π_0	521.92	1.47
$D(RINV)_t$	π_1	0.13	0.30
RPM_t	π_2	-21.17	-0.15
$REER_t$	π_2	-2.13	-0.49
$RINVM_{t-1}$	π_4	0.64	3.56**(0.6472)
	Adjusted R^2 = 0.45	*F*-statistic =5.67	
Other imports			
Constant	Ω_0	968.07	5.57***
$RGDP_t$	Ω_1	0.21	4.10*
RPM_t	Ω_2	-553.65	-2.67**(0.5456)
$REER_t$	Ω_3	-4.37	-2.11**(0.8761)
	Adjusted R^2 = 0.79	*F*-statistic = 29.21	

Table 2c: continued

Competitiveness			
Constant	η_0	-0.02	-1.37
$Openess_t$	η_1	0.05	2.89*(0.6542)
$REER_t$	η_2	0.0004	2.41**(0.5172)
INF_t	η_3	0.004	2.60**(0.107)
$USGDP_t$	η_4	$2.09*10^{-5}$	0.47
$CHIGDP_t$	η_5	$1.60*10^{-6}$	-1.07
	Adjusted R^2 = 0.92	*F*-statistic = 61.27	

Numbers in parentheses show the computed elasticity for significant explanatory variables (at their mean values) in their respective equations.

***, ** and * indicate significance at the 1%, 5% and 10% levels respectively.

manufactured items. This is especially true for Malaysia's electronic and electrical exports which depend considerably on imported electrical parts and accessories.[9] The dependence of Malaysia's manufactured exports on imported items is confirmed again by the insignificance of relative import price (RPM) and exchange rate (REER) variables in the imported investment goods equation. It is only in the miscellaneous imports equation that the income, price and effective exchange rate variables are found to be significant at the 5 per cent level or better. The estimated coefficient of the real GDP variable is 0.21, indicating a positive, but very low marginal propensity to import (MPM). In this study, all the disaggregated import equations registered very low MPM, typical of most developing countries (see Evans 1970; Ghartey and Rao 1990).

The estimated competitiveness equation recorded satisfactory results with an adjusted R^2 of 0.921.The significant variables are the openness of the economy, the difference between Malaysia's inflation rates and that of its neighbours and the real effective exchange rate. Despite having been based on an eclectic approach, this equation has still passed all the formal statistical tests carried out.[10]

In this analysis, the degree of openness variable is measured by the trade-GDP ratio. Being an export-oriented economy, the ratio of Malaysia's trade to her GDP is over 200 per

[9] In 2006, the imports of manufactured goods, especially parts and accessories of electronic and electrical goods, accounted for nearly 70 per cent of the country's total imports and the major import markets were Japan, the US, Singapore and Mainland China (Malaysia, Economic Report 2005/06).

[10] Lloyd and Toguchi (1996) looked at the pattern of EA manufactured exports growth using the constant market share analysis. They also discussed the causes of the change in EA exports competitiveness. The factors identified to account for the change in exports competitiveness from 1980-93 were rising labour wage, trade liberalisation, technology and changes in the exchange rate. However, this study has left out the technology factor as Malaysia has generally not developed much in terms of technology. Doraisami (2004) looked into the factors behind the slowdown of Malaysia's E&E exports for the period 1991-96. Her results suggest that a downturn in the demand for E&E and a misalignment of the exchange rate are the causes for the slowdown. From these two studies, we can see that many different factors could account for changes in a country's exports performance.

cent today. Modern neoclassical economic theory stresses openness as an explanatory variable for economic growth, but the openness may leave various costs and benefits to the economy. Fortunately, the openness of the Malaysian economy is favourable for the country's manufactured exports competitiveness. A strong domestic base and effective economic management are important factors for the economy to gain from its openness. Herein, the Malaysian government plays an important role in 'guiding' the economy'. And, the government does this through effective management of the Ringgit.

Since Independence, Malaysia has experienced different forms of exchange rate regimes. Prior to the 1997 Asian financial crisis, Malaysia had been using a managed floating exchange rate. From September 1998 till 2005, the Ringgit was pegged to the US dollar. The Ringgit is then allowed to operate in a managed float setting again till today. Despite these changes, the results show that Malaysia has benefited from these exchange rate arrangements especially during recessions. The computed exchange rate elasticity of 0.52 means that as the exchange rate index rises by 10 per cent, Malaysia's manufactured exports share in the EA region can be slightly enhanced. Surprisingly, we have found a small, positive coefficient for the INF variable. This means a slightly higher price level did not harm Malaysia's manufactured exports. A plausible explanation for this is that Malaysia has relatively low inflation rates compared to its neighbours such as Indonesia and Korea. Moreover, Malaysia has a good record of containing inflationary pressures in the country's monetary history, except perhaps during the early eighties, early nineties, 1998 and approaching the year 2000.[11]

The remaining regressors, the US GDP and China's GDP, are found to be insignificant. Nonetheless, the signs are in the expected direction. A positive coefficient is found for the US GDP, indicating that the growth of the US GDP is positively related to the competitiveness variable.[12] In contrast, a negative sign for China's GDP variable indicates that China is a potential competitor. Chen (2008) did an interesting study on the substitution rate of China's exports to the US market among its neighbouring countries. China's exports have been found to replace a significant portion of Taiwan's high and medium human-capital intensive exports in the US market. Malaysia's medium human-capital intensive exports are the most affected. This implies that the structure of China's exports have shifted away from simple

[11] The first two brief inflation periods were due to world oil shocks, hence representing imported inflation. In the 1990s, the economy was growing and inflation was mostly related to demand-pull factors. The price acceleration in 1998 was due to higher import prices as the Ringgit was weakening at that time. Malaysia's Central Bank focus has been more on interest rate targeting since the late eighties to curb rising prices. In 1998, the government administered capital controls and pegged the Ringgit to the dollar at RM3.80 per USD as the country was basically experiencing a cost-push inflation. Since 2006, Asian countries have been facing rising prices driven by higher commodities and oil prices. Further, the global economy is slowing down. Hence, interest rate and demand management policies would be inappropriate. A stronger currency may not be a wise option.

[12] If a significant positive coefficient is found, it means that Malaysia's market share is expanding or outperforming the reference economies' average market share when the US economy is booming. Inside the group, Malaysia is still ahead of the 'latecomers' such as Indonesia and the Philippines (focusing mainly on the semi-conductor industry). The focus of the 'Asian Tigers' is more on the high-cost, sophisticated semi-conductors which are not included in this analysis.

manufactures such as textiles and toys, towards the medium human-capital intensive exports such as office machinery.

In fact, we also tested several internal factors such as labour productivity and total factor productivity (TFP). Nonetheless, the feedback is insignificant. Another probable factor influencing the competitiveness ratio is the EA intra-regional trade. We did not test for this factor due to several reasons: firstly, due to the lack of consistent data; secondly, because of the unbalanced intra-regional trade shares where China-Japan-Korea's share is higher than that of the ASEAN members; thirdly, the dependent variable is in the form of ratio, the ratio between Malaysia's manufactured exports and the EA as a whole.

4.4 Monetary Sector

This last sector completes the model. The monetary equations may seem unrelated to exports competitiveness, but for any good policy making to work, it requires a dynamic relationship between the monetary variables and other parts of the economy. Furthermore, price stability is an important macroeconomic agenda for every nation. Table 2d shows that the estimated coefficients of all the explanatory variables in the price equation are in agreement with economic theory and also statistically significant at 1 per cent level of significance.

We found a very small estimated coefficient for money supply, that is, 0.00002. This indicates the effect of a weak monetary policy in Malaysia. A justification for this is that the Malaysian government has been relying more on interest rate targeting to manage inflation. In fact, the Malaysian government has shifted away from the monetary policy strategy of liquidity targeting towards interest rate targeting since the mid-1990s. The significance of the import duties (IMDU) variable means that domestic inflation in Malaysia is partly attributed to 'imported' inflation. Semudram (1982) also found a significant import cost factor in his study. The significant one-period lagged price variable is an indication of the effect of price expectations.

Table 2d: Results of estimates with *t*-statistics, adjusted R^2 and *F*-statistics for the monetary sector

Equation	Parameter	Coefficient	*t*-statistic
Domestic Price			
Constant	ψ_0	18.30	4.37***
MSS_t	ψ_1	0.00002	4.05***
$IMDU_t$	ψ_2	0.001	3.69***
DPL_{t-1}	ψ_3	0.67	8.43***
Adjusted R^2 = 0.99		*F*-statistic= 2385.77	
Money demand			
Constant	ρ_0	-39257.93	-0.37
$RGDP_t$	ρ_1	186.22	7.43***
$INTEREST_t$	ρ_2	10577.36	-2.23**
$D(DPL)_t$	ρ_3	-927.55	-0.53
Adjusted R^2 = 0.98		*F*-statistic = 426.77	

*** and ** denote significance at the 1% and 5% levels respectively.

5. Conclusion

This study has provided a basic structure to study the possible determinants of Malaysia's manufactured exports competitiveness. The parameters of the model were estimated using the 2SLS method. Despite the limitation of being a relatively simple macroeconomic model, the model is able to serve the purpose of this study. This is because most of the estimated coefficients are statistically significant at the 5 per cent level of significance and with the expected signs.

Our study shows that the openness of the Malaysian economy, differences between Malaysia's inflation rates and that of its neighbours and the exchange rate are important factors affecting Malaysia's manufactured export competitiveness. A high degree of openness of the Malaysian economy has the most impact. It is therefore imperative for developing countries such as Malaysia to open up their economies to benefit from FDI inflows and trade liberalisation in order to catch up. Nonetheless, opening up an economy also entails some risks. Thus, the trade performance of Malaysia and its neighbours' will largely depend on their ability to implement opening-up policies more effectively. In most cases, a way to mitigate any negative consequences would be prudent exchange rate management.

Our findings also show that imported manufactured and investment items in the trade equation did not respond to the exchange rate. This may indicate the limitations of an exchange rate policy in addressing the balance of trade deficit further in the near future. Malaysia inevitably needs to produce its own intermediate and investment parts to reduce the high import costs. This may not be possible within a short period, but over the long term and with steady FDI flows and government support, it can be realised. Nonetheless, the demand for imported consumer goods does respond to the exchange rate. This suggests the relevance of the exchange rate policy for Malaysia to a certain extent, that is, to curb imported inflationary pressures. The ability to mitigate inflationary pressures is essential as Malaysia is at present confronting several trade competitors with cost advantages such as China and India.

At the same time, Malaysia needs to work in raising the productivity of the economy's resources and labour in particular. This is because improvements in labour productivity help to keep labour costs at a manageable level. The same goes for the science and technology area, albeit not viable in the short term. Only with a stronger economic and technological base, will Malaysia be able to further develop its economy, which is important to enhance manufactured exports competitiveness.

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Appendix 1

List of Endogenous Variables

1. COMPET: Malaysia's manufactured export market share to the average EA share
2. GDP: Malaysia's Nominal Gross Domestic Product (RM million, in current prices)
3. Yd: Disposable income (RM million, in current prices)
4. EX: Aggregate exports (RM million, in current prices)
5. IM : Aggregate imports (RM million, in current prices)
6. DTX: Direct tax revenue from households and corporations (RM million, in current prices)
7. EXDU: Indirect tax revenue from exports (RM million, in current prices)
8. IMDU: Indirect tax revenue from imports (RM million, in current prices)
9. OTHTAX: Other taxes and non-tax revenue (RM million, in current prices)
10. RCONS: Real private consumption (RM million, in constant prices, (2000=100)), that is, private consumption deflated by the domestic price index
11. RINV: Real private investment (RM million, in constant prices, (2000=100)), that is, private investment deflated by the domestic price index
12. RMANUFX: Real manufactured exports (SITC 6,7,8) (RM million, in constant prices, (2000=100)), that is, manufactured exports deflated by the export price index
13. ROTHX: Real non manufactured exports (other than SITC 6,7,8) (RM million, in constant prices (2000=100)), that is, non-manufactured exports deflated by the export price index
14. RMANUFM : Real import demand for manufactured goods and miscellaneous manufactured articles (SITC 6,8) (RM million, in constant prices, (2000=100)), that is, import of the manufactured goods deflated by the import price index
15. RINVM : Real import demand for investment goods such as machinery and transport equipment (SITC 7) (RM million, in constant prices, (2000=100), that is, import of the investment goods deflated by the import price index
16. ROTHM : Real import demand for other items excluding SITC (6,7,8) such as consumer goods, mineral fuel and chemicals (RM million, in constant prices, (2000=100)), that is, import of the other items deflated by the import price index
17. DPL: Domestic price level based on the consumer price index (2000=100)
18. REER: Real effective exchange rate, that is, the price adjusted by nominal effective exchange rate (RM/USD)
19. RPM : Relative import price index, PM/DPL
20. MSS : Money Supply (RM million, in current prices)
21. M3: Money demand (RM million, in current prices)
22. NFA: Net Foreign Asset (RM million, in current prices)
23. RGDP: Real Gross Domestic Product, that is, GDP/DPL
24. CONS: Private Consumption, that is, RCONS * DPL
25. INV: Private Investment, that is, RINV*DPL
26. OPEN: Ratio of the sum of EX and IM to GDP
27. BOP: Balance of Payments (RM million, in current prices)

List of Exogenous Variables

1. G: Central government consumption and investment expenditures (RM million, in current prices)
2. NEER: Nominal effective exchange rate, that is, trade weighted effective exchange rate based on Malaysia's top ten trading partners.
3. WCPI: World consumer price index (2000=100)
4. PM: Import price index (2000=100)
5. PX: Export price index (2000=100)

6. RPX: Relative export price, that is, PX/WCPI (2000=100)
7. INT: Market interest rate (%)
8. FDI: Inflow of foreign direct investment to the manufacturing sector (RM million, in current prices)
9. CREDITPRI: Domestic credit to the private sector (RM million, in current prices)
10. CREDITPUB: Domestic credit to the public sector (RM million, in current prices)
11. NEXOP: Net external operations (RM million, in current prices)
12. KA: Capital account (RM million, in current prices)
13. NT: Net transfers (RM million, in current prices)
14. CHIGDP: China's GDP (Yuan billion, in current prices)
15. USGDP: The GDP of the U.S. (USD million, in current prices)
16. INF: The difference between Malaysia's inflation rates and the average inflation rates of the EA economies (%)
17. CAP: Capital controls imposed by the government, dummy variable =1 for the period 1994, 1998 and 1999, and 0 otherwise.
18. BALONGTC: Net Long-term Capital Inflows (RM million, in current prices)
19. BASHORTC: Net Short-term Capital Inflows (RM million, in current prices)
20. EO: Errors and Omissions (RM million, in current prices)
21. CSTOCK: Changes in stocks (RM million in current prices), to make the national income identity holds

Appendix 2

For each of the behavioural equations in the model, the estimated parameters of the individual variables are presented below. The number in parentheses below each coefficient is the *t*-value. Values of the adjusted coefficient of determination (R^2 adjusted), the Durbin-Watson statistic (DW) and the Durbin-h are listed wherever they are applicable. The asterisks ***, ** and * indicate that the variable is statistically significant at the 1, 5 and 10 per cent levels respectively. Four other diagnostic tests have been undertaken to check for any violations of the classical linear regression model.

The diagnostic tests conducted on the stochastic equations in the model are the Breusch-Godfrey Lagrange Multiplier (LM) Serial Correlation Test, the White Heteroskedasticity Test, the Ramsey Regression Specification Error Test (RESET) Test and the Jarque-Bera Normality Test. The Lagrange Multiplier (LM) Serial Correlation Test is to test for autocorrelation. The White Test is to test for heteroscedasticity caused by misspecification, the Ramsey RESET test is to assess the appropriateness of the functional form of the equations and the Jarque-Bera Normality Test is to test for the normality of the residuals.

Private Sector

1. Private consumption:

$$\underset{}{RCONS_t} = \underset{}{667.175} + \underset{(11.70)}{0.537\,RGDP_t^{***}} - \underset{(-2.16)}{21.423\,DPL_t^{**}} - \underset{(-1.40)}{11.928\,RINT_t}$$

Adjusted R^2 = 0.9877 DW = 0.9044 *F*-statistic = 669.984

Breusch-Godfrey Serial Correlation LM: (1) = 7.87; *p*-value = 0.005
White (no cross terms): *F*-statistic =0.9037; *p*-value = 0.5127
Ramsey RESET F(1) = 0.049; *p*-value = 0.8263
Jarque Bera = 0.3182; *p*-value = 0.8529

2. Private investment:

$$RINV_t = \underset{}{446.382} - \underset{(-0.89)}{0.406\,D(RGDP)_t} + \underset{(1.53)}{5.488\,RINT_t} + \underset{(2.19)}{0.017\,FDI_{t-1}^{**}}$$

$$+ \underset{(6.48)}{0.009\,D(CREDITPRI)_t^{***}} + \underset{(4.16)}{345.766\,CAP_t^{***}}$$

Adjusted R^2 = 0.8069 DW = 2.34 *F*-statistic = 21.6558

Breusch-Godfrey Serial Correlation LM: (1) =1.24; *p*-value =0.266
White (no cross terms): *F*-statistic =1.501; *p*-value = 0.23
Ramsey RESET F (1) = 0.86; *p*-value = 0.365
Jarque Bera = 1.814; *p*-value = 0.404

Government Sector

3. Direct tax

$$DTX_t = \underset{(-0.55)}{-472.88} + \underset{(12.78)}{0.077\,GDP_t^{***}}$$

Adjusted R^2 = 0.9368 DW = 0.9316 *F*-statistic = 373.2791

Breusch-Godfrey Serial Correlation LM: (1) = 6.226; *p*-value = 0.013
White (no cross terms): *F*-statistic =10.399; *p*-value = 0.0006

Ramsey RESET F (1) = 0.169; *p*-value = 0.685
Jarque Bera = 0.824; *p*-value = 0.516

4. Exports duties

$$EXDU_t = -77.081 + \underset{(1.57)}{0.0006\ EX_t} + \underset{(0.37)}{158.460\ RPX_t} + \underset{(6.68)}{0.845\ EXDU_{t-1}}^{***}$$

Breusch-Godfrey Serial Correlation LM: (1) =3.733; *p*-value =0.053
White (no cross terms): *F*-statistic =2.387; *p*-value = 0.069
Ramsey RESET F (1) = 0.598; *p*-value = 0.448
Jarque Bera = 0.957; *p*-value = 0.62

Adjusted R^2 = 0.6852 Durbin – h = -2.09 *F*-statistic = 18.4112

5. Import duties

$$IMDU_t = 575.004 - \underset{(-4.73)}{0.012\ IM_t}^{***} + \underset{(4.56)}{5214.766\ RPM_t}^{***} + \underset{(3.22)}{0.418\ IMDU_{t-1}}^{***}$$

Breusch-Godfrey Serial Correlation LM: (1) =1.798; *p*-value =0.18
White (no cross terms) : *F*-statistic = 0.991; *p*-value = 0.459
Ramsey RESET F (1) = 0.1; *p*-value = 0.755
Jarque Bera = 5.275; *p*-value = 0.072

Adjusted R^2 = 0.8613 Durbin – h = -1.0507 *F*-statistic = 49.7925

6. Non tax revenue

$$OTHTAX_t = -376.714 + \underset{(1.64)}{0.050\ GDP_t} + \underset{(2.57)}{0.699\ OTHTAX_{t-1}}^{**}$$

Breusch-Godfrey Serial Correlation LM: (1) =5.002; *p*-value =0.03
White (no cross terms): *F*-statistic =1.52; *p*-value = 0.233
Ramsey RESET F (1) = 0.06; *p*-value = 0.809
Jarque Bera = 9.846; *p*-value = 0.007

Adjusted R^2 = 0.9696 Durbin – h = -0.1064 *F*-statistic = 399.0502

Trade Sector
7. Manufactured exports

$$RMANUFX_t = -1821.952 + \underset{(1.87)}{0.1634\ RGDP_t}^{*} + \underset{(-4.00)}{1342.132\ RPX_t}^{***} - \underset{(2.30)}{0.022\ FDI_{t-1}}^{**} + \underset{(4.38)}{0.9018\ RMANUFM_t}^{*}$$

Breusch-Godfrey Serial Correlation LM: (1) =4.204; *p*-value =0.04
White (no cross terms): *F*-statistic =3.055; *p*-value = 0.025
Ramsey RESET F (1) = 0.05; *p*-value = 0.825
Jarque Bera = 0.553; *p*-value = 0.759

Adjusted R^2 = 0.9489 DW = 1.2393 *F*-statistic = 114.6871

8. Non manufactured exports

$$\underset{}{ROTHX_t} = \underset{}{-153.034} + \underset{(1.77)}{0.041\,RGDP_t^{***}} + \underset{(2.07)}{308.377\,RPX_t^{***}} - \underset{(-1.86)}{0.008\,FDI_{t-1}^{***}} + \underset{(9.26)}{0.823\,ROTHX_{t-1}^{*}}$$

Breusch-Godfrey Serial Correlation LM: (1) =2.853; *p*-value =0.091
White (no cross terms): *F*-statistic =2.03; *p*-value = 0.105
Ramsey RESET F (1) = 2.204; *p*-value = 0.153
Jarque Bera = 2.519; *p*-value = 0.284

Adjusted R^2 = 0.9397 Durbin-h = 1.8313 *F*-statistic = 100.0204

9. Imported investment goods

$$\underset{}{RINVM_t} = \underset{}{521.9187} + \underset{(0.30)}{0.1346\,D(RINV)_t} - \underset{(-0.15)}{21.169\,RPM_t} - \underset{(-0.49)}{2.1335\,REER_t} + \underset{(3.56)}{0.676\,RINVM_{t-1}^{**}}$$

Breusch-Godfrey Serial Correlation LM: (1) =0.017; *p*-value =0.896
White (no cross terms): *F*-statistic =1.898; *p*-value = 0.127
Ramsey RESET F (1) = 0.118; *p*-value = 0.735
Jarque Bera = 70.597; *p*-value = 0.00

Adjusted R^2 = 0.451 Durbin - h = 0.2453 *F*-statistic = 5.673661

10. Imported manufactured goods

$$\underset{}{RMANUFM_t} = \underset{}{-852.5717} + \underset{(1.09)}{0.1978\,RGDP_t} - \underset{(-1.24)}{693.2938\,RPM_t} + \underset{(1.85)}{10.9203\,REER_t^{*}} + \underset{(4.97)}{0.7975\,RMANUFM_{t-1}^{***}}$$

Breusch-Godfrey Serial Correlation LM: (1) =0.763; *p*-value =0.382
White (no cross terms): *F*-statistic =1.34; *p*-value = 0.29
Ramsey RESET F (1) = 3.101; *p*-value = 0.094
Jarque Bera = 44.116; *p*-value = 0.00

Adjusted R^2 = 0.872 Durbin - h = 1.3759 *F*-statistic = 43.41992

11. Miscellaneous imports

$$\underset{}{ROTHM_t} = \underset{}{968.0681} + \underset{(4.10)}{0.2074\,RGDP_t^{*}} - \underset{(-2.67)}{553.6546\,RPM_t^{**}} - \underset{(-2.11)}{4.3669\,REER_t^{**}}$$

Breusch-Godfrey Serial Correlation LM: (1) =5.002; *p*-value =0.025
White (no cross terms): *F*-statistic = 0.6; *p*-value = 0.7264
Ramsey RESET F (1) = 1.137; *p*-value = 0.298
Jarque Bera = 1.763; *p*-value = 0.414

Adjusted R^2 = 0.7921 DW = 1.0679 *F*-statistic = 29.2088

12. Manufactured exports competitiveness

$$COMPET_t = -0.0197 + \underset{(2.89)}{0.046\,OPEN_t^{*}} + \underset{(2.41)}{0.0004\,REER_t^{**}} + \underset{(2.60)}{0.0037\,INF_t^{**}} + \underset{(0.47)}{(2.09\times10^{-5})\,USGDP_t} - \underset{(-1.07)}{(1.60\times10^{-6})\,CHIGDP_t}$$

Breusch-Godfrey Serial Correlation LM: (1) = 0.1139; *p*-value =0.736
White (no cross terms): *F*-statistic =2.886; *p*-value = 0.566
Ramsey RESET F (1) = 0.01; *p*-value = 0.923
Jarque Bera = 2.903; *p*-value = 0.234

Adjusted R^2 = 0.9215 DW = 2.116 F-statistic = 61.2728

Financial Sector
13. Money demand

$$M3_t = -39257.93 + \underset{(7.43)}{186.215\,RGDP_t^{***}} - \underset{(-2.23)}{10577.36\,INT_t^{**}} - \underset{(-0.53)}{926.549\,D(DPL)_t}$$

Breusch-Godfrey Serial Correlation LM: (1) =9.718; *p*-value =0.002
White (no cross terms): *F*-statistic =1.076; *p*-value = 0.411
Ramsey RESET F (1) = 0.009; *p*-value = 0.927
Jarque Bera = 0.604; *p*-value = 0.739

Adjusted R^2 = 0.9806 DW = 1.0993 *F*-statistic = 426.7744

14. Domestic price

$$DPL_t = 18.297 + \underset{(4.05)}{0.00002\,MSS_t^{***}} + \underset{(3.69)}{0.001IMDU_t^{***}} + \underset{(8.43)}{0.674\,DPL_{t-1}^{***}}$$

Breusch-Godfrey Serial Correlation LM: (1) =0.636; *p*-value =0.425
White (no cross terms): *F*-statistic =2.518; *p*-value = 0.058
Ramsey RESET F (1) = 0.42; *p*-value = 0.524
Jarque Bera = 0.978; *p*-value = 0.613

Adjusted R^2 = 0.996 DW = 1.7155 *F*-statistic = 2385.768