

CHAPTER THREE: THEORETICAL OUTLINE

3.0 INTRODUCTION

The rapid Malaysian economic growth has been the result of a number of interacting factors such as economic, political and social factors. Though, we cannot easily quantify the relative importance of each factor, most analysts agree that export promotion and an outward-looking development strategy have played a prime role in the development of Malaysia⁶.

Based on the theoretical and empirical literature review of the preceding chapter, two regression models will be developed in this chapter.

As far as our first model is concerned, since exports alone do not explain fully the variation in economic growth of a country, this part of the paper analyses the dominant factors influencing growth in Malaysia over the period 1970-1999. The growth function is a hybrid one incorporating the arguments put forward by the various evidence on the relationship between exports and growth.

In addition, in order to find out if growing exports can drive the rest of the economy, a second model will be developed. We will examine the impact of exports on the non-trade sector, that is, we will examine if exports generate any spillover effects which may work via the establishment of linkages.

6. Bank Negara Malaysia annual Report (1999) and Chia Siow Yue (1999)

3.1 UNDERLYING THEORETICAL MODELS

The variables used in specifying our models are generally based on the theoretical literature presented in Chapter Two. A formal treatment of some of the models are given below in order to show the relationship between exports and growth.

3.1.1 The Harrod-Domar Model (1948)

First of all, the structure of the Harrod-Domar model is summarized below:

$$dQ_t = (1/g)I_t \text{ —————(3.1.1.1)}$$

Where Q_t is output in period t , g is the incremental capital output ratio and I_t is the change in capital stock (dK_t)

$$S_t = sQ_t \text{ —————(3.1.1.2)}$$

$$M_t = mQ_t \text{ —————(3.1.1.3)}$$

S and M represent the total amount of savings and imports respectively whereas s and m are the marginal and average propensity to save and import respectively.

$$X_t = X_0(1+e)^t \text{ —————(3.1.1.4)}$$

Where X shows the total amount of exports and e is the rate of growth of exports.

$$I_t - S_t = M_t - X_t \text{ —————(3.1.1.5)}$$

From equations (3.1.1.2), (3.1.1.3) and (3.1.1.5), we have

$$I_t = sQ_t + mQ_t - X_t \text{ —————(3.1.1.6)}$$

Substituting equation (3.1.1.6) into equation (3.1.1.1):

$$dQ_t = (1/g)[sQ_t + mQ_t - X_t] \text{ —————(3.1.1.7)}$$

Dividing both sides of equation (3.1.1.7) by Q_t :

$$(dQ_t/Q_t) = (1/g)[s + m - X_t/Q_t] \text{ —————(3.1.1.8)}$$

3.1.2 The Two-Gap Model [Chenery and associates (1962, 1966, 1970)]

The Two-Gap model which is subtly different from the Harrod-Domar framework is laid out below:

$$dQ_t = (1/g)I_t \text{ —————(3.1.2.1)}$$

$$S_t = sQ_t \text{ —————(3.1.2.2)}$$

$$M_t = mQ_t \text{ —————(3.1.2.3)}$$

$$X_t = X_0(1+e)^t \text{ —————(3.1.2.4)}$$

$$I_t = \min(aI_t^d, bM_t^k) \text{ —————(3.1.2.5)}$$

$$I_t - S_t = M_t - X_t \text{ —————(3.1.2.6)}$$

$$F_t = M_t - X_t \text{ —————(3.1.2.7)}$$

$$M_t = M_t^k + M_t^c \text{ —————(3.1.2.8)}$$

$$I_t = I_t^d + M_t^k \text{ —————(3.1.2.9)}$$

Equations (3.1.2.1) - (3.1.2.4) and (3.1.2.6) are identical to equations (3.1.1.1) – (3.1.1.5) in the Harrod-Domar model. In this case, I_t^d stands for investment from domestic resources, M_t^k and M_t^c represent the imports of capital and consumer goods respectively and F_t refers to the foreign exchange gap – the difference between imports and exports.

Equation (3.1.2.5) specifies that there are two limits to the amount of capital formation, I_t^d which is domestic investment and M_t^k which represents the import of capital.

The reduced form of the Two-Gap model varies according to whether the domestic or foreign resource constraint is operative. When the domestic constraint is operative, equation (3.1.2.5) is replaced by $I_t = aI_t^d$ and the reduced form of the model becomes:

$$(dQ_t/Q_t) = (1/g)[s + m - X_t/Q_t] \text{ —————(3a)}$$

which is identical to equation (3.1.1.8) in the Harrod-Domar model.

On the other hand, if the foreign resource constraint is operative, then equation (3.1.2.5) is replaced by $I_t = bM_t^k$ and thus we have:

$$(dQ_t/Q_t) = (1/g)[(X_t/Q_t) + (F_t/Q_t) - (M_t^c/Q_t)] \text{ —————(3b)}$$

where $M_t^k = F_t + X_t - M_t^c$ from equations (3.1.2.7) and (3.1.2.8)

Equation (3b) specifies a positive relationship between the proportion of exports to total output and the rate of growth of output, the intermediate link being the positive relationship between exports and capital goods import. In this case, it can be said that exports earnings ease the economy from foreign exchange constraints and permit the economy to import capital goods for investment purposes.

So far we have two testable hypotheses. The first one being:

$$(I_t^d/Q_t) = a_1 - b_1(X_t/Q_t) \text{ —————(3c)}$$

$$\text{and consequently } (dQ_t/Q_t) = a_1 - b_1(X_t/Q_t) \text{ —————(3d)}$$

The second hypothesis is:

$$(M_t^k/Q_t) = a_3 + b_3(X_t/Q_t) \text{ —————(3e)}$$

$$\text{and } (dQ_t/Q_t) = a_4 + b_4(X_t/Q_t) \text{ —————(3f)}$$

Equations (3c) and (3d) imply an inverse relationship between the proportion of exports to aggregate output and the latter's rate of growth, the intermediate link being the

negative relationship between exports and investment both competing for scarce domestic resources.

Conversely, the second hypothesis implies a positive relationship between the proportion of exports to total product and its rate of growth, the intermediate link being the positive relationship between exports and capital goods imports as discussed above.

Thus, according to these theories, the major policy implication is that countries which neglect exports through discriminatory economic policies are likely to have to settle for lower rates of economic growth. Thus, these theories show a strong preference for open development strategies emphasizing export-orientation rather than import-substitution.

3.2 THEORETICAL BASIS FOR THE CHOICE OF VARIABLES

The relationship between growth and exports is extremely complicated and the other key factors such as price variations, investment climate and political conditions affect their relationship to a great extent. This study, therefore, proposes a multivariate framework to examine the export-led growth hypothesis in Malaysia. It should be noted that all the variables are in logarithmic form and the explanatory variables are:

3.2.1 The Target Variable: Exports

The export-led growth hypothesis postulates that export growth is the key determinant of overall economic growth of a country. There are at least three arguments that can be used

to provide the theoretical rationale for this hypothesis (Bhagwati, 1988).

The first of these arguments is that export growth leads, via the foreign trade multiplier, to an expansion in output level.

Secondly, it can be argued that technical progress plays a very important role in the growth process⁷. It is further argued that the inflow of foreign technology through the import of capital goods is the most significant determinant of technical progress. Since foreign aid can hardly finance the import of capital in a country permanently, a sustained expansion in exports is essential to ensure technical progress and hence ultimately economic growth. Thus, an increase in exports which brings in foreign exchange helps to finance the imports of capital goods which in turn give rise to a more rapid pace of capital formation and technical progress and hence a higher rate of output growth.

In addition, improved economies of scale become possible as market boundaries are worldwide rather than just the nation's own borders. There is also a constant incentive to compete more effectively by reducing any internal inefficiencies, whether in choosing the combination of the factors of production in deciding what goods to produce or how to squeeze the most output out of a given stock of resources, that is achieving x-efficiency⁸.

7. see Grossman et al. (1991)

8. The advantages of an expanding export sector, including the non-quantifiable ones are traced out by Bhagwati (1988)

Likewise, the fact that the efficiency with which an economy operates shows clear signs of improvement with outward orientation represents another dynamic advantage. This is obvious from the comparative data on incremental capital output ratios which seem to fall, that is the efficiency of investment rises with an expansion in exports. The data are presented in Table 2.

TABLE 2: INCREMENTAL CAPITAL OUTPUT RATIOS IN LDCs

	1963-73	1973-85
Strongly outward-oriented	2.50	4.50
Moderately outward-oriented	2.50	5.00
Moderately inward-oriented	3.33	6.25
Strongly inward-oriented	5.26	9.09

Source: World Bank Data cited in 'The Economist', September 23, 26

Thus, as suggested by the data, outward orientation, that is, export expansion increases the efficiency of an economy and hence brings the economy to a higher growth path.

It is important to note that while the first argument pertains to short run (cyclical) changes in output, the remaining arguments pertain to long run (trend) changes and that failure to take advantage of these factors through trade impairs the growth rate.

Moreover, evidence of a high correlation between the rate of growth of exports and that of GDP has been frequently empirically found. A wide range of studies using both cross-country and time series data conclude that the relationship between export performance and growth performance is significant (Dollar, 1992; Dornbusch, 1992; Michaely,

1977; Krueger, 1978). Thus, the export variable, being our main focus, is included in our analysis based on the arguments of the above-mentioned studies.

3.2.2 Control Variables: Investment to Output Ratio and Terms of Trade

Since all variables are treated as endogenous in the first stage, investment and terms of trade are included in the time series analysis in order to control for export growth which results from price competitiveness and growth in the world economy.

3.2.2.1 Investment to Output Ratio

Investment is included in the growth equation because economic growth is known to have a direct relationship with investment via the accelerator principle and also because exports are indirectly related to investment as emphasized by both the Harrod-Domar and the Two-Gap models in Chapter Two. However, since investment is a component of GDP, the investment to output ratio is used as a regressor.

The inclusion of the investment to output ratio is based on the argument put forward by **Balassa (1978), Tyler (1981), and Feder (1982)** who examined the export-led growth hypothesis and included investment to output ratio as an explanatory variable. These studies found strong evidence in favour of the export-led growth hypothesis.

3.2.2.2 Terms of Trade

The terms of trade variable is incorporated on the basis of arguments along the lines of **Ghartey (1993)** and **Henriques and Sadrosky (1996)**.

The inclusion of terms of trade in a multivariate analysis is justified on the basis of the important role that the unit value indices for exports and imports play in influencing Malaysia's trade and its competitiveness in the international market. Terms of trade play a very crucial role in determining the size of exports, imports and trade balance.

In addition, terms of trade are also supposed to detect possible linkages of the real exchange rates (and possible effects of trade policy in the form of tariff barriers if they are reflected in the terms of trade) and output, a link which is much stressed by the literature on the "new" trade policies and the "hysteresis" model of trade (see **Baldwin and Krugman, 1986**). This variable also encapsules the major oil shocks that took place in 1973 and 1979.

3.2.3 The Overall Regression Functions

The main objective of this paper is to establish whether there is a link between exports and overall economic growth. Thus, bringing together all the variables discussed in the above sections, the general growth function for **model 1** becomes:

$$\text{LGDP}_t = a_0 + a_1 \text{LEX}_t + a_2 \text{LIO}_t + a_3 \text{LTOT}_t + U_t \text{ —————(3.2.3.1)}$$

It is further thought that the export sector can be related to Rostow's (1960) leading sector model in so far as the export sector may be the leading sector in the economy, growing more rapidly and propelling the rest of the economy as it is believed that many positive externalities are associated with the export sector. The spillover effects may work via the establishment of various linkages. The export product may be used as inputs to other products (forward linkages) or their production may require goods and services from other industries (backward linkages) which in turn expand output across a wider range than the export good itself. Moreover, linkages may also be created via final goods consumption and through taxation. The production of the export product creates income that is spent on consumer goods and the government revenue generated from the taxation of the export production can be used to finance the development of other sectors of the economy.

Thus, in addition to examining the export-led growth hypothesis, this paper tries to find out if exports exert any positive externalities on the non-trade sector. In this respect, the log of GDP net of exports and imports is regressed on the same variables as in model 1. Hence, **model 2** becomes:

$$LGNT_t = b_0 + b_1LEX_t + b_2LIO_t + b_3LTOT_t + E_t \text{ —————(3.2.3.2)}$$

Where $LGDP_t$ is the log of GDP in real terms at time t and it is used as a measure of economic performance

$LGNT_t$ is the log of real GDP net of exports and imports

LEX_t represents the log of real exports

LIO_t shows the log of the ratio of real investment to real GDP

$LTOT_t$ is the terms of trade defined as the ratio of export unit value to import unit value

U_t and E_t refer to the disturbance terms

The constant terms in the regressions, a_0 and b_0 can be seen as 'catch-all' terms which measure the effects of all other variables not included in the regressions -such as technical change, health and education - on overall economic growth and growth in output in the non-trade sector.

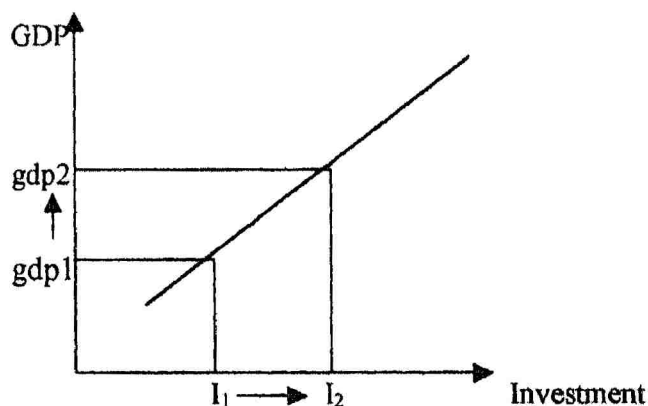
3.3 A PRIORI SIGN FOR EACH INDEPENDENT VARIABLE

3.3.1 Target Variable: Exports

As argued by the Classical and Neoclassical economists, the Harrod–Domar model, the Staple model and the Two-Gap model, exports must have a positive impact on GDP and hence on GDP growth. This positive impact may manifest itself through different channels (Jung and Marshall, 1985; Afxentiou and Serletis, 1991). First, an open economy is exposed to international competition and therefore needs to adjust towards more efficient production to remain competitive in the international market. Second, countries have access to world markets and therefore can benefit from the advantages of economies of scale. In addition, the expansion of the export sector creates positive externalities to the non-exporting sector. Last but not least, export expansion provides an additional source of foreign exchange earnings which can be used to finance purchases of productive intermediate goods (Fountas, 2000).

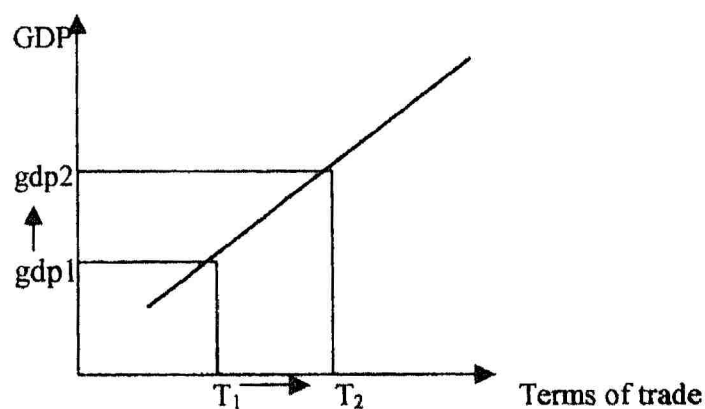
3.3.2 Control Variables: Investment to Output Ratio and Terms of Trade

Likewise, it is expected that there is a positive relationship between the investment to output ratio and GDP growth. This may arise due to the multiplier effect and accelerator principle. An increase in the investment to output ratio has both direct and indirect effects on GDP. The indirect effects can be seen through the linkages and further stimulation of economic activity due to the increase in investment to output ratio. This positive relationship can be represented by the following graph:



Similarly, an increase in the terms of trade is expected to have a positive impact on economic growth. The terms of trade is defined as the ratio of unit value of export to unit value of import. An amelioration in the terms of trade therefore means that either the export unit value increases or import unit value decreases or both an increase in the unit value of exports and a fall in the unit value of imports. All of these factors, accounting for the rise in the terms of trade, tend to generate increases in net exports earnings which help to finance the import of capital goods giving rise to a more rapid pace of capital formation and technical progress and hence a higher level of output.

This positive link between terms of trade and GDP can be shown diagrammatically as follows:



3.3.3 Summary

In short, the following a priori expectations can be made regarding the signs of the explanatory variables for both models:

Model 1: $LGDP = f(+LEX, +LIO, +LTOT)$

Model 2: $LGNT = f(+LEX, +LIO, +LTOT)$

3.4 CONCLUSION

Having given a more or less detailed discussion on the theoretical outline, the next step is to give an explanation on the methodology used in this paper. Thus, the next chapter deals with the methodological aspect.