CHAPTER V
RESULTS AND DISCUSSION

5.1 Introduction

This chapter shows the analyzed results and discussion of earlier works done in previous sections. Section 5.2 presents time series properties of the variables and this is followed by results of unit root tests, in levels and first differences, for both the ADF and PP tests, as presented in section 5.3. Test results of Granger non-causality are displayed and summarized in section 5.4. Section 5.5 ends with conclusion.
5.2 Time Series Properties

As discussed in section 4.5, it is well known that macro time series data such as the ones employed in this study tend to exhibit either a deterministic and/or stochastic time trend. Hence, there are not stationary. Figure 5.1 illustrates this statement. As we could observe, time series plots of $y$, $ex$ and $gni^*$ suggested linearly trended series, whereas it is much less clear whether $fdi$ and $rer$ are trended. However, given that the mean of the variables appeared to be non-constant, it suggests the variables are not stationary in levels. In contrast, plots of the first differences of each variable reveal no evidence of changing mean nor changing variances. Hence, we need to further test for the level of integration.

5.3 Unit Root Test Results – ADF and PP

Although we could observe from the graphs and they suggest the variables are not stationary in levels, appropriate unit root tests still need to be taken to avoid any misjudgements or biases. Hence, both ADF and PP tests of unit root are adopted in this study. Both ADF and PP tests are performed with drift and with drift and time trend in level, meanwhile, the first difference test only involves a drift and their results are presented in Table 5.1.
Figure 5.1: Time Series Properties

Figure 5.1a: Log $Y_t$ (y)

Figure 5.1b: Change in Log $Y_t$ ($\Delta y$)

Figure 5.1c: Log $EX_t$ (ex)

Figure 5.1d: Change in Log $EX_t$ ($\Delta ex$)

Figure 5.1e: Log $FDI_t$ (fdi)

Figure 5.1f: Change in Log $FDI_t$ ($\Delta fdi$)
Figure 5.1: Time Series Properties (Continued)

Figure 5.1g: Log $GNI^* (gmi^*)$

Figure 5.1h: Change in Log $GNI^* (Δgmi^*)$

Figure 5.1i: Log $RER (rer)$

Figure 5.1j: Change in Log $RER (Δrer)$
### Table 5.1: Unit Root Test Results

<table>
<thead>
<tr>
<th>Variables</th>
<th>Levels</th>
<th>First differences</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ADF</td>
<td>PP</td>
</tr>
<tr>
<td></td>
<td>Without trend</td>
<td>Trend</td>
</tr>
<tr>
<td>$y$</td>
<td>-0.0981(2)</td>
<td>-3.4836(2)**</td>
</tr>
<tr>
<td>$ex$</td>
<td>0.2766(1)</td>
<td>-3.2067(1)</td>
</tr>
<tr>
<td>$fdi$</td>
<td>-1.2592(3)</td>
<td>-1.8724(3)</td>
</tr>
<tr>
<td>$gni^{*}$</td>
<td>-2.3047(1)</td>
<td>-3.3620(1)</td>
</tr>
<tr>
<td>$rer$</td>
<td>-0.8692(2)</td>
<td>-1.4403(1)</td>
</tr>
</tbody>
</table>

Note: (*) is the rejection of non-stationary hypothesis at 1% confidence level; (**) is the rejection of non-stationary hypothesis at 5% confidence level. Significant lags in parentheses.

The critical value for ADF (level - without trend) at 1% and 5% of level of significance are -3.5111 and -2.8967 respectively.
The critical value for PP (level - without trend) at 1% and 5% of level of significance are -3.5101 and -2.8963 respectively.
The critical value for ADF (level - with trend) at 1% and 5% of level of significance are -4.0727 and -3.4645 respectively.
The critical value for PP (level - with trend) at 1% and 5% of level of significance are -4.0713 and -3.4639 respectively.
The statistical results show that all series do not reject the null hypothesis of non-stationary at levels, but reject the null hypothesis at first differences, for both tests, except for variable y. Some minor controversy appears for variable y. The ADF test of variable y with drift and time trend rejects non-stationarity hypothesis at 5% level of significance. However, by using PP test, which allows the disturbances to be weakly dependent and heterogeneously distributed, null hypothesis could not be rejected. In this case, we assume the disturbances of variable y is weakly dependent and heterogeneously distributed, hence, we do not reject null hypothesis of non-stationary at level. As a consequence, we conclude that all series are integrated of order one.

In conclusion, the unit roots tests of the series are consistent with the view that most macroeconomic variables are non-stationary in level but stationary at first difference.
5.4 Granger Non-causality Test Results – Toda and Yamamoto (1995)

As explained in last chapter, Toda and Yamamoto’s method of testing Granger causality lies in its simplicity and also its ability to overcome shortcomings of other econometric techniques. It is a simple method which involves estimation of VAR model using SUR and to obtain MWALD test statistics, which in turn are used to establish the causality relationship among the variables, if any, for our study.

The test has an asymptotic $\chi^2$ distribution when a $\text{VAR}(k + d_{\text{max}})$ is estimated. In this study, we have employed model of $\text{VAR}(5)$, where $k = 4$ and $d_{\text{max}} = 1$. Besides, several diagnostic tests have been done to ensure the model is correctly specified. The results of the tests are displayed in Table 5.2
Table 5.2: Results of Granger Causality Test and Diagnostic Tests

<table>
<thead>
<tr>
<th>Source of causation</th>
<th>y</th>
<th>ex</th>
<th>fdi</th>
<th>gni*</th>
<th>rer</th>
<th>Diagnostic tests</th>
<th>R²</th>
<th>Q(5)</th>
<th>ARCH(6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>y</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.5628</td>
<td>3.7247</td>
<td>12.3378</td>
</tr>
<tr>
<td></td>
<td>23.9708*</td>
<td></td>
<td>13.1829*</td>
<td>8.8848</td>
<td>24.3554*</td>
<td></td>
<td>(0.590)</td>
<td></td>
<td>(0.0548)</td>
</tr>
<tr>
<td>ex</td>
<td>3.8135</td>
<td></td>
<td></td>
<td>3.8471</td>
<td>5.1431</td>
<td>6.1089</td>
<td>0.4655</td>
<td>2.3596</td>
<td>11.0064</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0.797)</td>
<td></td>
<td>(0.0882)</td>
</tr>
<tr>
<td>fdi</td>
<td>2.6420</td>
<td>11.0977*</td>
<td></td>
<td>0.9471</td>
<td>14.2362*</td>
<td></td>
<td>0.3975</td>
<td>0.8365</td>
<td>5.1108</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0.975)</td>
<td></td>
<td>(0.5297)</td>
</tr>
</tbody>
</table>

Notes:
1. (*) significant at 5% level of confidence.
2. Q is the Ljung-Box-Pierce test for autocorrelation computed using regression residuals. (Ljung and Box, 1978)
3. ARCH is the test for autoregressive conditional heteroscedasticity computed using the squares of regression residuals. (Engle, 1982)
4. Figures in parentheses are the p-value for the test statistics.
5.4.1 Discussion

As shown in Table 5.2, there is uni-directional Granger causality between exports and growth. This suggests exports play an important role in the development process and supports the widely held idea that exports accelerate economic growth. Thus, an EP policy is an effective development strategy. It is also consistent with macroeconomic theory where exports are viewed as injections into the economy. This finding is consistent with earlier studies done by Balassa (1978), Chow (1987), and Thornton (1996).

In addition, the results support the FLG hypothesis. It is usually assumed that FDI inflows stimulate growth. Such a relationship can be expected because FDI encourages the incorporation of new inputs and foreign technologies in the production through capital accumulation. Furthermore, knowledge transfer improves the existing stock of knowledge in the labor force and introduces alternative management practices and organizational arrangements. This improves TFP level, resulting in better growth for the country. This means that FDI is a catalyst for domestic growth and technological progress. Similar results are found in Borensztein (1998), Ramirez (2000), and Ram and Zhang (2002).

Based on the findings, we are also able to establish the relationship between exports and FDI, which appears to be uni-directional, that is export-driven FDI. This is

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5.1 Exports contribute 70% to GDP in year 1988 and still as a major contributor of GDP. (Doraisamy, 1996).
particular true in the case of Malaysia. Looking back at the country’s development process since independence in 1957, our economy has been heavily dependent on the exports of primary goods such as rubber and tin. Subsequently, an IS policy was implemented to cope with the external trade imbalance. Later, in the 1970s, EP industrialization was actively promoted due to the failure of IS policy. This brought about significant changes in the economy. During that period, manufacturers produced goods in the free trade zones with the MNCs and TNCs playing an increasingly important role. Large volume of foreign capital funds was injected into the economy resulting in the setting up of new factories and companies. This inflow of capital funds had a positive spillover effects on domestic economy. For instances, new technology, knowledge and skilled labor spurred economic growth and reduced the unemployment rate. This also stimulated a more effective allocation of resources and improved productivity. Goods were produced at lower cost and sold at relatively attractive prices, which in turn contributed to export growth and subsequently further improving economic growth.

The above situation was most apparent from the 1990s until recently when more capital funds came into the economy partly due to the reinvestments of MNCs and TNCs; the reason for reinvestment being an attempt to take advantage of economies of scale in the manufacturing industry. Other factors such as political stability, a friendly macroeconomic environment, strong and sustained growth of demand, skilled and educated labor force, accessibility to supplies of inputs including infrastructure and business services, effective legal system providing adequate protection for investors, and relatively free trade policies and liberalized domestic economy, and so forth, play equally important roles in the process of development. With FDI, credit can be raised on
favorable terms and local savings and finances can be mobilized. Exceptionally large plants can also be set up on the invitation of other MNCs and TNCs for the benefit of the nation.

In terms of organization and management, FDI assists in improving managerial efficiency, exploring new investment opportunities for local entrepreneurs, and providing access to new technologies, skills and products. With its large-scale distribution networks, good reputation and marketing skills, this lead to an increase in export growth and the circulation of products in worldwide marketing outlets. Thus, this export-FDI relationship can be seen as one explanatory hypothesis for our contemporary situation.

From the results too, we are able to examine the impact of external dynamics to the domestic economy. This suggests that Malaysia is an open economy (evidence of trade), and is exposed to external factors such as exchange rate risks, particularly with regard to the US dollar exchange rate. This is crucial as there is a direct link between exchange rate and export viability, which in turn influences economic growth as well as the inflow of capital into our country. Hence, it is important for policy makers and Bank Negara Malaysia (BNM) – Central Bank of Malaysia, to monitor and take into consideration of these external dynamics before implementing development strategies.

53 We are confining our study to US only. In fact, US is one of the major leaders in the world economy. Most of the world tradings are traded in US dollar currency.
5.5 Policy Implications and Suggestions

From a policy-making point of view, it is crucial for policy makers to know which policy they should plan and implement in the process of development. For instance, the Malaysian government uses economic planning to achieve economic and social-economic goals in close coherence with the New Economic Policy (NEP), the National Development Policy (NDP), and the National Vision Policy (NVP).\textsuperscript{5,4} These policies have specified future objectives based on economic trends. They provide clear guidelines and motivation for development.

Generally, these policies tend to promote exports in Malaysia. This is because an impressive growth rate was achieved when export promotion industrialization was implemented. According to Olsson (1996), since most of the inflows of FDI into Malaysia has been export-oriented rather than intended for domestic sales, exports could generate foreign exchange that could reduce the amount of foreign debt needed to finance development. It also contributes to developing a competitive industry infrastructure where exports are high value-added products as a result of technological and knowledge improvement which would enhance competitiveness of our country in worldwide position. Lastly, FDI could reduce the unemployment rate by creating more job vacancies, particularly in the industrial sector.

\textsuperscript{5,4} NEP was launched in 1974 with both political and economic objectives which aim to reduce poverty by raising income levels for all Malaysians and to restructure the Malaysia society in order to erase all racial identification in economic terms. NDP replaced NEP when it expired in 1990. Basically NDP was an add-on document to NEP, the objectives of which were not achieved in 1990. It also provides Dr. Mahathir’s framework of Vision 2020. NVP was implemented in 2001 to replace NDP which largely incorporated most of the elements and updates the objectives from previous policies. (Olsson J., 1996; Australia Department of Foreign Affairs and Trade, 2003)
There are many ways to increase the volume of export. Firstly, is through trade liberalization process. The simplest way of doing this is to reduce tariff levels. This will not only decrease inflationary pressures in the expanding economy, but also increase the competitiveness of Malaysian market through strategic exposure. Besides, liberalization can also enhance export incentives from FDI’s such as in the Free Trade Zones.

Strategic exposure characterizes a crucial component in the Strategic Trade Theory. The rationale behind lowering barriers to trade and exposing domestic industry to foreign competition is to build a more competitive domestic industry. In order to survive, local firms are forced to improve their competitiveness and this leads to better production and resources allocation.

Besides that, our export is closely linkages to US investment cycle, particularly demand of electrical and electronic components. Due to vulnerability of export market and strong competition from China, Malaysia needs to move up in the value chain in terms of the quality of its exported products.\textsuperscript{5,5} Instead of producing low value-added products, we need to encourage high value-added exports to diversify and create different revenue streams. This requires more advanced technology, skills and knowledge in the production. By incorporating FDI as a strategic measure to enhance technological know-how, we can reduce domestic learning and experience curved in selected industries. Besides, tax deductible incentives in areas such as training local employees, and research and development (R & D), for investors would enable

\textsuperscript{5,5} Since China is producing similar product areas as Malaysia, it is hard for Malaysia to compete in low margin, high volume manufacturing.
Malaysia to increase its competitiveness worldwide. Hence, there is a need for us to attract FDI into our economy to achieve our goals.

Exchange rate policy is an important component in the Malaysian FDI promoting framework and in general economic policy. Malaysia has substantially opened up its foreign exchange regime until the recent Asian financial crisis where Ringgit was pegged to US currency. BNM intervenes in the foreign exchange market in order to avoid rapid fluctuations of Ringgit value and also to maintain a stabilized market environment especially in term of trade. Besides, as noted by the World Bank, export oriented FDI provides the foreign exchange required to develop a nation without incurring huge debts. Therefore, influx in foreign exchange can promote new development projects resulting in rapid industrial development.

However, critics of this strategy argue that Malaysia has become largely dependent on foreign technology and foreign expertise and has failed to develop its own technology and human capital bases.\textsuperscript{56} Hence, it is crucial for Malaysia to be independent enough and to build up its own solid bases. Malaysia could solve these problems by improving the quality of education and training in the country. More emphasis should be placed on R & D particular in science and technology, skills and knowledge. In fact, the Malaysian government has been implementing policies to increase expenditure in R & D, encouraging the setting up of more technical schools, and educating students in relation to science and technology.

\textsuperscript{56} Goldsworthy, D (1991)
In conclusion, this study has shown the intrinsic relationships among exports, FDI and economic growth, the nature of these relationships and promotion of strategies to better existing economic policies based on the empirical evidence gleaned from this study. Hence, effective planning and implementation of development policies by policy makers with corporation of the nation will ensure the continuity of the socio-economic growth and successful in a nation achieving its Vision 2020.

5.6 Conclusion

This chapter presents and discusses the results from the tests of analyzed data in hope of achieving this study’s objectives. The results support both ELG and FLG hypotheses. It also reveals uni-directional relationship which run from export to FDI, suggests a kind of export-led FDI growth linkage where export is the main force influencing economic performance in Malaysia. These findings are useful and it is crucial for policy makers to consider in the implementation of export-oriented policy to promote growth. External factors such as exchange rate risk is important and an appropriate monetary policy should be enforced to ensure stability in the foreign exchange (FOREX) market. This study also shows that external factors are important and hence needs to be taken into account in planning development strategies. Policy implications and suggestion were discussed to incorporate the study with practical issues to achieve the objective of this study.