The Effect of Foreign Direct Investment, Exports and Employment on Economic Growth Model

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ABSTRACT
Economic growth is very important for a country's developing. In economics, there are many components that affect a country's economic growth. Malaysia has undergone some changes in the structure of the economy since attaining the status of developing countries from the third world status since 1970-an. Hence, this study is conducted to identify the relationship between economic growth and others macroeconomics variables in Malaysia. There are three variables selected in this study; foreign direct investment, exports and employment. While economic growth is represented by the gross domestic product (GDP) variable. The study adopted ordinary least squares (OLS) method in order to develop the estimating modelling. This study applies annual time series data starting 1982 until 2014. The result shows that, exports and employment variables are important in influencing the economic growth in Malaysian in the long term. In contrast, the foreign direct investment variables are not important in influencing economic growth in Malaysia. According to diagnostic testing, the result further suggest that, first model is suffer of serious multicollinearity problem and second model survive of all diagnostic testing. Therefore the estimating models proposed in this study are robust.

KEYWORDS:
Foreign Direct Investment, Economic Growth, Employment and Exports

1. INTRODUCTION
The growth of an economy depends on the income of a country. Thus, the Gross domestic product is a preferable indicator to measure the growth of the country. Many study was conducted in identify the factors that influencing the economic growth in the long term. According to previous literature, the economic growth is influenced by many factors. Among others variables, the foreign direct investment, exports and employment is important component in explanatory the economics of the country. So this study is conducted to
understand in detail the relationship of the variable; foreign direct investment, exports and employment in influencing the economic growth in Malaysia.

Many previous researches conducted, to investigate the relationship between the macroeconomic variables and the economic growth. For instance, research by Boustead, 1998 claimed that, different components of GDP have a different impact on the economic growth of a country. In addition, economic growth involves a long and complicated relationship in policy variables. Moreover, according to Ibrahim (2002), a country that wants to build must have a focus and narrow the scope of their objectives for the county to archive. For example, if someone has too many proposals or goal in life, he most likely cannot meet all of these goals. So for the country, therefore, must have optimistic and realistic goals to achieve.


For instance, Riezman et al. (1996) has investigated the validity of the export–led growth hypothesis for over 126 countries, running annually data from 1965 to 1999. This study is different from previous study in the same field which is they had included the variable of the real import as one of the explanatory variables in the estimation modelling. The inclusion of import variable is about to avoided the spurious estimation in modelling. Result suggests mild relationship between export and growth. Moreover, Al-Yousif (1999) has evaluated the robustness of the correlation between exports and economic growth in the context of a single country. Applying cointegration and vector error correction modelling, he document further evidences supporting the export led growth hypothesis for the Malaysia cases. In contrast, Jung and Marshall (1985), Dorado (1993), Sengupta and Espana (1994) claimed that export growth has had a negative (rather than negative) effect on the Malaysian economic growth. The most interesting economic phenomenon suggests a two ways causal relationship among growth and trade. Among others, Doraisami (1996) using annually data from 1963 to 1993 found bi-directional relationship between Malaysia export and growth performance.

3. METHODOLOGY
This study employs secondary data from Department of Statistics and Website the global economy. Data of gross domestic product, foreign direct investment and exports are in US dollars, while employment is in the form of the number of employees in Malaysia. The data is in time series data and the length of time the data were starting from 1982 until 2014. All the variables have been changed to the natural logarithm form. The study estimated two models in order to capture the robust model. The study also adopted the Ordinary Least square (OLS)
modelling for analysis purposes. For each estimated model, the testing procedure are conducted in three criteria, namely; economics criteria, statistic criteria and econometrics criteria. The general model with OLS method has been established as follows:

\[ KDNK_t = f(FDI_t, X_t, PER_t) \]  

(1)

Based on previous studies, the estimation modelling is as follows;

\[ \ln KDNK_t = \beta_0 + \beta_1 FDI_t + \beta_2 X_t + \beta_3 PER_t + u_t \]  

(2)

Where,

- \( KDNK_t \) = Gross domestic product in the year \( t \)
- \( FDI_t \) = Foreign direct investment in the year
- \( X_t \) = Export in the year
- \( PER_t \) = Rate of employment growth in the year
- \( u_t \) = The random error in the year

4. EMPIRICAL FINDING

In this section, the finding will discuss in two part; First model and Second Model. The second model are better than the first model, by omitted the exports variable that cause multicollinearity problem in the first model. The purposes to estimated two models are for robust procedure.

**Estimating the First Model**

The model is formed of the theory and some previous studies is as follows:

\[ KDNK_t = -8.563 + 0.02 FDI_t + 0.429 X_t + 1.236 PER_t \]  

(3)

**Statistics Criteria**

There are two types of statistical tests that were carried out, namely the importance of testing \((t - test)\) and test the goodness of fit model \((F - test)\). The \(t - test\) results show whether accept the hypothesis null \( (H_0) \) or \( H_0 \) is rejected. Where, \( H_0 : \beta_1 = 0 \) and \( H_0 : \beta_1 \neq 0 \). Critical Area 2 tail is \( \pm 2.045 \). Value of \( t^* \) for FDI is 0.6452, then \( 2.045 < t^* < 2.045 \). \( H_0 \) is accepted, so FDI is not
important in explaining GDP. Value of \( t^* \) for export is 3.1314, then \( t^* > 2.045 \). \( H_0 \) is rejected and export important to explaining GDP. While the value of \( t^* \) for labor is 2.611, greater then 2.045. \( H_0 \) is rejected, so labor is important to explaining GDP. Result test the goodness of fit model indicate whether accept \( H_0 \) or reject \( H_0 \). Where, \( H_0 = \beta_1 = \beta_2 = \beta_3 = 0 \) and \( H_1 \neq \beta_1 \neq \beta_2 \neq \beta_3 \neq 0 \). Critical Area \( f - \) test is 2.935. Value or \( f^* \) is 244.7196, then \( f^* > 2.935 \). Result show reject \( H_0 \), matching this model is well and good.

**Economic Criteria**

There are two types of testing procedure under this criteria, namely; sign analysis and elasticity analysis. According to the results, it is found that positive relationship between FDI and GDP. This decision is consistent with finding by Choo (2003) which states that FDI can be a favorable effecting the economic growth. Also, the exports also showed a positive relationship between Exports and GDP. Results are consistent with the theory De Mello LR (1999) which states have policies that encourage exports catalyze economic growth. Not only that, the PER also showed a positive correlation with GDP. Elasticity analysis results are as follows. Results elasticity of FDI is 0.0046. This means that an increase of one unit of FDI increased GDP can lead to 0.0046 units. Results elasticity of exports is 0.4126. This means that the increase one unit in exports cause GDP increased by 0.4126 units. Results elasticity of employment is 2.4906. One unit increase in employment could lead to a rise in GDP of 2.4906 units.

**Diagnostic Testing Procedure**

There are three types of econometric tests that have been carried out, namely; autocorrelation test, test and test multicollinearity heteroscedasticity, and autocorrelation test.

For Multicollinearity testing procedure, the results suggest following outcome;

\[
R^2 (0.958) > \text{Corr} \left( \ln FDI_t, \ln X_t \right) = 0.613
\]
\[
R^2 (0.958) > \text{Corr} \left( \ln FDI_t, \ln PER_t \right) = 0.601
\]
\[
R^2 (0.958) > \text{Corr} \left( \ln X_t, \ln PER_t \right) = 0.976
\]

The independent variables of foreign direct investment, exports and employment \(( FDI_t, X_t, PER_t )\) connected to each other with a confidence level of 99 percent. Based on the results, the relationship between variables \( FDI_t \) with \( X_t \) shows that there have not serious multicollinearity problem because, \( R^2 > \text{Corr} (\ln FDI_t, \ln X_t) \). Also, the relationship between
variables $FDI_t$, with $PER_t$, shows no serious multicollinearity problem between the variables since, $R^2 > \text{Corr} (\ln FDI_t, \ln PER_t)$. However, the relationship between $X_t$ with $PER_t$ indicate problems or serious multicollinearity perfect because $R^2 > \text{Corr} (\ln X_t, \ln PER_t)$.

Under heteroscedasticity testing procedure, two others model has estimated, namely Park and Glejser model (Gujarati, 2005).

Origin Model (First Model):

$$KDNK_t = -8.563 + 0.02 FDI_t + 0.429 X_t + 1.236 PER_t$$  \hspace{1cm} (3)

New Model (Park Test):

$$\ln \hat{u}_t^2 = -0.933 + 0.003 FDI_t - 0.029 X_t + 0.12 PER_t$$  \hspace{1cm} (4)

New Model (Glejser Test):

$$|\mu_t| = -4.338 - 0.013 FDI_t - 0.127 X_t + 0.555 PER_t$$  \hspace{1cm} (5)

Table 1: Test the importance of individual (Heteroscedasticity) for the first model

<table>
<thead>
<tr>
<th>Model</th>
<th>Variable</th>
<th>Hypothesis</th>
<th>Accept/Reject</th>
<th>Outcomes Important/Not Important</th>
</tr>
</thead>
<tbody>
<tr>
<td>ORIGIN MODEL</td>
<td>$FDI_t$</td>
<td>$H_0 : \beta_1 = 0$</td>
<td>Reject $H_0$</td>
<td>Important</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$H_0 : \beta_1 \neq 0$</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$X_t$</td>
<td>$H_0 : \beta_2 = 0$</td>
<td>Reject $H_0$</td>
<td>Important</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$H_0 : \beta_2 \neq 0$</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$PER_t$</td>
<td>$H_0 : \beta_3 = 0$</td>
<td>Accept $H_0$</td>
<td>Not Important</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$H_0 : \beta_3 \neq 0$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PARK MODEL</td>
<td>$FDI_t$</td>
<td>$H_0 : \beta_1 = \text{non-existent problem heteroscedasticity}$</td>
<td>Accept $H_0$</td>
<td>Non-existent problem heteroscedasticity</td>
</tr>
<tr>
<td></td>
<td>$X_t$</td>
<td>$H_0 : \beta_2 = \text{non-existent problem heteroscedasticity}$</td>
<td>Accept $H_0$</td>
<td>Non-existent problem heteroscedasticity</td>
</tr>
<tr>
<td></td>
<td>$PER_t$</td>
<td>$H_0 : \beta_3 = \text{non-existent problem heteroscedasticity}$</td>
<td>Accept $H_0$</td>
<td>Non-existent problem heteroscedasticity</td>
</tr>
</tbody>
</table>
Table 1, shows the results of heteroscedasticity testing procedure. The results suggest that, the first model is free from heteroscedasticity problem. Finally, the results form Durbin Watson, a testing procedure for autocorrelation suggest of no problem of error in estimating modelling at 1% and 5% significant level.

**Estimating the Second Model**

Due to the existence of multicollinearity problem in the first estimating model, changes have been made and produce a second estimating model. Here is the second model;

\[ KDNK_t = -19.604 + 0.035 FDI_t + 2.66 PER_t \]  \hspace{1cm} (6)

**Statistic Criteria**

There are two types of statistical tests that were carried out, namely the importance of testing \( t \)-test and test the goodness of fit model \( f \)-test. The \( t \)-test results show whether accept the hypothesis null \( H_0 \) or reject \( H_0 \). Where, \( H_0 : \beta_1 = 0 \) and \( H_0 : \beta_1 \neq 0 \). Critical Area 2 tail is \( \pm 2.045 \). Value of \( t^* \) for FDI is 0.0996, then \( 2.045 < t^* < 2.045 \). \( H_0 \) is accepted, so FDI is important to explaining GDP. While the value of \( t^* \) is 18.277, grater then \( t^* > 2.045 \). \( H_0 \) is rejected and labour is important to explaining GDP. Result test the goodness of fit model indicate whether accept \( H_0 \) or reject \( H_0 \). Where, \( H_0 = \beta_1 = \beta_2 = \beta_3 = 0 \) and \( H_1 = \beta_1 \neq \beta_2 \neq \beta_3 \neq 0 \). Critical Area \( f \)-test is 3.32. Value or \( f^* \) is 279.118, then \( f^* > 2.935 \). Result show \( H_0 \) is rejected, so the model fulfills the testing requirement.
**Economic Criteria**

According to the results, it is shows that a positive relationship FDI with GDP. This decision is consistent with the finding of De Mello LR (1999), stated that the flow of FDI can be a favourable effects the economic growth. The employment also showed a positive correlation with GDP. This results consistent with finding by Norimah & Podinsky (2013). According to Norimah et al. (2013), exports effect the economic growth positively in the long term. In overall the sign analysis finding are consistent with the first estimating modelling. Results further suggests that, the elasticity of FDI is 0.008. This means that one unit increase in FDI will lead to GDP increase of 0.008 units. Results elasticity of employment is 5.360. One unit increase in employment can cause an increase in GDP of 5.360 units.

**Econometrics Criteria**

The Multicollinearity tests results are as follows:

\[ R^2 (0.958) > \text{Corr} \left( \ln FDI_i, \ln PER_i \right) = 0.601 \]

The independent variables of foreign direct investment and employment \((FDI_i, PER_i)\) connected to each other with a confidence level of 99 percent. The relationship between variables \(FDI_i, PER_i\) indicates that have not serious multicollinearity problem because \( R^2 > \text{Corr} \left( \ln FDI_i, \ln PER_i \right) \). The study also suggest for no autocorrelation problem in the estimating model at 1% and 5% significant level.

Heteroscedasticity tests were also performed. The Heteroscedasticity tests procedure suggests that there is no existing of this problem in the model.

Origin Model (First Model):
\[ KDNK_i = -19.604 + 0.035 FDI_i + 2.66 \times PER_i \]  \hspace{1cm} (6)

New Model (Park Test):
\[ \ln \hat{u}_i^2 = -0.196 - 0.004 FDI_i + 0.025 PER_i \]  \hspace{1cm} (7)

New Model (Glejser Test):
\[ |u_i| = -1.081 - 0.018 FDI_i + 0.136 PER_i \]  \hspace{1cm} (8)

Table 2: Test the importance of individual (Heteroscedasticity) for the second model
<table>
<thead>
<tr>
<th>Model</th>
<th>Variable</th>
<th>Hypothesis</th>
<th>Accept/Reject</th>
<th>Outcomes Important/ Not Important</th>
</tr>
</thead>
<tbody>
<tr>
<td>ORIGIN MODEL</td>
<td>$FDI_t$</td>
<td>$H_0: \beta_1 = 0$</td>
<td>Accept $H_0$</td>
<td>Not Important</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$H_0: \beta_1 \neq 0$</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$PER_t$</td>
<td>$H_0: \beta_2 = 0$</td>
<td>Reject $H_0$</td>
<td>Important</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$H_0: \beta_2 \neq 0$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PARK MODEL</td>
<td>$FDI_t$</td>
<td>$H_0: \beta_1 = \text{non-existent problem heteroscedasticity}$</td>
<td>Reject $H_0$</td>
<td>Non-existent problem heteroscedasticity</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$H_0: \beta_2 = \text{non-existent problem heteroscedasticity}$</td>
<td>Accept $H_0$</td>
<td>Non-existent problem heteroscedasticity</td>
</tr>
<tr>
<td>GLEJSER MODEL</td>
<td>$FDI_t$</td>
<td>$H_0: \beta_1 = \text{non-existent problem heteroskedasticity}$</td>
<td>Reject $H_0$</td>
<td>Non-existent problem heteroskedasticity</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$H_0: \beta_2 = \text{non-existent problem heteroskedasticity}$</td>
<td>Accept $H_0$</td>
<td>Non-existent problem heteroskedasticity</td>
</tr>
</tbody>
</table>

**CONCLUSION**

In the nutshell, it is show that, in both estimating model, the macroeconomics variables plays different effect on economic growth in Malaysia. According to data, for instance, the foreign direct investment variable should play an important role in the first model. However, because of the presence of serious multicollinearity problem in the model, thus the estimated model is spurious. No national policy development can be made according to the model. However, through the second estimating model, the result is robust. This model has fulfilled the goodness of model criteria (Anuar Amin, 1988 & Greene, 2005). Hence, this model is preferable for national policy development.
REFERENCES


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