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Determinants of Foreign Direct Investment in Malaysia: What Matters Most?

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This paper examines the determinants of foreign direct investment in Malaysia for the period 1970-2008. The causality and dynamic relationships between foreign direct investment (FDI) and its key determinants is identified using autoregressive distributed lag (ARDL) framework. The result suggests that among the variables, financial development and economic growth contribute positively to the inflow of foreign direct investment in Malaysia. The establishment of more financial intermediaries with a modern and sophisticated technology in the banking system creates a favorable environment to the foreign investors. The evidence provides strong policy recommendation on sustaining high growth and financial deepening in Malaysia.

Field of Research: Macroeconomics

1. Introduction

Malaysia is one of the countries in Asia that has benefited from strong foreign direct investment inflow. FDI was a major source of growth for manufacturing development in Malaysia that mainly targeted for the export market. The economy relied on the foreign fund as a major source of capital, modern technology and technical skills. Globalization, international financial integration and expansion of global production have intensified FDI in the past decades. The inflow of FDI was only US$94 million in the early 1970s but increased dramatically to US$7,297 million in 1996. The amount dropped to US$2,714 million in 1998 due to the 1997 financial crisis but recovered strongly with inflows of US$8,403 million in 2003. Malaysia was among the top attractive FDI destination to many investors in Southeast Asian countries. Last year, FDI was about US$7.3 billion. On another front, Malaysia was more bullish attracting FDI from the ASEAN region, China, India, South Korea and the Middle East. Most notably the environment investment has becoming more challenging and competitive for FDI. This paper identifies some of the main factors that contribute significantly to attracting FDI in Malaysia. This is crucial because private investment has been given a leading role to bring the economy to higher growth and sustainable economy.

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2. Literature Review

FDI is motivated mainly by the possibility of high profitability in growing markets, along with the possibility of financing these investments at relatively low rates of interest in the host country. The basic concept of international trade theory was founded by David Ricardo arguing that countries engaged in foreign trade due to comparative cost advantages. Heckscher, Ohlin, and Samuelson further developed Ricardo's theory of comparative advantage by arguing that a country specialized in producing and exporting goods in which it has comparative advantage due to natural endowments of the factors of production in the host country relative to elsewhere. This suggests that the ability to produce at lower opportunity cost relative to another country is a major factor in the location decision (Ohlin, 1933).

Recently, the Gravity Model has become a popular method to analyze the importance of countries' attractive location factors for FDI. The Gravity Model is based on the interactions of various potential sources across border. The model has an inverse relationship between country of origin and destinations. The basic gravity model proposes that trade between two countries is a function of the size of their economies as measured by the national income and population and the geographical distance between the two countries (Breuss and Egger, 1997).

There are few studies on FDI and its determinants in Malaysia. Some studies on FDI and its determinants are found in Zubir Hassan (2003), Hooi (2008) and Ang (2008). Zubair Hasan (2003) shows that foreign exchange rate, export expansion, and infrastructural development are important factors in attracting FDI into Malaysia. The exchange rate variable has a negative relationship with FDI. This implies that a weak currency reduces FDI inflows which contradict the hypothesized sign. Other factors such as growth rate, capital flight, and balance of payments have smaller impact on FDI inflows. The Engel-Granger test for cointegration however failed to support any long-term relationships between FDI and each explanatory variable.

In the same spirit, Hooi (2008) used Granger causality test and error correction method to examine the impact of FDI on growth and growth on FDI. The Indirect impact of FDI on growth is analyzed through manufacturing sector. He finds that the relationship between FDI and growth of the manufacturing sector is independent of each other and concludes that there is no long-run relationship between FDI and growth.

Study by Ang (2008) includes a wider coverage of FDI determinants with data spanning from 1960 to 2005. Among the variables tested are financial development, wage rates, income, economic growth, government spending on infrastructure, openness, exchange rate, inflation rate, corporate tax and financial crisis 1997-1998. The findings suggest that all the factors are important determinants of FDI. Economic growth rate has the smallest effect on FDI while exchange rate has the biggest role in attracting more FDI. The study concludes that higher corporate tax rate and ringgit appreciation have dampen effects on FDI inflows. Surprisingly, the study shows that

macroeconomic uncertainty promotes greater FDI. The possible explanation given to this is investors perceived that during macroeconomic uncertainty there is a greater potential for investment return.

The highly significant causal relationships of the variables in Ang's study raise some doubts. Although the problem of endogeneity bias is addressed via 2SLS estimation, the stationarity properties of the series are not tested. It is widely found that most time series data are nonstationary series, hence the high correlation among the variables may not reflect their true relationships but simply they are trending together over time. Therefore, the estimation of the dynamic relationships among the variables needs a different estimation technique. Moreover, the highly statistically significant estimates of the coefficients are the results of five different equations that exclude some of the variables from the equations. While the evidence of no long-run relationship between FDI and its determinants in the previous studies is due to the failure to model cointegration relationship appropriately.

Thus, these issues provide the motivational of this paper. This study aims to investigate the determinants of FDI in Malaysia for the period 1970-2008 using different approach analyzing the dynamics of the variables. This model applies cointegration analysis based on an autoregressive distributed lag (ARDL) technique. Specifically, it seeks to identify the most important variables that affect the FDI inflow in Malaysia and provides some new evidence on the existence of long-run relationship between FDI and its determinants.

3. Methodology and Data

3.1 Autoregressive distributed lag (ARDL)

Many macroeconomic variables are non-stationary at their level. A linear combination of non-stationary variables does not imply that all the variables are cointegrated. If the series are cointegrated, an error correction model shows that the short-run dynamics of the variables in the system are influenced by the deviation from equilibrium (Enders, 2004). Two distinguished advantages of using autoregressive distributed lag model are it allows cointegration of variables with different orders of integration and it is a robust estimation for a small sample data. Failure to model appropriately the relationships may not give accurate results of the relationships and this is crucial especially when it involves policy recommendations. The existence of long-run relationship between FDI and selected macroeconomics variable is modeled as follows.

$$Lfdi = f(Lm2, Lgdp, gro, Ldev, open, Lexc, tax, infl, crisis)$$

where *L* refers to the variable in logarithmic form, *fdi* is the foreign direct investment inflows (RM million), *m2* is the money supply i.e. a proxy for financial market development, *gdp* represents the market size of the economy (RM million) and *gro* is the growth rate of gross domestic product (%). Government infrastructure expenditure (RM million) is represented by variable

dev, *open* is the ratio of import and export over GDP which measures economic openness, *exc* is the exchange rate (RM/USD), *tax* is the corporate tax (%), *infl* is the inflation rate (%) and *crisis* is a dummy variable represents the effect of Asian financial crisis (1998=0 and otherwise=0). The expected sign of *Lm2*, *Lgdp*, *gro* , *Ldev* ,*open*, *Lexc* is positive and negative for *tax*, *infl*, *crisis* variables.

Financial development is used to measure financial depth of a country. A more developed financial system allows an economy to exploit the benefits of foreign direct investment more efficiently (Ang, 2009). Therefore, advancement in financial market system will attract more foreign investments. On the other hand, some studies also emphasize on the importance of large market size for efficient utilization of resources and exploitation of economies of scale (Zaman et al., 2006). An economy with a large market size should attract more FDI into the country. Market size is important for FDI as it provides greater profitability from selling in local markets than selling to export markets. Thus, a large market size provides more opportunities for sales and also profits to MNCs and therefore attracts FDI. However, the market size might be less influential or insignificant if foreign companies are using the host country only as a production base for export in a way that the MNCs are taking advantage of lower costs of production in countries like Malaysia and China. Many studies have proved that market size, represented by nominal GDP is significant in attracting FDI.

Countries with high and sustained growth rate, generally measured by GDP growth, are more likely to receive larger amount of FDI compared to other countries. There are numerous studies that show a positive relationship between growth rate and FDI (Sahoo, 2006). A stable economic growth rate signifies a good economic performance and therefore is more attractive to foreign investors. Another important factor that potentially affect foreign investors' decision in choosing a host country is the availability of physical infrastructure such electricity, water, transportation, and telecommunications. Previous studies have used several different proxies to measure the infrastructure development. Among them are total government spending on transport and communication (Ang, 2008), telephones per 1,000 population (Asiedu, 2002), infrastructure index (Sahoo, 2006), and government development expenditure (Zubair Hasan, 2003). Due to data availability, total expenditure by central government is employed as it accounts for not only transportation and communication, electricity, and water but it also includes expenditures on all economic sectors. Increase in development expenditure should have a positive impact on FDI.

Openness of the domestic economy is influenced both by direct FDI restrictions as well as trade barriers. FDI restrictions clearly raise barriers to FDI and are likely to influence the choice that the MNCs make regarding the investment location. The ratio of trade to GDP is often used as a measure of openness of an economy in many literatures. The other variables that can also measure economic openness are ratio of export to GDP and ratio of import to GDP. The impact of openness of an economy towards FDI would depend on the investment type. Trade restrictions and thus less openness of

an economy is associated with market-seeking investment that would affect FDI positively. This is because if MNCs face difficulties in terms of trade restrictions in the host country, they would set up subsidiaries in order to serve the host country local market. On the other hand, a more open economy would be an attractive location for MNCs that operate in exporting to reduce the transaction costs (Asiedu, 2002). Since the motive of MNCs engage in FDI is to export their products we expect that trade openness would have a positive relationship with FDI inflow.

Exchange rate is an important determinant of international capital flows in the financial market (Hsiao & Hsiao, 2004), although its effects on FDI are complicated and the direction of influence on FDI is not well-established. Tahir and Larimo (2005) argued that a country can attract FDI by devaluing its currency because FDI will benefit from currency weakness in the host country. The depreciation of foreign investors' country currency against Malaysia Ringgit would increase the inflows of FDI. The exchange rate is one of the most significant factors affecting trade between countries. If the exchange rate rises, trade is relatively more profitable to exporters, so exporters will be sensitive to changes in the exchange rate. Statutory corporate tax rate is used as a proxy for the effects of all fiscal policies on new investors, ignoring tax holidays, accelerated depreciation and other incentives that reduce the effects of the statutory rate. Higher corporate tax rate imposed to corporate profits reduces FDI returns and hence it would negatively affect FDI inflows.

In this study, the rate of inflation acts as a proxy for the level of economic uncertainty, a measure of overall economic stability. If investors prefer to invest in more stable economies which it reflects a lesser degree of economic uncertainty, thus lower inflation would stimulate more FDI into the country. The hypothesized signs of the selected variables are as follows.

Table 1: Variables Descriptions and Expected Signs

Variable	Description	Expected Sign
Lm2	Money supply (M2)	+
Lgdp	Gross Domestic Product	+
gro	Gross Domestic Product growth rate	+
Ldev	Government Development Expenditure	+
open	Ratio of Import and Export over Gross Domestic Product	+
Lexc	Exchange rate (RM/USD)	+
tax	Corporate tax	-
infl	Inflation rate	-
crisis	Value equal to "1" for year 1998 and "0" otherwise	-

3.2 Estimating model

The econometrics model of the causality of FDI and its key determinants is as follows:

$$Lfdi_t = \alpha_0 + \beta_1 Lm2_t + \beta_2 Lgdp_t + \beta_3 gro_t + \beta_4 Ldev_t + \beta_5 open_t + \beta_6 Lexc_t + \beta_7 tax_t + \beta_8 \inf l_t + \beta_9 crisis_t + \varepsilon_t \quad (1)$$

In testing the existence of the long-run relationship (cointegration), the error correction versions of the ARDL framework for equation (1) is given by equation (2).

$$\Delta Lfdi_t = \beta_0 + \sum_{i=1}^{n} b_i \Delta Lfdi_{t-i} + \sum_{i=1}^{n} c_i \Delta Lm2_{t-i} + \sum_{i=1}^{n} d_i \Delta Lgdp_{t-i} + \sum_{i=1}^{n} e_i \Delta gro_{t-i} + \sum_{i=1}^{n} f_i \Delta Ldev_{t-i} + \sum_{i=1}^{n} g_i \Delta open_{t-i} + \sum_{i=1}^{n} h_i \Delta Lexc_{t-i} + \sum_{i=1}^{n} j_i \Delta tax_{t-i} + \sum_{i=1}^{n} k_i \Delta \inf l_{t-i} + \sum_{i=1}^{n} l_i \Delta crisis_{t-i} + \delta_1 Lfdi_{t-1} + \delta_2 Lm2_{t-1} + \delta_3 Lgdp_{t-1} + \delta_4 gro_{t-1} + \delta_5 Ldev_{t-1} + \delta_6 open_{t-1} + \delta_7 Lexc_{t-1} + \delta_8 tax_{t-1} + \delta_9 \inf l_{t-1} + \delta_{10} crisis_{t-1} + \varepsilon_t \quad (2)$$

Equation (3) presents the error correction version of the ARDL framework when the variables are *Ldfi, Lm2* and *gro*.

$$\Delta Lfdi_t = \lambda_0 + \sum_{i=1}^{n} m_i \Delta Lfdi_{t-i} + \sum_{i=1}^{n} p_i \Delta Lm2_{t-i} + \sum_{i=1}^{n} q_i \Delta gro_{t-i} + \delta_1 Lfdi_{t-1} + \delta_2 Lm2 + \delta_3 gro_{t-1} + \varepsilon_t \quad (3)$$

To test for the existence of any long-run relationship we test whether all $\sum_i \delta_i = 0$.[1] The F-test has a non-standard distribution. The testing of the hypothesis is made by comparing the F-statistic with the upper and lower bounds of critical values at 5 per cent level of significance. The appropriate critical values for different number of regressors have been tabulated in Pesaran and Pesaran (1997). There is evidence of a long-run relationship between the variables if the F-test statistic exceeds their respective upper critical values. On the other hand, cannot reject the null hypothesis of no cointegration if the test statistics less than the lower bound critical values. The hypothesis remains inconclusive if the F-statistic lies between the upper and lower bound of the critical values and a decision will be made based on the ECM version of the ARDL model. The ECM integrates the short run dynamics with the long run equilibrium without losing long run information.

3.3 Data

Data spanning from 1970-2008 are obtained from various sources of publications. Data on FDI, rate of growth, openness, and government development expenditure are taken from various issues of *Bank Negara Malaysia reports*. FDI is the direct investment in Malaysia under the Balance of Payment account statement. In the case of Malaysia, FDI is measured as the initial capital outlays in the approved projects by Malaysian Industrial Development Authority (MIDA). *International Financial Statistics* provides data on exchange rate, money supply, and inflation rate. Statutory corporate tax data is taken from the *Department of Inland Revenue annual reports*.

4. Findings

Table 2 reports results on unit root test using Augmented Dickey Fuller (ADF) test. The finding suggests that all variables are integrated of order 1, I(1), except *gro* and *infl* which are I(0). This test suggests that an ARDL approach is the appropriate method of estimation since the variables are mixture of I(1) and I(0). Next we estimate equation (1) to determine the existence of any long-run relationship between FDI and other macroeconomic variables. The maximum order of lags in the ARDL model in both cases is n=1 due to the annual time series data utilized in the study. The calculated F-statistics for cointegration test is shown in Table 3 for equation (1) that includes all the variables. The F-test has a non-standard distribution. The critical value bounds for F-test are computed by Pesaran et al (1997).

Table 2: Augmented Dickey-Fuller (ADF) Test for Unit Root

Variable	Levels		First-differences	
	Without Trend	With Trend	Without Trend	With Trend
Lfdi	-1.346	-2.257	-5.448***	-5.418***
Lm2	-1.887	-2.456	-6.048***	-6.523***
Lgdp	-1.703	-1.897	-5.025***	-5.164***
gro	-4.927***	-5.298***		
Ldev	-1.994	-2.378	-4.899***	-4.887***
open	-0.887	-1.750	-4.753***	-4.707***
Lexc	-1.164	-2.905	-6.162***	-6.174***
tax	0.361	-1.853	-5.547***	-5.660***
infl	-3.525**	-3.932**		

Notes: i. ***, **, and * represent statistical significance at the 1%, 5%, and 10% level respectively.
ii. The optimal lag lengths are determined by the Schwarz's Information Criterion (SIC).

The calculated F-statistic for F(*Lfdi*|*Lm2*, *Lgdp*, *gro*, *Ldev*, *open*, *Lexc*, *tax*, *infl*, *crisis*) is 1.1557 which is less than the lower bound critical value at 5 per cent level of significance. This implies that the null hypothesis of no cointegration cannot be rejected and therefore it suggests that there is no evidence of cointegration among the variables in equation (1). This is not surprising as Ang (2008) also faces the similar problem when some of the variables turn

out to be insignificant when in a model that includes all the variables. The process of testing for the existence of a long-run relationship using bound testing is repeated for other combination of variables by dropping some of the variables in each of the equation. Finally, the presence of cointegration is detected in *F*(*Lfdi*| *Lm2*, *gro*). The *F*-statistics of Wald test for *F*(*Lfdi*| *Lm2*, *gro*) is 4.8644 which exceeds the upper bound critical value at 5 per cent level of significance. Therefore, the null hypothesis of no cointegration can be rejected. The result shows that there exist a long-run relationship between *Lfdi, Lm2* and *gro*.

Table 3: Cointegration Result

		Bound Critical Values (with an intercept and no trend)		
Value	Lag	I(0)	I(1)	Outcome
F(Lfdi|Lm2, Lgdp, gro, Ldev, open, Lexc, tax, infl, crisis)				
1.1557	1	2.163	3.349	No Cointegration
F(Lfdi|Lm2, gro, Ldev, open, Lexc, tax, infl, crisis)				
1.2812	1	2.272	3.447	No Cointegration
F(Lfdi|Lm2, gro, Ldev, open, tax, infl, crisis)				
1.5850	1	2.365	3.553	No Cointegration
F(Lfdi|Lm2, gro, Ldev, open, infl, crisis)				
1.2677	1	2.476	3.646	No Cointegration
F(Lfdi|Lm2, gro, Ldev, infl, crisis)				
1.6270	1	2.649	3.805	No Cointegration
F(Lfdi|Lm2, gro, Ldev, crisis)				
2.5079	1	2.850	4.049	No Cointegration
F(Lfdi|Lm2, gro, crisis)				
3.4268	1	3.219	4.378	Inconclusive
F(Lfdi|Lm2, gro, Ldev)				
3.4697	1	3.219	4.378	Inconclusive
F(Lfdi|Lm2, tax)				
1.7309	1	3.793	4.855	No Cointegration
***F*(Lfdi|Lm2, gro)**				
4.8644*	1	3.793	4.855	Cointegration

Note: * represents statistical significance at the 5 per cent level

If the long run relationship is assumed to exist in the equation (1), the ARDL model log-run results for equation (1) is given in Table (4). The estimated coefficients show only market size proxies by real GDP is statistically significant and has a right sign. Economic uncertainty proxies by inflation rate, financial development and corporate tax although statistically significant the signs are inconsistent with prior expectation.

Table 4: The Estimated Long-Run Coefficients in ARDL Model

ARDL (1, 1, 0, 0, 0, 0, 0, 0, 0, 0) selected based on AIC.

Regressor	Coefficient	Standard Error	t-statistics	p- value
Lm2	-3.4232**	1.4605	-2.3438	0.027
Lgdp	9.6492***	3.3548	2.8762	0.008
gro	-0.9871	0.0437	-0.0226	0.982
Ldev	0.4047	0.3201	1.2643	0.217
open	0.0108	0.0102	1.0537	0.302
Lexc	-0.0740	1.0845	-0.0682	0.946
tax	23.0261**	9.8803	2.3305	0.028
infl	0.0896**	0.0431	2.0794	0.048
crisis	0.0591	0.8602	0.0687	0.946
Constant	-83.1991***	27.9153	-2.9804	0.006

Note: ***, **, and * represent statistical significance at the 1%, 5%, and 10% level respectively.

The actual findings show that FDI has a long-run causal relationship with financial development and growth rate. Therefore, the next step is to continue with estimating ARDL cointegration for its long-term coefficients and error correction model. Table 5 presents the ARDL (1, 0, 1) model long-run results where the order of the distributed lag on the dependent variable was selected by AIC. The empirical results of the long-run model show that both money supply (*Lm2*) and growth rate (*gro*) are important determinants of FDI inflow in Malaysia. The signs of the coefficient of money supply and growth rate are consistent with prior expectation and statistically significant. It is concluded that financial development and growth rate are the key variables affecting FDI from this long-run relation. The estimated coefficients suggest that a 1 per cent increase in the financial development and economic growth attract FDI inflows into the country by approximately 0.9 per cent and 0.2 per cent, respectively. The coefficients reported in this paper are greater than those reveals by Ang (2008) where the effect of financial development is about 0.5 - 0.6 per cent, while the growth rate increases FDI by .09 - .03 per cent. Contrary to the findings of this study, it is the real exchange rate that has the biggest impact on FDI or the main factor that attract FDI in Malaysia.

Table 5: The Estimated Long-Run Coefficients in ARDL

ARDL (1, 0, 1) selected based on AIC.

Regressor	Coefficient	Standard Error	t statistics	p value
Lm2	0.8843***	0.0997	8.8667	0.000
gro	0.1863**	0.0696	2.6777	0.011
Constant	- 2.7682**	1.3370	- 2.0705	0.046

Note: ***, **, and * represent statistical significance at the 1%, 5%, and 10% level respectively.

Table 6 shows that the error correction term (*ect*) which is highly significant at 1 per cent level and with a correct sign. The speed of adjustment implied by the *ect* coefficient is 35 per cent. The short-run model provides information on how the dependent variable, FDI adjusts in response to the changes the financial development and economic growth. Approximately, 35 per cent of disequilibria from the previous year's shock converge back to the long-run equilibrium in the current year. The coefficients of *dLm2* and *dgro* are statistically significant with expected signs for the short-run dynamics of *dLfdi*. This indicates that financial market development and economic growth have a significant impact on FDI in the long-run and the short-run FDI function. However the response of FDI to changes in the financial development and economic growth from the short-run relationship is smaller.

Table 6: Error Correction Representation

ARDL (1, 0, 1) selected based on AIC.

Regressor	Coefficient	Standard Error	t statistics	p value
Constant	- 0.9644**	0.4995	- 1.9308	0.062
dLm2	0.3081***	0.1032	2.9856	0.005
dgro	0.0371**	0.0139	2.6712	0.012
ect (-1)	- 0.3484***	0.1137	- 3.0641	0.004

Note: ***, **, and * represent statistical significance at the 1%, 5%, and 10% level respectively.

5. Conclusion

This study re-examines the existing studies on the dynamics of FDI and its determinants in Malaysia. It explores the short-run and long-run coefficients of the determinants of FDI over the period 1970 to 2008. Recent estimates of the dynamic causality between FDI inflow and its determinants in Malaysia are not comprehensive. Unfortunately, evidence on the importance role of financial development and economic growth are not well supported in study by Ang (2008). The short-run and long-run dynamic relationships of the variables are not adequately examined. Cointegration relationships among the variables are not tested using the standard cointegration technique. In other studies, evidence of long-run stable relationship between FDI and its determinants are not found. Contradict from the previous findings, this study support the existence of long-run relationship between FDI and its key determinants. Changes in FDI are partly explained by its responses to changes in the system. The finding suggests the failure of the existing studies in the past to model cointegration analysis appropriately in the Malaysian case. The bound testing for a restricted model reveals that there is a significant positive relationship between FDI and its determinants money supply and growth rate. The positive significant signs of money supply and growth rate from the short-run and long-run coefficients demonstrate that money supply and GDP growth rate are important in attracting more FDI inflow in Malaysia. The presence of a long-run relationship between FDI and financial development suggests advancement in financial market instrument

and a more advanced banking system are an important factor driving more foreign investor into Malaysia. In contrast with the previous findings, we found that GDP growth does play an important role in attracting foreign investment to this country. High economic growth brings more FDI into country as investors are confident with the prospects of its investment in a country with positive outlook.

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