FOREIGN DIRECT INVESTMENT DETERMINANTS IN THE MANUFACTURING SECTORS IN MALAYSIA

Wong Hock Tsen
Faculty of Business, Economics and Accountancy, Universiti Malaysia Sabah, Jalan UMS, 88400 Kota Kinabalu, Sabah, Malaysia
htwong@ums.edu.my

Abstract

Foreign direct investment (FDI) is a vital driver for economic growth in a country. Hence, FDI determinants should be identified in order to promote FDI. FDI could stimulate economic growth and economic growth could attract FDI. This study examines foreign direct investment (FDI) determinants in the main manufacturing sectors and the impact of FDI on economic growth in Malaysia. Moreover, this study examines the link between FDI and real national income. The vector error correction model (VECM) is used to estimate FDI determinants and the link between FDI and real national income. The results of the vector VECM show that the coefficients of real exchange rate are found to have positive impact on FDI. The coefficients of real national income, trade openness and real infrastructure are mostly found to have positive impact on FDI whilst the coefficients of real average wage and financial development are mostly found to have negative impact on FDI. Autocracy and polity are found to be significant determinants for many manufacturing sectors in the short run. Inflation is found to influence negatively FDI in the transport equipment sector. The Asian financial crisis, 1997-1998 is found to have influential impact on FDI in the petroleum products sector and the chemical and chemical products sector. These findings reveal that FDI determinants are not exactly the same for all the manufacturing sectors. Therefore, FDI would be attracted through a variety of policies. FDI is found to Granger

cause real national income for the basic metal products sector and the chemical and chemical products sector whilst real national income is found to Granger cause FDI for the petroleum products sector. These findings demonstrate that FDI and economic growth are closely related. FDI can sustain economic growth in Malaysia. FDI is crucial for economic growth.

Keywords

Foreign Direct Investment, Determinants, Real Exchange Rate, Economic Growth, Malaysia

1. Introduction

Foreign direct investment (FDI) is an important economic activity and a vital driver for economic growth in a country (Lucke & Eichler, 2016; Nielsen, Asmussen, & Weatherall, 2017). FDI provides job opportunities, capital and better technology, which raise total factor productivity and boost economic growth. Therefore, FDI is good for the host country (Desbordes & Wei, 2017). The knowledge of FDI determinants would provide some wisdom to allure FDI. Malaysia actively attracts FDI. Investment Incentives Act 1968 and free trade zones, among others were introduced in the early 1970s and more open policies in the 1980s to attract FDI were promoted in the country. This results rapid economic growth rates and success of industrialisation in Malaysia (Ang, 2008; Kinuthia & Murshed, 2015). Recently, it has been argued that FDI determinants have changed due to globalisation, which makes production geographically separated. Hence, traditional FDI determinants may no longer effective to allure FDI casting doubt on the suitability of existing FDI policy in the host country. A variety of theoretical models deliver to explain FDI. There is no single theoretical model for FDI determinants (Kinuthia & Murshed, 2015; Ly, Esperança & Davcik, 2018; Magnier-Watanabe & Lemaire, 2018).

There is a huge literature on FDI determinants (Kendirli, Cankaya, & Cagatay, 2017; Raff, Ryan, & Stähler, 2018; Yan, Zhang, Shen, & Han, 2018; Zhai, 2014). Moreover, there are some studies on FDI in Malaysia (Ang, 2008; Tang, Yip, & Ozturk, 2014; Kinuthia & Murshed, 2015). There are not many studies on FDI determinants in the manufacturing sector and sub-sectors of the manufacturing sector in Malaysia.

FDI can influence GDP and vice versa. Chan et al. (2014) report FDI is positively affected by GDP in the short run. FDI is not directly affected by local investment but has a direct significantly positive impact on GDP in the long run. Makiela and Ouattara (2018) show that FDI influences positively and significantly on the input growth component of economic growth. Iamsiraroj (2016) also demonstrate that FDI are positively associated with per capita income growth and vice versa in an empirical study using 124 cross-country data for the period from 1971

to 2010. Feeny, Iamsiraroj and McGillivray (2014) find that a 10 per cent increase in the ratio of FDI to GDP is associated with higher GDP growth of about 2 per cent on average of countries studied but only about 0.1 to 0.4 per cent in the Pacific Island countries. Conversely, Alvarado, Iñiguez and Ponce (2017) report that FDI does not accelerate economic growth in Latin America, except of high-income countries in Latin America, namely Chile and Uruguay. FDI is important for economy and economy expansion might promote FDI.

Malaysia was a hub of FDI in the Asia region. The manufacturing sector is an important sector in Malaysia. This sector provides variety job opportunities, increases exports, generates foreign reserve and sustains economic growth. This study examines FDI determinants in the main manufacturing sectors, namely electronics and electrical products, petroleum products, basic metal products, chemical and chemical products and transport equipment and the impact of FDI on economic growth in Malaysia. FDI in the main manufacturing sectors and gross national income in Malaysia moved in an upward trend over the period from 1980 to 2016 (Malaysian Investment Development Authority; Figure 1). FDI determinants would likely not be the same for all the manufacturing sectors. There are not many studies on FDI determinants in the main manufacturing sectors in Malaysia. Moreover, FDI determinants may change from time to time. Furthermore, FDI could significantly contribute to economic growth in Malaysia and economic growth could attract more FDI.

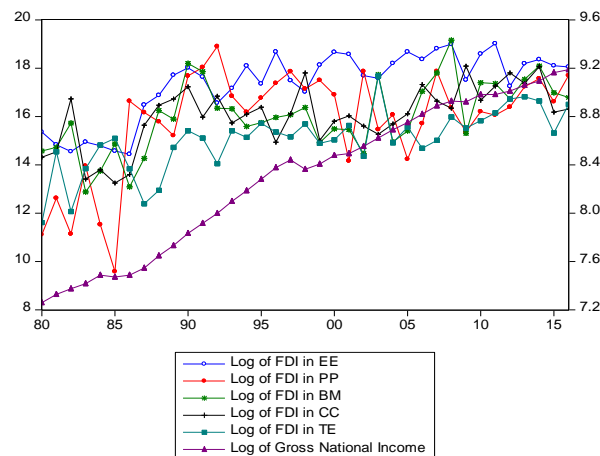**Figure 1:** *Logarithm of FDI in the Main Manufacturing Sectors and Logarithm of Real National Income in Malaysia, 1980-2016*

2. Literature Review

There is a huge literature on FDI determinants. Moreover, there are some studies on FDI in Malaysia. Ang (2008) examines FDI in Malaysia over the period from 1960 to 2005. The results show that real gross domestic product (GDP), growth rate of GDP, financial development,

infrastructure development, trade openness and higher macroeconomic uncertainty promote FDI. Tang, Yip and Ozturk (2014) provide a literature review of FDI determinants in Malaysia over the period from 1993 to 2010 and they investigate FDI determinants in the electrical and electronic (E&E) industry in Malaysia using the autoregressive distributed lag bounds test (ARDL) approach over the period from 1980 to 2008. The results display that GDP, real exchange rate, financial development and macroeconomic uncertainty are found to have a positive impact on FDI in the E&E industry in the long run whereas corporate income tax and social uncertainty are found to have a negative impact on FDI in the E&E industry. All explanatory variables are found to Granger cause FDI in the E&E industry in the long run. Macroeconomic and social uncertainties are found to Granger cause FDI in the E&E industry in the short run. Kinuthia and Murshed (2015) compare FDI determinants in Kenya and Malaysia over the period from 1960 to 2009. Malaysia's success in attracting FDI compared to Kenya due to differences in macroeconomic stabilisation, trade policies, infrastructure and institutional factors.

There are many essential FDI determinants reported but no general theory has been identified in the literature. Vo (2018) investigates FDI in Vietnam using a panel data over the period from 2005 to 2014. The results show that FDI in Vietnam depends on the market size, inflationary risk and the stock market volatility of the source country and the bilateral trade link and distance between the source and the host country. Villaverde and Maza (2015) study FDI determinants in the 260 European Union Nomenclature of Territorial Units for Statistics II (NUTS2) regions over the period from 2000 to 2006. The results show that the important FDI determinants are economic potential, labour market characteristics, technological progress and competitiveness. Conversely, market size and labour regulation are found to be insignificant FDI determinants.

Despite the vast literature on FDI determinants, there is still room for improvements in empirical evidence. Nielsen, Asmussen and Weatherall (2017) conclude that firms locate in good demand conditions but mixed evidence of the impact of high wages and taxes on FDI. Zhai (2014) studies policy competition for FDI between the host country and the home country. The results demonstrate policy competition does not attract FDI as a location for business operation and hence, policy competition does not change regional welfare. The equilibrium policy for promoting FDI could be a subsidy or a tax. Ly, Esperança and Davcik (2018) analysis 71,309 pairs of FDI determinant over the period from 2000 to 2012. The results reveal that language and information flow are positively associated with FDI. Technological differences impede the flow of FDI

between countries. Information flow diminishes the negative impact of distance. Desbordes and Wei (2017) show that country's financial development (SFD) and destination country's financial development (DFD) affect positively FDI. The economic impacts of SFD and DFD are about the same but their effects vary across margins and types of FDI. The transmission channels from financial shocks to FDI can be from a collateral channel, that is, changes in the value of investors' landholdings influence their borrowing ability and from a lending channel, that is, changes in bank health affect banks' lending ability (Raff, Ryan, & Stähler, 2018). The influences of external financial constraints on firms are larger than that of internal financial constraints on firms (Yan et al., 2018).

FDI can influence GDP and vice versa. Bekhet and Al-Smadi (2015) find GDP, M2, economic openness and stock market index are important FDI determinants in Jordan. FDI is important for economic growth in Jordan. Chan et al. (2014) report FDI is positively affected by GDP in the short run. FDI is not directly affected by local investment but has a direct significantly positive impact on GDP in the long run. Makiela and Ouattara (2018) show that FDI influences positively and significantly on the input growth component of economic growth. There is no discerning statistically significant effect of FDI on total factor productivity growth. The presence of domestic competition depresses bargaining power of the foreign parent firms and their ownership shares in the joint ventures with domestic firms (Nakamura & Zhang, 2018). Iamsiraroj (2016) also demonstrate that FDI are positively associated with per capita income growth and vice versa in an empirical study using 124 cross-country data for the period from 1971 to 2010. Feeny, Iamsiraroj and McGillivray (2014) find that a 10 per cent increase in the ratio of FDI to GDP is associated with higher GDP growth of about 2 per cent on average of countries studied but only about 0.1 to 0.4 per cent in the Pacific Island countries. Conversely, Alvarado, Iñiguez and Ponce (2017) report that FDI does not accelerate economic growth in Latin America except of high-income countries in Latin America, namely Chile and Uruguay.

There is a huge literature on FDI determinant but there is no consensus on a set of determinants. The important FDI determinants are commonly real income, real wage, trade openness, financial development and macroeconomic and social stability. FDI is important for economy and economy expansion might promote FDI. The ARDL approach is a commonly used in the literature. Moreover, there are not many studies on FDI determinants in the manufacturing sector and sub-sectors of the manufacturing sector in Malaysia. FDI determinants are likely not the same for different sub-sectors in economy.

3. Data and Methodology

Table 1 displays the description and source of the data. This study uses a set of FDI determinants closely to FDI determinants used by Kinuthia and Murshed (2015). FDI is expressed as a function as follows:

$$FDI_t = f(D_t, C_t, T_t, O_t) \qquad (1)$$

where D_t is domestic market measured by real national income, C_t is cost factors, namely the real average wage, which is a measure for the labour cost, real infrastructure, which is a measure for the development cost and financial development, which is a measure for the cost of financial system, T_t is trade openness, which is a measure for ease of doing business in the host country and O_t is other factors such as real exchange rate and inflation for macroeconomic stability and autocracy and polity for institution matters. Equation (1) is estimated using the vector error correction model (VECM).

Table 1: *The Data, Description and Source*

Data	Description
Real FDI (FDI_t)	$FDI_t = \dfrac{NFDI_t}{CPI_{m,t}}$ where $NFDI_t$ is FDI in approved projects in the manufacturing sector or sub-sectors of the manufacturing sector (RM million) and $CPI_{m,t}$ is consumer price index (CPI) in Malaysia (2010 = 100).
Real exchange rate (RER_t)	$RER_t = ER_t \times \dfrac{CPI_{us,t}}{CPI_{m,t}}$, where ER_t is Malaysian ringgit against the United States (US) dollar (RM/USD) exchange rate and $CPI_{us,t}$ is the US CPI (2010 = 100).
Real national income (NI_t)	$RNI_t = \dfrac{NI_t}{GDPD_t}$, where NI_t is gross national income in Malaysia (RM million) and $GDPD_t$ is GDP deflator in Malaysia (2010 = 100).
Real average wage (RAW_t)	$RAW_t = \dfrac{SW_t / TN_t}{CPI_{m,t}}$, where SW_t is salary and wage paid in the manufacturing sector in Malaysia (RM million) and TN_t is total number of persons engaged in the manufacturing sector.
Trade openness (TO_t)	$TO_t = \dfrac{XM_t}{GDP_t}$, where XM_t is total exports and imports in Malaysia (RM million) and GDP_t is GDP in Malaysia.

Financial development (FD_t)	$FD_t = \dfrac{BM_t}{GDP_t}$, where BM_t is broad money in Malaysia (RM million).
Real infrastructure ($INFRA_t$)	$INFRA_t = \dfrac{NINFRA_t}{CPI_{m,t}}$, where $NINFRA_t$ is development expenditure of Malaysia federal government in transport, communication, electricity and water and trade and industry (RM million)
Dummy variable (D_t)	The Asian financial crisis, 1997-1998, that is, 1 for 1997-1998 and 0 for the rest.
Autocracy (AC_t)	The institution freedom index for measure of governance or how the government is run in Malaysia.
Polity (PO_t)	A measure of how a government is formed and elected in Malaysia.

Notes: FDI and infrastructure data were obtained from Malaysian Investment Development Authority. Trade openness, financial development and inflation data were obtained from *World Development Indicators DataBank*, The World Bank. Exchange rate, gross national income, GDP deflator and CPI data were obtained from *International Financial Statistics*, International Monetary Fund. Autocracy and polity data were obtained from *PolityTM IV Project*, Center for Systemic Peace, 2017. All data were transformed into the natural logarithms before estimation, except inflation, autocracy and polity. The data is yearly from 1980 to 2016.

4. Empirical Results and Discussions

The results of the unit root test statistics, which are not reported show that all variables are non-stationary in levels and become stationary after taking the first differences, except inflation, autocracy and polity. In the estimations of the VECM, inflation, autocracy and polity are considered as deterministic variables. The results of the Johansen maximum likelihood statistics for cointegration, which are also not reported show that there are two cointegrating vectors for FDI in all the manufacturing sectors. The first cointegrating vector shall be real FDI and the second cointegrating vector shall be real national income. It is expected that there is a relationship between FDI and economic growth.

Table 2 depicts the results of the cointegrating vectors. The lag length selection criteria for estimating the VECM is based on the Schwarz information criterion (SIC). For the electronics and electrical products sector, the coefficients of real average wage, real exchange rate, trade openness and financial development are found to have positive impact on FDI. Conversely, the coefficients of real national income and real infrastructure are found to have negative impact on FDI. For the petroleum products sector, the coefficients of real national income, real exchange rate, trade openness and real infrastructure are found to have positive impact on FDI whilst real average wage and financial development are found to have negative impact on FDI. For the basic metal products

sector, the coefficients of real national income, real exchange rate and real infrastructure are found to have positive impact on FDI whilst real average wage, trade openness and financial development are found to have negative impact on FDI. For the chemical and chemical products sector, the coefficients of real average wage, real exchange rate, trade openness and real infrastructure are found to have positive impact on FDI whilst real national income and financial development are found to have negative impact on FDI. For the transport equipment sector, the coefficients of real national income and real exchange rate are found to have positive impact on FDI whilst real average wage, trade openness, financial development and real infrastructure are found to have negative impact on FDI. Generally, the coefficients of real are found to have positive impact on FDI. The coefficients of real national income, trade openness and real infrastructure are mostly found to be positive whilst the coefficients of real average wage and financial development are mostly found to be negative.

Table 2: *The Results of the Cointegrating Vectors*

FDI_{t-1}	NI_{t-1}	RAW_{t-1}	RER_{t-1}	TO_{t-1}	FD_{t-1}	$INFRA_{t-1}$
$FDI_{e,t}$ $\chi^2 = 0.0035$						
1.00	1.05	-2.85	-0.02	-5.41	-3.27	0.29
-	1.00	-	2.089	-0.89	1.10	-2.51
$FDI_{p,t}$ $\chi^2 = 0.0167$						
1.00	-0.55	0.35	-5.70	-4.22	5.35	-0.23
-	1.00	-	2.69	-1.75	1.70	-2.50
$FDI_{b,t}$ $\chi^2 = 0.0165$						
1.00	-2.43	2.04	-3.01	0.43	5.55	-0.15
-	1.00	-	5.53	-2.89	3.24	-3.61
$FDI_{c,t}$ $\chi^2 = 0.4386$						
1.00	0.34	-0.96	-1.74	-1.95	0.56	-1.55
-	1.00	-	5.00	-2.38	2.50	-3.31
$FDI_{t,t}$ $\chi^2 = 0.3678$						
1.00	-3.44	1.44	-0.15	1.10	2.41	1.15
-	1.00	-	3.78	-2.00	2.03	-2.87

Notes: $FDI_{e,t}$ is FDI in approved projects in the electronics and electrical products sector at time t. $FDI_{p,t}$ is FDI in approved projects in the petroleum products sector at time t. $FDI_{b,t}$ is FDI in approved projects in the basic metal products sector at time t. $FDI_{c,t}$ is FDI in approved projects in the chemical and chemical products sector at time t. $FDI_{t,t}$ is FDI in approved projects in the transport equipment sector at time t.. χ^2 is the likelihood ratio test for binding restrictions.

Table 3 report the results of the error correction models. The error correction terms are found mostly statistically significant. The coefficients of real average wage, real exchange rate, trade openness and real infrastructure are found to be statistically significant in some manufacturing sectors. The coefficients of autocracy and polity are mostly found to be positive and statistically significant for FDI. The coefficient of inflation is found to be negative and statistically significant for FDI in the transport equipment sector. The coefficients of the Asian financial crisis, 1997-1998 are found to be positive and statistically significant for FDI in the petroleum products sector and the chemical and chemical products sector.

Table 3: *The Results of the Error Correction Models*

	$\Delta\,FDI_{e,t}$	$\Delta\,FDI_{p,t}$	$\Delta\,FDI_{b,t}$	$\Delta\,FDI_{c,t}$	$\Delta\,FDI_{t,t}$
$\Delta\,NI_{t-1}$	-0.06	-25.80	-1.24	-0.77	6.64
$\Delta\,RAW_{t-1}$	-1.28	11.10	4.19	-10.17*	15.73***
$\Delta\,RER_{t-1}$	-5.02**	-14.07*	-9.03*	-6.40	-0.17
$\Delta\,TO_{t-1}$	7.85***	12.21	7.93	11.31**	4.65
$\Delta\,FD_{t-1}$	-0.52	0.79	1.56	2.12	0.52
$\Delta\,INFRA_{t-1}$	1.39**	2.60	2.78**	0.47	1.00
D_t	0.17	3.43*	1.98	3.12***	-0.43
AC_t	2.42***	2.43***	0.71	3.04***	-1.93***
PO_t	1.25***	1.26***	1.03***	1.56***	-0.55***
INF_t	0.08	0.08	0.15	0.09	-0.33**
$\Delta\,FDI_{t-1}$	-0.29	0.00	0.18	0.11	0.11
$EC_{1,t-1}$	-0.79***	-0.84***	-1.37***	-0.80***	-1.11***
$EC_{2,t-1}$	0.15	1.65***	0.87***	0.07	0.09
R^2	0.56	0.21	0.37	0.38	0.49

Notes: See also Table 2 for explanation. D_t is the dummy variable foe the Asian financial crisis, 1997-1998. AC_t is autocracy. PO_t is polity. INF_t is inflation. $EC_{i,t-1}$ is the error correction term of the first cointegrating vector and the second cointegrating vector, respectively (i = 1, 2). R^2 is the adjusted R-squared.

Table 4 displays the results of the Granger causality test in the VECM. The lag length used to estimate the Granger causality test is based on the SIC. FDI is found to Granger cause real national income for the basic metal products sector and the chemical and chemical products sector whilst real national income is found to Granger cause FDI for the petroleum products sector.

Table 4: *The Results of the Granger Causality Test in the VECM*

	$\Delta NI \to \Delta FDI$	$\Delta FDI \to \Delta NI$
$\Delta\ FDI_e$	0.0002	0.0475
$\Delta\ FDI_p$	3.3762*	0.4995
$\Delta\ FDI_b$	0.0175	8.1218***
$\Delta\ FDI_c$	0.0098	7.6438***
$\Delta\ FDI_t$	0.0432	0.0056

Notes: See also Table 2 for explanation. The values are χ^2 statistics. *** (*) denotes significance at the 1% (10%) level.

Depreciation of real exchange rate attracts FDI because cost of investment is smaller for foreign investors and therefore foreign investors can invest a larger amount of capital (Ang, 2008; Tang, Yip, & Ozturk, 2014). A high real national income encourages FDI for the purpose of marketing in the domestic market. A high real national income increases real average wage, which raises cost of production and discourages FDI. Bekhet and Al-Smadi (2015) demonstrate that GDP is an important FDI determinant in Jordan. Conversely, Villaverde and Maza (2015) show that market size is found to be insignificant FDI determinant. Trade openness is found to affect positively FDI in the manufacturing sector. Nonetheless, trade openness is found to influence negatively some sub-sectors of the manufacturing sector. For market seeking FDI, trade restriction leads to more FDI. For export oriented FDI, trade openness leads more FDI as trade openness lessens cost of exporting. Financial development is found to affect positively FDI in the manufacturing sector whereas its impact is mixed for sub-sectors of the manufacturing sector. Desbordes and Wei (2017) report that both country's financial development and destination country's financial development influence positively on FDI in greenfield, expansion and mergers and acquisitions. The overall economic impact of financial development tends to be similar but varies across margins and types of FDI. Real infrastructure is found to have negative impact on FDI. One reason can be FDI may not get much of benefits directly from government development expenditure in transport, communication, electricity and water and trade and sector. Nonetheless, Real infrastructure influences positively to real national income, which affects positively on FDI. Inflation discourages businesses including FDI (Ang, 2008; Tang, Yip, & Ozturk, 2014; Kinuthia & Murshed, 2015).

Inflation was low in Malaysia for an average of about 3 per cent over the period from 1979 to 2015. An increase in governance variable or polity would increase FDI. How the government is run and how a government is formed and elected can influence FDI. Chen, Yu and Zhang (2019)

show firms from countries with better institutional quality exhibit greater investment efficiency than firms from countries with weaker institutions. This can imply that institutional elements are important in managerial decisions and policy making. Political dimensions such as political stability, the control of corruption and government effectiveness can attract FDI and optimise their endogenous resources (Mourao, 2018).

The Asian financial crisis, 1997-1998 is found to have influential impact on FDI in the petroleum products sector and the chemical and chemical products sector in the short run. A variety of policies shall be implemented to promote FDI as FDI determinants are not the same for all sub-sectors of the manufacturing sector in Malaysia. Promoting FDI can be more challenging in globalisation of the world economy today than before. The government shall promote FDI that encourages the growth of the domestic industry. Technology transfer improves innovation capacity of the domestic firms and offsets the negative effect of the foreign competitive firms on the domestic firms (Li, Wan, & Wang, 2018).

FDI can sustain economic growth in Malaysia. Economic expansion would attract FDI. FDI and economic growth are closely connected. Chan et al. (2014), Feeny, Iamsiraroj and McGillivray (2014), Bekhet and Al-Smadi (2015), Iamsiraroj (2016), Makiela and Ouattara (2018) and amongst others report that FDI is important for economic growth. On the other hand, Alvarado, Iñiguez and Ponce (2017) report that FDI generally does not accelerate economic growth in Latin America.

5. Concluding Remarks

This study examines FDI determinants in the main manufacturing sectors in Malaysia and Granger causality between FDI in the manufacturing sectors and economic growth. The VECM is used to estimate FDI determinants and the link between FDI and real national income. Generally, real national income, real exchange rate, trade openness, financial development and real infrastructure are found to have positive impact on FDI in the manufacturing sector and sub-sectors of the manufacturing sector. Real average wage and real infrastructure are found to have negative impact on FDI. Financial development is found to have positive impact on some FDI and negative impact on other FDI. Inflation, autocracy and polity are found to be significant determinants for many sub-sectors of the manufacturing sector in the short run. The Asian financial crisis, 1997-1998 is not found to have influential impact on FDI in the short run. Real exchange rate, real average wage, trade openness and real infrastructure are important contributors to change in FDI

of the manufacturing sector. FDI determinants are not similar for all sub-sectors of the manufacturing sector. A variety of policy shall be implemented to attract FDI as FDI important determinants are not the same for all sub-sectors of the manufacturing sector in Malaysia. FDI can sustain economic growth in Malaysia and economic growth would attract FDI.

Acknowledgements

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