Journal of Optimization in Industrial Engineering
Vol. 16, Issue 2, Summer & Autumn 2023, 315-324
DOI: 10.22094/JOIE.2023.1999691.2115

Research Article

Absorptive Capacity Effects on the Relationship Between Foreign Direct Investment and Economic Growth in Malaysia

Siti Norbaya Yahaya [a], Mohd Hafiz Bakar [b], Nusaibah Mansor [a], Amiruddin Ahamat [a]

[a] *Universiti Teknikal Malaysia Melaka*
[b] *Universiti Teknologi MARA*

Received 24 October 2023; Revised 24 November 2023; Accepted 20 December 2023

Abstract

There has been plenty of debate on the relationship between FDI and economic growth among scholars. There are many diverse perspectives on how FDI and GDP are related. Although the relationship appears to be different, it depends on the host country's capacity for absorption. In order for host country to exploit spillovers from FDI, it needs to have a minimum amount of absorptive capacity. Therefore, the first focus of the research was on the link between FDI and GDP in Malaysia. Then, absorptive capacity which only limited to human capital, financial development and trade openness was included into the relationship between FDI and economic growth in order to determine the effectiveness of absorptive capacity towards the relationship between FDI and economic growth in Malaysia. In order to analysed the relationship between FDI and economic growth with the presence of absorptive capacity in Malaysia, Automated Regression Distributed Lag (ARDL) techniques was adopted to obtain the results. Based on the results, short run and long run analysis was tested by using ARDL and Error Correction Models (ECM). Thus, ARDL bounds testing was tested to test the presence of cointegration in the models. The results show that the outcome between FDI and GDP are inconclusive which shows that there is no direct relationship between FDI and economic growth. Apparently, by the presence of absorptive capacity, the results of FDI and GDP showing both long run and short run effect. These results proved that the relationship between FDI and economic growth in Malaysia can only be determined when there is minimum threshold of absorptive capacity.

Keywords: Foreign Direct Investment; Economic growth; Absorptive capacity; Human capital; Financial development and trade openness; Malaysia

1. Introduction

Globalisation is crucial for every nation in today's frenzied technological age if it is to reap considerable economic gains for itself. Globalization can affect economic growth process either positive or negative, in fact the positive effect gives greater impacts than the negative effects (Bende-Nabende, 2018). In particular, foreign direct investment (FDI) is one of the globalization acts that promote greater positive effects. Supported by Hayat (2019), FDI is one of element in the globalization process that created advantages for countries in the world to promote their economic growth. In order to attract FDI, developing countries mostly has opened up their economy and provide favorable environment for investor. Moran, (2016) also mentioned that country that have beneficial trade regimes, support private property and untainted business outlook for future. Therefore, there are some other possible factors that affect the relationship between FDI and economic growth that this paper will highlight.

As there were lots of conflicting opinions on the relationship between FDI and economic growth, this paper will eventually be discussed on the topic specifically in the scope of Malaysian economic. Despite the importance on this topic, there are limited sources of study in the context of intervening factors on FDI-growth relationship in Malaysia. Hence, this paper seeks to fill this gap and contribute to the body of knowledge in this area of study by examine the effect of absorptive capacity on the relationship between FDI and economic growth in Malaysia. There are several economic conditions which may affect the relationship between FDI and economic growth. The selected factors chosen in this paper are human capital, financial development and trade openness.

* Corresponding author Email address: sitinorbaya@utem.edu.my

2. Literature Review

2.1. Foreign direct investment

Foreign Direct Investment which also known as a globalization is a key element to in helping to grow in the international market. FDI creates a direct, stable and long-lasting link between economies and also act as the moving factors of the development of local enterprise as well as enlightening the competitiveness of host and home country's economy. Moreover, FDI help to boosts the transfer of technology and know-how between economies and gives an advantage for the host countries to enter the global market and promoting their products internationally. In the meantime, FDI also acts as the important sources of capital for the host and home country (OECD Benchmark Definition of Foreign Direct Investment, 2008)

Foreign Direct Investment is defined as owning of 10 percent or more of a foreign company by an individual or a business located other than its own country (Amadeo,

2019). Moreover, Amadeo (2019) claimed that investor do not have the power to controlling the interest of the host country despite the ownership of part of the company. Meanwhile, the investor is allowed to take part in the management, operations and the policies of the company in host country. Other than that, FDI also reflecting as long term investment in a foreign country other than its own country (Ali and Hussain, 2017).

According to United Nations Conference on Trade and Development (2019), FDI is defined as a long-term investment that involve in maintaining relationship and lasting interest which is controlled by the investor of home nation in a company located at other country than its own country. FDI means that the shareholder imposes a large degree of influence on the management of the citizen of the other economy. It covers the initial transaction between the two companies as well as all subsequent transactions between them and international partners, both incorporated and unincorporated (Alyammahi, Yahaya and Mansor, 2019). Thus, both individuals and business entities can conduct FDI. There are three components of FDI, which is equity capital, reinvested earnings and intra-company loans. Meanwhile, FDI stock is define as the sum of the share of their equity and resources attributable to the parent company, plus the net debt of the parent company's affiliates.

Although, FDI is said to be main pillars of globalisation in the late 20th century, serious debate has arisen on the effect of FDI towards globalisation among academician mostly. Whereas, the supports of FDI claimed that FDI helps in reducing poverty and upsurge global economy competency (Protsenko, 2004). Alguacil et al. (2011) mention FDI as one of key components of globalization as well as developing economies global integration. As stated by Nabi and Malarvizhi (2014), FDI in developing country was remarkable and contributed to the overall growth of the nations. Nevertheless, as one of the sources of international funds, FDI promote the economic development and a lot of countries has started soliciting international funds. In the same pages, attracting FDI is not quite the same as developing. The results reinforce the argument that policies designed to attract foreign investment are not enough to drive economic growth.

2.2. Economic growth

Scott (1991) in his seminal book comments that the current national income definition is circular and, therefore, unsatisfactory. National income should be described in Hicksian terms as well as individual income. The best estimates available are the sum of consumption and the gross investment. While, Haller (2012) define economic growth not only as the process of increasing the sizes of national economy. However, it helps in promoting macro-economic indications, specifically in increasing GDP per capita but not necessarily linear direction and positive effect on the economic-social sector. Piętak (2014) has define economic growth as one of the most significant notions of the world economy. It remains the primary indicator of success, given the criticism that growth levels and rates do not necessarily represent the real standard of living of a population. Belgian author that has produce seminal works in the field of economic, de la Croix (2015) has define economic growth as a process in which increases over time the amount of goods and services which may be provided with the same amount of work. That usually means earnings per worker increase over time, while working hours slowly decline.

Malaysia economic structure has become more diverse since Malaysia gained independence in 1957. In recent years, the manufacturing sector has become the main source of growth. Until 2018, Services and Manufacturing sectors has become the main contributor to Malaysia economic growth. According to Kei (2018), positive growth are recorded for all sectors except for agriculture sector.

Malaysia economic structure has become more diverse since Malaysia gained independence in 1957. In recent years, the manufacturing sector has become the main source of growth. Until 2018, Services and Manufacturing sectors has become the main contributor to Malaysia economic growth. According to Kei (2018), positive growth are recorded for all sectors except for agriculture sector.

In addition, Malaysia is a middle-income economy that is relatively small, accessible and diverse. As demonstrated by the overall trend rise in trade, international trade is one of the economic pillars. This rapid increase in international trade plays a major role in the Malaysian economic development and advancement. Therefore, Malaysia is best equipped to take advantage of significant advantages arising from international trade such as global spillovers of technology, access to a wider range of goods and services, among others.

2.3. Absorptive capacity

Previous research has shown variables results of the relationship between FDI and economic growth. Several factors also have been identified and has said to affect the relationship between FDI and economic growth. These influencing factors either strengthen the relationship or otherwise. In their seminal work, Cohen and Levinthal (1989) define absorptive capacity as the ability of the company to exploit more intermediate external knowledge. They also mentioned that absorptive capacity is an important part of the capacity of an organization to create new information. Extended from the study by Cohen and Levinthal (1989), Lane et al. (2002) has discussed the main findings and classification of absorptive capacity topics which includes definitions of absorptive capacity, knowledge characteristics and absorptive capacity, knowledge transfer and absorptive capacity, organizational learning and absorptive capacity, absorptive capacity and innovation, absorptive capacity and corporate scope and lastly, absorptive capacity and alliance. These seven broad characteristics explain absorptive capacity in different perspectives. Seminal work by Cohen and Levinthal (1989) has revealed that the ability of the company to use outside knowledge of a more intermediate kind also includes absorptive capacity. They also mentioned absorptive capacity as an important

part of the potential of an organization to create new information.

2.4. Human capital

Organization for Economic Co-operation and Development (OECD) defines human capital as knowledge, skills, competencies and attributes of one person that enable the formation of personal, social and economic welfare. Similarly, Goldin (2014) define human capital as the skills owns by the labor forces which resulting increased of individuals productive capacity as it increased. The World Bank (2018) also define human capital similarly which is individual skills, heath, knowledge and resilience. Plus, it highlights the importance of human capital investment which due to technological change it caused nature of work to evolve. In a seminal work by de la Croix (2015), accumulating human capital helps in sustaining the process of growth. Even though one country not able to increase its labor supply, it can take other initiative by enhance the quality of its labor which also refers as its human capital that encompasses education, experience and health.

Therefore, many researches have been done by the previous researcher to study the importance of human capital in economy and how it can affect economic growth and FDI. Kottaridi and Stengos (2010) in their research confirmed that human capital has a nonlinear effect on economic growth even in the presence of FDI which means that the changes value in human capital does not correspond with constant change in economic growth. In the other hands, Baharumshah and Almasaied (2009) who explore the role of FDI in economic growth in Malaysia founds that by cooperating FDI with human capital resulting positive effect of growth in short and long term. It explains that educational system allows country to receive more from the positive spillover effect of FDI. The researcher also stated that the factors of Malaysia's remarkable growth records over past three decades partly by the contribution of the education and financial institutions.

2.5. Financial development

A large and growing body of literature has conducted research on financial development. World Economic Forum (2012) describe financial development as a factor in successful financial intermediation and market policies and structures, deep and broad access to capital and financial services. Judith and Chijindu (2016) in their research define financial development as a combination of depth, access and efficiency. In the past study regarding financial development by Love and Zicchino (2006), financial development level in a country can be used as an indicator of the different levels of funding constraints faced by the organization. According to Choong, Yusop and Soo (2005) and Olagbaju and Akinlo (2018), when a recipient country has a well-developed and well-functioning financial sector, FDI appears to be more likely to boost economic growth more effectively.

According to Bhattacharya et al. (2018), they supported that financial development level in the host country will affect its ability to take advantage of FDI. In the same page, from a recent study by Vojtovič et al. (2019), financial development has been included in their study on the linkages between economic growth and FDI. It has been found that in the sense of FDI, the degree of financial market growth seems to be one of the necessary conditions for positive effect. They also highlighted the importance of economic growth and level of financial market development which is linked directly to country's absorptive capacity.

2.6. Trade openness

During the nineteenth and early twentieth centuries, international trade openness has often been referred to as the "force of prosperity" and help in encouraged the production of today's economically advanced nations (Baharom et al., 2008). Hess (2008) in his introduction to trade openness explains that developing countries create policies to determine their level of openness to foreign firms and their activities in order to set the stage for FDI in their markets.

Omri et al. (2015) in their study revealed that there is interrelated relationship between economic growth and trade openness which is an increase in trade openness will decrease economic growth. Supported by Kyophilavong et al. (2015) revealed that trade openness helps in increasing economic activity and lead to upwards of economic growth and in returned economic growth leads trade openness. Similarly, Baharom et al. (2008) also proved positive and significant relationship of trade openness on economic growth both short and long run relationship. In contrast, Sothan (2017) mentioned that FDI don't really helps in promoting economic growth in some country and it was said caused by several barriers and one of it is trade openness.

3. Methodology

3.1.Model development

The first objective of this study is to identify the relationship between FDI and GDP and the interaction effect of absorptive capacity on the relationship between FDI and GDP. The rest of the objective of this study is to reveal the channels through which FDI affects economic growth. Durham (2004) and Mingyong et al. (2006), added multiplication of FDI and absorptive capacity which they analyzed in order to examine simultaneous effect of FDI and related absorptive capacity variable. The empirical model for his study is as follows:

$$Lngdp_t = \alpha + \beta Lnfdi_t + \mu_t, \quad (1)$$

$$Lngdp_t = \alpha + \beta_1 Lnfdi_t * \beta_2 Lnhc_t + \mu_{t,} \quad (2)$$

$$Lngdp_t = \alpha + \beta_1 Lnfdi_t * \beta_2 Lnfd_t + \mu_{t,} \quad (3)$$

$$Lngdp_t = \alpha + \beta_1 Lnfdi_t * \beta_2 Lnto_t + \mu_{t,} \quad (4)$$

$$Lngdp_t = \alpha + \beta_1 Lnfdi_t + \beta_2 (Lnfdi * Lnhc) + \beta_3 (Lnfdi * Lnfd) + \beta_4 (Lnfdi * Lnto) + \mu_{t,} \quad (5)$$

Model 1: Baseline model of direct effect between FDI and GDP as shown in Equation (1(1)
Model 2: Baseline model with human capital as the control variables as shown in Equation (2)
Model 3: Baseline model with financial development as the control variables as shown in Equation (2)
Model 4: Baseline model with trade openness as the control variables as shown in Equation (42)
Model 5: Baseline model with all interaction terms between FDI and control variable as shown in Equation ((5)

3.2. First stage analysis

1- Descriptive statistics analysis

Descriptive statistics is a main feature of a collection of data and was used to describing the basic features of the data quantitatively. Hence, descriptive statistic was used in this research to supply depth on the specifications of the information. Plus, it is different from inferential statistics that the aim was to summaries the data set quantitatively without employing a probabilistic formulation. It also does not use the data to make inferences about the population that the data are thought to represent.

2- Correlation analysis

For this analysis, the correlation coefficient is used as a tool to examine the form and strength of relationships between dependent and potential independent variables. The matrix of correlation calculates the degree of multicollinearity between all the variables which is the regressor and regress and of the sample. The correlation test is often included in the list of the hypothesized independent variables to assess the most important factors

3- Unit root test

A preliminary test before investigating cointegration is analyzing stationarity properties of the time series. Using the Augmented Dickey-Fuller test for unit root testing, the order of integration of variables can be determined. Plus, Lau et al. (2018) also suggest Philip Perron test developed by Perron as the unit root test to test the consistent of the unit root test results from ADF test. Phillip Perron test contribute to milder assumption on the error distribution and also can control the higher order serial correlation and the heteroskedasticity in the series. According to Dickey and Fuller (1979), the null hypothesis referring to that when the variable contains a unit root, while the alternative is when the variable was generated by a stationary process. Therefore, to become stationary, the value of ADF or PP should be greater than the critical value

3.3. Second stage analysis

1- ARDL bounds testing analysis

After testing unit root test, there are three possibility outcomes which is first the series are integrated of order one and stationary at level form. The second possible outcome is the series are integrated of order 1, which means that the series are stationary at first difference. Lastly, the possible outcome is that the series are integrated in different orders. This is when there are combination of stationarity on level form and first difference form known as I (0) and I(1).

The null hypothesis of this test stated that there is no cointegrating equation. Meanwhile the alternative hypothesis stated that the null hypothesis is not true, there is cointegrating equation in the series. The rejection level is at the 10%, 5% or 1% level. The decision criteria for bounds test is that:

2- Long-run and short-run analysis

In this research, ECM was developed in order to test the long run effect between FDI and GDP and also with the presence of absorptive capacity. Therefore, the ARDL version of the ECM for the FDI and GDP model can be expressed as Equation 3.9 below. While Equation 3.10, 3.11 and 3.12 represent the ECM model for FDI and GDP with the presence of human capital, financial development and trade openness respectively. Lastly, for examining the presence of absorptive capacity FDI and GDP was tested in ECM model with the presence of human capital, financial development and trade openness.

4. Results

The results section summarizes the data collected for study in the form of descriptive statistics and also reports the results of relevant inferential stastically analysis (e.g., hypothesis tests) conducted on the data. You need to report the results in sufficient detail so that the reader can see which stasticall analyses were conducted and why, and to justify your conclusions. Mention all relevant

results, including those that are at odds with the stated hypotheses (American Psycho;ogy Association 2001: 20).

Table 1
Descriptive statistical analysis

Variable	GDP	FDI	HC	FD	TO
Mean	4366.82	3.99591	67.6377	90.6232	143.4204
Maximum	357.66	0.09	39.23	21.29	73.38
Minimum	11373.23	15.12	85.45	154.89	220.41
Std. Dev.	3455.26	4.04886	12.9837	37.7536	43.3142
Skewness	0.818648	0.99429	-0.4029	-0.47092	0.191709
Kurtosis	2.34902	2.97650	2.152569	2.076617	1.791552
Variance	1.19e+07	16.3932	168.5776	1425.34	1867.124
Observations	49	49	49	49	49

Table 2
Data correlation

Variable	GDP	FDI	HC	FD	TO	FDI* HC	FDI* FD	FDI* TO
GDP	1.000							
FDI	0.904	1.000						
HC	0.822	0.707	1.000					
FD	0.639	0.564	0.860	1.000				
TO	0.394	0.364	0.711	0.808	1.000			
FDI_HC	0.919	0.996	0.724	0.552	0.340	1.000		
FDI_FD	0.909	0.990	0.724	0.622	0.383	0.989	1.000	
FDI_TO	0.866	0.974	0.731	0.616	0.515	0.962	0.961	1.000

Table 3
Unit root test analysis

VARIABLE	**AUGMENTED DICKEY FULLER TEST**		**PHILLIPS-PERRON TEST**	
	LEVEL			
	Intercept	**Intercept and Trend**	**Intercept**	**Intercept and Trend**
GDP	-2.435 (0.1322)	-2.786 (0.2020)	-2.422 (0.1357)	-2.794 (0.1990)
FDI	-3.013** (0.0337)	-5.322*** (0.0001)	-2.766* (0.0633)	-5.283*** (0.0001)
HC	-3.172** (0.0216)	-2.690 (0.2403)	-3.133** (0.0242)	-2.705 (0.2341)
FD	-2.815* (0.0561)	-1.512 (0.8250)	-2.838* (0.0531)	-1.502 (0.8285)
TO	-1.462 (0.5523)	-0.079 (0.9933)	-1.473 (0.5469)	-1.150 (0.9923)
FDI*HC	-2.800* (0.0583)	-5.248*** (0.0001)	-2.554 (0.1028)	-5.193*** (0.0001)
FDI*FD	-2.544 (0.1051)	-4.359*** (0.0025)	-2.367 (0.1513)	-4.272*** (0.0035)
FDI*TO	-2.728* (0.0693)	-4.709*** (0.0007)	-2.480 (0.1203)	-4.665*** (0.0008)
	FIRST DIFFERENCE			
	Intercept	**Intercept and Trend**	**Intercept**	**Intercept and Trend**
GDP	-5.299*** (0.0000)	-5.557*** (0.0000)	-5.231*** (0.0000)	-5.484*** (0.0005)
FDI	-10.171*** (0.0000)	-10.103*** (0.0000)	-11.976*** (0.0000)	-11.988*** (0.0000)
HC	-5.711*** (0.0000)	-6.176*** (0.0000)	-5.713**** (0.0000)	-6.168*** (0.0000)
	FIRST DIFFERENCE			

	Intercept	**Intercept and Trend**	**Intercept**	**Intercept and Trend**
FD	-6.144*** (0.0000)	-6.766*** (0.0000)	-6.174*** (0.0000)	-6.766*** (0.0000)
TO	-5.184*** (0.0014)	-5.724*** (0.0000)	-5.145*** (0.0000)	-5.687*** (0.0000)
FDI*HC	-10.139*** (0.0000)	-10.091*** (0.0000)	-11.926*** (0.0000)	-12.009*** (0.0000)
FDI*FD	-10.010*** (0.0000)	-10.020*** (0.0000)	-11.582*** (0.0000)	-11.891*** (0.0000)
FDI*TO	-9.999*** (0.0000)	-9.971*** (0.0000)	-11.547*** (0.0000)	-11.714*** (0.0000)

Table 4
ARDL bounds cointegration test

BOUNDS TESTING TO COINTEGRATING		
Model 1	F-statistic	Conclusion
$Lngdp_t = f(Lnfdi_t)$	4.055	Inconclusive
Optimal lag	[1,1]	
SIGNIFICANCE LEVEL	CRITICAL VALUE	
	Lower Bounds (I0)	Upper Bounds (I1)
1%	6.84	7.84
5%	4.94	5.73
10%	4.04	4.78
Model 2	F-statistic	Conclusion
$Lngdp_t = f(Lnfdi_t*hc)$	9.630***	Cointegrated
Optimal lag	[1, 0]	
SIGNIFICANCE LEVEL	CRITICAL VALUE	
	Lower Bounds (I0)	Upper Bounds (I1)
1%	6.84	7.84
5%	4.94	5.73
10%	4.04	4.78
Model 3	F-statistic	Conclusion
$Lngdp_t = f(Lnfdi_t*fd)$	2.750	No-Cointegrated
Optimal lag	[1, 1]	
SIGNIFICANCE LEVEL	CRITICAL VALUE	
	Lower Bounds (I0)	Upper Bounds (I1)
1%	6.84	7.84
5%	4.94	5.73
10%	4.04	4.78
Model 4	F-statistic	Conclusion
$Lngdp_t = f(Lnfdi_t*to)$	3.688	No-Cointegrated
Optimal lag	[1, 1]	
SIGNIFICANCE LEVEL	CRITICAL VALUE	
	Lower Bounds (I0)	Upper Bounds (I1)
1%	6.84	7.84
5%	4.94	5.73
10%	4.04	4.78
Model 5	F-statistic	Conclusion
$Lngdp_t = f(Lnfdi_t*hc, Lnfdi_t*fd, Lnfdi_t*to)$	4.201*	Cointegrated
Optimal lag	[1, 0, 1, 0]	
SIGNIFICANCE LEVEL	CRITICAL VALUE	
	Lower Bounds (I0)	Upper Bounds (I1)
1%	4.29	5.61
5%	3.23	4.35
10%	2.72	3.77

Table 5
Long run and short run analysis

Variables	Model 2		Model 3		Model 4		Model 5	
Long Run	Coef.	t-stat	Coef	t	Coef	t	Coef	t
Lnfdi*hc	0.471	6.69***	-	-	-	-	3.0718	0.68
Lnfdi*fd	-	-	-	-	-	-	-6.5430	-0.60
Lnfdi*to	-	-	-	-	-	-	4.5530	0.55
ECT	-0.133	-4.35***	-	-	-	-	-0.0313	-0.68
Short Run								
Lnfdi*hc	-	-	-	-	-	-	-	-
Lnfdi*fd	-	-	0.0551	3.08***	-	-	0.0279	1.46
Lnfdi*to	-	-	-	-	0.0616	3.62***	-	

Table 6
Diagnostic test

Diagnostic Test								
Variables	Model 2		Model 3		Model 4		Model 5	
Durbin Watson test	1.3485		1.4402		1.4196		1.7563	
Breush Godfrey LM test	4.847	0.0277	3.752	0.0527	3.856	0.0496	0.493	0.4828
Heteroske-dasticity	3.97	0.5542	8.81	0.4647	6.65	0.6733	14.56	0.7437

5. Discussion

First stage analysis in this research identified potential determinants affecting the relationship between FDI and economic growth in Malaysia. Correlation analysis proved that there is a strong positive relationship between FDI and economic growth. After including absorptive capacity towards the relationship between FDI and economic growth also shows a strong positive relationship. Thus, the empirical finding supported the strong correlation between all variables. Next, unit root test was analysed on each variable in this research. In order to avoid spurious regression, it is important to make sure that the variables used are stationary. ADF unit root test was tested, and the results also supported by the outcomes of Phillips Perron unit root test to determine the reliability. Empirical findings suggested that GDP was only stationary after the first difference. While, FDI was stationary at 5% significance level. When including absorptive capacity, human capital, financial development and trade openness, all the variables were also proved to be stationary at level. Therefore, the next analysis can be conducted as all the variables are stationary. The cointegration analysis was tested by using Augmented Regression Distribution Lags (ARDL). The results of cointegration test for Model 1, which for FDI and GDP shows inconclusive results. This suggests that there is no short and long run in this model. Next, Model 2 represents FDI and economic growth relationship when moderated by human capital, the results suggest that this model is cointegrated which means there are both short run and long run presents in the model. Model 3, represented the relationship between FDI and economic growth when financial development moderated the relationship. The results stated that there is no cointegration in the model. It means that only a short run relationship exists in the model. By adopting trade openness towards the relationship between FDI and economic growth, the results suggest that the models are not cointegrated which shows that only short run relationships are available. Lastly, Model 5 which represents absorptive capacity, which consists of human capital, financial development and trade openness shows that the models are cointegrated. This means that there are both short run and long run available in this model.

The second stage of analysis in this research investigated the short run and long run effect on the relationship between FDI and economic growth. For the short run model, ARDL is implemented, and for a long run model Error Correction Model is implemented. Based on the empirical results, Model 2 shows that the percentage change in the interaction between FDI and human capital is associated with 0.47% increase in economic growth. On average, ceteris paribus at 1% level. There is a long run effect of 0.47% by human capital in the relationship between FDI and economic growth in Malaysia. Models 3 that have been tested in the short run relationship suggest that the percentage change in interaction between FDI and financial development is associated with 0.05% increase in economic growth. On average, ceteris paribus at 1% level. After that, trade openness is tested as the interaction factor on the relationship between FDI and economic growth. The results show that percentage change of the interaction between FDI and trade openness is associated with 0.06% increase in economic growth. On average, there is ceteris paribus at 1% significance level.

Findings of this Research	Hypothesis Analysis
Objective 1: Relationship between FDI and economic growth in Malaysia	
Model 1 After running ARDL bounds testing, the results for FDI and GDP show an inconclusive relationship. Therefore, the relationship between FDI and GDP is not conclusive when there is no other explanatory variable.	Not Supported H_1 H_1: There is relationship between FDI and economic growth
Objective 2: Examine the factors that moderate the relationship between FDI and economic growth in Malaysia	
2.1 Absorptive Capacity In order to examine absorptive capacity relationship with FDI and GDP, all of the interaction terms which are known as moderating effects such as human capital, financial development and trade openness were tested all at once. Thus, according to the ARDL bound testing, absorptive capacity was proved to have long run and short run effect towards the relationship between FDI and economic growth in Malaysia.	• Supported H_2 H_2: Absorptive Capacity Moderates the relationship between FDI and economic growth in Malaysia
2.1.1 Human Capital Human capital has both long run and short run effect on the relationship between FDI and economic growth in Malaysia as it proved to have cointegrated	Supported H_3 H_2: Human capital Moderates the relationship between FDI and economic growth in Malaysia
2.1.2 Financial Development Financial development shows that it moderates the relationship between FDI and economic growth in Malaysia	Supported H_4 H_2: Financial Development Moderates the relationship between FDI and economic growth in Malaysia
2.1.3 Trade Openness ARDL bounds testing results proved that trade openness moderates the relationship between FDI and economic growth in Malaysia.	Supported H_5 H_2: Trade Openness Moderates the relationship between FDI and economic growth in Malaysia
Objective 3: Effects of moderating factors towards the relationship between FDI and economic growth in Malaysia	
3.1 Absorptive Capacity	• Supported H_2 H_2: Absorptive Capacity Moderates the relationship between FDI and economic growth in Malaysia
3.1.1 Human Capital	Supported H_3 H_2: Human capital Moderates the relationship between FDI and economic growth in Malaysia
3.1.2 Financial Development	Supported H_4 H_2: Financial Development Moderates the relationship between FDI and economic growth in Malaysia
3.1.3 Trade Openness	Supported H_5 H_2: Trade Openness Moderates the relationship between FDI and economic growth in Malaysia

Fig. 1. Flowchart of research

6. Conclusion

The relationship between FDI and economic growth in Malaysia are worth examining as the relationship varies among different economic structures of the country. Therefore, the results of the relationship also differ based on the threshold of absorptive capacity on the host country (Fan et al., 2019). In general, this research proposed three main refinements to examine the results. Firstly, the relationship between FDI and economic growth in Malaysia was analysed. It is important to know the current trends of FDI and whether it can significantly reap positive spillovers from the transaction. Secondly, absorptive capacity was included in the nexus between FDI and economic growth in Malaysia. The absorptive capacity which consisted of human capital, financial

development and trade openness may have influenced the relationship between FDI and economic growth. Lastly, the level of effectiveness of absorptive capacity towards the relationship between FDI and economic growth was discovered.

The results of this paper show that FDI and economic growth in Malaysia does not have direct relationship. But apparently, by the presence of absorptive capacity which is human capital, financial development and trade openness, there is both short run and long run relationship. This proved that absorptive capacity moderated the relationship between FDI and economic growth in Malaysia.

Acknowledgement

The authors would like to express their gratitude to the Center for Technopreneurship Development (C-TED), the Center for Research and Innovation Management (CRIM), and the Faculty of Technology Management and Technopreneurship at Universiti Teknikal Malaysia Melaka (UTeM) for supporting this publication.

References

Alguacil, M., Cuadros, A. and Orts, V. (2011) 'Inward FDI and growth : The role of macroeconomic and institutional environment', *Journal of Policy Modeling*. The Society for Policy Modeling, 33(3), pp. 481–496. doi: 10.1016/j.jpolmod.2010.12.004.

Ali, N. and Hussain, H. (2017) 'Impact of Foreig Direct Investment on the Econommic Growth of Pakistan', *American Journal of Economics*, 7(4), pp. 163–170. doi: 10.5923/j.economics.20170704.01.

Alyammahi, M.A.R., Yahaya, S.N., Mansor. N. (2019), The Impact of Economic Risk Factors on Industry Stock Returns: An Empirical Investigation in The UAE Stock Market" Journal of Environmental Treatment Techniques, 2019, 7(4), pp. 737–746

Baharom, A. H., Habibullah, M. S. and Royfaizal, R. C. (2008) 'The Relationship between Trade Openness, Foreign Direct Investment and Growth: Case of Malaysia', *Munich Personal RePEc Archive*, (11928), pp. 1–10.

Baharumshah, A. Z. and Almasaied, S. W. (2009) 'Foreign Direct Investment and Economic Growth in Malaysia: Interactions with Human Capital and Financial Deepening', *Emerging Markets Finance and Trade*, 45(1), pp. 90–102. doi: 10.2753/ree1540-496x450106.

Bende-Nabende, A. (2018) *Globalisation, FDI, Regional Integration and Sustainable Development*, *Routledge*. doi: 10.4324/9781315202051.

Bhattacharya, M., Inekwe, J. and Paramati, S. R. (2018) 'Remittances and financial development: empirical evidence from heterogeneous panel of countries', *Applied Economics*. Routledge, 50(38), pp. 4099–4112. doi: 10.1080/00036846.2018.1441513.

Choong, C., Yusop, Z. and Soo, S.-C. (2005) 'Foreign direct investment and economic growth in malaysia: the role of domestic financial sector', *The Singapore Economic Review*, 50(2), pp. 245–268. doi: 10.1142/S0217590805001998.

Cohen, W. M. and Levinthal, D. A. (1989) 'Innovation and Learning: The Two Faces of R & D', *The Economic Journal*, 99(397), p. 569. doi: 10.2307/2233763.

Haller, A.-P. (2012) 'Concepts of Economic Growth and Development. Challenges of Crisis and of Knowledge', *Economy Transdisciplinarity Cognition*, 15(1), pp. 66–71. Available at: www.ugb.ro/etc.

Hayat, A. (2019) 'Foreign Direct Investment, Institutional Quality and Economic Growth', *The Journal of International Trade & Economic Development*. Taylor & Francis, 0(0), pp. 1–19. doi: 10.1080/09638199.2018.1564064.

Hess, M. L. (2008) *Doorways to Development : Foreign Direct Investment Policies in Developing Countries*.

Judith, M. N. and Chijindu, E. H. (2016) 'Relationship Between Financial Ddevelopment and Economic Growth in Nigeria: A Triangulation Approach', *International Journal of Economics and Financial Issues*, 6(4), pp. 1842–1850.

Kei, H. M. (2018) *Department of Statistics Malaysia*. Available at: https://www.dosm.gov.my/v1/index.php?r=column/pdfPrev&id=SU85RzF6TjNQdWJqUTd1RG9XeGF5dz09.

Kottaridi, C. and Stengos, T. (2010) 'Foreign direct investment, human capital and non-linearities in economic growth', *Journal of Macroeconomics*. Elsevier Inc., 32(3), pp. 858–871. doi: 10.1016/j.jmacro.2010.01.004.

Kyophilavong, P. *et al.* (2015) 'The energy-growth nexus in Thailand: Does trade openness boost up energy consumption?', *Renewable and Sustainable Energy Reviews*. Elsevier, 46, pp. 265–274. doi: 10.1016/j.rser.2015.02.004.

de la Croix, D. (2015) *Economic Growth*. Second Edi, *International Encyclopedia of the Social & Behavioral Sciences: Second Edition*. Second Edi. Elsevier. doi: 10.1016/B978-0-08-097086-8.71057-9.

Lane, P. J., Koka, B. and Seemantini, P. (2002) 'A Thematic Analysis and Critical Assessment of Absorptive Capacity Research', in *Academy of Management Proceedings*, pp. 1–6.

Love, I. and Zicchino, L. (2006) 'Financial development and dynamic investment behavior: Evidence from panel VAR', *Quarterly Review of Economics and Finance*, 46(2), pp. 190–210. doi: 10.1016/j.qref.2005.11.007.

Moran, T. (2016) 'Foreign direct investment', *The Wiley-Blackwell Encyclopedia of Globalization*. doi: 10.1002/9780470670590.wbeog216.pub2.

Nabi, M. H. and Malarvizhi, C. A. (2014) 'Impact of GDP and Exchange Rate on Foreign Direct Investment in Malaysia', *Australian Journal of Basic and Applied*

Sciences, 8(January), pp. 473–478.

Olagbaju, I. O. and Akinlo, A. E. (2018) 'FDI And Economic Growth Relationship In Sub-Saharan Africa: Is The Domestic Financial System A Significant Intermediator?', *Archives of Business Research*, 6(5), pp. 90–112. doi: 10.14738/abr.65.4540.

Omri, A. *et al.* (2015) 'Financial development, environmental quality, trade and economic growth: What causes what in MENA countries', *Energy Economics*. Elsevier B.V., 48, pp. 242–252. doi: 10.1016/j.eneco.2015.01.008.

Piętak, Ł. (2014) 'Review Of Theories And Models Of Economic Growth', *Comparative Economic Research*, 17(1), pp. 45–60. doi: 10.2478/cer-2014-0003.

Protsenko, A. (2004) *Vertical and Horizontal Foreign Direct Investments in Transition Countries*, *Doctoral Dissertation*.

Sothan, S. (2017) 'Causality between foreign direct investment and economic growth for Cambodia', *Cogent Economics and Finance*. Cogent, 5(1), pp. 1–13. doi: 10.1080/23322039.2016.1277860.

VOJTOVIČ, S., KLIMAVICIENE, A. and PILINKIENE, V. (2019) 'The Linkages between Economic Growth and FDI in CEE Countries', *Ekonomický časopis (Journal of Economics)*, 67, pp. 264–279.

World Economic Forum (2012) *The Financial Development Report 2012*. Available at: http://www3.weforum.org/docs/WEF_FinancialDevelopmentReport_2012.pdf.