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Human Capital Development and Foreign Direct Investment in Malaysia

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ABSTRACT

One of the spillover effects of the Foreign Direct Investment (FDI) to the host countries is human capital development. Skilled and semi skill labour force will enhance FDI and provide more attractive investment climate. Moreover, FDI through transferring of technology will contributes to human capital accumulation of the host countries. The purpose of this study is to determine the complementary effects of FDI on the Human Capital in Malaysia after the country received large FDI starting in 80s and onwards. This study has employed granger causality test and Autoregressive Distributed Lag (ARDL) model in investigating the relationship between variables. The annual data from 1982 to 2011 which consisted of FDI, Human Capital Accumulation were measured with two moderating variables, namely the number of labour force with certificate and trade openness. The result shows that all the variables are co-integrated in the short-run and long run. Besides, the evidence shows that there exists a unidirectional causality between Human Capital and FDI. For future study, other measures of human capital can be used in order to get different perspectives and robust findings on the relationship between FDI and human capital.

KEYWORDS: Human Capital, Foreign Direct Investment (FDI), Autoregressive Distributed Lag (ARDL), Complementary Effects, Co-Integrated.

INTRODUCTION

According to International Monetary Fund, foreign direct investment (FDI) is an international investment that reflects the objective of a resident in one country (the direct investor) obtaining a lasting interest in an enterprise residents in another country (the direct investment enterprise) with the acquisition of 10% or more of the ordinary shares. FDI is proven to provide strong force in accelerating the economic growth of developing countries through domestic capital formations and the spillover effects such as the transfer of technology, expansion of job opportunities and the rise of income level. To one side, human capital is a stock of knowledgeable and skilled labour which produces economic value efficiently [1]. Hence, FDI and Human Capital are among the key determinants of economic growth which can reinforce each other through complementary effects [2, 3].

The studies that give direct focus on the causality relationship between human capital and FDI are very rare found in the literature, instead, the relationship between both variables are examined separately. Therefore, this section presents a few of previous literatures on the relationship between human capital and FDI separately. In the endogenous growth model, [4] recognized knowledge spillovers as one of unintended consequences of investment, in which according to [5] it is not only limited to domestic investment but also on FDI. In reviewing literatures of human capital and inward FDI, in [6] concluded the significant spillover effects of FDI on host countries. However, they identified limitation for human capital effects on FDI in East Asia and Latin America. Using bound testing approach, [7] found a strong causality running from human capital to FDI in Turkey after 1970. They also evidenced that FDI alone failed to exhibit a causal relationship with per capita income.

According to [8], human capital development is one of the most potential positive spillovers of FDI. This was supported by [9] who empirically investigated that human capital in host countries may affect the distribution of FDI, using panel estimation of 36 countries from Africa, Asia and Latin America for the period of 1980 to 1994. Other studies that proved the significance of human capital to attract FDI were in [10] who used fixed effects models to analyze a set of panel data that consisted of 23 selected developing countries from 1970 to 2004. In order to measure human capital, they used the government expenditure on health and illiteracy rate. In [11], it has used Stochastic Frontier to study which determinants can influence productivity; either FDI, imports of machinery and equipment or imports of R&D. Besides proving the significance of these

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three variables of technology diffusion towards productivity, they also found that human capital has greatly influenced these variables.

Malaysia is among the major receivers of FDI in South-East Asia, especially in the 80s and 90s. It is expected that Malaysia might have witnessed human capital development for two reasons: firstly, through diffusion of technology technology and secondly, for the purpose of attracting more FDI. Therefore, it is expected that there would be a causal relationship between FDI and human capital development. The objective of this study is to find evidence of complementary effects of FDI and Human Capital Development measured by labour force with certificate which is rarely found in previous studies.

The remainder of this paper is organised as follows: Section II dicusses the data and several methods used in the study. Section III reports the empirical results and followed by conclusions in section IV.

METHODOLOGY

This study employed yearly time series data from year 1982 until 2011. The variables involved were Human Capital (HC), Foreign Direct Investment inflow to Malaysia (INFDI) and Trade Openness (TRADE) (the sum of export and import values of the GDP). All data were extracted from the websites of the Department of Statistic Malaysia and World Bank Data.

The methodology used in this study is based on the Autoregressive Distributed Lag (ARDL) bounds testing of co-integration approach developed by [12]. This bound testing procedure does not require the pre-testing of the variables included in the model for unit roots [13]. The test is applicable, irrespective whether the variables in the models are I(0), I(1) or mutually co-integrated. Furthermore, the bound test is relatively more efficient for data from a small sample size.

The first step was to test the existence of the long-run relationship between the variables in the system by estimating equation (1) using ordinary least square method and conducting F-test for the joint significance of the coefficients of the lagged level of the variables.

$$\Delta HC_t = a_0+\alpha_1 LnHCt_{-1}+\alpha_2 LnINFDI_{t-1}+\alpha_3 LnTRADEt_{-1}+a_1\Delta LnHC_{t-1}+ \sum_{t=1}^{n} a_2\Delta LnINFDI_{t-1}+ \sum_{t=1}^{n} a_3\, \Delta LnTRADE_{t-}+ e_t \qquad (1)$$

The short-run relationship can be obtained by estimating equation 2 specified as below:

$$\Delta LnHC_t = a_0 + \sum_{t=1}^{n} a_1\, \Delta LnHC_{t-1} + \sum_{t=1}^{n} a_2\, \Delta LnINFDI_{t-1} + \sum_{t=1}^{n} a_3\, \Delta LnTRADE_{t-1} + ECM_{t-1} + e_t \qquad (2)$$

RESULTS AND DISCUSSION

Unit root test is not required for co-integration testing using ARDL approach, however, it iscarried out to determine the underlying properties of the process that generate these time series.

Table 1: Augmented Dickey Fuller (ADF) unit root test

ADF Test				
Variable	**Constant**		**Trend**	
	Level	**1st diff.**	**Level**	**1st diff**
LnFDI	0.2884	0.0000***	0.0838	0.0000***
LnTRADE	0.1596	0.0000***	0.0840	0.0000***
LnHC	0.8708	0.0002***	0.2630	0.0011***

*** Significant at 1%

Table 2: Philip Perron (PP) unit root test

PP Test				
Variable	**Constant**		**Trend**	
	Level	**1st diff.**	**Level**	**1st diff.**
LnFDI	0.3560	0.0000***	0.0869	0.0000***
LnTRADE	0.1864	0.0000***	0.0840	0.0000***
LnHC	0.8619	0.0000***	0.2635	0.0002***

*** Significant at 1%

Based on Table 1 and Table 2, regardless of the types of unit root tests, all variables were stationary at first difference, I(1) with 1% significant level. Hence, the methods of Johansen as well as ARDL can be applied. The researchers used ARDL since it is capable in identifying the causal relationships between variables at different lags for each variable.

Co-Integration Tests

Table 3: ARDL bound testing (F-test)

Model	F-Statistic	Outcome
F_{lnFDI}(lnFDI| lnTRADE, lnHC)	0.115	Not co-integrated
$F_{lnTRADE}$(lnTRADE| lnFDI, lnHC)	0.024**	Co-integrated
F_{lnHC}(lnHC| lnFDI, lnTRADE)	0.211	Not co-integrated

** Significant at 5%

Table 3 reports the result of ARDL co-integration tests. The null hypothesis of no co-integration was rejected at 5% level of significance when Trade Openness was the dependent variable. It means that there exists a long run relationship among the variables. However, the result was inconclusive when FDI or HC acted as the dependent variable.

Selection of ARDL Model

Table 4: Testing of ARDL model

ARDL Model	Serial Correlation	Heteroskedasticity	Functional Form	Adjusted R^2	Model Significance (F-Statistics)
ARDL (0,0,0)	No	No	OK	0.59255	0.000***
ARDL (1,1,1)	No	No	OK	0.60282	0.000***
ARDL (2,2,2)	Yes	No	OK	0.56590	0.002***
ARDL (2,1,1)	No	No	OK	0.58353	0.000***
ARDL (1,2,1)	No	No	OK	0.59579	0.000***

*** Significant at 1%

In order to select the suitable ARDL Model for further analysis, a series of statistical diagnostic were conducted. Firstly, Lagrange Multiplier test of residual serial correlation was used to check for serial correlation. Secondly, regression of squared residuals on squared fitted were conducted to check the existence of heteroskedasticity and finally, the Ramsey's RESET test using square of the fitted values were applied in order to check the functional form. Based on Table 4, all ARDL models specified were significant at 1%. However, ARDL (1,1,1) was much better compared to other ARDL models as its adjusted R^2 was higher and free from the problems of serial correlation and heteroskedasticity. Therefore, the following part of the paper is using ARDL (1,1,1)

Long-run relationship

Based on the result of co-integration tests, long-run coefficient was estimated by normalizing on the Trade Openness.

Table 5: Long run elasticities ARDL (1.1.1)

Regressor	Coefficient	Standard Error	T-Ratio (Prob.)
lnFDI	-1.1070	0.48396	-2.2873 [0.033]**
lnHC	9.3220	2.0239	4.6059 [0.000]***
INPT	-64.5874	15.4383	-4.1836 [0.000]***

** Significant at 5%
*** Significant at 1%

Table 5 shows the existence of long-run relationship among the three variables. FDI was found to have negative relationship with Trade Openness at 5% significance level while HC had positive relationship with Trade Openness at 1% significance level. Based on the value of elasticities, it was also found that 1% increase in FDI would decrease 1.1% of Trade Openness. On the other hand, 1% increase in HC would increase 9% of Trade Openness.

ECM Analysis (Short-Run Relationship)

The ECM (Error Correction Mechanism) coefficient shows how quickly variables return to equilibrium and it should be statistically significant with negative sign. In [14] noted that significant lagged error term is a way to prove that the established long-run relationship is stable.

Table 6: Short-run elasticities ARDL (1,1,1)

Regressor	Coefficient	Standard Error	T-Ratio (Prob.)
dlnFDI	-0.48579	0.35125	-1.3830 [0.180]
dlnHC	13.3342	12.5899	1.0591 [0.301]
dINPT	-47.5644	18.2009	-2.6133 [0.016]
ECM(-1)	-0.73643	0.23420	-3.1445 [0.005]***

*** Significant at 1%

Table 6 shows significant negative (at 1%) short run co-integration results of Error Correction Model (ECM). The speed of adjustment is implied by the ECM (-1) coefficient. The short-run model provides information on how the dependent variable, Trade Openness adjusts in response to the changes in FDI and Human Capital. This result suggests that the deviation from short run to long run in Trade Openness is corrected by 74% each year.

Granger Causality Test

Based on Table 7, only the null hypothesis of lnHC does not Granger caused lnFDI was rejected at 10%. It shows that only Human Capital was found to have an effect on FDI. This means that there exists one way direction in the relationship between

FDI and Human Capital in Malaysia during the period of the study. Therefore, this study could not support the complementary effects of FDI and Human Capital.

Table 7: Granger causality test

Null Hypothesis	Probability
lnHC does not granger cause lnTRADE	0.2066
lnTRADE does not granger cause lnHC	0.1857
lnFDI does not granger cause lnTRADE	0.8306
lnTRADE does not granger cause lnFDI	0.2350
lnFDI does not granger cause lnHC	0.9726
lnHC does not granger cause lnFDI	0.0813*

* Significant at 10%

CONCLUSION

This study reveals that there are significant relationships among the Trade Openness, FDI and Human Capital in the long run and as well as in the short run. While FDI has a negative relationship with Trade Openness which shows the substitutions of the two, Human Capital is found to have positive relationship with Trade Openness. This study supports the study by [15] where investing in human capital will enable the country to exploit knowledge or technology that has been developed in other countries. Apart from that, this study fails to prove the complementary effects of FDI and Human Capital due to inaccessibility of data for longer period of study. Only unidirectional relationship is revealed from FDI to Human Capital. Therefore, it can be interpreted that Malaysia is prepared with developed human capital in order to enhance the FDI. For future studies, it is proposed that more data are compiled and other measures of human capital are used to have different perspective of findings. Despite the limitations, the results and findings from this study are still relevant and can contribute to the body of knowledge in this area.

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