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Foreign Direct Investment and Economic Growth in the Short Run and Long Run: Empirical Evidence from Developing Countries

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Received: 30 June 2019; Accepted: 11 September 2019; Published: 25 November 2019



Abstract: A contribution of foreign direct investment to economic growth is possibly one of the widely examined topics in academic research in the last five decades. However, few studies have examined both the short run and long run impacts of this effect concurrently for developing and emerging markets, in particular during the period of economic turmoil that includes the global financial crisis. As such, this paper examines and provides additional and relevant quantitative evidence on the impact of foreign direct investment (FDI) on economic growth, both in the short run and the long run in developing countries of the lower-middle-income group in 2000–2014. Various econometric methods are employed such as the panel-based unit root test, Johansen cointegration test, Vector Error Correction Model (VECM), and Fully Modified OLS (FMOLS) to ensure the robustness of the findings. The results of this study show that FDI helps stimulate economic growth in the long run, although it has a negative impact in the short run for the countries in this study. Other macroeconomic factors also play an important role in explaining economic growth in these countries. Money supply has a positive effect on growth in the short run while total credit for private sector has a negative effect. In addition, long-run economic growth is driven by money supply, human capital, total domestic investment, and domestic credit for the private sector. Based on these results, recommendations for the governments of these countries have been developed.

Keywords: foreign direct investment (FDI); economic growth; endogenous growth; developing countries

1. Introduction

The relationship between foreign direct investment (FDI) and economic growth has attracted major attention from academics and the governments of developing countries. Since economic growth is one of their main focuses, FDI attraction-related policies have been prioritized during the process of economic growth and development in these countries (Vo et al. 2019a). It is widely observed that FDI mitigates the saving-investment imbalance and provides technology which is used for the production of goods and services. Additionally, FDI enhances tax revenue as well as human capital (Buckley et al. 2002). From another view, it can be asserted that FDI is one of the crucial factors for the process of economic integration, since it increases long-term benefits and connections between different countries.

On one hand, various positive effects FDI provides for an economy have been discussed among scholars. Not only does FDI diversify the capital structure of the recipient but it also provides positive externalities such as technology and knowledge diffusion (Mansfield and Romeo 1980; Markusen and Venables 1999; Caves 1974; Blomström et al. 1994; Blomström and Kokko 2002). For example, FDI increases investment, which in turn reduces the gap between saving and investment (Erhieyovwe

and Jimoh 2016). On the other hand, it is the claim of previous studies that in the short-run, the impact of FDI on economic growth is negative (Schoors and Tol 2002), but in the long-run the effect of FDI on economic growth is positive (Bosworth et al. 1999).

In this era of globalization where economic, commercial, and technological barriers are fading, developing countries focus on FDI due to its positive effects (Demirsel et al. 2014). Though each country has its own characteristics and strengths to capitalize on when working towards economic growth, FDI still has an essential role among the major factors directly affecting growth. FDI is the key to global economic integration, providing financial stability, driving economic growth and improving social welfare (Borensztein et al. 1998; Nguyen et al. 2019).

The economic integration process has been penetrating geographical borders. For example, in Asia, the ASEAN Economic Community (AEC) is established and the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) has been signed. There are more opportunities and challenges for developing economies than ever. In this context, FDI brings valuable opportunities but challenges are unavoidable. Due to the importance and the contemporary nature of the subject matter, the authors aim to understand, assess, and quantify the role of FDI in short- and long-term economic growth rather than investigating the FDI-output volatility linkage, which is another strand of FDI-growth literature in developing countries for the lower-middle-income group in the 2000–2014 period. Results from the study will contribute to the literature on the controversial relationship between FDI and economic growth. Suitable policies are proposed to maximize the positive impact and minimize the negative impact of FDI, especially in countries with lower-middle-incomes.

The structure of the paper is as follows. Following this Introduction section, Section 2 discusses the literature review. Section 3 describes the model, methodology and data. Section 4 presents empirical results, followed by the Conclusions and policy implications being provided in Section 5.

2. Literature Review

The relationship between FDI and economic growth has attracted great attention from scholars around the world (Basu et al. 2003; Vo et al. 2019a). It is widely acknowledged that this relationship has been intensively investigated using data from a single country or a sample of many countries. Unfortunately, no consensus on empirical findings has been reached among scholars.

Concerning single-country investigation, Koojaroenprasit (2012) examined the impact of FDI on economic growth in Korea over the 1980–2009 period. The author found a strong positive effect of FDI on Korea's economic growth, while human capital, export, and employment also positively affected subsequent growth. The same observation was also found in Pakistan with a positive long-term effect of foreign capital flow on economic growth (Shahbaz and Rahman 2010).

The FDI-growth nexus also presents evidence to support the view that there is a negative effect of FDI on economic growth. Konings (2001) found no positive impact of FDI on relevant growth for Poland over 1993–1997 period. Moreover, the author stated FDI hindered growth for Romania and Bulgaria, since these countries were subjected to trade imbalances, monopolies or reverse transfers of knowledge and technology.

In addition to studies with the focus on the single-country data, various studies were conducted using cross-country data. Tiwari and Mutascu (2011) highlighted that both FDI and internationally commercial activity fostered economic growth for 23 Asian countries over the 1986–2008 period. Importantly, they found a profound effect of FDI on growth as an economy was developed. Borensztein et al. (1998) examined the role of FDI on economic growth for developing countries. Their findings indicate that FDI was an effective intermediary between technology and economic growth. In addition, they also stated the role of FDI would be more effective on an economy if the relevant country had high human capital. Omran and Bolbol (2003) showed both high correlation and significant causation between FDI and economic growth for Arab countries through a Causality test and OLS regression, respectively. Also, they concluded that local economic and political conditions together with FDI attraction-focused policies were significant factors determining FDI inflows. Alfaro et al. (2004)

claimed FDI was one of the significant factors in economic growth for 20 Organization for Economic Cooperation and Development (OECD) countries. Additionally, their empirical findings showed that in those countries, the level of development of the financial market mattered for the relationship between FDI and economic growth. [Basu et al. \(2003\)](#) considered a two-way linkage between FDI and economic growth for 23 developing countries over the period 1978–1996. They found that FDI and economic growth moved together in the long-run or they were cointegrated after allowing for heterogeneous country effects. Furthermore, their empirical results indicated there was a bidirectional causality between these two variables for the economies with a higher level of economic openness, but there was a unidirectional causality running from GDP to FDI for closed economies.

In contrast to the above mentioned positive relationship between FDI and economic growth for cross-country data, a negative one was found, contributing an important part of the (unsolved) puzzle. [Jyun-Yi and Chih-Chiang \(2008\)](#) identified no relationship between FDI and economic growth for 62 countries over 1975–2000 period. Similarly, [Lyroudi et al. \(2004\)](#) found no FDI impact on economic growth for emerging markets during 1995–1998.

Recently, there is a new and growing strand of literature emphasizing the relationship between FDI and volatility of output/consumption ([Backus et al. 1992](#); [Bodenstein 2008](#); [Caporale et al. 2015](#); [Levchenko 2005](#)). [Kose et al. \(2003\)](#) stated an increasing financial openness tends to positively relate to the rising volatility of consumption for developing countries from 1960 to 1999. [Kose et al. \(2009\)](#) investigated how countries had benefited from financial globalization. They found that industrial countries had attained increased risk sharing compared to emerging markets during the period of globalization.

3. Model, Methodology, Data

3.1. Empirical Model

The study aims to examine the importance of FDI to economic growth in the short and long run in lower-middle-income countries. Based on the research model by [Shahbaz and Rahman \(2010\)](#), the proposed research model is expressed as follows

$$\text{LGDPC}_{it} = \beta_0 + \beta_1 \text{FDI}_{it} + \beta_2 \text{M}_{2it} + \beta_3 \text{PRVT}_{it} + \beta_4 \text{CAP}_{it} + \beta_5 \text{SECP}_{it} + \varepsilon_{it} \quad (1)$$

where β_0 is the intercept. $\beta_1, \beta_2, \beta_3, \beta_4,$ and β_5 respectively are the estimation coefficients to be estimated. ε_{it} is the error term. Subscripts i and t denote country and year ($i = 1, 2, \dots, 30; t = 1, 2, \dots, 15$). The GDP per capita is converted into its natural logarithmic (LGDPC) to reduce potential heteroskedasticity. The definitions of variables are presented in Table 1.

Table 1. Variable definitions.

Factor	Variable	Symbol	Description	Expected Sign	Measurement
Dependent Variable					
Economic growth	Real GDP per capita	GDP	GDP per capita at 2005 prices		USD
Independent Variables					
Foreign capital flows	FDI, % inflows	FDI	Inflows to domestic businesses with management control and at least 10% stock	+	%GDP
Endogenous financial development	M ₂	M ₂	Money supply M ₂ : money in circulation outside of banks, savings, savings abroad, except for money in public sector	+	%GDP
Domestic financial development	Domestic credit for private sector	PRVT	Domestic credit is provided by a domestic financial system, including public credit	+	%GDP
Domestic capital reserve	Total domestic investments	CAP	Total domestic investments	+	%GDP
Human capital	People with secondary education and above	SECP	Number of students admitted to secondary schools, including both public and private education	+	%

3.2. Estimation Techniques

In this paper, various relevant methodologies are employed to examine the impact of our interest variable—foreign direct investment—on economic growth. Those employed estimation techniques are used to investigate the stationary or cointegration issue, or to estimate the long-run relationship. In particular, the LLC test (Levin et al. 2002), IPS test (Sołma et al. 2013), ADF test (Dickey and Fuller 1979), PP test (Phillips and Perron 1988), and Breitung test (Breitung 2001) are used for the unit root test, and the Johansen test is used for the cointegration test before FMOLS is employed to estimate the long-run relationship between the foreign direct investment and economic growth.

3.3. Data and Descriptive Statistics

To investigate the relationship between foreign direct investment and economic growth, this study employs panel data for 30 developing countries over the 2000–2014 period, a period of interest which includes the global financial crisis with a total of 450 observations. Data are collected from the World Development Indicators (WDI) published by the World Bank (2019). The choice for the time period selected in this study can be explained by the following reasons. First, we prefer to have some countries from the Association of Southeast Asian Nations (ASEAN) region among other emerging and developing countries in the study. As such, this data period includes four ASEAN countries (Indonesia, Laos, the Philippines, and Vietnam) whose economies have been highly integrated after the establishment of the ASEAN Economic Community, a major milestone in the regional economic integration agenda in ASEAN. This important event took effect in 2015. Second, some data are not available for some variables before 2000 (e.g., human capital for Sudan and Guyana, or total domestic investment for Laos). A list of selected countries and descriptive statistics are presented in Tables 2 and 3, respectively. Table 4 demonstrates the correlation matrix among variables.

Table 2. List of selected countries.

No.	Country Name	No.	Country Name	No.	Country Name
1	Armenia	11	Guatemala	21	Pakistan
2	Bangladesh	12	Guyana	22	Philippines
3	Bhutan	13	India	23	Senegal
4	Bolivia	14	Indonesia	24	Sri Lanka
5	Cameroon	15	Kenya	25	Sudan
6	Congo Rep.	16	Kyrgyzstan	26	Swaziland
7	Cote d’Ivoire	17	Laos	27	Tajikistan
8	El Salvador	18	Lesotho	28	Ukraine
9	Georgia	19	Moldova	29	Vanuatu
10	Ghana	20	Morocco	30	Vietnam

Table 3. Descriptive statistics.

Variable	Measurement	Mean	Median	Max	Min	S.D.	Obs.
GDPC	%	6.98	6.95	8.09	5.46	0.60	450
FDI	%GDP	3.71	2.46	38.81	0.04	3.93	450
CAP	%GDP	22.99	21.77	68.02	7.42	8.73	450
M ₂	%GDP	43.45	38.96	127.55	7.87	23.60	450
PRVT	%GDP	28.60	25.35	114.72	2.10	18.95	450
SECP	%	7.54	7.18	14.25	2.49	2.66	450

Table 4. Correlation matrix.

Variable	LGDP	M ₂	PRVT	CAP	FDI	SECP	VIF
LGDP	1						
M ₂	0.30	1					3.78
PRVT	0.35	0.83	1				3.55
CAP	0.08	0.31	0.16	1			1.17
FDI	0.15	−0.03	−0.01	0.13	1		1.04
SECP	−0.17	−0.00	0.13	0.03	0.14	1	1.07

Note: VIF—Variance-inflating factor.

Results from Table 4 show that the correlation coefficients between the independent variables are relatively low, ranging from 0.00 to 0.35, except for between M₂ and PRVT (about 0.83). However, the VIF (Variance-inflating factor) of M₂ and PRVT are 3.78 and 3.55, respectively. Since the VIF values are within the (2,10) range, the probability of multicollinearity between independent variables is very low.

4. Empirical Results

4.1. Results of Unit Root Test

To investigate the stationary and determine the integration level of the selected variables, we employed various recently developed tests, such as the LLC test (Levin et al. 2002), IPS test (SoIma et al. 2013), ADF test (Dickey and Fuller 1979), PP test (Phillips and Perron 1988), and Breitung test (Breitung 2001). The testing results obtained in Table 5 suggest that only GDP and FDI are stationary at their level form while other variables are not, and that all variables are stationary at their first difference.

Table 5. Unit root test.

Variable	LLC Test	Breitung Test	IPS Test	ADF Test	PP Test
Level					
LGDP	−6.45 ***	−4.04 ***	−1.43 *	90.92 ***	87.33 **
FDI	−7.11 ***	−3.91 ***	−4.60 ***	120.24 ***	111.05 ***
CAP	0.02 **	0.04	0.20	59.97	59.55
PRVT	−0.29	5.55	2.09	45.38	41.56
M ₂	−3.60 ***	2.74	0.48	49.96	73.39
SECP	−8.18 ***	−0.33	−3.68 ***	117.00 ***	107.73 ***
1st Difference					
ΔLGDP	−10.86 ***	−4.68 ***	−5.75 ***	132.71 ***	151.90 ***
ΔFDI	−19.83 ***	−11.05 ***	−13.23 ***	240.27 ***	326.57 ***
ΔCAP	−13.23 ***	−5.52 ***	−8.03 ***	165.62 ***	220.30 ***
ΔPRVT	−12.70 ***	−6.00 ***	−7.04 ***	151.94 ***	193.31 ***
ΔM ₂	−16.57 ***	−9.29 ***	−10.77 ***	209.56 ***	297.39 ***
ΔSECP	−9.35 ***	−1.89 ***	−4.99 ***	128.04 ***	168.38 ***

Note: ***, **, and * denote 1%, 5%, and 10% significant levels respectively. The estimated model includes both intercept and trend.

4.2. Results of Cointegration Test

In the next step, we examine whether a long-run relationship exists among the interested variables. We employed the Johansen cointegration test. Findings are in Table 6 and show that at least 2 cointegration vectors at the significant level of 5%. In other words, there exists a long-term relationship between the dependent variable and the independent variables in the proposed research model.

Table 6. Cointegration test results.

Assumption of No Cointegration	Trace Test		Maximum Eigenvalue test	
	Statistic	Critical Value	Statistic	Critical Value
No cointegration	127.14 **	95.75	45.10 **	40.08
1 cointegration	82.04 **	69.82	32.45 **	33.88
2 cointegration	49.60 *	47.86	27.72 *	27.58
3 cointegration	21.88	29.80	12.98	21.13
4 cointegration	8.90	15.49	8.80	14.26
5 cointegration	0.10	3.84	0.10	3.84

Note: **, and * denote 5%, and 10% significant level respectively.

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4.3. Vector Error Correction Model

The empirical findings in Section 4.2 suggest the variables are cointegrated or they move together in the long run. As such, it is appropriate to employ the Vector Error Correction Model (VECM) to examine both the long-run and short-run relationships between those variables. The VECM is a short-run model where the short-run deviation to be adjusted from the long-run equilibrium. In this research, the VECM is described as follows.

$$\begin{aligned} \Delta LGDPC_{it} = \theta_{1i} &+ \sum_{k=1}^n \theta_{11ik} \Delta LGDPC_{it-k} + \sum_{k=1}^n \theta_{12ik} \Delta M2_{it-k} + \sum_{k=1}^n \theta_{13ik} \Delta PRVT_{it-k} \\ &+ \sum_{k=1}^n \theta_{14ik} \Delta CAP_{it-k} + \sum_{k=1}^n \theta_{15ik} \Delta FDI_{it-k} + \sum_{k=1}^n \theta_{16ik} \Delta SECP_{it-k} \\ &+ \lambda_{1i} ECT_{it-1} + \varepsilon_{1it} \end{aligned} \tag{2}$$

$$\begin{aligned} \Delta FDI_{it} = \theta_{2i} &+ \sum_{k=1}^n \theta_{21ik} \Delta LGDPC_{it-k} + \sum_{k=1}^n \theta_{22ik} \Delta M2_{it-k} + \sum_{k=1}^n \theta_{23ik} \Delta PRVT_{it-k} \\ &+ \sum_{k=1}^n \theta_{24ik} \Delta CAP_{it-k} + \sum_{k=1}^n \theta_{25ik} \Delta FDI_{it-k} + \sum_{k=1}^n \theta_{26ik} \Delta SECP_{it-k} \\ &+ \lambda_{2i} ECT_{it-1} + \varepsilon_{2it} \end{aligned} \tag{3}$$

where Δ denotes the first difference and n is the optimal lag length determined by Akaike Information Criterion (AIC). Estimation results are presented in Table 7.

In the $\Delta LGDPC$ equation, the lagged error term (ECT) is negative and statistically significant, suggesting that M_2 , PRVT, CAP, FDI, and SECP all play an important role in determining GDP per capita.

The sign and significance of θ_{1i} , a (6 x 1) column vector, reveal short-run relationship between GDP per capita and the relevant variable. Particularly, the one-period lagged first difference of M_2 is positive and statistically significant while its two-period lagged first difference is negative and not statistically significant. The one-period lagged first difference of PRVT is negative and statistically significant; however, its two-period lagged first difference is positive and statistically insignificant. In relation to our interest variable, the estimated results show that both two one-period and two-period lagged first difference results are negative and statistically significant. The findings are also consistent with previous studies (Aitken and Harrison 1994; Alfaro et al. 2004; Konings 2001; Djordjevic et al. 2015; Lyroudi et al. 2004; Schoors and Tol 2002; Stanisis 2008). They claimed that domestic firms shared their markets with foreign counterparts.

Table 7. VECM results.

Exploratory Variables	Δ LGDP
Δ LGDP(-1)	0.317 [5.89]
Δ LGDP(-2)	0.090 [1.647]
Δ M ₂ (-1)	0.002 *** [4.85]
Δ M ₂ (-2)	-0.000 [-0.025]
Δ PRVT(-1)	-0.002 *** [-3.71]
Δ PRVT(-2)	0.000 [0.57]
Δ CAP(-1)	0.000 [0.52]
Δ CAP(-2)	-0.001 [-0.95]
Δ FDI(-1)	-0.001 ** [-1.82]
Δ FDI(-2)	-0.001 *** [-2.42]
Δ SECP(-1)	0.001 [0.25]
Δ SECP(-2)	0.000 [0.058]
Constant	-0.020 [7.47]
ECT(-1)	-0.001 *** [-2.75]
R-squared	0.26
Adj. R-squared	0.23
F-statistic	9.52

Note: ***, and ** denote 1%, and 5% significant level respectively. *t* statistics are given in square brackets.

4.4. Fully Modified Least Squares Estimation

The long-run estimates are estimated by the FMOLS (Fully Modified Least Squares estimation). It is widely known that both FMOLS and DOLS are often used to investigate long-run relationships (Vo and Vo 2017; Vo et al. 2019b). In this research, we are motivated to use FMOLS since Banerjee (1999) argued that the FMOLS and DOLS estimates are asymptotically equivalent for data with observations higher than 60. The empirical findings are presented in Table 8. The long-run effects are quite similar across the variables. It is clear that in the long-run, FDI, PRVT, M₂, CAP, and SECP are positively and significantly related to GDP per capita. The positive long-term relationship between FDI and GDP per capita is also found in the (Alfaro et al. 2004; Caves 1974; Blomström et al. 1994; Blomström and Kokko 2002; Barry and Bradley 1997; Borensztein et al. 1998; Bosworth et al. 1999; Mansfield and Romeo 1980; Markusen and Venables 1999; Olokoyo 2014; Roman and Padureanu 2012).

Table 8. Fully Modified OLS (FMOLS) result.

Variable	FDI	PRVT	M ₂	CAP	SECP
Coefficient	0.001 ***	0.007 ***	0.005 ***	0.005 ***	0.023 ***
<i>t</i> statistic	[2.61]	[38.25]	[27.44]	[16.48]	[19.37]

Note: *** denotes 1% significant level.

5. Conclusions and Policy Implications

The study aims to assess and estimate the impact of FDI on economic growth in 30 developing countries that are in the lower-middle-income group in 2000–2014, both in the short run and the long run. VECM and FMOLS techniques are used to examine this impact. Results from the study contribute to the literature on the relationship between FDI and growth in developing countries, with a focus on this relationship in both the short and long run during the important of 2000 to 2014 period, which includes the global financial crisis.

Empirical results from the study can be summarized as follows. Firstly, FDI capital flows can hinder a country's economic growth in the short run, but also have a positive effect in the long run. Secondly, domestic credit for the private sector affects economic growth negatively in the short run, while money supply is determined to have a positive effect in both the short and long run for economic growth. Human capital, total domestic investment, and domestic credit for the private sector have a positive effect on economic growth in the long run.

As a result, it can be asserted that FDI is an important factor for economic growth in a long run, especially for emerging and developing economies. Efforts to attract FDI to supplement domestic investment in lower-middle-income developing economies should be encouraged. However, it should be considered that policies to attract FDI need to be constructed with a long-term view to maximize the positive effects of FDI on a country's economy. Policies that aim to attract FDI at all cost in the short run will not bring fundamental benefits to the economy. Lower-middle-income developing countries have been trying to attract FDI to seek its positive benefits. The impact of FDI on economic growth is not always positive, as it depends on characteristics of the investment resulting from FDI, such as type, sector, scope, duration, proportion of domestic businesses in the sector, and so on. Governments should put in place policies to improve the quality of human resources and labor skills. Since FDI always comes with technology, there needs to be highly skilled labor in order to utilize the new technology and to create a positive technological diffusion effect.

At the same time, other than prioritizing the attraction of FDI, governments should look into policies on human capital, money supply, total domestic investment, and total credit for the private sector in order to enhance economic growth and absorb the maximum FDI benefits. Money supply always brings positive effects in increasing economic growth in both the short and long run. Therefore, the formulation and flexible use of monetary policies to support growth should be prioritized.

Despite the efforts put into the study, certain limitations cannot be avoided. Firstly, the period utilized in this study may not be sufficient for an econometric study on a macroeconomic subject matter (usually 15 years). Secondly, the presence of a global economic crisis in the time period being utilized in this paper may lead to economic and political instability in developing and emerging markets included in the sample. This potential issue has not been considered in the study. It is expected that subsequent studies should take these important considerations into account in order to mitigate the limitations of this paper.

Author Contributions: Conceptualization, T.T.-H.D. and D.H.V.; methodology, T.T.-H.D. and T.C.N.; software, A.T.V.; validation, D.H.V.; formal analysis, T.T.-H.D.; investigation, A.T.V. and T.C.N.; resources, T.T.-H.D.; data curation, T.T.-H.D., A.T.V., and T.C.N.; writing-original draft preparation, T.T.-H.D.; writing-review and editing, D.H.V. and T.C.N.; visualization, T.T.-H.D.; supervision, D.H.V.; project administration, D.H.V.

Funding: This research received no external funding.

Acknowledgments: We are grateful to the three anonymous referees for their constructive comments. We also thank the participants at the 3rd Vietnam's Business and Economics Research Conference VBER2019 (Ho Chi Minh City Open University, Vietnam, 18–20 July 2019) for their helpful suggestions. The authors wish to acknowledge financial supports from Ho Chi Minh City Open University. The authors are solely responsible for any remaining errors or shortcomings.

Conflicts of Interest: The authors declare no conflict of interest.

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