DOES FOREIGN DIRECT INVESTMENT ACCELERATE THE VIETNAMESE ECONOMIC GROWTH? – A SIMULTANEOUS EQUATIONS APPROACH

Hiep Ngoc Luu
University of St Andrews, UK
Centre for Applied Economics and Business Research, Vietnam
Vu Quang Trinh
University of Newcastle, UK
Nam Hoai Vu
University of Leicester, UK
Centre for Applied Economics and Business Research, Vietnam

ABSTRACT

The main purpose of this paper is to investigate the impact of foreign direct investment (FDI) on economic growth in Vietnam over the five-year post-crisis period of 2010-2014. In addition, it also provides a comparative analysis with the pre-crisis period to yield greater insight into how the FDI-growth nexus evolved over time and under different economic conditions. Our empirical work is based on a panel data set containing 63 provinces in Vietnam. We start our analytical section by examining the FDI-growth relationship using two simple ordinary-least-square (OLS) models, where FDI and economic growth are the dependent variables and are regressed on a number of other factors that seemingly influence FDI and growth. With an awareness of the possible endogeneity bias, we re-estimate our model using the simultaneous equation approach, employing the two-step system generalized method of moment (GMM) estimator. We complement our study by re-estimating the model on the pre-crisis sample during the period 1999-2006. Then, we re-run our regressions on the full-sample setting and take into account the possible effect of the 2007/2008 crisis by incorporating the crisis dummy variables (D2007 and D2008) to shed more light on the impact of the crisis on FDI and economic growth. Overall, we find some evidence of the simultaneous relationship: increased inward FDI promotes economic growth, while at the same time, greater growth could help the country to attract additional FDI capital. However, this bi-directional relationship only existed in the post-crisis period, and not in the pre-crisis time. During the pre-crisis period, growth does not exhibit a significant impact on FDI, while FDI is found to be an important driver of growth. In our full-sample setting, we find a robust positive significant influence of FDI on economic growth. However, economic growth, again, does not exhibit a significant positive impact on FDI. Some other factors, including domestic investment, market size, exports, level of trade openness and infrastructure development, either promote economic growth or inward investment. We also find some evidence suggesting that Vietnam should invest more in human capital to obtain a sufficient absorptive capability in order to benefit from advanced technologies and knowledge transfers that accompany inward FDI. In the end, our empirical findings suggest that the country should implement a more 'open door' policy to exploit further benefits from additional FDI inflows.

INTRODUCTION

Since the introduction of the *DoiMoi*[1] political and economic reforms in 1986, Vietnam has obtained a number of remarkable economic achievements. Over the last 30 years, from one of the poorest nations in the world with a per capita income of less than US$100, Vietnam has transformed into one of the most dynamic emerging countries in the East Asia region, with a per capital income well above US$2000 in 2014 (Word Bank 2015). In recent years, whilst worldwide economies have still been experiencing a very slow and uneven recovery as a consequence of the 2007/2008 global financial crisis, Vietnam has been maintaining relatively high and stable economic growth. By the end of 2014, Vietnam's GDP had increased by 5.98% compared to the previous year's figure, while the inflation rate dropped significantly from more than 20% in the 2010-2011 period to 3.7% (World Bank 2015).

The investment climate in Vietnam continues to improve, largely due to the stable political environment, flexible economic policies and constant economic growth. This consistently puts Vietnam among the most attractive destinations for investment in the Southeast Asia region. Over the past few years, FDI inflows into the country have continued to increase. By December 2014, the total number of on-going FDI projects licensed reached up to 17,700, with a total cumulative capital registered of more than US$252 billion (GSO 2015), making FDI to contribute more than 18% of the national GDP and generate (both directly and indirectly) over 1.7 million jobs (Tapchicongsan 2014).

FIGURE 1. FDI INFLOWS IN VIETNAM (US$ MILLION), 1998-2014

Source: Author calculation
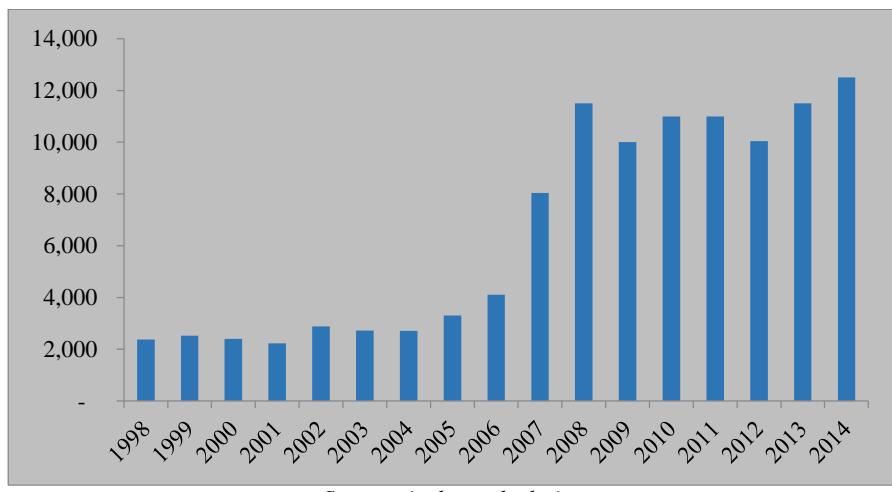
However, the evidence so far might not be sufficient to judge whether FDI led to the growth of Vietnam's economy, or whether economic growth helped the country to attract a greater flow of inward investments. In fact, empirical study on the relationship between FDI and economic growth in Vietnam is still neglected and out-of-date, and the results are mixed at best. Thus, our study contributes to the existing literature in a number of ways. First, to the best of our knowledge, this is among the first to examine comprehensively the bi-directional relationship between inward FDI and economic growth in different cities/provinces in Vietnam after the 2007/2008 global financial crisis. It is interesting and important to look at the post-crisis period because as a consequence of the financial meltdown, the investment capabilities of multinational enterprises (MNEs) were weakened significantly. MNEs were increasingly exposed to the problem of liquidity constraints and asset value deterioration, as a consequence of the collapse in the credit and capital markets. In addition, their incentives to invest abroad were also lessened due to the negative growth prospect and higher risk (UNCTAD 2009a). This is evidenced by a sharp drop in global FDI in 2008 and the subsequent year (UNCTAD 2009b). Nevertheless, right in the midst of the crisis, one could still observe an upward trend in FDI inflow to Vietnam (Figure 1). Although FDI into the country decreased in 2009 and fluctuated in the following years, the overall inward investment flows were still very high compared to the pre-crisis period. Thus, this raises an interesting question: could it be the case that the stable economic growth in Vietnam helped to attract more foreign investors, leading to capital formation and subsequently contributing to maintaining economic growth, even in difficult times? After all, this makes the study on FDI-growth nexus in an emerging country like Vietnam more important and interesting than ever before.

Regarding the methodology, we overcome the endogeneity concern described above by utilizing the two-step system Generalized Method of Moments (GMM) estimator. Although Anwar and Nguyen (2010) have explored and handled the two-way linkage between FDI and growth using the GMM estimator, the two-step system GMM is believed to be more consistent and efficient (Vallascas and Hegendorff 2013). According to Roodman (2009), the two-step system GMM is particularly appropriate for panel data with "small T and large N". In our case, T=5 and N=63. Based on a panel data set containing 63 cities/provinces in Vietnam over the 2010-2014 period, we found sufficient evidence that FDI and economic growth positively and simultaneously reinforce each other.

FDI AND ECONOMIC GROWTH: REVIEW OF THE LITERATURE

In the standard neoclassical growth model, inward FDI is proposed to promote growth through its positive impact on the stock of capital by financing capital formation (Solow 1957). However, since FDI is considered as the movement of a bundle of financial capital plus exogenous technological and labor factors from a parent entity to the recipient country (Berms 1970), FDI only increases the investment rate, which leads to a transitional increase in short-term per capita income growth. Thus, as the country moves towards a new steady stage, FDI should have no long-term growth effect on the economy. As a result, the influence of FDI on economic growth is identical to that of domestic investment (Herzer *et al*. 2007). By contrast, under the new endogenous growth models, technology is considered as an endogenous factor, and FDI is believed to have a permanent and positive growth effect on the host country's economy through technological diffusion and spillover

(Li and Liu 2005). According to Borensztein et al. (1998), FDI promotes the incorporation of new technologies into the production function of the recipient's economy, leading the effects from technological diffusion and spillover to offset the effects of diminishing returns on capital, which subsequently retains economic growth, even in the longer term. In addition, FDI can further promote long-term economic growth, not only by enriching the existing stock of knowledge in the recipient country's economy through labor training and skill/knowledge transfer, but also through the implementation of new management and organizational practices (Herzer et al. 2007).

While FDI is generally considered to be a powerful driver of economic growth, many studies claim that it has no growth effect, or eventually it could negatively influence the economy. Borensztein et al. (1998) emphasized that the impacts of FDI on growth may vary differently, depending upon the absorptive capacities of different nations. Specifically, in countries with low levels of human capital, the impact of FDI on growth is not significant, or eventually negative. However, once human capital reaches the minimum threshold, FDI turns to be positively related to growth. The most plausible explanation for this is that only nations with a sufficiently high-level of human capital can make the most of the advantages from technology transfers and spillover effects associated with inward FDI. Carkovic & Levine (2005), after thoroughly controlling for endogeneity bias, also found that FDI does not appear to have an independent significant positive effect on economic growth.

Empirical findings on the FDI-growth nexus in developing countries are also far from reaching a consensus. While Blomstrom et al. (1994), Al Nasser (2010), Mohamed and Sidiropoulos (2010), and Jiménez (2011) all found strong evidence supporting a positive relationship between FDI and economic growth, they also claim that a number of conditional factors (i.e. sufficient levels of human capital, economic stability and market liberalization) need to exist for a country to fully exploit the growth effect. Blomstrom et al. (1994), for example, concluded that FDI affects positively economic growth only in high-income developing countries, whilst it does not have any significant relationship in lower-income developing nations. This had been partly explained by Kokko *et al.* (1996) that domestic firms in less-developed countries, using very backward production technologies and a low-skilled labor force, may not be able to learn and benefit from MNEs if the technology gap is either too wide or too small. In their subsequent studies, Herzer et al. (2008) and Alguacil et al. (2011) failed to find robust and clear evidence of a positive FDI-growth relationship, while Neelankavil et al. (2011) only found a short-run growth impact of FDI

In fact, most governments (particularly in developing economies) consider FDI as a major driver of economic growth. Accordingly, they offer various incentivising policies to attract foreign investors. However, one prerequisite for the positive influence of FDI on the economy through capital accumulation is that inward investment must not crowd-out an equal amount of investment from domestic sources. Thus, if FDI entry creates competition pressures that crowd-out domestic firms, then it could substantially harm the economy. This is mostly because MNEs could benefit from lower marginal costs as a consequence of FDI incentives, and therefore be able to attract demand from domestic enterprises, forcing those domestic entities to shrink their scale and increase their average cost curves. Many other studies (i.e. Lall 1977) also reached the consensus that FDI would possibly displace domestic investment in the recipient countries because domestic

enterprises that are relatively small and weak cannot compete with such highly developed and sophisticated tactics, and therefore may end up being forced out of business.

Yet, curiously, the empirical evidence of the relationship between FDI and economic growth, both at the national level and within different regions of a country, remains ambiguous. Findings on the growth effects of FDI are controversial for two main reasons. First, insufficient data in either cross-country or time-series studies is claimed to be a reason for the different results found, and secondly, the different models and methodologies used is a reason why the studies do not agree. Depending on the particular objective of the study, it is often difficult to conclude which models and methods are the best to apply in all cases.

DATA AND MODEL SPECIFICATION

The purpose of this study is to investigate the relationship between FDI and economic growth in Vietnam after the 2007/2008 global financial crisis. For that reason, this empirical study will be carried out based on a panel data set consisting of 63 Vietnamese provinces over the 2010-2014 period. Our models are specified as follow.

$$Growth_{it} = \zeta_0 + \zeta_1 FDI_{it} + \boldsymbol{\delta_2^J X_{it}'} + \mu_{it} \tag{1}$$

$$FDI_{it} = \delta_0 + \delta_1 Growth_{it} + \boldsymbol{\delta_2^K X_{it}''} + \varepsilon_{it} \tag{2}$$

Where *i* and *t* characterise each province and time period. *Growth* is the annual provincial GDP growth rate, and *FDI* is the total annual registered FDI capital inflow to GDP by province. μ and ε are error-terms. $\boldsymbol{X_{it}'}$ = [*Human Capital_{it}, Export_{it}, Domestic investment_{it}, Population_{it}, Inflation_{it}, Exchange_{it}, Geography_{it}*] is the vector of *J* covariates that potentially influence economic growth, while $\boldsymbol{X_{it}''}$ = [*Openness_{it}, Labour_{it}, Infrastructure_{it}, Market size_{it}, Inflation_{it}, Exchange_{it}*] is the vector of *K* covariates that potentially influence inward FDI. $\boldsymbol{X'}$ and $\boldsymbol{X''}$ comprise sets of variables that have often been examined in growth and FDI literatures. For more discussion of factors affecting FDI and economic growth, see, for example: Fischer (1993), Borensztein et al. (1998), Evans *et al.* (2002), Durham (2004), Li and Liu (2005), Presbitero (2006), and Anwar and Nguyen (2010). Main variable descriptions and their expected impacts on FDI and economic growth are in Table 1.

TABLE 1: VARIABLE DESCRIPTIONS

Variables	Description	Expected signs	
		Growth	*FDI*
Human Capital	The ratio of total enrolled university and college students to total provincial population	+	
Export	Export/GDP by province	+	
Domestic Investment	Provincial domestic investment per capita	+/-	
Population	Provincial population growth rate	+/-	
Openness	(Export + Import)/GDP by province		+
Labour	Percentage of labor force at age 15 years and above to total provincial population		+
Infrastructure	Natural logarithms of the gross output of construction at current prices		+
Market size	Provincial GDP per capita		+
Inflation	Annual provincial inflation rate	-	-
Exchange	Real exchange rate	-	+
Geography	coastline-to-total-areas by province	+	

EMPIRICAL RESULTS

The Results of Single Equations

The OLS regression results for the *Growth* and *FDI* regressions are presented in Tables 2 and 3, respectively. As can be seen from Table 2, FDI appears to accelerate economic growth since the estimated coefficient on *FDI* is positive and statistically significant. This confirms the findings of Vu *et al.* (2008) and Anwar and Nguyen (2010). Human capital, exports and the inflation rate also positively influence provincial economic growth. Real exchange rate misalignment discourage growth as in Kamin and Roger (2000). Other variables, including domestic investment, population growth and geography, do not appear to be determinants of provincial economic growth in Vietnam.

TABLE 2. FACTOR EFFECTING PROVINCIAL ECONOMIC GROWTH IN VIETNAM, 2010-2014

	Coefficient	*P-value*
FDI	0.000	0.049
Human Capital	0.019	0.007
Export	0.019	0.016
Domestic investment	0.485	0.184
Inflation	0.038	0.000
Exchange	-0.000	0.001
Geography	0.194	0.149
Population	-0.000	0.154
Constant	0.313	0.455
Provinces	63	
No. Obs.	303	

With regard to the *FDI* equation, Table 3 shows that economic growth is not a determinant factor affecting the level of inward FDI into Vietnam, since the coefficient on *Growth* is not statistically significant. Meanwhile, although labor force and inflation rate appear to have no statistically significant impact on FDI inflows, other factors, including market size, the degree of trade openness, and infrastructure development all directly and positively influence the level of inward investment.

TABLE 3. FACTOR EFFECTING PROVINCIAL FDI INFLOW IN VIETNAM, 2010-2014

	Coefficient	*P-value*
Growth	-0.185	0.906
Size	0.000	0.054
Openness	0.294	0.013
Infrastructure	0.000	0.004
Labor	-23.50	0.718
Inflation	1.038	0.548
Exchange	-0.000	0.069
Constant	5.692	0.126
Provinces	63	
No. Obs.	315	

TABLE 4. FACTOR EFFECTING PROVINCIAL ECONOMIC GROWTH IN VIETNAM (WITH INTERACTIONS), 2010-2014

	No Interaction	With interaction between FDI and Human Capital	With interaction between FDI and Domestic Investment	With interaction between FDI, Human Capital and FDI and Domestic investment
	(1)	*(2)*	*(3)*	*(4)*
FDI	0.000	0.000	0.002	0.002
	(0.049)	(0.053)	(0.062)	(0.051)
Human Capital	0.019	0.010	0.018	0.016
	(0.007)	(0.009)	(0.008)	(0.009)
Export	0.019	0.019	0.016	0.0169
	(0.016)	(0.014)	(0.022)	(0.021)
Domestic investment	0.485	0.485	0.518	0.447
	(0.184)	(0.197)	(0.134)	(0.135)
Inflation	0.038	0.038	0.039	0.038
	(0.000)	(0.000)	(0.000)	(0.000)
Exchange	-0.000	-0.000	-0.000	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)
Geography	0.194	0.1857	0.184	0.185
	(0.149)	(0.151)	(0.163)	(0.154)
Population	-0.000			
	(0.154)			
FDI*Human Capital		-0.076		-0.098
		(0.369)		(0.355)
FDI*Domestic Investment			0.207	0.207
			(0.117)	(0.118)
Constant	0.313	0.312	0.319	0.317
	(0.455)	(0.458)	(0.448)	(0.451)
Provinces	63	63	63	63
No. Obs.	303	303	303	303

Note: p-values in parentheses.

Based on the literature discussed, we further investigated the impacts of FDI on growth through the hypothesis of the existence of absorptive capability in Vietnam. In doing so, we included in our model the interactions of FDI on two other variables: *Human capital* and *Domestic investment*. For convenience, we re-present the results of the model without the interaction terms in Column 1 of Table 4, while the interaction of FDI with *Human Capital* is showed in Column 2, and the interaction of FDI with *Domestic Investment* is provided in Column 3. Finally, Column 4 reports the regression results after controlling for both the interaction terms *FDI*Human Capital* and *FDI*Domestic Investment*. As can be seen from Columns 1 to 4, FDI appears to have a robust positive effect on growth. With regard to other variables, it is interesting to note from Column 2, 3

and 4 that, even after including interaction terms, the results are very similar to those of the baseline model reported in Column 1.

Next, according to Column 2 of Table 4, the estimated coefficient on *FDI*Human Capital* is not statistically significant, indicating that the flow of advanced technology and knowledge diffusion brought in by FDI could not contribute to increasing the growth rate of Vietnam's economy by interacting with the country's stock of human capital. This neither conform to the endogenous growth theories, which suggest that FDI could accelerate economic growth through technological diffusion and knowledge spillover, nor supports the finding of Nguyen and Anwar (2010) that as far as the stock of human capital is concerned, Vietnam has reached the minimum required threshold. This is probably because the knowledge gap may be too large, so Vietnamese enterprises may not be able to learn and benefit from technology and knowledge diffusion and spillovers. Therefore, as suggested by Blomstrom and Kokko (1998) and Borensztein *et al.* (1998), the country should invest more in human capital to obtain a sufficient absorptive capability in order to benefit from advanced technologies and knowledge transfers that come along with inward FDI.

A similar argument holds when we account for the indirect impacts of FDI on economic growth through its interaction with domestic investment. As can be seen from Column 3 of Table 4, both the coefficients on *FDI* and *FDI*Domestic Investment* do not enter significantly, implying that this type of absorptive capacity does not appear to influence the nature of inward investments in a significant way. In Column 4, when the two interaction terms are included together in the *Growth* equation, the results still confirm the previous findings. Thus, given all the models conducted, inward investment seems to not exert a robust positive effect on growth, and advanced technology transfer and knowledge diffusion from inward FDI are not yet the channels that promote provincial economic growth in Vietnam.

The Results of Simultaneous Equations

It should be noticed that the single-equation regressions presented in the previous section might be subject to the endogeneity bias. It is possible that greater economic growth sends a good signal to foreign investors and encourages them to invest more into the country, which in turn could lead to capital formation and a positive impact on economic growth. Therefore, to further assess the mechanisms relating inward FDI and economic growth in Vietnam, we control for the endogenous determinant of FDI and growth by employing the two-step system GMM estimator[2] for the system of equations containing equations 1 and 2[3]. One problem arising during the two-step system GMM procedure is multicollinearity. Thus, we exclude the interaction terms in the *Growth* equation and keep only the main variables. The regression results of the system of equations model are presented in Table 5. As can be seen from Columns 1 and 2 of Table 5, in Vietnam, during the period from 2010 to 2014, FDI and economic growth are simultaneously related. Column 1 shows that, even after controlling for the endogeneity bias, increase in FDI inflows still exhibit a positive impact on economic growth. Meanwhile, the coefficient estimated on *Growth* in Column 2 is now positive and statistically significant, indicating that, after controlling for the endogeneity bias, increase in provincial economic growth does help to attract more FDI flows into the province.

TABLE 5. FDI AND ECONOMIC GROWTH, SIMULTANEOUS EQUATIONS, 2010-2014

	Growth *(1)*	*FDI* *(2)*
FDI	0.005 (0.001)	
Human Capital	0.013 (0.005)	
Export	0.006 (0.062)	
Domestic investment	0.002 (0.071)	
Population	0.000 (0.784)	
Geography	0.189 (0.127)	
Growth		16.66 (0.037)
Size		0.000 (0.078)
Openness		0.097 (0.026)
Infrastructure		0.000 (0.000)
Labor		-33.93 (0.966)
Inflation	0.337 (0.000)	-5.515 (0.129)
Exchange	-0.000 (0.036)	0.000 (0.087)
Constant	0.023 (0.819)	1.234 (0.804)
Hansen J statistic	0.714	0.278
Durbin-Wu-Hausman *(p-value)*	0.001	0.000
Provinces	63	63
No. Obs.	303	315

Note: p-values in parentheses.

The coefficients on other variables offer some important insights. For example, except for *Geography* and *Population*, all other variables appear to have direct impact on economic growth. Unlike the results from the single-equation models, the estimated coefficient on *Domestic Investment* is now positive and significant. The effects of other variables on provincial economic growth remain qualitatively unchanged. With regard to factors affecting FDI inflow, Column 2 of Table 5 shows that, except for *Labour* and *Inflation*, all of the other variables, again, appear to have significant roles in determining FDI inflow.

Further Evidence on the FDI-Growth Nexus

We complement our analysis of the FDI-growth nexus with some additional tests. As mentioned at the beginning, it is both theoretically and practically unclear how the recent crisis has affected FDI and economic growth in Vietnam. While our main assessment is conducted during the post-crisis period, it could be interesting to see how the FDI-Growth relationship has evolved over time. To do so, we first re-estimate our model on the pre-crisis sample, covering the period 1999-2006. 1999 is selected as our starting year since data prior to 1999 is relatively poor, both in term of quantity and quality. Furthermore, we re-estimate our model in the full sample setting for the 1999-2014 period. We also incorporate in our full sample investigation the dummy crisis variables *D2007* and *D2008*, which take the value of 1 if the given year is 2007 and 2008, respectively, and 0 otherwise. By doing so, we can capture the effect of the recent crisis on growth and FDI in Vietnam.

TABLE 6. A COMPARATIVE ANALYSIS OF THE DETERMINANTS OF FDI AND GROWTH IN VIETNAM ACROSS DIFFERENT TIME-PERIODS USING TWO-STEP SYSTEM GMM

	Pre-crisis (1)		*Post-crisis* (2)		*Full Sample* (3)		*Full Sample (with Dummy Crisis)* (4)	
	Growth	*FDI*	*Growth*	*FDI*	*Growth*	*FDI*	*Growth*	*FDI*
FDI	0.002 (0.076)		0.005 (0.001)		0.040 (0.000)		0.005 (0.008)	
Human Capital	-0.002 (0.148)		0.013 (0.005)		0.054 (0.003)		0.097 (0.002)	
Export	0.006 (0.043)		0.006 (0.062)		0.006 (0.045)		0.005 (0.083)	
Domestic investment	0.040 (0.064)		0.002 (0.071)		0.008 (0.777)		0.012 (0.020)	
Population	0.000 (0.692)		0.000 (0.784)		0.000 (0.782)		0.000 (0.326)	
Geography	-0.529 (0.247)		0.189 (0.127)		-0.435 (0.272)		0.85363 (0.010)	
Growth		11.36 (0.114)		16.66 (0.037)		-7.868 (0.508)		13.81 (0.022)
Size		0.000 (0.090)		0.000 (0.078)		0.000 (0.064)		0.000 (0.032)
Openness		0.018 (0.007)		0.097 (0.026)		0.007 (0.073)		0.006 (0.048)
Infrast		0.000 (0.000)		0.000 (0.000)		0.000 (0.000)		0.000 (0.000)
Labor		7.136 (0.004)		-33.93 (0.966)		11.16 (0.082)		12.07 (0.007)
Inflation	0.086 (0.000)	-5.028 (0.525)	0.337 (0.000)	-5.515 (0.129)	0.160 (0.000)	0.796 (0.321)	0.173 (0.000)	0.690 (0.668)
Exchange	-0.000 (0.012)	0.000 (0.428)	-0.000 (0.036)	0.000 (0.087)	-0.000 (0.009)	-0.000 (0.423)	-0.000 (0.006)	0.000 (0.071)
D2007							-0.027 (0.094)	-0.279 (0.435)
D2008							-0.093 (0.043)	-0.448 (0.491)
Constant	0.640 (0.000)	-0.846 (0.356)	0.023 (0.819)	1.234 (0.804)	-0.242 (0.002)	0.282 (0.761)	-0.383 (0.000)	1.347 (0.380)
Hansen J statistic *(p-value)*	0.014	0.599	0.714	0.278	0.478	0.692	0.663	0.955
Durbin-Wu-Hausman *(p-value)*	0.001	0.031	0.001	0.000	0.000	0.000	0.000	0.000

| No. Obs. | 396 | 276 | 303 | 315 | 888 | 778 | 888 | 778 |
| Year | 99-06 | 99-06 | 10-14 | 10-14 | 99-14 | 99-14 | 99-14 | 99-14 |

Note: p-values in parentheses.

Table 6 reports the estimation results of all the models. It can be seen from Column 1 that, for the period prior to the crisis, FDI exhibited a positive influence on economic growth. The result of the pre-crisis years is therefore consistent with the FDI-led growth hypothesis, and in line with the prior findings of Vu et al. (2008), Hoang et al. (2010) and Anward and Nguyen (2010). With respect to factors affecting inward FDI in the pre-crisis period, since the estimated coefficient on *Growth* as shown in Column 1 is not statistically significant, we cannot conclude that an increase in economic growth would help to attract further FDI. This finding is in contrast to our post-crisis result.

Next, columns 4 and 5 provide the estimation results of the full sample with and without crisis dummies. There is strong and robust evidence that increased FDI leads to higher economic growth, since the estimated coefficients on *FDI* are all positive and statistically significant in all the models. Meanwhile, *Growth* does not exhibit a robust positive influence on FDI. It is also interesting to note from our full sample estimations that whilst the economic growth appears to be declined as a result of the crisis, the level of inward FDI into Vietnam did not significantly change following the crisis as the estimated coefficients on the crisis dummies, although negative, are not statistically significant.

CONCLUSIONS

The empirical studies on the relationship between FDI and economic growth are hardly conclusive. Thus, with the aim of extending previous studies, we first investigate the FDI-growth nexus by employing the panel pooled OLS analysis based on two single-equation models, of which FDI and economic growth are the dependent variables, respectively. Then we address the endogeneity problem by utilizing the two-step system GMM estimator on a simultaneous equations model and providing some comparisons with the panel pooled OLS results specified previously.

By using a comprehensive panel dataset covering 63 provinces in Vietnam, we found some evidence of a mutually reinforcing two-way linkage between FDI and economic growth. On the one hand, FDI exhibits a robust and significant positive effect on growth, while on the other hand, economic growth also appears to positively influence FDI in the post-crisis period but not in time prior to the recession. Other factors including human capital, exports, domestic investment, market size, the degree of trade openness, level of infrastructure development, inflation, and exchange rate also are found to be important drivers of either FDI or economic growth. Thus, this study also offers some insights to regulators and policymakers by showing that Vietnam should implement a more '*open door*' policy to attract further foreign investment capital. Further studies could extend our research by investigating, for example, whether and to what extent FDI, in its different mode of entry, i.e. Greenfield investment and cross-border merger and acquisition, affects economic growth in Vietnam. In addition, it might also be interesting and important for researchers to analyze and compare the results across different countries and/or regions to gain more insight into this nexus.

ENDNOTES

[1] *DoiMoi*-1986 is the economic and political reforms initiated in Vietnam in 1986. It aims to transform the centrally-planned economy into a market-oriented one, where the prices of products and services are able to change in accordance to changes in supply and demand in the market (Tran and To, 2003).

[2] We employ lag values (*t-2*) of endogenous variables as instruments. We also investigate further to see if our chosen IVs are valid by conducting the Hansen J-test to test for over-identification restrictions under the null hypothesis that all instrumental variables are exogenous. The test results are reported in Table 5, and since the p-values are both statistically insignificant, our selected instruments are believed to be valid.

[3] Given the endogeneity concern, it is important to see if the simultaneous equations model is necessary to utilize. As such, the Durbin-Wu-Hausman test is performed. If the Durbin-Wu-Hausman tests provide statistically significant results, then there is a strong rationale to believe that FDI and growth are endogenously formed. Otherwise, those two variables are exogenous, which subsequently discourage the use of the IV model. We applied the test for both of the equations and the results are presented in Table 5. Since the Durbin-Wu-Hausman tests provide statistically significant results, *FDI* is an endogenous variable in the *Growth* equation, while at the same time, *Growth* is an endogenous variable determining the level of inward FDI.

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