ANALYSIS OF FOREIGN DIRECT INVESTMENT AND ECONOMIC GROWTH IN VIETNAM

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ABSTRACT

This research paper examines the relationship between foreign investment and economic growth in Vietnam by experimenting with a VAR model. The results agree with international economic theory that there is a linkage between FDI, GDP, and Openness to trade. For a small developing country like Vietnam, FDI provides a vital source of capital for economic growth. Our model and analysis have shown the positive linkage between FDI and GDP, manifested by the positive coefficients in the VAR model. Furthermore, the model uses two other variables: Openness to trade and International Crisis, both of which have significant impact on the flow of foreign investment and economic growth.

Key words: FDI, GDP, VAR model.

Background and Research Objectives

1. Background

Foreign Direct Investment (FDI) has been regarded as a crucial factor in driving economic growth in Vietnam, one of the fast emerging countries in East Asia. Vietnamese economy began to develop after the Economic Reform of 1986, accelerated after the lifting of trade embargo with the U.S. in 1993, and continued forward with the participation in World Trade Organization (WTO) in 2007. During the decade of 2000, Vietnamese economy has grown remarkably, averaging 7.25% annually. Since then, Vietnam has always been included in the group of high-growth countries and among the popular destinations for foreign investment. Up to 2015, Vietnam has accumulated more than 15,000 FDI projects with total registered capital of 250 billion. The most foreign-invested sectors are manufacturing, construction, information technology, communication, mining, real estate... Over the last two decades, FDI growth rate has frequently surpassed the growth rate of GDP of Vietnam. The contribution of FDI-related sector to GDP has increased from 2% in 1992 to 12% in 1997, 17% in 2006, and 19% in 2011. FDI impact on the economy is most significantly manifested on export manufacturing.

This remarkable progress of FDI along the path of economic development in VietNam has prompted intellectual curiosity on this important macroeconomic relationship, leading to several studies of this particular topic. In essence, researchers examine whether there is a significant causal link between FDI and economic growth. This is critical to evaluate the effectiveness of FDI implementation and contribution to economic development in Vietnam.

This paper attempts to model FDI and economic growth in Vietnam with the Vector Autoregression (VAR) approach. It is different from previous studies in Vietnam that were mainly qualitative.

2. Research objectives

To summarize previous empirical studies on the linkage between FDI and growth;

To provide a review of the FDI progress in Vietnam since its inception, and the parallel economic cycle over the same period;
To develop a VAR model of the linkage between FDI and GDP in Vietnam, two main variables. Besides, the model uses two other variables: Openness to trade and International Crisis.

Overview of Empirical Studies on FDI and Economic Growth

Neoclassical theories such as Solow (1957) did not pinpoint the linkage between FDI and economic growth. Most of them are related to the theory of endogenous growth, such as Romer (1986) and Lucas (1998), which explains technological progress and growth. FDI was considered as a positive impact to growth, not just directly through capital accumulation, job opportunities, and export increase, but also indirectly through technological improvement, all contributing to production expansion and growth. Borensztein (1998) observed that the interaction between FDI and growth often depends on the characteristics of the host country, such as the level of technology and human capital.

Using OLS regression, Balasubramanyam et al. (1996) found evidence of positive impact of FDI on growth, especially for export-oriented countries, which implies that trade policy may influence how FDI could stimulate growth of a country.

Borensztein et al. (1998) modeled FDI and growth in both industrial and developing countries by panel data regression. They found that FDI may not improve productivity until human capital reaches a certain level.

Using a database of 80 countries in the period 1971-1995, Choe (2003) found evidence of mutual causality between FDI and growth, however with clearer causal link from growth to FDI, not vice versa.

Lix & Liu (2005) used a panel data of 84 countries in the period 1970-1999 to develop a system of simultaneous equations for GDP and FDI. They concluded that FDI not only exerts economic growth directly, but also indirectly through its promotion of human capital; this is evident in developing countries. On the other hand, technological gap may hinder the impact of FDI on growth.

Nabende & Ferd (1998) developed a system of simultaneous equations to analyze the link between growth and government policy in Taiwan. Based on the theory of multiplier effects, they concluded that FDI can spur growth, and the most relevant policy should aim to develop the infrastructure.

Chan (2000) examined the impact of FDI on processing industries in Taiwan with Granger causality test, and concluded that technology transfer is the main channel in which FDI propels growth in Taiwan.

Zhang (2001) used a VAR model to examine the causality between FDI and output in sample countries in East Asia and South America. He found the impact of FDI more significant in East Asian countries than Latin American ones, conditional on reform package such as trade liberalization and education reform, which increases human capital and promote stable, export-oriented growth.

Nabende et al. (2003) also used VAR model to analyze the positive impact of FDI in five East Asian countries, and found the indirect causality is different in each country. Baharumshah & Thanoon (2006) also used VAR model to conclude there is a long-term relationship between FDI, saving, and growth in eight East Asian countries. On the other hand, Shan (2002) used VAR model to analyze the relationship between FDI and output through channels as labor, trade, and energy consumption, and found that FDI is not a main fuel of rising output, nevertheless output has important implication for attracting FDI.

Manal Suliman Omer & Liu Yao (2011) researched on the impact of FDI on long-term growth in Malaysia. Using VAR model with data period 1970-2008, they found FDI has significant impact on Malaysian long-term economic cycle.

Adam Balcerzak & Mirosława Żurek (2011) researched on the relationship between FDI and labor market in Poland, using quarterly data period 1995-2009 and a VAR model with variables: FDI, GDP, unemployment, domestic demand, average salary, export-import ratio. They found a long-term link between rising FDI and lowering unemployment in Poland.

Mohd Shahidan Bin Shaari, Thien Ho Hong & Siti Norwahida Shukeri (2012) used VAR model to examine the impact of FDI on GDP in Malaysia for the period 1972–2010. They concluded there is Granger causality between FDI and GDP.

Using GMM approach, Sajid Anwar & Lan Phi Nguyen (2010) developed a regression model to analyze the growth rate for all provinces of Vietnam for the period 1996-2005. The model incorporated multiple variables: government spending ratio, ratio of export to GDP, number of post-secondary students, ratio of domestic investment to GDP, vocational training, and real exchange rate. They found a link between FDI and growth in Vietnam, even though it was not significant in some provinces. Furthermore, the research suggested that the impact of FDI on growth would be stronger if more efforts were put in improving education and training, financial market development, and bridging technological gap between domestic and foreign enterprises.

These empirical studies worldwide have shown that there exists a link between FDI and economic growth. Depending on the type of model, variables, time period, scope and location of research, different studies may indicate varying degree of linkage between FDI and growth. In the next section, this paper briefly introduces the progress of FDI in Vietnam, in parallel to the economic cycle that the country has experienced since its initiation into market economy.

**Overview of Vietnam: FDI and Economic Growth**

Foreign investment started in Vietnam since 1987 when the Law on Investment was passed. Government data (source: Ministry of Planning and Investment) shows that Vietnam has made strong progress on raising FDI. Started in 1988-1990 with a humble foreign registered investment of US$1.6 billion with 214 projects, FDI began to rise spectacularly with 1,781 projects over the period 1991-1996. The next period 1997-2000 saw a downturn as the Asian financial crisis set in. FDI decreased year-by-year during this period. The cycle rised again in the period 2001-2005 with FDI reaching $20.8 billion, which was 30% higher than government target. FDI increased year-by-year during this period. The real deal came in 2006 when Vietnam accession to World Trade Organization (WTO) signified an unprecedented period of boom. From 2007 to 2010, Vietnam attracted $123 billion, far exceeding its previous successful period of 2001–2005. Registered FDI capital exploded in consecutive years from 2007 to 2010, seemingly unaffected by the global recession of 2008-2009. FDI registration in Vietnam reached its record high of $64 billion in 2008. From 2011 onward, Vietnam experienced a down cycle in foreign investment as the market overheated from tremendous capital inflow. However, it appears to stabilize in 2014-2015. The flow of FDI in Vietnam over the span 1989-2015 is depicted in the following chart:

Chart 1: FDI progress in Vietnam (1990-2015)
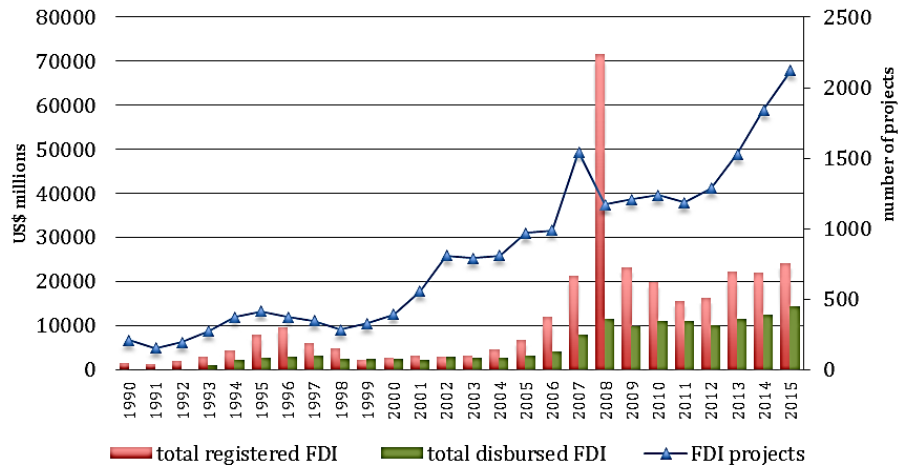
As a fast emerging country in South East Asia, Vietnam has experienced rapid growth since the early 1990s. After the Economic Reform in 1986, Vietnam has gradually been opened to international trade and market economy. During the period 1990-1997, it attained considerable economic achievement, with growth rate increasing from 6% in 1991 to the peak 10% in 1997. This period of successful economic growth is associated with large FDI inflow. In 1998–1999, the negative impact of Asian financial crisis stalled the fast-growth of Vietnam economy, which was at merely 4% in 1999. This shock was detrimental to a small open economy of Vietnam. The country recovered in 2000 and continued its next growth cycle from 2000 to 2007. It was perhaps the period of fastest growth, from 6.5% in 2000 to 8% in 2007. Vietnam successfuly joined WTO in 2007, which confirmed its status as a fast emerging open economy. FDI inflow was also unprecedented during this golden period, with registered FDI capital reaching a record $64 billion in 2008. Then, the global recession of 2008-2009 had a negative impact on Vietnam, however the country still achieved relatively stable growth and attracted considerable FDI during this worldwide turmoil. Recently, some economic research even suggest that Vietnam should revise its economic development strategy to sustain its growth. Currently, Vietnam is ranked as a middle-income country.

Chart 2: GDP and growth in Vietnam (1986-2015)
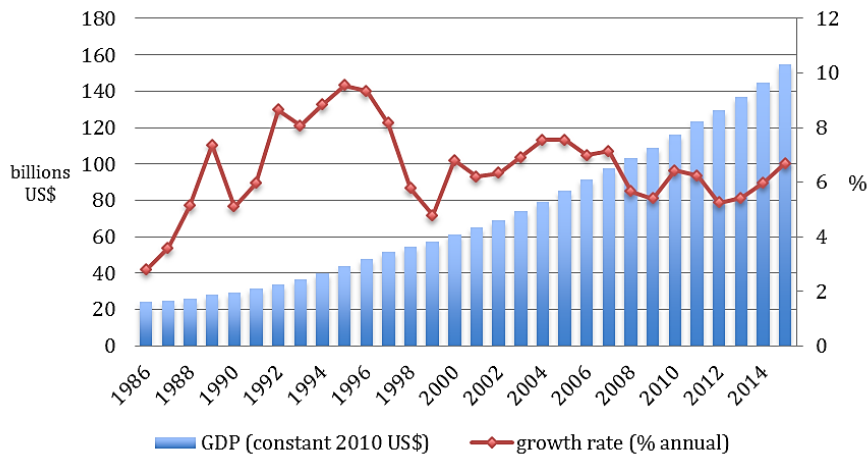
The fluctuation in FDI inflow can be seen as closely related to the economic cycle in Vietnam. In particular, the Reform of 1986 opened the economy to international market, and since that critical milestone, the contribution of FDI has become increasingly significant as Vietnam continues its economic progress. Economic cycle with upward trends in 1990-1997 and 2000-2007 seem to coincide with high FDI inflow, and economic downturns of 1997-1998 and 2008-2009 were followed by reduction in FDI. Qualitatively speaking, there may exist correlation between FDI and the status of the economy; whether such correlation may be the result of direct causality from one variable to the other, or the causality is mutual, or indirect causality through some auxiliary variables, is subjected to examination.

It can be observed that foreign investment has a general upward trend throughout the period 1996-2015, even though two major international crises brought volatility to this trend. Foreign investment, after the Asian crisis 1997-1998 and prior to the global recession 2008-2009, increased rapidly and reached its peak in 2008.

Chart 3: pattern of GDP and FDI in Vietnam

— change in GDP (% annual) — change in FDI (% annual)
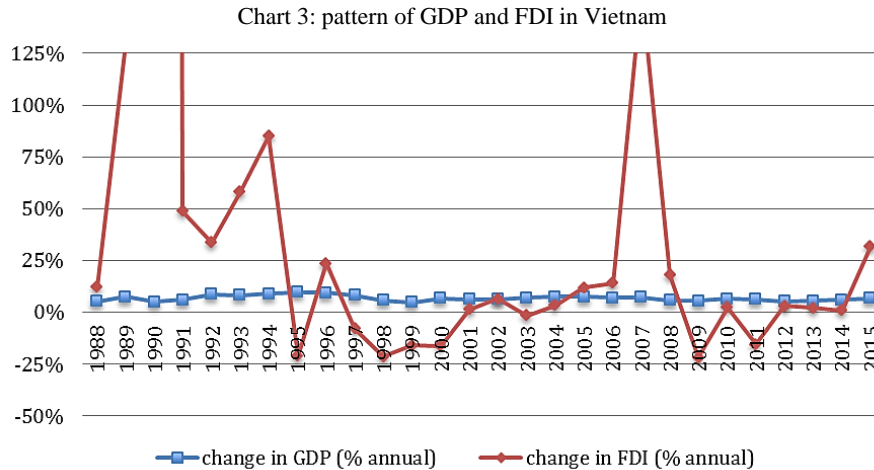
Overall, Vietnam in the period 1986-2015 has seen remarkable economic development, along with even more incredible progress in foreign investment. For a small country which just suffered from long civil war like Vietnam, FDI is extremely important in its course from poverty reduction to rapid modernization and global integration. In turn, economic development is the key attraction of international investors who seek opportunities in growing economies. Although there are still issues regarding the effectiveness of FDI implementation, the pivotal role of this source of fund in the economic development of Vietnam is undeniable.

Modeling FDI and Economic Growth in Vietnam

1. **Data**

This study uses macroeconomic data of Vietnam over the 30-year period 1986 – 2015. (*The data used in this research is obtained from World Bank database*. GDP and FDI are the two main variables. Beside GDP and FDI, two other variables are used in the model. One of them is the openness to trade. This variable is measured as $\% \frac{\text{export} + \text{import}}{\text{GDP}}$, indicating the level of exposure and engagement in international trade of a country. Furthermore, openness to trade is seen as an attractive sign to potential foreign investors because it implies the ease of importing materials and machinery and exporting manufactured products. Thus, FDI can have a double effect on Openness, raising both export and import. Furthermore, the rising trend of export in Vietnam economy convinces us of the role of Openness as an important catalyst to stimulate FDI and economic growth.

Another variable in our model is international crisis. This variable is exogenous in the model, since Vietnam economy has almost no influence on the possibility of world crisis. Therefore, the relationship between world crisis and Vietnam economy is one-way direction.

Table 1summarizes the variables in our model:

Table 1: Summary of variables
$$Y_t = \mu + \phi_1 Y_{t-1} + \phi_2 Y_{t-2} + \cdots \phi_p Y_{t-p} + \delta X_t + u_t$$

Y_t (endogenous)	X_t (exogenous)
▪ GDP : GDP of Vietnam, measured in constant 2010 US$ ▪ FDI : net FDI inflow, measured in constant 2010 US$ ▪ Openness : aggregate % of export and import over GDP	▪ Crisis: binary variable indicating whether an international crisis happens in a particular year (0 – no crisis, 1 – crisis). This variable takes value of 1 in 1997-1998 (Asian financial crisis) and 2008-2009 (global recession)

As theory suggests, FDI and GDP and Openness tend to go in the same direction. That means if FDI rises, GDP and Openness tend to rise as well. The correlations between these variables are shown in Table 2.

Table 2: Correlation between GDP, FDI, and openness to trade

	GDP	FDI	Openness
GDP	1	0.848	0.943
FDI	0.848	1	0.851
Openness	0.943	0.851	1

There are strong positive correlations between GDP, FDI, and Openness to trade. For the purpose of macroeconomic analysis, we use the natural logarithm of these variables then compute their correlations. Table 3 shows the correlations between log GDP, log FDI, and log Openness.

Table 3: Correlation between log GDP, log FDI, log Openness

	log GDP	log FDI	log Openness
log GDP	1	0.697	0.882
log FDI	0.697	1	0.871
log Openness	0.882	0.871	1

There are strong correlations between the natural logarithm of the variables. Based on the common practice in empirical literature, this research paper explores the interaction between GDP and FDI by using the log-log model:

$$Y_t = (logGDP, logFDI, logOpenness)_t$$

The next step is to examine the stationarity of these time series. The augmented Dickey-Fuller (ADF) test is conducted to check the null hypothesis of unit root. On the other hand, the KPSS test is to check the null hypothesis of stationarity.
Both tests confirm the presence of unit root and thus reject the stationarity of these time series.

Table 4: stationarity test statistics

	Lag order	ADF statistic	KPSS statistic
log GDP	4	-2.36	0.71
log FDI	4	-1.01	0.49
log Openness	4	-1.65	0.66

Note: for ADF test, critical value at 5% significant level is -2.93
for KPSS test, critical value at 5% significant level is 0.46

The testing process is repeated for the first differences in these variables. Both test statistics indicate that for variable logGDP, the stationarity hypothesis is accepted at 10% significant level; whereas for variable logFDI and logOpenness, it is accepted at 5% significant level. Therefore, we use the first differences of logarithm of these variables in the model.

Table 5: stationarity test statistics for first differences of the variables

	Lag order	ADF statistic	KPSS statistic
D(log GDP)	4	-2.66 (*)	0.13 (**)
D(log FDI)	4	-2.93 (**)	0.41 (**)
D(log Openness)	4	-3.54 (**)	0.25 (**)

Note: for ADF test, (*) and (**) indicate 10% and 5% significant level, respectively
for KPSS test, (**) indicates failure to reject the null at 5% significant level

2. **Model**

To determine the lag order of the VAR model, several information criteria are used. Due to the limited sample size in this study (T=30) with four variables including an exogenous variable, it is expected that the optimal lag length may not be greater than 2.

Table 6: lag order based on information criteria

Lag order	AIC	HQ	SC	FPE
1	-14.180	-13.965	-13.460	$7.03*10^{-7}$
2	-15.007	-14.664	-13.855	$3.21*10^{-7}$

All the information criteria in Table 6 suggest the optimal lag order is 2.

Estimates of the coefficients of the VAR(2) model are as following:

$D(logGDP)_t =$
$0.777*D(logGDP)_{t-1} + 0.0056*D(logFDI)_{t-1} - 0.025*D(logOpenness)_{t-1}$
$+ 0.0185*D(logGDP)_{t-2} + 0.003*D(logFDI)_{t-2} - 0.011*D(logOpenness)_{t-2}$
$- 0.0127*Crisis + 0.0157$

$D(logFDI)_t =$
$4.17*D(logGDP)_{t-1} - 0.228*D(logFDI)_{t-1} + 3.175*D(logOpenness)_{t-1}$
$- 1.325*D(logGDP)_{t-2} + 0.237*D(logFDI)_{t-2} + 0.224*D(logOpenness)_{t-2}$
$- 0.407*Crisis - 0.175$

$D(logOpenness)_t =$
$- 3.4*D(logGDP)_{t-1} - 0.058*D(logFDI)_{t-1} + 0.333*D(logOpenness)_{t-1}$
$+ 4.3*D(logGDP)_{t-2} + 0.165*D(logFDI)_{t-2} - 0.35*D(logOpenness)_{t-2}$
$- 0.122*Crisis - 0.014$

The roots of the VAR(2) are computed in Table 7. As all the roots are within the unit circle, it is confirmed that the model is stationary.

Table 7: roots of the characteristic polynomial within the unit circle

Roots of the characteristic polynomial					
0.8437344	0.715781	0.715781	0.6255747	0.271001	0.1769376

The next step is to verify the model by checking the residual autocorrelations. If the model is well specified, theoretically the residuals should have no correlation. Graphs of residual autocorrelations are shown in the following:

Chart 5: residual autocorrelations
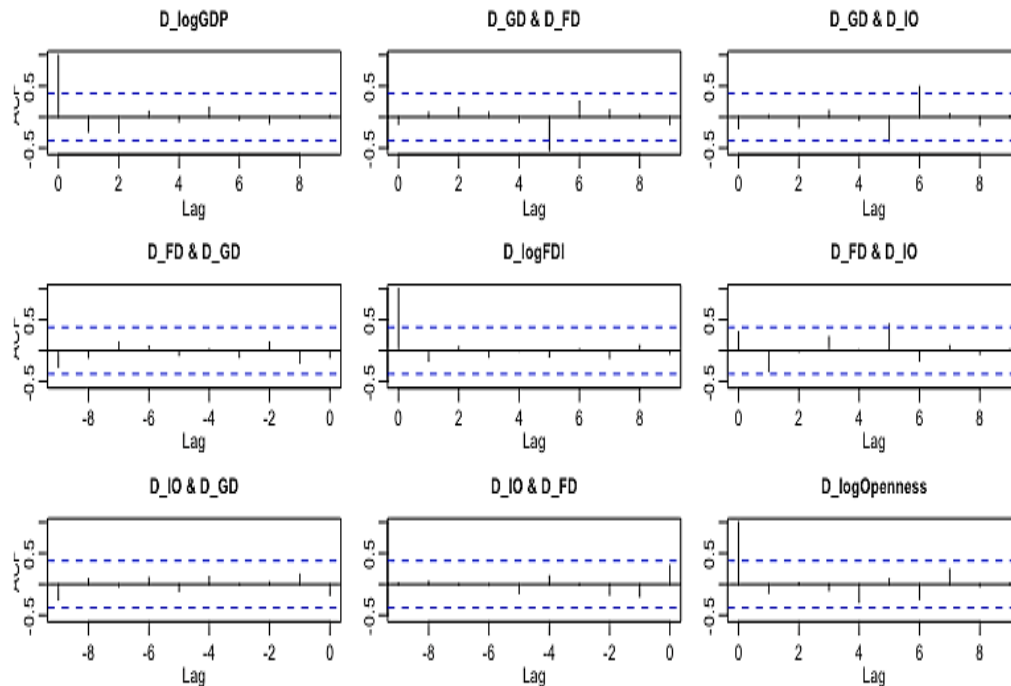
The graphs show that almost all of the residual autocorrelations are within the 95% confidence bound, thus the model is well specified. Formal tests for residual autocorrelations in multivariate time series are Portmanteau test and Breusch-Godfrey LM test.

Table 8: tests for residual autocorrelations

	chi-squared	d.f.	p-value
Portmanteau	24.512	18	0.139
Breusch-Godfrey LM	50.753	36	0.053

Test results indicate that the residuals have no correlation, as shown in Table 8. Both tests fail to reject the null hypothesis of residual autocorrelations at 5% significant level.

Estimates of the coefficients of the model enable us to make some preliminary conclusions about the behavior of each variable at present based on its past values, as well as the temporal relations between variables. In our model, these variables technically represent the growth rates of the corresponding variables in the economy.
GDP is positively correlated with its past values, especially the first lag. GDP is also positively correlated with FDI, as theory often suggests.

For FDI, the correlation with past values is rather mixed. While FDI is negatively correlated with its first lag, the correlation becomes positive on the second lag. This may possibly due to investment capital coming in waves in one year, followed by a break in the next year, then rising again.

FDI is also positively correlated with Openness to trade. FDI in Vietnam often concentrates on export sector, which stimulates both export and import activities because of the need for material import for manufacture assembly.

Openness is positively correlated with its first lag, but negatively correlated with its second lag. Openness is negatively correlated with both GDP and FDI on the first lag, but the correlations become positive on the second lag of both variables.
As expected, international crisis has negative impact on all variables, as indicated by the negative coefficients in all equations. In particular, crisis has strong negative impact on FDI. This phenomenon has been observed in reality, given that the Asian financial crisis 1997 and the global recession 2008-2009 devastated the international capital market and reduced the available funds from the most important FDI partners with Vietnam (Japan, South Korea, China, U.S., Malaysia). International crisis also has considerable negative impact on openness to trade, as export usually decreases due to falling world demand. For the Vietnam case, falling export leads to lower demand for material import for manufacturing sector. So, international crisis can have double impact on openness to trade in Vietnam.

Conclusion

This research paper examines the relationship between foreign investment and economic growth in Vietnam. To achieve this goal, first we provide a brief review of existing empirical studies on this topic. The literature review section shows what has been done worldwide through a variety of studies using different methods and models, variables, time period, location. Different studies have illustrated varying degrees of interaction between FDI and economic growth, nonetheless they all agree on the importance of this macroeconomic relationship.

We then proceed to examine this relationship in the last 30 years in Vietnam by experimenting a VAR model. The main variables are GDP and FDI, and we also introduce two auxiliary variables which are relevant to the Vietnam case: Openness to trade and International Crisis. Our qualitative analysis earlier has indicated that there seems to exist strong linkages between these variables.

The results from our VAR model agree with international economic theory that there is a positive linkage between FDI and GDP, which is manifested by the positive coefficients in the VAR model. The linkage is strongest in the first year, then tends to diminish over time. What this means for the Vietnam economy is that the mutual relationship between foreign investment and growth is positive at first but may not persist over time. This raises the question of the long-term effectiveness of foreign investment in Vietnam, the strategic management of this important source of fund at the government level, and the implementation of approved investment projects at local level.

Furthermore, FDI plays an influential role in the export-oriented economy of Vietnam. In this regards, the model uses two other variables: Openness to trade and International Crisis, both of which have significant impact on the flow of foreign investment and economic growth. Specifically, FDI is positively correlated with Openness to trade, GDP is also positively correlated with FDI, openness is negatively correlated with both GDP and FDI on the first lag, but the correlations become positive on the second lag of both variables.

International crisis has strong negative impact on FDI, which also has considerable negative impact on openness to trade, as export usually decreases due to falling world demand.

Further research should be directed to test the causal relationship between foreign investment and economic growth, using well known methods such as causality test. In this case, it is more complicated since our model has more than two variables so the causality between FDI and GDP may include the direct causality between them and the indirect causality by the presence of other variables in the model.

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