

# **THE INTERRELATIONSHIP AMONG FOREIGN DIRECT INVESTMENT, DOMESTIC INVESTMENT AND EXPORT IN VIETNAM: A CAUSALITY ANALYSIS**

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## **ABSTRACT**

This study aims to find dynamic interaction between domestic investment, foreign direct investment, export and exchange rate in Vietnam for the period 1985–2015. Augmented Dickey-Fuller (ADF) test is used to assess unit root in the concerned data series. Johansen cointegration approach is applied to examine the long run relationship and the Granger causality test is thus performed in the context of the vector error correction model. The empirical findings reveal that domestic investment growth and export growth directionally caused FDI inflows growth while the direction from FDI inflows towards investment growth and export growth is not identified in this study. Additionally, the significant unidirectional causal relationship is found between foreign direct investment growth and exchange rate movement. This study also explores that domestic investment bidirectionally causes export growth. Furthermore, the strong bidirectional linkage is found between exchange rates and domestic investment. However, this study could not provide any further evidence concerning causal relationships running from exchange rate depreciation to export growth and foreign direct investment growth in the case of Vietnam.

## 1. Introduction

Since the launch of “Doi Moi” reforms in 1986, the Vietnam economy has been transformed into one of the fast growing economies in the East Asia with a gross domestic product (GDP) of US\$204 billion and per capita GDP US\$2200 in 2015. To attain the economic development objectives, Vietnam has actively sought to utilize investment and foreign trade.

Investment has been identified as a fundamental variable determining economic growth. Therefore, in terms of foreign investment policy, Vietnam has promulgated the law of investment to boost FDI in the country in 1987. Then it had amended the Law of Foreign Investment 1987 many times to gradually eliminate obstacles for foreign investors, thereby attracting FDI inflows into Vietnam. Today, Vietnam has created a strong and competitive investment climate compared to other neighboring countries. The expected benefits are to boost the economic growth by generating opportunities for technology transfer, job creation, linkages with domestic enterprises and opportunities for diversification into more dynamic activities.

While FDI is a crucial source of external finance, the relationship between FDI and domestic investment is worth concerning. If it crowds out the domestic investment, it will squeeze out the growth of the domestic capital stock; otherwise, if it crowds in the domestic investment, it will help to expand the domestic investment. Furthermore, the increase in domestic investment is a signal of a sound and highly-turnover market for appealing foreign investors. (Ullah et al., 2014)

Currently, Vietnam has significantly integrated its economy into the global economy towards more open and trans-border economic cooperation. It has joined in regional and international institutions and organizations such as the AFTA, ASEAN, the ASEM, APEC, and the WTO. Major trade agreements have been recognized such as trade agreements with the US, Japan, China, ASEAN peers, and EU partners. In the widely global trend of integration, the more capital flows are moving which lead to easing capital constraints and growth acceleration in developing countries. Vietnam’s trade volume has steadily increased, which is seen to be accompanied by the rapid inflows of FDI (Anwar and Nguyen, 2011). Recently, Sothan (2015) explored the causal relationship between FDI and export for long-run growth in the 21 Asian countries being investigated over the period 1980 to 2013.

While the issue of impact of FDI inflows on the host country's growth has been taking increasingly attention among scholars concerning the case of Vietnam, contribution to the interrelationships between investment and trade in Vietnam is rather limited as compared to its importance. In particular, a little empirical works have considered the relationship between foreign direct investment and export in the case of Vietnam. Also, mostly up to date there are no published empirical studies that examines the role of domestic investment on export. Furthermore, recently, considerable number of researchers has highlighted the missing causal linkages between foreign investment and domestic investment in transition and developing economies such as Malaysia (Lean & Tan, 2011), Pakistan (Ullah et al., 2014), or based on a large cross-country sample (Lautier and Moreaub, 2012), thus encouraging more insights into such relationship in the case of Vietnam. In overall, this study will bridge this gap of literature by revealing the linkages between foreign direct investment, domestic investment and export in Vietnam, which is a unique phenomenon to study. Furthermore, since these three variables share the common determinants of macro economy - the nominal exchange rate, the dynamic linkages between these four factors should be examined. Presently, Vietnam follows a managed floating regimes based on averaging of the previous day’s interbank exchange rate with varying band width. One of the most important objectives of Vietnam exchange rate regimes is to promote international trade, as Vietnam economy is export-oriented economy.

This study attempts to extend the existing literature by investigating the relationship between FDI, domestic investment, export and trade in the case of Vietnam by applying the time-series methods to the annual dataset for the time span from 1985 to 2015. The time-series methods include unit-root tests, co-integration tests, vector autoregressive (VAR) models, vector error correction (VEC) models, and Granger causality tests.

The remainder of the paper is organized as follows. Literature review is presented in Section II. Methodology employed by this study is specified in Section III. Based on econometrics method, the empirical results are present in Section IV. Section V presents briefly the concluding remarks.

## **2. Literature Review**

Using a bivariate GARCH-M model based on dataset of Singapore exchange rate and export from 1979 till 2002, Fang and Miller (2004) shows that depreciation does not significantly enhance exports turnover, however, that exchange rate risk significantly hinder exports activity of Singapore firms. Similarly, Nyeadi et al. (2014) found out no impacts of exchange rate on the exports of goods and services in Ghana. However, for China, Liu et al. (2013) reveals that a 1% of RMB appreciation leads to a fall in total exports by 1.89%.

The depreciation of the host country currency is likely to reduce the cost of domestic labor relative to foreign production cost as well as increase the relative wealth of foreign investors, thus raising advantage of MNE over domestic firms (Moosa, 2002). This implies the corresponding growth of foreign direct investment inflows into the host countries. However, according to Caves (1989), the effects the local exchange appreciation on the FDI depend on the objective of the FDI. Regarding the host country currency appreciation, the FDI inflows become positive if the FDI objective is mainly to serve the local market, indeed, investment and trade is substitute. When the FDI objective is to export or to reduce cost, the relationship becomes negative. In Vietnam, by manifesting the bilateral exchange rate between Vietnam and 10 partner countries' currency, Pham and Nguyen (2013) explores that when VN currency depreciates with respect to the foreign currency, the corresponding increases are found in both foreign direct investment and export. Similarly, Liu (2010) found that depreciation of real exchange rate had a positive relationship with the FDI inflows into China based on data from 18 source countries during the period of 1989–2006. However, Lily et al. (2014) indicates that the real appreciation of Singapore dollar, Malaysian ringgit, and the Philippine peso has a positive impact on FDI inflows.

Furthermore, the exchange rate could also influence domestic investment through its effect on the cost of imported capital goods or by its effect on the competitive environment (Lafrance and Tessier, 2001). However, when it comes to the effects of exchange rate in domestic investment, number of research papers developed is still limited considering the importance of this area of research. Campa and Goldberg (1995) reveals that exchange rate appreciations reduced investment in durable goods sectors in the 1970s but stimulated investment after 1983 as US manufacturing sectors were primarily export-exposed in the 1970s and became predominantly import-exposed since the early 1980s. Lafrance and Schembri (2000) proposed that a depreciating real exchange rate can be detrimental to domestic productivity growth because it shelters domestic firms from foreign competition, thus reducing their incentive to make productivity-enhancing investments.

Several previous studies in developing countries including Liu (2010), Osinubi and Amaghionyeodiwe (2009), Baek and Okawa (2001) documented the directional causality running from FDI towards exchange rate. Lily et al. (2014) figured out that both Singapore and the Philippines show long-run bidirectional causality between FDI and exchange rate whereas such

insignificant long-run relationship was found in Thailand. Nguyen (2011) reveals that increased FDI leads to real appreciation of VND against the USD, however capital inflows excluding FDI causes the depreciation of exchange rate. These various effects of foreign direct investment inflows raise a question for effective policy instruments to neutralize the effects of capital inflows on the real effective exchange rate in Vietnam.

The presence of foreign firms in the country can affect the export domestic firms in upstream and downstream industries on export performance, which is so called export spillovers (Anwar and Nguyen, 2010). Hsiao and Hsiao (2006), based on the panel data causality results, argue that FDI has unidirectional effects exports for the group of 8 rapid developing east and Southeast Asia. By harnessing gravity model to disentangling the effects of FDI on variables of trade, Anwar and Nguyen (2011) explore that there is a complementary relationship between FDI and export in Vietnam except for the time of Asian financial crisis period based on a dataset involving Vietnam's 19 major trading partners for the period 1990-2007. Bhatt (2013) indicates that 1% increase in FDI inflows into Vietnam will lead to 0.25% increase in exports with one year time gap.

Concerning whether FDI and export causes each other, employing the annual dataset of 81 countries for the years 1982 - 1998, Aizenman and Noy (2006) found the two-way significant linkages between FDI and manufacturing trade. However, Beugelsdijk et al. (2008) analyzed that horizontal FDI and trade are largely substitutes based on the aggregated data of 44 host countries, thus an increase in trade couples with a decrease in investment.

The dynamic interaction between foreign direct investment and domestic investment is of paramount importance, thus taking increasingly concerns among economists recently. With regard to the developing areas, FDI inflows promote domestic investment with beneficiary effects, i.e., more advanced production technology, improved organizational and managerial skills, marketing know-how and market access. Consequently, their improvements in competition, technology, institutions, and in the speed of development in general, are expected to further encourage domestic entrepreneurship (Apergis et al., 2006). Furthermore, the rise of private investment means higher return from the domestic economy, while public investments put into infrastructure, thereby raising benefits for foreign investors (Ndikumana and S. Verick, 2008). Apergis et al. (2006) used panel integration and cointegration tests, for a dynamic heterogeneous panel of 30 countries to conclude that there is a significant two way dynamic relationship between FDI and domestic investment. According to Hoi and Wah (2010), FDI has positive impact on the domestic investment while there is also a causal relationship from domestic investment to FDI in the short-run for Malaysia economy during the period 1970-2009. However, implementing panel cointegration estimation technique, Eregha (2012) revealed that foreign direct investment inflow crowds out domestic investment in the ECOWAS region for the period 1970-2008.

### **3. Data and Methodology**

This study used the following variables to find out the interrelationships between the investment capital and key determinants of trade.

LNFDI = natural logarithm of foreign direct investment

LNINV = natural logarithm of domestic investment, by taking gross fixed capital formation (GFCF) minus FDI

LNEXC = natural logarithm of nominal exchange rate (VND per USD)

LNEXP = natural logarithm of export of products and services

The data set consists of annual time series data over a 31 year period from 1985 to 2015, which is derived from various reliable sources. Specifically, the data gross fixed capital formation is extracted from The United Nations Statistics Division (UNSD). However, the data of FDI, export and official exchange rate (yearly average VND per USD) are taken from the World Development Indicators (WDI).

As a norm, the unit-root test is primarily conducted to check for stationary and the order of integration of the four series variables LNFDI, LNINV, LNEXC and LNEXP in the 31 years span. According to Nelson and Plosser (1982), most economic and financial data are categorized as nonstationary and turn to be stationary in their first difference or higher. If the four series have one unit root and are co-integrated, then the bi-variate vector error correction model (VECM) is specified and estimated. The Granger causality test is then implemented in the dynamic system of VECM. If the four series have one unit root but are not co-integrated, then the bi-variate vector autoregressive model (VAR) is employed and estimated for both variables in their first difference. The Granger causality test is then conducted in the context of the VAR model.

### *3.1 Unit Root Test*

A stationary series has a constant mean, a constant variance and a constant auto covariance for each given lag. In case the series is nonstationary with  $n$  roots,  $n^{\text{th}}$  difference would be conducted until it becomes stationary. However, crucial risk involves losing the long-term relationship possibility when taking differences to make series stationary, implying that optimal series can be  $I(0)$  or for a suitable conditions it can be  $I(1)$  (Granger, 1969). Consequently, this study performs the Augmented Dickey-Fuller (ADF) (Dickey and Fuller, 1979) tests to investigate stationarity properties of each variable in order to avoid any spurious regression. Augmented Dickey-Fuller (ADF) test consists of running a regression of the first difference of the series against the series lagged once, lagged difference terms, and optionally, by employing a constant and a time trend.

### *3.2 Cointegration Test*

Furthermore, the time series has to be examined for co-integration. Co-integration analysis helps to identify long-run economic relationships between two or several variables and to avoid the risk of spurious regression. Co-integration analysis is crucial because if two non-stationary variables are cointegrated, a Vector Autoregression (VAR) model in the first difference is misspecified due to the effect of a common trend. If a cointegration relationship is identified, the model should include residuals from the vectors (lagged one period) in the dynamic Vector Error Correcting Mechanism (VECM) system. The cointegration test employed in this paper is the Johansen test developed by Johansen and Juselius (1990). There are two tests in the Johansen method, i.e., the trace test and the maximum eigenvalue test. If the test statistic is greater than the critical value, then the null hypothesis that there are  $r$  cointegrating vectors is rejected in favor of the alternative hypothesis that there are  $r+1$  cointegrating vectors for the trace test. The testing is performed in a sequence under the null hypothesis that  $r=0, 1, \dots, k-1$  if there are  $k$  variables under investigation. Johansen and Juselius (1990) indicated that the trace test might lack power relative to the maximum eigenvalue test. Based on the power of the test, the maximum eigenvalue test statistic is often preferred.

### *3.3 Vector Autoregressive Model*

The vector autoregressive model (VAR) is a system incorporating  $k$  variables in time  $t$  treated as dependent variables on the left hand side of each of the  $k$  equations and all variables in

time  $t-1$ ,  $t-2$ , ...,  $t-m$  treated as independent variables on the right hand side. There is no need to make distinction between endogenous and exogenous variables because all are treated as endogenous. It is noted that all variables in the VAR model should be stationary series. Each equation of the VAR model can be estimated using the OLS method since all the variables on the right hand side are lagged and thus can be treated as exogenous.

### *3.4 Vector Error Correction Model*

When the nonstationary variables under investigation are found to be cointegrated, the vector error correction (VEC) model will be performed for them with the error correction term included in the VAR model. The dynamics of the VEC model's specification enable to force the long-run behavior of the endogenous variables to converge to their cointegrating relationships, while accommodating short-run dynamics. It is suggested deleting the insignificant variables until a regression with all its coefficients statistically significant will be obtained. The error term in the VEC model is used to correct a deviation from equilibrium toward long-term equilibrium. The VEC model is a system incorporating  $k$  variables in time  $t$  treated as dependent variables on the left hand side of each of the  $k$  equations and all variables in time  $t-1$ ,  $t-2$ , ...,  $t-m$  as well as the error term in  $t-1$  treated as independent variables on the right hand side. Each equation of the VEC model can be estimated using the OLS method. The VAR model and the VEC model are employed in this paper to conduct the Granger causality test for

### *3.5 Granger Causality Test*

The Granger causality test will be performed on the four series in the context of the VAR model or the VEC model. Engle and Granger (1987) argue that, if cointegration exists between two variables in the long run, there must be either unidirectional or bi-directional Granger causality between these two variables. Engle and Granger also argue that the cointegrated variables must have an error correction model representation.

As mentioned above, if the four series data have one unit root and are cointegrated, then the bi-variate vector error correction model (VECM) is specified and estimated. Granger causality test is then conducted in the context of the VEC model. If two series have one unit root and are not co-integrated, then the bi-variate vector autoregressive model (VAR) is specified and estimated. Granger causality test is then conducted in the context of the VAR model.

## **4. Empirical Results**

Table 1 exhibits the estimates of the Augmented Dickey – Fuller (ADF) test in levels and in first differences of the data with an intercept, with an intercept and trend and with no intercept or trend. The tests have been performed on the basis of 5 percent significance level, using the McKinnon Critical Values. Initially, ADF test with an intercept implies that all variables are not stationary at levels even at 10 percent level of significance. Similarly, the test with an intercept and trend at levels presents no significance at any accepted significance level. On the other hand, at 1<sup>st</sup> differences all variables are integrated of order one. ADF test with no intercept or trend reports that at levels none of the examined variables have a unit root. Collectively, at 1<sup>st</sup> differences, all four variables are stationary at 1 percent. The first difference denotes percentage changes in or growth of that variable. Therefore, DLNFDI denotes real FDI growth, DLNINV domestic investment growth, DLNEXC exchange rate movement (appreciation or depreciation) of VND against USD, DLNEXP export growth. Thus, robust results indicate that all variables are integrated of order one i.e.  $I(1)$  for the case of Vietnam.

**Table 1 Augmented Dicky-Fuller Unit Root Test for Vietnam**

Variables	Test with Intercept		Test with Intercept and Trend		Test with no Intercept and Trend	
	Levels	1 <sup>st</sup> differences	Levels	1 <sup>st</sup> differences	Levels	1 <sup>st</sup> differences
LNEXP	0.139	0.185***	0.101	0.001***	0.006	-0.258***
LNFDI	0.012	0.404***	0.013	-0.065***	0.015	-0.843***
LNEXC	0.647	0.045***	0.010	-0.001***	-0.002	-0.422***
LNINV	2.347	0.112***	0.070	-0.004***	-0.172	-0.134***

Notes: \*, \*\*, \*\*\* denote significance at 10%, 5% and 1% respectively

As the series are all integrated of order one, the Johansen test is conducted to examine whether the eight variables are co-integrated or whether they have the long-run equilibrium relationship. Table 2 provides the results from the application of Johansen cointegration test among the data set. Empirical findings show that both the maximum eigenvalue and the trace tests reject the null hypothesis of no cointegration at the 5 percent significance level according to critical value estimates. The null of at most 3 co-integrating equations is not rejected for the trace test because the trace statistic is found to be 2.5932 somewhat below the 5% critical value 3.8414. The maximum eigenvalue test provides the same result in the sense that the null of at most 3 co-integrating is not rejected based on the test statistic 2.5932 well below the 5% critical value 3.8414. It is concluded that there exist three co-integrating equations among the FDI growth, domestic investment growth,

**Table 2: Johansen Co-integration Test results**

Null Hypotheses	Trace statistic	5% Critical Value	Maximum Eigen value statistic	5% Critical Value
$r^* = 0$	215.0957	47.85613	119.5405	27.58434
$r \leq 1$	95.55516	29.79707	64.99276	21.13162
$r \leq 2$	30.56240	15.49471	27.96915	14.26460
$r \leq 3$	2.593251	3.841466	2.593251	3.841466

Table 3 documented the causality tests as performed using the VECM approach. Evidence from the Granger causality test shows that domestic investment growth and export growth directionally caused FDI inflows growth. Regarding the interrelationship between FDI and EXC, we are obliged to reject the null hypothesis of no granger causality since there is a significant unidirectional causal relationship between foreign direct investment growth and exchange rate movement running from FDI to EXC. Domestic investment is found to bidirectionally cause export growth. Furthermore, the strong bidirectional linkage is found between exchange rates and domestic investment. However, this survey could not document any further causal relationships running from exchange rate depreciation to export growth and foreign direct investment growth in the case of Vietnam.

**Table 3 Results from the Granger Causality Test**

Chi-square Statistic	Degree of Freedom	Probability
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<b>Panel A DLNINV Granger caused by</b>			
LNEXP	7.960	1	0.046
LNEXC	68.418	1	0.000
<b>Panel B DLNEXP Granger caused by</b>			
LNINV	10.307	1	0.016
<b>Panel C DLNEXC Granger caused by</b>			
LNINV	42.577	1	0.000
LNFDI	17.172	1	0.000
<b>Panel D LNFDI Granger caused by</b>			
LNINV	30.128	1	0.000
LNEXP	7.414	1	0.0598

Notes: Those significant at the 1%, 5%, and 10% levels are reported.

## 5. Conclusion

This paper has investigated the possible linkages among exchange rate, FDI flows into Vietnam, domestic investment and Vietnam exports, using yearly data for the period 1985 - 2015 by time series methods. It is found from the unit root test that all the series are nonstationary with one unit root test, therefore, the Johansen cointegration test is then performed on the four series. Our finding provides evidence of a number of statistically significant linkages in the long run in the case of Vietnam.

First, Vietnam export growth is revealed to contribute to the growth of FDI inflows into Vietnam. This conclusion is consistent with Pham and Nguyen (2013), thus proving the fact that export-oriented policy of Vietnam has been attractive to foreign investors. However, this study could not explore the spillover effects of FDI inflows on the growth of Vietnam export.

Second, domestic investment growth is found to bi-directionally cause export growth of Vietnam. Domestic investors including both government and private entrepreneurs are major partners to enhance Vietnam export growth over the years from 1985-2015. The export development in the period also appeals government and private sector to invest for deriving export turnovers.

Third, this study has recognized the role of domestic investment growth in promoting FDI growth into Vietnam. This implies that domestic investment in Vietnam is a strong catalyst for foreign investors to put capital into Vietnam. According to UNCTAD (2013), the contribution from FDI tends to be greater in countries where the domestic sector is dynamic and well developed. Nevertheless, the causal linkages running from FDI growth towards domestic investment growth could not be found in this study. As a result, policies towards FDI should be designed not only to raise growth, create jobs, build productive capacity but also foster a dynamic and vibrant domestic private sector.

Further, FDI inflows growth into Vietnam is associated with nominal depreciation of the VND. As Vietnam has adopted the managed floating exchange rate regimes to support the export-oriented economy, these findings indicated that State-bank of Vietnam has made efforts to stabilize the real appreciation of VND against USD which is resulted from massive inflows of FDI into Vietnam. The optimal mix of exchange rate flexibility and stability should be maintained in such modern context of profound integration.

Finally, this study reveals the bi-directional linkages between exchange rate movement and domestic investment. Exchange rate appreciation (depreciation of VND) could result in higher cost of imported materials, facilities, thereby affecting adversely the domestic investment growth. Also, the domestic investment growth may cause a change in demand for money in the market, leading to the movement of exchange rate.

However, this study is subject to small sample with annual dataset of gross fixed capital formation, foreign direct investment, export income and official exchange rate in 31 years only. Future studies that manifest the sector data of FDI and export as well as real exchange rate data will provide better insights into the relationship between these four variables. Despite these restrictions, the empirical results obtained from this study could be significant to policy recommendations. Policy makers should rethink the investment policy approach to strengthen the linkages between domestic investment and foreign direct investment. The more balanced and strategic perspective on how FDI can fit into the development context of Vietnam should be adopted to stimulate domestic investment, promoting productivity of local enterprises, and thereby improving export performance of Vietnam. Furthermore, domestic enterprises create signals to attract foreign direct investment in Vietnam, which will arouse policy makers to promote the development of dynamic enterprises that can fulfill the requirements of highly competitive domestic and international markets. Such a good image about the state of the economy will be the most crucial determinants to gain foreign direct investment flows into Vietnam. Finally, the results implies that although Vietnam gain success in enhancing the efficiency of exchange rate regimes, policy makers must continuously adapt its goals to changing economic circumstances and priorities.

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