The Inter-linkage among FDI, Export and Economic Growth in Vietnam: A Causality Analysis

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Abstract
The aim of this paper is to investigate the linkage among export, foreign direct investment and economic growth in Vietnam. By using Granger causality method based on VECM model to analyze data over the period 1990-2015, this study estimates the causal relationship among FDI, export and Vietnamese economic growth in short run and long run. The unit root test and Johansen test are also applied to verify the stationary of variables and co-integration among three time-series. The findings indicate that both FDI and export Granger cause Vietnamese economic growth and have positive effects on Vietnamese economic growth in long run. Besides, the short-run influences of FDI on Vietnamese economic growth and export are also demonstrated in this research.
Keywords: Export; FDI; Granger Causality; VECM model; Vietnamese Economic Growth

1. Introduction
In 1986, Vietnam implied the national economic reform policy, called "DOI MOI", to transit from centrally-planned economy to socialist-oriented market economy, develop a multi-sector economy in which the private sector plays an increasingly important role as well as proactively gear up economic integration in the region and over the world in accordance with practical conditions of Vietnam. After more than twenty years since the Party Congress in 1986, the renovation of Vietnam has made great achievements. The country has maintained a high growth rate for several years. Vietnam's per capita GDP growth rate has been among the fastest in the world, with an average growth rate of 5.5 percent per year from 1990, and 6.4 percent per year in the 2000s. After successfully overcoming difficulties in finance and real estate sectors, Vietnam's economy recovered and continued to strengthen in 2015, with estimated GDP growth rate of 6.7 percent for the whole year. The growth rate downed to 6.2% in 2016 and forecasts remaining at 6.3% in 2017(ADB, 2016).

Figure 1. GDP Growth in Vietnam Comparing with Other Regions

Source: The Database of World Bank, compiled by the authors in February 2017

The credit goes to the positive, proactive international economic integration policies, economic ties between Vietnam and foreign countries and international organizations have been increasingly expanding. Since the renovation, foreign trade turnover of Vietnam has increased by 20 % per year. Export volume surged from about half a billion dollars a year before 1986 to 48.4 billion US dollars in 2007 and 62.7 billion US dollars in 2008. The export structure of goods has also shifted to processed and manufacturing sectors instead of raw materials in pre-renovation period.
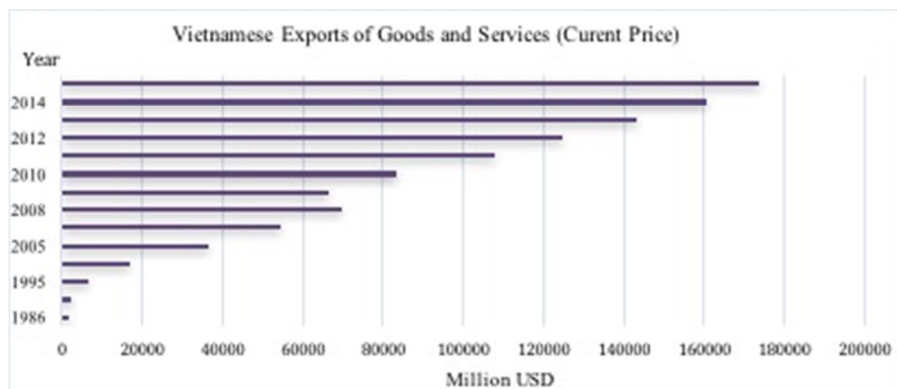
Figure 2. Export volume in Vietnam from 1986-2015
Source: World Bank Database, compiled by the authors in February 2017

Together with the openness to global market, Vietnam also applied new and liberal foreign investment law in order to attract more foreign investment. Since first promulgating a foreign investment law in 1987, Vietnam has successfully attracted FDI into this developing, transitional economy. Indeed, FDI has played an important role in the economic transition, business liberalization and macro-economic growth of Vietnam over the last decade.
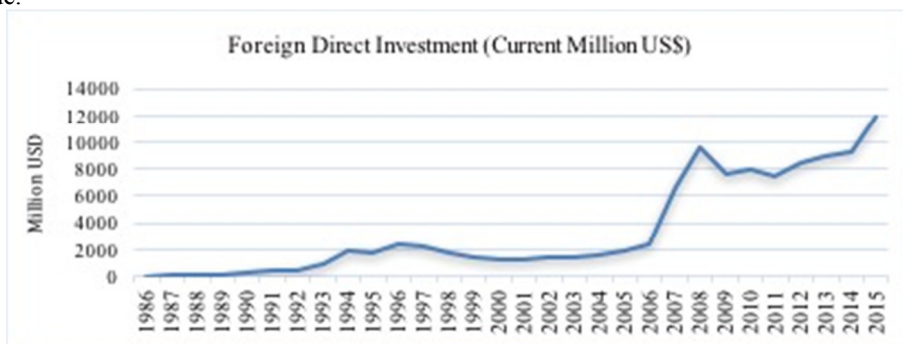

Figure 3: Foreign direct investment in Vietnam from 1986-2015
Source: World Bank Database, compiled by the authors in February 2017

The evolution of FDI, export and economic growth in Vietnam has arisen the concern about the relationship between these three factors as well as their mutual effects in the host country. This study aims to answer the question: "What is the relationship between FDI, export and Vietnamese economic growth in both short term and long term". The research expects to present a comprehensive and up-to-date reference with an empirical analysis about foreign direct investment in Vietnam.

2. Literature Review
2.1 Conceptual Issues
FDI or Foreign direct investment is defined by OCED as follow: "Direct investment is a category of cross-border investment made by a resident in one economy with the objective of establishing a lasting interest by owning at least 10% of the voting power in an enterprise that is resident in an economy other than that of the direct investor. "(OECD, 2008) The United Nations conference on Trade and Development (UNTAD) introduced another definition of FDI according to the IMF (Balance of Payments Manual: Fifth Edition, Washington, D.C., International Monetary Fund, 1993) "FDI refers to an investment made to acquire lasting interest in enterprises operating outside of the economy of the investor." (IMF, 1993)

There are three terms the direct investor, the direct investment enterprise and the lasting interest are mentioned in both definitions of FDI. The first concept, the direct investor is a legal person whose residence is outside of the economy that he invests in. Then, the direct investment enterprise means the is referred to the unincorporated or incorporated enterprise, in which direct investment is made. A direct investment enterprise is either a subsidiary (a controlled enterprise if it is more than 50% owned by its immediate direct investor), an associate (an influenced enterprise if it is owned between 10 and 50% by its immediate direct investor) or a branch (a quasi-corporation). And the lasting interest, in cases of FDI, implies that the investor´s purpose is to gain an effective voice in the management of the enterprise. Some degree of equity ownership is almost always considered to be associated with an effective voice in the management of an enterprise; both OCED and IMF suggest a threshold of 10 per cent of equity ownership to qualify an investor as a foreign direct investor. If the 10% voting power criterion is not met where there is either no equity ownership in one another or it is insufficient for

direct investment to exist) but are directly or indirectly influenced in the ownership hierarchy by the same enterprise (which must be a direct investor in at least one of them) are fellow enterprises (OECD, 2008).

Gross domestic product (GDP) at market prices is defined by OECD as "the expenditure on final goods and services minus imports: final consumption expenditures, gross capital formation, and exports less imports"(OECD). The term "Gross" means totals of products value without the depreciation of machinery, buildings and other capital products used in producing output. "Domestic" implies that the production is made inside the border of a country. The final goods and services, that is, those that are purchased, imputed or otherwise, as: final consumption of households, non-profit institutions serving households and government; fixed assets; and exports (minus imports). The measurement of GDP differs from nominal GDP and real GDP. Nominal GDP is GDP given in current prices, without adjustment for inflation. Real GDP is GDP given in constant prices and refers to the volume level of GDP. Constant price estimates of GDP are obtained by expressing values of all goods and services produced in a given year, expressed in terms of a base period. Real GDP eliminates inflation effect and can better reflect the growth of one country over period of time. The growth rate of real GDP is often used as an indicator of the general health of the economy. In broad terms, an increase in real GDP is interpreted as a sign that the economy is doing well (Callen, 2012).

2.2 Theoretical Review on FDI
The theories of FDI was first introduced in 60s of the 20th century. In 1960, Hymer proposed Monopolistic Advantage Theory in his dissertation "The International Operations of National Firms: A Study of Foreign Direct Investment"(Hymer, 1960). He tried to answer three fundamental questions: (a) why do firms go abroad? (b) How are they able to survive in foreign markets in which they bear initial costs (i.e. communication, misunderstanding) vis-à-vis native firms? (c) Why do they want to retain control and ownership? (Hymer et al., 1979). Basically, he found two kinds of incentives; "monopolistic or oligopolistic advantages" the home country firms enjoyed over host country firms and "removal of competition" between the firms in different countries. He noted, "international firms do not operate under conditions of perfect competition" (Hymer et al., 1979). He claimed that a direct foreign investor owns some kind of proprietary or monopolistic advantage that local firms don't have. These advantages include economies of scale, superior technology, or superior knowledge in marketing, management, or finance. The firm "internalizes or supersedes" these market failures through direct investment (Hymer, 1960). C.P.Kindleberger, the supervisor for Hymer's theses, by extending the work of Hymer, put forward his theory of FDI on the basis of monopolistic power, argued that "in a world of perfect competition in goods and markets, FDI cannot exist"(Kindleberger, 1969).

Buckley and Casson provided another explanation of FDI by putting emphasis on intermediate inputs and technology in the theory of internationalization. They argued that because of market imperfections in intermediate products, firms would create an internal market (internalize external market) in order to increase profits and avoid certain costs (P.J.Buckley and Casson, 1976). This theory differed from Hymer's theory with the unnecessary of monopolistic or oligopolistic power at the beginning, though it is acknowledged later that monopolistic or oligopolistic advantages could also be internalized (Teece, 1981) or internalization of intermediate products could lead to monopolistic or oligopolistic advantages (Casson, 1987). They articulated their theory based on three postulates: (a) Firms maximize profits in a market that is imperfect; (b) When markets in intermediate products are imperfect, there is an incentive to bypass them by creating internal markets. (c) Internalization of markets across the national borders leads to MNCs. In original theory, (P.J.Buckley and Casson, 1976) claimed four factors cause internalization decision "(1) industry specific factors relating to the nature of the product and the structure of the external market, (2) region specific factors relating to the geographical and social characteristics of the region linked by the market, (3) nation specific factors relating to the political and fiscal relations between the nations concerned, (d) firm specific factors which reflect the ability of the management to organize an internal market"(Buckley and Casson, 1976). Later on, other writers such as (Teece, 1981), (Hennart, 1982), (Casson, 1985) brought the conception called "transaction cost" or "natural market imperfections" to prominence for the decision to internalize markets. The logic of transaction cost is that if firms bear lower costs or higher revenues, then they will internalize markets across national borders. Dunning and Rugman argue, "If an exogenous market imperfection leads MNEs to organize an internal market or to replace more expensive modes of transactions, then the process of internalization improves efficiency. No rents would be expected for the MNEs"(Dunning and Rugman, 1985). The internalization (transaction) theory retains that "(1) firms choose the least cost location for each activity they perform, and (2) firms grow by internalizing markets up to the point where the benefits of further internalization are outweighed by the costs" (Buckley, 1988).

The product cycle theory refers to whole process from launching new products, massive producing, selling until exiting market. Vernon distinguished three different stages in the life of a product; "the new product", "the maturing product" and "the standardized product". He claimed that technological innovations (development and production of new products) in consumer and industrial goods could explain foreign

investments of firms. He presumes that "(a) products undergo predictable changes in production and marketing, (b) restricted information is available on technology, (c) production process changes overtime and economies of scale prevalent, (d) tastes differ according to income and products can be standardized at various income level". The first stage takes place in large markets with high income per capita and in industries with high labor cost. After receiving feedback from the market and product is modified accordingly, the new product emerges. At the second stage "a certain degree of standardization" comes into existence because of the rising in demand and "the commitment to achieve economies of scale" (Vernon, 1966). Meanwhile, elasticity of product price is strengthened, competitors start to imitate those new products, and the market competition is increasingly intense. This stage is crucial for the firms whether to invest in other advanced countries or to continue to export, after careful evaluation about cost of production, protected patent position, threats of new competition in the country of import, the level of tariff protection and the political situation. At the last stage of product life, product is standardized, firm's technology monopolistic advantage disables, and the cost and price of product gain the most attention and importance. Hence, the less developed countries are considered to provide competitive advantages especially in terms of labor cost.

A few shortcomings of product cycle theory are expressed. Rugman et al (1985)(Dunning and Rugman, 1985) argued that it did not consider various comparative advantages of different countries at the initial stage of production. As a point in case, it is shown that resource oriented MNEs do not fit in this theory (Hood and Young, 1979), or products are developed not only for a particular market but also for different markets continuously (P.J.Buckley and Casson, 1976).

Dunning combined different theories and developed an eclectic paradigm or so called "OLI (Ownership, Location, Internalization) paradigm. He argued "the eclectic (paradigm) is less an alternative theory of international production than one which pinpoints the essential and common characteristics of each of the mainstream explanations"(Vernon, 1966). That is why he renamed it 'paradigm' instead of the original 'theory'. In his path breaking work, Dunning amalgamated the major imperfect market-based theories discussed above – the oligopolistic and internalization theories – and added a third dimension location theory to explain why a firm opens a foreign subsidiary. OLI can be explained as (1) It should have ownership advantages vis-à-vis other firms (O); 2) It is beneficial to internalize these advantages rather than to use the market to transfer them to foreign firms (I); (3) There are some location advantages in using a firm's ownership advantages in a foreign locale (L)(Dunning, 1979).

Dunning claimed that multinational firms they must possess certain advantages specific to the nature and/or nationality of their ownership to compete with domestic firms in the host country. The first term ownership advantage was defined "any kind of income generating assets which make it possible for firms to engage in foreign production"(Dunning, 1979). He also noted that the firm's ownership advantages are different due to the "characteristics of the firms, the products they produce and the markets in which they operate" (Dunning, 1988). Regarding the location advantages, Dunning indicated that firms will be "involved in foreign production whenever they perceive it is in their best interests to combine spatially transferable intermediate products produced in the home country, with at least some immobile factor endowments or other intermediate products in another country" (Dunning, 1988). The third advantage, internalization, is related to the advantages of controlling, coordinating ownership and location specific advantages within the MNEs rather than selling the right to use those advantages to domestic firms in the host country. The benefits of internalization make it more profitable to bring into effect transactions within the firm than to depend on external markets. By combining several complementary theories, and identify a set of factors that influence the activities of MNCs. For this reason, his theory gained wider acceptance than other theories. But Dunning's eclectic paradigm is only based on developed countries' condition, and couldn't explain why firms in developing countries, which don't possess those advantages, still invest their money to international market.

2.3 Related Empirical Review

Foreign direct investment (FDI) is considered a key driver of international economic integration. With the right policy framework, FDI can provide financial stability, promote economic development and enhance the well-being of societies (OECD, 2008). The relationship between FDI and economic growth in the host country has been discussed widely in last decade. From the optimistic view of researchers and policymakers, FDI plays an important role in boosting up host country's economy through different channels. External investments increase the capital stock, create more job vacancies then reduce unemployment; stimulate technological change through the adoption of foreign technology and know-how and technological spillovers. FDI is also expected to improve human resource in the host country through labor training, skill acquisition and diffusion since many foreign investors focus on capital-intensive industries, which require skilled labor. FDI indirectly accelerate the consummation of local enterprises; strengthen their competitiveness to compete with FDI-enterprises. The survey about FDI in East Asia and Latin American countries addressed that FDI helps to boost host economic growth in 11 example counties, the impact of FDI tends to be greater in East Asia than Latin America (Zhang,

2001). Hansen and Rand (2006) analyze the causal relationship between these variables in a sample of 31 developing countries covering three continents, indicated a strong causal link from FDI to GDP in the long run irrespectively of the development level of the selected countries. Shaikh (2010) find bidirectional causality between foreign direct investment, export and economic growth, address that foreign direct investment, export are two important factors that boost up Pakistani economic growth. There is also long run relationship between FDI, GDP and trade verified in the research of Belloumi (2014) about relationship between trade, FDI and economic growth in Tunisia.

In Vietnam, some researchers apply the bivariate analysis to investigate the impact of FDI on economic growth; the result is found significant in many studies. Bang (2008) applied time-varying coefficients in an augmented production function and use labor productivity as an indirect factor of FDI to analyze impact on Vietnamese economic growth. He found that FDI has significant and positive effect on labor productivity and economic growth in Vietnam, but its effect is unequally distributed among economic sectors. Chien (2012) analyzed the linkages between FDI and GDP on provincial level in Vietnam, pointed out that FDI and GDP in the North Central region and South Central Coast of Vietnam have close positive relationship with each other.

However, radical economists gave pessimist view about the effect of FDI on host country's economy, emphasized that poor absorptive capacity, crowding out effect on domestic investment, external vulnerability and dependence, a possible deterioration of the balance of payments as profits are repatriated and negative, destructive competition of foreign affiliates with domestic firms and "market-stealing effect". Therefore, FDI is also found non-significant effect on economic growth in some practical studies. For example, Kersan-Skabic and Zubin (2009) examined the influence of FDI on the growth of GDP, unemployment and export in Croatia, concluded that FDI inflow does not have effect on the GDP growth and export, because the share of greenfield investments is low.

In other hand, foreign direct investment is believed to accelerate export in the host country. It is easy to be understood in term of resource-seeking FDI, which resource seeking investors invest in foreign countries, mostly developing countries where the natural resources are abundant and labor is cheap to minimize the cost of products. Investments surge into labor-intensive industry such as textile and processing and assembling, hence, the finial products are exported to home country or third markets. In term of market-seeking investment, the investors not only value the host country's market but also want to get the opportunity to jump into other markets that already have trading link with the host country. For example, the Chinese enterprise can enjoy lower trading barrier when export their products to ASEAN countries than export directly from China thank to the free trade agreement among ASEAN's countries. Hsiao and Hsiao (2006) examined the Granger causality relations between GDP, exports, and FDI among the eight rapidly developing East and Southeast Asian economies, summarized that the growth of GDP and inward FDI promote exports in eight Asian countries. Besides, FDI inflows and export join together to bring up GDP growth. Goswami and Saikia (2012) found bi-directional causality between FDI and export in India. The long-run equilibrium relationship between the FDI and export in Turkey is also revealed in the research of Temiza and Gökmena (2011). Xuan and Xing (2008) examined the impact of 23 countries' FDI on Vietnamese exports with gravity equations and claimed that FDI is a major factor driving the rapid export growth in Vietnam.

Regarding the effect of FDI on export and economic growth, many model were applied to find the linkage among variables. Zhiyuan Liu et al adopted a pendulum gravity model to analyze relationship between outward FDI and export. Panagiotis Pegkas used OSL method to reveal the positive long-run co-integrating relationship between FDI stock and economic growth in Eurozone countries. Okon J.Umoh et all applied three stage least squares to investigate the relationship between foreign direct investment and economic growth in Nigeria, revealed a bi-directional relationship between FDI and economic growth. However, the results only indicate a bi-variate relationship in long run, the short run effect of FDI on economic growth hasn't been included. Moreover, it is hard to solve the problem for more than two variables with above methods. In this case, Granger causality analysis is found to be more efficient. For example, the multi causality between financial, investment and economic growth in Tunisia is revealed in Helmi Hamdi's empirical research by using Granger analysis. Another paper use causality analysis to examine the linkage between energy consumption and GDP, found a long-run bi-directional relationship between two variables and a short-run unidirectional causality from energy to GDP.

On overall, most of the previous researches support that FDI is expected to bring in positive gain to the host countries economy, especially developing countries such as Vietnam. The previous studies have demonstrated the linkage between FDI and GDP in both direct and indirect perspectives. However, they are still limited in the bivariate analysis, the mutual relation between FDI and export hasn't been included in as well as the data is out of date. There were also notable finding recently, but they laid emphasis on provincial level. In this study, we continue to investigate the linkages between FDI and Vietnamese economic growth on national level using the newest data panel from 1990 to 2014. The empirical analysis is expanded to tri-variate VECM model to make a broader view about foreign investment, foreign trade and domestic production in Vietnam.

3. Research Methodology

3.1 Estimation Technique and Procedure

This study aims to examine the relationship between FDI, export and economic growth in Vietnam. In this paper, Granger causality test model is adopted to estimate causal linkages between three time series. The basic principle of Granger-causality analysis (C.W.J.Granger, 1986) is to test whether or not lagged values of one variable helping to improve the explanation of another variable from its own past. Considering two time series stationary, variables X_t and Y_t, according to Granger, a time series X_t is said to Granger-cause Y_t if it can be shown, usually through a series of t-tests and F-tests on lagged values of X_t (and with lagged values of Y also included), that those X_t values provide statistically significant information about future values of Y_t.

To perform Granger model, the precondition is that time series must be stable. In order to test the stationary of time series, the ADF unit root test (Maddala and Wu, 1999) is used in this case. The ADF test includes the extra lagged terms of the dependent variables in order to eliminate autocorrelation (Sridharan, 2009). In this study, the minimum values of the Akaike Information Criterion (AIC) and Schwartz Criterion (SC) have provided the number of relative time lags. The ADF test expresses the three following regression equations:

$$\Delta X_t = \delta X_{t-1} + \sum_i^k \gamma_i \Delta X_{t-i} + \varepsilon_t \qquad (1)$$

$$\Delta X_t = \alpha + \delta X_{t-1} + \sum_i^k \gamma_i \Delta X_{t-i} + \varepsilon_t \qquad (2)$$

$$\Delta X_t = \alpha + \beta t + \delta X_{t-1} + \sum_i^k \gamma_i \Delta X_{t-i} + \varepsilon_t \qquad (3)$$

Here, ΔX_{t-i} shows the 1st difference with k lags. On the other hand, ε_t adjusts the error of autocorrelation. It requires to estimate γ_i and the coefficients α, β and δ. The test starts from equation (1), then (2) and (3) and to be continued until the result rejects null hypotheses. The null and alternative hypotheses for the existence of unit root in variable X_t are as follows: $H_{0:} \delta = 0$; $H_{0:} \delta < 0$

If the result of unit root test reject null hypothesis, it indicates the existence of unit root of time series. In this case we can't not directly apply Granger test for time series at the level. The co-integration test has to be implemented to recognize whether there is the long run relationship between variables or not. In case of multivariate co-integration test, Johansen model (Johansen, 1988) is suggested. The model builds on a Vector Auto-regression("Vector autoregression,")("Vector autoregression,")(VAR)(Hamilton, 1994), and then by using the difference operator, the VAR in levels in equation (4) can be transformed to a vector error correction model (VECM)(Engle et al., 1978) (Stock and Watson, 2001):

$$\Delta Y_t = \sum_{i=1}^{t-1} \Gamma_i \Delta Y_{t-i} + \alpha \beta' Y_{t-i} + \mu_0 + \varepsilon_t \qquad (4)$$

Where: $\Delta Y_t = Y_t - Y_{t-1}$, μ_0 is an unrestricted constant term, ε_t is residual term, α, β are pxk matrix, where β_i represents the ith co-integration vector, and α_j represents the effect of each co-integrating vector on the $\Delta y_{p,t}$ variables in the model. $\beta' Y_{t-i}$ is called vector error correction term (VECT).

Johansen approach is highly sensitive to the number of lags in the VAR model (Bahmani-Oskooee and Brooksa, 2003). In order to implement the Johansen test, it is necessary to determine a sufficient number of lags. The optimum lags of the Johansen test are decided on the basic of AIC and SC criteria, which used in the first different variables. If the lag length in VAR model is p, then lag length in Johansen test is p-1. Originally, Johansen derived two tests, maximum eigenvalue test and the trace test. The tests perform by starting from the hypothesis of zero co-integrating vectors. Thus $H_{0,1}$:0 co-integrating vectors is tested against the alternative $H_{a,1}$: at least one co-integrating vector. If $H_{0,1}$ is rejected the next test is $H_{0,1}$:1 co-integrating vector against $H_{a,2}$: at least two co-integrating vectors. This process continues until the test cannot reject null hypothesis $H_{0,r}$ and implies that there are r co-integrating vectors among tested variables.

The existence of co-integration demonstrates that there is long-term dependence between those variables. However, co-integration doesn't indicate the direction of the causal relationship and it is leaving aside the possibility of the short-term fluctuations between examined variables. Because the long-run information is removed in the first differencing so VAR model is unspecified in the presence of co-integration (Granger et al., 1978). While VECM can distinguish between a long- and a short-term relationship among the variables and can identify sources of causation that cannot be detected by the usual Granger causality test (Oh and Lee, 2004). Then VECM is adequate tool to analyze short-term deviations, necessary to achieve long- term balance between the two variables (Cipra and Tlusty, 2008). So we go a further step to test the causality between variables based on the VECM, it is sometimes called "short-run Granger causality". We can test for the absence of Granger causality by estimating the following VECM model:

$$\Delta Y_t = \sum_{i=1}^{k-1} \Gamma_i \Delta Y_{t-i} + \alpha VECT_{t-i} + \mu_0 + \varepsilon_t \qquad (5)$$

Firstly, each row vector of coefficient matrix Γ_i of the independent variable indicates that dependent variables are responding to the short-term shocks to the stochastic environment. If the estimated coefficients on lagged values of dependent variable are statistically significant, then it implies that there is Granger-causality in the short-run. Secondly, the significance of the speed of each dependent variable's adjustment α_i, which is the coefficient of the error-correction term, indicates long run causality. The significance of α_i indicates that the long-run equilibrium relationship is directly driving the dependent variable. If, for example, α_i is zero, then it

implies that the change in dependent variable i does not respond to deviation in the long-run equilibrium for the $t-1$ period.

3.2 Data Source and Model Specification

The research analysis uses the data set of foreign direct investment (FDI); export volume (EXP) and gross domestic products (GDP) of Vietnam from 1990 to 2015. GDP and export value is expressed in constant 2010 price. FDI value is transferred to real value by dividing to GDP deflator. Data is obtained from World Bank official website and in US dollar. Eviews version 6.0 is used to conduct the analysis. To reduce the effect of outliers, we take logarithms of time series, denotes by LGDP, LEXP and LFDI, and the VAR functional form is described as follow:

$$\begin{pmatrix} LGDP_t \\ LFDI_t \\ LEXP_t \end{pmatrix} = \begin{pmatrix} c_1 \\ c_2 \\ c_3 \end{pmatrix} + \phi_1 \begin{pmatrix} LGDP_{t-1} \\ LFDI_{t-1} \\ LEXP_{t-1} \end{pmatrix} + \cdots + \phi_p \begin{pmatrix} LGDP_{t-p} \\ LFDI_{t-p} \\ LEXP_{t-p} \end{pmatrix} + \begin{pmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \\ \varepsilon_{3t} \end{pmatrix} \quad (6)$$

Where, t = 1, 2…T. T is sample size; p is the lag order of model, c is vector of constants (intercepts); ϕ_i is coefficient matrices and ε_t is unobservable zero mean white noise vector process (serially uncorrelated or independent) with time invariant covariance matrix Σ.

Denotes $Y_t = \begin{pmatrix} Y_{1t} \\ Y_{2t} \\ Y_{3t} \end{pmatrix} = \begin{pmatrix} LGDP_t \\ LFDI_t \\ LEXP_t \end{pmatrix}$; $C = \begin{pmatrix} c_1 \\ c_2 \\ c_3 \end{pmatrix}$; $\varepsilon_t = \begin{pmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \\ \varepsilon_{3t} \end{pmatrix}$ then the equation is re-written:

$$Y_t = C + \emptyset_1 Y_{t-1} + \cdots + \emptyset_p Y_{t-p} + \varepsilon_t \quad (7)$$

4. Data Analysis and the Empirical Findings

4.1 Unit Root Test Results

The distribution of LFDI, LEXP and LGDP is presented in Figure 4, 5, 6. It shows the existence of random walking and time tendency of three variables, implies that variables are not stable at original level. Then it is needed to test the stationary of variables.
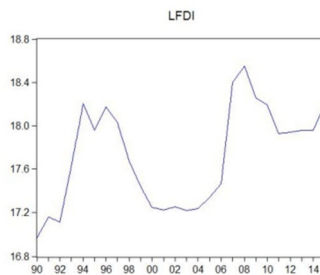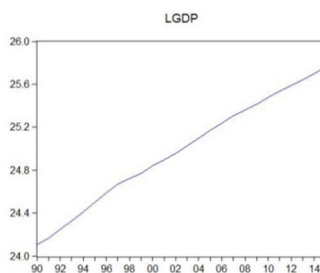

Figure 4: The distribution of LFDI

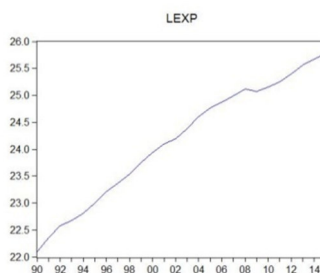Figure 5: The distribution of LEXP

Figure 6: The distribution of LGDP

In order to test the stationary of time series, we use ADF model to test unit root of LGDP, LFDI, and LEXP. The result is shown in Table 1. At ordinary level, the null-hypothesis of non-stationary is accepted; all three variables LGDP, LFDI, LEXP are not stationary at their level. Then ADF unit root test is applied on all variables at the first order level and the test reject the null-hypothesis at 5% level of significance, implying that three variables are non-stationary at their level but are stationary at the 1st differences.

Table 1. ADF unit root test results

Variables	Levels			The first difference			Conclusion
	Type of test	t-statistic	p-value	Type of test	t-statistic	p-value	
LGDP	(c,t,1)	-3.45	0.067	(c,t,5)	-4.55	0.0097**	I(1)
LFDI	(0,0,0)	0.79	0.877	(0,0,0)	-3.77	0.0006**	I(1)
LEXP	(c,t,0)	-1.205	0.887	(c,t,0)	-3.62	0.041*	I(1)

*, **Denotes rejection of the hypothesis at the 5% level and 1% level respectively.

4.2 Co-integration Test Results

Because all variables are stationary at the same level of order one, we go a further step to test whether three variables are co-integrated over the considered period. Johansen approach is implemented in this case based on a multivariate VAR model. We determine the optimum lag length for Johansen co-integration test on the foundation of minimum AIC and SC values through the unrestricted VAR estimation (choosing five lag intervals in the levels for 3 variables) (Table 2).

Table 2. Lag order selection criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	0.744921	NA	0.000249	0.214769	0.363987	0.247153
1	112.4760	180.8979	1.42e-08	-9.569140	-8.972270	-9.439604
2	121.3796	11.87156	1.53e-08	-9.559965	-8.515443	-9.333277
3	127.0418	5.931841	2.50e-08	-9.242081	-7.749906	-8.918241
4	148.9620	16.70103	1.06e-08	-10.47257	-8.532739	-10.05157
5	207.2379	27.75045*	2.18e-10*	-15.16551*	-12.77803*	-14.64737*

* Indicates lag order selected by the criterion

By using Eviews version 6.0 to perform the test, both trace test and maximum eigenvalue indicate that there is one co-integration equation among variables. The result is shown in Table 3 and Table 4, rejects null-hypothesis of one co-integrating vectors at the 5% level of significant. In other words, there is existence of long-run relationship between FDI, EXP and GDP in Vietnam.

Table 3. Unrestricted Co-Integration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.979465	124.5833	29.79707	0.0000
At most 1 *	0.870019	42.98497	15.49471	0.0000
At most 2	0.006513	0.137218	3.841466	0.7111

* Denotes rejection of the hypothesis at the 0.05 level

Table 4. Unrestricted Co-Integration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.979465	81.59831	21.13162	0.0000
At most 1 *	0.870019	42.84776	14.26460	0.0000
At most 2	0.006513	0.137218	3.841466	0.7111

* Denotes rejection of the hypothesis at the 0.05 level

Then the co-integration regression model is specified:

$$LGDP = 0.188548* LFDI + 0.469343* LEXP +10.2768 \qquad (8)$$
$$(0.00438) \qquad (0.00188)$$

The above equation implies that both FDI and export have positive long run effect on Vietnamese economic growth, if the FDI increase by 1% then there is an increase in gross domestic products of 0.188 % while 1% increasing of export causes a growth in gross domestic products of 0.47%.

4.3 VECM result

Because of the co-integration existing, the VECM is set up to examine the long run and short run causality between FDI, EXP and GDP. The system's lag length is estimated by AIC criterion to be 4. The long run effects and short run Granger cause of variables are shown in Table 5.

Table 5: Granger Causality Results based on VECM

Independent variables				
Dependence variables	χ^2-Statistics of lagged 1st differenced term (P-value)			ECTt-1 Coefficient
	D (LGDP)	D (LFDI)	D (LEXP)	[T-ratio]
D (LGDP)	-	42.10554** (0.0000)	15.12267** (0.0045)	0.367894 [3.98208]**
D (LFDI)	1.202062 (0.8778)	-	0.759702 (0.9438)	-2.962468 [-0.368990]
D (LEXP)	18.51512** (0.0010)	14.77408** (0.0052)	-	1.037636* [1.90085]

*, ** Denotes significant at 5% and 1% significant level respectively.

The result of Granger causality test is shown in Table 6 indicates a significant effect of FDI on Vietnamese economic in short-term. It can be explained that external investments contributed huge capitals, new technologies to Vietnam's domestic market, accelerated the inner competiveness, speed up the industrial restructuring and help to boost the economic up. Likewise, the short-term causality of export on gross domestic production is significant at 1% significant level, indicates that export accelerates the growth of GDP. In the long term, both FDI and export have positive effects on Vietnamese economic growth and the long-term equilibrium relation is adjusted by approximately 36.78 % rate of convergence from short-term deviation.

On the other hand, there is also Granger causality from gross domestic products and FDI to export. FDI has significant effect on export at 1% level. It can be explained that many investors invest in Vietnam to capture the cheap cost of labor and resources then export the finished products back to their countries or to the third markets. Specifically, many foreign investors, such as Jiangsu Yulun Corporation from China or Haputex Development Limited from Hong Kong, focus on Vietnamese textile sector, invested billions US dollar in this industry and the product output is mainly exported to Europe and America. The annual export turnover of textile products in Vietnam is approximately 20 billion US dollars, of which the FDI-enterprises contributed 12 billion US dollar ((MPI)). Another example is investment in processing and assembling industry by investors from Korea, Japan and Hong Kong. The export volume growth is made by FDI-enterprises but not local enterprises. GDP also has significant effect on export. It implies that the domestic producing capacity and the development of inner power will bring in external trading. When domestic productivity becomes stronger, product supply is sufficient, local enterprises will seek for more demand abroad. Then it is also a requirement for enterprises to improve products quality in order to meet the global product's standard. In long run, there is about 103.76% of disequilibrium corrected by changes in export volume every year.

5. Discussion and Policy Recommendations

This study emphasizes the significant positive effect of FDI and export on Vietnamese GDP. The FDI into Vietnam lead to more export volume and a growth in GDP. In long term, export and foreign investment are two determinants driven Vietnamese GDP. In other words, government should pay more attention at attracting external investment and expanding export to boost up the nation's economic growth.

Although, the volume of export value is growing year by year, but the import volume is also increasing quickly and make the export balance remaining small, even deficit. Previous research observed that the FDI enterprises in Vietnam rely less on local supplies and import more from neighboring countries (Miza and Giroud, 2004). Vietnamese trade balance in 2015 was in deficit of USD 3.55 billion. In 2016, Vietnam was successful to gain a surplus of USD 2.42 billion trade balance (GSO, 2016). However, the producing of main exporting product highly relies on external resource. For example, textile products are one of the main exporting products of Vietnam. In 2016, Vietnam exported 28.1 billion USD of textile products in 2016, accounting for 16% of total export volume. But the domestic market can only provide 0.3% of cotton demand, 40% of yarn demand. In 2016, Vietnam imported 10.5 billion USD of fabric and 5.1 billion USD of weaving and footwear raw materials, accounting for nearly 40% and 18% of textile export value separately. The weakness in raw materials supply puts Vietnamese enterprises in passive position, limit their competitiveness and hold up the industry growth.

Vietnam is a developing country which possesses low cost labor force, abundant natural resource, a stable political environment and prior geographic position in the area, is considered the second world-factory after China. However, there are still many problems existing that hold up external capitals inflow, such as corruption in administration sectors, complex and inconvenient administrative procedure, poor and non-unified infrastructure system… It calls an urgent need to eliminate those obstacles in order to improve investment environment and gain more international attention. There are some political recommendations to help the country to overcome current difficulty and speed up its economic growth:

- Vietnamese government has to commitment to overcome corruption, reform administrative procedure

and make a transparent management system for both foreign and local investors. Vietnam can learn from other countries in same region who are attractive destination of global investment capitals such as China, Singapore, Thailand…For example, the negative list investment management mode which was first introduced in Shanghai pilot free trade zone and now is applied widely in whole China is considered a great step in administrative reforming.

- In addition, Vietnam needs to focus on infrastructure development, grant more incentives to attract more investment projects in term of infrastructure and high technology industries.
- Besides improving the investment environment, Vietnam also need to control the balance of export-import volume, strengthen its domestic supply chain in order to master the producing of key industries.
- In many provinces of Vietnam, where possess sufficient labor workforce and well-off natural conditions, agriculture and manufacturing scale are still small and scattered and are unable to fulfill the increasing demand, especially material demand of processing industries. Together with setting up the processing factories, the local governments can consider to build the raw material supply area in accordance to local resources and advantages.
- The country should accelerate its industrialization and modernization in agriculture and manufacturing sector, invest technology and capitals to build up key materials base areas that will be supplied to manufacturing and processing factories, encourage high-quality investments into agriculture and components and parts production in order to fill the gap of domestic demand and contribute to export capacity of the nation.

6. Conclusions

The paper examines the relationship between FDI, export and economic growth of Vietnam over last 26 years after the economic reform. In order to avoid the deviation caused by time lag difference of observed data, unit test root is applied and reveals that the time series of GDP, FDI and export are non-stationary at the level but stationary at the first lag order. By using the Johansen co-integration technique and Granger causality test, the results found in Vietnam conform to the hypotheses of FDI-led GDP and FDI-led export. There was a co-integration relationship between three time series that implies a long-term equilibrium relation among GDP, FDI and export in Vietnam. In short term, FDI has strong effects on Vietnamese GDP and export. In turn, GDP also makes significant increase in export volume at the second lag difference through the improvement of production capacity. This study confirmed the importance of FDI on the Vietnamese economic growth; and it suggests a need to strongly improve the investment environment to attract more FDI inflow to Vietnam.

Limitations of This Research

During conducting this research, we could access the data only up to 2015. If we could access the data of 2016, more recent scenario could be explored.

Further Research Directions

In this study, the empirical test is applied for single country to examine the effect of foreign direct investment on national level but the application of the research can be enlarged to regional scope with different countries. We also can use this model to investigate the dissimilar effects of FDI between two or more than two countries. It may be presented in the further researches in term of regional economic cooperation analyzing.

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