

## FDI Determinants in Vietnam: Gravity Model Approach

### Author's Detail:

**Nguyen Hoang Nam**-Faculty of Business Management, Hanoi University of Industry

Email: [nguyenhoangnam@hau.edu.vn](mailto:nguyenhoangnam@hau.edu.vn)

### Abstract

*This paper uses the gravity model to examine a number of determinants affecting FDI attraction to Vietnam based on panel data from 10 biggest FDI partners of Vietnam for the period of 2005-2019. By using Pooled ordinary least square (OLS), random effect (RE) and fixed effect (FE) models, the empirical results show that the geographical distance, gross domestic product (GDP), gross domestic product per capita (GDP per capita), trade openness and labor costs significantly impact on FDI attraction. These results offer an insight to suggest some policy implications that will help promote more FDI inflows into Vietnam in the future.*

**Keywords:** FDI determinants, Gravity model, Vietnam.

**JEL code:** F15, F21

### INTRODUCTION

Foreign direct investment (FDI) in Vietnam had sharply increased in the past 15 years. In 2005, the disbursed FDI was about 3 billion USD and this figure drastically goes up to 20.38 billion USD in 2019, up 6.7% as compared to the same period in 2018. In the context of the general downturn of global FDI inflows, maintaining capital growth is encouraging achievement. The FDI sector has been making increasingly important contributions to Vietnam's socio-economic development such as contributing to the gross domestic product (GDP), export turnover and the state budget. FDI enterprises are also an important source of employment for domestic workers and an important technology transfer channel in Vietnam. With an important role of FDI in Vietnam, especially the competition to attract FDI in the coming time will be increasingly fierce as Vietnam is preparing to join the agreements and free trade communities in the region and the world, the study of the factors affecting the attraction of FDI capital into Vietnam is urgent and necessary.

The paper aims to find out the determinants affecting FDI inflows into Vietnam based on gravity models and extended variables such as: trade openness and labor costs. The empirical evidence gained from this model will then be the basis for developing policy implications to promote the attraction of FDI into Vietnam further. Because trade and FDI have many similar characteristics, some studies on FDI determinants also apply the gravity model, which was originally built to study the bilateral trade between the two countries (Eaton & Tamura, 1996; Di Mauro, 2000). The gravity model has shown many statistical explanations, consistency and high suitability when applied in FDI studies. The model was built by pairs of variables on the size of the economy (as measured by GDP indicators) and the geographical distance between the importing and exporting countries. Gravity model in international trade interprets the flow of exports instead of gravity as in Newton's original model. The two variables in the gravity model in economics are often expressed as the GDP of a pair of countries (Tinbergen, 1962).

The paper is structured as follows: Section 2 presents both the theoretical framework and literature reviews. Section 3 introduces variable, source of data, model and methodology. The empirical results will be analyzed in Section 4. And Section 5 will conclude and suggest some policy implications.

### THEORETICAL FRAMEWORK AND LITERATURE REVIEW

#### Theoretical framework

With the goal of combining many theories to explain the investment behavior and internationalization of investors, Dunning (1980) proposed a common theory called the Eclectic Theory Paradigm or OLI model to explain the factors affecting foreign investment decisions of a country. Dunning presents three conditions, which are the components of the OLI model, for an enterprise to invest FDI capital into another economy, namely:

Ownership (O) advantages: This factor refers to the ownership advantage of foreign enterprises compared to domestic enterprises. These advantages include easy access to raw materials for production or product distribution chains, as well as intangible assets of foreign businesses, and economies of scale and other advantages that come from the multinational characteristics of foreign businesses.

Location (L) specific advantages: These include the favorable conditions of recipient countries as compared to home countries as the availability of natural resources, infrastructure, raw material costs and low labor costs, policies of local authorities, etc.

Internationalization (I) advantages: This factor explains the motivation of foreign investors when deciding to invest in the form of establishing a wholly owned subsidiary. Internationalization helps foreign investors gain a number of advantages such as avoiding high negotiating and transaction costs, ensuring delivery time and enforcing intellectual property rights.

### **Literature review**

Eaton & Tamura (1996) was one of the first economists to apply the gravity model in FDI research between Japan and the United States. Gravity models were then used in a number of other FDI studies and showed statistically significant and high explanatory results for both traditional gravities and expanded models with variables such as GDP per capita, level of shareholder protection, corporate tax rates and openness to foreign investment. The paper reviews some latest studies on FDI determinants by gravity approach or in Asia.

Ismail (2009) used a semi gravity model to identify the determinants of FDI in ASEAN countries. The results revealed that besides the market size for host and source country, other criteria such as the shorter the distance, common in language and border, the extended market relative to distance also attracts more foreign investors. Other macroeconomic factors such as lower inflation rate, the slightly higher in the exchange rate and good management of the government budget are among the key factors that attract more FDI. In addition to economic factors, social factors such as good telecommunication and infrastructure and non-economic factors such as transparency and trade policy also encourage more investors to the ASEAN.

Bellos and Subasat (2012) examined the link between governance and foreign direct investment in the case of 14 transition countries by using a panel gravity model approach in two alternative ways. First, the level of governance in the target country is studied. Second, the absolute difference in the governance level between the source and target country is investigated. In both cases the results suggest that the lack of good governance does not deter, in fact it encourages, foreign direct investment.

Hoang (2012) analyzed the factors of FDI inflows to countries in Southeast Asia over the period 1991 to 2009. The results indicate that the market size, openness of the economy, quality infrastructure, human capital, labor productivity are the main factors that have a positive impact on FDI flows. Additionally, exchange rate policy, real interest rates, political risk and institutional quality also affect FDI flows. Surprisingly, the cheap labor does not help to attract FDI to the region, because foreign investors are particularly interested in labor productivity. This study also showed that the Asian financial crisis in 1997 affects the amount of FDI inflows, but not on the nature of FDI inflows in the region.

By constructing a gravity model, using descriptive, quantitative methods and applying them to recent data set by Vietnam's authorities and the international organizations during the period from 1995 to 2011 of 18 Vietnam's major country partners, Cuong (2013) found evidence broadly consistent with the prediction that the WTO has had a positive impact on FDI flows to Vietnam.

Kahouli and Maktouf (2015) developed a static and dynamic gravity model to test the determinants of FDI between 14 investment partners and 39 host countries during the period 1990-2011 and evaluate the impact of the recent economic crisis on FDI. Our empirical estimates take into account the endogenous nature of the effects of integration and the existence of the dynamic effect.

Mamasalaev (2019) used RE and GLS to examine the determinants of FDI inflow in landlocked Asian countries (LLCs) for the period of 1996-2016. Whereas the impact of market size, trade openness, institutional variables and corporate profit tax on FDI inflow is found statistically significant in Asian LLCs, other variables, namely inflation, human capital, control of corruption and ease of doing business are found to have no significant impact on FDI inflow in Asian LLCs.

Asghar and Gupta (2019) analyzed the India outbound FDI determinants by using the gravity model approach for the period of 2011-2016. The empirical results indicate that all selected macroeconomic variables have a significant influence on OFDI. Also, the need for natural resources, market size and openness and technology seeking motives are the key determinants of Indian OFDI to European nations.

Shahriar et al. (2019) investigated the major determinants of China's outward foreign direct investment (OFDI) in the economies along with the "Belt & Road" Initiative (BRI afterward). China works on advancing the agenda of the BRI both at home and abroad. The BRI is set up to promote connectivity in five key areas: policy coordination, infrastructure connectivity, trade facilitation, financial cooperation and people-to-people contacts.

## METHODOLOGY

### Data

The empirical research uses panel data from 2005 to 2019 and 10 biggest implemented FDI investors in Vietnam. The biggest FDI partners include Korea, Japan, Singapore, Taiwan, Hong Kong, China, Malaysia, United State, Virgin and Thailand. Additionally, the panel data is established from some variables reflecting the characteristics of countries as GDP, GDP per capita, geographical distance, bilateral import-export turnover (for calculating trade openness) and the minimum wage for workers in the FDI sector. Specifically, FDI data was obtained from the General Statistics Office, the Foreign Investment Department; Distance data from the French International Economic Research Institute (CEPII); GDP and GDP per capita data from the World Bank; Import and export data from the General Statistics Office; Salary data from Vietnamese legal documents.

### Variables, model and methodology

From the traditional gravity model, two extended variables are introduced to construct the regression model as follows:

$$\ln FDI_{ijt} = \beta_0 + \beta_1 \ln GDP_{it} + \beta_2 \ln GDP_{jt} + \beta_3 \ln OPEN_{ijt} + \beta_4 \ln WAGE_{it} + \beta_5 \ln DIST_{ij} + \varepsilon_{ijt} \quad (1)$$

In which,  $i$  and  $j$  represent the host country and the recipient country.  $FDI_{ijt}$  is a dependent variable, interpreting capital flows from investor  $j$ , for example-Japan, into receiving country  $i$ , Vietnam in time  $t$ .  $GDP_{it}$  represents the gross domestic product of Vietnam in time  $t$  and  $GDP_{jt}$  is the gross domestic product of the host country in time  $t$ .  $DIST_{ij}$  denotes the geographical distance between Vietnam and the host country.  $OPEN_{ijt}$  is representative of the bilateral trade openness between Vietnam and the host country  $j$  in time  $t$ .  $WAGE_{it}$  is the average minimum wage for employees working in the foreign-invested economy sector in Vietnam in year  $t$ . And  $\varepsilon_{ijt}$  is the white noise.

$$\ln FDI_{ijt} = \beta_0 + \beta_1 \ln GDPC_{it} + \beta_2 \ln GDPC_{jt} + \beta_3 \ln OPEN_{ijt} + \beta_4 \ln WAGE_{it} + \beta_5 \ln DIST_{ij} + \varepsilon_{ijt} \quad (2)$$

In Model 2, GDP per capita is used in the gravity model. In particular,  $GDPC_{it}$  and  $GDPC_{jt}$  respectively represent the GDP per capita of Vietnam and home countries in year  $t$ . GDP and GDP per capita are indicators of the market size of the host country, and these variables are expected to have a positive relationship with the dependent variable of FDI. As a core variable in the gravity model, the  $DIST$  variable reflects the geographical distance between the host country and the home country. Normally, increasing geographical distance means increasing the negative impacts on FDI inflows into Vietnam.

The  $OPEN$  variable denotes the bilateral trade openness between Vietnam and the home country, suggesting a trade relationship between the two countries. The data of the  $OPEN$  variable is calculated based on the formula of taking the percentage of total trade turnover (total import and export turnover) between the pair of Vietnam and the home country and the amount of gross domestic product of Vietnam in year  $t$ . The bilateral trade openness between the two countries is expected to have a positive impact on FDI flows from that country to Vietnam. Finally, the  $WAGE$  variable in the models denotes the labor costs that FDI enterprises incur when investing in Vietnam.

The paper uses three methods as Pooled OLS, random effects model (REM) and fixed effects model (FEM) to run an empirical model by the software Eviews 9. Because the Pooled OLS method ignores the difference, a heterogeneity that exists in each of the 10 FDI partner countries in the panel data, therefore, the REM and FEM regression methods are also used in this paper. Compared with the pooled OLS, the REM and

FEM models show the differences and heterogeneity of each FDI partner country and the differences between the characteristics of each country will have different effects on the dependent variable. Besides, the use of the REM model allows estimation of time-invariant variables as the DIST variable.

## EMPIRICAL RESULTS

**Table 1: Unit root tests**

Variables	Levin, Lin & Chu-t
Ln FDI	-3.96145***
Ln GDP home	-4.83766***
Ln GDP host	-1.77904**
Ln GDPC home	-5.21247***
Ln GDPC host	-1.70944**
Ln WAGE	-7.24092***
Ln OPEN	-9.50226***

Source: Author's calculation

All variables of the model are stationary, therefore, the paper continues to conduct further analysis. Table 2 indicates that all variables in the model show statistical significance (except for the DIST and GDP variables of the home country in model 1) and the correlation with the dependent variable of FDI as expected. In addition, model 2 shows the statistical results are more meaningful when all variables have the correlation is expected and statistically significant at 1% and 5%. First, the variables representing Vietnam's market size, such as GDP and GDP per capita, all show a positive impact on the expected inflows of FDI into Vietnam. The size of the market and purchasing power of the recipient country market, represented by Vietnam's GDP and GDP per capita is among the location advantages in Dunning's OLI theory. A domestic market with a high growth rate and increasing purchasing power is a good sign for foreign investors. This helps create opportunities for increasing sales of goods and products to foreign businesses in Vietnam, especially investors aim at market-seeking to distribute products and services of FDI enterprises right in the Vietnam market.

**Table 2: The regression results**

Model 1	Dependent variable: LnFDI		
	Pooled OLS	REM	FEM
Ln GDP home	-0.241338 *	0.0063225	0.510942
Ln GDP host	4.153615 ***	3.877672***	4.127038***
Ln WAGE	-2.801488 **	-2.487124 ***	-2.491372***
Ln OPEN	1.124016 ***	0.618559 **	0.169615
Ln DIST	-0.234615	-0.672151*	-
Constant	-22.30619	-22.15437	-16.82054
Adjusted R-square	0.451618	0.321541	0.670515
Observations	150	150	150
Model 2			
Ln GDPC home	0.634205 ***	0.613345**	0.451618
Ln GDPC host	3.622701 ***	3.651504 ***	3.491517***
Ln WAGE	-2.813412**	3.980314***	-2.842133**
Ln OPEN	0.835017 ***	0.70814***	0.216412
Ln DIST	-0.910416 ***	-0.913122***	-
Constant	-7.668017	-7.821225	-31.05811
Adjusted R-square	0.556058	0.381512	0.668514
Observations	150	150	150

Note: The asterisks \*, \*\* and \*\*\* denote the statistical significance at 1, 5 and 10 percent, respectively

Source: Author's estimation

Furthermore, the OPEN variable denoting the bilateral trade openness between Vietnam and the investor country also shows significance in the relationship with the dependent variable of FDI. This shows that the high level of bilateral trade integration between the home and recipient countries will facilitate FDI inflows. This is especially true for types of efficiency-seeking FDI or vertical FDI, where foreign investors set up production facilities in other countries then export the products to the recipient country or nearby markets. Labor costs are one of the important factors affecting FDI inflows (Demirhan & Masca, 2008; Changwatchai, 2010). According to the regression results, the WAGE variable shows an inverse relationship to the FDI dependent variable. This

is appropriate to the expectation that an increase in the minimum wage will correlate with the increase in labor costs faced by FDI enterprises. For foreign enterprises investing in low labor cost advantages in Vietnam, the relative increase in labor costs of the recipient country compared to other potential economies is certainly will discourage foreign investors.

Besides, geographical distance is also an important determinant in attracting FDI. Far geographic distances can create a barrier for foreign businesses, for example, as shown by higher shipping and transaction costs, differences in language and culture as well as business thinking. Finally, the home country's GDP per capita variable in model 2 also shows significance, meaning that FDI often comes from countries with higher levels of per capita income, which also means a higher financial capacity to make an offshore investment.

## CONCLUSION AND RECOMMENDATION

From the empirical analysis, the paper suggests some policy implications for the authorities in promoting attracting FDI inflows into Vietnam. First, the fact of maintaining and achieving average GDP and GDP per capita is very important in attracting FDI. Therefore, maintaining macroeconomic stability, promoting economic growth in both the private and public sectors and expanding the domestic market are essential measures to attract FDI inflows. In addition, stable economic growth is also crucial in maintaining the confidence of foreign investors. Second, measures to reduce trade barriers and promote bilateral and multilateral trade are also essential to attract FDI inflows. With the establishment of the ASEAN Economic Community (AEC) and the signs of the Vietnam-EU Free Trade Agreement (EVFTA), Vietnam is now continuing to show efforts in promoting trade liberalization. Therefore, the central authority needs to seize the opportunities and create favorable conditions to promote bilateral trade and push up FDI inflows from these free trade communities. Third, Vietnam also needs to focus on building a competitive labor market to facilitate attracting FDI. This is especially important when Vietnam is losing the advantage of low labor costs. Therefore, the fact of developing a competitive and quality labor market is essential, especially in the context that Vietnam plans to attract more FDI inflows into technical industries and capital-intensive industries. This requires the authority to call for investment and consultation from both public, private and foreign sectors. In addition, it can be seen that geographical distance is one of the factors that have a negative effect on attracting FDI inflows. Thus, in order to minimize difficulties and obstacles for foreign investors, the fact of ensuring the effective operation of transport and logistics systems is so important. This will facilitate the business activities of FDI enterprises as well as attract FDI inflows from further regional countries. In fact, Vietnam has many opportunities to develop a leading transportation hub in Asia serving many major maritime routes in the region. So, the authority should also continue to develop and expand the system of deep-water ports to serve large vessels at optimal port locations along the coast.

To sum up, this paper shows the empirical evidence on researching the determinants of FDI into Vietnam by gravity model application. In addition, meaningful empirical results also provide an insight to help formulate policy implications and suggestions. Last but not least, this paper is expected to continue to contribute to the literature on the factors affecting FDI in Vietnam and the application of gravity and OLI theory in FDI flows analysis, especially in the context of the FDI economic sector, is increasingly contributing to the economic development in Vietnam.

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