



## **Determinants of Foreign Direct Investment in Nghe An Province, Vietnam**

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### **A B S T R A C T**

This paper examines the determinants of Foreign Direct Investment (FDI) in Nghe An province, Vietnam through a regression model. By using a dataset of 225 observations in 10 years starting from 2008, it was found that three factors play a pivotal role in promoting FDI capital in Nghe An province, namely economic growth, infrastructure and labor productivity. All three variables have a positive relationship with the FDI capital flow. Especially, labor productivity plays a most important role to promote FDI in Nghe An province. On the other hand, the research result shows that there is no influence of inflation, tax and the world economic crisis in 2008 on the attraction of FDI capital in Nghe An province. The paper makes recommendations to the authorities to enhance the ability to attract FDI capital inflow in the developing localities like Nghe An province, Vietnam.

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## 1. Introduction

IMF conceived that Foreign Direct Investment (FDI) was the investment capital made to gain long-term benefits in an enterprise operating in an economy different from the economy of investors. The aim was for effective voice in the management of that business.

FDI has a bi-directional impact on the economy of a country in general and in each locality in particular. In developing countries like Vietnam, due to the limited level of technological-socio-economic development, most of the technology in the country is old-fashioned, which causes low labor productivity. FDI capital is considered as an important source to promote technology development. FDI capital has been creating new businesses or increasing the scale of existing units, thereby creating jobs for many workers, especially in Vietnam where there is always an abundant labor force. Foreign-invested enterprises also have created competitive motivation for domestic enterprises to adapt in the context of globalization, which improves the capacity of domestic companies. However, FDI capital has also brought many dark sides. Foreign investors take advantage of the weaknesses in testing and technology management of the host country to import outdated technologies at expensive prices. Moreover, many foreign projects are one of the culprits causing serious environmental pollution due to outdated technology, no investment in wastewater treatment technology to save cost, etc. However, at the conference to summarize 30 years to attract foreign investment in January 10/2018, the Government asserted that FDI plays an extremely important role to promote reforming and restructuring the economy, renewing the growth model, improving labor productivity, efficiency and competitiveness of Vietnam's economy (Phuong, 2018).

Nghe An is at the centre of the North Central region but is still a poor province with slow economic development. The attraction of external capital, especially FDI capital is extremely important because FDI is the most important capital supplement channel, meeting the needs of development investment and economic growth, contributing to the formation and development of the system of industrial and processing zones. According to the Department of Planning and Investment of Nghe An province, from the beginning of the year 2019 until now, there have been 85 new investment projects with a total registered capital of 9 985 billion dong which leads in terms of total investment capital in the province. However, the annual FDI capital flows into regions in Nghe An province are uneven. Therefore, the study of the factors affecting FDI scale in Nghe An province is extremely necessary while the previous research overview shows that there is no quantitative study this problem. On the other hand, the global financial crisis of 2008 is considered as the Great Depression causing many problems in all aspects. The crisis stems from a drop in house prices primarily in the United States and many European countries, leading to a subprime lending crisis. The financial crisis expanded into a global economic recession and affected foreign investment flows. Therefore, the author would like to examine the impact of this crisis on the FDI inflow in Nghe An province, Vietnam. The research paper has examined determinants of FDI capital inflow in Nghe An, which is the base for the authorities in enacting the policy and giving solution to enhancing the scale of this capital in Nghe An province.

Apart from the Introduction, the paper consists of four parts. The second part examines studies related to FDI and factors affecting FDI. The third part proposes methodology to build a model. The fourth part presents the research results. The final section proposes discussion and recommendations to improve FDI inflows to Nghe An in particular and Vietnam in general.

## 2. Literature Review

Many studies have examined the impact of factors on FDI. Mottaleb (2008) when studying the determinants affecting FDI capital of 60 developing countries, the author used 11 independent variables,

including: GDP (Gross Domestic Product), GDPGR (growth rate), INV (value added by industry), INTER (the number of Internet users), TELE (number of telephone lines), TRC (time required to execute contracts), TRD (time necessary to start a business), CPI (Corruption Perceptions Index), BC (cost for business start-up procedures), TR (commerciality). After running the model with the dependent variable is the logarithm of FDI, the author concluded that the greater GDP and higher GDP growth rates as well as a friendly business environment with modern infrastructures, the more the FDI capital attracted. Besides, the authors also tested the significant impact of FDI on the economic growth of a country.

Demirhan and Masca (2008) used the data of 38 countries from 2000 to 2004 to study the factors influencing FDI of developing countries. The model's dependent variable is FDI. The independent variable is the growth rate of per capita GDP, inflation rate, telephone lines per 1,000 people, labor costs per worker in the manufacturing industry, the level of openness of the economy and tax rates. According to the econometric results, the average growth rate per capita, the telephone line system and the level of openness affect positively while the inflation rate and tax rate have a significant negative impact on FDI. Labor costs have a positive impact, however, this impact is negligible (Demirhan & Masca, 2008).

Gamboa (2012) examines the impact of foreign direct investment in Mexico during 10 year, starting from 1994. An empirical model is indicated based on the recent FDI literature. This model is estimated by using statistical data and spatial econometric techniques. The model result shows that a high education level and lower debt ratio exert positive effects to attract FDI. The study also shows the relationship between FDI of the domestic country of its neighbouring countries (Gamboa, 2012).

Hoang and Bui (2015) study the factors of FDI inflow into ASEAN countries from 1991 to 2009. The results show that market size, trade openness, infrastructure, quality capital, labor productivity are the main factors having a positive impact on FDI flow. Besides, the exchange rate, real interest rate, political risks and corruption status also negatively affect FDI inflows. One of the highlights of the paper is that cheap labor has not to influence FDI because foreign investors are particularly interested in labor productivity. This study also shows that the 1997 Asian financial crisis did not affect the FDI inflows in the region (Hoang & Bui, 2015).

There are also many studies examining the factors affecting FDI in Vietnam. Using the OLS method to analyze the determinants of Vietnam's FDI flow from 1988 to 1998, Pham (2002) concluded that FDI depends on the scale of market, education and infrastructure. Studying a 12-year period, starting from 1988, Meyer and Nguyen (2005) concluded that FDI inflow in Vietnam is significantly affected by the main factors, including market size, labor quality and infrastructure. One common result of the above studies is that localities do not affect each other in the process of attracting FDI (Meyer, 2005) (Pham, 2002).

Hoang and Goujon (2014) used an econometric model to find the determinants of FDI in Vietnam after the Asian crisis of 1997. The article showed that FDI is attracted by market size and infrastructure. Also, industrial development policies and labor productivity play an important role in increasing FDI inflows. This paper is the first research to examine the characteristics of neighbouring provinces (Hoang, 2014). The result is consistent with the result of Nguyen (2016) using a database of Vietnam from 2008 to 2012.

In general, the previous articles about FDI in Vietnam focus on four independent variable groups: economic growth, infrastructure, labor force and issues related to the superstructure. However, no research has evaluated the impact of the 2008 economic crisis on FDI and factors affecting FDI in Nghe An province, Vietnam. Based on this research loophole, the authors build a model in the scope of studying Nghe An province, Vietnam from 2008 to 2018.

### 3. Methodology and Data

#### 3.1 Sample and observations

The quantitative research method is used to test factors impacting on the FDI capital. Based on literature review, the paper proposes a research model with six independent variables, namely the economic growth, tax, the labour productivity, the corporate income tax, the infrastructure, the global financial crisis 2008. We obtain our data from two sources, namely Nghe An Statistical Office and Fiingroup. Data about economic growth, labour productivity and infrastructure are collected from Nghe An Statistical Office from 2008 to 2018 of 21 districts and towns. Data on inflation and corporate income tax are provided by Fiingroup which is the leading company in financial information and business in Vietnam. After the collection process, we select 225 observations, which ensures a good sample needed for the regression model. After collecting data, Eviews 10 is used to run the regression model and examine the model's diagnostics.

#### 3.2 Empirical model

The FDI model has the following form:

$$FDI_{it} = \beta_0 + \beta_1 GDP_{it} + \beta_2 TAX_{it} + \beta_3 LABOR_{it} + \beta_4 INF_{it} + \beta_5 INFRA_{it} + \beta_6 CRISIS_t + \varepsilon_{it}$$

Where: FDI is the dependent variable that indicates FDI capital of the local i at time t

$GDP_{it}$  is the gross domestic product of the local i at time t

$TAX_{it}$  is the corporate income tax at time t

$INF_{it}$  is the inflation rate at time t

$LABOR_{it}$  is the labor productivity of the local i at time t

$INFRA_{it}$  is the infrastructure of the local i at time t

CRISIS is the global financial crisis 2008

$\varepsilon_{it}$  is a random error term

##### 3.2.1. The dependent variable

When studying the factors affecting FDI and its impact on the economic growth of developing countries, Mottaleb (2008), Hoang and Bui (2015), Nguyen (2016) used  $\ln(FDI)$  as the dependent variable for evaluation (Mottaleb, 2008). According to the previous research of Hoang and Gujon (2014), the authors use logarithm  $(1 + FDI)$  to preserve the spatial impact of localities even if there is no local FDI at a specific time or in the entire research period.

##### 3.2.2. The independent variables

###### *Economic growth (GDP)*

According to Tocar (2018), economic growth is one of the most fundamental determinants of FDI in the previous researches. Mistura, F. and Roulet, C. (2019) showed that the bigger the market size is, the larger FDI capital attracted is. The greater market size will promise economic growth potential in the future with high demand potential and returns to scale, which brings more profit for the FDI enterprises. Indeed, this has a similar result with many studies in Vietnam, such as Hoang and Goujon (2014), Meyer and Nguyen (2005), Pham (2002); or in the world, such as Mottaleb (2008); Demirhan and Masca (2008). In the framework of this research, the authors utilize GDP data of each locality to estimate market size and expect that this factor has a positive impact on FDI.

###### *Corporate income tax (TAX)*

According to Demirhan and Masca (2008), tax is considered as a factor making a huge contribution

to decreasing FDI inflow. Because it is a cost burden of all enterprises, including FDI enterprises. A country that offers many taxes with high-interest rates on businesses will increase the cost of the business, which decreases the return of enterprises. The effects of taxes on FDI capital can vary significantly, which depends on tax types, tax rate and procedures (Blonigen, 2005). This study examines the impact of the corporate income tax rate on the attraction of FDI. The authors expect that this factor is a barrier to reducing the attractiveness of FDI because it makes a huge contribution to decreasing the enterprise's after-tax return. In other means, the higher corporate taxation is, the lower local attractiveness for foreign investors is.

### ***Labor productivity (LABOR)***

Labour productivity is often thought of as a factor in promoting FDI attraction. The higher labor productivity, the more attractive the locality. A highly productive locality will help foreign companies reduce costs and increase their profits. Previous studies by Hoang and Bui (2015), Meyer and Nguyen (2005) show that labor productivity affects positively. Therefore, the authors expect the relationship between labor productivity and FDI in Nghe An is positive.

According to the International Labor Organization (2016), labor productivity is calculated by the weight of output on the input, in which output is calculated by GDP (gross domestic product) or GVA (Total Gross Value Added). The input is usually calculated by labor hours, labor force or the number of employees. According to ILO's guidance on measuring productivity, labor productivity based on value-added and the number of workers is the most common parameter for calculating labor productivity (ILO, 2016). Therefore, the authors choose this method to determine the labor productivity of localities in Nghe An province.

### ***Transport infrastructure system (INFRA)***

Infrastructure exerts many essential merits to attract FDI. A locality with good infrastructure supports foreign businesses easily conduct their economic activities, which increases productivity, reduce transportation cost and as a result, increase profit. Torca (2018) shows that the areas having a developed infrastructure attract a larger volume of FDI because of the ability to serve the production and business activities of investors. Therefore, infrastructure factor has a positive impact on FDI attraction. This is demonstrated by the papers of Hoang and Bui (2015), Mottaleb (2008), etc.

Infrastructure element is often expressed through roads, ports, electricity system or information technology system. Because of that diversity, the previous researchers had many options for using this variable. Meyer and Nguyen (2005) used cargo volume and the number of passengers transported, Hoang and Goujon (2013) took a different approach by using the number of mobile phones per 1,000 people. As the center of the north-central region of Vietnam, almost all areas in Nghe An province have adequate infrastructure. The biggest difference in infrastructure across regions is the air transport infrastructure. Therefore, the authors used a dummy variable for town or district having an airport. The authors use a dummy variable with 1 representative for localities with airports and 0 otherwise.

### ***Inflation (INF)***

Kersan-Skabic (2013) pointed out that there is a positive relationship between inflation and FDI capital. Explaining for this result, Kersan-Skabic (2013) showed that inflation with a slight level plays an important role in promoting demand for goods and services, which attracts foreign investors. However, Demirhan and Masca (2008) and Kok & Ersoy (2009) argued that inflation has detrimental effects on FDI. Inflation represents changes in the general price level, therefore, it is considered as a parameter expressing macroeconomic stability. The higher the rate, the less favourable economic investment environment. Because foreign investors need more time, money and effort to adapt to an

increase in price. The markets with unstable and unpredictable inflation rates breed uncertainty in setting the price and profit of FDI companies. As a result, it reduces the real return on investment. Therefore, the author expects the market with a low inflation rate stimulates FDI inflows and vice versa.

### **The economic crisis in 2008**

The global financial crisis in 2008 had some adverse drawbacks in developing countries, including Vietnam. One of the consequences is the reduction of FDI capital due to two reasons. First, the mobilization of capital in the world faced many difficulties because of the higher cost of capital. Consequently, investors limited increase in new investments. Secondly, the disbursement of FDI may also decrease, when investment companies would be more cautious in financial planning and investment. Also, most of the investment projects in general, FDI projects in particular, the debt usually accounts for a large proportion of the total investment. As a result, that financial institutions were in trouble influences many loan contracts would not be signed or could not be disbursed (Vo, 2008). Therefore, the author expects that the 2008 economic crisis has detrimental impacts FDI inflows into the locality.

## **4. Test result**

### **4.1 Descriptive statistics**

The data set is used to run the model including 225 observations of 21 localities from 2008 to 2018 and has been reclassified to match the model of regression. Descriptive statistical result of the variables is shown in the following table:

**Table 1: Descriptive statistics**

Variable	Obs	Mean	SD	Min	Max
FDI	225	0.154864	0.441890	0.000000	3.000434
GDP	225	107.3850	6.830696	59.13000	142.4800
INF	225	0.077722	0.065207	0.006300	0.229664
INFRA	225	0.048889	0.216117	0.000000	1.000000
LABOR	225	0.001007	0.000553	0.000180	0.002231
TAX	225	0.230400	0.022045	0.200000	0.250000

(Source: Eview 10)

The table above shows the average, the median, the largest unit, the smallest unit of each independent variable.

### **4.2 Main estimations**

#### **4.2.1. The result of regression model**

Using Eview 10 with ordinary least squares method (OLS), our results are as follows:

**Table 2: The result of the regression model**

Dependent variable: FDI	
C	(0.675944)
GDP	0.009055**
INF	0.272365
INFRA	0.531236***
LABOR	223.4619***
TAX	0.222510

CRISIS	(0.175777)
Prob (F-statistic)	0.000000
R-squared	0.196485
Observations	225

Note: \*, \*\* and \*\*\* denote significance level at 1%, 5% and 10%, respectively.

We see Prob (F-statistic) = 0.00000 < 0.05, so the model is statistically significant. R-squared = 0.196485, the model explains 19.65% of the change of the dependent variable. The variables GDP, LABOR, INFRA have Prob < 0.05, so these variables are statistically significant. However, the remaining variables, namely C, TAX, INF, CRISIS have Prob > 0.05. Therefore, they are not statistically significant. The author suspects that these variables do not affect the dependent variable. The authors use the Wald Test to test the relevance of the regression coefficient with the result table shown in Table 3.

**Table 3: The result of the Wald Test**

Test Statistic	Value	df	Probability
F-statistic	1.083030	(4,218)	0.3658
Chi-square	4.332119	4	0.3629

In Table 3, we see that Prob (F-statistic) = 0.3568 > 0.05. Therefore, the authors eliminate the variables, namely C, TAX, INF, CRISIS which are not statistically significant. We have a new model as follows:

**Table 4: The result of the new regression model**

Dependent variable: FDI	
GDP	0.003203***
INFRA	0.544329***
LABOR	211.6221***
Prob (F-statistic)	0.000000
R-squared	0.180517
Observations	225

Note: \*, \*\* and \*\*\* denote significance level at 1%, 5% and 10%, respectively.

The regression results show that R-squared is equal to 0.180517, which indicates that the model explained 18.0517% of the variation of the dependent variable. Prob of economic growth (GDP), labor productivity (LABOR) and infrastructure (INFRA) is less than 0.05. Therefore, these variables are statistically significant at the 5% significance level. In other words, GDP, LABOR and INFRA affect FDI. Specifically, all three variables have a positive impact on the growth of FDI, but the degree of impact varies. The impact level of economic growth is small, particularly when the growth rate increases by 1%, FDI increases by 0.003203%. Infrastructure has a great positive impact on FDI of localities in Nghe An. In particular, the impact of labor productivity is very large, when labor productivity rises by 1%, FDI raises by 211.6221%.

#### 4.2.2. Test for diagnostics

##### *Test for Multicollinearity*

We use the Variance Inflation Factor to examine multicollinearity error, the result is shown in Table 5. We see that the VIFs of the three variables are less than 10. Therefore, multicollinearity is not a serious problem of the model.

**Table 5: The result of Variance Inflation Factors**

Variable	Coefficient Variance	Uncentered VIF
GDP	3.19E-07	5.140851
LABOR	2669.623	4.906849
INFRA	0.016784	1.143178

*Note: Included observations: 225*

#### **Test for Heteroskedasticity**

Using the White test to test for Heteroskedasticity, we have the result Appendix Table 4. It shows that Prob. (F-statistic) is lower than 0.05, which points out that Heteroskedasticity problem is an issue of this model (Table 6).

**Table 6: The result of the White Test**

F-statistic	4.047479	Prob.F(3,221)	0.0079
Obs*R-squared	11.71837	Prob. Chi-Square(3)	0.0084
Scaled explained SS	86.66934	Prob. Chi-Square(3)	0.0000

By using the weighting method of Breusch & Pagan (1979), we have solved this problem. A new model is shown in Table 4. After retesting with White Test, we see that Prob (F-statistic) = 0.2549 > 0.05, implies that the model has been addressed Heteroskedasticity error (Table 7).

**Table 7: The result of the White Test**

F-statistic	2.134871	Prob.F(3,221)	0.0967
Obs*R-squared	6.336891	Prob. Chi-Square(3)	0.0963
Scaled explained SS	116.2861	Prob. Chi-Square(3)	0.0000

#### **Test for autocorrelation**

Serial Correlation LM is used to test for autocorrelation. The result is shown in Table 8 as follows.

**Table 8. The result of the Serial Correlation LM**

F-statistic	1.803490	Prob.F(1,221)	0.1807
Obs*R-squared	1.821269	Prob. Chi-Square(1)	0.1772

*Note: Breusch-Godfrey Serial Correlation LM Test*

We see that Pro (F-statistic) is equal to 0.1807, higher than 0.05. Therefore, autocorrelation is not a problem with this model. The final model after addressing all the defects as follows:

**Table 9: The result of the best regression model**

Dependent variable: FDI	
GDP	0.004179***
INFRA	0.490251***
LABOR	350.9806***
Prob (F-statistic)	0.000000
R-squared	0.134259
Observations	225

*Note: \*, \*\* and \*\*\* denote significance level at 1%, 5% and 10%, respectively.*

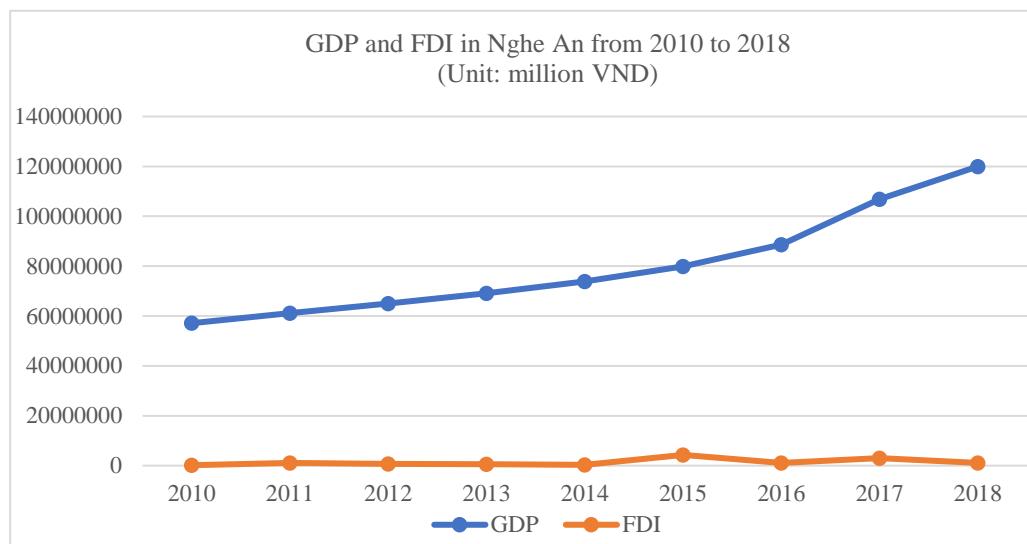
In conclusion, three variables, namely economic growth, labor productivity and infrastructure have a positive impact on FDI in Nghe An from 2008 to 2018. In particular, labor productivity plays a pivotal role in enhancing FDI capital. The result of the regression model is consistent with the author's expectation and the result of previous studies. The remaining variables such as the crisis in 2008, corporate income tax and inflation have no impact on FDI in Nghe An. The result of this study contradicts with the research by Demirhan and Masca (2008) and the authors' expectations. However, the authors find that the model results reflect the reality in Nghe An province, Vietnam.

## 5. Conclusion and Policy Implies

### 5.1. Conclusion

In this study, we examine determinants affecting FDI in Nghe An province, Vietnam. To achieve this goal, the author used a single set of 225 observations from 21 districts and towns of Nghe An in the 10 years, starting from 2008. By running the regression model with OLS, the paper shows the following results.

Economic growth has a positive influence on FDI capital in Nghe An province, Vietnam. Large market size helps attract more foreign direct investment. However, this impact is not significant. This is clearly shown in Graph 1. GDP and FDI in Nghe An province, Vietnam have a positive relationship. We see that economic growth promotes FDI, but this effect is not large.



**Figure 1. GDP and FDI in Nghe An from 2010 to 2018**

Source: Statistics Office of Nghe An province, Vietnam

In fact, Nghe An's GDP accounts for a small proportion (only accounting for 2.16%) of Vietnam's GDP, lower than GDP of big cities like Hanoi (accounting for 16.46% GDP of the whole country), Ho Chi Minh (accounting for about 23.97% of the country's GDP) as of January 2019. The main reason foreign direct capital flows to Nghe An is not due to economic development. The infrastructure and human resources are fundamental factors, in which labor productivity is the core determinant.

The regression result shows that infrastructure development plays a crucial role to attract foreign investors. Good infrastructure is one of the important factors that support foreign investors to reduce indirect costs in production and can easily implement investment activities. The fact demonstrates that

capital flows only pour into places where there is a developing infrastructure to be capable of serving activities of investors. Therein, the transport network plays a key part in attracting FDI, as a basis for transporting materials, consuming products and most importantly, the transport hub adjacent to the world as seaports, airports. A modern and multi-media transportation network will help investors reduce unnecessary transportation costs. Therefore, it is undeniable about positive sides of infrastructure in promoting FDI into the locality.

One of the highlights of the paper is that labor productivity is the determining factor of FDI inflows to Nghe An. Labor quality is a competitive advantage for investors in any field, especially in areas using many modern technologies. Increasing labor productivity creates greater profits for investors, which is a decisive factor to attract foreign investment into Nghe An province.

## 5.2. Policy Implies

From the results of the regression model, the author presented two main solutions to promote FDI into Nghe An province.

Firstly, Nghe An Province needs to promote the construction and development of physical and technical infrastructure. This issue is of primary concern to foreign direct investors. With a relatively complete and modern infrastructure, it will ensure quick and timely capital transfer in response to market fluctuations. Improving the quality of infrastructure to reduce business costs for investors is an urgent requirement, not only to attract more FDI projects but also to retain existing projects.

Secondly, the most essential measure is to improve labor productivity. Nghe An province need to develop the labor market and perfect the labor market in the direction of approaching international standards about education, vocational training, employment, etc in the integration process. A policy of training human resources should be enacted to meet the requirements of foreign investors. On the other hand, to have a qualified workforce, it depends on the system of education, vocational training quality. Therefore, to enhance the level of labor, Nghe An province needs to join between many parties from the government, enterprises, in which vocational education institutions playing a vital role.

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## APPENDIX

**Table 1. The independent variables studied**

NNo	Acronym	The name of variables	The variable description	The reference papers	Expectation
11	GDP	Economic growth	Logarithm (FDI +1)	Hoang and Goujon (2014), Meyer and Nguyen (2005), Pham (2002); Mottaleb (2008); Demirhan and Masca (2008); (Tocar, 2018); Mistura, F. and Roulet, C. (2019)	+
22	TAX	Corporate income tax	According to Decision of the Vietnamese goverment	Demirhan and Masca (2008); Blonigen (2005)	-
33	LABOR	Labor productivity	GDP/ the number of people	Hoang and Bui (2015), Meyer and Nguyen (2005)	+
44	INF	Inflation	The inflation rate is calculated based on consumer price index CPI at the end of the quarter this year and the same quarter last year in Vietnam (%).	Demirhan và Masca (2008); Kersan-Skabic (2013); Kok & Ersoy (2009)	-
55	INFRA	Transport infrastructure system	We have used a dummy variable as a notation of the infrastructure. It equals 1 if the local has an airport. Otherwise, it equals 0.	Hoang and Bui (2015); Mottaleb (2008); (Tocar, 2018)	+
66	CRISIS	The global financial crisis 2008	A dummy variable with 1 for the 2008 crisis and 0 otherwise	According to the authors	-