



The Role of Absorptive Capacity in the Relationship Fdi and Economic Growth: A Case Study of Binh Dinh Province, Viet Nam

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Abstract

Absorptive capacity of host countries towards foreign direct investment (FDI) has received a lot of attention from researchers around the world. However, research on this issue is still limited in Vietnam. Based on the theory of FDI absorptive capacity, this paper approaches the regression analysis method by using Autoregressive Distributed Lag model (ARDL) of Pesaran et al., 2001 to investigate and point out factors that play a role like FDI absorptive factors with economic growth in Binh Dinh province, Vietnam. The research results shown that among the FDI absorptive factors, the impact of FDI on economic growth in Binh Dinh province depends on human capital and local infrastructure. Thereby, this paper gives some recommendations for management agencies. Besides to focusing on FDI attraction, local authorities should pay attention to improve FDI absorptive capacity to promote the role of this capital source for economic growth.

Keywords: FDI, absorptive Capacity, economic growth, Binh Dinh – Viet Nam

1. Introduction

For host countries, FDI plays an important role in economic growth through the addition of capital, job creation, budget contributions and technology transfer promotion,...However, the benefits of FDI as well as the spillover effects from this capital do not come naturally, it needs to have a suitable environment. To acquire knowledge and take advantage of benefits from FDI, this process requires

the host country to develop basic knowledge and sufficient capacity to receive the benefits provided by this capital, that is called absorptive capacity (Hoang et al., 2009). Besides, Nunnenkamp (2004) show that the host country needs to meet the initial conditions such as the basic foundation of technology and people before attracting FDI to exploit and absorb the benefits from this capital. Therefore, promoting the benefits of FDI that contribute to economic growth, besides to focusing on FDI attraction, host countries need to improve FDI absorptive capacity, this is necessary. However, during the time, the issue of attracting FDI in Vietnam in general and Binh Dinh in particular is still limited like many localities did not promote the role of local factors in absorbing this capital, leading to poor FDI absorptive capacity and low disbursement rate. Hence, the objective of this study is to find empirical evidence of the role of FDI absorptive factors with local economic growth, specific case in Binh Dinh, Vietnam.

2. Literature Review

Previous studies have mentioned the FDI absorptive capacity on some angles. Dahlman & Nelson (1995) have given a definition about the FDI absorptive capacity that is the ability to learn, the ability to receive, the addition of appropriate technology and skills from developed countries. More generally, Beatrice Farkas (2012) point out that the benefits which FDI brings to the host countries are access to technology and knowledge transfer. To absorb advanced technologies, host countries need to create a convenient investment environment for the positive spread of FDI and meets some conditions for FDI absorptive capacity. These factors include quality of human resources, trade openness, quality of infrastructure and quality of institutions.

Besides to emphasizing the role of investment capital, endogenous growth theory also refers to the specific factors in promoting growth in the host country such as: quality of human resources, trade openness, financial market development, infrastructure system, quality of institutions and macroeconomic stability. In the relationship between FDI and economic growth, these factors have not only a direct impact but also indirect impact growth in the host country because they affect the attractive ability and the reception of benefits from FDI. This has been confirmed in many studies (Borensztein et al., 1998; Kose et al., 2006; Cuong, 2016). It is the interaction between FDI and absorptive factors that results in growth for the local economy.

In fact, many authors conduct empirical research to identify absorptive factors in the relationship of FDI and economic growth. They have given absorptive factors into research models to control the factors that are both absorbing factors and factors of promotion for economic growth. The research results have confirmed that the impact of FDI inflows on economic growth needs certain conditions. Typically, the research of Zhang (2001) for the case of China show that FDI only promotes local economic growth when localities have good infrastructure conditions, macroeconomy stability and policies to attract FDI. Another research based on the FDI absorptive capacity theory, Hoang et al. (2009) show that the host country only benefits from FDI when they meet the basic conditions related to human capital, absorptive capacity of domestic enterprises, financial systems, infrastructure and quality of institutions. With empirical evidence in research conditions in Vietnam, the authors have pointed out that there are three most important factors affecting absorptive capacity such as human capital, quality of institutions and infrastructure. Besides, Kotrajaras (2010) conducted a study of some East Asian countries, this research indicates that FDI has a positive impact on economic growth when these countries have appropriate economic conditions. These conditions include infrastructure, human capital and trade openness. In addition, Cuong (2016) shows that absorptive capacities are also known as local factors, including economic policy issues and other features for each country such as human capital is measured by education level, quality of infrastructure and macroeconomic environment.

3. Research Methods

3.1 Research site

Binh Dinh is one of five provinces in the Central Vietnam key economic region and located in the center of the North - South axis, Vietnam. This is the locality with outstanding advantages in linking, international cooperation and economic exchange. For example, Binh Dinh is the most favorable gateway for economic activities between the Central Highlands provinces, Southern Laos, Northeast Cambodia and Thailand through Quy Nhon port and National Highway 19. In terms of geo-economic location, Binh Dinh is a locality with enough elements in attracting investment and economic development such as: 134 km of coastline; Nhon Hoi economic zone, Phu Cat airport and Quy Nhon port (This is an important port of South Central Vietnam, Vietnam). In the socio-economic development goals of Binh Dinh province in particular and Vietnam in general, FDI capital is

considered an engine of economic growth. However, FDI attraction and contribution of this capital source to Binh Dinh's economic growth are still limited. How to reinforce the role of FDI capital with economic growth? Solving this problem in Binh Dinh will contribute greatly in practice, and this is the reference channel for localities with similar conditions in Vietnam and around the world.

3.2 Model

This study provides empirical evidence about the role of FDI absorptive factors in economic growth in Binh Dinh province by developing a regression model based on research by Kotrajaras, 2010, the model is developed as follows:

$$G_t = \beta_0 + \beta_1 FDI_t + \sum \beta_i A_{i,t} + \sum \beta_j FDI_t \times A_{j,t} + \sum \beta_k B_{k,t} + u_t \quad (1)$$

The model is designed to assess the impact of FDI and absorptive factors on economic growth based on the assumption that FDI promotes economic growth through a direct channel, spillover effects and technology transfer. Besides, this study is based on the assumption that FDI promotes the benefits for economic growth depending on the initial conditions such as quality of institutions, macroeconomic stability (Kose et al., 2006). In addition, Kotrajaras (2010) concluded that infrastructure conditions, quality of human capital and trade openness help the host country better receive and absorb technology from FDI and contribute to increase total factor productivity. Therefore, there are 4 absorptive factors affecting the absorptive capacity of FDI (A_i) which the author chose to study in accordance with local conditions including: Human capital (H), infrastructure (INFR), macroeconomic stability (INFL), and trade openness (OPEN).

Group of interaction variable ($FDI \times A_i$) is the product of FDI and absorptive factors (including: $FDI \times H$; $FDI \times INFR$; $FDI \times OPEN$; $FDI \times INFL$). This group is considered to represent the local FDI absorptive capacity and they are included in the model to determine the presence of absorptive factors that will increase or decrease the spread of FDI for with economic growth. To be detailed, if the interaction between FDI and human resources ($FDI \times H$) is positive and statistically significant, it indicates that the locality has high qualified human resources, this locality will receive greater benefits from FDI in encouraging

economic growth. Similarly, quality of infrastructure, macroeconomic stability and international trade have an interaction with FDI in promoting economic growth.

In addition, this research also use 3 control variables (B_k). These variables are commonly used in previous studies such as capital from domestic private sector (DI), capital from state sector (GI) and labor (L). These variables are kept constant when changing the interaction and absorption variables in the regression model.

According to function 1, regression model assessing the impact of FDI on economic growth is specifically written as follows:

$$G_t = \beta_0 + \beta_1 FDI_t + \beta_2 DI_t + \beta_3 GI_t + \beta_4 L_t + \beta_5 H_t + \beta_6 INFR_t + \beta_7 OPEN_t + \beta_8 INFL_t + \beta_9 FDI \times H_t + \beta_{10} FDI \times INFR_t + \beta_{11} FDI \times OPEN_t + \beta_{12} FDI \times INFL_t + u_t \quad (2)$$

In which, G is denoted as the local economic growth rate (%); FDI is real foreign direct investment capital (VND billion); DI is investment capital from domestic private sector in locality (billion VND); GI is public investment capital in locality (billion VND); L is labor (thousand people); H is the ratio of trained workers (%), representing human capital; INFR is the volume of goods transported by local transport industry (thousand tons), representing infrastructure; OPEN is the total value of imports and exports, representing the openness of the economy; INFL is a consumer price index, representing the level of macroeconomic stability and Subscript $t = 1997, \dots, 2016$ represents the period 1997-2016.

3.3 Data and analysis methods

This research uses time series data to assess the role of absorptive factors in the relationship between FDI and economic growth in the locality, based on the application of ARDL model (Autoregressive Distributed-lagged developed by Pesaran et al., 2001). This model can overcome the disadvantages in the case of small sample sizes.

The scope of the study is limited to Binh Dinh Province, Vietnam. Secondary data from 1997-2016 was collected from the Statistical Office of Binh Dinh Province, Vietnam to serve as a basis for analysis. After collecting data, the author uses Eviews 9.0 software as a tool to assist in data analysis to perform regression estimation. When the research applies ARDL approach, the variables are converted to natural logarithms for estimation. The conversion of the original data to natural

logarithms for the variables in the model to reduce the high dispersion as well as have some unusual observations of the original data. Thereby, the auto regressive distributed lag model - ARDL with lag (p0, p1, p2, p3, p4 ... p12) for the empirical study as follows:

$$\begin{aligned}
 LG_t = & \alpha + \sum_{i=1}^{p_0} \beta_{i0} LG_{t-i} + \sum_{j=0}^{p_1} \beta_{j1} LFDI_{t-j} + \sum_{k=0}^{p_2} \beta_{k2} LDI_{t-k} + \sum_{l=0}^{p_3} \beta_{l3} LGI_{t-l} + \sum_{m=0}^{p_4} \beta_{m4} LL_{t-m} + \\
 & \sum_{n=0}^{p_5} \beta_{n5} LH_{t-n} + \sum_{o=0}^{p_6} \beta_{o6} LINFR_{t6-o} + \sum_{q=0}^{p_7} \beta_{q7} LOPEN_{t-q} + \\
 & \sum_{r=0}^{p_8} \beta_{r8} LINFL_{t-r} + \sum_{s=0}^{p_9} \beta_{s9} LFDIXH_{t-s} + \sum_{u=0}^{p_{10}} \beta_{u10} LFDIXINFR_{t-u} + \\
 & \sum_{v=0}^{p_{11}} \beta_{v11} LFDIXOPEN_{t-v} + \\
 & \sum_{w=0}^{p_{12}} \beta_{w12} LFDIXINFL_{t-w} \tag{3}
 \end{aligned}$$

In which: LG_{t-i} , $LFDI_{t-j}$, LDI_{t-k} , LGI_{t-l} , LL_{t-m} , ..., $LFDIXINFL_{t-w}$ are the stationary variables at the different lag; u_t is white noise.

4. Results and Discussion

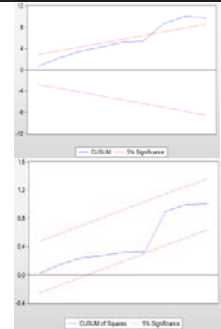
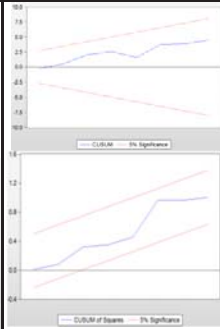
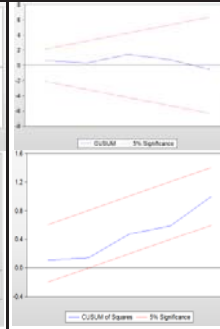
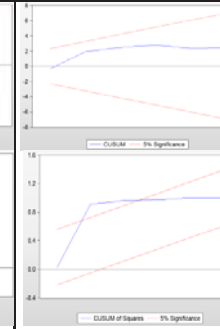
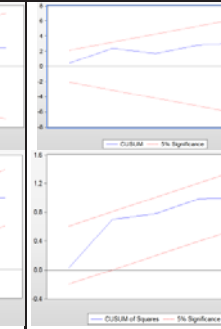
4.1 Unit root tests

In this study, the author uses Augmented Dickey-Fuller test (ADF) of the extended Dickey Fuller (1979) to check the stationary for variables in the regression model. The results of table 1 indicates that in the original string, most of the variables are not stationary at both case of having trend and no trends. Exclusively, LDI variable is a stationary string I (0) according to ADF standard with 10% significance level. When the author conducts the first difference test, most of the variables are stationary at both case of having trend and no trends with 1% significance level while LDI and LL variables are stationary strings I(1) with 10% significance level in the case of having no trend; LGI and LINEF are stationary strings I(1) with 5% and 1% significance level, respectively according to ADF standard in the case of having trend.

Table1. The result of unit root test (ADF standard)

Variable	Original string		First difference	
	No trend	Trend	No trend	Trend
LG	-0.467570	-1.502512	-9.372449***	-9.131582***
LFDI	-0.189624	-2.289175	-5.876021***	-5.602684***
LDI	3.844322	-3.482453*	-1.608874*	-6.618465***
LGI	2.129336	-1.426668	-3.79247***	-4.231444**
LL	4.055455	-2.426988	-1.769911*	-5.376118***
LH	1.173736	-2.564752	-3.818762***	-3.941088**

C	11.78797* (5.936268)	1.778627 (3.286825)	12.88221 (9.684637)	-3.219041** (1.098226)	5.343555* (3.419021)
Human capital variables					
LH	1.921998*** (1.270660)	–	–	–	1.390060** (0.465909)
LFDI×H	-0.444520** (2.211510)	–	–	–	-0.918053* (0.778598)
Infrastructure variables					
LINFR	–	0.440844*** (0.131010)	–	–	0.923030* (0.366182)
LINFR(-1)	–	-0.223183 (0.182354)	–	–	–
LFDI×INFR	–	0.290724*** (0.006066)	–	–	0.261498* (1.096472)
Trade openness variables					
LOPEN	–	–	0.846334** (0.266712)	–	0.160957 (0.088023)
LOPEN(-1)	–	–	1.509554*** (0.327586)	–	–
LFDI×OPEN	–	–	-0.128856 (0.195860)	–	-0.682616 (1.554091)
LFDI×OPEN(-1)	–	–	-0.137436 (0.168348)	–	–
Macroeconomic stability variables					
LINFL	–	–	–	-0.073559* (0.031650)	-0.087031* (0.422892)
LINFL(-1)	–	–	–	0.052782 (0.032140)	–
LFDI×INFL	–	–	–	-0.784058 (0.493691)	0.100147 (0.092040)
LFDI×INFL(-1)	–	–	–	1.845829** (0.565592)	–
F-Statistic; Prob	81.56808; 0.000000	661.6483; 0.000000	192.9508; 0.000007	246.9741; 0.000000	544.2727; 0.000001
Autocorrelation (LM)	Giá trị thống kê χ^2 =0.240375; Prob. = 0.6239	Giá trị thống kê χ^2 =2.228404; Prob. = 0.1355	Giá trị thống kê χ^2 =4.438527; Prob. = 0.0351	Giá trị thống kê χ^2 =0.139929; Prob. = 0.7084	Giá trị thống kê χ^2 =2.270969; Prob. = 0.1318
Heteroskedasticity	Giá trị thống kê χ^2 =10.91626; Prob. = 0.2815	Giá trị thống kê χ^2 =8.729152; Prob. = 0.5580	Giá trị thống kê χ^2 =16.27472; Prob. = 0.2346	Giá trị thống kê χ^2 =9.546648; Prob. = 0.6557	Giá trị thống kê χ^2 =10.75112; Prob. = 0.6317
Correct function	Giá trị thống kê F =0.042191;	Giá trị thống kê F =11.70562;	Giá trị thống kê F = 0.029012;	Giá trị thống kê F = 9.813815;	Giá trị thống kê F =0.046505;

form(Ramsey RESET)	Prob. = 0.8424	Prob. = 0.0111	Prob. = 0.8730	Prob. = 0.0259	Prob. = 0.8398
Stability of residuals (CUSUM)					

Notes: *Significant at 10%; **Significant at 5%; ***Significant at 1%. The value in () is the standard deviation value

Based on AIC and SBC criterias, ARDL (1,1,0,0,1,0,0) model with model 1, ARDL (1,0,1,1,0,1,0) model with model 2, ARDL (1,1,1,1,1,1,1) model with model 3, ARDL (1,0,1,1,1,1,1) model with model 4 is chose. The F-statistics with P.value have a 1% significance level that indicate the appropriate model. However, test results are performed with the stability of residuals in the model through CUSUM test - Cumulative Sum of residuals (Brown et al., 1975). The results of model 1 and model 4 are not reliable enough to estimate the short-term and long-term coefficients due to the solid line overcome the limit of two dash straight lines (this mean that cumulative sum of residuals is outside the standard range) at 10% significance level. Besides, the results obtained by Ramsey Reset tests indicate that model 2 and model 4 omitted the variable with P. values = 0.0111 and P.values = 0.0259 respectively, less than 0.05. At the same time, testing for autocorrelation (Autocorrelation LM Test) in model 3 show that P.Value = 0.0351 less than 0.05. These show that the regression coefficients in model 1, 2, 3 and 4 models are not reliable.

Model 5 represents ARDL model (1,0,0,0,0,0,0,0,0,0,0), this model includes all the adsorptive factors and intraction variables. Based on the results of the autocorrelation test, heteroskedasticity, the stability of residuals, the Model 5 is the most suitable and reliable and has no defects. CUSUM test- Cumulative Sum of residuals about autocorrelation (LM) shows P.Value = 0.1318; heteroskedasticity test shows P.Value = 0.6317 and Ramsey RESET shows P.Value = 0,8398. Therefore, these greater than 0.05, showing that the model ensures reliability.

After that, the author continues to estimate the ARDL (1,0,0,0,0,0,0,0,0,0,0) model in order to determine the impact of FDI and absorptive factors on short-term and long-term economic growth through the results of table 3 as follows:

Table 3. The estimation results of the impact of FDI, absorptive factors on short-term and long-term economic growth

(This case has all absorptive factors and interaction variables)

Model (6) Long-term coefficient of ARDL (1,0,0,0,0,0,0,0,0,0,0) (Dependent variable LG)		Model (7) Short-term coefficient of ECM model based on ARDL approach (Dependent variable ΔLG)	
Variables	Coefficient và T- Statistics	Variables	Coefficient và T-Statistics
LFDI	0.152260 (0.389923)	Δ (LFDI)	0.164352 (0.418250)
LDI	0,587079*** (0.089375)	Δ (LDI)	0.633704*** (0.081079)
LGI	-0.866776*** (0.185746)	Δ (LGI)	0.935614*** (0.198706)
LL	-0.102309 (0.090246)	Δ (LL)	-0.110434 (0.093144)
LH	1.287786** (0.399784)	Δ (LH)	1.390060** (0.465909)
LINFR	0.855118** (0.318246)	Δ (LINFR)	0.923030* (0.366182)
LOPEN	0.149114 (0.076085)	Δ (LOPEN)	0.160957 (0.088023)
LINFL	-0,0945* (0.392550)	Δ (LINFL)	-0.087031* (0.422892)
LFDI×H	-0.176932** (0.670148)	Δ (LFDI×H)	-0.918053* (0.778598)
LFDI×INFR	0.242321* (1.075236)	Δ(LFDI×INFR)	0.261498* (1.096472)
LFDI×OPEN	-0.632392 (1.427883)	Δ(LFDI×OPEN)	-0.682616 (1.554091)
LFDI×INFL	0.092779 (0.085600)	Δ(LFDI×INFL)	0.100147 (0.092040)
C	4.950402* (3.308872)	ECM(-1)	-1.079418*** (0.111524)

Notes: *Significant at 10%; **Significant at 5%; ***Significant at 1%. The value in () is the standard deviation value

With the results of the impact of absorptive factors on the relationship between FDI and economic growth from ARDL model-estimating long-term coefficients (Model 6, table 3) and short-term coefficients (Model 7, table 3). Impact coefficient of LINFR and LH on LG have statistical significance in both cases. Interaction variable between FDI and INFR has positive and statistically significant in both short and long term cases. This shows that infrastructure is really an important factor that promotes the spread of FDI in the localities receiving investment. Because good infrastructure will facilitate economies of scale, reduce trade costs of goods exchange, and therefore an important factor when foreign investors decide to invest in production and business and contribute to economic growth (Zhang, 2001; Hoang et al., 2009; Kotrajaras, 2010; Bao, 2014; Cuong, 2016).

The coefficient of interaction variable between FDI and bH has negative and statistically significant in both cases. This shows that good quality of labor is an advantage for attracting FDI. However, in this case, the quality of labor in Binh Dinh is low. According to Statistical yearbook of Vietnam 2016, the rate of trained workers in Binh Dinh in 2016 is only 15%, the lowest compared to 5 provinces of the Central Vietnam key economic region. This is a barrier that limits the contribution of FDI to economic growth. This evidence is similar to some studies such as Borensztein et al., 1998; Anh et al., 2006. Therefore, the places have high human capital which is reflected in the quality of labor. The higher qualification is, the easier and faster the locality will receive technology from FDI. Thereby, human capital plays a role in promoting economic growth through FDI spillover mechanisms.

The impact coefficient of FDI variable on G has not statistically significant in both cases. The estimation results show that no empirical evidence was found for the impact of foreign direct investment on short-term and long-term economic growth. This can be explained in the case of Binh Dinh, FDI capital attracted too little. In addition, implemented capital is lower than registered capital. According to figures of Statistics Office of Binh Dinh Province and General Statistics Office of Vietnam, by the end of 2016, Binh Dinh only attracted 67 projects with a registered capital of 780.3 million USD, accounting for 5.06% of the registered capital of the Central Vietnam key economic region and 0.27% Vietnam. Besides, the ratio of implemented capital in Binh Dinh is only 24.3% compared to the registered capital in the 1997-2016 period.

In summary, research results show that human capital and quality of infrastructure are two important factors that the locality must achieve to benefit from FDI. In other words, the real

motivation for economic growth in Binh Dinh province is the role of FDI with local policy in improving the quality of human capital and infrastructure.

5. Conclusion

To find empirical evidence for the existence of absorptive factors that affect to the relationship between FDI and economic growth, this study is conducted with four factors: human capital, infrastructure, macroeconomic stability and trade openness. The research results show that the benefits from FDI will be better in the locality if the locality has good human capital and infrastructure. And FDI promotes economic growth in Binh Dinh province when Binh Dinh has appropriate factors about human capital and infrastructure.

Therefore, the empirical evidences of this research reinforce the view - improving the quality of infrastructure and the quality of labor actually affects absorptive capacity of locality. Based on the research results and the typical context of Binh Dinh province, the author proposes some suggestions to promote the role of local factors in FDI attraction to contribute to economic growth:

(i) *Synchronous construction of local infrastructure*: In which, Binh Dinh should continue to prioritize investment in upgrading infrastructure of airports, seaports, roads, power grid infrastructure and services. In particular, Binh Dinh needs to handle the environment to actively support projects that promote the highest efficiency in industrial parks.

(ii) *Training and developing local human resources* to meet the requirements of FDI enterprises in Binh Dinh province and promote the training of high quality human resources. To be detailed, Binh Dinh needs to focus on improving the efficiency of coordination between enterprises, authorities and vocational training institutions in training and recruitment of workers. Besides, Binh Dinh needs to focus on improving management skills at all levels. Especially, the grassroots level about expertise, appraisal and project management capacity to select projects with high efficiency. At the same time, focusing on foreign language training for the workforce to reduce barriers in technology transfer.

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