

# Panel Data Analysis on the Relationship of Foreign Direct Investment and Export on the Economic Growth of Indonesia, China and India

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## ABSTRACT

*Foreign direct investment is one of the most important areas for developing countries particularly Asian countries such as Indonesia, India and the Philippines. The economic globalization processes have impact developing countries that have been beholding immense surge of FDI inflows during last two decades. This study is panel data analysis using Panel data to examine the relationship of FDI and export on the Indonesian, China and India's economic growth. The research analyses the share of FDI and export on the economic growth of the countries and examine whether foreign direct investment and exports have positive effect on the economic growth. The paper highlights the policy implications and complexities in sustaining economic growth*

**Keywords: Foreign direct investment, export, GDP growth, Panel data, Economic growth, competitiveness, Economic Sector analysis.**

## 1. INTRODUCTION

FDI is an investment made to acquire lasting interest in enterprises operating outside of the economy of the investor. Further, in cases of FDI, the investor purpose is to gain an effective voice in the management of the enterprise. The foreign entity or group of associated entities that makes the investment is termed the "direct investor". The unincorporated or incorporated enterprise-a branch or subsidiary, respectively, in which direct investment referred to as a "direct investment enterprise"(UNCTAD, 1993).

Foreign direct investments is commonly categorized into three typologies; horizontal, vertical or

conglomerate. A horizontal direct investment is referred to the investor establishing the same type of business operation in a foreign country as it operates in its home country, for instance, a cell phone provider based in the United States opening up stores in China. Further, a vertical investment is the one in which different but related business activities from the investor's main business are established or acquired in a foreign country, such as when a manufacturing company acquires an interest in a foreign company that supplies parts or raw materials required for the manufacturing company to make its products. While a conglomerate type of foreign direct investment is one where a company or individual makes a foreign investment in a business that is unrelated to its existing business in its home country that takes place in the form of a joint venture because the investor has no previous experience in the industry. The FDI inflows into a country are often linked with the economic prosperity issue. FDI plays an important role in the internationalization of business. Profound changes have taken place both in terms of size, scope and methods of FDI in the last decade. These changes occur due to technology, easing restrictions on foreign investment and acquisitions in many countries, and the deregulation and privatization of many industries. The development of information technology systems and cheap global communication enables management of foreign investments much more easily. The main benefits of FDI according to Todaro (2000) are to fill the shortage of savings that can be collected from within the country, increase foreign exchange reserves, increase government revenues and develop managerial skills for the economy in the recipient country. Export stimulates economic growth

from demand side and produce efficiency gain on the supply side. Anwara and Nguyen (2010) examined the determinants of FDI on the economic growth and they found a close relationship between FDI- led growth.

Based on the 2018 World Investment Report published by UNCTAD, Indonesia is included in the top 20 countries for inflows of FDI. Indonesia is the world's fourth most populous nation, the world's 10th largest economy in terms of purchasing power parity (PPP). Indonesia is also an emerging market economies of the world with massive consumption rate so that it attracts foreign investors to invest in Indonesia. The presence of Indonesia in some international trading organizations such as G-20 (Group of twenty) and ASEAN (Association of Southeast Asian Nations) gives a better economic prospect of Indonesia which is good for future investment. India well known major monetary source for economic development derived from foreign direct investment. Foreign direct company invests to fast growing private Indian business to consider the lower wages of India. In 2015, India overtook China and United States as the top destination of the foreign direct investment. India attracted investment of \$31 billion compared to \$27 billion of China and \$28 billion of United States (Financial Times, 2015). China became one of the fastest growing economies with an average economic growth of 9.5 percent in the 1980s (Shang-Jin Wei, 73). Then, Chinese economy boosted after China's accession to the World Trade Organization in 2001. China rises in the 1990s directed the concern of FDI redirection from ASEAN to China.

According to Schutz (2001), growth is the sustained rise in both quantity and quality of the goods and services produced in an economy. Economic growth theory evolved from two distinct generation models. The first is exogenous growth model inspired by neoclassical model with exogenous source of long-term growth which focus shifted to inflation and unemployment as the determinants of growth. The second is endogenous growth model focus on economic growth as result of rational and optimal behavior of agency and the structural characteristics of the economy and macroeconomic policy. The new model now combined with diffusion of technology to emphasize the role played by FDI in the economy.

The purpose of this study is to identify the relationship of foreign direct investment and export on the economic growth of Indonesia, India and China. Many studies have investigated the relationship of foreign direct investment on the economic growth of one country. However, there has been little detailed

empirical study on the relationship of FDI on the economic growth using panel data analysis from countries of Indonesia, India and China. It is very important to find out the relationship of FDI and export on the economic growth rate of these three countries. Understanding the causal connections between these phenomena using panel data is important for development strategies in Indonesia, India and China as biggest countries population in Asia.

## **2. LITERATURE REVIEW**

### **2.1 Foreign direct investment, export and GDP growth**

Andi Nurhikmah Daeng Cora, et.al (2018) in her study on the Relationship between Foreign Direct Investment, Export and GDP Growth in Indonesia stated that all countries are very open to the international trade to achieve high economic growth because extensive researches and economic literature claims that international trade has a positive impact on economic growth. There are two main points of views on the FDI study. The first is the majority of the study claims that FDI has positive impacts on the host country. FDI becomes powerful tools and indicators for economic development and global integration. The second argument is the study claims that the FDI can cause growth in the economy only in short term condition and reduce growth in the long- run. The economy of Indonesia has expanded strongly over decades. Indonesia recently becomes an important country to contribute to the development of the global economy. Indonesia becomes the four largest in east of Asia. In the base of purchasing power parity, Indonesia is the 15th largest economy in the world. Indonesia as one of the expanded growth put FDI as one of the most important engine of power to increase the expected growth of economy.

### **2.2 Foreign Direct Investment effects on economic growth**

According to Shahbaz and Rehman (2010), foreign direct investment, financial development, public investment, human capital, trade openness and inflation have positive effects on economic growth.

Andi Nurhikmah Daeng Cora, et.al (2018) investigates the relationship between foreign direct investment, export, and GDP growth in Indonesia using Vector Error Correction Model (VECM) for the period 1981-2015. The result suggests that there is a relationship between foreign direct investment, GDP growth and

export for Indonesia. The Vector Error Correction Model shows that there is long run and short run causality running from FDI and GDP to export.

A study by Mehmet Eryigit (2012), investigated the long-term relationship between foreign direct investment and export volume, foreign direct investment and GDP, and export and GDP through co-integration test. The study conducted panel data analysis for the period of 2000 to 2010 from 15 countries. Panel unit-root tests showed that variables are stationary at the first level. Based on the test on Error correction, the study concluded that there is long-term relationship between FDI and export, FDI and GDP and export and GDP.

According to Dees (1998) foreign direct investment affects Chinese growth through ideas diffusion. Foreign direct investment plays significant positive effect on Chinese long-term growth by influence of technical change in 1990s.

A study by Berthelemy and Demurger (2000) presented new evidence on the role of human capital and stated that human capital contributes to growth by facilitating the adoption process of foreign technologies. It also showed that the direct impact of export growth disappears when both exports and foreign investment introduced in the regression of growth.

Tsiao and Tsiao (2006) used time series and panel data from 1986 to 2004 to examine the granger causality relations between GDP, exports, and FDI among countries of China, Korea, Taiwan, Hong Kong, Singapore, Malaysia, Philippines and Thailand. Those countries are rapid developing East and Southeast Asian Economies. The study construct panel data of the three variables for eight economies as a group and use fixed effect s and random effects to estimate the panel data VAR for granger causality test. The result reveals that foreign direct investment has unidirectional effects on GDP directly and indirectly through exports and there is Bidirectional causality between exports and GDP for the group.

Chakraborty and Basu (2002) did their study on India Case. The study used co-integration and error-correction model to investigate the link of FDI on the economic growth in India. The study find out that GDP in India not caused by FDI and the causality run more from GDP to FDI.

Alfaro (2003) reported that FDI in the primary sector tends to have a negative effect on growth whereas investment in manufacturing has positive effect. A study on India case done by Jayachandran and Seilan (2010) concluded that foreign direct investment and exports are among the factors that affect economic growth but the reciprocal does not apply. High and low economic growth rate has no effect on the presence of foreign direct investment and exports in India

### **3. METHODOLOGY**

#### **3.1 Data Collection**

This study used Panel data analysis. The data taken from World Bank, International finance statistics publication and Statistic data Indonesian

#### **3.2 Research Variables**

The dependent variable of this research is GDP growth rate and the independent variables are foreign direct investment and exports.

#### **3.3 Regression Model**

The study uses panel data regression to measure the relationship between foreign direct investments, export on GDP growth rate among three countries Indonesia, China and India. The study runs the estimation using fixed effect approach and random effect approach technique. Random effect implemented if individual specific component assumed to use random with respect to the explanatory variables and fixed effect implemented if the individual component not independent with respect to the explanatory variables.

The study applied pooled OLS Model, Estimate fixed effect model, estimate random effect model, and Hausman test to know the best models to use in the analysis. Hausman test (1978) will be used to choose between Fixed effect model or Random effect model.

### **4. RESULT & DISCUSSION**

#### **4.1 Pooled OLS Model**

From table 1, we see that the p-value of the export is less than 5% means that the variable can explain the GDP growth rate at level of 0.03. The variable of FDI is also statically significant with level very small below 5%. However, for time being we do not accept the result of this pool regression model yet.

**Table 1. Pooled OLS Model Result**

Source	SS	df	MS			
Model	331.261908	2	165.630954	Number of obs =	75	
Residual	552.269025	72	7.67040313	F( 2, 72) =	21.59	
				Prob > F =	0.0000	
				R-squared =	0.3749	
				Adj R-squared =	0.3576	
Total	883.530933	74	11.9396072	Root MSE =	2.7695	

  

gdpgrowthr~e	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
export	-.1241995	.0409114	-3.04	0.003	-.205755	-.0426441
fdi	1.193958	.2092043	5.71	0.000	.7769166	1.610999
_cons	7.639296	1.106096	6.91	0.000	5.434335	9.844257

**4.2 Panel Variable and Time Variable**

Panel variable showed that all countries are strongly balanced. Then the next the study conduct fixed effect model or LSDV model.

panel variable: country (strongly balanced)  
time variable: year, 1993 to 2017  
delta: 1 unit

**Fig 1: Result of declare dataset**

**4.3 Fixed effect model or Least Square Dummy Variable (LSDV)**

Fixed effect model or Least Square Dummy Variable (LSDV) model allows a heterogeneity among three countries by have their own intercept values.

From table 2, we can say that our model is accepted and fitted. All coefficients of the model are equal to zero. The probability prob>F = 0.0208 which is very small below 5%. FDI is statically significant. The p values of export is 0.037 means it is significant to explain the variable of GDP growth rate. Export also statically significant to explain the variable of GDP growth rate.

**Table 2. Fixed Effect Model Result**

Fixed-effects (within) regression	Number of obs =	75
Group variable: country	Number of groups =	3
R-sq: within = 0.1535	Obs per group: min =	25
between = 0.9538	avg =	25.0
overall = 0.3662	max =	25
	F(2,70) =	6.35
corr(u_i, xb) = 0.5832	Prob > F =	0.0029

gdpgrowthr~e	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
fdi	.7196107	.2657029	2.71	0.008	.1896831	1.249538
export	-.1064651	.0500069	-2.13	0.037	-.2062006	-.0067295
_cons	8.152448	1.35106	6.03	0.000	5.457844	10.84705
sigma_u	1.4095617					
sigma_e	2.6577211					
rho	.21953462	(fraction of variance due to u_i)				

F test that all u\_i=0: F(2, 70) = 4.09 Prob > F = 0.0208

#### 4.4 Random Effects Model

The outcomes from the random effect model shows that the probability value of the F statistic is equal to 0.0000 less than 0.05. This data shows us that our

model is well acceptable and fitted. The calculation also shows that the variable of FDI and export are significant to explain GDP growth rate. It means that this model at overall fulfill our requirement.

**Table 3. Random Effect Model Result**

Random-effects GLS regression		Number of obs	=	75
Group variable: country		Number of groups	=	3
R-sq: within	= 0.1500	obs per group: min	=	25
between	= 0.9962	avg	=	25.0
overall	= 0.3749	max	=	25
Random effects u_i ~ Gaussian		wald chi2(2)	=	43.19
corr(u_i, X) = 0 (assumed)		Prob > chi2	=	0.0000

  

gdpgrowthr~e	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]
fdi	1.193958	.2092043	5.71	0.000	.7839248 1.603991
export	-.1241995	.0409114	-3.04	0.002	-.2043844 -.0440146
_cons	7.639296	1.106096	6.91	0.000	5.471389 9.807204
sigma_u	0				
sigma_e	2.6577211				
rho	0	(fraction of variance due to u_i)			

#### 4.5 Hausman Test Analysis

Hausman test applied to check which model is appropriate whether fixed effect model or random effect model. The null hypothesis is random effect model appropriate and alternative hypothesis is fixed

effect model is appropriate. If the probability value is less than 5 %, we can reject null hypothesis and accept alternative hypothesis. In this case, fixed effect model is the right model and should accept fixed effect model as our model.

**Table 4. Hausman Test Result**

	Coefficients		(b-B) Difference	sqrt(diag(v_b-v_B)) S.E.
	(b) FIXED	(B) RANDOM		
fdi	.7196107	1.193958	-.4743471	.1638034
export	-.1064651	-.1241995	.0177344	.0287566

b = consistent under Ho and Ha; obtained from xtreg  
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

$$\begin{aligned} \text{chi2}(2) &= (b-B)' [(v_b-v_B)^{-1}] (b-B) \\ &= 9.32 \\ \text{Prob}>\text{chi2} &= 0.0095 \end{aligned}$$

The probability value is less than 10% so that this study accept null hypothesis. Therefore fixed effect model is more appropriate than the random effect model. The study considers the results of fixed effect models as: in GDP Growth rate = 8.15 + 0.071 FDI + 0.010 EXPORT

The equation above shows that Foreign direct investment has positive influence and significant at 5 % level. One percentage change in FDI and export lead to percentage change in GDP growth rate. In this case, foreign direct investment increases at 1 % related to 0.071% increases in a regions' growth. It means foreign direct investment positively influence

economic growth in Indonesia, China and India. These results are consistent with A study by Mehmet Eryigit (2012), investigated the long-term relationship between foreign direct investment and export volume, foreign direct investment and GDP, and export and GDP through co-integration test. The study conducted panel data analysis for the period of 2000 to 2010 from 15 countries. Based on the test on Error correction, the study concluded that there is long-term relationship between FDI and export, FDI and GDP and export and GDP. The study also consistent with a study on Indonesian case by Andi Nurhikmah Daeng Cora, et.al (2018) investigates the relationship between foreign

direct investment, export, and GDP growth in Indonesia using Vector Error Correction Model (VECM) for the period 1981-2015. The result suggests that there is a relationship between foreign direct investment, GDP growth and export for Indonesia. The Vector Error Correction Model shows that there is long run and short run causality running from FDI and GDP to export.

## 5. CONCLUSION

The study finds that foreign direct investment in Indonesia, China and India influence economic growth positively. The results showed that foreign direct investment- export- GDP growth rate co-integrated in long-run association. An increase in foreign direct investment and exports positively correlated with an increase of economic growth in Indonesia, China and India. The government for Indonesia, China and India need to manage and implemented appropriate direction to foreign direct investments and exports. The policy makers have to develop the country economic by giving easy access for FDI, more incentive to investors to invest and make easy the regulations of exports. This effort will improve economic growth.

There are some limitations need to be addressed in this study. The study only limited to three variables of each country. For future research, the study can extend to see others variables relating to economic growth rate such as consumption models, imports, exchange rate of each countries.

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