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# THE EFFECT OF FOREIGN DIRECT INVESTMENT ON ECONOMIC GROWTH IN INDONESIA

Pengaruh Investasi Asing Langsung Terhadap Pertumbuhan Ekonomi Indonesia

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#### ABSTRAK

Hubungan antara investasi asing langsung atau Foreign Direct Investment (FDI) dengan pertumbuhan ekonomi merupakan salah satu tema yang paling banyak diperdebatkan dalam ilmu ekonomi. Penelitian ini bertujuan untuk menginvestigasi dampak dari FDI terhadap pertumbuhan ekonomi di Indonesia. Metode penelitian yang digunakan dalam studi ini adalah regresi linier dengan berbasis pada data time series dari tahun 1981 hingga 2012. Hasil penelitian ini menunjukkan bahwa tidak ada hubungan khusus antara FDI dengan pertumbuhan ekonomi di Indonesia, baik secara langsung maupun tidak langsung. Lebih dari itu, FDI mendominasi investasi domestik di Indonesia dan tidak ada bukti signifikan yang menunjukkan bahwa FDI lebih efisien untuk pertumbuhan ekonomi dari pada investasi domestik.

Kata Kunci: Investasi asing langsung, Pertumbuhan ekonomi, Sumber Daya Manusia, Investasi domestik

#### ABSTRACT

The relationship of Foreign Direct Investment (FDI) on economic growth is one of the most debatable topic in economic. This study is aiming to investigate the impact of FDI on economic growth in Indonesia. This research using linear regression method which base on time series data from 1981 to 2012. A Major finding is there is no special relationship between FDI and economic growth, both directly and indirectly. Moreover, FDI does crowd-in the domestic investment and is no significance evidence to prove that FDI is more efficient on economic growth than domestic investment.

Keyword: Foreign direct investment; economic growth; human capital; domestic investment;

JEL Classification: E22

#### 1. Introduction

The effect of foreign direct investment (FDI) and economic growth of the host country has been a long discussion and debate. It became one of the two most important issues and questions being researched theoretically and empirically, other than the determinants of FDI itself (Driffield & Love, 2007). It is quite understandable since economic growth is the main economic and welfare indicator which every country will put much effort on it. While FDI is involving international activity in the host country, it must give some benefits for the economic growth.

Theoretically FDI will increase growth through two channels: capital accumulation and total factor productivity. These two channels are derived from classical model of endogenous growth. There are at least three underlying motivations that encourage investment in particular country: access to market, differences in factor endowment, and access to natural resources (Hejazi & Pauly, 2003)

While Borensztein, Gregio, and Lee (Borensztein, et al., 1998) emphasize their study on the role of technological diffusion as the important underlying motivation of FDI. They argue that the main determinant of the long-term economic growth is the rate of technological progress. The main result of their study is a country will get the benefit from the inflow of FDI to that country if there is a certain level of human capital stock available.

This paper is trying to focus only on Indonesia's case. The motivation is because of Indonesia has been an important economic power since the last few years in both Asia and the world. Indonesia is the largest economy in Southeast Asia and its GDP is expected to reach US\$1 trillion in 2013; Indonesia is also a member of G20, a group of the largest twenty economies in the world. By the early 2012, Indonesia

had been awarded an investment grade status by Moody's and Fitch which reflects the better investment climate in Indonesia. It has been providing a big opportunity for multinational company to invest in Indonesia within FDI framework.

There is a positive trend of realized FDI inflow since the post-crisis 1997 until 2011 (as shown by Figure 1), although there are some cyclical up and down during this period. It suggests that Indonesia is becoming more open to external economy, especially in term of FDI.

Figure 1. Realized Foreign Direct Investment (FDI) in Indonesia



Source: Indonesia Investment Coordinating Board, 2013

Using the study from (Borensztein, et al., 1998) as a foundation, the main objective of this study is to examine empirically the role of FDI on technological transfer and economic growth in Indonesia. Since human capital stock is determining the absorptive capability of the advance technology, I will also examine the impact of interaction of FDI and human capital stock on economic growth. This paper will also examine the effect of FDI on domestic investment. Some hypotheses are developed: FDI is important factor of economic growth; FDI does not give effect directly to economic growth, but need a certain level of human capital stock; FDI will spillover or crowd-in domestic investment; and FDI is more efficient than domestic investment in affecting economic growth.

These hypotheses are going to be tested using time series OLS regression with 32 yearly data on some variables. The main regression is consisting of economic growth as a dependent variable which will be regressed on FDI and human capital stock. However, to create a better regression, this study is trying to include some important control variables.

The results from the examination are not supporting the hypothesis that FDI is indeed an important factor to economic growth. There is no significant relationship between FDI and economic growth. The interaction of FDI and the human capital stock is also insignificant to economic growth. Another result suggests that FDI is not more efficient that domestic investment in influencing economic growth.

This paper is organized into six sections as follows: the first section is introduction and will be followed by discussion of previous research in the literature review as the second section. In the third and fourth section I will describe the methodology and data used in this research. The fifth section will be a discussion and an analysis of the result. And the last section is conclusion and recommendation for further research.

#### 2. Literature Review

There are some empirical research discussing the relationship between FDI and economic growth. But, there is no single conclusion since the results are varied among cases. Some studies may prove that FDI has significant effect on economic growth, and some others give evidence that there is no significant relationship between these variables.

The study conducted by Borensztein, et al., (1998), which is used as the main reference of this study, give an empirical evidence that FDI indeed affect economic growth but indirectly through its interaction with human capital stock available in the host country. This interaction is needed because the absorptive capability of the technological diffusion is required to get full benefit of FDI. Another finding also suggests that FDI does not have independent impact on economic growth (Carkovic & Levine, 2002). Graham & Wada (2002) have the similar result in the case of China's economic growth. They find that FDI has contributed significantly to economic growth in China by increasing total factor productivity. Har, Teo, and Yee (2008) find the consistent result using Malaysia's time series data over the 1970-2005 periods, that there is a significant relationship between FDI and economic growth.

However, there also some evidences that FDI has no effect on economic growth. Kosack and Tobin (2006) investigate empirically the effect of FDI and aid to economic growth and human development by using panel data estimation of 89 countries. Their results suggest that in one side FDI does not affect economic growth and slows down the rate of human development in less-developed countries. In the other side aid has powerful impacts on both economic growth and human development. One important argument is that FDI will decrease the rate of human development if there is no extensive human capital in the country. They compare these FDI and aid, but eventually they demonstrate that they are not substitute or even complements in the development of developing countries. The finding from Aitken and Harrison (1991) suggest that there is limited or no evidence of the relationship of FDI and economic growth in Venezuela (Lim, 2001).

#### 3. Methodology

The standard estimation of FDI's impact on economic growth is based on the endogenous economic growth model. Based on Borensztein, Gregio, and Lee (1997), FDI is playing an important role in a technical progress in an economy. This technical advancement is the result of 'capital deepening' by increasing the number of varieties of capital goods. The economy is considered as follow:

### $Y_t = AH_t^{\infty}K_t^{1-\alpha}$

where A is an environment consists of various control and policy variables that give an influence on the level of productivity, H represents human capital stock which is considered as a given endowment, and K denotes physical capital in the host economy.

Borensztein, Gregio, and Lee then develop a simple linear regression model to examine the impact of FDI on economic growth:

$$g=c_0+c_1FDI+c_2FDI\times H+c_3H+c_4Y_0+c_5A$$

where g is economic growth as a function of FDI, human capital stock of H, initial GDP per capita of  $Y_{0}$ , and a set of variables in A. Economic growth g is measured by GDP per capita growth, while FDI is measured as ratio to GDP. The inclusion of variable  $Y_{0}$  to capture the presence of the 'catchup' effect. In this study, the set of variables A comprises government consumption and the inflation rate.

#### 4. Data

The data used for this study are time series data of Indonesia's economy during 1981 until 2012 (32 years). All of the data are mainly collected from World Bank's databank, except the data of human capital stock is taken from Barro and Lee (2013).

Net inflows of FDI (new investment inflow less disinvestment) as the percentage of the GDP's host country is going to be used to measure variable FDI. The data is actually based on balance of payments data reported by the International Monetary Fund (IMF), and is complemented by the World Bank. IMF acknowledges FDI as an investment which includes "equity investment, including investment associated with equity that gives rise to control or influence; investment in indirectly influenced or controlled enterprises; investment in fellow enterprises; debt (except selected debt); and reverse investment." (World Bank Data Bank) The growth rate of income is measured by the annual percentage of growth rate GDP per capita, which is based on constant local currency; the aggregates data are based on constant price 2005 U.S. dollars. For initial income, this study is using GDP per capita in constant price 2005 U.S. dollars. Government consumption is general government final consumption expenditure as the sum of all government's purchases on goods and services, including compensation of employees, and national defense and security. This government expenditure is measured in percentage of GDP. Domestic investment is represented by the gross fixed capital formation which is recognized formerly as gross domestic fixed investment as a percentage of GDP. This series consists of land improvement, plant, machinery, and equipment purchases; and the construction of roads, railways, and the like, including schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings. Inflation rate is measured by the annual percentage change in the consumer price index.

For human capital stock variable, this study uses the average years of total secondary schooling for the age group above 15 constructed by Barro and Lee (2013). Since Barro and Lee only provide 5-yearly data, the yearly is produced by calculating the average growth for each 5 years.

The following table is the descriptive statistic of the data:

Variable	Obs	Mean	Std. Dev.	Min	Max
FDI	32	0.8064	1.2579	-2.7570	2.9160
GDP per capita growth	32	3.6898	3.8377	-14.3850	7.0980
GDP per capita	32	1158.0410	853.6962	449.1840	3556.7860
Government Expenditure	32	8.5088	1.6074	4.3800	11.5400
Schooling	32	1.1219	0.2262	0.6600	1.6500
Inflation	32	10.0941	9.4242	3.7200	58.3900
Investment	32	25.6106	3.7882	19.4300	33.8700

#### **Table 1. Summary of Descriptive Statistics**

And the following table is showing the correlation between variables:

Table 2. Correlation between variables							
	FDI	GDP per capita growth	GDP per capita	Gov expend	Schooling	Inflation	Investment
FDI	1						
GDP per capita growth	0.3651	1					
GDP per capita	0.5063	0.1799	1				
Government expenditure	0.0225	0.2482	-0.2735	1			
Schooling	0.3649	0.1575	0.7868	-0.3649	1		
Inflation	-0.2271	-0.8484	-0.2656	-0.3047	-0.2404	1	
Investment	0.7255	0.2393	0.6382	-0.0431	0.4302	-0.1639	1

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The table shows that FDI has positive correlation with the growth of GDP per capita, and generally has positive correlation with all variables except inflation. While schooling variable is positively correlated with FDI and GDP per capita growth.

#### 5. Result

Since the examination will be conducted in time series regression, we need to test the stationary of the variables to create a consistent result. For the time series regression model analysis, we have to use the stationary variables. If the variables are not stationary at level, then we should check at first, second, third, or more difference which is stationary. Among all the variables are used in this study and tested using Augmented Dickey-Fuller test, only the inflation variable is stationary at level. While FDI, growth of GDP per capita, GDP per capita, and schooling are stationary at the first difference. Total investment is stationary after second difference, and government consumption is stationary at the third difference. Moreover, the interaction between FDI and schooling are stationary at the first difference and the interaction of total investment and schooling is stationary after second difference.

The objectives of this study are to examine the effect of FDI on economic growth and how important the human capital stock, the effect of FDI on domestic investment, and weather FDI is more efficient than domestic investment. Therefore, there will be three regression models, which are derived from the basic regression model.

#### 5.1. The effect of FDI on economic growth

In this first specification, economic growth is regressed on FDI. Table 3. shows the result of the regression.

			R	egressio	on Number		
	1.1		1.2	C	1.3		1.4
In dam an damt Maniahlar	Coefficient						
independent variables	(standard err	or)					
Initial GDP per capita	0.0127		0.0130		0.0134		0.0089
	(0.0038)	***	(0.0063)	**	(0.0037)	***	(0.0051)
Schooling	-4.0435		-3.9721		3.6237		0.1832
	(7.9982)		(5.4726)		(9.5243)		(9.8009)
Government expenditure	0.0542		0.0518		-0.0459		0.2003
	(0.4071)		(0.4862)		(0.4050)		(0.4457)
FDI	0.1448				7.8411		1.6539
	(0.8192)				(5.4937)		(7.3370)
FDI*Schooling			-0.0205		-6.9952		-1.8131
			(0.8614)		(4.9397)		(6.3964)
Inflation rate							-0.1629
							0.1300
Constant	-1.2598		-1.2779		-1.2245		0.7799
	(0.8131)		(0.9189)		(0.7970)		(1.7829)
No. observation	29		29		29		29
Adjusted R <sup>2</sup>	0.2578		0.3630		0.2876		0.3049
Durbin	1.9456		1.9571		1.9622		1.8934

	Table 3.	FDI	and	per	capita	GDP	Growth
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Note: Dependent variable is 1<sup>st</sup> difference of growth of GDP per capita, Initial GDP per capital at 1<sup>st</sup> difference, Schooling is 1<sup>st</sup> difference of average years of total secondary schooling for age group above 15, Government expenditure at 3<sup>rd</sup> difference, FDI at 1<sup>st</sup> difference, Interaction of FDI and Schooling at 1<sup>st</sup> difference, Inflation rate at level. Durbin refers to p-value of Durbin Watson alternative test (H0: no serial correlation). \*10 percent; \*\*5 percent; \*\*\*1 percent

The table reveals some interesting or even surprising result from four regressions with different component of independent variables. In the regression 1.1 coefficient of FDI is positive; it means that FDI gives a positive impact on economic growth. The result is produced after controlling initial GDP, schooling, and government expenditure. However, this coefficient is not statistically significant.

The specification in regression 1.2 is replacing the FDI variable by the interaction of FDI and schooling. The coefficient of this interaction is negative which suggests that human capital stock that available in the host country and used to absorb technological transfer through FDI does not improve economic growth. Again, however, the coefficient is not statistically significant.

Regression 1.3 and 1.4 examines more variables including control variables of government expenditure and inflation rate. None of the coefficient of the FDI and the product of FDI and schooling are statistically significant, even though the signs of coefficient are varied; the coefficient of FDI is positive in all regressions, and the coefficient of the interaction term is negative. Moreover, the Durbin Watson test for each regression is showing the value close to 2, so there is no statistical evidence of the presence of autocorrelation in the residuals (error terms are not auto correlated).

Overall, it can be concluded that FDI does not have direct and indirect effect to economic growth; the direct effect through the variable of FDI itself, while the indirect effect through the variable interaction between FDI and human capital (schooling). This result is not consistent with the hypothesis stated earlier that FDI indeed does not have direct effect on economic growth, but it has indirect effect through its interaction with the human capital stock.

This result might be in line with the argument from Nunnekamp and Spatz (2003) that effect of FDI on economic growth is ambiguous because of ignoring the suitability if the type of FDI with the host country's fundamental economic situation. They mention at least three kinds of type of FDI based on the motivation: resource-seeking, market-seeking, and efficiency-seeking. There is a possibility that the aggregate FDI inflows to Indonesia cannot be differentiated clearly those type, that can affect to the impact of the economic growth.

#### 5.2. The effect of FDI on domestic investment

Further examination is conducted to investigate the relationship of FDI and total investment, especially domestic investment. FDI contributes to economic growth by augmenting capital accumulation. Theoretically, enabling FDI in the host country will give two possible impacts on domestic investment: FDI will crowd-in (improve) the domestic investment or FDI will crowd-out (decrease) the domestic investment.

Regression Number

0.1
2.1
fficient

Table 4. FDI and aggregate investment rate

	2.1	2.2		2.3
	Coefficient			
Independent Variables	(Robust stan	dard error)		
Initial GDP per capita	-0.0001	0.0004		-0.0019
	(0.0024)	(0.0018)		(0.0031)
Schooling	0.0697	4.9678		3.2239
C	(3.9184)	(5.5479)		(5.2687)
Government expenditure	-0.4175	* -0.4815	**	-0.3567
*	(0.2127)	(0.1878)		(0.2099)
FDI	-0.1361	4.7806	**	1.6444
	(0.3828)	(2.1561)		(3.2089)
FDI*Schooling	· · · ·	-4.4688	**	-1.8421
e		(2.0195)		(2.7520)
Inflation rate		. ,		-0.0825
				(0.0711)
Constant	0.0414	0.0639		1.0799
	(0.4344)	(0.3952)		(1.1931)
No. observation	29	29		29
$R^2$	0.1392	0.2384		0.2862
Durbin	2,1770	2.3556		2.3852

Note: Dependent variable is 2<sup>nd</sup> difference of investment, Initial GDP per capital at 1<sup>st</sup> difference, Schooling is 1<sup>st</sup> difference of average years of total secondary schooling for age group above 15, Government expenditure at 3<sup>rd</sup> difference, FDI at 1<sup>st</sup> difference, Interaction of FDI and Schooling at 1<sup>st</sup> difference, Inflation rate at level. Durbin refers to p-value of Durbin Watson alternative test (H0: no serial correlation). \*10 percent; \*\* 5 percent; \*\*\* 1 percent

To test this issue, table 4 shows several specifications of regression model with aggregate investment as the dependent variable. Regression 2.2 and 2.3 show that FDI increases total investment more than one for one, while in regression 2.1 the coefficient of FDI is negative. Total investment consists of domestic investment and FDI, therefore coefficient of FDI equal to one means FDI does not affect domestic investment.

The result could suggest that FDI is indeed crowding-in domestic investment. However, not all the coefficients are statistically significant within the different specifications. Only the specification in regression 2.2 the coefficient of FDI is statistically significant at five percent. Perhaps, it is because in this specification the interaction term (FDI and schooling) is included. The coefficient of interaction term itself is also statistically significant, even though the sign in negative. This suggests that the complementary between FDI and domestic investment is sensitive to the productivity of FDI. Therefore, FDI will improve domestic investment directly, but indirectly it will reduce domestic investment. The net effect will depend on the level of schooling.

All the regression specifications are suspected to have autocorrelation problem. The test using Durbin Watson shows the statistic a bit larger than 2 which means the successive error terms are positively correlated. Having autocorrelation in the regression model may mislead a model look better than it actually is. The coefficients are unbiased, but no longer effective to estimate the parameter because the true variance of parameters are increased and estimated variance of parameters are smaller.

#### 5.3. Efficiency of FDI and Domestic Investment

This part is aiming to test whether FDI is more efficient than domestic investment in affecting the economic growth. The overall specifications of regression model are the same with first regression model, except the inclusion of total investment in the following regressions. FDI is more efficient if the coefficients are statistically significant and larger that the coefficients of total investment.

In all specifications, none of the coefficients of FDI and total fixed investment is statistically significant, suggests that they are not affecting economic growth. Even if we put the interaction terms –both the interaction between FDI and schooling, and the interaction of total investment and schooling- the coefficients are still statistically insignificant. Therefore, there is no difference between FDI and domestic investment. Moreover, the Durbin Watson statistic show the values close to 2, which means no serial correlation problem in the model.

The argument that the interaction of human capital is unique only for FDI in affecting the economic growth, while domestic investment does not need certain level of human capital stock, is not proven here. Neither FDI nor domestic investment has significant impact on economic growth after interacting with human capital. One possible reason because the type of FDI inflows to Indonesia did not need a special skill; almost of FDI was just simply the assembly factories, which can be learned quickly and easily.

	Regression Number							
	3.1	3.2		3.3		3.4		3.5
	Coefficient							
independent variables	(Robust stand	lard error)						
Investment rate	0.2286	0.2250		0.0544		0.1621		-0.0739
	(0.4021)	(0.4108)		(0.3205)		(0.5065)		(0.2883)
Initial GDP per capita	0.0127	0.0130	**	0.0134	**	0.0134	**	0.0088
	(0.0059)	(0.0061)		(0.0052)		(0.0053)		(0.0058)
Schooling	-4.0594	-4.0478		3.3537		5.6353		0.4216
	(5.2409)	(5.6035)		(7.5116)		(9.3892)		(5.8723)
Government expenditure	0.1497	0.1468		-0.0197		-0.0669		0.1739
	(0.4586)	(0.4474)		(0.4811)		(0.5546)		(0.4588)
FDI	0.1759			7.5812		7.1535		1.7754
	(1.0971)			(6.9565)		(6.7885)		(5.4244)
FDI*Schooling		0.0282		-6.7523		-6.3311		-1.9493
		(0.9164)		(5.9179)		(5.8162)		(4.8235)
Investment rate*schooling						-0.1209		
						(0.2843)		
Inflation rate								-0.1690
								(0.1166)
Constant	-1.2692	-1.2850		-1.2280		-1.3071		0.8597
	(0.8801)	(0.9119)		(0.7483)		(0.8208)		(1.2809)
No. observation	29	29		29		29		29
$R^2$	0.3733	0.3721		0.4153		0.4185		0.4546
Durbin	2.0578	2.0689		1.9862		1.9705		1.8569

#### Table 5. Per capita GDP growth: productivity of FDI and domestic investment

Note: Dependent variable is  $1^{st}$  difference of growth of GDP per capita, Initial GDP per capital at  $1^{st}$  difference, investment rate at  $2^{nd}$  difference, Schooling is  $1^{st}$  difference of average years of total secondary schooling for age group above 15, Government expenditure at  $3^{rd}$  difference, FDI at  $1^{st}$  difference, Interaction of FDI and Schooling at  $1^{st}$  difference, Interaction of investment rate and schooling at  $2^{nd}$  difference, Inflation rate at level. Durbin refers to p-value of Durbin Watson alternative test (H0: no serial correlation). \*10 percent; \*\* 5 percent; \*\*\* 1 percent

#### 6. Conclusion

The effect of FDI on economic growth has been and will be one of the most important issues in economic studies. Theoretical and empirical studies provide various findings; no single conclusion has been made. Therefore, the discussion will be still relevant for some circumstances.

This paper is trying to investigate the effect of FDI on economic growth in Indonesia. Moreover, other tests are also conducted to know whether FDI has indirect effect on economic through interaction with human capital, the effect of FDI on domestic investment, and the efficiency of FDI relative to domestic investment.

Using time series data during 1981-2012 periods, this study finds that there is no special relationship between FDI and economic growth, both direct and indirectly. This will be an addition to empirical evidence of FDI-growth counter argument. Moreover, in some cases FDI does crowd-in the domestic investment, and there is no significance evidence to prove that FDI is more efficient on economic growth than domestic investment.

Despite this result, there are some limitations in this study that could be addressed to get better result. First, the number of observation is only 32 and the number became smaller in the model because of the use of non-level variable lead. Second, this study only uses two control variables, which is often cannot capture the real condition. The control variable should be added to establish a representative model.

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