Foreign Direct Investment and Economic Growth in Indonesia: Role of Human Capital and Trade Openness

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Abstract

This study examines FDI – economic growth nexus in Indonesia throughout 1970 to 2019. It also focuses on analyzing whether FDI-human capital and FDI-trade openness complement each other to enhance economic growth. Employing the autoregressive distributed lag (ARDL) bound test and fully modified ordinary least square (FMOLS), the study find cointegrated relationship between FDI and economic growth. Specifically, the interaction between FDI and human capital is statistically non-significant to long-term growth. However, interestingly FDI and trade openness complement each other to encourage long-term growth. From the policy perspective, this study supports the improvement of the quality of human capital to enhance the benefits of a foreign presence in the economy and further reforms in the trade sector to enhance long-term growth in Indonesia.

Key words : Foreign Direct Investment, Human Capital, Trade Openness, Economic Growth, ARDL

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INTRODUCTION

Foreign direct investment (FDI) has become an integral part of an open international economic system and is widely known to be one of the main catalysts for the enhancement of developing countries. Nowadays, many countries have liberalized their FDI regimes and pursued specific policies to attract investment, and discussed how best to maximize the benefits of a foreign presence in the domestic economy. Many scholars argue that foreign investment not only creates capital accumulation but also brings positive externalities through the adoption of new technologies, managerial skills, and knowledge of developed countries (OECD, 2002).

There are at least two perspectives on the impact of FDI on developing countries: the financial flows, and the knowledge flows that accompany capital. Based on the latter perspective, the effects of FDI can be found mainly in the transfer of technology from developed to developing countries. In this

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view, FDI is an important channel of economic integration through the transfer of knowledge, technology, and management practices and systems from multinational enterprises to their host countries (Doytch & Narayan, 2016). Baldwin et al., (2005) develop an endogenous growth model finds that the transfer of new or superior technologies through FDI and export channels can increase economic growth. Further research by Borensztein, et al. (1998) concludes that a country's ability to take additional benefits from FDI (in the form of technology transfer) is limited by the stock of human capital in the host country. Without adequate human resources, the impact of FDI in the host country may not be very significant (Saggi, 2002). Li & Liu (2005) and Batten & Vo (2009) found that the impact of FDI on growth is stronger in countries with higher levels of education. Similarly, Su & Liu (2016) in China and Baharumshah & Almasaied (2009) in Malaysia found the positive role of human capital on FDI to drive growth. These results ignite skepticism, which was shown by other studies that demonstrate the contrary. Ram and Zhang (2002), and Makki & Somwaru (2004) found weak evidence that the interaction between FDI and human capital affects growth, as well as specific studies in developping countries such as Nigeria (Akinlo, 2004), Vietnam (Hoang et al., 2010), and Pakistan (Rehman, 2016). Likewise, Yanping et al., (2016) in the case of Western China, find that financial development is more important than human capital in promoting GDP growth. This mixed evidence implies that the role of human capital on the FDI-economic growth nexus remains an open question.

Widely known, that the new growth theory provides analytical support for the role of investment and trade in promoting long-run growth (Feasel et al., 2001). The critical issue regarding the relationship between FDI and trade is whether it is complementary or substitute. One of the reasons that FDI and trade are substitutes is that they are two alternative modes of entry. However, there is reason to believe that FDI does not replace exports, but stimulates them, as FDI allows companies to build a larger distribution base, thereby expanding the product line sold in foreign markets beyond what exports can achieve (Moosa 2002). FDI can stimulate international trade by increasing trade flows between developing and industrialized countries (Goldberg & Klein, 1997) and affect innovation and long-run growth (Grossman & Helpman, 1991). These views are also supported by Makki & Somwaru (2004), Batten & Vo (2009), and Lee & Tan (2006). Nevertheless, Ramondo & Rodriguez-Clare, (2010) examine the channels through which openness affects growth by considering three channels: trade, multinational enterprises, and the direct diffusion of ideas. They find that the diffusion of ideas is quantitatively more important than trade and multinational enterprises in accounting for gains from openness. Although the existing literature largely supports complementary nexus, country-specific testing may yield different evidence. Guided by cross-border growth models, this study examines whether human capital and trade openness in the host country plays a role in technology transfer from FDI to drive long-term growth in Indonesia over the period 1970-2019.

Questions about the role of human capital and trade on the FDI-economic growth nexus are interesting in Indonesia's context. Until now, the government of Indonesia has taken a clear policy to attract foreign investment. For instance, the November 2018 Phase XVI Economic Policy Package was followed by the issuance of PMK Number 150/PMK.010/2018 concerning the Provision of Corporate Income Tax Exemption Facilities or Subtraction. Nevertheless, FDI contributed only 2 percent to Indonesia's GDP, on average, over the last five years. Thus, the government needs to pay attention to whether a massive policy to attract FDI into the country can significantly drive economic growth. Regardless of the facts, President Joko Widodo in January 2018 stated that the

government will begin to focus on improving human resources, as a necessary condition to take full advantage of Indonesia's demographic dividends and to be globally competitive. Thus, this study attempts the linkage the role of human capital to FDI - economic growth nexus in Indonesia. On the other side, the government is also trying to increase the volume of international trade. So far, trade has contributed about 51 percent of Indonesia's GDP, on average over the period 1970-2019, although its contribution has tended to decline over the last five years, averaging 40% of GDP. This achievement needs to be improved. The Ministry of Trade in the 2020-2024 strategic plan targets to increase market access for Indonesia's goods and services in the international market, including increasing the percentage of exports from 42% to 46%. To many scholars, trade is a beneficial factor in driving the economic growth of developing countries. They have been made to integrate FDI and international trade theory (eg, Markusen, 2000). Goldbrg & Klein, (1997) have shown that FDI directed to developing countries affects their trade flows with industrialized countries. This is interesting since development strategies in the fields of investment, human resources, and trade in developing countries need to complement each other to encourage long-term growth. To our best knowledge, there is no research that examines the role of human resources, trade, and investment, simultaneously on Indonesia's long-term economic growth.

This study contributes to the literature in the following ways. While there is a broad consensus that FDI is important for developing countries, equally essential is whether human capital and trade openness of the host country play a role in the transfer of technologies brought by FDI. In our view, the analysis for country-specific data in this issue is still limited. No empirical research from a macroeconomic perspective has attempted to measure the interaction between FDI-human capital, and FDI-trade openness to Indonesia's economic growth over a time series of almost fifty years. Furthermore, the selection of time series analysis of country-specific data in this study will be more insightful than cross-country growth studies, as it allows for unique economic structures and solves the problem of heterogeneity about FDI-growth nexus. For the arrangement of this report, the other parts include the following, Section II, which provides the utilized methods, Section III, where the results and discussion are presented, and Section IV, which involves the conclusion.

METHOD

To analyze the FDI-growth nexus, we conducted the autoregressive distributed lag (ARDL) bound test proposed by Pesaran & Shin (1997) and Pesaran et. al. (2001). We chose this approach due to the following reasons: (i) it is relatively simple and allows estimation of the cointegration relationship using the OLS method; (ii) can test for the presence of a long-run relationship regardless of whether the variable is I (o) or I (1) or a combination of both; (iii) more efficient in limited sample studies (iv) correctly defined lag structure, not only controlling for serial correlation but also minimizing potential endogeneity in the model (Chen et al., 2017; Haug, 2002; Pesaran et al., 2001; Sakyi et al., 2015). We also employ FMOLS for robustness. This provides reliable estimates and statistical tests on a limited sample (Chen et al., 2017) and leads to the generation of asymptotically efficient coefficients that takes into account the serial autocorrelation and endogeneity (Menegaki, 2019). To obtain optimal lag, we used the Schwarz/ Bayesian Information Criterion (SIC / BIC) which tends to choose a parsimony model regarding the limited samples that we used (Kripfganz & Schneider, 2018). Before that process, The Dickey Fuller-Generalized Least Square (DF-GLS) and Zivot-Andrews (ZA) unit root tests were perfor-

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med to determine the degree of cointegration of each variable. These are a more robust "second generation" unit root test when compared to "first-generation" tests such as Augmented Dickey-Fuller and Phillip-Perron (Baum, 2005). Since the DF-GLS analysis failed to represent the structural breaks in series, we also performed the ZA test that allows for one structural break in the series, which may arise in intercepts, trends, or both (Baum, 2005).

Our model is based on the endogenous growth literature derived from a production function, in which the level of a country's productivity depends on FDI, human capital, trade, and domestic investment (Makki & Somwaru, 2004) with the following specification:

$$growth = f(FDI, SEC, TRD, DIV) \qquad (1)$$

Where growth is per capita GDP growth rate; FDI is FDI net inflow, SEC is human capital represented by secondary school enrollment, TRD is trade openness represented by the value of exports plus imports, DIV is domestic investment represented by gross fixed capital formation. Then we added government consumption (GOVCON) as a control variable that is frequently used as a growth determinant (Barro, 1996, 2000).

Human capital is an important facilitator of technology transfer from innovative countries to less innovative countries to catch up to developed countries. Accumulation of know-how – either by importing or learning by doing - will promote labor and capital productivity, hence, investment in human capital is proxied by educational variables (Baharumshah & Almasaied, 2009). Trade promotes economic growth; exports can increase productivity and alleviate the country's foreign exchange constraints; imports can provide the country with advanced technology (Belloumi, 2014). To rep-

resent the role of human capital and trade in the FDI - growth nexus, we added the interaction of FDI-human capital and FDI-trade openness, to test whether these variables complement each other to drive long-term growth (Borensztein et al., 1998; Makki & Somwaru, 2004). Thus, our empirical model is formulated in Eq.(2) as follows:

$$growth_t = \beta_0 + \beta_1 FDI_t + \beta_2 SEC_t + \beta_3 TRD_t + \gamma_1(FDI_t x \, SEC_t) + \gamma_2(FDI_t x \, TRD_t) + \varphi DIV_t + \delta GOVCON_t + \mu_t \qquad (2)$$

Later, we added the 1998 dummy variable to capture the impact of the Asian financial crisis and political instability on Indonesia's economic growth (dmy = 1 for 1998 and zero otherwise) and μ_t is the error term.

All variables were yearly data througout 1970-2019 obtained from the World Development Indicators(https://databank.worldbank.org). Growth is GDP per capita growth, FDI is FDI net inflows, Trade Openness (TRD) is sum of export and import, DIV is gross fix capital formation, GOVCON is government consumption. FDI, TRD, DIV, & GOVCON measured from the ratio to GDP. SEC is secondary enrollment rate (in percent). Table 1 summarizes the descriptive statistics of the utilized variables.

RESULTS AND DISCUSSION

The ARDL bound tests were valid when all variables were integrated at the level I(0) or the first difference I(1), combined both, and not in higher order. If a variable is integrated at I (2) or higher, the F-statistic calculation for cointegration becomes inconclusive since the critical bonds are based on the assumption that all variables are stationary at I (0) or I (1) (Pesaran et al., 2001). In Table 2, the unit root tests show that all variables have stationary at I (1), hence the use of the ARDL bound test is proper. These tests also indicate that there is a 1998 break level for all variables - except human capital and government consumption, which supports the selection of the 1998 dummy model.

Table 1. Descriptive Statistics

	growth	FDI	SEC	TRD	DIV	GOVCON
Mean	3.708	1.205	50.808	50.543	26.571	9.151
Median	4.225	1.23	49.271	50.145	27.338	9.129
Maximum	7.318	4.241	90.761	96.186	35.072	12.035
Minimum	-14.351	-2.757	18.217	28.683	13.623	5.694
Std Deviation	3.014	1.322	22.36	10.979	5.748	1.422
Variance	9.086	1.746	499.958	120.533	33.035	2.021
Skewnwess	-4.463	-0.428	0.175	1.345	-0.262	-0.127
Kurtosis	27.1	3.819	1.924	7.588	2.018	2.814
JB normality	2.00E-299	0.232	0.263	1.60E-13	0.275	0.902

Source: World development indicator

Table 2. Unit Root Test

Variables	DF-GLS		ZA	
	Intercept	Intercept & Trend	Intercept & Trend	BreakPoint
Panel.1 Level				
growth	-4.528***	-4.666***	-6.237 ***	1998
FDI	-2.692 ***	-2.789	-4.399	1998
SEC	1.343	-2.579	-4.034	1990
TRD	-1.432	-1.801	-7.422	1998
FDI * SEC	-1.857	-2.656	-4.716	1998
FDI * TRD	-3.094 ***	-3.149*	-4.191	1998
DIV	-0.194	-1.744	-4.573	1998
GOVCON	-1.557	-1.693	-3.851	1994
Panel.2 First Difference				
AFDI	-3.084 ***	-4.326***	-10.182 ***	2001
ASEC	-3.543 ***	-3.819 **	-7.207***	1989
ATRD	-6.826 ***	-7.239***	-10.845***	1999
AFDI * SEC	-4.773 ***	-5.219***	-8.54***	2001
AFDI * TRD	-4.135***	-4.864 ***	-8.899 ***	2001
ADIV	-4.122***	-4.689***	-7.835***	2003
AGOVCON	-5.206 ***	-5.701 ***	-10.196***	1999

Notes: Standard errors in parentheses, ***p<0.01, * ** p<0.05, * p<0.1

After confirming that all of our variables were not integrated at I(2) or more, we conducted ARDL Bound Test as shown in Table 3. Panel 1, Panel 2, and Panel 3 report the ARDL Bound Test, the ECT coefficient, and the Diagnostic Test, respectively. The diagnostic tests include non-autocorrelation tests (Breu-sch-Godfrey LM test & Durbin-Alternative Test), homoskedasticity test (White Test), nor-mality test (J-Bera), and parameter stability test (Sb CUSUM). As shown in Panel 1, the F-statistic and t-statistic values in all models are above the critical values provided by Kripfganz & Schneider (2018) at the 1% level of significance. Thus, H_0^F and H_0^t in the absence of cointegration are rejected, or there are an evidence of a long-run relationship between FDI and economic growth over the period 1970 - 2019.

Panel 2, ECTt-1 whose values were negative at the 1% significance level which indicates the convergence process in the equilibrium path of Indonesia's economic growth throughout the sample period. ECTt-1 values are between -0.77 and -1.29 indicating that the change from short to long-run is corrected between 77-129% per year. Furthermore, as shown in Panel 3, all models are no serial correlation, homoscedastic, and have stable parameters. Although the stochastic error in our model is not normally distributed as expected under classical assumptions, the ARDL still provides a consistent estimator of the BLP (Best Linear Predictor) regardless of any normality assumptions.

Next step, we identified the magnitude of FDI on growth in the long term as shown in Table 4, which includes 3 models. Model (1) covers the main growth model including FDI,

SEC, TRD, FDIxSEC, FDIxTRD, DIV, and GOV-CON, model (2) without government consumption, and model (3) extends a dummy 1998. And then, the FMOLS technique was paired respectively.

As represented in Table 4, FDI has a negative effect on long-term growth. It is statistically significant except for the dummy model. In this estimation, the dummy variable turned out to the affect of FDI and the other variables on growth. However, the FMOLS verifies that the impact of FDI remains negative and significant even in the dummy model. Based on the ARDL in the model (1) and (2), the magnitude of the impact of FDI is between -2.595 and -3.257, or an average of -2.926. While in FMOLS between -1.491 and - 4.484 or an average of -3.08. As in Borensztein et al. (1998), these results imply that FDI makes a negative contribution to long-term growth.

Table 3. ARDL Bound Test, ECTt-1, & Diagnostic Test

	Model 1	Model 2	Model 3
ARDL	(2.0.0.1.0.0.0.0)	(2.0.0. 1.0. 0. 0)	(1. 0.0. 0. 0. 0. 0. 0. 0)
Panel 1. F_{stat} & t_{stat}			
F-statistics	6.931***	6.811***	34.212***
Critical value (F)			
I (0)	3.399	3.77	3.464
I (1)	5.345	5.478	5.176
t-statistics	-6.573 ***	-6.516***	-10.137***
Critical value (t)			
I (0)	3.971	-3.569	-3.578
I (1)	-5.444	-3.26	-5.611
Panel 2. ECT			
ECTt-1	-1.259***	-1.292***	-0.774***
Panel 3. Diagnostic Test			
Dorbinait (X^2)	0.265	0.135	0.895
Bgodfrey (X^2)	0.206	0.115	0.881
White test (X^2)	0.432	0.432	0.65
Jarque-Bera (X^2)	0.024	3.40E-06	1.10E-05
SB CUSUM (X^2)	0.604	0.368	0.435
	(stable)	(stable)	(stable)

Notes: Standard errors in parentheses, *** p<0.01

It may be easier to understand that FDI does not contribute additionally to growth but it is difficult to understand the situation in which FDI will reduce growth.

A possible explanation, such as in Herzer (2012), FDI can reduce capital accumulation when foreign investors demand scarce resources, such as import licenses, skilled labor, credit facilities, and FDI activities, which can hinder domestic investment. Positive externalities from management, skills, ideas, and technology might have a small impact on local resource development, and may even hinder development by suppressing the growth of local entrepreeurship due to the dominance of MNCs in the local market (Todaro & Smith, 2015). As in Agosin & Machado (2005), funding proceeds from M&A are generally not used to increase production capacity, so the impact on capital formation is doubtful. In addition,

FDI can have a crowding-out impact on the domestic economy. This effect occurs when domestic companies have limited absorption while foreign companies dominate, and the market becomes less efficient, with a potentially negative effect on growth and investment (Farla et al., 2016). This result is in contrast to Febiyansah (2017) which shows the positive effects of inward FDI on economic activity in Indonesia in the long run, from 2000 to 2012, and Narayan, (2019) for the period 1998-2018. However, Narayan (2019) stated that their research was based on a short sample period and was therefore limited in terms of dynamics and growth factors captured in a single equation model. Thalib, (2017) normative legal research finds that, while the Indonesian government imposed performance requirements in the regulation of foreign investment for a faster technology transfer effect, the surrounding legislation is weak and not enforced.

Table 4. Long Run Coefficient of ARDL and FMOLS

| Independent Variable | Dependent Variable: growth per capita | | | | | |
| | Model 1 | | Model 2 | | Model 3 | |
	ARDL	FMOLS	ARDL	FMOLS	ARDL	FMOLS
FDI	-3.257⁰**	-4.464***	-2. S95***	-3.264⁰**	-0.846	-1.491**
	(0.961)	(1.13)	(0.901)	(1.153)	(1.121)	(0.715)
SEC	0.069*	0.229*	0.042	0.214	0.066*	0.148*
	(0.032)	(0.119)	(0.028)	(0.133)	(0.033)	(0.073)
TRD	0.148*	0.237*	0.096*	-0.184**	0.031	0.066*
	(0.0457)	(0.046)	(0.035)	(0.042)	(0.053)	(0.038)
FDI* SEC	0.018	0.019	0.011	0.003	0.019	0.023**
	(0.013)	(0.015)	(0.012)	(0.016)	(0.014)	(0.009)
FDI* TRD	0.054***	0.068***	0.050*	0.062	0.002	0.016
	(0.018)	(0.022)	(0.018)	(0.024)	(0.021)	(0.060)
Div	0.037	-1.114	0.024	-0.048	0.067	0.016
	(0.076)	(0.101)	(0.078)	(0.114)	(0.087)	(0.060)
GOVCON	-0.514*	0.590*			-0.587*	-0.513***
	(0.275)	(0.0324)			(0.031)	(0.193)
dmy 1998					-23.740***	-16.158***
					(3.612)	(1.790)
Intercept	23.064⁰**	28.778***	12.666***	17.256***	9.654***	15.277***
	(6.223)	(5.856)	(3.557)	(3.549)	(4.543)	(3.952)
adjusted R²	0.72	0.28	0.70	0.20	0.86	0.11

Notes: Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table 4 showed that human capital has a negative effect on growth and it is statistically significant. The FMOLS ensures that these results remain significant in the dummy model. Further, the interaction of FDI and human capital on growth is positive, but it is statistically insignificant. In this process, FMOLS found the same results, except for the dummy model, although the resulting coefficient was very small.

These results indicate that human capital is not yet a long-term growth channel and has not an effective channel for technology transfer from FDI. Limited relationships between foreign investors and local actors, limited recruitment of local employees, and a lack of incentives for foreign investors to transfer technology may justify the reasons for it (Sultana & Turkina, 2020); Iamsiraroj, 2016). But noteworthy that the increase in secondary school enrollment rates may not reflect the quality of human resources required for technology transfer. UNDP (2020) shows that the 2018 Indonesian Human Development Index is still low (0.491) or ranked 111th in the world and ranked 6th in ASEAN countries. This figure is far behind Singapore (0.649) and still lower than Brunei Darussalam (0.587), Malaysia (0.558), Thailand (0.531), and the Philippines (0.494). Furthermore, as in Wößmann & Hanushek (2007), instead of increasing school attainment, the cognitive skills of the population - are closely related to individual income, income distribution, and economic growth.

Table 4 reports that trade openness has a negative effect on growth and it is statistically significant, except for the dummy model. The FMOLS confirmed that the effect is statistically significant even in the dummy model. Then we test how FDI and trade interact on growth, which ARDL finds positive and statistically significant, except for the dummy model. As previously discussed, the use of a dummy in ARDL estimation affects the significance of the relationship of other independent variables on growth.

Based on the ARDL and FMOLS appro-aches in the model (1), the impact of FDI and trade is between 0.054 and 0.068 indicating that a 1% increase of interaction FDI and trade elevated growth by 0.54% and 0.68% when all factors are constant. This result implies that trade openness itself is not sufficient to drive long-term growth. However, the entry of FDI will encourage trade in the domestic economy so they complement each other to encourage gro-wth. In this case, FDI provides the opportunity to expand a larger distribution base increasing the product line in the market beyond what can be achieved through exports or can be consumed through imports. Helpman (1984), stated that if FDI inflows further promote export productivity, FDI and trade will complement each other to increase growth. Thus, FDI inflows affect international trade flows to promote growth (Goldberg & Klein, 1997) and are very likely related to technology transfer through trade channels. The result is in line with Makki & Somwaru (2004) and Batten & Vo (2009).

As shown in Table 4, the ARDL and FMO-LS find that the effect of domestic investment on long-term growth is statistically insignificant. Furthermore, government consumption and dummy 1998 have a negative effect and are statistically significant. This may be related to the crowding-out effect on the economy from government consumption (a fiscal deficit leads to an increase in loan demand and interest rates, as well as a decrease in private investment). The 1998 dummy model confirms that the financial crisis and national political instability have a very significant impact on growth. In the ARDL approach, the magnitude of the impact of the 1998 dummy can be seen from the magnitude of the resulting coefficient and its impact on the significance of the relationship between other independent variables in the model. This is possible for technical reasons: the major changes

in economic growth in 1998 rendered the other explanatory variables insignificant.

CONCLUSION

This study examines FDI – economic growth nexus in Indonesia throughout 1970-2019 and analyzes whether FDI-human capital and FDI-trade openness complement each other to enhance long-term growth. This study indicates cointegrated relationships between FDI and economic growth in Indonesia. Specifically, FDI has a negative effect on growth, and the interaction between FDI and human capital is statistically insignificant to long-term growth. These results indicate that human capital has not an effective channel for technology transfer from FDI to encourage long-term growth. On the other side, the interaction of FDI with trade openness has a positive effect on long-term growth, which indicates the effect of complementarity between them. Th-us, the positive impact of FDI on the economy is influenced by the extent to which FDI interacts with trade openness to promote growth. If FDI inflows further boost, for instance, export productivity, FDI will stimulate growth.

Based on these results, improving the quality of human capital is needed to increase the absorption of technology from FDI, not only at the level of educational attainment but more emphasis on skills to enhance the benefits of a foreign presence in the economy. Also, the government needs further reforms in the trade sector to increase the positive impact of FDI on long-term growth. In this regard, investment from FDI needs to be encouraged to create high-value-added products that are export-oriented by maximizing domestic resources.

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