Trade and Foreign Direct Investment on Economic Growth in Indonesia: ARDL Approach

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Abstract

The purpose of this research is to examine the short- and long-term effects of foreign investment and trade on economic development in Indonesia. This analysis makes use of yearly time series data spanning the years 1985 to 2020. This data is derived from secondary sources such as the World Bank. In this research, the dependent variable is the national gross domestic product, which serves as a proxy for economic growth. In this research, the independent variables are trade (T) and foreign direct investment (FDI), which serve as indices of economic activity. The findings of the research utilizing the ARDL technique indicate that although two factors, trade, and foreign direct investment, have little influence on economic development, in the long run, they do have a considerable effect in the short run. According to the ARDL results, trade and foreign direct investment are critical for Indonesia's economic growth, but in Indonesia, a trade sector dominated by imports causes this variable to have a significant negative relationship with economic growth, implying that the greater the proportion of trade, the lower economic growth in Indonesia.

Background

Solow's theory of economic growth explains that investment and population growth are factors that influence economic growth. In neoclassical theory, it is also explained that international trade is needed for economic growth. Based on the neoclassical growth theory, the capital owned by the state is one of the requirements to build economic growth in the country. Capital from various sources will help drive the country's economy (Vehapi, Sadiku, & Petkovski, 2014).

The success of economic growth or income of a province cannot be separated from increased investment. Theoretically, it is known that investment is a means of increasing the capital stock, whose presence in an area will determine the economic capacity of that area. In various literature, there has been a consensus regarding the higher productivity of foreign investment (FDI) relative to domestic investment. FDI has the potential to enhance production via a multiplier effect, transfer technology and expertise, and improve the degree of competition among local enterprises (Sadeghi, Shahrestani, Kiani, & Torabi, 2020).

According to the hypothesis that foreign investment benefits the host country's economic development, such as the study conducted by Magazzino & Mele (2022) in Malta from 1971 to

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2017. As Athukorala (2003) discovered, FDI has a positive influence on GDP, and there is a unidirectional association between GDP and FDI in Sri Lanka. Contrary to the findings of Sadik and Bolbol (2001), the quantity of entering FDI has a negative effect on the total output of Tunisia, Egypt, and Saudi Arabia. Consider prior findings of the link between FDI and economic growth, which indicate a positive and negative relationship. This became the primary reason for us to use time-series data to explore the link between FDI, trade, and economic development in Indonesia. The purpose of this research is to examine the short- and long-term effects of foreign investment and trade on economic development in Indonesia.

Economic growth is a long-term process of increasing production. According to neoclassical economic growth theory, economic development is influenced by four factors: population, the total stock of products and capital, geographical area and natural richness, and degree of technology utilized (Astuti, 2016). This theory also explains that international trade is needed for economic growth because the benefits derived from the specialization and trade of a country can encourage an increase in opportunity costs. In other words, investment and foreign commerce have a favorable impact on the economy.

There is a need for foreign investment since development finance is not entirely provided by the government because the government has a budget deficit in addition to providing opportunities for the private sector to participate in developing the Indonesian economy. Development financing from the private sector, especially foreign investment, is expected to increase economic growth and provide employment opportunities as well as accelerate the poverty alleviation process (Kuncoro, 2004).

According to a recent report, Malaysia has emerged as one of Southeast Asia's most attractive FDI locations. However, what impact will this influx of FDI have on the Malaysian economy? The endogenous growth model was developed to determine the influence of foreign direct investment in Malaysia's economic development. The yearly data set spans the years 1975 to 2010. International investment and human resource development have been shown to be critical to the economic prosperity of the host nation. To spur economic development, technical advances brought on by FDI inflows must be supplemented with more human capital. This means that the government should put more effort into strengthening the nation's workforce in order to attract and service foreign direct investment (FDI). In addition, economic openness and the foreign exchange environment will continue on a beneficial path (Fadhil & Almsafir, 2015).

Research Methodology

The World Bank has provided this data as a secondary source. For the years 1985 to 2020, the following variables will be analyzed using two different time series models. The GDP of the country is used as a measure of economic growth in this research. Trade (T) and FDI (FDI) are the study's independent variables since they serve as indicators of how economic activity is affected. We use the following econometric model:

$$Eg_t = \beta_0 + \beta_1 EG_{t-1} + \beta_2 EG_{t-2} + \beta_3 EG_{t-3} + \beta_5 T_{t-1} + \beta_6 T_{t-2} + \beta_7 FDI_{t-1} + e_t$$

Where,
EG : Economic growth
T : Trade
FDI : Foreign direct investment
e : Error term
t : Time series

According to the study of Pesaran et al. (2001), the cointegration test employed the obtained F-statistical value as the foundation for reaching judgments regarding whether there was cointegration among research variables.

Dynamic ARDL was used in this work. When the independent variables undergo a shock, it is possible to investigate, simulate, and forecast it using the ARDL model, as stated by Khan et al. (2020). ARDL simulation models may be employed if there is a cointegration connection between study variables, according to Jordan and Philips (2018).

Result and Discussion

According to the study's variables, descriptive data are shown in Table 1.

Table 1. Descriptive statistics

	EG	T	FDI
Mean	4.864960	52.52893	1.172908
Median	5.500952	51.87710	1.347943
Maximum	8.220007	96.18619	2.916115
Minimum	-13.12673	33.19173	-2.757440
Std. Dev.	3.642906	11.68134	1.311260
Skewness	-3.754225	1.421566	-1.154323
Kurtosis	18.52443	6.890509	4.184849
Jarque-Bera	433.6863	33.86171	9.819999
Probability	0.000000	0.000000	0.007372
Sum	170.2736	1838.513	41.05177
Sum Sq. Dev.	451.2060	4639.427	58.45967
Observations	35	35	35

The results of descriptive statistics are expressed in terms of the mean, min, max, and Std Dev. EG Mean 4,864, EG Min -13,126, EG Max 8,220, EG Std Dev 3,642. T Mean 52.528, T Min 33,191, T Max 96,186, T Std Dev 11,681. FDI mean 1.172, FDI min -2.757, FDI max 2.916, FDI Std Dev 1.311. EG is Indonesia's economic growth, T is Indonesia's trade as a percentage of GDP, and FDI is a foreign direct investment in Indonesia.

Before using the ARDL model to estimate the value, a stationary test should be performed. Augmented Dickey-Fuller (ADF) may detect whether the series is not stationary by evaluating the error component, which contains any possibility for autocorrelation if the series is not stationary. Here are the results:

Table 2. ADF's Unit Root Test on EG, T, and FDI data in Indonesia

Variable	Unit Root	Include in the examination Equation	Statistics for the ADF Test	5% Critical Value	Description
Economic Growth (EG)	Level	Intercept	-3.851914	0.0058	Stationer

			-2.510594	0.1219	
Trade (T)	Level	Intercept	-2.510594	0.1219	
	First Diff	Intercept	-8.868588	0.0000	Stationer
Foreign Direct Investment (FDI)	Level	Intercept	-2.303508	0.1767	
	First Diff	Intercept	-5.511589	0.0001	Stationer

The EG data is stationary at the original level, while the T and FDI data are stationary at the first difference. This is indicated by the Augmented Dickey-Fuller Test, with a probability of 0.0058, a probability of less than 5%, in this case, the EG data shows stationary in the original data. The same thing happened to the T and FDI data which were stationary at the first difference from the original data. Likewise, if we test the stationarity of the three data simultaneously, the results are as follows:

Tabel 3. Stationary Test

Series	Prob.	Lag	Max Lag	Obs
EG	0.0000	0	7	33
T	0.0000	0	7	33
FDI	0.0001	0	7	33

The data of the three variables if tested stationary at the same time shows that prob < 5%, meaning that all three are stationary.
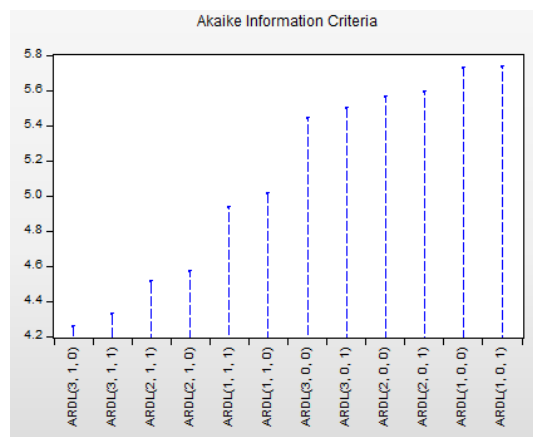
Picture 1. Optimum Lag Test

The optimum lag test is carried out to see which lag is suitable for use in the next test, from the picture above, it can be seen that lag 3 is the most recommended.

Tabel 4. ARDL bounds test

F-Bounds Test				
Test Statistic	Value	Signif.	I(0)	I(1)

F-statistic	29.57561	10%	2.63	3.35
K	2	5%	3.1	3.87
		2.5%	3.55	4.38
		1%	4.13	5

According to the findings of the ARDL model's Limit Test in Table 1.4, the F-statistic model value of 29.57561 is larger than the upper limit value at the 5% level and even greater than the upper limit values at the 2.5% and 1% levels. This demonstrates that the three variables examined in this research, namely economic growth, trade, and foreign investment, are long-term cointegrated, or that the three variables move in lockstep over time.

Tabel 5. ARDL analysis results

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
EG(-1)	-0.161425	0.101241	-1.594464	0.1239
EG(-2)	-0.580022	0.100773	-5.755721	0.0000
EG(-3)	-0.299346	0.090523	-3.306866	0.0030
T	0.017940	0.035637	0.503402	0.6193
T(-1)	-0.306415	0.039748	-7.708955	0.0000
FDI	1.731552	0.387963	4.463191	0.0002
C	-0.478557	0.332890	-1.437583	0.1635
R-squared	0.863243	Adjusted R-squared		0.829054

The adjusted R-squared value and the R-Bar-squared value of the ARDL model are relatively high, with an average of around 0.82 and 0.86. The adjusted R-squared value of 0.82 indicates that each of the independent variables in the specified ARDL model, namely trade and foreign direct investment, can account for 82% of the variance in the dependent variable of economic growth. This is an indication that this research model is good enough to be analyzed. As can be observed from the ARDL estimate findings, the EG(-1) variable has a coefficient value of -0.16, indicating that the previous year's economic growth factor is also a factor affecting economic growth. For instance, a 1% economic growth rate in the preceding year would result in a 16 percent decline in Indonesia's GDP. Economic growth in the previous year also played a more important role when compared to trade and foreign direct investment, where the coefficients were relatively larger than those of trade and FDI. The value of the trade coefficient is 0.17 which means an increase of 1 percent will increase by 17%.

Conclusion

Indonesia is one of the developing countries that have an economic growth rate above the projected average world economic growth rate. The factor of trade and foreign direct investment is quite massive from 1985 to 2020 to encourage economic growth in Indonesia. The findings of the research utilizing the ARDL technique indicate that although two factors, trade, and foreign direct investment, have little influence on economic development, in the long run, they do have a considerable effect in the short run. According to the ARDL results, trade and foreign direct investment are critical for Indonesia's economic growth, but in Indonesia, a trade sector dominated by imports causes this variable to have a significant negative relationship with

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