

Causality Relationship between Economic Growth, Export, and Foreign Debt in Indonesia

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Abstract

This study examined the causality relationship between economic growth, exports, and foreign debt in Indonesia. This study used time-series data during 1984-2020. The data analysis methods used were the vector error correction model (VECM) and the Granger causality test. The results showed that in the long run, exports and the exchange rate had a significant and negative effect on economic growth, while foreign debt had a positive and significant effect on economic growth. According to the Granger causality test, there was a two-way relationship between exports and economic growth and exports as the determining factor for economic growth. There was no Granger relationship between foreign debt and economic growth, although the foreign debt was a determining factor for economic growth. There was a Granger relationship between the exchange rate and economic growth, but the exchange rate was not a determining factor for economic growth, and there was also a Granger relationship between the exchange rate and exports, but the exchange rate did not determine exports.

Keywords: economic growth, exports, foreign debt, and exchange rate

1. Introduction

Economic development aims to increase state income to encourage economic growth and social welfare. The potential of natural resources in Indonesia is quite adequate, and this is an asset that needs to be explored to increase economic growth. In fact, since 1980, Indonesia's economic growth has always been positive even though the income level has moved slowly. Therefore, capital loans from other countries are necessary to increase economic growth because of the lack of skill in human resources in processing natural resource potentials to finance economic development (Atmadja, 2000).

Besides, efforts to increase economic growth in Indonesia through foreign trade by increasing exports are moving slowly. Since 1984, exports ratio to Gross Domestic Product (GDP) was 8%, and decreased in 1990 by 2%, then increased in 2000 by 3%, and decreased again in 2010 by 2%, and continued to decline in 2020 by 1% (Statistics Indonesia 2020). The decline in exports in Indonesia is due to export goods and demand in the world market that cannot compete with agricultural goods in other countries due to the low-quality production (Amri & Nazamuddin, 2018). The unstable development of export value influences the decline in foreign exchange reserves in a state as a source to finance economic development.

Economic development that continues to develop in Indonesia requires large amounts of capital to finance it, while domestic capital is not sufficiently available. Therefore, the Indonesian government is forced to request loan assistance from other countries, such as low-interest loans (grants), development assistance, export credit, and other forms of loans. Since 1980, the ratio of foreign debt to GDP continued to increase, wherein 1984, it was 4.79% and decreased by 1.01% in 1990, then increased by 5.39% in 2000, and decreased again by 1.56%, but in 2020 government debt increases by 19.34%. Indonesia's debt growth has continued to develop over the past 10 years, indicating a tendency for higher economic development to be financed by foreign debt, but the usage is still not right with results that are not yet fully optimal. Meanwhile, foreign loans must be returned, at the same time with interest, where debt repayments damage the country's economic order, which has an impact on the people.

Studies on the relationship between economic growth, exports, and foreign debt have been carried out by a number of researchers. (Jones, 1989; Sheehey, 1990; Bahrumshah & Rashid, 1999). Ahmed et al (2000) examined the reciprocal relationship between exports, foreign debt, and economic growth in South and Southeast Asian countries. The result showed that there was no relationship between the three variables. Amoateng & Amoako-Adu (1996) examined the reciprocal relationship of export growth, foreign debt, and economic growth in various African countries. The results suggest that there is a two-way relationship between foreign debt, exports, and economic growth. Previously, the research study conducted by Bhat (1995) and Chandra (2003) pointed out that there is positive relationship between export growth and output growth. In line with Bhat and Chandra, an empirical study conducted by Shirazi and Manap (2004) also found a significant long-term relationship between these three variables.

Other researcher such as Pradhan (2010), Mishra (2011), Ray (2011), Kaur & Sindhu (2012), and Devi (2013) suggested the research results based on time-series analysis to explore the causal relationship between output growth and exports, where the first group of researchers supported the hypothesis and found that output growth was driven by exports. Saad's (2012) research results showed the reciprocal relationship between economic growth and foreign debt and exports had a direct relationship with economic growth and granger causality from exports to foreign debt and showed unidirectional causality from exchange rates to economic growth.

2. Method

This study used time-series data from 1984 to 2020. The data for Gross Domestic Product (GDP), Exports, Foreign Debt (DEP), and exchange rates (ECR) were obtained from the Indonesian Central Bureau of Statistics. Gross Domestic Product (GDP), Exports (EXP), foreign debt (DEP), and Exchange rate (ECR) were transformed in the form of Logs. To find a reciprocal relationship between economic growth, exports, and foreign debt in Indonesia from 1984 to 2020, the several steps used consisted of testing the unit root test following the Augmented Dickey-Fuller or ADF (1981) and developed by Phillip Peron (1988). The next step, the Cointegration Test based on Johansen and Juselius (1990) with maximum likelihood estimation and likelihood ratio test statistics based on the maximum Eigen test or trace test values. When these variables are integrated, two equations are as follows: (1) the long-term equation formulated as follow:

$$LGDP_t = \alpha_0 + \alpha_1 + LEXP_t + \alpha_3 LDEP_t + \alpha_4 ECR_t + \mu_t$$

LGDP is the logarithmic value of Gross Domestic Product, LEXP is the logarithmic value of exports, while LDEP is the logarithmic value of foreign debt, and ECR is the exchange rate. Meanwhile, μ_t is an error term. (2) the Vector Error Correction Model (VECM) utilized to investigate short run relationship between variables. Implementation of the dynamic model as mean of data analysis is also supported by a number of previous researcher (Amri, 2018; Hasyim et al., 2020; Nazamuddin & Amri, 2020; Adnan & Amri, 2021).

$$\Delta LGDP_t = \alpha_1 + \sum_{i=1}^{\rho} \delta_{1i} \Delta LEXP_{t-i} + \sum_{i=1}^{\rho} \theta_{1i} \Delta LDEP_{t-i} + \sum_{i=1}^{\rho} \gamma_{1i} \Delta ECR_{t-1} + \beta_1 ECT_{t-1} + \mu_{1t}$$

$$\Delta LEXP_t = \alpha_2 + \sum_{i=1}^{\rho} \delta_{2i} \Delta LEXP_{t-i} + \sum_{i=1}^{\rho} \theta_{2i} \Delta LDEP_{t-i} + \sum_{i=1}^{\rho} \gamma_{2i} \Delta ECR_{t-1} + \beta_2 ECT_{t-1} + \mu_{2t}$$

$$\Delta LDEP_t = \alpha_3 + \sum_{i=1}^{\rho} \delta_{3i} \Delta LEXP_{t-i} + \sum_{i=1}^{\rho} \theta_{3i} \Delta LDEP_{t-i} + \sum_{i=1}^{\rho} \gamma_{3i} \Delta ECR_{t-1} + \beta_3 ECT_{t-1} + \mu_{3t}$$

$$\Delta ECR_t = \alpha_4 + \sum_{i=1}^{\rho} \delta_{4i} \Delta LEXP_{t-i} + \sum_{i=1}^{\rho} \theta_{4i} \Delta LDEP_{t-i} + \sum_{i=1}^{\rho} \gamma_{4i} \Delta ECR_{t-1} + \beta_4 ECT_{t-1} + \mu_{4t}$$

Where, Δ is the first difference of operators, GDP is Gross Domestic Product, EXP is exporting, DEP represents foreign debt, and ECR is Exchange Rates. ECT is an error correction term referring to a long-term relationship between variables.

3. Results

The results of the research unit root test with the ADF from data on economic growth, exports, foreign debt, and exchange rate data from 1984 to 2020 as shown in Table 1.

Table 1. The result of the unit root test

Variables	Unit Root Test	ADF Test	Critical	Explanation
LGDP	Level I (0)	-2.658294	-2.945842	Not Stationary
	First Difference I(I)	-6.098829	-3.632900	Stationary
LEXP	Level I (0)	-2.734208	-2.945842	Not Stationary
	First difference(I)	-4.302993	-3.632900	Stationary
LDEP	Level I(0)	-1.435244	-2.945842	Not Stationary
	First Difference I (I)	-5.345445	-3.632900	Stationary
ECR	Level (0)	-0.718989	-2.945842	Not Stationary
	First Difference I (I)	-7.139865	-3.632900	Stationary

Sign *** (**) rejects H0, indicating that the stationary variable is significant at 1% (5%)

Table 1 shows that LGDP, LEXP, LDEP, and ECR are not stationary at level I (0) because the critical value > the ADF test value is significant at the 5% level. Therefore, it is necessary to apply the first difference I (I). Based on the stationary test of LPDB, LEXP and LDEP, and ECR in first difference I (1) show the ADF value > critical value at the 1% level. Thus, the three variables are stationary.

Table 2. The result of Johansen cointegration tests

Hypothesized No. of CE(s)	Trace Statistics	0.05 Critical value	Probability
None *	48.04976	47.85613	0.0479
At most 1	15.80695	29.79707	0.7258
At most 2	9.205021	15.49471	0.3468
At most 3	3.793955	3.841466	0.0514
Hypothesized No. of CE(s)	max-eigen statistics	0.05 Critical value	Probability
None *	32.24280	27.58434	0.0117
At most 1	6.601931	21.13162	0.9678
At most 2	5.411065	14.26460	0.6893
At most 3	3.793955	3.841466	0.0514

Note: * Significant at 5%. Critical Values from Osterwald-Lenum (1992).

The cointegration test in Table 2 with Trace Statistics shows that two vector equations are cointegrated at a significant level of 5% and through max-eigen statistics with the results of the two vector equations with a significant cointegration of 5%. Thus, there is a long-term relationship between LGDP, LEXP, LDEP, and ECR. So, the null hypothesis is rejected from the trace statistics, and there is one vector equation cointegrated in the max-eigen statistics.

Table 3. The result of long-term estimates

Variables	Coefficient	Standard Error	t-statistics
C	-19.92959		
LEXP	-1.073869***	0.31127	-3.45000
LDEP	1.890775***	0.53149	3.55750
ECR	-0.000424***	0.00012	-3.40519

Note: *** ** and* show significant at 1%, 5% and 10%.

The results in table 3 show that in the long run, exports or LEXP significantly affect economic growth (LGDP) but have a negative relationship. But based on long-term predictions, foreign debt or LDEP has a positive effect on economic growth or LGDP. Meanwhile, the exchange rate or ECR affects inversely or negatively on economic growth in Indonesia.

Furthermore, to study the existence of a short-term relationship, the Granger multivariate causality test according to the Vector Error Correction Model (VECM) correction models is used because there is only one co-integrated vector of the four variables. The test results using the VECM model can be presented in table 4, as follows:

Table 4 The result of the Granger causality test

Dependent Variables	Short-run lagged differences				
	Δ LGDP	Δ LEXP	Δ LDEP	Δ ECR	ETC_{t-1}
Δ LGDP		0.04431 1.40268	0.12550 -0.09984	644.143 -0.22675	0.07178*** -5.58862
Δ LEXP	0.48409 -2.09505**		0.44675 -0.08062	2292.96 0.22793	0.02339 -1.92498*
Δ LDEP	0.27535 0.58363	0.08972 1.23015		1304.24 -0.43113	0.06624 -1.74407*
Δ ECR	5.8E-05 -1,70669*	1.9E-05 -2.45596*	5.3E-05 -0.02403		339.980 0.65645

Note: *** ** and* show significant at 1%, 5% and 10%.

Based on the long-term prediction, exports in Indonesia cannot boost the real sector because exports are not productive in creating added value. After all, agricultural products exported still use semi-technology. Based on the results in table 4 using the Granger causality test with the VECM model, there is a two-way relationship between exports to GDP short and long-term relationship. It means export growth has not been able to encourage economic growth even though exports are a crucial factor in increasing economic growth, where the ECT coefficient is significant at 10% of exports to GDP. Long-term results show that foreign debt can boost economic growth because the government continues to increase debt, where debt can invest in building domestic industries to produce goods for export.

4. Conclusion

Based on the Granger causality test in table 4, there is no short-term and long-term two-way relationship of foreign debt with economic growth because debt can increase economic growth in the long term. However, in the short term, the debt must be paid using foreign exchange so that it has an impact on economic growth. However, foreign debt is not a determining factor that drives economic growth, although the ECT coefficient is significant at 10%. After all, debt is creating inverse economic growth because foreign debt is an obligation that must be paid.

Long-term predictions show that the exchange rate has not been able to drive economic growth. Although it is significantly affected, it has a negative relationship due to a crisis in the rupiah exchange rate against the dollar, resulting in domestically produced goods and services will decline the global market selling values. If examined based on the research results in table 4, there is a Granger relationship in the short and long term between the exchange rate to GDP,

which means that the rupiah exchange rate is weak against the dollar. It is proven by the insignificant ECT coefficient, which means that the exchange rate is not a determinant of economic growth. Furthermore, based on the Granger causality test in table 4, there is a two-way relationship in the long and short-term between exchange rates and exports, which affects the fluctuating exchange rate. If the Rupiah exchange rate against the dollar strengthens, it will increase export values (based on agriculture), but the ECT coefficient is not significant. It shows that the exchange rate is not a determinant of the increase in export value in Indonesia.

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