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## Analysis Dimensions of Globalization and Poverty : Vector Error Correction Model (VECM) Approach

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**ABSTRACT:** This study analyzes how the dimensions of globalization, economic growth, and income inequality affect poverty with the Vector Error Correction Model (VECM) model in the long term. This research method uses time series data and secondary data. The data used in this study are economic growth rate, Gini ratio index, de facto and de jure economic globalization index, social globalization index (%), and the number of poor people (%) in Indonesia from 1984 to 2020 sourced from BPS, World Bank, and KOF ETH Zurich. The result of this study is the cointegration of the dependent variable, namely poverty, with the independent variables, namely the dimensions of globalization, economic growth, and inequality in Indonesia. Hence, the model chosen in this study is the Vector Error Correction Model (VECM). Economic growth, economic globalization, social globalization, and economic cooperation negatively and significantly affect poverty in Indonesia in the long run. Inequality has a positive and significant effect on poverty in Indonesia in the long run.

KEYWORDS: Globalization, Poverty, Economic Growth, Inequality

#### I. INTRODUCTION

Poverty is one of the factors inhibiting the economic development process. The literature generally indicates that a large population ratio has a negative impact on economic growth to alleviate poverty [1]. In this case, Indonesia has a large population ratio, making poverty a significant challenge for Indonesia. According to Worldometers, Indonesia is the 4th most populous country, with 277.7 million people. In addition, based on the World Population Review in 2020, Indonesia is among the 100 poorest countries in the world, ranking 78th. This is because the World Bank changed the poverty line so that 13 million middle and lower-class Indonesians became poor. Economic development can be understood as various activities carried out by society to develop economic activities, which, in the long run, will impact increasing people's per capita income and improving people's living standards and welfare [2]. The direction of economic development is not only focused on increasing people's per capita income but also on reducing poverty, unemployment, and inequality in income distribution between social groups [3].

Economic development must be connected to involvement and interaction with other countries in the global arena. Based on the theory of comparative advantage proposed by David Ricardo (1817) it provides an understanding that the concept of comparative advantage underscores the importance of international collaboration and exchange. There isn't country is independent in all resources and capabilities, so through specialization in production following their respective comparative advantages, they can exchange goods and services, creating beneficial interdependence [4]. Globalization generally refers to the increasing integration between countries that ensures the efficient exchange of knowledge, technology, goods and services, and human mobility between countries [5]. Globalization has economic, political, and social impacts on people worldwide. Being a global citizen will inevitably mean knowing each other socially through various forms of communication, and globalization is the way the world's economies are connected through FDI and trade [6].

The trend of economic globalization in the last ten years has stagnated with an index in the range of 40-42. In other words, the economic globalization index has not experienced either an increase or a decrease; in 2020, it decreased due to the COVID-19 pandemic, which lowered the economic globalization index in Indonesia. Then, the economic cooperation index tends to decrease slightly from the 60s index range to the 58-56 index. Caused in 2014 by the decline in oil prices caused a mini-crisis in 2015 in Indonesia. Then, the social globalization index in Indonesia has increased in the last ten years with a range of 10 indices.





Figure 1. Economic Globalization Index, Economic Cooperation Index and Social Globalization Index in Indonesia Source : KOF ETH Zurich

Globalization and poverty are two significant issues on the global economic and political agenda today [7].Previous researchers have emphasized that globalization can be disastrous for the vulnerability of the poor in developing countries through increased poverty, unemployment, inequality, food and financial crises, and other economic variables [8], [9]. Then, there are several studies that show that globalization can reduce poverty levels [10]–[12], and other studies that globalization can increase poverty [7], [13].

In this era of globalization, creating a free market in which there are many trade activities between countries, both exports and imports, the benefits of a free market can increase the ease of imports and exports while creating jobs. Economic growth results from various factors, including labor force growth, physical capital growth, and productivity growth [14]. In Todaro, according to Kuznet, economic growth and poverty have a very close relationship. This is because poverty tends to increase in the early stages of the development process. However, the number of poor people tends to decrease gradually as the final stage of the development process approaches. Steady economic growth can create more employment opportunities in both the formal and informal sectors [15]. Additional employment will reduce unemployment and increase the income-earning population so that more people have decent jobs, which can improve living standards by creating opportunities for individuals to access resources such as education, health, and basic infrastructure so that people can escape the cycle of poverty.

Similarly, income inequality can limit individuals' access to education, health services, and economic opportunities [16]. This reduces their capability to fully participate in the economy and society, exacerbating poverty and inequality in the long run. It is argued that globalization increases investment, creates employment opportunities, and raises wages for unskilled and semi-skilled labor-intensive workers, increasing economic growth and reducing income inequality and poverty. So, with a long flow process in the influence of one variable to another, a method is needed to see the influence in the long and short term.

#### **II. RESEARCH METHODS**

This research method uses time series data and secondary data. The data used in this study are economic growth rate, Gini ratio index, de facto and de jure economic globalization index, social globalization index (%), and the number of poor people (%) in Indonesia from 1984 to 2020 sourced from BPS, World Bank, and KOF ETH Zurich. This study uses the VAR / VECM model framework to determine the suitable model for exogenous and endogenous variables.

1. Unit Root Test

The Unit Root Test is one of the more popular concepts recently used to test the stationarity of time series data. The stationarity test used is the ADF (Augmented Dickey-Fuller) test using a real level of 5% [17]. If the variable test is stationary at the level, then it will continue with VAR modeling, but if it is not stationary at the level. Then, it will be tested again at the first difference level. When the result is stationary and less than 0.05, it can continue in VECM modeling.

#### 2. Lag Optimum

Testing the optimal lag length is necessary in VAR/VECM estimation. This can be determined by Akaike Information Criterion (AIC) testing by selecting the smallest result from other lags. Then the benefit of this test is that it can remove the autocorrelation problem that often occurs in time series data so that the autocorrelation problem is considered to be absent with the selection of the optimal lag.Cointegration Test [17].

3. Cointegration Test

According to Engle-Granger, the presence of non-stationary variables increases the likelihood of a long-run relationship between variables in the system. One possible method to test for the presence of cointegration is the Johansen cointegration method. The correlation between variables is tested using a time-varying cointegration test. If the variables used in the model are cointegrated, it is assumed that there will be a long-run relationship between them and other variables [17].

#### 4. VAR/VECM

If there is cointegration, it will be continued with VECM modeling, but if there is no cointegration with a stationary test at the first difference level, it will continue with the VAR difference model. The equation that will be obtained in this research in the long term and short term:

 $\mathsf{POV} = \alpha_0 - \beta_1 \mathsf{GDP}_{t\text{-}1} + \beta_2 \mathsf{GR}_{t\text{-}1} - \beta_3 \mathsf{GEI}_{t\text{-}1} - \beta_4 \mathsf{SGI}_{t\text{-}1} - \beta_5 \mathsf{KEI}_{t\text{-}1} + \epsilon t$ 

 $POV_{t-j} = \alpha_0 - \lambda_1 GDP_{t-j} + \lambda_2 GR_{t-j} - \lambda_3 GEI_{t-j} - \lambda_4 SGI_{t-j} - \lambda_5 KEI_{t-j} + \lambda_6 ECTI_{t-j} + \epsilon t$ 

 $\alpha_0$  = Intersep

$$\begin{split} \lambda_{1..etc} &= \text{Coefficient of short-term relationship} \\ \beta_{1...etc} &= \text{Coefficient of long-term relationship} \\ \text{GDP}_t &= \text{Percentage of economic growth in year t (%)} \\ \text{POV}_t &= \text{Number of poor people in year t (%)} \\ \text{SGI}_t &= \text{Income inequality in year t} \\ \text{GEI}_t &= \text{Economic globalization index in year t} \\ \text{SGI}_t &= \text{Social globalization index in year t} \\ \text{SGI}_t &= \text{Social globalization index in year t} \\ \text{KEI}_t &= \text{Economic cooperation index in year t} \\ \text{at = error term} \\ \text{j} &= \text{Parameter (Lag 1,2,..dst)} \\ \text{t} &= \text{Years 1984-2020} \end{split}$$

#### **III. RESULT AND DISCUSSION**

The stationarity test using the ADF test results that all variables in the level test are greater than 0.05, so it can be said that the poverty variable (POV), economic growth (GDP), income inequality (GR), economic globalization (GEI), social globalization (SGI), and economic cooperation (KEI) show non-stationary results. While the results of the ADF stationarity test at the 1st difference level, all variables show stationary results because the probability of the 1st difference level is smaller than 0.05. The results of the optimum lag test with the AIC value on lag 3 are smaller than the AIC value of other lags of 32.88901. Then, the results of the cointegration test get the results of four indications of the trace test, which shows the existence of cointegration, namely the trace statistic value is greater than the critical value at four ranks at the 5% confidence level and is marked with an acentric sign (\*). Thus, the analysis in this study can be done using the VECM method.

#### Table 1. Stationarity Test, Lag Selection, and Cointegration Test Results

Variable / Lag / Cointegration Test	Probability / Statistic / Critical Value	Explanation / Prob.	
1st Difference Level (Prob)			
POV	0.0001		
GDP	0.0064		
GR	0.0010	Charling and	
GEI	0.0000	Stationary	
SGI	0.0000		
KEI	0.0000		
Lag Selection (AIC)			
Lag 3	LogL: -428.6687	AIC: 32.88901*	
Johansen Cointegration Test			
None *	Eigenvalue: 0.932308	Trace Statistic: 216.2325	
	Critical Value: 83.93712	Prob.: 0.0000	
At most 1 *	Eigenvalue: 0.789743	Trace Statistic: 127.3705	
	Critical Value: 60.06141	Prob.: 0.0000	
At most 2 *	Eigenvalue: 0.722522	Trace Statistic: 75.90959	
	Critical Value: 40.17493	Prob.: 0.0000	

At most 3 *	Eigenvalue: 0.527010	Trace Statistic: 33.60308
	Critical Value: 24.27596	Prob.: 0.0025

#### Source : Output E-views 9

Table 1 below shows the long-term results that all independent variables, namely economic growth, economic globalization, social globalization, and economic cooperation, negatively and significantly affect poverty in Indonesia in the long run. Meanwhile, inequality has a positive and significant impact on poverty in Indonesia in the long run. The economic growth variable has a negative and significant effect on poverty with 0.02772 percent. This means that a one percent increase in economic growth will cause poverty to fall by 0.02772 percent, along with other factors, such as ceteris paribus.

The inequality variable has a positive and significant effect on poverty of 4.58146, which means that when inequality increases by one index, poverty decreases by 4.58 percent with other factors ceteris paribus. Then, the economic globalization variable has a negative and significant effect on poverty of 1.05351. If economic globalization increases by one index, poverty in Indonesia decreases by 1.05 percent, along with other factors, such as ceteris paribus. The social globalization variable also has a negative and significant effect of 2.06487. This means that if social globalization in Indonesia increases by one index, poverty in Indonesia decreases by 2.06 percent with other factors ceteris paribus. The last independent variable, namely the economic cooperation variable, has a negative and significant effect on poverty in Indonesia of 0.4587, which means that when the economic cooperation variable increases by one index, there will be a decrease in the poverty variable by 0.45 percent with other factors ceteris paribus. The short-term results show that all economic growth, inequality, economic globalization, social globalization, and economic cooperation in lags 1, 2, and 3 have no significant effect on poverty. It can also be explained that economic growth, inequality, economic globalization, social globalization, and economic cooperation have no effect on poverty in the short term.

	0			
Variable	Coefisien	t-statistic	t-table	Conclusion
С	188,9687			
GDP	-0,02772	11,7022	2,0395	Significant
GR	4,58146	14,5932	2,0395	Significant
GEI	-1,05351	14,1683	2,0395	Significant
SGI	-2,06487	14,9799	2,0395	Significant
KEI	-0,45871	12,2649	2,0395	Significant

#### Table 2. Results of Long-Term VECM Estimation

Source : Output E-views 9

Based on previous tests, the stationary test was carried out with the 1<sup>st</sup> difference results and the cointegration of the test data so that the VECM data analysis model was determined in this study. The following are the results of regression coefficients with the VECM model in the form of long-term equations with (\* $\alpha$ =5%) :

 $\mathsf{POV} = 188,96 - 0,02772 \mathsf{GDP}_{t\text{-}1} * + 4,58146 \mathsf{GR}_{t\text{-}1} * - 1,05351 \mathsf{GEI}_{t\text{-}1} * - 2,06487 \mathsf{SGI}_{t\text{-}1} * - 0,45871 \mathsf{KEI}_{t\text{-}1} * - 1,05351 \mathsf{GEI}_{t\text{-}1} * - 1,05351 \mathsf{G$ 

The long-term equation above shows that all independent variables, namely economic growth, income inequality, economic globalization, social globalization, and economic cooperation, significantly affect poverty with an  $\alpha$  tolerance of 0.05 or t-statistic > t-table. This is in accordance with the hypothesis in this study that cointegration is present in the research test to get the results of the VECM model, which has a long-term equation.

#### DISUCUSSION

#### Economic Growth on Poverty in Indonesia in the Long Run

Economic growth negatively and significantly affects poverty, with a coefficient of -0.02772. The results of this study, along with the theory and previous research, show that economic growth has a negative effect on poverty. The trickle-down effect theory implies that economic growth is automatically accompanied by a vertical flow from the rich to the poor. The rich will feel the benefits of economic growth first, while the poor will benefit from the expenditure of these benefits. Therefore, the effect of economic growth on poverty alleviation is an indirect effect due to the vertical flow from the rich to the poor. If the poor only receive a small portion of the benefits of economic growth, then poverty reduction will only occur in small amounts. This situation can create opportunities for further poverty because economic growth favors the rich over the poor, thus widening income inequality. So, in accordance with the theory, economic growth affects poverty in the long term and is reduced on a small scale according to the results of the coefficient of -0.02772. As supported by previous research such as Akhmad et al., (2018); Hutabarat

et al., (2023); Kouadio & Gakpa, (2022); Marrero & Servén, (2022); Niyimbanira, (2017); M. A. Sari & Rofiuddin, (2022) which found that economic growth has a negative effect on poverty.

In 2023, manufacturing and trade were the two main sectors contributing to GDP in Indonesia. This shows that Indonesia has begun to experience economic progress that is less dependent on extractive sectors such as mining and agriculture, which tend not to have a major impact on creating broad and sustainable employment opportunities for local communities. However, agriculture and mining are still among the top five contributors to Indonesia's GDP. This condition is expected to continue so that it can reduce poverty in the long run. The relationship between economic growth and poverty has challenges and complexities that indicate that sustainable economic growth can reduce poverty in Indonesia in the long term. It also needs to be accompanied by supportive policies to ensure that the benefits of economic growth are evenly distributed throughout society.

#### Income Inequality and Poverty in Indonesia in the Long Run

Income inequality has a positive and significant effect on poverty, with a coefficient of 4.58146. This is consistent with theory and previous research that income inequality has a positive effect on poverty. Based on the Poverty Vicious Circle Theory, market imperfections or what can be called inequality in resource ownership patterns, the quality of human resources, and differences in access to capital lead to low community productivity and will increase poverty. So, when income inequality increases, which indicates the inequality of capital, poverty increases. The results of this study are also supported by several studies, such as Aisyah et al., (2023); Akhmad et al., (2018); Mehedintu et al., (2019); Osinubi & Olomola, (2020); Soava et al., 2020), that income inequality has a positive effect on poverty. Income inequality can limit individuals' access to education, health services, and economic opportunities [16]. This reduces their capability to fully participate in the economy and society, which can exacerbate poverty and inequality in the long run.

Income inequality can limit individuals' access to education, health services, and economic opportunities [16]. This reduces their capability to fully participate in the economy and society, which can exacerbate poverty and inequality in the long run. The inability of the poor to access capital and resources for investment in productive enterprises or education is a determining factor in widening income inequality. In contrast, capital resources are only accessible to the rich. Therefore, low productivity makes it difficult to compete in the labor market, leading to low wages and precarious working conditions, thus exacerbating poverty.

#### Economic Globalization on Poverty in Indonesia in the Long Term

Economic globalization negatively and significantly affects poverty, with a coefficient of -1.05351. This is consistent with theory and previous research that economic globalization has a negative effect on poverty. Modernization theory states that globalization, through mechanisms such as foreign direct investment (FDI), can spur economic growth and development that can reduce poverty [28]. For example, inward FDI is seen as a critical component of globalization that can promote economic development by bringing capital, technology, and managerial expertise. This theory also states that globalization can increase agricultural value-added in developing countries by increasing agricultural exports and improving farmers' welfare through better access to global markets and technology. This result is also supported by previous research, which states that economic globalization has a negative effect on poverty (Alinsato, 2015; Bergh & Nilsson, 2014; Firmani & Aif, 2021; Uzonwanne, 2018).

Based on World Bank 2019 data, Indonesia's trade-to-GDP ratio is at the bottom of ASEAN countries at 43.02% of GDP. Indonesia is below Laos, with a ratio of 75.83%, and Myanmar is 47.5%. The trade ratio data indicates that Indonesia's economic openness is still low. This shows domestic or national products cannot compete in the global market. Government policy is fundamental in increasing economic openness in Indonesia, with evidence that economic openness can reduce poverty in the long term by streamlining business licensing, improving infrastructure, providing incentives for export-oriented businesses, and improving the quality of human resources in formal education and informal training.

#### Social Globalization on Poverty in Indonesia in the Long Term

Social globalization negatively and significantly affects poverty, with a coefficient of -2.06487. This is consistent with previous research that social globalization has a negative effect on poverty [29]. Based on KOFGI, the social globalization index interprets international telephones, tourists, international students, migration, internet bandwidth, high-tech exports, and trade in cultural goods. Poverty is not only limited to financial difficulties, but it is also a result of the lack of empowerment, knowledge, opportunities, income, and capital [30]. Student exchanges can improve the quality of human resources. Investing in the education of these children is critical in improving their human capital and employment prospects and can, therefore, play an important role in long-term poverty alleviation [31]. With education, people can improve their health and productivity. People with good education will have basic knowledge and skills and will have the option to get a job, starting from increasing productivity and income [32].

Foreign tourists can reduce poverty by increasing local income and creating new jobs in various sectors, but tourists must spend their money on accommodations such as food, lodging, and transportation. Thus, the existence of tourism can increase income and reduce poverty. Several studies show that tourism can reduce poverty, such as Bakari, (2015); He et al., (2023); Tsaurai, (2021) Migration can also be a factor in reducing poverty with a mechanism that allows foreign workers to gain skills from the country where they work so that they can bring new knowledge that can be used in the local economic sector and also foreign workers with a higher exchange rate than Indonesia so that income is high so that there are remittances or money sent domestically as a source of family income [36].

#### Economic Cooperation on Poverty in Indonesia in the Long Run

Economic cooperation negatively and significantly affects poverty, with a coefficient of -0.45871. This is consistent with previous research that shows that economic cooperation has a negative effect on poverty. Economic cooperation often includes trade agreements that reduce tariff and non-tariff barriers, thereby increasing the volume of trade between countries [37]. Developing countries that are more integrated into the world economy experience faster economic growth and significant poverty reduction. Researchers have found that countries that increase exports tend to increase per capita income more than countries that are less open to international trade [38].

Economic cooperation can attract foreign direct investment, bringing capital, technology, and managerial skills to developing countries [39]. Direct investment can create new jobs, particularly in labor-intensive sectors such as manufacturing, agriculture, and services. When investment creates jobs, household incomes rise and move out of poverty. In other words, the primary need for foreign direct investment (FDI) in some developing countries is the development of proper infrastructure and access to raw materials, transportation routes, skills, and labor costs, which impact the community's economy. Foreign direct investment (FDI) positively impacts wages in the host industry [40]. In 2020, based on the economic cooperation index published by KOFGI within ASEAN, Indonesia ranked number 4 out of 10 countries, which means that economic cooperation is among the four highest in ASEAN. Singapore's economic cooperation index was 89.89, Malaysia's 72.05, Thailand's 63.76, Indonesia's 47.33, Cambodia's 55.58, Brunei Darussalam's 55.24, the Philippines' 54.65, Vietnam's 51.94, Laos' 47.16 and Myanmar's 42.72 in 2020. Therefore, government policy should make more effort to return from the benefits that exist in economic cooperation so that it can be utilized as well as possible for Indonesia's population of 275 million people, who are a potential market and a source of competitive labor.

#### **IV. CONCLUSIONS**

There is cointegration in the dependent variable, namely poverty, with the independent variables, namely the dimensions of globalization, economic growth, and inequality in Indonesia, so the model chosen in this study is the Vector Error Correction Model (VECM). Economic growth, economic globalization, social globalization, and economic cooperation negatively and significantly affect poverty in Indonesia in the long run. Inequality has a positive and significant effect on poverty in Indonesia in the long run. The independent variables of the dimensions of globalization, economic growth, and income inequality on poverty have no effect in the short term. This is of more concern to the Indonesian government in making appropriate public policies with a focus on the five contributing sectors to Indonesia's GDP: agriculture, mining, quarrying, processing industry, and trade repair. According to BPS, 51.33% of poor households work in agriculture. The agricultural sector is critical in developing policies such as the smart farmer program to improve farmers' quality of life by providing knowledge training, educational scholarships for farmers' children, government contract farming of agricultural products, and investment in agricultural technology.

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