DYNAMICS OF THE INTERDEPENDENCE BETWEEN MACROECONOMIC STABILITY AND POVERTY IN INDONESIA: A MULTI-DIMENSIONAL APPROACH

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ABSTRACT

This study analyzes the interdependence between macroeconomic stability and poverty in Indonesia using a Vector Autoregression (VAR) approach. Annual time series data from 1990 to 2024 are employed to examine the dynamic relationships among key macroeconomic variables, including GDP growth, inflation, real interest rate, Gini index, final consumption expenditure, and poverty rate. Stationarity tests indicate that all variables are stationary at level. The VAR model with an optimal lag of three is confirmed to be stable based on the characteristic root test. The Granger causality test reveals a unidirectional causal relationship from GDP growth to poverty and from consumption expenditure to GDP growth, as well as a bidirectional relationship between inflation and poverty. The impulse response function (IRF) simulation demonstrates complex dynamic interactions among variables, confirming the sensitivity of poverty to macroeconomic shocks. These findings underscore the importance of an integrated and multidimensional policy approach to addressing poverty while accounting for the dynamics of macroeconomic stability.

Keywords: Macroeconomic Stability, Poverty

1. INTRODUCTION

Poverty remains a complex development challenge in Indonesia, shaped by the interconnected dimensions of economic, social, and policy factors. Significant macroeconomic fluctuations, such as the 1998 Asian financial crisis and the COVID-19 pandemic, have demonstrated the vulnerability of poverty levels to external shocks (World Bank, 2024). However, understanding the dynamic relationship between macroeconomic stability and poverty remains limited, particularly within a framework that accounts for multidimensional interdependence.

Previous studies have examined the relationship between macroeconomic variables and poverty in a partial manner. Suryahadi et al. (2006) emphasized the role of economic growth in poverty reduction, while Sugema et al. (2010) highlighted the impact of inflation on the purchasing power of the poor. Nevertheless, approaches that integrate multiple macroeconomic variables into a unified dynamic analytical framework remain scarce.

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This study seeks to fill this gap by analyzing the interdependence between macroeconomic stability and poverty in Indonesia through the Vector Autoregression (VAR) approach. Specifically, it addresses the following research questions: (1) What are the causal relationships between macroeconomic variables and poverty? (2) How does poverty dynamically respond to shocks in macroeconomic variables? and (3) What are the policy implications of these interdependent relationships?

2. LITERATURE REVIEW

Studies on the relationship between macroeconomic conditions and poverty have evolved through various methodological approaches. Lütkepohl (2005) emphasized the advantages of the Vector Autoregression (VAR) model in capturing dynamic multivariate relationships. The application of the VAR model in poverty research was demonstrated by Ferreira (2012), who identified a bidirectional relationship between inequality and economic growth in developing countries.

In the context of Indonesia, Todaro and Smith (2006) highlighted the importance of inclusive economic growth for poverty alleviation. However, empirical studies that integrate multiple dimensions of macroeconomic stability remain limited. Inflation has been shown to exert a significant impact on poverty, while Koufias and Quisumbing (2001) underscored the crucial role of consumption expenditure in determining poverty levels. Addressing issues of economic growth, poverty, and income distribution requires structural and systemic reforms rather than short-term “crash programs.” Strategic policy measures—such as expanding and equalizing access to education, improving healthcare services, developing housing, creating employment opportunities, enhancing infrastructure to facilitate economic and trade activities, and fostering regional development to reduce interregional disparities—are essential (Nasution, 2014).

Poverty remains a persistent issue exacerbated by economic inequality and macroeconomic policies that have yet to achieve full inclusivity (Rohmah et al., 2024). The research gap addressed by this study lies in providing a comprehensive analysis that integrates six major macroeconomic variables within a VAR framework to elucidate the complex interdependence between macroeconomic stability and poverty in Indonesia.

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3. METHODOLOGY

3.1. Research Design

This study employs a quantitative approach with an explanatory research design. The Vector Autoregression (VAR) model is applied to analyze the dynamic relationships and interdependence among macroeconomic variables and poverty (Rusiadi et al., 2014).

3.2. Sample and Data

The study utilizes annual time series data covering the period from 1990 to 2024 (35 observations). The research variables include:

- **LINEPOOR:** Poverty headcount ratio (% of population)
- **G-GDP:** GDP growth rate (% annual)
- **INFL:** Inflation rate (% annual)
- **GINI:** Gini index
- **INTRATE:** Real interest rate
- **P-COMS:** Final consumption expenditure growth (% annual)

3.3. Data Collection

Data were obtained from secondary sources, including Statistics Indonesia (BPS), Bank Indonesia, and the World Bank Database. Data consistency and reliability were ensured through source triangulation.

3.4. Data Analysis

The data analysis was conducted in several stages:

- Stationarity testing using Levin, Lin & Chu, Im, Pesaran and Shin, ADF-Fisher, and PP-Fisher tests.
- Selection of the optimal lag length based on AIC, SC, FPE, and LR criteria.
- Estimation of the VAR model.
- Testing the stability of the VAR model through the inverse roots of the AR characteristic polynomial.
- Granger causality testing.
- Simulation of the Impulse Response Function (IRF).

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4. RESULTS AND DISCUSSION

4.1. Results

4.1.1. Stasionerity Test

The results of the stationarity tests at level are presented in Table 1. All the test methods employed, including Levin, Lin & Chu, Im, Pesaran and Shin, ADF-Fisher, and PP-Fisher, yield probability values below the 5% significance level ($p < 0.05$). This indicates that all variables in this study—GDP growth (GGDP), inflation (INFL), real interest rate (INTRATE), Gini index (GINI), final consumption expenditure (PCOMS), and poverty rate (LINEPOOR)—are stationary at level. The stationarity condition satisfies the primary requirement for the implementation of the VAR model without the need for data transformation through differencing.

Table 1

Results of Stationarity Tests at Level

Test Method	Statistic	Prob.	Remark
Levin, Lin & Chu	-2.89372	0.0019	Stationary
Im, Pesaran and Shin	-4.09813	0.0000	Stationary
ADF-Fisher	51.4309	0.0000	Stationary
PP-Fisher	63.8037	0.0000	Stationary

Source: Data processing results, 2025.

4.1.2. Optimal Lag Selection

The optimal lag length for the VAR model was determined using several information criteria, as presented in Table 2. The results indicate that a lag length of three is selected as the optimal lag based on the Akaike Information Criterion (AIC), which yields the lowest value of 26.69559, the Final Prediction Error (FPE), which records the smallest value of 46378.29, and the Likelihood Ratio (LR), which produces the highest statistic of 52.24393. In contrast, the Schwarz Criterion (SC) suggests a lag length of one. Given that the majority of criteria support a lag length of three, the VAR model in this study adopts three lags as the optimal lag length to ensure an adequately specified model.

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Tabel 2

Optimal Lag Selection Based on Information Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-524.5685	NA	10154104	33.16053	33.43535	33.25163
1	-417.5603	167.2002	125288.2	28.72252	30.64630*	29.36020
2	-377.4297	47.65513	124920.6	28.46435	32.03709	29.64861
3	313.1295	52.24393*	46378.29*	26.69559*	31.91728	28.42643*

Source: Data processing results, 2025.

4.1.3. Granger Causality Test

The results of the Granger causality test with three lags are presented in Table 3. The test reveals several statistically significant causal relationships at the 5% significance level ($\alpha = 0.05$). First, there is a unidirectional causal relationship running from economic growth (GGDP) to the poverty rate (LINEPOOR), with a probability value of 0.0106. Second, final consumption expenditure (PCOMS) significantly influences economic growth (GGDP), as indicated by a probability value of 0.0253. Third, a bidirectional causal relationship is identified between inflation (INFL) and poverty (LINEPOOR), with probability values of 0.0092 and 0.0025, respectively. In addition, final consumption expenditure (PCOMS) also significantly affects the poverty rate (LINEPOOR), with a probability value of 0.0103.

Table 3

Granger Causality Test Results (Significant at $\alpha = 5\%$)

Null Hypothesis	F-Statistic	Prob.	Decision
GGDP does not Granger-cause LINEPOOR	4.61071	0.0106	Reject H0
PCOMS does not Granger-cause GGDP	3.68214	0.0253	Reject H0
LINEPOOR does not Granger-cause INFL	4.76921	0.0092	Reject H0
INFL does not Granger-cause LINEPOOR	6.30962	0.0025	Reject H0
PCOMS does not Granger-cause LINEPOOR	4.63990	0.0103	Reject H0

Source: Data processing results, 2025.

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4.1.4. VAR Stability Test

The stability test results for the VAR model show that all roots of the characteristic polynomial have moduli below 1, with the highest value being 0.952490. This condition indicates that the specified VAR model satisfies the stability requirement and is suitable for further analysis, including impulse response function simulations and forecast error variance decomposition.

4.2. Discussion

The stationarity tests (Table 1) confirm that all variables are stationary at level, indicating that data transformation through differencing is not required. The optimal lag selection (Table 2), based on the AIC, FPE, and LR criteria, identifies a lag length of three as the most appropriate specification for the VAR model.

The Granger causality test results (Table 3) reveal a complex pattern of relationships. Economic growth (GGDP) significantly influences poverty (LINEPOOR), supporting the findings of Suryahadi et al. (2006) on the role of growth in poverty reduction. The bidirectional relationship between inflation and poverty confirms the vulnerability of the poor to inflationary pressures.

The impulse response function results indicate that shocks to inflation generate a significant negative response of poverty in the initial periods, consistent with the theoretical view that inflation erodes the purchasing power of the poor. The response of poverty to shocks in economic growth exhibits a more complex pattern, with significant medium-term effects that reflect the transmission lag of growth to poverty outcomes.

The stability of the VAR model is further confirmed by the characteristic root test, which shows that all moduli lie inside the unit circle (maximum modulus 0.952490), fulfilling the stability condition for dynamic systems (Lütkepohl, 2005).

5. CONCLUSION

This study confirms the existence of a complex interdependence between macroeconomic stability and poverty in Indonesia. The main findings indicate: (1) a causal relationship running from economic growth to poverty and a bidirectional relationship between inflation and poverty; (2) a dynamic response of poverty to macroeconomic shocks that varies across the short and medium term; and (3) the importance of an integrated policy approach.

The policy implications of these findings are as follows. First, inflation control should be a key priority to protect the poor. Second, growth-oriented policies need to be directed

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toward sectors that directly absorb poor and vulnerable workers. Third, poverty alleviation programs should explicitly account for the vulnerability of poor households to macroeconomic shocks.

The limitations of this study include the relatively limited observation period and the linearity assumption embedded in the VAR model. Future research could extend the analysis by applying nonlinear modeling approaches and incorporating institutional variables to achieve a more comprehensive understanding of the macroeconomic–poverty nexus.

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