

# State-Owned Enterprises as Economic Drivers: Profitability and Solvency Analysis of Gross Domestic Product

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## Abstract

**Purpose:** This study aims to examine the effects of profitability and solvency on State-Owned Enterprises (SOEs) in Indonesia from 2012 to 2020.

**Methodology/approach:** Data processing was carried out using dynamic panel data regression analysis with the Generalized Method of Moments (GMM) approach, assisted by Stata 18 software.

**Results:** The results indicate that Net Profit Margin (NPM) has a positive and significant impact on economic growth, suggesting that operational efficiency within SOEs plays a role in driving national output. In contrast, Return on Equity (ROE) demonstrates a significant negative effect, which may reflect the inefficient reinvestment of profits or limited productive use of equity returns. Meanwhile, Return on Assets (ROA) and Debt Asset Ratio (DAR) show no statistically significant impact, implying that neither asset efficiency nor leverage structure alone strongly influences GDP growth during the observed period.

**Conclusions:** The findings show that previous GDP growth positively influences current GDP, underscoring the need for SOE profit strategies to support long-term sustainable growth over short-term gains.

**Limitations:** The financial indicators used in this study do not include other relevant dimensions, such as liquidity, which may influence national economic growth. Furthermore, this study does not explore the potential role of moderating or mediating variables (e.g., government spending or employment absorption) that could strengthen or weaken the relationship between SOEs' financial performance and economic growth.

**Contributions:** This study provides strategic implications for policymakers and SOE management to optimize financial performance to support long-term development goals, including the realization of the Indonesia Emas 2045 vision.

**Keywords:** *Economic Growth, Generalized Method of Moments, Profitability, Solvency, State-Owned Enterprises.*

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## 1. Introduction

Indonesia has proclaimed a major vision, Indonesia Emas 2045, which aims to develop and sovereign country with a strong, inclusive, and sustainable economic foundation. This vision is officially articulated in the National Long-Term Development Plan 2025–2045 document (Maimunah, Tumagor, & Suwito, 2024). To achieve this goal, economic transformation is a key factor that will enable Indonesia to escape the middle-income trap and transition into a high-income country (Maimunah et al., 2024).

The strategies adopted include strengthening regulations, infrastructure development, enhancement of human resource capacity, data governance, research, innovation, and increased investment (Kementerian PPN/Bappenas, 2019). Based on national economic growth data, the targets of Indonesia Emas can be achieved if economic growth reaches 6% per year. Supported by various factors, including the demographic bonus, structural reforms, and technological advancement, Indonesia is expected to become the country with the 5th largest GDP by 2045.

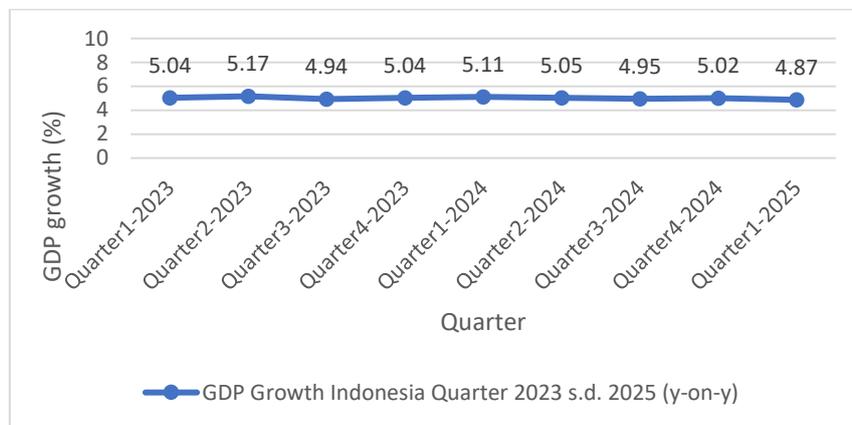


Figure 1. Indonesia's gross domestic product from 2023 to 2025

The long-term development framework that has been prepared places State-Owned Enterprises (SOEs) in a strategic position as agents of development and creators of economic value. State-Owned Enterprises play a crucial role because, in addition to carrying out business functions, these entities also have significant social and fiscal mandates (Kementerian BUMN, 2023). State-Owned Enterprises (SOEs) are business entities owned and managed by the state to support and strengthen the national economy. Based on the official report of the Ministry of SOEs, total State-owned Enterprise assets reached IDR 10,401 trillion in 2023, indicating a very large economic scale and a dominant role in the national economy. In addition, state-owned enterprises' contributions to state revenue in the form of taxes, dividends, and Non-Tax State Revenue amounted to 21.9% in the same year (Kementerian BUMN, 2023a).

Over the past four years, State-owned Enterprise net profits have grown significantly, reaching IDR 327.13 trillion in 2023. Increased capital expenditure also demonstrates a commitment to support long-term growth (Kementerian BUMN, 2023). The contribution of State-owned Enterprise to the state should continue to increase over time, considering that priority development programs continue to expand along with increasing State Capital Participation allocated to State-owned Enterprise (Ampri, 2024). Financial performance, as a financial indicator that helps identify a company's financial condition, is therefore important to observe (Wadma 2016). This is because the strong financial performance of State-Owned Enterprise can strengthen the overall economy (Walid Ali et al., 2022).

Well-managed entities generally develop systems capable of creating added value for stakeholders through effective control and the establishment of an order that ensures the fulfillment of all existing rights (Anjarningsih et al., 2022). Based on the macro-financial literature, various studies have demonstrated a relationship between corporate financial performance and economic growth; however, the results remain diverse and contextual. Rabaa and Younes (2016) and Walid Ali et al. (2022) reveal that indicators such as ROA and ROE positively impact GDP. In contrast, Siddikee et al. (2023) show that ROA has a negative impact, while ROE has a positive effect.

Meanwhile, Putra and Musthofa (2023) concluded that ROA does not significantly affect economic growth. However, studies that specifically evaluate the contribution of State-Owned Enterprise financial performance to national GDP in Indonesia remain limited. Considering that the proportion of the economy managed by state-owned enterprises accounts for nearly one-third of total national economic activity, an analysis of the effectiveness of these entities' financial performance is highly relevant.

State-Owned Enterprises play a strategic and crucial role in directly contributing to national economic growth. Some studies discussing the relationship between financial performance and economic growth are limited (Ledhem & Mekidiche, 2020). Several previous studies examining how corporate financial performance variables affect national economic growth reveal research gaps that generate debate. The variables described earlier continue to show varied results, and there is still no research that explicitly discusses the effect of State-Owned Enterprise financial performance on national economic growth, particularly in Indonesia.

Based on these issues, this study aims to analyze the effect of State-Owned Enterprise profitability and solvency indicators on national economic growth during the period 2005–2023. This study not only fills the gap in the empirical literature regarding the role of state-owned enterprises in macroeconomic growth but also offers strategic insights for policymakers and managers of state-owned enterprises. The findings of this study are expected to serve as a basis for designing policies to optimize State-Owned Enterprise financial performance in line with long-term national development targets, particularly in welcoming the era of Indonesia Emas 2045. This study is entitled “State-Owned Enterprises as Drivers of the Economy: An Analysis of Profitability and Solvency on Gross Domestic Product.”

## 2. Literature Review and Hypothesis Development

### 2.1 Literature Review

#### 2.1.1 Classical Economic Growth Theory

According to classical economic theory, economic growth is determined by free market mechanisms, in which individuals pursuing their self-interest are guided by the “invisible hand” toward economic efficiency (Smith, 1776). According to Smith, factors influencing economic growth include capital accumulation, labor specialization, and free trade. Within this framework, the state only plays a role as a provider of infrastructure, justice, and security, while economic growth occurs spontaneously. Economic growth will be high if the population size is balanced with capital reserves, and productivity remains high.

#### 2.1.2 Neoclassical Economic Growth Theory

According to neoclassical economic growth theories, such as the Harrod–Domar and Solow models, savings and investment play important roles as drivers of economic growth. The Solow model states that long-term economic growth is influenced by capital growth, labor growth, and technological progress (Mankiw, 2018). In this model, capital accumulation without technology generates only short-term growth. The Harrod–Domar model states that growth is determined by the ratio of savings to output ( $s$ ) and the ratio of capital to output ( $k$ ) (Todaro and Smith, 2020). The higher the savings rate and investment efficiency, the higher the economic growth rate. The Harrod–Domar growth model formula is as follows:

- Savings ( $S$ ) represent a certain portion or  $s$  of national income ( $Y$ ). Thus, the equation can be expressed as  $S = sY$ .
- Investment ( $I$ ) is defined as the change in capital stock ( $K$ ); thus, the equation becomes  $I = \Delta K$ . Because capital stock ( $K$ ) has a direct relationship with national income ( $Y$ ), based on the capital–output ratio ( $k$ ), the equation is  $K/Y = k$  or  $\Delta K/\Delta Y = k$ , resulting in  $\Delta K = k\Delta Y$ .
- Because total national savings ( $S$ ) must be equal to the total investment ( $I$ ), the equation can be written as  $S = I$ .

From the three equations above, the summary of the Harrod–Domar model is as follows:

$$I = \Delta K = k\Delta Y \tag{1}$$

$$S = Sy - k\Delta Y = \Delta K = 1 \text{ atau } sY = k\Delta Y \tag{2}$$

$$\frac{\Delta Y}{Y} = \frac{s}{k} \tag{3}$$

Description: ( $I$  = Investment,  $K$  = Capital stock,  $k$  = Capital–output ratio,  $Y$  = National income,  $S$  = National savings,  $sY$  = Total savings,  $s$  = Marginal saving rate)

### 2.1.3 Profitability

Profitability reflects a company's ability to generate profits through revenue, assets, and equity, and is measured based on certain criteria or assessment methods (Rahayu & Sucipto, 2024). This study measures this aspect using three main indicators: Return on Equity (ROE), Return on Assets (ROA), and Net Profit Margin (NPM). The ROA indicator measures the efficiency level of using a company's total assets to generate net income (Suhailah, Ramadhan, & Marliyah, 2024). The higher the ROA, the better the company is at generating profit (Restiana et al., 2025).

ROE reflects the return on shareholders' equity and indicates how effectively a company manages its invested capital (Kieso, 2017). The NPM indicator shows the percentage of net profit from total sales (Kristiyani et al., 2025). NPM is also a financial performance metric that shows how efficiently a company manages productive assets to generate revenue and control costs (Maharani, 2025). Based on research conducted by Ledhem and Mekidiche (2020), the three profitability ratios used in this study are calculated as follows:

$$\text{Return on Asset} = \frac{\text{Net Income}}{\text{Total Asset}} \quad (4)$$

$$\text{Return on Equity} = \frac{\text{Net Income}}{\text{Total Equity}} \quad (5)$$

$$\text{Net Profit Margin} = \frac{\text{Net Income}}{\text{Sales}} \quad (6)$$

### 2.1.4 Solvency

Solvency reflects a company's ability to meet its long-term obligations. This study uses the Debt to Asset Ratio (DAR) as an indicator to measure solvency. The DAR reflects the proportion of assets financed by debt. The higher the DAR, the higher the company's financial risk (Suhailah et al., 2024). This ratio is important for analyzing the sustainability of state-owned enterprises, especially those with complex financing structures and state involvement in capital participation. Based on research conducted by Putra and Musthofa (2023), the solvency ratio can be calculated as follows:

$$\text{Debt to Asset Ratios} = \frac{\text{Total Liabilities}}{\text{Total Asset}} \quad (7)$$

### 2.1.5 Gross Domestic Product

Gross Domestic Product (GDP) is used as an indicator to measure a country's economic growth over a certain period, covering the total value of goods and services produced. GDP is an important indicator of economic activity and societal welfare (Mankiw, 2018). There are three approaches to calculating GDP: the income, expenditure, and production (output) approaches. The Solow model explains that GDP will increase with technological growth, capital accumulation, and labor productivity (Mankiw, 2018).

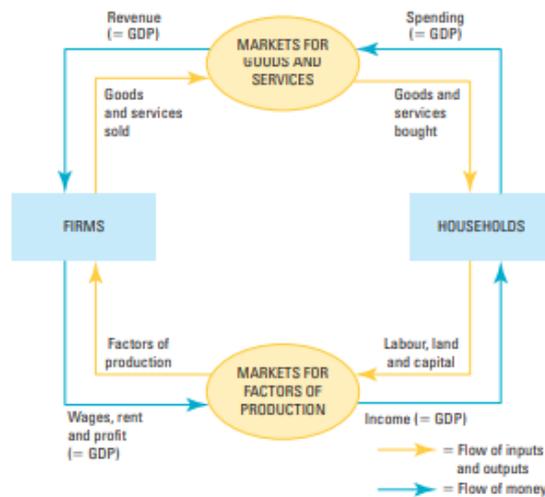


Figure 2. Circular flow diagram

The dependent variable, Gross Domestic Product (GDP), is calculated as follows:

$$GDP = C + I + G + NX \quad (8)$$

Description:

- GDP : Gross Domestic Product
- C : Consumption (household consumption)
- I : Investment (investment by firms, including purchases of capital, equipment, and new buildings, as well as changes in inventories)
- G : Government purchases (government spending on goods and services)
- NX : Net exports (exports minus imports)

## 2.2 Hypothesis Development

The ROA ratio describes the level of efficiency of a company in utilizing all of its assets to generate profits. In the context of state-owned enterprises, this efficiency reflects managerial performance in maximizing state assets to drive productivity. Ledhem dan Mekidiche (2020) and Walid Ali et al. (2022) reveal that ROA has a significant positive effect on economic growth. Similarly, Shahriar et al. (2023) show that ROA influences long-term GDP growth through asset efficiency and productive investments.

$H_1$ : Return on Assets (ROA) affects national economic growth.

ROE reflects a company's ability to manage equity, including state capital, and generate profits. A high ROE demonstrates corporate accountability in the productive use of the public funds. A study by Walid Ali et al. (2022) show that ROE contributes positively to economic growth. Although Siddikee et al. (2023) found different results in certain developing countries, these differences are suspected to be related to fiscal policy and corporate structures.

$H_2$ : Return on Equity (ROE) affects national economic growth.

NPM measures the final profitability after all costs are incurred. A high NPM indicates a company's ability to manage its operations efficiently and increase its net profit. According to Mehmood et al. (2024), an increase in NPM in the public sector is positively correlated with GDP growth if profits are reinvested in development projects and public services. Therefore, NPM in BUMN is an important indicator of fiscal and economic contributions.

$H_3$ : Net Profit Margin (NPM) affects national economic growth.

The DAR reflects the proportion of assets financed through debt. In the short term, productive debt can encourage the expansion of BUMN operations and increase the national output. Shahriar et al. (2023)

show that the public sector debt structure significantly affects GDP growth in developing countries. That excessively high debt ratios can reduce State-Owned Enterprise contributions to growth due to increasing interest burdens.

$H_4$ : The Debt to Asset Ratio (DAR) affects national economic growth.

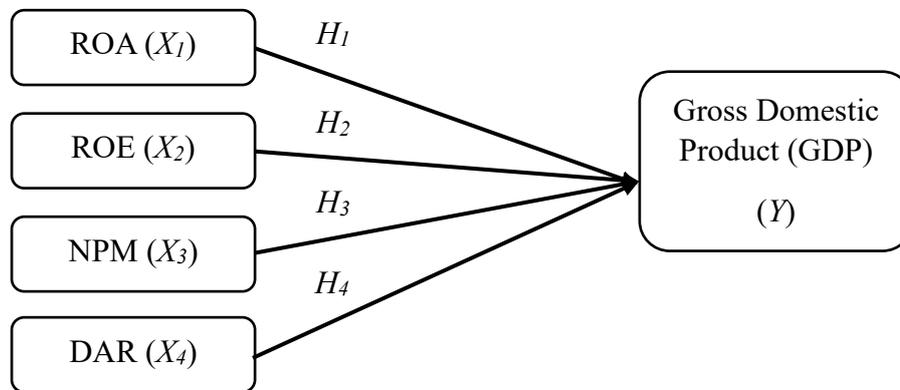


Figure 3. Research model

### 3. Research Methodology

This study employs a quantitative research methodology using secondary data obtained from the Central Statistics Agency (*Badan Pusat Statistik*) for 2010–2020. The sampling method used in this study was saturated sampling, a method in which all members of the population are included in the sample (Murib, 2025). This study involves all State-Owned Enterprises that have been classified according to business sectors based on the Indonesian Standard Industrial Classification (Klasifikasi Baku Lapangan Usaha/KBLI). The number of business sector data (cross-sections) is 13 with an observation period of 9 years, resulting in a total of 117 valid observation data points. The operational variables and measurements used in this study are as follows.

Table 1. Operational Variables and Measurements

No.	Variable	Measurement	Scale	Reference
1	Gross Domestic Product	$GDP = C + I + G + NX$	Natural logarithm of GDP	Putra & Musthofa (2023) and Ledhem & Mekidiche (2020)
2	Return on Asset	$ROA = \frac{Net\ Income}{Total\ Asset}$	Ratio	Ledhem & Mekidiche (2020)
3	Return on Equity	$ROE = \frac{Net\ Income}{Total\ Equity}$	Ratio	Ledhem & Mekidiche (2020)
4	Net Profit Margin	$NPM = \frac{Net\ Income}{Sales}$	Ratio	Ledhem & Mekidiche (2020)
5	Debt to Asset Ratio	$DAR = \frac{Total\ Liabilities}{Total\ Asset}$	Ratio	Putra & Musthofa (2023)

Table 1 shows the classical assumption tests conducted to ensure the validity of the regression model before further interpretation of the results. These tests include four main aspects: normality, multicollinearity, heteroskedasticity, and autocorrelation tests. Each test aimed to evaluate whether the data structure met the classical linear regression assumptions so that the estimation results were unbiased and efficient. A normality test was conducted to assess whether the residuals in the regression model were normally distributed. The Shapiro–Wilk test was used because it is sensitive to relatively small sample sizes. The null hypothesis was accepted if the Shapiro–Wilk probability value  $> \alpha$ , indicating that the residuals were normally distributed (Shapiro & Wilk, 1965).

The multicollinearity test aims to detect high correlations among independent variables that may disrupt the stability of the regression coefficients. This test was conducted using the Variance Inflation Factor (VIF). If all VIF values are  $< 10$  and tolerance values are  $> 0.1$ , the model is free from multicollinearity problems (Ghozali 2018). A heteroskedasticity test was conducted to assess whether the residual variance was constant across observations. The test was performed using the Breusch–Pagan test. The null hypothesis is accepted if the probability value (p-value)  $> \alpha$ , indicating no heteroskedasticity (Ghozali 2018). Autocorrelation is a condition in which residuals (prediction errors) from one observation are correlated with the residuals from another observation across time or units. The Durbin–Watson (DW) test is a commonly used method to detect autocorrelation. If the DW value lies within the range of  $-2$  to  $2$ , it indicates that there is no autocorrelation (Gujarati and Porter, 2020).

### 3.1 Dynamic Model Equation Test

The dependent variable in this study is economic growth, measured by Gross Domestic Product (GDP) and transformed into its natural logarithm form. This transformation aims to represent growth that is constant over time. In this context, economic growth is analyzed as a relative change between periods rather than an absolute one. Therefore, the GDP variable was presented in logarithmic form. The research model to be analyzed is as follows.

$$\text{LnPDBit} = \beta^0 + \delta \text{LnPDBi}, t - 1 + \beta^1 (\text{ROAit}) + \beta^2 (\text{ROEit}) + \beta^3 (\text{NPMit}) + \beta^4 (\text{DARit}) + \varepsilon_{it} \quad (9)$$

### 3.2 Dynamic Model Specification Test

#### 3.2.1 Two-Step Arellano–Bond

By testing the Arellano–Bond statistics  $m1$  and  $m2$ , an autocorrelation test was conducted to ensure the consistency of estimation results. The  $m1$  statistic is expected to show a significant value, whereas the  $m2$  statistic should show a non-significant value (Yuniar & Kusriani, 2021).

#### 3.2.2 Sargan Test

The Sargan test was conducted using a greater number of instrumental variables than the estimated parameters to test the overall validity of the instruments in the model. The null hypothesis of this test states that the instruments are valid or that the instrumental variables are not correlated with the error term (valid over-identifying restrictions). The Sargan test is also used to examine whether the residuals of the GMM estimation exhibit homoscedasticity.

### 3.3 Parameter Significance Test

#### 3.3.1 Simultaneous Significance Test

In their study, Arellano and Bond (1991) used the Wald Test to examine whether a dynamic panel data regression model shows relationships among variables. This test was used to assess the overall (simultaneous) significance of the model. The null hypothesis ( $H_0$ ) is rejected when the Wald statistic value is higher than the critical chi-square ( $\chi^2$ ) value. However, if the probability value exceeds the significance level ( $\alpha$ ), then there is no significant effect of the independent variables on the dependent variable.

#### 3.3.2 Partial Significance Test

A partial significance test was conducted to evaluate whether each coefficient in the model had a significant effect. In conditions with a large number of observations, partial testing was performed using the Z-test (Gujarati & Porter, 2020). With  $\alpha = 5\%$ , the Z-table value was 1.96. The null hypothesis was rejected, and the independent variable was considered to have a significant effect on the dependent variable if the Z-test statistic exceeded the Z-table value of 1.96.

## 4. Results and Discussion

### 4.1 Results of Classical Assumption Tests

The selection of the best model in panel data regression began with the Chow test to compare the Common Effect Model (CEM) and the Fixed Effect Model (FEM). The results showed an F value of

243.78 with a probability of 0.0000, which did not exceed the 5% significance level; therefore, it was concluded that the FEM was superior to the CEM. Next, the Hausman test was conducted to choose between FEM and the Random Effect Model (REM), producing a chi-square value of 5.77 with a probability of 0.2174. Because this probability value exceeded 0.05, there was no significant difference between the two models, and the REM was considered more efficient. Finally, the Lagrange Multiplier (LM) test was conducted to compare the CEM and REM, resulting in a  $\chi^2$  value of 346.22 with a probability of 0.0000. These results indicate that the REM is statistically better than the CEM. Based on these three tests, FEM was better than CEM, but REM was more appropriate than FEM and CEM. Overall, the random-effects model was selected as the most suitable estimation model for this study.

#### 4.1.1 Normality Test

One of the prerequisites for panel regression analysis is the fulfillment of the residual normality assumption. To test this, this study employed the Shapiro–Wilk test because of its sensitivity to small-to medium-sized samples (< 2000). Based on the test results using the command *swilk uhat* in Stata 18, a W value of 0.98326 and a probability z-value of 0.15398 were obtained. A W value close to 1 and a probability value exceeding the 0.05 significance threshold indicate that the residuals in this model were normally distributed. Therefore, the normality assumption was satisfied, and the model was considered statistically appropriate for interpretation.

#### 4.1.2 Multicollinearity Test

Multicollinearity detection in this study used the Variance Inflation Factor (VIF), which measures the extent to which the variance of a coefficient increases due to correlations among independent variables. The multicollinearity test was conducted using Stata 18 with the command “vif, uncentered,” and the results are presented as follows.

Table 2. Results of multicollinearity test

Variable	VIF	Tolerance
ROA	2,73	0,366933
ROE	1,16	0,860035
DAR	1,30	0,766416
NPM	2,61	0,383589

Based on the results of the multicollinearity test presented in Table 2, all VIF values were < 10 and all tolerance values were > 0.1. This indicates that the research model was free from multicollinearity problems.

#### 4.1.3 Heteroskedasticity Test

To detect the presence of heteroskedasticity in the panel regression model, the Breusch–Pagan–Godfrey test was conducted on the residuals of the Random Effect Model. Based on data processing using Stata 18, a statistical value of 22.194 was obtained, which exceeds the critical  $\chi^2$  table value of 9.49 at the 5% significance level with four degrees of freedom. Thus, it can be concluded that the model exhibits heteroskedasticity. Nevertheless, in the panel regression, non-constant residual variance is not an anomaly that invalidates the model. Baltagi (2021) states that as long as standard error corrections are applied using approaches such as Generalized Least Squares (GLS) or the Generalized Method of Moments (GMM), parameter estimates remain reliable and consistent even in the presence of heteroskedasticity.

#### 4.1.4 Autocorrelation Test

In this study, an autocorrelation test was conducted using the Durbin–Watson Statistic sequentially through Stata 18 software. The results show that the Durbin–Watson Statistic value is 1, which lies between –2 and 2. This indicates that the analytical model is free of autocorrelation problems.

#### 4.2 Results of Descriptive Statistical Analysis

Table 3. Results of descriptive statistics

Variable	Obs	Mean	Std. dev.	Min	Max
LnPDB	117	33,74657	1,426997	29,51867	35,67648
ROA	117	0,0450957	0,0546987	-0,0889	0,186
ROE	117	0,0123231	0,8441783	-8,9206	0,8199
DAR	117	0,0795179	0,1420491	-0,7758	0,4142
NPM	117	0,5251214	0,2259682	0,1256	0,99

Based on the descriptive statistics results in Table 3, all variables in this study consisted of 117 observations. The dependent variable used is Gross Domestic Product (GDP), which represents national economic growth. After applying the natural logarithm transformation, the mean value of LnGDP was 33.74657, with a standard deviation of 1.426997, reflecting considerable variability across sectors or observation periods. The minimum value recorded is 29.51867, and the maximum value is 35.67648, indicating that the contribution of BUMN to GDP varies significantly depending on the business sector, scale of operations, and the managerial effectiveness of each enterprise.

Meanwhile, Return on Assets (ROA), as an indicator of asset utilization efficiency, shows a mean value of 0.0450957 with a standard deviation of 0.0546987. The minimum ROA value of -0.0889 indicates the presence of entities experiencing losses relative to their total assets, whereas the maximum value of 0.186 reflects very strong company performance in generating profits through asset utilization. Return on Equity (ROE), which measures the rate of return on equity, shows a mean value of 0.0123231 with a relatively high standard deviation of 0.8441783. This indicates a large variability in capital returns across companies. The minimum ROE value of -8.9206 reflects extremely unstable financial conditions in some companies, whereas the maximum value of 0.8199 indicates the presence of companies with highly profitable equity performance.

Furthermore, Net Profit Margin (NPM), as an indicator of net profit efficiency from sales, records a mean value of 0.0795179. The minimum value of -0.7758 indicates that some companies experience substantial losses relative to sales, whereas the maximum value of 0.4142 indicates high efficiency in converting revenue into net profit. The standard deviation of 0.1420491 suggests considerable variation in profitability efficiency across the sectors. Meanwhile, the Debt to Asset Ratio (DAR), which reflects the solvency level of companies, has a mean value of 0.5251214 with a standard deviation of 0.2259682. This indicates that, in general, more than half of the BUMN assets are financed by debt. The minimum value of 0.1256 reflects a conservative financing structure, while the maximum value of 0.99 indicates the existence of companies whose total liabilities are nearly equal to their total assets, which may serve as an indicator of high financial risk.

#### 4.3 Results of Dynamic Model Equation Testing

Dynamic model testing was conducted using the First Differences Generalized Method of Moments (FD-GMM) and System Generalized Method of Moments (SYS-GMM) approaches. The selection of these methods was motivated by the need to address endogeneity problems commonly encountered in dynamic modeling, particularly because of the presence of lagged dependent variables. In the GMM framework, variables are first differenced to eliminate individual fixed effects, followed by the instrumentation of endogenous variables using their lagged values as internal instruments.

Based on the results of the dynamic model equation testing using the First Differences Generalized Method of Moments (FD-GMM), the estimated regression equation is as follows:

$$\begin{aligned} LnPDBit = & 4,844603 + 0,8600257 L1.LnPDBit - 1 + 0,0923326 ROAit - \\ & 0,0141398 ROEit + 0,2320238 NPMit - 0,1257668 DARit + eit \end{aligned} \quad (10)$$

Meanwhile, using the System Generalized Method of Moments (SYS-GMM), the following results were obtained:

$$\text{LnPDBit} = 2,939416 + 0,9152434 \text{ L1.LnPDBit} - 1 + 0,2250413 \text{ ROAit} - 0,0169916 \text{ ROEit} + 0,3110595 \text{ NPMit} - 0,0610512 \text{ DARit} + \text{eit} \quad (11)$$

#### 4.4 Estimation Results of FD-GMM and SYS-GMM Models

In dynamic panel data regression modeling, as employed in this study, the lagged dependent variable (L1.LnGDP) was included as an explanatory variable.

Table 4. Results of GMM model estimation

Variable	FD-GMM	SYS-GMM	FEM	PLS
L1.LnPDB	0,8600257	0,91524345	0,87598282	0,99677027
ROA	0,09233261	0,22504133	0,13857134	0,05144739
ROE	-0,0141398	-0,01699161	-0,01164352	-0,00411119
NPM	0,23202381	0,31105948	0,24930039	0,19353245
DAR	-0,12576681	-0,0610512	-0,06317845	0,04929457

The estimation results indicate that the SYS-GMM coefficient for L1. The LnGDP of 0.91524345 falls within the range between the FEM estimate of 0.87598282 and the PLS estimate of 0.99677027. Therefore, the SYS-GMM estimation can be considered valid, and the instruments used are sufficiently strong. In contrast, the FD-GMM estimate does not fall within this range of values.

#### 4.5 Results of dynamic model specification tests

Dynamic model specification tests were conducted using two approaches: Two-Step First Differences GMM (FD-GMM) and Two-Step System GMM (SYS-GMM), each accompanied by the Arellano–Bond test and the Sargan/Hansen test to evaluate model validity and determine the most appropriate model, as previously described. The results of the comparison of the two models are presented below.

Table 5. Results of Dynamic Model Specification Tests

Model	P-Value		
	Arellano-Bond m1	Arellano-Bond m2	Sargan Test
FD-GMM	0,5444	0,2909	0,9966
SYS-GMM	0,769	0,360	0,9999

In the two-step GMM approach, the Arellano–Bond test is used to evaluate whether residual autocorrelation exists in the model. The test results indicate that the m1 statistics for both the estimation models are insignificant. Furthermore, the Arellano-Bond m2 test results are also not significant (> 0.05), indicating that the instruments used are free from second-order residual autocorrelation. These findings confirm that the GMM model assumptions are satisfied and that the model does not suffer from second-order residual autocorrelation issues. This condition strengthens the validity of the model, as it meets the fundamental assumption that residuals at this level should not exhibit autocorrelations.

Instrument validity is further reinforced through the Sargan test, which assesses the validity of the instruments employed in the model. The final Sargan test results for both estimation models show insignificant values, indicating no problems with instrument validity and confirming that the models are valid. In other words, there is no overidentification problem in the use of instruments, and GMM models that are not correlated with the error term can be reliably used to explain the relationship between profitability, solvency, and economic growth. Based on the estimation results and specification tests, the System Generalized Method of Moments (SYS-GMM) was selected as the model for conducting parameter significance tests. This selection is justified because the SYS-GMM estimation satisfies the criterion that requires the coefficient of L1. LnGDP to lie between the Pooled Least Squares (PLS) and Fixed Effect Model (FEM) estimates.

#### 4.6 Results of Simultaneous Significance Test

The simultaneous significance test in dynamic panel regression modeling aims to examine whether the independent variables collectively contribute significantly to the dependent variables. In the Generalized Method of Moments (GMM) framework, this test is conducted using the Wald test as a means of evaluating the joint significance of regression parameters (Baltagi, 2021).

Table 6. Results of simultaneous significance test

Wald Test Statistic	P-Value
418786,98	0,0000

Based on the Wald test results for the SYS-GMM model, the p-value was 0.0000. A p-value lower than 0.05 indicates that the null hypothesis ( $H_0$ ) is rejected, and the alternative hypothesis ( $H_a$ ) is accepted. Therefore, it can be concluded that Return on Assets, ROE, Net Profit Margin, and debt-to-assets ratio simultaneously affect national economic growth.

#### 4.7 Results of Partial Significance Test

The partial significance test was conducted using the z-statistic and p-value as the basis for decision-making regarding the partial hypotheses for each variable. The following are the results of the partial significance tests conducted using the System Generalized Method of Moments (SYS-GMM) model.

Table 7. Results of partial significance test

Independent Variables	SYS-GMM	
	Coefficient Value	P-Value
L1.PDB	0,91524345	0,000
ROA	0,22504133	0,572
ROE	-0,01699161	0,004
NPM	0,31105948	0,000
DAR	-0,0610512	0,115

In the SYS-GMM test, the p-value of L1.The GDP (GDP $t-1$ ) variable is  $0.000 < 0.05$ , with a positive coefficient value of 0.91524345. This indicates that national economic growth in the previous period ( $t-1$ ) positively affects national economic growth in the current period ( $t$ ). This means that there is a dynamic effect in national economic growth, where past economic performance contributes positively to current economic conditions. The Return on Assets (ROA) variable has a p-value of  $0.572 > 0.05$  and a positive coefficient value of 0.22504133. This indicates that  $H_1$  is rejected, meaning that ROA does not significantly affect national economic growth.

The SYS-GMM test results for the Return on Equity (ROE) variable show a p-value of  $0.004 < 0.05$ , with a negative coefficient value of  $-0.01699161$ .  $H_2$  is accepted, meaning that ROE has a significant negative effect on national economic growth. Furthermore, the SYS-GMM test results for the Net Profit Margin (NPM) variable show a p-value of  $0.000 < 0.05$ , with a positive coefficient value of 0.31105948. This indicates that  $H_3$  is accepted, meaning that Net Profit Margin has a significant positive effect on national economic growth. Finally, the Debt to Asset Ratio (DAR) variable has a p-value of  $0.115 > 0.05$  and a negative coefficient value of  $-0.0610512$ . This indicates that  $H_4$  is rejected, meaning that the Debt to Asset Ratio does not significantly affect national economic growth.

#### 4.8 Discussion

Based on the results of the analysis conducted using the Generalized Method of Moments (GMM) approach with the System GMM (SYS-GMM) model, the Wald test results were significant. These findings indicate that the financial variables analyzed, Return on Assets (ROA), Return on Equity (ROE), Net Profit Margin (NPM), and Debt to Asset Ratio (DAR), simultaneously affect national economic growth during the period 2012 to 2020. From a macroeconomic perspective, these findings illustrate that the dynamics of profitability and solvency of state-owned enterprises (SOEs) play an important role in driving Indonesia's economic growth through an increase in gross domestic product.

The GMM model, as a dynamic model, incorporates the lagged dependent variable, namely, the logarithm of GDP from the previous year, as an explanatory variable. The regression results of the model equation show that lagged GDP from the previous year (lag-1) has a positive and significant effect on GDP growth across all regression models. This indicates that past GDP levels contribute significantly to influencing economic growth in subsequent periods. This is consistent with the endogenous growth theory, which states that capital accumulation and past growth have long-term implications for future economic growth. In other words, economic growth reflects the legacy of past economic performance and is not solely influenced by current conditions.

The results of the dynamic panel data regression using the SYS-GMM model demonstrate consistency in terms of the simultaneous effects on economic growth. This confirms that, in general, profitability and solvency indicators measured by Return on Assets (ROA), Return on Equity (ROE), Net Profit Margin (NPM), and Debt to Asset Ratio (DAR) are closely related to the long-term rate of national economic growth. These findings are consistent with the view that SOEs, as agents of development, not only bear commercial responsibilities but also play a strategic role in strengthening the national economy's stability and sustainability.

However, the results of the partial significance tests, which aimed to examine whether each independent variable significantly affected the dependent variable, showed varied outcomes in the SYS-GMM model. The following are the conclusions of the partial significance test results, along with their interpretations.

Table 8. Interpretation of Partial Significance Test Results (SYS-GMM)

Variable	Significance	Interpretation
L1.PDB	Significant (+)	This indicates that the GDP in the previous period has a significant positive effect on the current GDP. The presence of economic dynamics is also reflected.
ROA	Not Significant (+)	In the SYS-GMM model, ROA has no significant effect on economic growth. This implies that asset efficiency is not the primary determinant of GDP.
ROE	Significant (-)	In the SYS-GMM model, ROE has a significant negative effect, indicating that higher ROE is negatively correlated with national economic growth (GDP)
NPM	Significant (+)	In the SYS-GMM model, the net profit margin shows a significant positive effect on economic growth. This indicates that higher profit efficiency has a greater impact on economic growth.
DAR	Not Significant	In the SYS-GMM model, the debt-based financing structure has no significant effect on GDP.

The findings of this study indicate the presence of past economic growth. This is consistent with the classical economic theory, which states that economic growth is influenced by capital accumulation and specialization. The continuity of GDP from year to year reflects the ongoing accumulation of capital and labor productivity effects (Smith, 1776).

#### 4.8.1 The Effect of Net Profit Margin on Gross Domestic Product

In a macroeconomic context, the profitability performance of state-owned enterprises (SOEs), as reflected through indicators such as Net Profit Margin (NPM), has been proven to make a significant positive contribution to the increase in gross domestic product (GDP). This indicates that business efficiency and a firm's ability to generate profits from its operational activities are important factors in supporting the national output. The results of this study are consistent with and support previous studies conducted by Ledhem and Mekidiche (2020) and Siddikee et al. (2023). In the long run, improvements

in efficiency can strengthen a country's fiscal capacity, expand productive investment opportunities, and generate broader economic multiplier effects (Mankiw, 2018).

#### *4.8.2 The Effect of Return on Equity on Gross Domestic Product*

In contrast, the findings related to Return on Equity (ROE), which show a significant negative relationship, indicate potential risks when profit accumulation is not optimally allocated toward expansion or development. This finding reinforces the results of Siddiquee et al. (2023). This serves as an important lesson for SOEs to not solely focus on profit generation for shareholders, but also to direct profits toward strategic reinvestment that supports infrastructure development, improves public service quality, and encourages innovation in the industrial sector. If profits are merely retained within the company without being reinvested in productive sectors, the function of profit as a driver of growth (from a classical perspective) becomes suboptimal (Mankiw, 2018).

#### *4.8.3 The Effect of Return on Assets and Debt to Asset Ratio on Gross Domestic Product*

Meanwhile, Return on Assets (ROA) and the Debt to Asset Ratio (DAR) do not significantly affect national economic growth. This indicates that there is no significant relationship between economic growth and economic growth. The absence of a significant effect from Return on Assets (ROA) and the Debt to Asset Ratio (DAR) also highlights that asset utilization effectiveness and financing structure have not been fully capable of driving macroeconomic growth. Therefore, a comprehensive evaluation of resource allocation and debt management within state-owned enterprises is required (Todaro & Smith 2020).

These findings provide an empirical foundation for policymakers to strengthen the synergy between SOE corporate strategies and national economic policies. Governance reforms and increased accountability in SOE profit management are crucial to ensure that SOEs not only generate value for the company but also contribute to inclusive and sustainable development. Accordingly, future policy directions should emphasize optimizing the role of SOEs as agents of development through productive investment strategies integrated into the national agenda (Mankiw, 2018). However, researchers and practitioners may also use these results as a basis for developing fiscal policy models that are more responsive to the dynamics of financial performance in state-owned enterprises.

## **5. Conclusions**

### **5.1 Conclusion**

This study analyzes the effect of the financial performance of State-Owned Enterprises (SOEs) on national economic growth in Indonesia using a dynamic panel method with a two-step System GMM approach for the period 2012–2020. The estimation results indicate that the model used meets valid statistical criteria, as evidenced by a significant Wald test value and the use of valid instrumental variables. The previous year's Gross Domestic Product (GDP) shows a positive and significant effect on the current-year GDP. This indicates the presence of intertemporal dependence in the economic growth process, where past economic conditions contribute to determining the current economic performance.

Partial findings show that Net Profit Margin (NPM) has a significant positive effect on economic growth, indicating that the operational profit efficiency of SOEs has a tangible impact on increasing national output. In contrast, Return on Equity (ROE) shows a significant negative effect, reflecting that a profit-oriented approach without productive reinvestment strategies can reduce the contribution of SOEs to macroeconomic growth. These findings emphasize the importance of profit management, which is not only oriented toward short-term results but also supports sustainable and inclusive economic development.

### **5.2 Research Limitations**

Although this study was systematically developed based on scientific analysis, every research effort has unavoidable limitations. Although the four indicators used in this study reflect aspects of profitability

and solvency, they do not cover other dimensions, such as liquidity, which may influence national economic growth. Furthermore, this study does not analyze the possible presence of moderating variables (such as macroeconomic conditions) or mediating variables (such as government spending or labor absorption) that could potentially strengthen or weaken the relationship between SOE financial performance and economic growth.

### **5.3 Suggestions and Directions for Future Research**

Based on the results of this study, policymakers and SOE management should improve operational efficiency and profit management strategies that support long-term economic growth. The positive effect of Net Profit Margin (NPM) indicates that efficient operations enhance SOEs' contribution to national output, while the negative impact of Return on Equity (ROE) suggests the need for better reinvestment policies to ensure sustainable value creation. Future research should consider incorporating additional financial indicators, such as liquidity or leverage ratios, and extending the study period to strengthen this analysis. Moreover, examining the role of moderating or mediating variables such as government spending, employment, or macroeconomic conditions would provide deeper insights into the relationship between SOE financial performance and economic growth.

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### **Author Contributions**

KS was responsible for the conceptualization, study design, data collection, and manuscript drafting. RS contributed to the data analysis, manuscript revision, and overall supervision of the research.

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