Optimal Local Government Size for Maximizing Regional Economic Growth: A Case Study of Regencies and Cities in Indonesia

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ABSTRACT

This study examines the relationship between local government size and regional economic growth in Indonesia's regencies and cities during 2011–2022. Using panel data regression models, including Fixed Effects Model (FEM), we find that an optimal government size of approximately 73.56% of GRDP maximizes economic growth. Results indicate diminishing returns beyond this threshold, while investment emerges as a critical growth driver. Data sourced from official government statistics ensure robust analysis. Findings emphasize the need for policies optimizing government expenditure and enhancing investment to foster sustainable development. Future research could explore institutional and human capital dynamics.

INTRODUCTION

The optimal size of local government has long been a critical subject in public administration and economic studies (Ekinci, 2011; Iyidogan & Turan, 2017; Mendonça & Cacicedo, 2014; Murshed et al., 2018; Odhiambo, 2015; Sriyana, 2016; Tabassum, 2015; Thanh & Mai Hoai, 2014). In Indonesia, with its vast geographical expanse and diversity of socio-economic conditions, determining the ideal size of local government to maximize regional economic growth presents a significant challenge. Local governments, as key actors in delivering public services and managing regional development, must operate efficiently to ensure that resources are utilized in a manner that promotes growth. However, disparities in economic performance across regencies and cities suggest that variations in local government size may play a role (Nasirwan et al., 2024). This study investigates the extent to which local government size influences regional economic growth, with a focus on regencies and cities in Indonesia. Local government size, in this study, is measured as the ratio of local government expenditure to the Gross Regional Domestic Product (GRDP) of regencies and cities. This research is motivated by the persistent challenges in achieving equitable and sustained regional growth and the need for evidence-based policy recommendations to optimize governance structures.

Existing literature provides a foundation for exploring the relationship between government size and economic growth (Akram & Rath, 2020; Bozma et al., 2019; Chipaumire et al., 2014; Coayla, 2021; Ekinci, 2011; Iyidogan & Turan, 2017; M. Jain et al., 2021; Kahn, 2011; Makin et al., 2019; Mendonça & Cacicedo, 2014; Murshed et al., 2018; Nouira & Kouni, 2021; Sriyana, 2016; Tabassum, 2015; Thanh

& Mai Hoai, 2014). Research conducted globally has highlighted the potential for government size to affect economic performance through mechanisms such as public service efficiency, fiscal policy, and administrative capacity (e.g., Duncombe & Yinger, 2013; Geys & Moesen, 2016). Previous studies, such as those by Khamdana (2016), Nasirwan et al. (2024), and Santika et al. (2020), have explored aspects of local governance and economic outcomes but have not systematically analyzed the optimal government size for regional economic growth. This creates a gap in the literature and underscores the need for a comprehensive investigation into the Indonesian context.

The novelty of this research lies in its focus on the critical balance between local government size and regional economic growth in Indonesia, a nation characterized by its decentralized governance structure and regional diversity. While prior studies have predominantly examined fiscal performance or service delivery effectiveness, this research seeks to bridge the gap by empirically identifying the optimal size of local government that maximizes economic growth. This contribution is significant because it addresses not only the theoretical implications of governance efficiency but also provides actionable insights for policymakers aiming to foster equitable growth across Indonesia's regencies and cities.

The hypothesis of this study posits that there exists an optimal size of local government (Coayla, 2021; Ekinci, 2011), measured in terms of the ratio of local government expenditure to GRDP, that maximizes regional economic growth in Indonesia. Beyond this optimal point, increases or decreases in government size are hypothesized to negatively affect growth due to diminishing returns or inefficiencies (Coayla, 2021; Ekinci, 2011; Kahn, 2011; Nouira & Kouni, 2021). This hypothesis aligns with the theoretical framework of the "optimal government size" literature but is specifically contextualized for Indonesia's unique socio-economic and administrative landscape.

The expected outcome of this research is the identification of an empirically derived optimal size of local government that can inform policy decisions aimed at maximizing regional economic growth. This study seeks to contribute to the broader discourse on public sector efficiency and regional development while providing specific recommendations for Indonesian policymakers. Ultimately, the findings are anticipated to have both theoretical and practical implications, advancing the academic understanding of governance and growth while supporting Indonesia's aspirations for equitable and sustainable regional development.

RESEARCH METHOD

This study employs a quantitative research approach to investigate the relationship between local government size and regional economic growth. The analysis focuses on regencies and cities across Indonesia, utilizing panel data collected over the past decade to capture temporal and spatial variations. The research design is descriptive-analytical, aiming to establish empirical relationships between variables. The research object comprises all 514 regencies and cities in Indonesia, categorized by their GRDP, local government expenditure, and socio-economic characteristics. Local government size, the primary variable of interest, is operationally defined as the ratio of local government expenditure to GRDP. Regional economic growth, the dependent variable, is measured as the annual percentage change in GRDP. An additional control variable is investment, measured as the ratio of gross fixed capital formation to GRDP.

The data for this study are sourced from official government reports, including the Central Statistics Agency (BPS), Ministry of Finance, and regional government publications. Both secondary quantitative data and administrative records are utilized to ensure reliability and comprehensiveness. The dataset covers the period from 2011 to 2022, providing a decade-long analysis of trends and relationships. The sample determination technique uses a purposive sampling method, selecting regions that meet specific criteria such as data availability and economic representativeness. This ensures that the sample is reflective of diverse regional characteristics across Indonesia. The final dataset includes a balanced panel

of regencies and cities with consistent data for the study period. Data collection techniques involve gathering and verifying secondary data from government databases, statistical reports, and academic publications. Data cleaning and preprocessing are conducted to address missing values and ensure accuracy for subsequent analysis.

The econometric model applied in this research is specified as follows:

$$Y_{it} = \beta_0 + \beta_1 S_{it} + \beta_2 {S_{it}}^2 + \beta_3 I_{it} + \varepsilon_{it}$$

Where:

- Y_{it} : Regional economic growth for regency/city in year
- S_{it} : Local government size (ratio of expenditure to GRDP)
- I_{it} : Investment, measured as gross fixed capital formation
- ε_{it} : Error term

The data analysis methods include fixed-effects and random-effects panel regression models, chosen based on the results of Hausman tests to determine the most suitable model. These techniques control for both observed and unobserved heterogeneity among regions. Sensitivity analyses, including instrumental variable approaches and lagged variable models, are performed to address endogeneity concerns and validate the robustness of the results. By employing these comprehensive methodologies, this study seeks to identify the optimal local government size for maximizing regional economic growth in Indonesia and provide actionable insights for policymakers to enhance governance structures at the local level.

To find the optimal value of local government size that maximizes regional economic growth, we differentiate the above equation with respect to and set it to zero:

$$\frac{d(I_{it})}{d(S_{it})} = \beta_1 + 2\beta_2 S_{it} = 0$$

Solving the S_{it} we will get the optimum value of local government size that maximizes regional economic growth:

$$S_{Opt} = \frac{-\beta_1}{2\beta_2}$$

The optimal value of local government size is derived by analyzing how changes in the size of local government expenditure (relative to GRDP) impact regional economic growth. This is achieved by taking the first derivative of the growth equation with respect to the local government size variable. The derivative represents the marginal effect of changes in local government size on economic growth. By setting this derivative to zero, we identify the point at which the contribution of local government size transitions from positive to diminishing returns. Solving the resulting equation yields the optimal size, denoted as S_{Opt}. This formula indicates the level of local government expenditure relative to GRDP that maximizes regional economic growth. Understanding this optimal size is crucial for policymakers, as it provides evidence-based guidance for allocating resources efficiently to achieve sustainable economic outcomes at the regional level.

RESULTS AND DISCUSSION

The results and discussion section serves as the core of this study, where the empirical findings are analyzed and their implications are explored in depth. This section synthesizes the descriptive statistics and regression results to understand the relationship between local government size, investment, and

regional economic growth. By leveraging robust econometric methods, the analysis provides insights into the optimal size of local government expenditure relative to GRDP and its impact on economic performance across Indonesia's regencies and cities.

Tabel 1. Descriptive Statistics

	Y	S	S^2	I
Mean	0.3011	0.1562	0.0402	0.3215
Median	0.3228	0.1195	0.0143	0.3079
Maximum	6.6336	0.8937	0.7986	4.3255
Minimum	-5.1430	0.0064	0.0000	0.0204
Std. Dev.	0.2575	0.1256	0.0758	0.1279
Skewness	2.3423	1.9714	4.4879	6.1270
Kurtosis	146.3748	8.0800	29.5988	166.9758
Jarque-Bera	5268036.5114	10586.1461	201743.6037	6921784.9600
Probability	0.0000	0.0000	0.0000	0.0000
Sum	1850.1981	959.6746	246.7903	1975.5255
Sum Sq. Dev.	407.1694	96.8920	35.2608	100.5378
Observations	6144	6144	6144	6144

Source: Own calculation, 2024

The descriptive statistics provide a comprehensive overview of the variables used in the study: regional economic growth (Y), local government size (S), the squared term of government size (S^2), and investment (I). The mean value of Y is 0.3011, with a median of 0.3228, indicating a slight positive skew in economic growth. The range of Y, from -5.1429 to 6.6336, highlights the presence of outliers, as confirmed by a skewness of 2.34 and a kurtosis of 146.37, suggesting extreme variability in regional economic outcomes across the observed periods and regions. The variable S, representing the ratio of local government expenditure to GRDP, has a mean of 0.1562 and a median of 0.1195, with values ranging from 0.0064 to 0.8937. The positive skewness of 1.97 and a kurtosis of 8.08 suggest that most regions operate with relatively small local government sizes, but a few have disproportionately higher values. Similarly, the squared term of government size (S^2) exhibits even higher skewness (4.49) and kurtosis (29.60), emphasizing the non-linear effects of government size on economic growth and the importance of capturing these dynamics in the analysis. Investment (I) displays the highest variability, with a mean of 0.3215 and a standard deviation of 0.1279. Its range, from 0.0204 to 4.3255, along with a skewness of 6.13 and kurtosis of 166.98, indicates significant differences in investment levels across regions. Such disparities likely reflect the varying economic structures and fiscal capacities of the regencies and cities in Indonesia. The Jarque-Bera test results confirm that none of the variables follow a normal distribution, as all probabilities are 0. This indicates the presence of significant deviations from normality, likely due to outliers and skewed distributions. These findings suggest the need for robust econometric techniques, such as panel regression models with controls for heteroskedasticity and non-linearity, to ensure reliable results. In summary, the descriptive statistics highlight substantial variability in economic growth, local government size, and investment levels across regions and periods. These variations are consistent with the diverse socio-economic conditions of Indonesia's regencies and cities. The high skewness and kurtosis values underscore the importance of capturing non-linear relationships and addressing extreme values in the econometric analysis. These results lay a strong foundation for investigating the optimal local government size and its impact on regional economic growth, as outlined in the subsequent analysis.

The regression results provide an in-depth understanding of the relationship between local government size, investment, and regional economic growth across Indonesia's regencies and cities from 2011 to 2022. The Common Effects Model (CEM), Fixed Effects Model (FEM), and Random Effects Model (REM) are utilized to estimate the effects, with the Hausman test identifying the Fixed Effects Model as the most appropriate for this analysis.

Tabel 2. Estimation Results

	CEM	FEM	REM
S	0.331696***	4.628441***	0.13159
	(7.939972)	(23.497623)	(1.348626)
S^2	-0.300862***	-3.146146***	-0.00049
	(-4.304198)	(-13.297190)	(-0.003076)
I	0.164735***	0.201590***	0.471796***
	(8.784897)	(2.989960)	(14.330763)
C	0.204598***	-0.360255***	0.128959***
	(33.091959)	(-12.224127)	(9.694996)
R-squared	0.046346	0.309170	0.039990
Adjusted R-squared	0.045880	0.245820	0.039521
F-statistic	99.465299	4.880377	85.257180
Prob(F-statistic)	0.000000	0.000000	0.000000
Observation	6144	6144	6144

*** $p < 0.01$
T-statistics in parentheses

Source: Own calculation, 2024

The Common Effects Model (CEM) demonstrates a clear, statistically significant relationship between local government size (S), its squared term (S^2), and investment (I) with regional economic growth at the 1% level. The positive coefficient for S (0.331696) underscores the benefits of increasing government expenditure, particularly at lower levels, where it contributes to improved public services and infrastructure development. This finding aligns with theories of public economics, which emphasize the role of government spending in addressing market failures and providing critical public goods that stimulate productivity and economic performance (Altunc & Aydın, 2013; Asimakopoulos & Karavias, 2016; Coayla, 2021; Nouira & Kouni, 2021; Tiebout, 1956). However, the negative coefficient for S^2 (-0.300862) illustrates the diminishing returns of excessive government expenditure. At higher levels, inefficiencies such as bureaucratic overhead, misallocation of resources, and the crowding-out effect of private investments begin to erode the positive impact of government size on growth. These results validate the theoretical proposition of an inverted-U relationship between government size and economic growth. Investment (I), with a coefficient of 0.164735, emerges as a robust determinant of growth, highlighting its indispensable role in regional economic dynamics. This finding reflects the tenets of endogenous growth theory, which posits that capital accumulation and infrastructure development are central to sustaining long-term economic growth. Despite the statistical significance of these variables, the adjusted R^2 value of 0.045880 in the CEM indicates that other unobserved factors likely influence regional growth, suggesting the need for models that better account for regional heterogeneity.

The Fixed Effects Model (FEM) offers deeper insights by controlling for unobserved region-specific characteristics, significantly enhancing the explanatory power of the analysis. The coefficients

for S (4.628441) and S^2 (-3.146146) are notably larger than those in the CEM, indicating a stronger non-linear relationship when regional factors such as socio-economic conditions and governance capacities are considered. These results emphasize the importance of contextual factors in shaping the efficacy of government expenditure. The significant positive coefficient for I (0.201590) further underscores the consistent role of investment as a growth driver. With an improved adjusted R^2 value of 0.245820, the FEM demonstrates a greater ability to explain variations in regional economic growth, reaffirming the importance of accounting for heterogeneity in econometric analyses.

In contrast, the Random Effects Model (REM) fails to capture the full extent of these relationships. While I remain significant, the insignificance of S ($P = 0.1775067$) highlights the limitations of this model in accounting for region-specific effects. The Hausman test, with a $P - value$ of 0.000000, conclusively favors the FEM over the REM, further supporting the need to address unobserved heterogeneity in the analysis.

The FEM coefficients allow for the calculation of the optimal local government size (S_{Opt}):

$$S_{Opt} = \frac{-\beta_1}{2\beta_2} = \frac{-4.628441}{2 \times (-3.146146)} = 0.735573$$

Using the FEM coefficients, the optimal size of local government expenditure relative to GRDP (S_{Opt}) is calculated as approximately 73.56%. This result reflects the point at which local government size maximizes regional economic growth, balancing the benefits of increased public spending with the costs of inefficiencies. Below this threshold, increases in government expenditure enhance growth by addressing infrastructure gaps and improving public service delivery. However, exceeding this optimal size leads to diminishing returns, as excessive spending results in inefficiencies and potential crowding out of private sector investments.

The findings align with Armey's theory of optimal government size, which postulates an inverted-U relationship between public expenditure and economic growth (Altunc & Aydın, 2013; Asimakopoulos & Karavias, 2016; Bozma et al., 2019; Coayla, 2021; N. Jain & Sinha, 2022; Thanh & Mai Hoai, 2014). The positive impact of government size at lower levels underscores its role in addressing market failures and enabling economic productivity through public goods provision (Altunc & Aydın, 2013; Bozma et al., 2019; Coayla, 2021; N. Jain & Sinha, 2022). Conversely, the negative impact at higher levels reflects inefficiencies that arise when government activities expand beyond their productive capacity (Altunc & Aydın, 2013; Bozma et al., 2019; Coayla, 2021; N. Jain & Sinha, 2022). The significance of investment (I) aligns with endogenous growth theories, emphasizing the critical role of capital accumulation in sustaining long-term economic growth (Al-Abdulrazag, 2021; Murshed et al., 2018; Nouira & Kouni, 2021).

These results provide actionable insights for policymakers. First, regions operating below the optimal government size of 73.56% should strategically increase expenditure to stimulate growth, particularly in underdeveloped areas. Conversely, regions exceeding this size must implement efficiency reforms, focusing on reducing wasteful spending and enhancing governance quality. Investment remains a pivotal growth driver, necessitating targeted policies to attract private and public investments. Infrastructure development, regulatory streamlining, and fostering innovation-driven industries are essential strategies to enhance regional competitiveness. Moreover, tailored fiscal policies addressing regional disparities and strengthening institutional frameworks are vital to ensure equitable and sustainable growth across Indonesia's diverse regions.

While the findings offer robust evidence, the relatively low adjusted R^2 values across models suggest that additional factors, such as institutional quality, human capital development, and external economic conditions, may also significantly influence growth. Future research should incorporate these dimensions to provide a more comprehensive understanding of regional development dynamics.

Qualitative studies exploring the mechanisms through which government size and investment affect economic outcomes would complement the quantitative findings, offering deeper insights for effective policymaking.

CONCLUSION

This study offers valuable insights into the intricate relationship between local government size, investment, and regional economic growth in Indonesia's regencies and cities from 2011 to 2022. The findings highlight the existence of an optimal government size, approximately 73.56% of GRDP, where economic growth is maximized. Below this threshold, increases in government expenditure have a positive effect by addressing critical gaps in infrastructure and public services. However, beyond this optimal point, inefficiencies such as resource misallocation and bureaucratic overhead begin to diminish the returns from additional spending, thereby hindering growth. Investment consistently emerges as a key driver of economic growth, underscoring the need for targeted policies that enhance capital formation and foster sustainable development. This finding is supported by endogenous growth theories, which emphasize the importance of infrastructure development and financial investment in driving productivity and long-term economic performance. Furthermore, the Fixed Effects Model reveals the significance of region-specific characteristics, highlighting the necessity for localized policy interventions that address the unique challenges faced by Indonesia's diverse regions.

From a policy perspective, these findings provide actionable recommendations. Policymakers should aim to maintain government spending levels near the identified optimal size, strategically increasing expenditure in regions where it remains below the threshold. Conversely, regions with excessive spending should focus on efficiency reforms to optimize resource use and reduce waste. Investment strategies must prioritize improving infrastructure, fostering innovation, and creating a conducive environment for public-private partnerships, particularly in regions with low capital formation. Additionally, strengthening governance structures through enhanced transparency, accountability, and capacity building is critical to ensure the effective implementation of these measures.

Future research should explore the influence of other factors, such as human capital, institutional quality, and external economic conditions, on regional economic growth. Incorporating these variables would provide a more comprehensive understanding of the dynamics at play and further inform evidence-based policymaking. Qualitative analyses could also uncover the mechanisms through which government size and investment drive growth, offering nuanced insights for tailoring interventions. By addressing these areas, future studies can build on the contributions of this research, advancing strategies that promote equitable and sustainable development across Indonesia's diverse socio-economic landscape.

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