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GOVERNMENT FINANCIAL MANAGEMENT REVIEW: THE IMPACT OF GOVERNMENT SPENDING AND BUDGET SURPLUS (SILPA) ON REGIONAL DEVELOPMENT

Agung Angga Somantri[1*], Muslimin[2], Juliana Kadang[3], Darman[4], Munawarah[5], Aulia Rahim[6]
[1,2,3,4,5] Faculty of Economics and Business, Tadulako University, Palu
[6]School of Sociology and Social Policy, University of Nottingham, UK
Email: [1]agung.angga@kemenkeu.go.id, [2]hasan.muslimin66@gmail.com, [3]Juliana_kadang@untad.ac.id, [4]darman_tadulako@yahoo.com, [5]munawarah@untad.ac.id, [6]aulia.rahim@nottingham.ac.uk
*Corresponding author

ABSTRACT
Research Originality — This study examines Indonesian government spending—both state and local budgets—at a disaggregated level, with particular attention to the role of the Budget Surplus (SILPA). By doing so, it provides a clearer picture of how specific fiscal policies and excess budget financing shape regional economic growth.
Research Objectives — The primary aim of this study is to explore how different types of government spending, along with excess budget financing (SILPA), affect regional economic performance in Indonesia. It also seeks to identify which fiscal components contribute most effectively to growth and where potential inefficiencies lie.
Research Methods — This study applied Principal Component Analysis (PCA) to nine fiscal variables from 2020 to 2024 across 34 provinces, reducing them to two principal components that together explained more than 91% of the total variance. These components were then analyzed using panel data regression, with the Between OLS model identified as the best fit. The model's reliability was further validated through a series of statistical tests.
Empirical Results — The results indicate that the first principal component (PC1) exerts a significant positive influence on GRDP, whereas the second principal component (PC2) has a negative effect. This implies that although government spending overall tends to stimulate economic growth, inefficiencies—especially within central government expenditures—can offset and weaken these benefits.
Implications — The findings underscore the importance of enhancing efficiency and strengthening coordination in government spending. They suggest that policymakers should focus on improving the effectiveness of central government expenditures within the regional context and on strategically channeling SILPA into productive projects. Such measures can stimulate local economies and support the development of more effective, well-targeted fiscal policies.

Keywords: Government spending, SILPA, economic growth, regional development.
JEL Classification: H72, E62, O23.
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INTRODUCTION

Regional economic development serves as a key indicator for assessing the effectiveness of both state and local government fiscal policies. It is most commonly measured through Gross Regional Domestic Product (GRDP) (Gatari et al., 2024). GRDP represents the total economic output generated within a region over a specific period and is shaped by various factors, including government spending.

As outlined in Keynesian economic theory, government spending is considered a key driver of economic value creation (Iriyadi & Purba, 2022), which significantly enhances the economic growth (Ahuja & Pandit, 2020). Moreover, government expenditures have been found to positively affect multisectoral development progress (Bouakez et al., 2023) and even act as a catalyst for economic recovery during crises (Räsänen & Mäkelä, 2021). According to Keynesian theory, when the economy experiences a downturn, higher public spending can help compensate for weakening private sector demand, thereby reducing

unemployment and supporting economic stability. This perspective highlights the counter-cyclical role of fiscal policy, positioning government expenditure as a crucial instrument for both stabilizing the economy and accelerating growth.

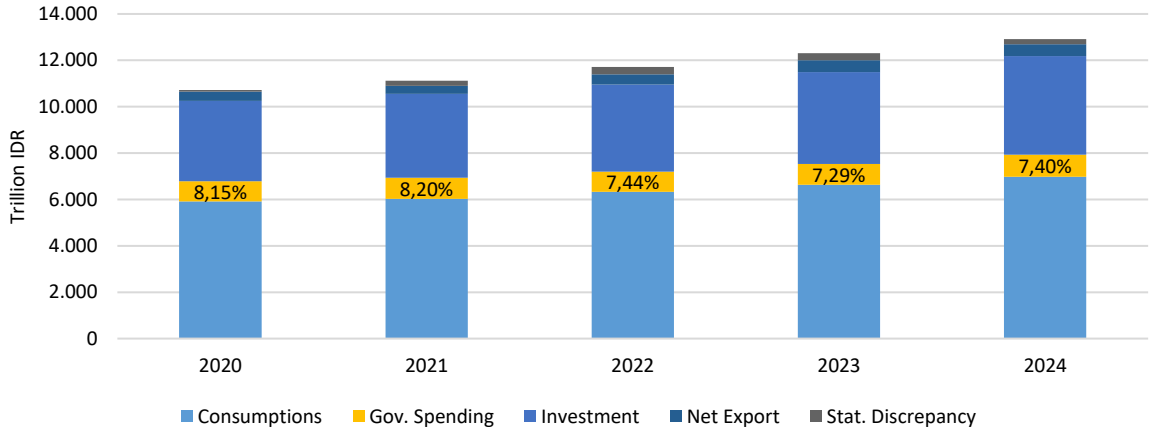
APPLICATIONS FOR PRACTICE

- Government spending and SILPA can significantly promote regional economic growth.
- SILPA should be minimized to avoid opportunity cost for regional development.
- Local governments should invest SILPA in low-risk instruments to optimize idle cash, and use the returns for scholarships or job-creation programs.
- Local and central governments need to improve budget coordination to avoid overlapping programs, enhance spending quality, and promote the use of local products and labor for regional development.

Beyond the Keynesian perspective, fiscal federalism theory offers another important framework for analyzing government spending, especially in decentralized systems. It highlights the importance of distributing fiscal responsibilities effectively across different levels of government to achieve optimal outcomes. Strengthening the financial management from state to local authorities based on specific targets (Tom & Ataide, 2021). The theory argues that local governments are often better equipped to understand and respond to community preferences and regional conditions, making localized public spending more effective in reducing development disparities (Agrawal et al., 2024). This framework also provides a strong rationale for examining regional spending patterns when assessing their impact on economic outcomes.

Indonesia's economic structure is predominantly driven by household consumption, which has consistently contributed around 54% to 55% of total Gross Domestic Product (GDP) over the past five years (see Chart 1). Investment (I) follows as the second-largest driver of growth. In comparison, government spending (G) directly accounted for about 7.4% of GDP in 2024. In nominal terms, government expenditure rose from IDR 3,471 trillion in 2020 to IDR 4,248 trillion in 2024, reflecting efforts to reinforce the national economy.

Chart 1 Indonesian Constant GDP Distributions/Shares (2020 – 2024)

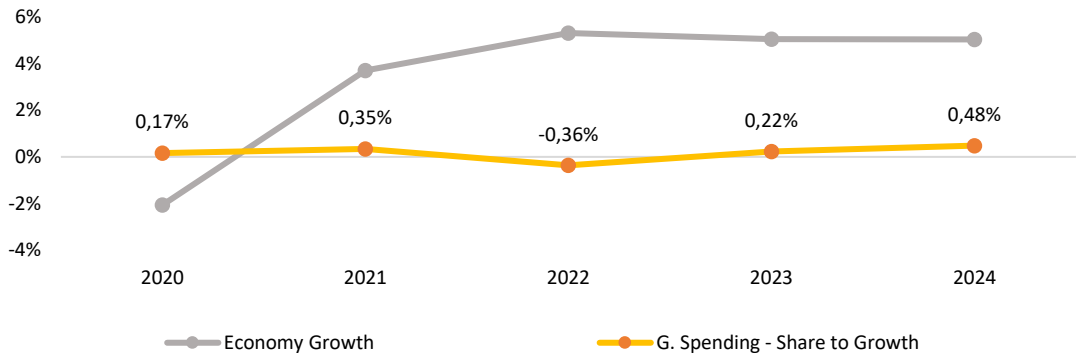


Source: BPS-Statistics Indonesia (2025)

The government's fiscal contribution is reflected not only in economic output but also in its vital role in improving community welfare and fostering private sector activity. Dupaigne & Fève (2016) found that government spending can strengthen the investment climate in the short run. Additionally, a study by Ruzima & Veerachamy (2023) showed that government spending in the health sector contributes in improving the level of community development. Sutiono & Syafitri (2018) and Rahmawati & Nur Intan (2020) also demonstrated the positive influence of government spending on income inequality and Human Development Index (HDI). These benefits can only be realized through accountable, effective, and efficient execution of government budgets—both at the central level (State Revenue and Expenditure Budget/APBN) and at the regional level (Local Revenue and Expenditure Budget/APBD).

Government spending has also played a crucial role in stabilizing economic conditions. For example, as shown in Chart 2, government expenditure was increased to mitigate the economic downturn brought about by the Covid-19 pandemic. Notably, government spending contributed around 0.17% to economic growth (year-on-year) in 2020, while overall GDP growth contracted by about –2.07% (yoy). Although the direct contribution was relatively modest, the government spending variable (G) proved essential in sustaining community welfare during times of crisis, as stated by Hadiyanto et al. (2022). Amid the current period of stagnant economic growth, hovering around 5±1%, optimizing budget realization becomes crucial

Chart 2 Overall Economic Growth and Gov. Spending Share to Growth in 2020 until 2024

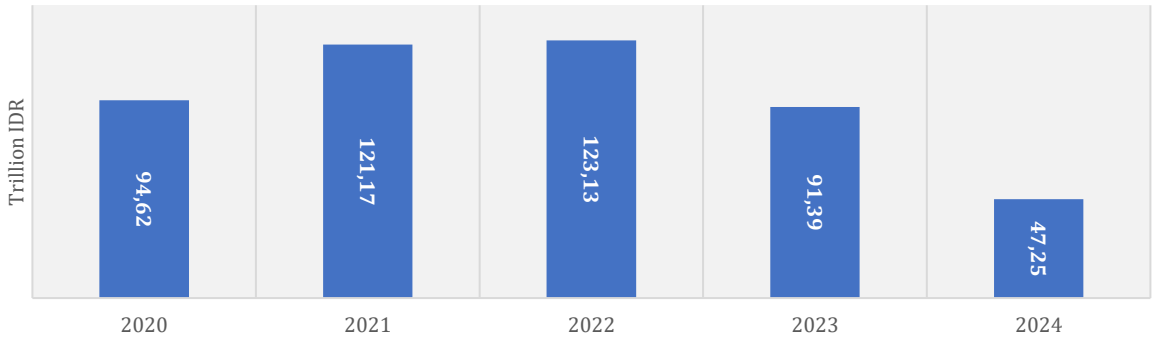


Source: BPS-Statistics Indonesia (2025)

for maintaining stability and reinforcing multiple sectors of the economy. Ensuring that government spending is both efficient and effective is key to stimulating economic activity, encouraging investment, and supporting long-term development.

This highlights the importance of recognizing that government budgets are distributed across various expenditure categories, such as employee spending, capital investment, and other types of expenditures. As noted earlier, many studies have confirmed the impact of government spending on both economic performance and welfare development. However, most of this research tends to examine spending in aggregate (see Bouakez et al., 2023; Dupaigne & Fève, 2016; Puspitasari et al., 2023; Sutiono & Syafitri, 2018; Räsänen & Mäkelä, 2021), offering only limited thematic insights. In practice, though, each expenditure category plays a distinct role in supporting economic development.

Chart 3 Local Government SILPA (Aggregated) from 2020 to 2024



Source: Ministry of Finance (2025)

In regional public cash management, the implementation of the Regional Budget (APBD) over the past five years has generally resulted in a Post-Financing Budget Surplus (SILPA) (see Chart 3). SILPA reflects the gap between realized revenue plus net financing and actual expenditure (Okynawa et al., 2018). Ideally, government budget allocations should be fully absorbed to support public programs and activities. Yet, as of 2024, Indonesia's Regional Budget (APBD) still recorded about IDR 47.25 trillion in excess budget, essentially reflecting unspent funds. While SILPA can be carried over and allocated in the financing section of the following year's APBD, a persistently high SILPA often signals weaknesses in regional planning and budgeting. This not only reflects inefficiencies but also creates opportunity costs in fiscal management and regional development. Moreover, Sari et al. (2018) stated that SILPA converges to less optimal budget absorption and further lower the budget allocation quality. Some studies also point out that SILPA has an insignificant impact on the fiscal quality of local governments in East Java Province (Putri & Ratnawati, 2023) and unsignificantly employing economic growth in West Sumatra Province (Pinem et al., 2020).

To deepen the understanding of government spending's impact, this study analyzes detailed expenditure components from both the state budget (APBN) and regional budgets (APBD), while also incorporating regional SILPA. Building on previous research, integrating SILPA at the national level offers the advantage of producing more generalizable results. The analysis covers all Indonesian provinces over

the period 2020 to 2024 and applies two methods: Principal Component Analysis (PCA) and Panel Data Regression.

Breaking down expenditure components and incorporating SILPA allows this study to identify the most effective fiscal strategies for strengthening regional economies in Indonesia. The use of PCA and panel data regression is designed to generate findings that are generalizable at the national level. In particular, PCA helps minimize information loss while enhancing the interpretability of the results (Chen, 2021) thereby strengthening the robustness of the estimation model and providing a more accurate reflection of actual economic conditions.

The analytical approach used in this study is expected to generate a model that effectively captures the impact of different categories of government spending on the economy. In doing so, the study seeks to provide stronger policy recommendations for optimizing spending implementation in support of regional economic growth. By mapping the effects of APBN and APBD expenditures alongside regional SILPA, the government can design policies that are better aligned with regional development needs. Ultimately, these insights will help policymakers prioritize strategies for regional economic development, especially when operating under budgetary constraints.

LITERATURE REVIEW

One of the most common challenges faced by governments around the world today is managing public finances to ensure the effective implementation of their duties and functions (Teremetskyi et al., 2021). Governments are expected to apply sound financial management principles as the foundation for administering revenue, expenditure, and financing. At its core, financial management involves planning, organizing, making decisions on spending and financing, as well as managing assets (Higgins et al., 2023). This aligns with Weston (1998) concept, which emphasizes financial management as a cornerstone for guiding an organization's financial decisions. With effective financial management, public sector organizations can optimize the use of resources, reduce risks, and create greater value, ultimately leading to improved public service delivery.

In this context, government spending serves as a key fiscal instrument for carrying out governmental tasks and functions. Its implementation is aligned with the division of authority between central and regional governments to prevent overlapping activities and promote program integration. Generally, government spending is directed toward achieving development goals such as maintaining price stability, fostering economic growth, ensuring equitable income distribution, and creating employment opportunities (Syadali, 2023).

According to the Regulation of the Minister of Finance (PMK) Number 214 of 2013, central government spending is classified into several categories, including account segmentation. This segmentation can extend up to six digits, providing detailed classifications for revenue, expenditure, and financing accounts. The framework was later refined and updated through the Decree of the Director General of Treasury Number KEP-291/PB/2022. Together, these regulations establish the codification system that serves as the standard for administering transactions within the central government budget (APBN).

In regional financial management, the Minister of Home Affairs issued Regulation Number 90 of 2019 to strengthen the effectiveness of regional development and financial governance. The regulation requires local governments to adopt classification, codification, and nomenclature systems in administering regional finances. As a result, local governments also apply a segmentation system of up to six-digit codes. According to Suryanto (2019), this codification policy in the APBD functions as an accounting standard to uphold administrative discipline, effectiveness, efficiency, and transparency in managing local finances.

At the two-digit codification level, government spending is grouped into several main categories, including employee expenditure, goods and services, capital expenditure, social assistance, and other types of spending. This codification system is designed to enhance transparency and strengthen accountability in budget utilization. In addition, it allows for more effective budget tracking, such as analyzing the share of each spending category and assessing the government's overall contribution to economic stimulus.

In economic terms, employee expenditure is directly reflected in the GRDP component. By definition, this category covers government spending allocated for salaries and allowances of civil servants, as well as state budget (APBN) spending for retirees (Rofiq & Arza, 2021). However, Mawaddah et al. (2024) found that the role of employee spending for regional ASN (State Civil Apparatus) did not have a significant impact on driving economic growth in North Sumatra. The weak influence of employee spending on regional economic development was also mentioned in the research of Syuhada et al. (2023) in Southeast Sulawesi. Consistent with previous studies, it is important to re-evaluate the share of employee expenditure, which has accounted for more than 30% of APBD allocations since 2020 (see Chart 4 and Chart 5). Adjustments are needed to comply with Law Number 1 of 2022, which stipulates that employee spending should not

exceed 30% of total regional expenditure. Such realignment would help create greater fiscal space for regional development programs.

Chart 4 Central/State Government Spending Distributions (2020 to 2024)

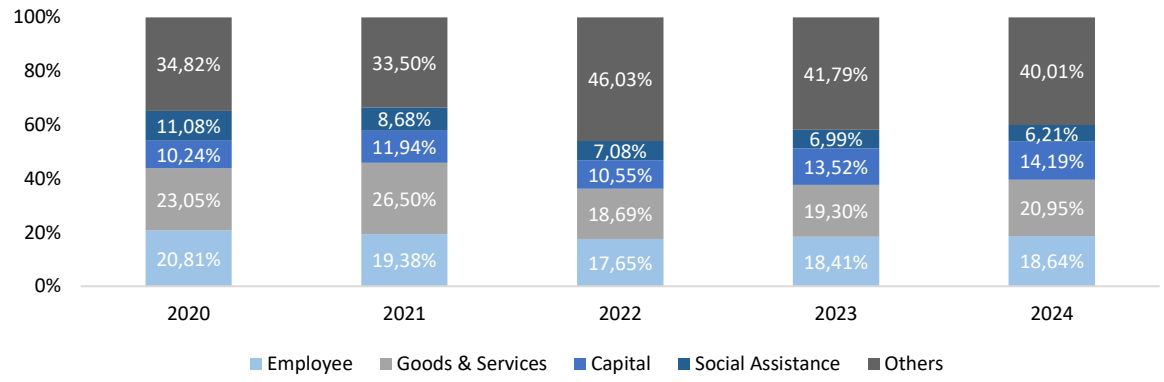
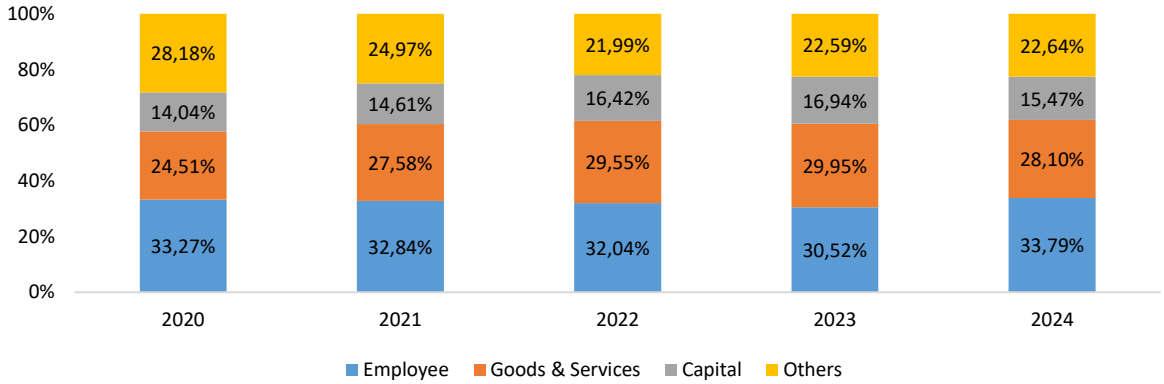


Chart 5 Local Government Spending Distributions (2020 to 2024)



Source: Ministry of Finance (2025)

In addition to employee expenditure, spending on goods and services is a major component in ensuring the successful implementation of government programs. Representing about 18%–30% of the total budget, this category finances operational needs such as electricity, office supplies, and maintenance. Research has shown that goods and services spending is positively associated with regional economic growth (Parno & Nuryanto, 2023). In this context, such expenditures are typically directed to local vendors, thereby stimulating private sector activity within the region.

The government also promotes economic growth through capital expenditure. Both at the national (APBN) and regional (APBD) levels, capital spending is regarded as a fiscal instrument with a strong multiplier effect across the economic ecosystem as concluded in the study of Waweru (2021), Savira et al. (2022), and Puspitasari et al. (2023). Government spending on capital projects and public infrastructure generates significant multiplier effects, boosting economic activity in both the short and long term, particularly in social welfare (An Nisa & Handayani, 2021; Priambodo & Djirimu, 2024) and regional economic development (Nurilmih et al., 2023). However, Ganelli & Tervala (2020) argue that the multiplier effect of public infrastructure emerges only when government capital spending is managed efficiently, capital depreciation remains relatively low, and infrastructure output responds with a high degree of elasticity.

Aside from promoting the economic growth, government spending also serves as a social safety net, especially during economic crises (Harvey & Mohamed, 2022). Social assistance spending is designed to safeguard vulnerable groups and help them cope with socio-economic risks (Ayu, 2021). In certain cases, social assistance spending not only provides protection but also contributes positively to economic growth (Sumiyarti, 2022; Varshney et al., 2021). In this study, local government social assistance spending is grouped together with other expenditure categories, following the primary codification of local budget allocations.

As noted earlier, the implementation of the APBD often leaves a year-end surplus, known as SILPA. This surplus is commonly seen as an indicator of regional spending efficiency and is carried over to finance expenditures in the next fiscal year or to support new programs that were not initially included in the APBD

(Rafi & Arza, 2023). Optimizing SILPA becomes crucial (Yuliantoni & Arza, 2021) especially in ensuring that SILPA is used for priority regional development programs. In line with this urgency, Ariyanto et al. (2024) found that between 2015 and 2019, regional SILPA did not significantly enhance the effectiveness of infrastructure development, thereby reducing its potential multiplier effect on regional economic growth

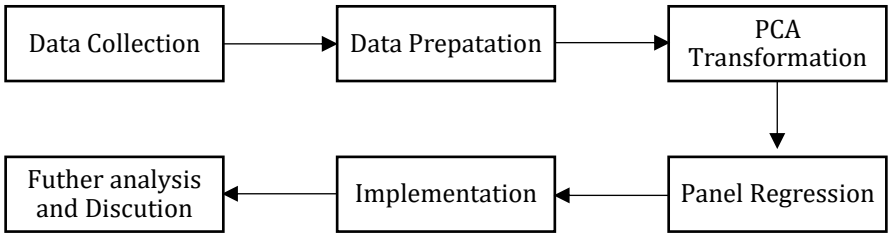
Several previous studies highlight the positive role of government spending in promoting regional economic growth. However, many of these analyses remain limited, as they do not fully consider the interplay between central and regional government expenditures in greater detail, nor the contribution of SILPA to current economic conditions.

Building on earlier studies, this research seeks to provide a more comprehensive understanding of the relationship between government spending, SILPA, and regional economic development. By analyzing spending patterns through detailed budget accounts and recent data, it aims to offer a clearer picture of how effectively regional expenditures contribute to driving economic growth. This study also considers the role of SILPA, which requires careful management to be optimally utilized in supporting infrastructure development and enhancing community welfare. Recognizing the importance of fiscal policy in maintaining economic stability and promoting sustainable development, the findings are expected to provide strategic recommendations for the government to strengthen regional economic development interventions through more effective use of fiscal capacity, both from the APBN and APBD.

METHODS

This study aims to quantitatively analyze the impact of government spending and SILPA on regional economic development. The analysis covers data on spending and SILPA from all provinces in Indonesia for the period 2020–2024. Data processing and analysis are carried out using Jupyter Lab with the Python programming language. In brief, this study follows several key stages: starting with data collection and preparation, moving through PCA implementation and panel data regression, and concluding with the interpretation and discussion of results (Figure 1).

Figure 1 Research Flow



Source: Process by the author

The data for this study were sourced from official government platforms. Specifically, government spending and SILPA, which serve as the independent variables, were obtained from the Ministry of Finance. Meanwhile, the dependent variable, GRDP realization for all provinces over the past five years, was provided by BPS. A summary of these research variables is presented in Table 1.

Furthermore, these variables were incorporated into the following econometric equation:

$$PDRB_{ij} = NP_{ij} + NB_{ij} + NM_{ij} + NSOS_{ij} + DP_{ij} + DB_{ij} + DM_{ij} + DLAIN_{ij} + SILPA_{ij} + \varepsilon$$

Where:

- NP represents employee expenditure sourced from the APBN, expressed in billions of rupiah.
- NB denotes the realized expenditure on goods and services by K/L units, measured in billions of rupiah.
- NM is capital expenditure sourced from the APBN in billions.
- NSOS represents social assistance expenditure managed by the central government.
- DP represents employee expenditure for regional ASN sourced from the APBD.
- DB refers to the expenditure on goods and services by regional apparatus organizations, expressed in billions of rupiah.
- DM is capital expenditure of regional governments.
- DLAIN refers to a group of other expenditure accounts within APBD management.
- SILPA represents the Post-Financing Budget Surplus in billions of rupiah.
- ε represents the error term of the model.
- i represents the year.
- j represents the entity or province.

Subsequently, the independent variables in the mathematical framework were transformed using PCA. PCA can be used to avoid multicollinearity symptoms (Pendi, 2021), and remove noise while retaining

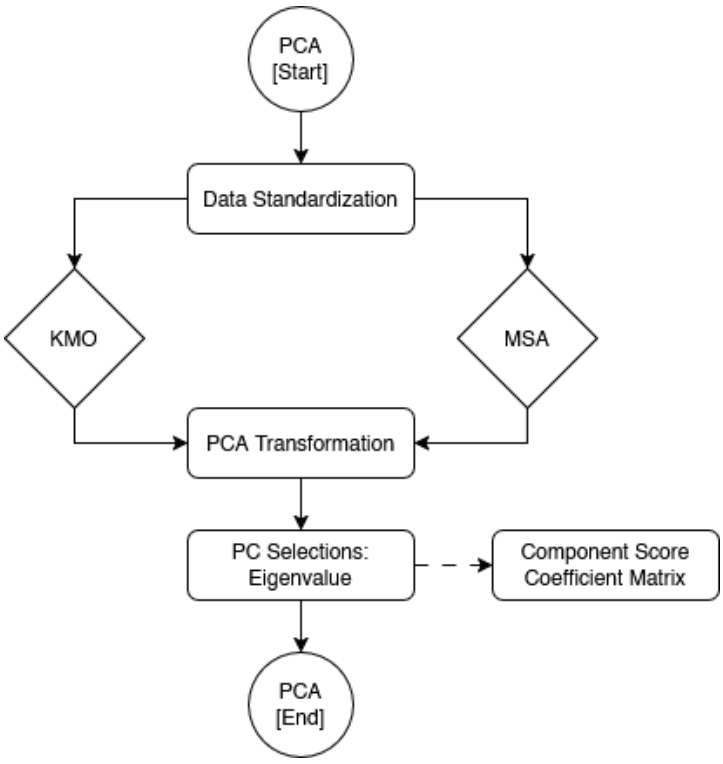
Table 1 Research Variable Information

Variable	Description	Source	Usage Reference
PDRB	Gross Domestic Regional Product (GDRP)	Statistics Indonesia	Gatari et al., 2024; Nurilmih et al., 2023
NP	State governmental employee expenditure (APBN)	Directorate General of Treasury (DJPb), Ministry of Finance (MOF)	Rofiq & Arza, 2021
NB	Good and services expenditure of APBN	DJPb, MOF	Parno & Nuryanto, 2023
NM	Capital expenditure of APBN	DJPb, MOF	An Nisa & Handayani, 2021
NSos	Social assistance expenditure of APBN	DJPb, MOF	Harvey & Mohamed, 2022
DP	Capital expenditure of Local Government Budget (APBD)	Directorate General of Fiscal Balance (DJPK), MOF	Mawaddah et al. (2024)
DB	Good and services expenditure of APBD	DJPK, MOF	Parno & Nuryanto, 2023
DM	Capital expenditure of APBD	DJPK, MOF	Priambodo & Djirimu, 2024
DLain	Other expenditure of APBD	DJPK, MOF	Regulation of the Minister of Home Affairs Number 90 of 2019
SILPA	Post-Financing Budget Surplus of APBD execution	DJPK, MOF	Rafi & Arza, 2023

Source: Process by authors

information from the original dataset (Hasan & Abdulazeez, 2021). Pendi (2021) in his research explained that the PCA transformation process begins with standardizing independent data. Furthermore, the Kaiser-Meyer-Olkin (KMO) and Measure of Sampling Adequacy (MSA) tests are used to assess whether the data are suitable for PCA. If the requirements of the KMO and MSA tests are satisfied, the data are then transformed into several Principal Components (PCs). In practice, not all PCs are used in the subsequent analysis process. Wu (2021) explains that the relevance of PC selection is based on the eigenvalue above 1. In addition, calculating the Component Score Coefficient Matrix for each selected PC is suggested to improve the clarity of interpretation. For ease of understanding, the overall flow of the Principal Component Analysis is presented in Figure 2.

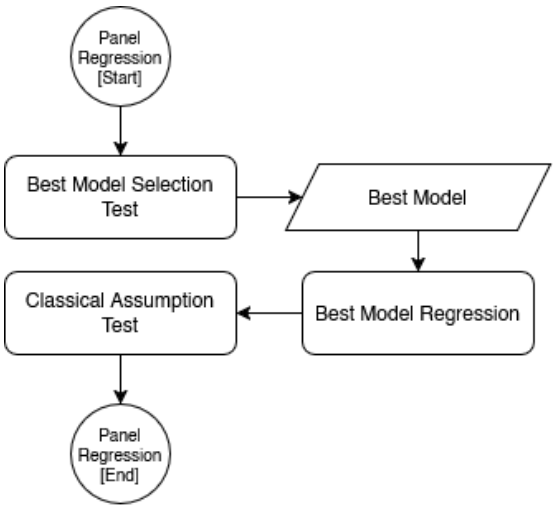
Figure 2 PCA Transformation Flow



Source: Authors based on Pendi (2021) & Wu (2021)

The influence of each independent variable, as represented by the PCs, on GRDP can be tested using the panel data regression method. Madany et al. (2022) explained that panel data regression is suitable for analyzing data that combines characteristics across entities (cross-section) and over time (time series). Panel data regression analysis is begun by selecting the best regression model (Septianingsih, 2022). With the Linearmodels library, the authors need to select the most appropriate model from several options, including Fixed Effects, Random Effects, First Difference, Between Estimation, Pooled OLS (Common Effect), and Fama-MacBeth Estimation. The selection of the best regression model can be done by comparing the AIC and BIC values (Huang, 2017) for each estimation model. The chosen model must first pass the classical assumption tests before it can be further interpreted.

Figure 3 Panel Regression Steps



Source: Process by authors

Each stage of data analysis must be carefully conducted to ensure that the model estimation is valid in explaining the contribution of government spending and SILPA to regional economic development. A well-estimated model will generate fact-based findings that provide a solid foundation for further discussion.

RESULT AND DISCUSSION

Findings

Before proceeding to the main analysis, a descriptive overview of the data is necessary to provide a clearer understanding of the variables. The descriptive statistics presented in Table 2 highlight several key points. With 170 observations, the data show a wide range of values, reflecting substantial variation. For NP, NB, NM, and NSOS, the mean values are relatively low compared to their standard deviations, suggesting the presence of outliers. In contrast, the variables DP, DB, DM, and DLAIN display mean values that are more consistent with their standard deviations, indicating that the data points are more tightly clustered around the mean. The PDRB variable shows the largest magnitude, with an average of Rp349.54 trillion and a maximum value exceeding Rp2.1 quadrillion, underscoring its role as the most significant economic indicator in the dataset. Meanwhile, the SILPA variable records a negative minimum value (Rp2.56 trillion), indicating that some provinces experienced deficits rather than surpluses. Overall, the data appear highly skewed—particularly for NP, NB, NM, and PDRB—where the maximum values are several times greater than the 75th percentile, confirming the presence of outliers. This substantial variability across variables highlights the importance of conducting further diagnostic tests before moving to the main analysis.

Table 2 Descriptive Statistics

	NP	NB	NM	NSos	DP	DB	DM	DLain	SILPA	PDRB
N	170	170	170	170	170	170	170	170	170	170
MEAN*	11,966	13,653	7,769	4,996	11,436	9,854	5,470	8,441	2,823	349,544
STD*	41,091	49,670	25,424	28,795	10,146	8,942	4,220	8,917	3,525	494,391
MIN*	709	1,019	433	0	2,584	1,782	769	1,214	-2,559	28,031
25%*	2,271	2,721	1,685	10	4,923	4,283	2,554	3,258	741	74,579
50%*	3,358	3,905	2,420	18	8,505	6,848	4,103	5,736	1,667	148,798
75%*	4,781	5,379	3,860	30	11,859	11,343	6,971	9,234	3,421	373,148
MAX*	282,281	381,033	204,011	201,734	46,519	42,339	21,364	42,374	21,182	2,151,041

Source: Data analysis with Jupyter Lab
*data denoted in Billion Rupiah

The variables and estimations in the panel data model must pass the classical assumption tests, with particular attention to multicollinearity and heteroscedasticity (Septianingsih, 2022). The initial multicollinearity test revealed that most independent variables were affected by multicollinearity (Table 3), as indicated by Variance Inflation Factor (VIF) values exceeding 10.

Table 3 Early-stage of Multicollinearity Testing

Variable	VIF	Decision
const	3.635877	
NP	239.798389	reject
NB	34.613357	reject
NM	68.780429	reject
NSos	72.341113	reject
DP	23.038572	reject
DB	29.346168	reject
DM	9.982827	ok
DLain	21.622654	reject
SILPA	3.084745	ok

Source: Data analysis with Jupyter Lab

As noted earlier, PCA transformation was applied to address the issue of multicollinearity. Before this step, the independent variables were standardized using Z-score standardization. The results of the KMO and MSA tests further confirmed that the sample size met the requirements for subsequent analysis. Based on Pendi (2021), the feasibility of the aggregate data is indicated by the KMO value > 0.5 as written in Table 4. Furthermore, the MSA value also indicates that each variable is adequate (value > 0.5) for further analysis (Table 5). Thus, the independent variables in this study can be transformed into Principal Components (PCs).

Table 4 KMO Testing Result

Testing	Value
KMO Measure of Sampling Adequacy (KMO)	0.757

Source: Data analysis with Jupyter Lab

Table 5 MSA Testing Result

Variable	Value
Z(NB)	0.932415
Z(SILPA)	0.882851
Z(DLain)	0.860464
Z(DB)	0.842530
Z(DP)	0.794294
Z(DM)	0.692944
Z(NSos)	0.692622
Z(NM)	0.628457
Z(NP)	0.624226

Source: Data analysis with Jupyter Lab

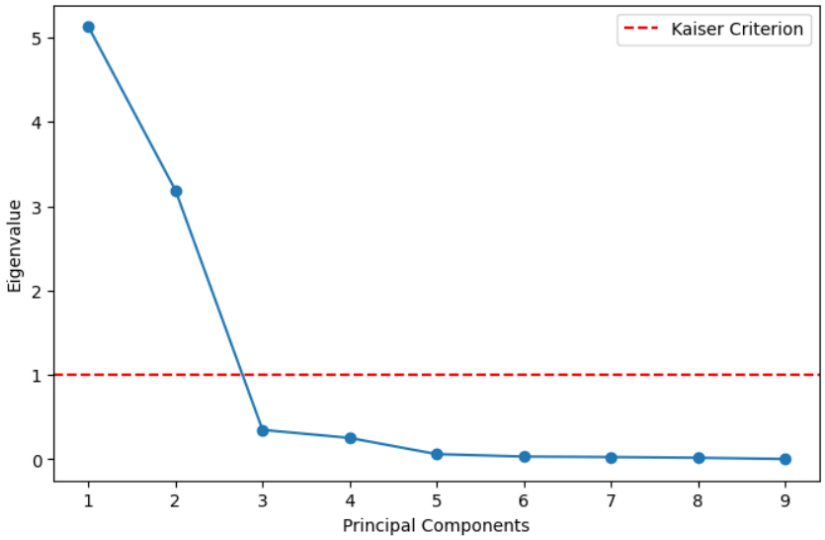
The PCA transformation generated 2 out of 9 principal components (PCs) with eigenvalues greater than 1, namely PC1 and PC2. As shown in Table 6 and the Scree Plot (Chart 6), these two components were selected as the principal components. Together, PC1 and PC2 account for approximately 91.84% of the cumulative variation in the dataset, demonstrating a strong representation of the original data structure.

Table 6 Eigenvalue and Cumulative Variance

PC	Eigenvalue	Variance Explained	Cumulative Variance
PC1	5.127200	56.63%	56.63%
PC2	3.187646	35.21%	91.84%
PC3	0.347818	3.84%	95.69%
PC4	0.252605	2.79%	98.48%
PC5	0.060362	0.67%	99.14%
PC6	0.031660	0.35%	99.49%
PC7	0.025856	0.29%	99.78%
PC8	0.017229	0.19%	99.97%
PC9	0.002878	0.03%	100%

Source: Data analysis with Jupyter Lab

Chart 6 Scree Plot of PCA



Source: Data analysis with Jupyter Lab

Panel data regression is employed to assess the contribution of government spending and SILPA, represented by PC1 and PC2, to the economy. As noted earlier, selecting the most suitable panel data regression model is essential to ensure the most accurate estimates of how the independent variables contribute to regional economic performance. A summary of the information criteria for all panel data regression models is presented in Table 7. The best model is determined by comparing the absolute values of AIC and BIC, with preference given to the smallest values. In this study, the Between OLS model produced the lowest BIC (897.11) and AIC (901.69). Therefore, the Between OLS model is considered the most appropriate for estimating the impact of the independent variables on the dependent variable.

Table 7 Information Criterion Panel Regression Models

FEM	
R-squared	27.06%
F-statistic	24.86
AIC	4039.25
BIC	4048.66
REM	
R-squared	60.43%
F-statistic	127.50
AIC	4165.95
BIC	4175.36
FirstDiff	
R-squared	11.53%
F-statistic	8.73
AIC	3161.54
BIC	3167.36
Between	
R-squared	94.15%
F-statistic	249.38
AIC	897.11
BIC	901.69
CEM	
R-squared	92.91%
F-statistic	1094.4
AIC	4495.28
BIC	4504.69
FAMA	
R-squared	92.91%
F-statistic	1094.3
AIC	4495.29
BIC	4504.70

Source: Data analysis with Jupyter Lab

In addition, the coefficient of determination (R-squared) for the Between model reached 94.15%, making it the highest among the models compared. R-squared serves as an important indicator of explanatory power and is widely applied in social science modeling (Ozili, 2023). The R-squared value of 94.15% indicates that the independent variables in the Between model can explain about 94.15% of the variation in GRDP, while the remaining 5.85% is influenced by other factors outside the model.

Table 8 Between OLS Regression Result

Dep. Var	: GDRP	R2	: **94.15%**
Entities	: 34	F-statistic	: 249.38
Periods	: 5	Prob(F)	: 0.0000

Parameter Estimates

Variable	Coef.	T-stat	P-value
Const	349500	16.376	0.0000
PC1* **	211800	22.276	0.0000
PC2*	-20880	-1.7320	0.0932

Source: Data analysis with Jupyter Lab

*Significant at 10%, **at 5%, and ***at 1%.

The regression results from the Between model indicate that the independent variables are jointly significant in explaining PDRB, as evidenced by the F-statistic probability value being below the 5% threshold. Individually, each principal component (PC) also demonstrates a significant effect on the dependent variable. In this regard, the PC1 variable has a very high level of significance [Prob(t-stat) < 1%] and PC2 shows a moderate level of significance [Prob(t-stat) < 10%].

Table 9 Multicollinearity Testing of Between Model Variables

Variable	VIF	Decision
const	1.0	
PCA1	1.0	Ok
PCA2	1.0	Ok

Source: Data analysis with Jupyter Lab

To confirm the validity of the model estimation, classical assumption tests were carried out, focusing on multicollinearity and heteroscedasticity. The multicollinearity test shows that all VIF values are below 10, indicating no serious multicollinearity problem. Moreover, the use of PCA transformation effectively addresses potential multicollinearity, allowing the independent variables to be included in the model and interpreted with greater confidence.

Table 10 Goldfeld-Quandt Test for Heteroscedasticity

Variable	Value
GQ Statistic	1.15
GQ p-value	0.40

Source: Data analysis with Jupyter Lab

Furthermore, the heteroscedasticity test using the Goldfeld–Quandt method produced a p-value of 0.40. Since this value is greater than the 5% significance level, it indicates that the model does not suffer from heteroscedasticity.

The information in Table 9 and Table 10 shows that the model has passed the classical assumption test. Thus, the estimates in the model can be further interpreted. Using the data in Table 8, the mathematical equation of the model can be described as follows:

$$PDRB=349500+211800*PC1-20880*PC2 \quad [1]$$

In essence, a Principal Component (PC) is a composite variable derived from all independent variables. To make the interpretation clearer, the coefficient matrix for the variables forming PC1 and PC2 is presented in Table 11.

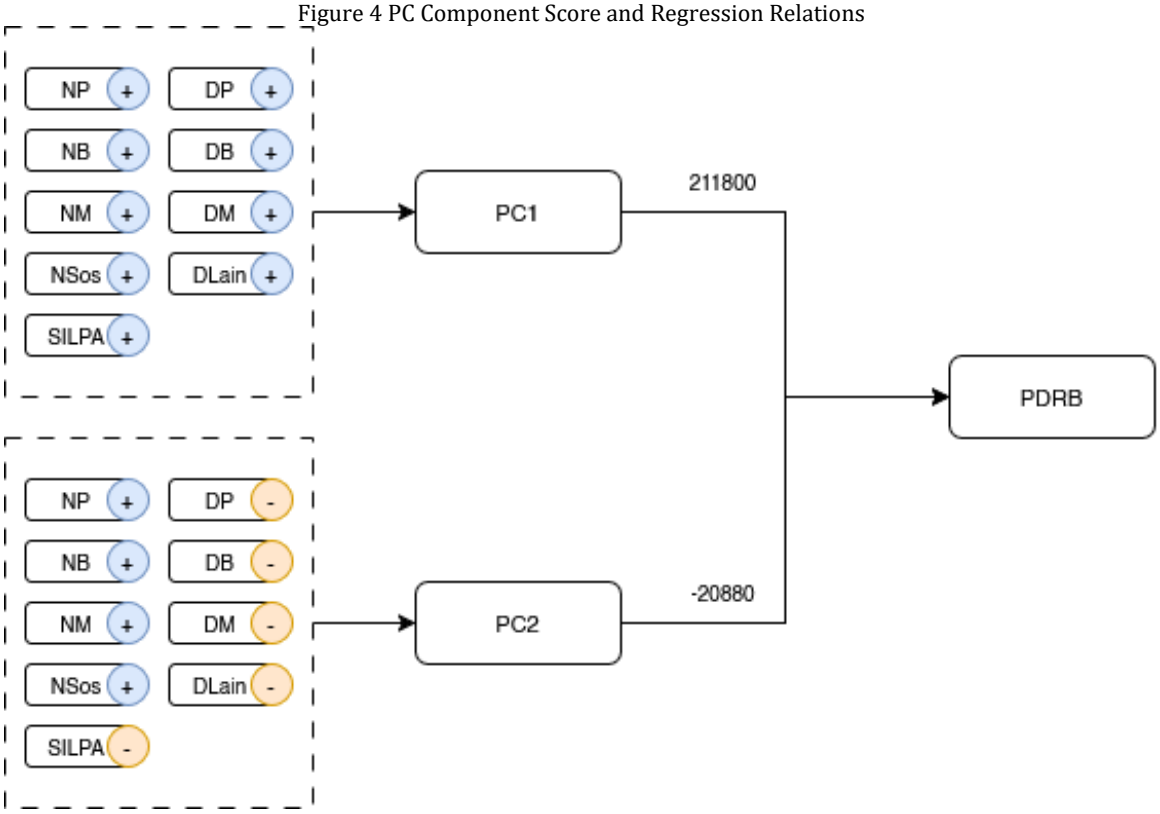
PC1, which accounts for the largest share of variance, reflects that all independent variables move in the same direction, thereby strengthening its positive influence on the regional economy. In contrast, PC2 captures a mixed effect: APBN spending makes a positive contribution that amplifies PC2's impact, while regional spending and SILPA contribute negatively, dampening its effect. The interpretation of these regression results, as summarized in equation [1], is further illustrated in Figure 4 through the component score coefficient matrix.

The regression results and PC components can be interpreted in more detail as follows:

1. The constant term suggests that, even without any contribution from government spending or SILPA as captured by the PC variables, the economy would still grow by around 349,500 billion IDR.

2. An increase in PC1 is projected to drive regional economic growth by approximately 211,800 billion IDR. Since all contributing variables carry positive coefficients, any rise in these independent variables will further strengthen PC1's role in boosting the economy.
3. The coefficient of PC2 is -20,880, meaning that every 1-unit increase in PC2 reduces real regional added value by 20,880 billion IDR. Unlike the components of PC1, not all independent variables move in the same direction with PC2. APBN spending variables (NP, NB, NM, and NSos) show positive values, which contribute to amplifying the negative impact of PC2 on GRDP. In contrast, regional spending variables (DP, DB, DM, and DLain) along with regional SILPA work to lower the nominal value of PC2, thereby helping to reduce its negative effect on the regional economy.

Figure 4 PC Component Score and Regression Relations



Source: Process by the authors

Table 11 Component Score Coefficient Matrix

Variable	PC1	PC2
NP	0.321	0.384
NB	0.310	0.391
NM	0.314	0.373
NSos	0.282	0.423
DP	0.353	-0.294
DB	0.391	-0.241
DM	0.333	-0.288
DLain	0.357	-0.301
silpa	0.321	-0.246

Source: Data analysis with Jupyter Lab

As shown in Figure 4 and supported by the component score matrix in Table 11, the independent variables forming the Principal Components do not always move in the same direction. PC1 and PC2 capture different dimensions of variation within the data. PC1 largely reflects a dimension where all original variables—covering various types of government spending and regional SILPA—tend to move positively, signaling a general growth trend. By contrast, PC2 reflects a mixed pattern: some variables (such as NP, NB, NM, and NSos) move positively, while others (including DP, DB, DM, DLain, and SILPA) move negatively.

The regression results (Table 8) show that both PC1 and PC2 have a significant influence on the dependent variable. The strongly positive and highly significant coefficient of PC1 confirms that a broad increase across the variables it represents—covering overall government spending and regional budget surpluses—serves as a powerful driver of regional economic development. Conversely, the marginally significant negative coefficient of PC2 indicates that although government spending generally supports

economic growth, certain shifts in the composition of spending (as reflected in PC2) may result in slight losses or less-than-optimal outcomes for GRDP (see Table 12). This suggests that not all increases in the underlying variables contribute equally—or positively—to regional economic output. A more detailed explanation of the regression results will be presented in the following section.

Table 12 Compounded Direction of Independent Variables

Component Score Direction		PC Coef. Direction	Final Direction to GDRP Creation
NP	Positive	PC1 Positive	Positive
NB	Positive		Positive
NM	Positive		Positive
NSos	Positive		Positive
DP	Positive		Positive
DB	Positive		Positive
DM	Positive		Positive
DLain	Positive		Positive
silpa	Positive		Positive
NP	Positive	PC2 Negative	Negative
NB	Positive		Negative
NM	Positive		Negative
NSos	Positive		Negative
DP	Negative		Positive
DB	Negative		Positive
DM	Negative		Positive
DLain	Negative		Positive
silpa	Negative		Positive

Source: Process by the authors

Discussion

This research confirms the positive influence of government spending and SILPA on regional economic development, consistent with the findings of earlier studies. As outlined in the Introduction and Literature Review, government expenditure has long been recognized as a key driver of economic growth. By incorporating recent data, this study strengthens the evidence for the positive relationship between public spending and regional economic output. Moreover, the inclusion of SILPA in the analysis underscores its important contribution to GRDP, offering fresh insights into the role of fiscal policy in supporting regional development.

Despite its overall positive impact, the analysis also points to a notable negative effect of government expenditure on regional economies, as reflected in PC2. This indicates the presence of inefficiencies and economic leakages within APBN spending that may weaken its intended outcomes. Since GRDP is measured by the flow of goods and services within a region's boundaries, it is crucial to understand how APBN allocations actually contribute—or fail to contribute—to local economic growth. These potential losses from APBN spending can be better understood through the following key aspects:

1. Employee Expenditure (NP)

A large share of APBN spending goes toward salaries and benefits for central government officials. In principle, this should stimulate local economies by boosting demand for goods and services in the regions where these officials are stationed. In practice, however, many employees continue to spend in line with their home regions rather than in their assigned locations, limiting the intended local economic impact.

For example, although state civil servants (ASN) are stationed in different regions, much of their major spending—on housing, savings, or large purchases—still occurs in their hometowns. This limits the multiplier effect of their income in the areas where they actually work, creating economic leakages that weaken the direct contribution of government salaries to regional GRDP growth.

To reduce these inefficiencies, optimizing employee expenditure should be a key priority. Approaches such as encouraging local spending, ensuring a fairer geographic distribution of salaries, and tying wage allocations more closely to local service productivity can strengthen APBN's impact on regional economies. At the same time, these strategies must be carefully aligned with budget capacity to remain fiscally sustainable.

2. Goods and Services Expenditure (NB)

Government procurement is a key driver of economic activity, creating direct demand for goods and services across Indonesia. However, when procurement is inefficient or poorly allocated, it can result in unnecessary budgetary waste and weaken its overall contribution to regional economies.

A key inefficiency lies in the procurement of goods and services outside the regions where government offices are based. Many central government units still source materials, supplies, and services from major economic hubs—such as Java—rather than from local providers. While this is often driven by supply chain

limitations in certain regions, the result is that a large share of APBN spending bypasses local economies and instead benefits suppliers in more industrialized areas.

This situation creates an economic imbalance, as APBN spending often flows out of the very regions it is meant to support. To counter this, procurement policies should give greater priority to local suppliers, strengthen regional production capacity, and uphold fair market competition to encourage more balanced economic distribution. At the same time, procurement must be carried out at competitive market prices to reduce waste and allow budget allocations to fund additional productive programs.

3. Capital Expenditure (NM)

Capital spending is intended to drive long-term economic growth by funding infrastructure and productive assets such as roads, bridges, healthcare facilities, schools, and other strategic projects. Ideally, these investments improve regional connectivity, strengthen local businesses, and generate new jobs—helping to accelerate overall economic development.

The effectiveness of capital expenditure largely depends on how well it is executed. Delays, inefficient budget use, or misallocation can greatly diminish the intended economic benefits. For example, postponements in road construction projects limit regional connectivity, slow down economic activity, and prolong underdevelopment. Likewise, when infrastructure spending fails to meet quality standards, the long-term benefits fall short of expectations, resulting in wasted resources and reduced economic impact.

A significant share of capital expenditure still depends on suppliers from outside the project regions, largely because of the limited availability of local contractors and resources. As a result, the direct economic benefits for the regions where infrastructure is built remain constrained. To strengthen APBN's impact on regional economies, capital spending needs to be more carefully planned—supported by better project management to avoid delays, stronger local procurement strategies, and stricter quality control to secure lasting economic gains.

4. Social Assistance Expenditure (NSos)

Social spending is designed to improve public welfare through financial assistance, subsidies, and various social programs. Ideally, these allocations should strengthen household purchasing power, reduce poverty, and enhance productivity, thereby contributing to broader economic growth. In practice, however, the impact of social expenditure largely depends on accurate targeting and strong oversight.

When social spending is misallocated or poorly distributed, its economic benefits can be greatly diminished. Inefficiently managed subsidy programs may fall short of stimulating household consumption or fostering long-term productivity gains. At the same time, weak monitoring systems heighten the risk of budget leakages, misallocation, or even misuse of funds, further reducing the effectiveness of social assistance in strengthening regional economies.

Minor inefficiencies in social spending arise when allocated funds fail to deliver their full economic value—whether in the short term, by boosting household consumption, or in the long term, by strengthening human capital and productivity. To enhance the effectiveness of these programs, governments need to improve targeting, strengthen monitoring, and allocate resources more strategically so that social spending generates the greatest possible economic impact.

While APBN spending is vital for regional economic development, its effectiveness needs constant improvement to reduce inefficiencies and maximize impact. By addressing potential losses—such as ineffective employee spending, procurement inefficiencies, delays in capital projects, or poorly targeted social programs—fiscal policy can play a stronger role in promoting sustainable regional growth. These improvements would also amplify the positive impact of APBN already reflected in PC1.

At the local level, APBD spending has been shown to play a positive role in driving regional development. It acts as the backbone of local economic activity by directly supporting household consumption, business operations, and infrastructure projects through local vendors. Salaries for government employees also help sustain demand, since most recipients are local residents. Unlike wages funded by the APBN, APBD-funded payrolls tend to circulate more fully within the community, creating stronger demand for local goods and services. The positive coefficients of DB in PC1 and PC2 underscore the importance of goods and services procurement in channeling capital to local businesses, strengthening regional supply chains, and driving private sector growth. At the same time, capital expenditure (DM) plays a vital role in building long-term assets—such as roads and public facilities—that improve market access, lower transaction costs, and attract private investment. Meanwhile, subsidies and social programs foster inclusive growth by supporting MSMEs, agriculture, and community welfare initiatives, ultimately boosting productivity and enhancing economic resilience.

Strategic improvements in budget planning, resource allocation, and spending execution are crucial to maximize the impact of government expenditure and strengthen its direct contribution to regional

economic growth. At the regional level, closer alignment between APBN and APBD is essential to support more balanced and inclusive development.

Beyond optimizing fiscal instruments, the effective management of regional SILPA offers an important strategy to reduce economic losses and improve fiscal efficiency. As a surplus from unspent allocations—caused by expenditure savings and financing—SILPA should not be left idle. Instead, it needs to be treated as a strategic resource that can be reinvested in the following fiscal year to maximize its impact on regional development. Sound financial management is key to keeping SILPA productive. One practical option is to place it in low-risk instruments, such as government securities or regional bank deposits, which maintain liquidity while still earning returns. More importantly, SILPA should be channeled into job-creating initiatives like infrastructure projects, MSME development, and labor-intensive programs. These investments not only generate employment but also strengthen household purchasing power and support long-term economic growth. By focusing on efficient allocation, strategic investment, and pro-employment spending, regional governments can turn SILPA into a true driver of development—ensuring fiscal sustainability while reducing the negative impacts of spending inefficiencies.

CONCLUSION

This study examines how government spending at both the national (APBN) and regional (APBD) levels influences real regional economic output, with particular attention to the role of excess budget financing (SILPA) between 2020 and 2024. Using Principal Component Analysis (PCA) and panel data regression, the findings show that government expenditure generally supports regional economic development, though its full potential is often reduced by inefficiencies. The analysis further indicates that APBD allocations—covering wages, procurement of goods and services, capital projects, and other local expenditures—play a crucial role in stimulating local economic activity. However, the study also reveals potential losses in central government spending, especially from inefficiencies in employee expenditure, procurement processes, delayed capital projects, and misdirected social programs. Such inefficiencies create economic leakages that weaken the overall impact of APBN spending, preventing regions from receiving its full intended benefits.

The findings highlight the need for more strategic management of government spending to ensure fiscal policies truly support regional development. Areas that require particular attention include directing employee expenditures more effectively, prioritizing local procurement for goods and services, minimizing delays in capital projects, increasing the use of local labor for infrastructure, and strengthening the impact of social assistance programs. By tackling these inefficiencies, both APBN and APBD spending can be made far more effective, driving sustainable and inclusive regional growth. At the same time, prudent management of SILPA plays a vital role in reducing economic waste, ensuring that unused funds are reinvested productively rather than left idle. SILPA should not be left idle but rather reinvested into productive and job-creating projects that directly stimulate local economies, or even scholarship provision for local students.

In conclusion, this study underscores the vital role of both APBN and APBD spending in driving regional economic growth, while also pointing to the need for policy refinements to minimize potential inefficiencies. By optimizing government expenditure and improving the management of SILPA, regional governments can contribute to more balanced and sustainable national economic development. These findings provide a valuable reference for policymakers in Indonesia in formulating fiscal strategies that are responsive to regional contexts and supportive of long-term economic stability.

LIMITATION

This study has two primary limitations. First, it does not account for potential endogeneity or omitted variable bias, which may weaken the strength of causal interpretation. Future research could address this by applying methods such as instrumental variable regression (IV) or dynamic panel models (GMM) to enhance causal inference. Second, although PCA is effective in mitigating multicollinearity, it reduces the interpretability of individual expenditure categories, which may limit its practical value for policy analysis. To maintain policy relevance, future studies are encouraged to complement PCA with category-level analysis.

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