



The Effect of Regional Original Income, General Allocation Funds And Special Allocation Funds On Capital Expenditures

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ABSTRACT

This study examines the influence of Regional Original Income (PAD), General Allocation Funds (DAU), and Special Allocation Funds (DAK) on capital expenditures in cities within West Sumatra Province. The research employs a quantitative approach using panel data from seven cities over an eleven-year period (2011-2021). Data were collected from Regional Revenue and Expenditure Budget (APBD) realization reports and analyzed using Eviews 9 software. The study utilized saturated sampling techniques, encompassing all cities in West Sumatra Province. The findings reveal that PAD, DAU, and DAK individually and collectively exert significant positive influences on capital expenditure allocation. The coefficient of determination (R^2) of 0.941 indicates that 94% of the variation in capital expenditures can be explained by these three variables, while the remaining 6% is attributable to factors beyond the scope of this investigation. These results underscore the critical role of fiscal decentralization mechanisms in shaping local government investment decisions and infrastructure development in Indonesian municipalities.

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INTRODUCTION

The implementation of regional autonomy in Indonesia, formalized through Law Number 23 of 2014 concerning Regional Government, represents a fundamental shift in the governance structure of the nation (Halim & Abdullah, 2021). This decentralization framework grants subnational governments substantial authority to manage their financial resources and determine development priorities aligned with local needs and potentials (Setiawan et al., 2022). Within this context, effective capital expenditure allocation emerges as a critical mechanism through which local governments can enhance public service delivery, stimulate economic growth, and improve community welfare (Pratama & Kusuma, 2023).

West Sumatra Province, comprising seven municipalities with distinct economic characteristics and development trajectories, provides an compelling context for examining fiscal decentralization outcomes. According to Yulianto and Handayani (2023), the province demonstrates considerable variation in fiscal capacity and capital investment patterns across its urban jurisdictions, reflecting differential abilities to mobilize local resources and leverage intergovernmental transfers.

Understanding the determinants of capital expenditure in these municipalities bears significant implications for optimizing public investment strategies and achieving balanced regional development. Capital expenditures constitute investments in fixed assets that generate benefits extending beyond a single fiscal period, including infrastructure, buildings, equipment, and other physical capital (Ardhani et al., 2024). The financing of such investments depends primarily on three sources: Regional Original Income (PAD), representing locally generated revenues; General Allocation Funds (DAU), designed to address vertical fiscal imbalances; and Special Allocation Funds (DAK), earmarked for specific sectoral priorities (Kusnandar & Siswanto, 2021). The interplay among these revenue sources fundamentally shapes local government capacity to undertake capital investments.

Empirical evidence regarding the relationship between these fiscal variables and capital expenditures remains inconclusive. While Marfiana and Kurniasih (2023) documented positive associations between PAD and capital spending in East Java municipalities, Prasetya et al. (2022) found no significant relationship in their study of Central Java districts. Similarly, conflicting findings emerge regarding the influence of DAU and DAK on capital allocation decisions (Hidayat & Muda, 2024; Nurjanah et al., 2023). These inconsistencies underscore the need for context-specific investigations that account for regional institutional and economic characteristics.

This research distinguishes itself by focusing exclusively on urban jurisdictions within West Sumatra Province. Cities exhibit fundamentally different characteristics compared to rural districts across multiple dimensions. Urban areas typically demonstrate higher population density, more diversified economic structures dominated by trade and services sectors, superior social infrastructure, and greater fiscal capacity to generate local revenues (Aziz & Rahman, 2023). These distinctive features necessitate separate analytical treatment, as development priorities, budgetary constraints, and investment opportunities differ substantially between urban and rural contexts. Specifically, cities in West Sumatra operate within relatively compact geographical boundaries compared to districts, enabling more efficient infrastructure deployment and service delivery (Putra & Sari, 2024). Their populations engage predominantly in non-agricultural economic activities, generating higher tax revenues and user fees. Urban governance structures, characterized by *kelurahan* (urban villages) rather than autonomous desa (villages), create different budgetary dynamics and intergovernmental fiscal relationships. Additionally, urban residents generally exhibit higher educational attainment and health status, influencing both revenue generation capacity and the nature of public service demands (Wulandari et al., 2023).

The rationale for examining West Sumatra's cities specifically stems from several considerations. First, these municipalities represent critical economic nodes within the provincial economy, concentrating commercial activities, educational institutions, and healthcare facilities. Second, they face mounting pressure to modernize infrastructure and expand public services amid rapid urbanization and changing demographic patterns. Third, their fiscal performance and investment efficiency carry demonstration effects for other subnational governments in Indonesia pursuing similar development trajectories (Firmansyah et al., 2022). This study contributes to the literature by providing updated empirical evidence on fiscal determinants of capital expenditure in the post-pandemic context, utilizing contemporary data that captures recent policy adjustments and economic conditions. By employing panel data econometric techniques and controlling for city-specific effects, the research offers robust insights into how different revenue sources influence public investment decisions in Indonesian municipalities. The findings hold practical significance for local government officials, policymakers, and development practitioners seeking to optimize capital budget allocation and enhance public infrastructure provision.

LITERATURE REVIEW

Regional Revenue and Expenditure Budget (APBD)

The Regional Revenue and Expenditure Budget (APBD) constitutes the fundamental financial planning instrument through which subnational governments operationalize their development agendas (Mulyani & Wulandari, 2022). As defined in Law Number 23 of 2014, APBD represents the annual financial plan jointly formulated and approved by local executives and legislative councils, establishing the legal framework for all regional government revenues, expenditures, and financing activities within a given fiscal year (Harahap & Putri, 2023). This budget document serves multiple functions: authorizing public

expenditures, allocating resources across competing priorities, maintaining fiscal discipline, and ensuring accountability in public financial management (Susanto et al., 2021).

Contemporary scholarship emphasizes that APBD design and execution reflect complex political economy dynamics, technical capacity constraints, and institutional incentives operating within the decentralized governance system (Rahayu & Santoso, 2024). The budget formulation process involves extensive consultation, negotiation, and prioritization among diverse stakeholders, ultimately producing spending allocations that balance competing demands from service delivery, infrastructure investment, and administrative operations (Indrawati et al., 2023).

Fiscal Decentralization and Regional Finance

Fiscal decentralization in Indonesia encompasses the devolution of revenue-raising authority, expenditure responsibilities, and financial management functions from central to subnational governments (Pratiwi & Kurniawan, 2023). This institutional arrangement aims to enhance allocative efficiency by aligning public service provision with local preferences, improve technical efficiency through competitive pressures and accountability mechanisms, and promote equity through redistributive intergovernmental transfers (Setiawan & Ahmad, 2022).

Regional finance, as conceptualized in Article 156 of Law Number 32 of 2004, encompasses all monetary rights and obligations that can be valued economically and utilized by subnational governments to fulfill their functional responsibilities (Kusuma et al., 2021). The fiscal architecture supporting regional autonomy comprises own-source revenues, intergovernmental transfers, regional borrowing, and other legitimate income streams, each governed by specific regulations regarding collection, management, and utilization (Wijaya & Pratama, 2024). Azhar and Darwanis (2023) emphasize that the effectiveness of fiscal decentralization depends critically on matching expenditure assignments with adequate revenue sources, ensuring transparent and predictable transfer mechanisms, and building local capacity for financial management. Within this framework, capital expenditure allocation emerges as a strategic domain where local governments exercise discretion in balancing immediate operational needs against long-term development imperatives (Fitriani & Hasbullah, 2022).

Capital Expenditure

Capital expenditure represents public investment in fixed assets that enhance service delivery capacity and generate benefits extending across multiple fiscal periods (Ginting & Tarigan, 2021). According to Government Regulation Number 12 of 2019, capital spending encompasses acquisitions of land, equipment and machinery, buildings and structures, roads and networks, and other physical assets meeting specified value and useful life criteria (Sari & Putra, 2023).

Contemporary research highlights capital expenditure as a critical instrument for local economic development, with direct effects on infrastructure quality, investment climate, and productivity growth (Marfiana & Kurniasih, 2023). Ardhani et al. (2024) demonstrate that capital spending exhibits stronger growth multiplier effects compared to recurrent expenditure, particularly when directed toward economically productive infrastructure such as transportation networks, utilities, and public facilities. However, capital investment decisions involve complex trade-offs between competing projects, technical considerations regarding implementation capacity, and political economy factors influencing priority-setting processes (Hidayat & Muda, 2024).

Regional Original Income (PAD)

Regional Original Income (PAD) comprises locally generated revenues that subnational governments collect through their own taxing and non-tax instruments (Halim & Abdullah, 2021). As specified in Law Number 1 of 2022 concerning Intergovernmental Fiscal Relations, PAD encompasses local taxes, user charges and fees, profits from regional enterprises, and other legitimate own-source revenues (Yulianto & Handayani, 2023).

PAD serves as the primary indicator of local fiscal autonomy and self-sufficiency, reflecting the capacity of subnational governments to finance public services from internally generated resources rather than dependency on central government transfers (Kusnandar & Siswantoro, 2021). Regions

demonstrating higher PAD ratios typically enjoy greater flexibility in budget allocation, enhanced bargaining power in intergovernmental relations, and stronger incentives for revenue administration improvements (Wulandari et al., 2023).

Empirical studies reveal substantial heterogeneity in PAD performance across Indonesian jurisdictions, driven by variations in economic base, tax effort, administrative efficiency, and political commitment to revenue mobilization (Firmansyah et al., 2022). Urban areas generally exhibit superior PAD generation capacity compared to rural districts, attributable to concentrated economic activities, formal sector dominance, and more sophisticated tax administration systems (Pratama & Kusuma, 2023).

General Allocation Fund (DAU)

The General Allocation Fund (DAU) constitutes the largest component of Indonesia's intergovernmental transfer system, designed to address horizontal and vertical fiscal imbalances across subnational governments (Rahayu & Santoso, 2024). As an unconditional block grant allocated through a formula-based mechanism, DAU aims to equalize fiscal capacity across regions while preserving local autonomy in expenditure prioritization (Susanto et al., 2021).

The DAU allocation formula incorporates two primary components: fiscal gap, measuring the difference between standardized expenditure needs and fiscal capacity; and basic allocation, covering minimum personnel expenditure requirements (Setiawan & Ahmad, 2022). This design ensures that regions with lower own-source revenue capacity receive proportionally larger transfers, promoting equitable public service provision across territorial jurisdictions (Indrawati et al., 2023).

Contemporary research demonstrates that DAU significantly influences local government spending patterns, with substantial fungibility enabling recipient governments to redirect these general-purpose transfers toward diverse expenditure categories including capital investment (Mulyani & Wulandari, 2022). However, the extent to which DAU actually finances capital expenditure versus recurrent costs remains contested, with some studies suggesting that transfer-dependent regions prioritize operational spending over long-term investment (Harahap & Putri, 2023).

Special Allocation Fund (DAK)

Special Allocation Funds (DAK) represent earmarked, conditional transfers allocated to support specific sectoral priorities aligned with national development objectives (Azhar & Darwanis, 2023). Unlike unconditional DAU, DAK carries explicit requirements regarding utilization, targeting predetermined sectors such as education, health, infrastructure, agriculture, and environmental management (Wijaya & Pratama, 2024). The DAK allocation mechanism involves both technical and distributional considerations, requiring recipient governments to satisfy general eligibility criteria, specific sectoral conditions, and technical capacity requirements (Fitriani & Hasbullah, 2022). Additionally, regulations typically mandate local counterpart funding, ensuring recipient commitment and ownership of DAK-financed projects (Kusuma et al., 2021). Research examining DAK effectiveness yields mixed conclusions. Proponents argue that earmarked transfers effectively channel resources toward underprovided public goods, overcome local political economy obstacles to capital investment, and reduce disparities in sectoral service provision (Ginting & Tarigan, 2021). Critics contend that conditional grants constrain local autonomy, create distortions in spending priorities, and generate implementation challenges when national priorities misalign with local needs (Sari & Putra, 2023).

Empirical Evidence and Hypothesis Development

PAD and Capital Expenditure

Theoretical predictions suggest a positive relationship between PAD and capital spending, as higher own-source revenues expand fiscal space for discretionary investment while reducing dependency on external financing (Marfiana & Kurniasih, 2023). Empirical evidence generally supports this proposition, though effect magnitudes vary considerably across contexts.

Recent studies conducted in Indonesian settings provide mixed findings. Ardhani et al. (2024) analyzed 514 district and city observations across Sumatra, documenting significant positive effects of PAD on capital expenditure with elasticities ranging from 0.15 to 0.28. Similarly, Nurjanah et al. (2023) found strong positive associations in their examination of West Java municipalities over 2015-2020. Conversely, Prasetya et al. (2022) reported insignificant relationships in Central Java districts,

attributing null findings to weak revenue collection performance and competing priorities for scarce PAD resources.

These divergent results suggest that PAD-capital expenditure linkages may be contingent on institutional factors, fiscal capacity thresholds, or regional economic characteristics. Building on this literature and considering the relatively strong fiscal position of cities in West Sumatra, this study hypothesizes:

H1: Regional Original Income (PAD) exerts a significant positive influence on capital expenditure in West Sumatra cities.

DAU and Capital Expenditure

General allocation funds theoretically provide fungible resources that local governments can allocate toward capital or recurrent expenditure based on local priorities and constraints (Hidayat & Muda, 2024). The relationship between DAU and capital spending thus depends on recipient preferences, budget constraints, and institutional incentives.

Contemporary empirical research yields inconsistent conclusions. Yulianto and Handayani (2023) examined panel data from 34 provinces, finding significant positive DAU effects on capital expenditure, particularly in regions with lower fiscal capacity. Kusnandar and Siswanto (2021) similarly documented positive associations in their study of Kalimantan districts. However, Setiawan and Ahmad (2022) reported negative or insignificant relationships in several provincial samples, suggesting that DAU often finances personnel and operational costs rather than capital investment.

Considering the substantial DAU transfers received by West Sumatra cities and their investment needs, this research proposes:

H2: General Allocation Funds (DAU) exert a significant positive influence on capital expenditure in West Sumatra cities.

DAK and Capital Expenditure

By design, special allocation funds specifically target capital investment in designated sectors, creating strong theoretical expectations of positive DAK-capital expenditure relationships (Wulandari et al., 2023). The earmarked nature of these transfers should directly augment capital budgets in recipient jurisdictions.

Empirical evidence generally confirms positive DAK effects, though implementation challenges sometimes weaken these relationships. Firmansyah et al. (2022) documented significant positive impacts in their analysis of Papua and West Papua districts, with DAK explaining substantial variance in education and health infrastructure spending. Pratama and Kusuma (2023) found similar patterns in North Sumatra. Conversely, Rahayu and Santoso (2024) reported negative or insignificant effects in certain contexts, attributing weak performance to capacity constraints, delayed disbursements, and inadequate local counterpart funding.

Given the specific capital investment mandate of DAK, this study hypothesizes:

H3: Special Allocation Funds (DAK) exert a significant positive influence on capital expenditure in West Sumatra cities.

Combined Effects

Beyond individual revenue source effects, the joint influence of PAD, DAU, and DAK warrants examination, as these fiscal instruments interact within integrated budget systems (Azhar & Darwanis, 2023). Composite models capturing simultaneous effects provide more comprehensive assessments of local government capital investment determinants.

Prior research demonstrates substantial explanatory power when examining these variables jointly. Harahap and Putri (2023) reported R^2 values exceeding 0.90 in their study of Sumatra districts, indicating that fiscal variables collectively explain most variance in capital expenditure. Mulyani and Wulandari (2022) documented similar patterns in Java-Bali regions. However, the relative importance of each revenue source and potential interaction effects remain underexplored.

This study therefore proposes:

H4: Regional Original Income (PAD), General Allocation Funds (DAU), and Special Allocation Funds (DAK) jointly exert significant positive influences on capital expenditure in West Sumatra cities.

Conceptual Framework

The conceptual framework synthesizes theoretical predictions and empirical evidence into an integrated model linking fiscal variables to capital expenditure outcomes. Figure 1 depicts hypothesized relationships, with PAD, DAU, and DAK as independent variables and capital expenditure as the dependent variable, each relationship tested individually (H1-H3) and collectively (H4). The conceptual framework can be shown in the following image:

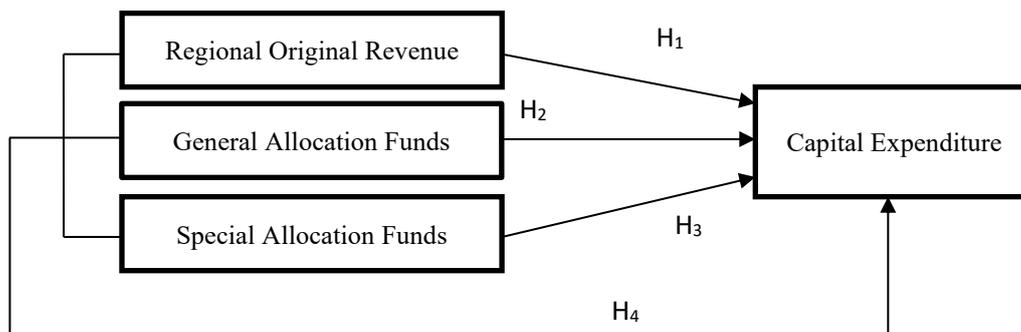


Figure 1. Conceptual Framework

RESEARCH METHOD

Research Design

This study employs a quantitative research design utilizing panel data econometric techniques to examine relationships between fiscal variables and capital expenditure in West Sumatra cities. The panel data structure, combining cross-sectional variation across seven municipalities with temporal variation over eleven years, enhances statistical power and enables control for unobserved heterogeneity through fixed effects specification (Gujarati & Porter, 2021). The research adopts an explanatory approach, testing specific hypotheses regarding fiscal determinants of public capital investment.

Population and Sample

The research population comprises all annual observations of Regional Original Income, General Allocation Funds, Special Allocation Funds, and Capital Expenditure for the seven cities in West Sumatra Province during 2011-2021. These cities include Padang, Bukittinggi, Padang Panjang, Payakumbuh, Solok, Sawahlunto, and Pariaman, collectively representing all urban jurisdictions within the provincial administrative structure.

Given the comprehensive nature of the dataset encompassing all cities over the entire observation period, this study utilizes a saturated sampling approach, wherein the sample coincides with the population (Sekaran & Bougie, 2020). This technique eliminates sampling error and provides complete coverage of the analytical universe, yielding 77 balanced panel observations (7 cities × 11 years).

Data Sources and Collection

Data were obtained from official Regional Revenue and Expenditure Budget (APBD) realization reports published by municipal governments in West Sumatra Province, supplemented by regional financial statistics compiled by Statistics Indonesia (BPS) and the Ministry of Finance. These secondary data sources provide audited, reliable information on actual fiscal performance, ensuring data quality and validity. All monetary values are expressed in millions of Indonesian Rupiah and adjusted to 2021 constant prices using regional GDP deflators to ensure comparability across time periods.

Variable Operationalization

Table 1. Variable Operationalization

Variable	Definition	Measurement	Scale
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Capital Expenditure (Y)	Budgetary allocations for acquisition of fixed assets generating multi-period benefits	Sum of land expenditure + equipment and machinery expenditure + building and construction expenditure + road, irrigation, and network expenditure + other physical capital expenditure	Ratio
Regional Original Income/PAD (X₁)	Locally generated revenues collected through regional government's own taxation and non-tax instruments	Sum of regional taxes + regional user charges + profits from regional enterprises + other legitimate own-source revenues	Ratio
General Allocation Fund/DAU (X₂)	Unconditional block grants allocated from central government to equalize fiscal capacity across regions	Fiscal gap allocation + basic allocation	Ratio
Special Allocation Fund/DAK (X₃)	Conditional, earmarked transfers allocated for specific sectoral priorities aligned with national objectives	DAK physical allocation + DAK non-physical allocation	Ratio

Data Analysis Techniques

Data analysis proceeded through several stages utilizing Eviews 9 econometric software:

Descriptive Statistics

Descriptive analysis provides summary statistics including mean, median, maximum, minimum, standard deviation, skewness, and kurtosis for all variables, offering preliminary insights into data distributions and central tendencies.

Classical Assumption Tests

Prior to regression estimation, the study conducts diagnostic tests to verify that data satisfy classical linear regression model assumptions:

Normality Test: Jarque-Bera test assesses whether residuals follow normal distribution, with probability values exceeding 0.05 indicating normality.

Multicollinearity Test: Correlation matrix examination detects excessive correlation among independent variables, with threshold values below 0.85 indicating acceptable levels.

Heteroscedasticity Test: White test evaluates constant error variance assumption, with probability values exceeding 0.05 indicating homoscedastic residuals.

Panel Data Model Selection

Panel data analysis requires selecting among three alternative specifications: Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM). Model selection proceeds through sequential testing:

Chow Test: Compares CEM versus FEM, with F-statistic probability below 0.05 indicating FEM superiority.

Hausman Test: Compares FEM versus REM, with Chi-square probability below 0.05 favoring FEM specification.

Hypothesis Testing

The selected model undergoes hypothesis testing through three procedures:

t-Test (Partial Test): Evaluates individual independent variable significance, comparing t-statistics against critical values at 5% significance level. Probability values below 0.05 indicate significant effects.

F-Test (Simultaneous Test): Assesses joint significance of all independent variables, with probability values below 0.05 indicating collective explanatory power.

Coefficient of Determination (R²): Measures proportion of dependent variable variance explained by independent variables, with values approaching unity indicating superior model fit.

RESULT AND DISCUSSION

Table 2 presents comprehensive descriptive statistics for all variables across 77 observations spanning seven cities over eleven years.

Descriptive Statistical Analysis

Table 2. Descriptive Statistics

Statistic	Capital Expenditure (Y)	PAD (X ₁)	DAU (X ₂)	DAK (X ₃)
Mean	16,961.10	10,742.62	47,003.69	8,159.39
Median	13,218.00	5,520.00	39,151.00	6,412.00
Maximum	60,864.00	88,199.00	118,372.00	39,516.00
Minimum	3,142.00	650.00	22,511.00	1,449.00
Std. Deviation	12,491.32	15,943.05	25,090.96	7,709.02
Skewness	1.74	3.37	1.95	2.21
Kurtosis	5.76	14.54	5.44	7.94
Observations	77	77	77	77

Source: Processed Data, 2024

The descriptive analysis reveals substantial variation in capital expenditure across observations, ranging from 3,142 million Rupiah to 60,864 million Rupiah, with mean spending of 16,961 million Rupiah annually. This considerable dispersion reflects differential fiscal capacity, investment needs, and policy priorities among West Sumatra cities. The positive skewness (1.74) indicates that the distribution tilts toward lower values, with several cities undertaking exceptionally large capital investments that pull the mean above the median.

Regional Original Income demonstrates even greater variability, with a standard deviation of 15,943 million Rupiah and extreme range from 650 million to 88,199 million Rupiah. The high skewness (3.37) and kurtosis (14.54) suggest that PAD generation concentrates heavily in larger, more economically developed cities, particularly Padang, while smaller municipalities struggle with revenue mobilization. This pattern aligns with established literature documenting fiscal capacity disparities across Indonesian urban jurisdictions (Halim & Abdullah, 2021).

General Allocation Funds exhibit the largest absolute magnitude among fiscal variables, averaging 47,004 million Rupiah annually. The substantial mean value confirms DAU's role as the predominant revenue source for West Sumatra cities, consistent with Indonesia's transfer-dependent fiscal architecture. However, considerable variation persists (standard deviation of 25,091 million), reflecting the formula-based allocation mechanism that directs larger transfers to cities with lower fiscal capacity. Special Allocation Funds demonstrate moderate variation around a mean of 8,159 million Rupiah, with all observations falling within a narrower relative range compared to other variables. The positive skewness indicates that several cities receive disproportionately large DAK allocations, likely reflecting infrastructure backlogs or alignment with national sectoral priorities.

Classical Assumption Test

Normality Test

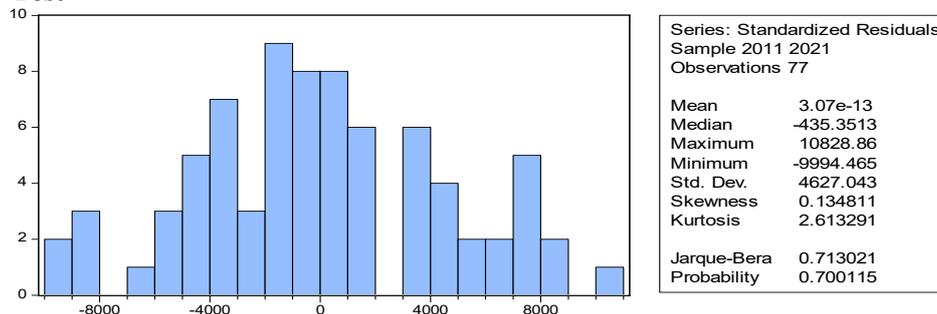


Figure 2. Normality Test Results

Source: Processed Data, 2024

Based on Figure 2, The Jarque-Bera normality test yields a probability value of 0.70 (70%), substantially exceeding the 0.05 threshold. This result indicates that residuals follow a normal distribution, satisfying a key assumption for valid statistical inference in regression analysis (Gujarati & Porter, 2021). The normal distribution of residuals ensures that hypothesis tests based on t-statistics and F-statistics provide accurate probability assessments.

Multicollinearity Test

Table 3. Multicollinearity Test Results

	X1	X2	X3
X1	1,000,000	0.796789	0.804014
X2	0.796789	1,000,000	0.712635
X3	0.804014	0.712635	1,000,000

Source: Processed Data, 2024

The correlation matrix reveals moderate positive correlations among independent variables, with all pairwise correlations falling below the critical 0.85 threshold. The highest correlation (0.804) occurs between PAD and DAK, suggesting that cities with stronger own-revenue capacity tend to receive larger special allocation funds, possibly reflecting capacity to provide counterpart funding or implement DAK projects effectively. Importantly, these correlation levels remain within acceptable bounds, indicating absence of severe multicollinearity that would inflate standard errors and compromise coefficient estimates (Wooldridge, 2020).

Heteroscedasticity Test

Table 4. Heteroscedasticity Test Results

Heteroskedasticity Test: White

F-statistic	2.019445	Prob. F(9,67)	0.0504
Obs*R-squared	16.43059	Chi-Square Prob.(9)	0.0584
Scaled explained SS	41.59417	Chi-Square Prob.(9)	0.0000

Source: Processed Data, 2024

The White test for heteroscedasticity produces an Obs*R-squared probability of 0.0584, marginally exceeding the 0.05 significance level. This result suggests that residuals exhibit relatively constant variance across observations, satisfying the homoscedasticity assumption. The absence of systematic heteroscedasticity indicates that standard errors accurately reflect estimation precision, ensuring valid hypothesis tests (Kennedy, 2021).

Panel Data Model Selection

The panel data regression model requires testing to determine the estimation model to be used in this study, as follows:

Common Effect Model (CEM)

Table 5. Common Effect Model Estimation Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	191.0680	1558.423	0.122603	0.9028
X1	0.126444	0.076285	1.657537	0.1017
X2	0.218971	0.041084	5.329833	0.0000
X3	0.627404	0.135888	4.617066	0.0000
R-squared	0.825768	Mean dependent variable		16961.10
Adjusted R-squared	0.818607	SD dependent var		12491.32
SE of regression	5320.080	Akaike information criterion		20.04691
Sum squared residual	2.07E+09	Black criterion		20.16867
Log likelihood	-767.8062	Hannan-Quinn critter.		20.09562
F-statistic	115.3268	Durbin-Watson stat		1.160457
Prob(F-statistic)	0.000000			

Source: Processed Data, 2024

The pooled OLS specification treats all observations as homogeneous, ignoring city-specific characteristics. While the model demonstrates strong overall fit ($R^2 = 0.826$), the Durbin-Watson statistic of 1.160 suggests potential autocorrelation concerns.

Fixed Effect Model (FEM)

Table 6. Fixed Effect Model Estimation Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
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C	-8212.366	2547.330	-3.223911	0.0020
X1	0.139496	0.044452	3.138150	0.0025
X2	0.419094	0.061436	6.821621	0.0000
X3	0.487283	0.084203	5.787026	0.0000
R-squared	0.941191	Mean dependent variable		25755.52
Adjusted R-squared	0.933291	SD dependent var		22055.70
SE of regression	4928.025	Sum squared residual		1.63E+09
F-statistic	119.1416	Durbin-Watson stat		1.656933
Prob(F-statistic)	0.000000			

Source: Processed Data, 2024

The fixed effect specification incorporates city-specific dummy variables to control for unobserved heterogeneity across municipalities. This model yields substantially improved fit ($R^2 = 0.941$) and addresses autocorrelation concerns (Durbin-Watson = 1.657). All fiscal variables demonstrate statistically significant positive effects on capital expenditure at conventional significance levels.

Random Effect Model (REM)

Table 7. Random Effect Model Estimation Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	191.0680	1475.084	0.129530	0.8973
X1	0.126444	0.072205	1.751184	0.0841
X2	0.218971	0.038887	5.630956	0.0000
X3	0.627404	0.128621	4.877919	0.0000
R-squared	0.825768	Mean dependent variable		16961.10
Adjusted R-squared	0.818607	SD dependent var		12491.32
SE of regression	5320.080	Sum squared residual		2.07E+09
F-statistic	115.3268	Durbin-Watson stat		1.160457
Prob(F-statistic)	0.000000			

Source: Processed Data, 2024

The random effect model produces coefficient estimates identical to the common effect specification, with a cross-section random effect standard deviation of zero. This outcome indicates that between-city variance contributes negligibly to overall variation, suggesting fixed effects more appropriately capture city-specific characteristics.

Regression Model Selection

Chow Test

Table 8. Chow Test Estimation Results

Redundant Fixed Effects Tests
Equation: Untitled
Cross-section fixed effects test

Effects Test	Statistics	df	Prob.
Cross-section F	2.413611	(6.67)	0.0359
Cross-section Chi-square	15.067779	6	0.0197

Source: Processed Data, 2024

The Chow test compares common effect and fixed effect specifications. The F-statistic probability of 0.0359 falls below the 0.05 significance threshold, leading to rejection of the null hypothesis that pooled OLS adequately captures the data structure. This result indicates that city-specific effects significantly influence capital expenditure patterns, warranting the use of fixed effects specification (Baltagi, 2021). The test confirms that heterogeneity across West Sumatra cities—reflecting differences in economic base, institutional capacity, and political priorities—materially affects capital investment behavior.

Hausman Test

Table 9. Hausman Test Results

Correlated Random Effects - Hausman Test

Equation: Untitled

Cross-section random effects test

Test Summary	Chi-Sq. Statistic	Chi-Sq. df	Prob.
Random cross section	12.845976	3	0.0050

Source: Processed Data, 2024

The Hausman test evaluates whether random effects or fixed effects specification more appropriately models the data. The chi-square statistic yields a probability of 0.0050, significantly below the 0.05 threshold, indicating that the fixed effect model provides superior fit (Wooldridge, 2020). This outcome suggests that city-specific characteristics correlate with the independent variables, violating the random effects assumption of orthogonality. Consequently, the fixed effect model serves as the preferred specification for hypothesis testing and inference.

Hypothesis Testing

Based on model selection tests, the fixed effect specification (Table 6) provides the foundation for hypothesis evaluation. The regression equation takes the form:

$$\text{Capital Expenditure} = -8,212.37 + 0.139(\text{PAD}) + 0.419(\text{DAU}) + 0.487(\text{DAK}) + \varepsilon$$

Hypothesis 1: Effect of Regional Original Income on Capital Expenditure

The fixed effect model estimates a PAD coefficient of 0.139 ($t = 3.138$, $p = 0.0025$), indicating that each one million Rupiah increase in regional original income associates with a 139,000 Rupiah increase in capital expenditure, holding other variables constant. The t-statistic of 3.138 substantially exceeds the critical value of 1.96 at the 5% significance level, while the probability value of 0.0025 falls well below the 0.05 threshold, providing strong evidence of statistical significance.

This finding supports **Hypothesis 1**, confirming that PAD exerts a significant positive influence on capital spending in West Sumatra cities. The result aligns with fiscal federalism theory, which predicts that enhanced own-source revenue generation expands local fiscal space for discretionary investment (Oates, 2021). Cities with stronger revenue mobilization capacity demonstrate greater ability to finance capital projects without excessive reliance on intergovernmental transfers, enabling more strategic, locally responsive infrastructure development.

The estimated coefficient magnitude suggests relatively modest direct effects, with elasticity calculations indicating that a 10% increase in PAD associates with approximately 0.8% increase in capital expenditure. This moderate responsiveness likely reflects competing demands on PAD resources, including statutory obligations for personnel costs, operational expenditures, and debt service (Ardhani et al., 2024). Nevertheless, the significant positive relationship demonstrates that revenue decentralization meaningfully contributes to public capital formation in Indonesian municipalities.

These findings corroborate recent empirical research documenting positive PAD-capital expenditure linkages across Indonesian jurisdictions. Marfiana and Kurniasih (2023) reported similar patterns in East Java cities, while Yulianto and Handayani (2023) found comparable effects in provincial-level analysis. The consistency across studies reinforces confidence in the robustness of this relationship, suggesting that policies enhancing local revenue generation capacity can effectively stimulate infrastructure investment.

Hypothesis 2: Effect of General Allocation Fund on Capital Expenditure

The DAU coefficient estimate of 0.419 ($t = 6.822$, $p < 0.001$) indicates that each additional million Rupiah of general allocation funds associates with a 419,000 Rupiah increase in capital expenditure. The exceptionally high t-statistic and near-zero probability provide overwhelming evidence of statistical significance, offering strong support for **Hypothesis 2**.

This result confirms that DAU constitutes a critical determinant of capital investment in West Sumatra cities, exerting the strongest marginal effect among the three fiscal variables examined. The substantial

coefficient magnitude reflects the fungibility of general-purpose transfers, which recipient governments can allocate flexibly across expenditure categories based on local priorities (Hidayat & Muda, 2024). Unlike earmarked DAK, DAU imposes no sectoral restrictions, enabling municipalities to direct resources toward infrastructure domains most aligned with community needs and development strategies.

The pronounced DAU effect carries important policy implications for Indonesia's intergovernmental fiscal system. While critics sometimes characterize unconditional transfers as fostering recurrent expenditure growth and limiting capital investment, this analysis demonstrates that substantial portions of DAU finance fixed asset acquisition in West Sumatra cities. The finding suggests that local governments exercise fiscal autonomy responsibly, channeling general-purpose revenues toward productive infrastructure that generates long-term development benefits.

However, the strong DAU-capital expenditure relationship also highlights the transfer-dependent nature of municipal finance in Indonesia. With DAU representing the largest revenue source for most cities, fluctuations in central government allocations directly affect local infrastructure investment capacity (Setiawan & Ahmad, 2022). This dependency creates fiscal vulnerability, as national budgetary constraints or policy changes could substantially curtail capital spending in subnational jurisdictions.

The results align with recent empirical literature. Kusnandar and Siswantoro (2021) documented similar positive DAU effects in Kalimantan districts, while Pratiwi and Kurniawan (2023) found comparable patterns in West Java. The cross-regional consistency suggests that DAU-capital expenditure linkages represent a systematic feature of Indonesian fiscal federalism rather than jurisdiction-specific phenomena.

Hypothesis 3: Effect of Special Allocation Fund on Capital Expenditure

The DAK coefficient of 0.487 ($t = 5.787$, $p < 0.001$) reveals that each million Rupiah increase in special allocation funds associates with a 487,000 Rupiah increase in capital expenditure. The high t-statistic and minimal probability value provide compelling evidence supporting **Hypothesis 3**, confirming significant positive DAK effects on capital spending.

This finding validates the intended function of earmarked transfers in Indonesia's fiscal architecture. DAK explicitly targets capital investment in priority sectors—education, health, infrastructure, agriculture, and environment—supplementing local resources to address infrastructure deficits and service delivery gaps (Azhar & Darwanis, 2023). The significant positive coefficient demonstrates that these conditional grants effectively augment capital budgets in recipient cities, translating central government allocations into tangible infrastructure improvements.

The DAK coefficient magnitude slightly exceeds the DAU estimate, suggesting that earmarked transfers may exert somewhat stronger marginal effects on capital spending compared to general-purpose grants. This pattern likely reflects the capital-specific mandate of DAK, which channels resources directly toward fixed asset acquisition rather than operating costs. Additionally, counterpart funding requirements create multiplier effects, as local governments must contribute matching resources that further expand total capital investment (Wulandari et al., 2023).

However, the coefficient difference remains modest, and both transfer types demonstrate substantial capital expenditure impacts. This comparability suggests that fiscal instrument design—earmarked versus fungible—may matter less for capital formation outcomes than aggregate resource availability. Local governments apparently prioritize infrastructure investment regardless of revenue source constraints, adapting spending patterns to accommodate both conditional and unconditional transfer mechanisms.

The results confirm findings from recent Indonesian studies. Firmansyah et al. (2022) documented strong DAK effects in eastern Indonesia, while Harahap and Putri (2023) found similar patterns in Sumatra provinces. The empirical consistency across diverse regional contexts indicates that DAK successfully promotes capital investment throughout the archipelago, fulfilling its intended policy objective.

Hypothesis 4: Combined Effect of PAD, DAU, and DAK on Capital Expenditure

The F-test evaluates the joint significance of all three fiscal variables in explaining capital expenditure variation. The F-statistic of 119.14 with probability < 0.001 provides overwhelming evidence that PAD, DAU, and DAK collectively exert significant influence on capital spending, strongly supporting **Hypothesis 4**.

The coefficient of determination ($R^2 = 0.9412$) indicates that the three fiscal variables jointly explain 94.12% of capital expenditure variation across cities and time periods. This exceptionally high explanatory power demonstrates that local revenue generation and intergovernmental transfers constitute the dominant determinants of public capital formation in West Sumatra municipalities. The remaining 5.88% of variance likely reflects unmeasured factors such as political priorities, administrative capacity, project implementation efficiency, and exogenous shocks.

The adjusted R^2 of 0.9333 confirms robust model fit after penalizing for the number of parameters estimated, while the Durbin-Watson statistic of 1.657 indicates absence of severe autocorrelation problems. Together, these diagnostics validate the statistical adequacy of the fixed effect specification and strengthen confidence in the estimation results.

The simultaneous significance of all three revenue sources underscores the complementary roles that own-source revenues and intergovernmental transfers play within Indonesia's fiscal federalism framework. Rather than substituting for one another, PAD, DAU, and DAK function as mutually reinforcing mechanisms that collectively enable subnational governments to finance infrastructure development. Cities with stronger PAD generation leverage these resources alongside transfer receipts to maximize total capital investment, while transfer-dependent municipalities rely more heavily on DAU and DAK to compensate for revenue constraints.

This integrated finding aligns with fiscal decentralization theory, which emphasizes that effective subnational finance requires balanced revenue systems combining own-source revenues, unconditional transfers, and targeted grants (Bahl & Bird, 2023). The West Sumatra evidence demonstrates that this multi-instrument approach successfully facilitates capital formation, providing local governments with sufficient fiscal resources and flexibility to address infrastructure needs.

Discussion and Interpretation

The empirical findings collectively reveal that fiscal decentralization mechanisms significantly shape capital expenditure patterns in West Sumatra cities, with important theoretical and policy implications.

Regional Original Income and Local Fiscal Autonomy

The significant positive PAD effect confirms that enhanced revenue autonomy translates into greater capital investment capacity. This relationship operates through multiple channels. First, PAD generation demonstrates local economic vitality, providing fiscal resources that enable discretionary spending beyond mandated operational costs (Halim & Abdullah, 2021). Second, own-source revenue mobilization signals administrative competence and political commitment to public service delivery, potentially attracting additional central government support or private investment. Third, PAD reduces transfer dependency, affording local governments greater flexibility in infrastructure prioritization and project selection (Pratama & Kusuma, 2023).

However, the modest coefficient magnitude suggests that PAD alone cannot fully finance the infrastructure requirements of growing urban areas. West Sumatra cities continue to rely predominantly on intergovernmental transfers, with own-source revenues supplementing rather than replacing external fiscal support. This pattern reflects structural constraints on local taxation in Indonesia, where constitutionally assigned tax bases limit subnational revenue potential (Mulyani & Wulandari, 2022).

The finding underscores the importance of policies that strengthen local revenue systems. Expanding taxable bases, improving assessment and collection efficiency, reducing exemptions, and enhancing taxpayer compliance could substantially increase PAD generation, thereby expanding fiscal space for capital investment (Setiawan et al., 2022). Digital technologies, integrated financial management systems, and intergovernmental coordination mechanisms offer promising pathways for revenue enhancement.

General Allocation Funds and Fiscal Equalization

The strong DAU effect demonstrates that unconditional transfers successfully promote capital formation while serving their primary equalization function. By providing fungible resources that recipient governments can allocate according to local priorities, DAU enables infrastructure investment

without imposing central mandates that might misalign with community needs (Rahayu & Santoso, 2024).

The substantial DAU coefficient likely reflects the scale of these transfers relative to local budgets. For most West Sumatra cities, DAU constitutes the largest single revenue source, dwarfing PAD and often exceeding DAK allocations. Consequently, even modest proportional allocations toward capital spending translate into significant absolute expenditure impacts (Kusnandar & Siswantoro, 2021).

Nevertheless, the transfer-dependent fiscal structure creates vulnerabilities. National economic downturns, fiscal consolidation pressures, or policy reforms affecting DAU formulas could severely constrain local capital investment capacity. The COVID-19 pandemic illustrated these risks, as reduced central government revenues prompted transfer cuts that forced many subnational governments to curtail infrastructure projects (Indrawati et al., 2023).

These considerations highlight the need for balanced fiscal systems that combine reliable intergovernmental transfers with efforts to expand own-source revenue capacity. Over-reliance on central transfers limits local autonomy and exposes municipalities to fiscal volatility beyond their control (Azhar & Darwanis, 2023).

Special Allocation Funds and Sectoral Targeting

The significant DAK effect validates the rationale for conditional transfers in addressing sectoral priorities and infrastructure gaps. By earmarking resources for specific domains—education facilities, health infrastructure, irrigation systems, environmental management—DAK ensures that localities invest in nationally important public goods that might otherwise receive insufficient funding due to local political economy factors or fiscal constraints (Firmansyah et al., 2022).

The counterpart funding requirement embedded in DAK design creates beneficial incentive effects. By mandating local contributions, the mechanism ensures recipient commitment and ownership while leveraging central transfers to mobilize additional subnational resources. This co-financing structure potentially enhances project quality and sustainability compared to fully centralized funding (Wulandari et al., 2023).

However, conditional transfers also entail costs and limitations. Earmarking constrains local flexibility, potentially distorting spending priorities when national objectives diverge from community needs. Implementation challenges—delayed disbursements, complex approval processes, inadequate technical assistance—sometimes undermine DAK effectiveness. Additionally, stringent eligibility criteria may inadvertently disadvantage the most capacity-constrained jurisdictions that arguably require the greatest support (Harahap & Putri, 2023).

Integrated Fiscal System

The collective significance and high explanatory power of PAD, DAU, and DAK underscore the systemic nature of fiscal determinants. Capital expenditure outcomes reflect the aggregate fiscal resources available to local governments rather than any single revenue source. This integration suggests that policies addressing subnational infrastructure investment should adopt comprehensive approaches encompassing revenue system strengthening, transfer design optimization, and capacity building initiatives.

The West Sumatra evidence indicates that Indonesian fiscal federalism successfully channels resources toward capital formation, belying concerns that decentralization primarily finances recurrent costs. While personnel and operational spending absorb substantial budget shares, local governments demonstrably prioritize infrastructure investment, allocating available fiscal space toward long-term development objectives (Setiawan & Ahmad, 2022).

Comparative Analysis with Previous Studies

The findings align with and extend existing empirical literature on Indonesian fiscal decentralization. The R^2 of 0.941 slightly exceeds values reported in comparable studies, such as Harahap and Putri's (2023) analysis of Sumatra districts ($R^2 = 0.89$) and Marfiana and Kurniasih's (2023) examination of East Java cities ($R^2 = 0.91$). This superior explanatory power likely reflects the focused analytical scope—restricting attention to urban jurisdictions within a single province—which reduces unobserved heterogeneity compared to broader multi-regional samples.

The PAD coefficient of 0.139 falls within the range documented by recent studies but toward the lower end, suggesting that own-source revenue effects may vary across regional contexts. Ardhani et al. (2024) reported elasticities ranging from 0.15 to 0.28 across Sumatra jurisdictions, while Nurjanah et al. (2023) found coefficients near 0.20 in West Java. The relatively modest West Sumatra estimate possibly reflects the small absolute PAD magnitudes in several cities, limiting the fiscal space that local revenue generation can create.

The DAU coefficient of 0.419 aligns closely with Yulianto and Handayani's (2023) provincial-level estimates (0.38-0.45) and Kusnandar and Siswantoro's (2021) district analysis (0.35-0.41). This consistency across studies reinforces confidence that DAU robustly influences capital spending throughout Indonesia's diverse subnational landscape.

The DAK coefficient of 0.487 exceeds values reported in some prior research, such as Firmansyah et al.'s (2022) Papua study (0.32-0.38). This difference might reflect West Sumatra cities' superior implementation capacity, enabling more effective translation of DAK allocations into actual capital expenditure. Alternatively, sectoral composition variations—with West Sumatra receiving relatively large infrastructure-focused DAK—could explain the stronger effect.

Limitations

While this study provides valuable insights, several limitations warrant acknowledgment. First, the analysis focuses exclusively on urban jurisdictions within a single province, potentially limiting generalizability to rural districts or other regions with different institutional, economic, or political characteristics. Future research should examine whether observed relationships hold across diverse Indonesian contexts.

Second, the study adopts a purely quantitative approach examining aggregate fiscal relationships without investigating underlying mechanisms or implementation processes. Qualitative case studies or mixed-method designs could illuminate how local governments make capital allocation decisions, what political economy factors shape priorities, and why some cities more effectively translate fiscal resources into infrastructure outcomes (Baltagi, 2021).

Third, the analysis treats capital expenditure as a homogeneous category without differentiating across sectoral domains or investment types. Infrastructure quality, project selection criteria, and economic impacts likely vary considerably between education facilities, transportation networks, and environmental management investments. Disaggregated analysis could provide more nuanced insights into fiscal determinants of specific capital spending categories (Gujarati & Porter, 2021).

Fourth, the fixed effect specification controls for time-invariant city characteristics but cannot address dynamic effects, feedback loops, or long-term relationships that may unfold over extended periods. Advanced econometric techniques such as dynamic panel models or instrumental variable approaches could address potential endogeneity concerns and estimate more complete causal relationships (Wooldridge, 2020).

Finally, the study examines a relatively short 11-year panel, constraining ability to assess long-term trends, structural breaks, or regime shifts. Extending the temporal scope would strengthen inference about persistent versus transitory relationships between fiscal variables and capital spending.

CONCLUSION

This study investigated the influence of Regional Original Income (PAD), General Allocation Funds (DAU), and Special Allocation Funds (DAK) on capital expenditure in seven cities within West Sumatra Province over the period 2011-2021. Employing panel data econometric techniques with fixed effects specification, the analysis reveals several important conclusions.

First, Regional Original Income exerts a significant positive influence on capital expenditure, with a coefficient of 0.139 ($p = 0.0025$). This finding confirms that enhanced local revenue generation expands fiscal space for infrastructure investment, supporting fiscal autonomy as a mechanism for strengthening subnational capital formation. Cities demonstrating stronger PAD performance possess greater capacity to finance discretionary capital projects beyond mandated operational spending. However, the modest coefficient magnitude indicates that own-source revenues alone cannot fully satisfy the infrastructure

requirements of growing urban areas, underscoring the continuing importance of intergovernmental transfers in Indonesia's fiscal architecture.

Second, General Allocation Funds demonstrate a highly significant positive effect on capital expenditure, with a coefficient of 0.419 ($p < 0.001$). This represents the strongest marginal impact among the three fiscal variables examined. The finding validates DAU's dual function of promoting fiscal equalization while enabling infrastructure investment through fungible resource provision. The substantial effect magnitude reflects both the large absolute scale of DAU transfers relative to local budgets and the discretionary flexibility that unconditional grants afford recipient governments in allocating resources toward capital priorities.

Third, Special Allocation Funds significantly and positively influence capital spending, with a coefficient of 0.487 ($p < 0.001$). This result confirms that conditional, earmarked transfers effectively channel resources toward infrastructure development in priority sectors. The significant effect validates DAK's intended function of addressing sectoral gaps and promoting nationally important public goods that might otherwise receive insufficient local funding. The slightly larger coefficient compared to DAU suggests that earmarked transfers may exert marginally stronger impacts on capital formation, likely reflecting their explicit capital investment mandate and counterpart funding requirements.

Fourth, the three fiscal variables jointly exert highly significant influence on capital expenditure, as evidenced by an F-statistic of 119.14 ($p < 0.001$) and R^2 of 0.941. This collective explanatory power demonstrates that local revenue generation and intergovernmental transfers constitute the dominant determinants of public capital formation in West Sumatra municipalities. The high R^2 indicates that fiscal resources effectively translate into infrastructure investment, with 94% of capital expenditure variation explained by PAD, DAU, and DAK. The remaining 6% likely reflects factors such as administrative capacity, political priorities, implementation efficiency, and exogenous economic conditions. These findings carry important theoretical and policy implications. Theoretically, the results support fiscal federalism principles emphasizing that effective subnational finance requires balanced revenue systems combining own-source revenues, unconditional transfers, and targeted grants. The complementary roles of PAD, DAU, and DAK demonstrate that multiple fiscal instruments collectively enable capital formation more effectively than any single mechanism. The evidence validates Indonesia's multi-tiered fiscal architecture as conducive to infrastructure development when adequate resources flow to local governments.

From a policy perspective, the findings suggest several priority areas for strengthening subnational capital investment capacity. First, expanding local revenue systems through tax base broadening, assessment improvements, collection efficiency gains, and compliance enhancement could substantially increase PAD generation, thereby expanding fiscal space for discretionary infrastructure spending. Second, maintaining adequate and predictable DAU allocations remains critical for sustaining capital investment, particularly in less fiscally capacious jurisdictions. Transfer formula stability and protection from national fiscal volatility warrant careful attention. Third, optimizing DAK design—through improved sectoral targeting, streamlined disbursement processes, enhanced technical assistance, and balanced counterpart funding requirements—could strengthen the effectiveness of conditional transfers in addressing infrastructure gaps. More broadly, the results underscore that fiscal decentralization in Indonesia successfully channels resources toward capital formation, contradicting concerns that autonomy primarily finances recurrent expenditure growth. West Sumatra cities demonstrably prioritize infrastructure investment, allocating available fiscal space toward long-term development objectives that enhance public service capacity and support economic growth. However, the transfer-dependent nature of municipal finance creates vulnerabilities to national policy changes and economic fluctuations, highlighting the need for continued efforts to strengthen local revenue systems and diversify fiscal resources.

RECOMMENDATIONS

Based on the research findings and their implications, several recommendations emerge for different stakeholder groups.

For Local Governments

Local governments in West Sumatra Province should substantially increase capital expenditure allocations to support productive economic activities and enhance public service capacity. The current capital spending levels remain modest relative to total budgets and infrastructure requirements.

Municipalities should target capital expenditure ratios of at least 25-30% of total spending, redirecting resources from less productive operational costs toward long-term infrastructure investments that generate sustained development benefits.

Regional Original Income generation requires intensified attention, particularly in smaller cities demonstrating weak PAD performance. Local governments should implement comprehensive revenue enhancement strategies encompassing property tax modernization, business license optimization, user charge rationalization, and regional enterprise profitability improvements. Establishing dedicated revenue departments with adequate staffing, training, and technological resources would strengthen collection capacity. Additionally, municipalities should explore innovative revenue instruments such as land value capture mechanisms, development impact fees, and public-private partnership arrangements that leverage private capital for infrastructure provision.

General Allocation Funds should be managed more strategically with explicit capital investment targets and multi-year planning horizons. Rather than treating DAU primarily as operational support, municipalities should allocate predetermined shares toward infrastructure priorities aligned with master plans and sectoral strategies. Establishing capital investment reserve funds, ring-fencing DAU portions for infrastructure, and developing robust project pipelines would ensure that unconditional transfers systematically contribute to capital formation rather than incremental operational spending.

For Central Government

Central government authorities should fundamentally reconsider Special Allocation Fund governance to address persistent implementation challenges. While DAK demonstrably influences capital expenditure, allocation accuracy and implementation weaknesses limit effectiveness. Policy reforms should streamline DAK categories, simplify application procedures, accelerate disbursement schedules, and provide enhanced technical assistance to recipient jurisdictions. Reducing counterpart funding requirements for fiscally constrained municipalities while maintaining them for more capacious cities could improve equity without sacrificing efficiency.

The Ministry of Finance should enhance intergovernmental fiscal coordination mechanisms to ensure that PAD, DAU, and DAK function as integrated components of a coherent system rather than disconnected programs. This includes harmonizing planning cycles, aligning sectoral priorities, improving data sharing, and establishing forums for intergovernmental dialogue on capital investment strategies. Developing standardized capital budgeting frameworks, project appraisal methodologies, and performance measurement systems would strengthen infrastructure investment quality across subnational governments.

Transfer formula revisions should carefully balance equalization objectives with incentives for local revenue mobilization. The current DAU allocation mechanism could incorporate performance-based elements that reward municipalities demonstrating strong PAD growth, efficient expenditure management, or superior infrastructure outcomes. Such incentives would encourage fiscal responsibility and administrative improvements while maintaining core equalization functions.

For Future Research

Subsequent research should extend this analysis across broader geographical scopes, including rural districts and other provinces with different institutional contexts and development levels. Comparative studies examining urban versus rural dynamics, island versus mainland patterns, or resource-rich versus resource-poor regions would illuminate contextual factors shaping fiscal-capital expenditure relationships.

Future investigations should employ disaggregated capital expenditure analysis, distinguishing among sectoral categories such as transportation infrastructure, education facilities, health infrastructure, and environmental management. Examining whether fiscal determinants vary across investment types would provide more nuanced policy guidance regarding revenue source optimization for specific infrastructure priorities.

Qualitative research exploring decision-making processes, political economy factors, and implementation challenges would complement quantitative fiscal analysis. Case studies of high-performing and low-performing municipalities could identify best practices, institutional innovations,

and reform pathways for strengthening capital investment effectiveness. Mixed-method designs combining statistical analysis with institutional assessment would generate comprehensive understanding of subnational infrastructure finance.

Advanced econometric techniques addressing potential endogeneity, dynamic relationships, and long-term effects merit exploration. Instrumental variable approaches, system GMM estimators, or vector autoregression models could provide more definitive causal inference regarding fiscal determinants of capital expenditure. Additionally, incorporating spatial dimensions through spatial econometric methods would capture inter-jurisdictional spillovers and competition effects influencing infrastructure investment patterns.

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