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The Effect of Regional Budget Proportions on Community Welfare, Infrastructure Conditions, and Human Resource Conditions: A Study of Regencies/Cities in West Kalimantan Province

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ABSTRACT

This study analyzes the effects of the proportions of capital expenditure, education expenditure, and health expenditure on infrastructure conditions, human resources (HR), and community welfare across 14 regencies/cities in West Kalimantan Province during the 2014–2023 period (140 observations). Using a two-way fixed-effects panel data regression with cluster-robust standard errors, the results show that the proportion of capital expenditure has a significant positive effect on access to adequate sanitation ($\beta = 0.293$; $p = 0.034$), while health expenditure has a significant positive effect on life expectancy ($\beta = 0.084$; $p = 0.021$). Both education and health expenditure also have significant positive effects on the Human Development Index ($\beta = 0.027$; $p = 0.020$ and $\beta = 0.031$; $p = 0.036$, respectively). Education expenditure does not yet have a significant effect on mean years of schooling, and none of the three expenditure proportions has a significant effect on the poverty rate. The effects of budget proportions differ significantly between regions with high and low fiscal capacity for sanitation, poverty, and mean years of schooling outcomes. These findings remain consistent after controlling for fiscal capacity, regional per capita income, and population density, highlighting that the size of budget allocations needs to be accompanied by spending quality and well-targeted programs.

INTRODUCTION

Fiscal decentralization in Indonesia, which began with Law Number 22 of 1999 and Law Number 25 of 1999 and was subsequently refined through Law Number 32 of 2004, Law Number 33 of 2004, and Law Number 23 of 2014 on Regional Government, grants local governments broad authority to manage the Regional Revenue and Expenditure Budget (APBD) to finance regional development. This autonomy entails substantial responsibility in allocating budgets optimally to improve community welfare.

Data from the Ministry of Finance indicate considerable disparities across regions in the proportions of capital, education, and health expenditures relative to total APBD, while data from the Central Statistics Agency (BPS) reveal significant disparities in Human Development Index (HDI) outcomes across regions. West Kalimantan Province provides a relevant context because its HDI in 2023 (69.11) remained below the national average (74.39), while infrastructure conditions and human resource outcomes in some areas, particularly inland and border regions, remained limited. The fundamental question addressed is the extent to which the proportion of budget allocations to these priority sectors empirically contributes to differences in development outcomes across regions.

The literature indicates that the relationship between fiscal capacity, expenditure composition, and development outcomes is not mechanical. Darwanto and Yustikasari (2007) identify economic growth, Locally Generated Revenue (PAD), and the General Allocation Fund (DAU) as factors analyzed in the allocation of capital expenditure, making capital expenditure the dependent variable in their study. In the context of West Kalimantan, Deswantoro et al. (2017) found that capital expenditure has a positive effect on welfare, as measured by the HDI, while also showing that the expenditure structure of regencies/cities remains dominated by personnel expenditure. At the national level, Wardhana et al. (2021) demonstrated that expenditure on education, health, economic, and infrastructure functions is positively associated with the HDI and its component indicators, whereas Nurintasya and Santoso (2023) showed that the effectiveness of education and health expenditure in improving human resource quality may vary due to time lags, geographical accessibility, and the availability of facilities.

Permata and Tanggulungan (2015) also found differences in the effectiveness of expenditure across functions in relation to the HDI in East Java. These findings are consistent with Mongan (2019), who found that education and health expenditures are associated with human development, although the direction and magnitude of their effects are not always consistent. Broader fiscal literature indicates that locally generated revenue, transfers, budget governance, economic capacity, and expenditure structures also influence regional capacity to provide infrastructure and improve welfare (Purbadharmaja et al., 2019; Suarjana & Dewi, 2018; Irmawati & Kawedar, 2025; Gombos et al., 2022). From an institutional perspective, Touchton et al. (2023) emphasize that the quality of budgeting processes and administrative capacity affects the ability of public spending to generate basic services, while Ali et al. (2026) identify fiscal and institutional capacity as important conditions for regional autonomy to produce improvements in welfare. Nevertheless, previous studies have generally examined nominal expenditure, specific expenditure classifications, fiscal capacity, or a single development outcome separately. Research that simultaneously examines the proportions of capital, education, and health expenditures in relation to infrastructure, human resource components, the HDI, and poverty using a panel of all regencies/cities in West Kalimantan, while controlling for regional and year effects and testing heterogeneity based on fiscal capacity, remains limited. This gap constitutes the main contribution of the present study.

Based on the above discussion, this study aims to: (1) describe the proportions of capital, education, and health expenditures across regencies/cities in West Kalimantan from 2014 to 2023; (2) analyze the effect of the proportion of capital expenditure on infrastructure conditions; (3) analyze the effects of the proportions of education and health expenditures on human resource conditions; (4) analyze the effects of the three expenditure proportions on community welfare, as measured by the HDI and poverty; and (5) examine differences in these effects between regions with high and low fiscal capacity.

RESEARCH METHOD

This study employs a quantitative explanatory approach with a longitudinal panel data design. The unit of analysis comprises all 14 regencies/cities in West Kalimantan Province during the 2014–2023 period, using a census/total sampling method, resulting in 140 regency/city-year observations. Secondary data were obtained from the Directorate General of Fiscal Balance (DJPK) of the Ministry of Finance (regional budget realization), the Central Statistics Agency (BPS) of West Kalimantan Province and its regencies/cities, and Regional Government Financial Reports (LKPD) audited by the Audit Board of the Republic of Indonesia (BPK).

The independent variables consist of the proportion of capital expenditure (X1), the proportion of education expenditure (X2), and the proportion of health expenditure (X3), each calculated as the percentage of realized expenditure for the respective sector relative to total realized regional expenditure. The dependent variables include access to adequate sanitation as a proxy for infrastructure, the Human Development Index (HDI) and the poverty rate as indicators of community welfare, and mean years of schooling (MYS) and life expectancy at birth (LE) as indicators of human resource conditions. Three control variables were used for robustness testing: regional fiscal capacity/ln per capita locally generated revenue (PAD) (Z1), ln total regional revenue per capita (Z2), and population density (Z3).

The main model was estimated using a two-way fixed-effects panel data regression, controlling for regency/city fixed effects and year fixed effects, with cluster-robust standard errors at the regency/city level to address heteroskedasticity and serial autocorrelation (Baltagi, 2005). A random-effects model was estimated for comparison using the Hausman test (Hausman, 1978). Diagnostic tests included the Breusch–Pagan test for heteroskedasticity, the Wooldridge test for autocorrelation, the Jarque–Bera test for residual normality, and the Variance Inflation Factor (VIF) for multicollinearity. Hypothesis H9 was tested by dividing the sample into high- and low-fiscal-capacity groups based on the median value of per capita PAD, followed by testing the group × expenditure proportion interactions using a joint Wald test.

RESULT AND DISCUSSION

Descriptive Statistics

During the 2014–2023 period, education expenditure accounted for the highest average proportion (27.53%), followed by capital expenditure (19.25%) and health expenditure

(17.07%); capital expenditure exhibited the greatest variation (ranging from 9.44% to 34.81%). Regarding outcomes, access to adequate sanitation showed the widest range (7.40%–98.13%), indicating a stark infrastructure gap across regencies and cities. Detailed descriptive statistics are presented in Table 1.

Table 1. Descriptive Statistics of Research Variables (N = 140)

Variable	N	Mean	Std. Dev.	Min	Max
Capital Expenditure Proportion (X1), %	140	19.248	5.358	9.438	34.809
Education Expenditure Proportion (X2), %	140	27.533	3.266	20.351	41.318
Health Expenditure Proportion (X3), %	140	17.073	4.570	5.987	27.867
Adequate Sanitation, %	140	69.619	18.364	7.400	98.130
HDI	140	67.972	3.994	61.820	81.100
Poverty Rate, %	140	7.575	2.625	4.120	12.830
MYS, years	140	7.216	0.949	5.860	10.440
LE, years	140	72.556	1.519	67.710	74.720
ln Per Capita PAD	140	12.667	0.415	11.815	13.694

Hypothesis Testing Results

A two-way fixed effects model was selected as the primary model because it accounts for time-invariant regional characteristics as well as common year-specific shocks; the standard Hausman test proved unstable in several equations, leading to the use of a fixed effects model with cluster-robust standard errors as a more conservative primary model. Diagnostic tests indicated heteroskedasticity in the AHH and HDI models and autocorrelation in the sanitation, AHH, HDI, and poverty models, while VIF tests showed no severe multicollinearity among the variables. Of the nine hypothesis groups tested, four—H1, H3, H5, and H6—received significant support at the $\alpha = 5\%$ level, as summarized in Table 2.

Table 2. Summary of Hypothesis Testing Results H1–H8 (Two-Way Fixed Effects, Cluster-Robust SE)

Hypothesis	Relationship	Coefficient	p-value	Decision
H1	X1 → Sanitation	0.2930	0.0335	Supported
H2	X2 → MYS	0.0016	0.6327	Not Supported
H3	X3 → LE	0.0842	0.0207	Supported
H4	X1 → HDI	-0.0028	0.8181	Not Supported
H5	X2 → HDI	0.0272	0.0204	Supported
H6	X3 → HDI	0.0314	0.0360	Supported
H7	X1 → Poverty	-0.0059	0.6132	Not Supported
H8a	X2 → Poverty	0.0022	0.9073	Not Supported
H8b	X3 → Poverty	-0.0071	0.6900	Not Supported

The proportion of capital expenditure has a positive and significant effect on access to adequate sanitation ($\beta = 0.293$; $p = 0.034$), supporting H1. Substantively, a one-percentage-

point increase in the proportion of capital expenditure is associated with an increase of approximately 0.29 percentage points in adequate sanitation coverage, ceteris paribus. This finding is consistent with the arguments of Aschauer (1989) and Calderón and Servén (2004) regarding the productivity of infrastructure investment. In the Indonesian context, this finding complements Deswantoro et al. (2017), who found a positive effect of capital expenditure on the HDI in regencies/cities in West Kalimantan, and Suarjana and Dewi (2018), who demonstrated that fiscal capacity through locally generated revenue (PAD) and intergovernmental transfer funds supports infrastructure development. The difference is that this study examines the proportion of realized capital expenditure relative to total expenditure and uses access to adequate sanitation as a physical outcome of basic services, thereby providing more direct evidence of the relationship between budget composition and infrastructure outcomes.

For the HDI, the proportions of education expenditure ($\beta = 0.027$; $p = 0.020$) and health expenditure ($\beta = 0.031$; $p = 0.036$) have significant positive effects, supporting H5 and H6, respectively, whereas the proportion of capital expenditure is not significant ($\beta = -0.003$; $p = 0.818$), and H4 is therefore not supported. The effect of education expenditure is consistent with Permata and Tanggulungan (2015) and Wardhana et al. (2021). For health expenditure, the findings are more consistent with Wardhana et al. (2021) and differ from Permata and Tanggulungan (2015), who found that health expenditure was not significant in relation to the HDI. The insignificant effect of capital expenditure on the HDI also differs from Deswantoro et al. (2017) and Irmawati and Kawedar (2025), who reported a positive relationship between capital expenditure and the HDI. These differences may arise from differences in measurement: previous studies generally used expenditure values or allocations, whereas this study uses the proportion of realized expenditure relative to total expenditure. Thus, an increase in the proportion of capital expenditure does not necessarily improve the HDI directly if the assets constructed do not immediately improve health, education, and living standards.

The H9 test shows significant differences in effects between high- and low-fiscal-capacity groups for sanitation ($p = 0.0067$), poverty ($p = 0.0112$), and mean years of schooling (MYS) ($p = 0.0301$), but not for the HDI ($p = 0.6160$) or life expectancy at birth (LE) ($p = 0.9022$). Therefore, H9 is partially supported. After controlling for ln per capita PAD, ln total regional revenue per capita, and population density, the decisions regarding H1–H9 remained unchanged. This heterogeneity is consistent with Purbadharmaja et al. (2019), who showed that economic capacity and governance influence the pathways through which fiscal decentralization affects welfare, as well as Gombos et al. (2022), who demonstrated differences in expenditure structures and budgetary capacity across regions. Ali et al. (2026) also emphasized that the effectiveness of regional autonomy depends on fiscal and institutional capacity. Thus, the H9 findings reinforce the argument that the same budget proportion may generate different outcomes when financing capacity, service accessibility, and implementation capacity differ.

Overall, the evidence from this study suggests three academic implications. First, the use of realized expenditure proportions demonstrates that budget composition has different explanatory power from nominal expenditure values. Second, disaggregating outcomes into sanitation, MYS, LE, HDI, and poverty indicates that fiscal transmission is sector-specific and operates over different time horizons. Third, differences in outcomes according to fiscal capacity indicate that expenditure quality and implementation capacity are important contextual factors rather than merely residual factors. These findings bridge previous studies on regional expenditure in West Kalimantan (Deswantoro et al., 2017) with national literature on human development (Wardhana et al., 2021; Nurintasya & Santoso, 2023) and international literature on governance and local budget structures (Purbadharmaja et al., 2019; Gombos et al., 2022; Touchton et al., 2023).

Several limitations should be considered when interpreting the findings. First, the use of expenditure proportions reflects relative budget priorities but does not measure the efficiency, output quality, or targeting accuracy of individual programs. Second, MYS and some development outcomes are stock measures and may respond to expenditure with a time lag, as demonstrated by Nurintasya and Santoso (2023). Third, the infrastructure indicator is limited to adequate sanitation and does not include roads, drinking water, electricity, or connectivity. Fourth, the classification of fiscal capacity based on the median of per capita PAD is an operational approach that does not capture all dimensions of fiscal space and governance. Therefore, future research could employ distributed-lag or dynamic panel models, expenditure efficiency and governance indicators, and broader infrastructure outcomes.

CONCLUSION

The study of 14 regencies/cities in West Kalimantan Province during the 2014–2023 period shows that the structure of regional expenditure proportions is heterogeneous across regions and over time. The proportion of capital expenditure has a significant positive effect on access to adequate sanitation, the proportion of health expenditure has a significant positive effect on life expectancy at birth, and the proportions of education and health expenditures have significant positive effects on the Human Development Index (HDI). In contrast, the effects on mean years of schooling (MYS) and the poverty rate are not statistically significant, while differences in effects between fiscal-capacity groups are observed only for some outcomes, namely sanitation, poverty, and MYS. All major findings remain robust after controlling for fiscal capacity, regional per capita income, and population density.

In practical terms, regency/city governments need to strengthen outcome-based budgeting, prioritize capital expenditure for basic service infrastructure accompanied by sustainable asset maintenance, maintain consistent education and health expenditure focused on service quality and equitable access, and design more adaptive policies for regions with low fiscal capacity through complementary funding support and strengthened institutional capacity. Future research is recommended to extend the observation period, expand infrastructure

indicators and control variables (e.g., GDP per capita), and consider dynamic panel or instrumental variable approaches to strengthen the identification of causal relationships.

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