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Revisiting Fiscal Transfer Equity: Lessons from Indonesia's General Allocation Fund Reform

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Abstract

Indonesia's fiscal transfer system predominantly relies on a formula-based approach, which tends to reflect continental characteristics and neglects the unique needs of archipelagic regions. As a result, provinces with extensive marine territories are structurally disadvantaged in the allocation of General Allocation Funds (GAF), Special Allocation Funds (SAF), and Revenue Sharing Funds (RSF). In response to this disparity, a policy was introduced in 2018 to incorporate a 100% weight for marine area in the GAF formula; however, no parallel adjustments have been made for SAF or RSF. This study investigates the impact of this reform, along with other determinants, on fiscal transfer disparities and regional inequality between archipelagic and non-archipelagic provinces over the period 2012–2023. Using panel data and a fixed-effects model, the findings indicate that higher GRDP per capita significantly reduces disparities in per capita GAF, SAF, and RSF. In contrast, local government revenue per capita exacerbates these disparities. Additionally, regional fiscal dependency and the 2018 reform are found to worsen per capita GAF disparities. On the other hand, the ratio of GAF, SAF, and RSF to regional direct expenditures, the ratio of Own-Source Revenue (OSR) to total expenditure, and the GAF reform contribute to reducing regional income inequality. Among these, OSR ratios and GRDP per capita exhibit the strongest equalizing effects. These results underscore the importance of differentiated transfer formulas that account for regional typologies, particularly in archipelagic contexts.

Keywords: fiscal transfer; regional inequality; archipelagic provinces; non-archipelagic

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INTRODUCTION

Regional development disparities have long been a structural challenge within Indonesia's economy. Despite the implementation of fiscal decentralization policies since 2001 (Aji et al., 2021; Herianti and Marundha, 2024; Gonschorek, 2021), interregional inequality—particularly between archipelagic and non-archipelagic provinces—remains stark. Archipelagic provinces typically encounter geographic isolation, high logistical costs, and infrastructure deficits (Amin et al., 2021; Ayala et al., 2021)—factors that have not been fully incorporated into the national fiscal transfer formula. This issue persists in Indonesia, the world's largest archipelagic state, where fiscal transfers from the central government to subnational governments are a vital instrument for promoting equitable development and fiscal justice.

In many developing countries, intergovernmental transfers remain a primary source of local government revenue (Panao, 2021; Shani et al., 2023; Afonso et al., 2024),

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often surpassing own-source revenue (OSR) in importance. Within the framework of decentralization, the central government delegates fiscal authority to subnational governments under the assumption that they are more attuned to local preferences and geographic specificities (Choudhury and Sahu, 2022), and are more efficient in delivering public services than the central government (Dick-sagoe, 2020; Otoo and Danquah, 2021). This delegation is accompanied by fiscal transfers categorized into general purpose transfers and specific purpose transfers (Gordin, 2021; Wang et al., 2024). In Indonesia, these transfers are collectively known as intergovernmental fiscal transfers, governed by Law No. 1/2022 and the Ministry of Finance Regulation No. 121/2018.

The General Allocation Fund (GAF) and the Revenue Sharing Fund (RSF) are classified as general purpose transfers, whereas the Special Allocation Fund (SAF) represents specific purpose transfers. GAF is designed to support regions in implementing decentralization mandates, while SAF finances national priority programs, including both physical and non-physical projects. RSF is based on revenue-sharing between the central and local governments but has been criticized for perpetuating inequality due to the uneven spatial distribution of natural resources and tax bases. Although GAF aims to equalize fiscal capacity across regions, its allocation remains uneven (Akita et al., 2021). Ideally, fiscal transfers should function as corrective instruments to mitigate disparities arising from variations in economic capacity (Gong et al., 2021); however, their effectiveness remains contested (Sugiyarto, Lee and Wilson, 2025), especially in the context of archipelagic and non-archipelagic provinces.

The formulas used to determine GAF and SAF allocations are largely formula-based, relying on criteria for assessing regional eligibility. However, the current system has been criticized for favoring continental characteristics and inadequately accounting for marine territories, thereby disadvantaging archipelagic provinces (Akita et al., 2021);. Since 2018, GAF's allocation formula has incorporated a 100% weighting for marine areas, as stipulated in Presidential Regulation No. 131/2018. Nevertheless, this reform has not extended to SAF and RSF, which continue to neglect considerations of spatial justice for maritime regions.

Indonesia comprises eight archipelagic and twenty-four non-archipelagic provinces (excluding newly formed provinces). The average marine area of archipelagic provinces reaches 74,135 km², while their land area averages only 27,842 km². In contrast, non-archipelagic provinces possess an average marine area of 32,578 km² and a land area of 66,675 km² (BPS, 2016). These figures underscore the stark spatial imbalance, where archipelagic provinces possess significantly larger marine areas but smaller land areas relative to their continental counterparts. Consequently, fiscal transfers based predominantly on land area risk exacerbating spatial disparities. Additional contributing factors include unequal distribution of natural resources, geographic remoteness, and uneven development financing (Olayele and Soo, 2020; Tang et al., 2024; Lin and Zhou, 2021; Kassouri, 2022; Sun et al., 2023; Wang et al, 2024).

A broad range of studies has explored fiscal transfer disparities and regional inequality across countries (Akita et al., 2021; Liu and Song, 2022; Szczepaniak et al., 2022; Guerrero et al., 2022; Pietrovito et al., 2023; Loras-gimeno et al., 2024). However, few explicitly distinguish between archipelagic and non-archipelagic provinces. Limited attention has been given to disparities in the allocation of GAF, SAF, and RSF, or to income per capita inequality between these two regional groups. Ideally, the

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establishment of a Special Archipelagic Transfer Fund (SATF) should be considered as an alternative solution to correct the fiscal transfer allocation formula (Suzuki, 2021), particularly in addressing geographical inequalities in allocation resulting from differing spatial characteristics.

Recent empirical findings have begun to uncover the determinants of fiscal transfer disparities, although most have not examined geographic disparities between archipelagic and non-archipelagic areas. Variables such as GRDP per capita used as a proxy for fiscal capacity have been found to exacerbate transfer disparities (Olayele and Soo, 2020; Boret et al., 2021; Gong et al., 2021). Likewise, higher local government revenues, fiscal dependency, and historical transfer allocations have been linked to increased inequality (Canare et al., 2020). In contrast, OSR per capita tends to have a redistributive effect (Kim et al., 2022). Other influential variables include population size and prior fiscal deficits (Ahmad, 2021). These patterns suggest that fiscal decentralization can unintentionally create new forms of inequality, especially due to structural biases in national allocation formulas that inadequately reflect the cost complexities of public service delivery in archipelagic settings.

This study aims to fill the empirical and theoretical gaps by comparing fiscal transfer disparities and income per capita inequality between archipelagic and non-archipelagic provinces in Indonesia during the period 2012–2023. The novelty of this research lies in the integration of spatio-temporal fiscal analysis and the evaluation of the 2018 GAF formula reform, which introduced a 100% marine area weighting. While previous studies have generally overlooked these spatial dimensions, this study provides empirical evidence on how national fiscal transfers are allocated across provinces and their implications for regional inequality.

The study is guided by three principal research questions: (1) What are the determinants of disparities in GAF, SAF, and RSF allocations between archipelagic and non-archipelagic provinces? (2) How do the ratios of GAF, SAF, and RSF to regional direct expenditures affect income per capita inequality in these regions? (3) Does the 2018 GAF formula modification significantly mitigate fiscal transfer disparities and income inequality?

The objectives of this research are: (1) to identify the key determinants of GAF, SAF, and RSF disparities between archipelagic and non-archipelagic provinces; (2) to assess the impact of these disparities on regional income inequality; and (3) to evaluate the effectiveness of the 2018 GAF formula reform. By introducing a spatial typology framework, this study addresses a critical gap in the literature, which often neglects geographic differentiation in fiscal policy analysis. The study's originality lies in its provision of empirical insights into how formula-based transfers interact with the unique structural constraints of archipelagic provinces. The findings are expected to inform Indonesia's fiscal policy reforms by advocating for more equitable, typology-sensitive transfer mechanisms. Moreover, the study offers broader relevance for other archipelagic nations grappling with similar spatial-fiscal disparities.

LITERATURE REVIEW

The first-generation theory of fiscal decentralization, initially formulated by Oates (1973), posits that decentralization can improve the allocative efficiency of public resources and enhance equity between regions. This perspective emphasizes the potential of fiscal decentralization to facilitate income predistribution between lagging

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and more developed regions (Feld et al., 2021), primarily by granting subnational governments greater autonomy in managing revenues and expenditures according to local needs. Within this framework, fiscal transfers between central and local governments are seen as tools to correct vertical and horizontal fiscal imbalances. Local governments are therefore expected to fulfill allocation, distribution, and stabilization functions (Musgrave and Musgrave, 1989), depending on the authority granted by the central government. The rationale behind this is that local governments are better positioned to understand and respond to their citizens' preferences and socio-economic contexts (Oates, 1997; Siburian, 2022; Ayala etal., 2021).

In this context, there are indications that the allocation of fiscal transfers to regions as an implementation of fiscal decentralization in Indonesia still presents its own set of problems. These problems particularly pertain to geographical differences between archipelagic provinces, which have a larger maritime area than land area, and non-archipelagic provinces, which have more land area than maritime areas. While the basis for determining the allocation of these transfer funds follows the principle of continental regions, the geographic disparities lead to discrepancies. This leads to the formulation of the following research hypothesis:

H1: Disparities in fiscal transfers between governments—particularly the General Allocation Fund (GAF), Specific Allocation Fund (SAF), and Revenue Sharing Fund (RSF)—between archipelagic and non-archipelagic provinces are significantly influenced by structural factors such as per capita fiscal capacity (GRDP), per capita regional revenues, and fiscal dependency levels.

The first hypothesis provides a deeper explanation regarding the potential imbalance in fiscal transfer allocations between archipelagic and non-archipelagic provinces. While decentralization has the potential to improve efficiency and equity, this hypothesis tests whether structural factors, such as per capita fiscal capacity and fiscal dependency, influence the disparities in fiscal transfers. Directly, this first hypothesis addresses the challenges faced by archipelagic provinces, which incur higher distribution costs, and the need for fiscal policies more sensitive to their geographical conditions.

However, the second-generation theory of fiscal decentralization emerged as a critical response, seeking a more optimal design by considering institutional incentives, political economy constraints, and territorial heterogeneity. These elements require comprehensive analysis, particularly when the aim is to design an efficient and responsive fiscal governance structure (Mauro et al., 2023). Contemporary scholars argue that fiscal decentralization must go beyond formal devolution and instead foster allocative efficiency and distributive justice (Suzuki, 2021; Dick-sagoe, 2020), especially in fragmented and spatially diverse nations. Recent studies emphasize the need for decentralization to accommodate territorial asymmetries, such as those experienced by archipelagic and non-archipelagic provinces (Yan et al., 2024; Qiu et al., 2024; Amin et al., 2021), given the persistent disparities in intergovernmental fiscal transfer allocation.

In Indonesia, transfers such as the General Allocation Fund (GAF), Revenue Sharing Fund (RSF), and Specific Allocation Fund (SAF) are key instruments for fiscal equalization. However, these mechanisms often fail to reflect structural cost differences due to spatial constraints, particularly in archipelagic provinces. While theoretically intended to correct vertical and horizontal fiscal imbalances (Feld et al., 2021; Guerrero et al., 2022; Mai et al., 2025), the operationalization of these transfers is

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still largely focused on terrestrial areas, which do not adequately consider maritime geography.

Moreover, contemporary decentralization theorists highlight the need to reinvigorate the subsidiarity principle to ensure that subnational entities, endowed with local knowledge and administrative proximity, can deliver public services more effectively—provided that spatially sensitive fiscal policies support these efforts (Loras-gimeno et al., 2024; Maket and Naibei, 2025; Gong et al., 2021). Despite these theoretical advancements, empirical literature increasingly questions the automaticity of decentralization's equalizing effects. In light of this, the following research hypothesis is formulated:

H2: Higher ratios of fiscal transfers and fiscal autonomy relative to local government expenditure significantly reduce regional income inequality, especially in archipelagic provinces.

The second hypothesis suggests that with increased fiscal transfers and greater fiscal autonomy, income inequality between regions, particularly in archipelagic provinces, can be reduced. This hypothesis is highly relevant to the theory that recognizes the need for more flexible fiscal policies that are responsive to the geographical and logistical challenges faced by archipelagic provinces. In this regard, increasing fiscal freedom for local governments allows them to better address local needs, which in turn can reduce disparities between regions.

In Indonesia, transfers such as the General Allocation Fund (GAF), Revenue Sharing Fund (RSF), and Specific Allocation Fund (SAF) are primary tools for fiscal equalization. However, these mechanisms often fail to reflect structural cost differences due to spatial constraints, particularly in archipelagic provinces. While theoretically intended to correct vertical and horizontal imbalances (Feld et al., 2021; Guerrero et al., 2022; Zhang and Xiang, 2023), the implementation of these transfers remains predominantly terrestrial-oriented, which does not sufficiently account for maritime geography.

Additionally, contemporary decentralization theorists highlight the importance of reviving the subsidiarity principle to ensure that subnational entities, endowed with local knowledge and administrative proximity, can provide public services more effectively—as long as spatially sensitive fiscal policies support these efforts (Loras-gimeno et al., 2024; Guo et al., 2021; Gong et al., 2021). Despite these theoretical advancements, empirical literature increasingly questions the automaticity of decentralization's equalizing effects. This leads to the formulation of the following research hypothesis:

H3: The 2018 General Allocation Fund (GAF) reform significantly contributed to reducing fiscal transfer disparities and regional income inequality in archipelagic provinces compared to the pre-reform period.

The third hypothesis evaluates the 2018 GAF reform, which aimed to reduce disparities in fiscal transfers and income between regions. This reform introduced spatial weighting more sensitive to the geographic conditions of archipelagic provinces, but there are still challenges in its full implementation. The third hypothesis concludes that although this reform represents a step forward, its limited application shows that there are still disparities that need to be addressed. Therefore, this study will analyze whether the 2018 GAF reform successfully reduced disparities between

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archipelagic and non-archipelagic provinces, which remains a significant challenge in fiscal policy.

METHODOLOGY

This study uses a panel data method involving 32 provinces as research locations, including 8 archipelagic provinces and 24 non-archipelagic provinces. Excluded from the study are the Special Capital Region of Jakarta and newly established provinces. The reason for this exclusion is that Jakarta is categorized as an independent province, while the newly established provinces face data limitations. The selection of research locations is based on two considerations: 1) There is still a disparity in fiscal transfer allocation and regional income inequality between archipelagic and non-archipelagic provinces due to geographical differences. The group of archipelagic provinces has a larger marine area than land area, whereas non-archipelagic provinces have a larger land area than marine area. This difference has not yet been accommodated in the determination of fiscal transfer allocations, particularly the General Allocation Fund (GAF), which uses the area size component as one of the regional fiscal needs indicators. However, it only considers land area, which does not meet the principles of equity and justice between regions; 2) Since 2018, a reformulation of the GAF has been implemented, incorporating a 100% marine area weight. However, this reformulation has not indicated any improvement in equity, especially since the policy has not been applied to the Special Allocation Fund (SAF) and Revenue Sharing Fund (RSF). The classification of the eight archipelagic provinces is based on Law Number 23 of 2014 and the Batam Declaration of 2018. The eight archipelagic provinces included in this study are: Riau Islands, Maluku, North Maluku, East Nusa Tenggara, West Nusa Tenggara, Bangka Belitung Islands, North Sulawesi, and Southeast Sulawesi.

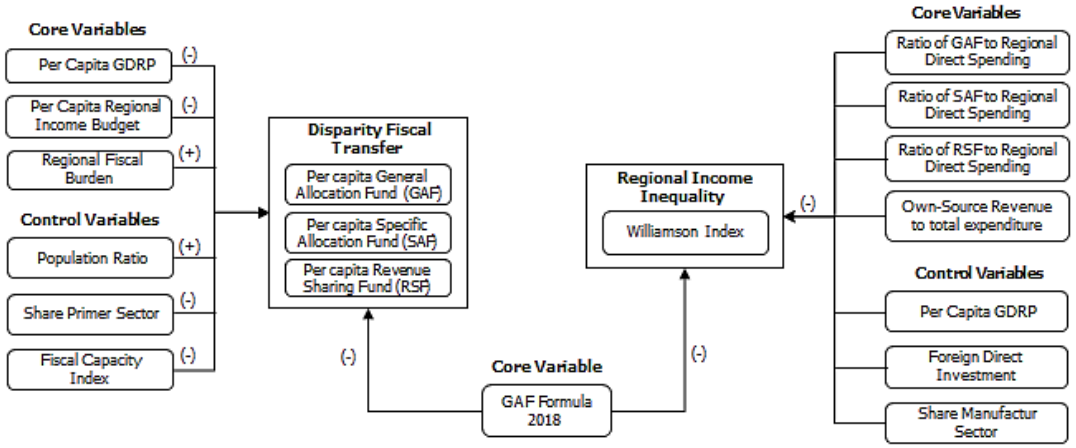

Figure 1. Research Framework

The empirical model applied in this study includes the fiscal transfer model and the regional per capita income inequality model. Both models refer to the conceptual framework proposed by Gonschorek (2021); Olayele and Soo (2020), as well as Wang et al. (2024), and are then adjusted to the contextual objectives of this study. The specification of Model (1) is expressed as follows:

$$log(TRANSF_{it}) = \beta_0 + \beta_1 log(GRDP_{it}) + \beta_2 log(INC_{it}) + \alpha_3 log(RFB_{it}) + \varsigma DUM18 + \gamma log(CONT_{it}) + \varepsilon_{it} \quad (1)$$

Where i =1,2,3,…,32 represents the units of archipelagic and non-archipelagic provinces; t = 2012−2023 denotes the time series units; *log* refers to the logarithm;

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$TRANSF_{it}$ includes per capita GAF_{it}, SAF_{it}, and RSF_{it} transfers; $GRDP_{it}$ is the real per capita gross regional domestic product; INC_{it} is the per capita regional revenue budget; and RFB_{it} is the regional fiscal dependency burden (the ratio of the number of civil servants to regional revenue). *DUM18* is a dummy variable for the GAF formula policy in 2018 (where DUM18 = 1 for the period before 2018, and DUM18 = 0 for the period after). Meanwhile, $CONT_{it}$ represents control variables, including: the ratio of provincial population to the national population ($POPR_{it}$); the share of the primary sector in real per capita GRDP ($PRIM_{it}$); the Regional Fiscal Capacity Index (FCI_{it}); and ε_{it} is the error term. The specification of Model (2) is presented as follows:

$$INEQ_{it} = \phi_0 + \phi_1 FTR_{it} + \phi_2 OSR_{it} + \delta DUM18 + \lambda CONT_{it} + u_{it} \quad (2)$$

Where $INEQ_{it}$ represents the Williamson Index; FTR_{it} denotes the ratio of fiscal transfers, including the ratios of GAF_{it}, SAF_{it}, and RSF_{it} to regional direct expenditures; OSR_{it} is the ratio of Own-Source Revenue to regional expenditures; and *DUM18* is a dummy variable representing the 2018 GAF formula reformulation policy (*DUM*18 = 1 for the period before 2018, and *DUM18* = 0 for the period after). Meanwhile, CONT refers to control variables, including real per capita $GRDP_{it}$; FDI_{it} indicates foreign direct investment (used as a proxy for regional economic openness); and $MANU_{it}$ refers to the ratio of the labor force employed in the manufacturing sector, proxied by the number of individuals aged over 15 working in the industrial sector. u_{it} is the error term. Both models are estimated using standard panel data specification tests, including the Chow test, Lagrange Multiplier (LM) test, Hausman test (Mukherjee, 2023; Wooldridge, 2025; Baltagi, 2021), classical assumption tests, and goodness-of-fit assessments (Banerjee et al., 2025).

RESULTS AND DISCUSSION

Model (1) Testing and Estimation Results

The estimation of Model (1) begins with specification tests for GAF, SAF, and RSF using the Chow test, LM test, and Hausman test (Table 1). The results of the Chow test for all three transfers indicate that the Fixed Effects Model (FEM) is appropriate. Meanwhile, the LM test suggests that the Random Effects Model (REM) is preferred. Conversely, the Hausman test identifies the FEM as the most suitable specification. Based on the outcomes of these three tests, the FEM is ultimately deemed the most appropriate model for the analysis.

Classical assumption testing was also conducted (Table 2). The results of the Variance Inflation Factor (VIF) test for the three fiscal transfer models show that all VIF values are below 10, indicating the absence of multicollinearity. The autocorrelation test, conducted after applying the Cochrane-Orcutt (C-O) method, confirmed that none of the three models exhibit autocorrelation. Furthermore, the Glejser test results demonstrate that the regression coefficients of the independent variables in all three models are not significantly related to the absolute values of their residuals, suggesting the absence of heteroscedasticity.

Table 1. Results of Chow, LM, and Hausman Tests for Model (1)

Model	Chow-test			LM-test			Hausman-test		
	Chi.Sq-Stat	Prob	Result	B-P (Both)	Prob	Result	Chi.Sq-Stat	Prob	Result

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$\log(GAF_{it})$	306.784	0.000		319.757	0.000		58.345	0.000	
$\log(SAF_{it})$	158.194	0.000	FEM	1049.893	0.000	REM	108.091	0.000	FEM
$\log(RSF_{it})$	360.726	0.000		561.990	0.000		13.678	0.000	

Note: *) 5%

Source: EViews Data Processing Output, 2025.

The regression results of the core variables under the FEM show that the GAF, SAF, and RSF per capita models meet the goodness-of-fit criteria (Table 2). The adjusted R^2 values of the three models are 0.855, 0.762, and 0.798, respectively. In addition, the F-statistics for all models are significant. The variable GRDP has a negative and statistically significant effect across all models. Specifically, a 1% increase in GRDP is estimated to reduce GAF, SAF, and RSF by 0.90%, 2.83%, and 1.82%, respectively. Conversely, INC has a positive and statistically significant effect in all three models, indicating that a 1% increase in INC would increase GAF, SAF, and RSF by 1.24%, 1.68%, and 0.77%, respectively. Both RFB and DUM18 show a positive and significant impact in Model (1.1) only. A 1% increase in RFB is associated with a 0.02% increase in GAF. The effect of DUM18 indicates an increase in GAF following the implementation of the revised GAF formula in 2018.

Table 2. FEM Regression Results for Model (1)

Variable	FEM								
	(1.1)			(1.2)			(1.3)		
	Coeff	t-Stat	Prob.	Coeff	t-Stat	Prob.	Coeff	t-Stat	Prob.
C	1.217	1.328	0.185	-14.404	-3.882*	0.000	-3.618	-3.037*	0.003
$\log(GDRP_{it})$	-0.904	-1.845**	0.066	-2.825	-2.683*	0.008	-1.824	-3.174*	0.002
$\log(INC_{it})$	1.244	7.610*	0.000	1.680	3.428*	0.002	0.769	4.071*	0.001
$\log(RFB_{it})$	0.024	2.049*	0.041	0.005	0.148	0.882	0.016	1.118	0.265
DUM18	0.042	2.361*	0.019	0.060	0.938	0.349	0.022	0.969	0.333
$\log(POPR_{it})$	-3.798	-4.370*	0.000	-3.824	-2.168*	0.031	-1.063	-1.173	0.242
$\log(PRIM_{it})$	2.098	0.950	0.343	1.102	1.919**	0.056	-1.146	-2.427*	0.007
$\log(FCI_{it})$	0.008	0.539	0.590	-0.067	-1.821**	0.070	0.010	0.558	0.577
$Adj.R^2$		0.855			0.762			0.799	
F-stat.		50.426*			27.924*			34.427*	
Prob(F-stat.)		0.000			0.000			0.000	
VIF-test		No			No			No	
DW.stat (C-O)		2.149*			1.961*			1.693**	
Glejser-test		No			No			No	
Obs		320			320			320	

Note: *) 5%; **) 10%.

Source: EViews Data Processing Output, 2025.

Table 3. Cross-Section Effects of Model (1) in Archipelagic Provinces

Province	Model		
	(1.1)	(1.2)	(1.3)
Bangka Belitung Islands	-0.256	-0.621	-0.030
Riau Islands	-0.139	-1.371	-0.205
West Nusa Tenggara	-0.232	0.234	0.189
East Nusa Tenggara	-0.485	-1.606	0.186

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North Sulawesi	-0.216	-0.381	-0.186
Southeast Sulawesi	-0.236	-0.411	-0.073
Maluku	-0.402	-0.003	-0.009
North Maluku	-0.356	-0.212	0.084
Total	-2.323	-4.604	-0.504
Average	-0.290	-0.658	-0.101

Source: EViews Data Processing Output, 2025

Among the control variables, RPOP has a significant effect at the 5% level in Models (1.1) and (1.2), with regression coefficients of –3.798 and –3.824, respectively. This implies that a 1% increase in RPOP is likely to reduce GAF by 3.80% and SAF by 3.82%. This finding appears contradictory to the SAF allocation mechanism, which is not population-based. However, it can be interpreted from the perspective of increased SAF needs due to population growth, especially in remote and archipelagic regions, to meet national priority programs—thus rendering the finding contextually relevant.

Furthermore, the variable PRIM is statistically significant at the 10% and 5% levels in Models (1.2) and (1.3), with regression coefficients of 1.102 and –1.146, respectively. Meanwhile, FCI has a significant effect only in Model (1.2), at the 10% level, with a coefficient of –0.067. These findings suggest that a 1% increase in the primary sector's share would increase SAF by 1.10% and reduce RSF by 1.15%. Similarly, a 1% increase in FCI would decrease SAF by 0.07%.

Disparities in fiscal transfers between archipelagic and non-archipelagic provincial groups are indicated by the cross-section effect (CS-Effect) values (Tables 3 and 4). The CS-Effect values for all archipelagic provinces in model (1.1) are negative both partially and in total (Table 3), indicating a reduction in GAF disparities, with the largest decreases in East Nusa Tenggara and Maluku provinces at -0.485% and -0.402%, respectively. The smallest decline occurred in Riau Islands at -0.139%. The total reduction amounted to -2.323%, averaging -0.290% per year. These results are confirmed by the significant influence of the DUM18 variable in model (1.1), indicating that the GAF formula reform policy in 2018 effectively reduced GAF disparities in archipelagic provinces.

A different pattern was observed in the non-archipelagic provinces. The CS-Effect values in Model (1.1) were positive for 9 provinces, while the remaining 15 provinces had negative values (Table 4). The largest positive CS-Effect values were found in West Java, East Java, and Central Java, indicating an increase in GAF disparities. Conversely, the largest decreases in disparities were found in Aceh and Gorontalo provinces. The total reduction in GAF disparities amounted to -3.657%, averaging -0.244% per year. Fiscal transfer equalization in the group of non-archipelagic provinces was thus greater than that in the archipelagic provinces. This finding is also confirmed by the lack of significant effect of the DUM18 variable on GAF. Likewise, the disparity effect of GAF between the two provincial groups was not significant, as indicated by the insignificance of the constant term in Model (1.1).

Table 4. Cross-Section Effect of Model (1) in Non-Archipelagic Provinces

Province	Model			Province	Model		
	(1.1)	(1.2)	(1.3)		(1.1)	(1.2)	(1.3)
Aceh	-0.374	-0.621	-0.077	Banten	0.072	0.303	-0.063
North Sumatra	0.403	0.880	0.010	Bali	-0.235	-0.441	-0.258

West Sumatra	-0.062	0.083	-0.192	West Kalimantan	-0.223	-0.033	-0.065
Riau	0.017	-0.780	-0.010	Central Kalimantan	-0.067	-0.253	-0.119
Jambi	-0.142	-0.548	-0.009	South Kalimantan	-0.260	-0.289	0.215
South Sumatra	0.041	0.093	0.270	East Kalimantan	-0.301	-2.095	-0.169
Bengkulu	-0.312	-0.259	-0.056	Central Sulawesi	-0.157	-0.376	-0.158
Lampung	0.069	0.615	-0.068	South Sulawesi	0.105	0.358	-0.152
West Java	2.157	4.717	0.774	Gorontalo	-0.368	-0.455	-0.250
Central Java	1.406	3.273	0.412	West Sulawesi	-0.323	-0.085	-0.271
Yogyakarta	-0.246	-0.069	-0.201	West Papua	-0.333	-1.627	-0.181
East Java	1.712	3.410	0.568	Papua	-0.252	-1.429	0.095
Total	(1.1) = -3.657; (1.2) = -9.361; (1.3) = -2.299						
Average	(1.1) = -0.244; (1.2) = -0.624; (1.3) = -0.135						

Source: EViews Data Processing Output, 2025

The CS-Effect values in Model (1.2) for archipelagic provinces indicate that West Nusa Tenggara is the only province with a positive value, at 0.234. The other seven provinces show negative values. This suggests that the effect of increasing SAF disparities occurred only in West Nusa Tenggara. In contrast, Model (1.3) reveals that disparity increases were observed in both West Nusa Tenggara and East Nusa Tenggara. The total CS-Effect for Models (1.2) and (1.3) was -4.604% and -0.504%, respectively, with an annual average of -0.658% and -0.101%.

In comparison, for non-archipelagic provinces, positive CS-Effect values were found in only 7 provinces, while the remaining 17 provinces had negative values. This implies that the increase in SAF disparities was limited to these 7 provinces. Jabar, Jatim, and Jateng were the three provinces that dominated per capita SAF disparities. Conversely, the largest reductions in SAF disparities occurred in East Kalimantan, West Papua, and Papua. A similar pattern was also observed in the case of RSF, where disparity reductions were most prominent in West Sulawesi, Bali, and Gorontalo. The total reduction in SAF disparities reached -9.361%, or an average of -0.624% per year, while the total reduction for RSF was -2.299%, with an annual average of -0.135%.

Model (2) Testing and Estimation Results

The results of the Chow test, the LM test, and the Hausman test for the regional inequality model indicate that the FEM is the most appropriate specification for all three research models (Table 5). Furthermore, all models successfully passed the classical assumption tests (Table 6). Beginning with the multicollinearity test, the VIF values were found to be below the threshold of 10, indicating the absence of multicollinearity. Autocorrelation was tested using the Cochrane-Orcutt (C-O) method, and the resulting DW statistic was significant at the 0.05 level based on the DW table, thus confirming the absence of autocorrelation.

In addition, the results of the Glejser test indicate that all three models are free from heteroskedasticity, as none of the regression coefficients were statistically significant when tested against the absolute residuals of each model. Regarding the goodness-of-fit test, the Adj.R^2 values suggest that the independent variables collectively provide a convincing explanation for the variation in the dependent variable. Moreover, the F-statistics for all models were statistically significant, indicating that the independent variables, as a group, exert a significant influence on the dependent variable.

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Table 5. Results of the Chow, LM, and Hausman Tests for Model (2)

Model	Chow-test		Result	LM-test		Result	Hausman-test		Result
	Chi-Sq.Stat	Prob		B-P (Both)	Prob		Chi-Sq.Stat	Prob	
(2.1)	677.016	0.000		1119.415	0.000		14.6801	0.023	
(2.2)	704.647	0.000	FEM	1222.407	0.000	REM	13.0372	0.042	FEM
(2.3)	700.930	0.000		1221.649	0.000		10.5003	0.062**	

Note: **) 10%l

Source: EViews Data Processing Output, 2025

The regression results for $GAFR_{it}$, $SAFR_{it}$, and $RSFR_{it}$ in all three models were estimated separately. This approach was adopted to assess their partial effects and to avoid potential multicollinearity. The five core variables were found to have a statistically significant negative effect across all models. Specifically, a 1% increase in $GAFR_{it}$, $SAFR_{it}$, and $RSFR_{it}$ is estimated to reduce $INEQ_{it}$ by approximately 0.086%, 0.001%, and 0.010%, respectively. Additionally, a 1% increase in $ROIR_{it}$ is expected to reduce $INEQ_{it}$ by approximately 0.113% and 0.002%, respectively, depending on the model specification.

The dummy variable DUM18 reflects the reformulation of the GAF policy in 2018, which was associated with a reduction in interprovincial per capita income inequality of approximately 0.02%. This effect is consistent with the intended outcomes of the 2018 GAF formula adjustment, although its impact on SAF and RSF is more indirect.

Table 6. FEM Regression Results for Model (2)

Variable	FEM								
	(2.1)			(2.2)			(2.3)		
	Coeff.	t-Stat	Prob.	Coeff.	t-Stat	Prob.	Coeff.	t-Stat	Prob.
C	-0.271	-0.821	0.412	-0.279	-0.811	0.418	-0.289	-0.854	0.394
$GAFR_{it}$	-0.086	-2.618*	0.009						
$SAFR_{it}$				-0.001	-1.733**	0.074			
$RSFR_{it}$							-0.010	-1.811**	0.051
OSR_{it}	-0.113	-1.652**	0.099	-0.002	-1.637**	0.090	-0.002	-1.643**	0.095
DUM18	-0.016	-1.961**	0.051	-0.016	-1.961**	0.051	-0.015	-1.906**	0.058
$Log(GDRP_{it})$	-0.288	-1.734**	0.056	-0.266	-1.812**	0.059	-0.277	-1.743**	0.050
$Log(FDI_{it})$	-0.014	-1.767**	0.063	-0.013	-1.732**	0.060	-0.013	-1.750**	0.052
$Log(MANU_{it})$	-0.931	-0.883	0.378	-1.110	-1.040	0.299	-1.077	-1.011	0.313
Adj.R^2		0.610			0.618			0.602	
F-stat.		14.471*			14.943*			14.056*	
Prob(F-stat)		0.000			0.000			0.000	
VIF-test		No			No			No	
DW.stat		1.967*			1.963*			1.988*	
Glejser-test		No			No			No	
Obs		320			320			320	

Note: Dependent Variable, $INEQ_{it}$; *) 5%; **) 10%.

Source: EViews Data Processing Output, 2025

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Table 7. Cross-Sectional Effects of Model (2) in Archipelagic Provinces

Province	Model		
	(2.1)	(2.2)	(2.3)
Bangka Belitung Islands	-0.135	-0.146	-0.141
Riau Islands	-0.072	-0.068	-0.067
West Nusa Tenggara	0.132	0.134	0.131
EAST NUSA TENGGARA	0.220	0.238	0.228
North Sulawesi	0.001	-0.005	-0.005
Southeast Sulawesi	-0.038	-0.040	-0.040
Maluku	0.039	0.032	0.030
North Maluku	-0.051	-0.052	-0.050
Total	-0.296	-0.312	-0.303
Average	-0.074	-0.062	-0.061

Source: EViews Data Processing Output, 2025

The estimation results for the control variables show that only $MANU_{it}$ does not have a statistically significant effect on $INEQ_{it}$. In contrast, both $GRDP_{it}$ and FDI_{it} have significant negative effects across all three models. A 1% increase in $GRDP_{it}$ is estimated to reduce $INEQ_{it}$ by approximately 0.3%, while a similar increase in FDI_{it} is expected to reduce $INEQ_{it}$ by about 0.01%.

The partial inequality effects across the two provincial groups are reflected in the coefficients of the CS-Effect presented in Tables 7 and 8. Model (2.1) indicates a positive CS-Effect for four archipelagic provinces—West Nusa Tenggara, East Nusa Tenggara, North Sulawesi, and Maluku—suggesting an increase in regional income inequality. Conversely, four other archipelagic provinces exhibit negative coefficients, indicating a trend toward greater income equalization.

Table 8. Cross-Sectional Effects of Model (2) in Non-Archipelagic Provinces

Province	Model			Province	Model		
	(2.1)	(2.2)	(2.3)		(2.1)	(2.2)	(2.3)
Aceh	-0.033	-0.024	-0.023	Banten	0.024	0.027	0.028
North Sumatra	0.019	0.013	0.012	Bali	-0.103	-0.112	-0.109
West Sumatra	-0.069	-0.084	-0.081	West Kalimantan	-0.042	-0.049	-0.047
Riau	-0.126	-0.117	-0.114	Central Kalimantan	-0.126	-0.134	-0.129
Jambi	-0.023	-0.025	-0.024	South Kalimantan	-0.026	-0.021	-0.019
South Sumatra	0.068	0.077	0.075	East Kalimantan	-0.104	-0.085	-0.081
Bengkulu	-0.004	-0.014	-0.013	Sulteng	0.019	0.016	0.016
Lampung	-0.084	-0.094	-0.091	Sulsel	0.081	0.080	0.077
West Java	0.065	0.066	0.064	Gorontalo	-0.093	-0.100	-0.097
Central Java	0.070	0.066	0.064	West Sulawesi	-0.004	-0.010	-0.009
Yogyakarta	0.060	0.058	0.057	West Papua	0.079	0.101	0.097
East Java	0.169	0.173	0.168	Papua	0.088	0.100	0.096
Total	(2.1) = -0.835; (2.2) = -0.868; (2.3) = -0.838						

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Average	(2.1) = -0.064; (2.2) = -0.067; (2.3) = -0.064

Source: EViews Data Processing Output, 2025.

In comparison, among non-archipelagic provinces, 11 show positive CS-Effects, suggesting widening regional inequality, while the remaining 13 demonstrate negative values, implying a reduction in income disparities. The implementation of the GAF reformulation policy (DUM18), alongside other explanatory variables, contributed to a significant decline in intra-provincial inequality, both within non-archipelagic and archipelagic regions. Overall, the total and average CS-Effect values for both provincial groups are negative, indicating a general trend toward greater equity. However, the magnitude of income equalization appears to be more pronounced among non-archipelagic provinces.

Determinants of Fiscal Transfer Disparities between Archipelagic and Non-Archipelagic Provinces

The analysis reveals that real Gross Regional Domestic Product (GRDP) per capita significantly reduces disparities in the allocation of General Allocation Funds (GAF), Special Allocation Funds (SAF), and Revenue Sharing Funds (RSF) across provincial types. Conversely, higher per capita regional revenue tends to exacerbate disparities, indicating that wealthier provinces—typically endowed with greater fiscal autonomy—receive proportionally lower transfers. This finding aligns with recent studies suggesting that fiscal capacity is inversely related to reliance on central government transfers.

However, the distributional pattern varies by the type of transfer. Both SAF and RSF, which are linked to sector-specific needs and revenue-sharing mechanisms, exhibit a stronger redistributive response compared to the more formulaic GAF (Psycharis et al., 2021). This highlights a degree of sensitivity to regional characteristics, especially in archipelagic provinces that face higher administrative costs and infrastructural constraints. Empirical evidence from Pietrovito et al. (2023), Wang et al. (2024), and Hayakawa et al. (2020) further supports the notion that spatially aware allocations can play a pivotal role in narrowing interregional disparities.

Additionally, provinces with larger populations and a higher reliance on primary sectors tend to experience more pronounced disparities in SAF allocations. This may reflect the inability of current allocation formulas to sufficiently account for geographic and economic constraints specific to archipelagic regions. Although the 2018 reform that incorporated marine area weighting into the GAF formula increased transfer volumes to archipelagic provinces, the disparities actually widened. This paradox suggests that partial reforms may unintentionally amplify horizontal fiscal imbalances.

The Role of Fiscal Transfers in Mitigating Regional Income Inequality

This study finds that the ratio of GAF, SAF, and RSF to direct regional expenditure significantly reduces inter-provincial income disparities, with GAF exerting the strongest impact. These findings resonate with the works of Panao (2021); Siburian (2022), and Shao and Razzaq (2022), who emphasized that well-targeted fiscal transfers can enhance public service provision and foster social equity, especially when adjusted to local circumstances. However, in contrast to Akita et al. (2021), this study

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finds that RSF tends to increase income disparities, while SAF has no statistically significant effect on income inequality among Indonesian provinces.

Moreover, the ratio of own-source revenue (OSR) to total expenditure demonstrates a strong equalizing effect, underscoring the critical role of regional fiscal autonomy in shaping income distribution. These findings support Pietrovito et al. (2023), who argue that revenue decentralization—when accompanied by adequate institutional capacity—can effectively reduce disparities in both urban and rural contexts. Akita et al. (2021) similarly assert that while the impact of fiscal transfer disparity on regional inequality may be modest in the short term, it is imperative to develop a new transfer formula that incentivizes local governments—especially in geographically disadvantaged areas such as archipelagic regions—to enhance their own revenue-generating capacities. Such incentives could create a virtuous cycle if the additional revenues are reinvested in regional development, particularly in education and infrastructure sectors.

Nonetheless, the study also finds that the inequality-reducing effect is less evident in provinces with low industrial labor absorption, despite increasing investment levels. The weak significance of the manufacturing labor share in reducing disparities supports the Kuznets hypothesis, which posits that inequality tends to rise in the early stages of development and only declines later as structural transformation and sectoral diversification take place (Sima et al., 2023; Todaro and Smith, 2020).

Evaluating the Impact of the 2018 Marine-Area Reform in the GAF Formula

The implementation of a 100% marine-area weighting in the GAF allocation formula since 2018 has had a statistically significant but moderate effect in reducing regional income inequality. While the reform has increased fiscal allocations to marine-dominated regions, its effect remains weaker compared to the influence of GRDP and OSR ratios. This suggests that, although spatial equity principles have been partially integrated into the fiscal framework, their effectiveness remains constrained without concurrent adjustments to SAF and RSF mechanisms.

This finding is consistent with Akita et al. (2021), who recommend that the spatial weighting approach be extended beyond GAF to include all major transfer instruments. Similar insights are offered by Sugiyarto et al. (2025), who advocate for performance-based allocation models, especially for lagging provinces. A parallel lesson can be drawn from the Philippines (Tang et al., 2024), where spatially targeted transfers led to notable reductions in poverty and income inequality.

In summary, while the 2018 reform marked a progressive step toward incorporating geographic responsiveness into Indonesia's fiscal formulas, its partial implementation has not been sufficient to rectify entrenched systemic disparities between archipelagic and non-archipelagic provinces. Future fiscal transfer reforms in Indonesia must expand marine-based criteria across all transfer instruments and integrate performance indicators, equity metrics, and fiscal capacity considerations to promote more balanced and inclusive regional development.

CONCLUSION

This study finds that real GRDP per capita significantly reduces disparities and fiscal dependency in the allocation of General Allocation Funds (GAF), Special Allocation Funds (SAF), and Revenue Sharing Funds (RSF) between archipelagic and non-archipelagic provinces. Conversely, higher local government revenue per capita

exacerbates disparities across all three transfer types, suggesting that wealthier regions receive proportionally fewer transfers. Fiscal dependence and the GAF formula reform implemented in 2018 are also associated with increased inequality in GAF distribution. Demographic factors—particularly population size—play a mitigating role in GAF and RSF disparities, while the fiscal capacity index only affects SAF allocation. The proportion of employment in the primary sector significantly reduces disparities in SAF and RSF, indicating a more targeted distribution responsive to structural characteristics. Furthermore, the ratios of GAF, SAF, and RSF to total regional expenditures are found to significantly reduce per capita income inequality between the two provincial groups, as does the ratio of locally generated revenue (OSR). In contrast, the share of manufacturing employment shows no significant effect on income disparities, reflecting weak industrial absorption in some regions. Importantly, the 2018 policy introducing a 100% marine area weighting in the GAF allocation formula has made a statistically significant contribution to reducing interprovincial income inequality. However, while this reform marks a step toward spatial equity, its impact remains partial. Future fiscal transfer policies must consider extending marine-based criteria across all transfer schemes (GAF, SAF, RSF) and incorporate performance-based and equity-sensitive indicators to ensure a more balanced and inclusive fiscal framework for Indonesia's archipelagic context.

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