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Does Integrated Social Spending and *Zakat-Infaq-Sadaqah* Improve Welfare in Indonesia?

ABSTRACT - Human capital is widely acknowledged not only as a key driver of economic growth and poverty reduction but also as the ultimate objective of development, focused on expanding human freedoms. While government social spending is intended to achieve welfare objectives, it remains insufficient to fully finance public goods, necessitating alternative funding sources. Zakat, Infak, and Sedekah (ZIS) funds represent potential complementary resources, given their shared objective of promoting social welfare. This study aims to examine the role of integrated financing—social spending and ZIS—in enhancing human development in Indonesia. Using panel data from 34 provinces over the period of 2013–2022 and applying the System Generalized Method of Moments (Sys-GMM), the analysis evaluates both the independent and interactive effects of these funding sources. The findings reveal that social spending and ZIS individually exert a positive and significant effect on human development, while their integration produces a stronger and more substantial impact. These results highlight the importance of harmonizing Islamic social finance with state expenditures to accelerate human development outcomes. The study contributes to the literature as the first to apply a Sys-GMM approach in examining the interaction between social spending and ZIS, offering novel insights into the design of sustainable and inclusive development financing in Indonesia.

ABSTRAK - Apakah Integrasi Pengeluaran Sosial dan ZIS dapat Meningkatkan Kesejahteraan di Indonesia? *Sumber daya manusia diakui tidak hanya sebagai pendorong utama pertumbuhan ekonomi dan pengentasan kemiskinan, tetapi juga sebagai tujuan akhir pembangunan yang berfokus pada perluasan kebebasan manusia. Meskipun pengeluaran sosial pemerintah ditujukan untuk mencapai tujuan kesejahteraan, alokasi tersebut belum cukup untuk sepenuhnya membiayai kebutuhan publik, sehingga diperlukan sumber pendanaan alternatif. Dana Zakat, Infak, dan Sedekah (ZIS) dipandang sebagai sumber daya pelengkap karena memiliki tujuan yang sama dalam meningkatkan kesejahteraan masyarakat. Penelitian ini bertujuan mengkaji peran pendanaan terintegrasi—pengeluaran sosial dan dana ZIS—dalam meningkatkan pembangunan manusia di Indonesia. Dengan menggunakan data panel dari 34 provinsi selama periode 2013–2022 serta pendekatan System Generalized Method of Moments (Sys-GMM), analisis dilakukan untuk mengevaluasi pengaruh langsung maupun interaksi dari kedua sumber dana tersebut. Hasil penelitian menunjukkan bahwa pengeluaran sosial dan dana ZIS masing-masing berpengaruh positif dan signifikan terhadap pembangunan manusia, namun ketika digabungkan, pengaruhnya menjadi lebih kuat dan substansial. Temuan ini menegaskan pentingnya harmonisasi antara keuangan sosial Islam dan belanja negara untuk mempercepat pencapaian pembangunan manusia. Penelitian ini berkontribusi sebagai studi pertama yang menerapkan Sys-GMM dalam menganalisis interaksi antara pengeluaran sosial dan ZIS, sekaligus memberikan wawasan baru mengenai perancangan pembiayaan pembangunan berkelanjutan dan inklusif di Indonesia.*

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INTRODUCTION

Development is increasingly recognized as a multidimensional phenomenon that transcends mere economic growth (Castells-Quintana et al., 2019). Ul Haq (1995) emphasized the centrality of human beings in the production process, underscoring that the primary goal of economic development is the enhancement of human quality. Human capital not only drives economic growth and poverty reduction but also contributes to broader dimensions of freedom and well-being (Sen, 1999). Similarly, Solow highlighted the indispensable role of human labor and agency in economic activities, noting that natural resources attain value only through human processing and utilization to transform inputs into outputs (Onabote et al., 2023). Thus, strengthening human capabilities is essential for sustainable development and the advancement of individual welfare.

Kranenburg introduced the concept of the welfare state, asserting that governments must actively promote citizen well-being while ensuring justice and equity across society (Azhary, 1986). In the same vein, Spicker (2023) emphasized the state's responsibility in allocating public resources to secure basic needs and foster prosperity. Despite these commitments, inequality remains a critical challenge in the 21st century, driven by poverty, limited access to opportunities, and entrenched social hierarchies. Consequently, government intervention is vital for stability and human development (Ananta et al., 2023).

As part of such intervention, social expenditure represents a major component of national budgets, financing development programs and supporting inclusive growth. Empirical studies have consistently shown that social spending can significantly enhance human development (Agrawal, 2015; Baldacci et al., 2008; Haile & Niño-Zarazúa, 2018; Miranda-Lescano et al., 2023, 2024; Onabote et al., 2023; Ranjan & Panda, 2022; Ruzima & Veerachamy, 2023; Sijabat, 2022; Sulistyowati et al., 2017; Ananta et al., 2023). However, the high financial burden of social protection programs necessitates exploring alternative funding sources. Durán-Valverde et al. (2020) estimated a global funding gap of USD 191.6 billion for full implementation, echoing Miranda-Lescano et al.'s (2024) call for alternative financing mechanisms, including charitable contributions and donor-funded initiatives, which are often underutilized in conventional fiscal planning.

Within this context, zakat which is an obligatory form of almsgiving in Islam, emerges as a potential complementary source of public funding. Although distinct in its religious and legal foundations, zakat shares with social spending the objective of poverty alleviation and well-being enhancement (Ibrahim, 2011), as stipulated in Act No. 23 of 2011. Several studies have documented the positive effects of zakat, infaq, and sadaqah (ZIS) on human development (Akmal et al., 2020; Karuni, 2020; Nurzaman, 2017; Qudah et al., 2022; Rusanti et al., 2023; Suprayitno et al., 2017). Moreover, the integration of zakat into national legal frameworks provides opportunities for its recognition as a fiscal instrument (Kementerian Keuangan [Kemenkeu], 2012).

Despite growing evidence on the effectiveness of social spending and ZIS, studies examining their interaction remain scarce. For example, Ananta et al. (2023) demonstrated that corruption weakens the impact of public spending on human development, while Widodo (2019) found that

integrating commercial Islamic finance with zakat-based social finance significantly reduces inequality. His findings suggest that the synergy between commercial and social financial mechanisms—particularly via Islamic microfinance and banking—enhances their redistributive effectiveness.

The potential integration of social expenditure with zakat thus offers a promising pathway for strengthening social protection systems. Given the fiscal limitations of conventional social protection budgets, leveraging zakat can support economic redistribution and promote social justice. Zakat, far from being merely charitable giving, functions as an instrument of socioeconomic equity through wealth redistribution (Ruhana, 2019). Accordingly, this study explores the potential synergy between social expenditure and zakat, along with their implications for human development.

LITERATURE REVIEW

Human Development as a Measure of Welfare

Human development represents a central objective in the pursuit of overall well-being. Drawing on Solow's theory of economic growth, economic expansion is driven by the interaction of key production factors—primarily labor and capital—augmented by technological advancements that increase output. Within the neoclassical framework, sustained economic growth requires either sufficient population growth to offset diminishing returns to capital accumulation or continuous technological progress to raise the marginal productivity of capital. A balanced growth equilibrium is achieved when a country maintains a stable capital stock without depreciation, while population growth remains at or below the growth rate of capital and output (Ibrahim, 2018).

In relation to human development, Sen (1999) established the theoretical foundation of the Human Development Index (HDI), arguing that individuals seek to maximize achievements in three core capabilities essential for effective functioning within society. These capabilities are assessed through three dimensions: (a) life expectancy at birth, (b) adult literacy rates alongside school enrollment at the primary, secondary, and tertiary levels, and (c) income measured by gross domestic product (GDP) adjusted for purchasing power parity (PPP). Each dimension is assigned equal weight, with a one-third contribution to the overall index. A higher HDI score, therefore, reflects improved societal well-being. Sen (1999) also underscored the significance of per capita GDP, considering it both an intrinsic component of material welfare and a capability necessary for achieving broader dimensions of well-being.

Since its adoption, the HDI has been widely recognized as a global benchmark by the United Nations Development Programme (UNDP, 1990). Developed by Amartya Sen and Mahbub Ul Haq, the HDI evaluates national progress through three dimensions: longevity and health, knowledge, and a decent standard of living. By integrating indicators related to health, education, and income, the HDI offers a holistic perspective on development that transcends economic growth alone. This framework provides policymakers with critical insights to design inclusive and sustainable strategies aimed at improving the quality of life and promoting long-term prosperity.

Integration of Social Spending and ZIS *(Zakat, Infak, and Sedekah)* Funds

In the Keynesian tradition, government expenditure is considered a central instrument for economic stabilization. During recessions, increased public spending is recommended to stimulate aggregate demand and reduce unemployment, whereas in periods of inflationary pressure, fiscal contraction is advised. Wagner's Law further posits that government activity naturally expands as an economy develops, evidenced by the growing proportion of public expenditure relative to GDP. While this perspective suggests that high-income countries typically allocate a larger share of their GDP to government spending, Onabote et al. (2023) challenged the notion that public expenditure inevitably increases with rising per capita income, emphasizing instead the role of political dynamics that influence fiscal decisions. They argue that sustainable fiscal policy requires governments to balance expenditure growth with taxpayer concerns, ensuring fiscal strategies align with societal needs.

Musgrave and Musgrave (1989) defined public expenditure as government-directed spending designed to maintain economic stability, promote equity, and provide public goods that enhance societal welfare. Public spending influences fiscal policy directly, shaping growth trajectories, income distribution, and social protection systems. For fiscal policies to be effective, they must prioritize growth-oriented and pro-poor approaches. According to the International Monetary Fund (IMF, 2019), social spending encompasses expenditures on social protection, education, and healthcare, all of which generate significant benefits, particularly for low-income groups (Awalurramadhana et al., 2024). Such spending proved especially critical during the COVID-19 pandemic, when it played a central role in shielding vulnerable populations. Because lower-income groups rely disproportionately on public services compared to wealthier individuals, social spending is vital for promoting inclusive development (Agrawal, 2015).

Given increasing demands on public resources, alternative financing mechanisms must be explored. Traditional public budgets can be complemented with philanthropic contributions or foreign aid–funded initiatives, which are often underutilized (Miranda-Lescano et al., 2024). Indonesia, consistently ranked as the world's most generous nation according to the World Giving Index, offers a striking example. With an estimated zakat potential of IDR 327 trillion (Badan Amil Zakat Nasional [BAZNAS], 2022), the country's culture of generosity highlights the significant opportunity for zakat to supplement social welfare financing (Pranata et al., 2022). Law No. 23 of 2011 formally institutionalized zakat contributions, integrating them into the national legal framework and enabling their recognition as fiscal instruments (Kementerian Keuangan [Kemenkeu], 2012).

The concept of *zakat, infak,* and *sedekah* (ZIS) resonates with broader trends in resource-sharing economies. The sharing economy model, developed by Swiercz and Smith at the University of Georgia, advocates for collective utilization of resources to mitigate economic shocks. Beik (2009) similarly emphasized the importance of sharing in sustaining prosperity, highlighting the positive link between philanthropy and economic welfare. Within the Islamic economic framework, zakat is particularly significant. Chapra (1992) described zakat as a foundational instrument for promoting economic well-being, social cohesion, and equitable income distribution, while Shirazi (2006) underscored its role as an effective poverty alleviation mechanism comparable to social security systems. Consequently, integrating zakat into social

protection strategies presents a viable pathway for addressing fiscal limitations and fostering socio-economic justice through wealth redistribution (Ruhana, 2019).

Previous Studies

Numerous studies have explored the impact of social spending on enhancing human development quality. Scholars consistently agree that social spending positively influences human development and recommend that governments increase social spending while improving overall living standards by creating employment opportunities (Miranda-Lescano et al. (2024); Ananta et al. (2023); Onabote et al. (2023); Haile & Niño-Zarazúa (2018); Agrawal (2015); Baldacci et al. (2008)). However, contrasting findings by Villela & Paredes (2022) and Ranjan & Panda (2022) suggest that development spending has no significant impact on human development.

Parallel lines of research focus on the influence of ZIS funds on human development. Empirical evidence suggests that ZIS has a positive effect on poverty reduction and welfare enhancement (Akmal et al., 2020; Karuni, 2020; Nurzaman, 2017; Qudah et al., 2022; Rusanti et al., 2023; Suprayitno et al., 2017). For instance, Nurzaman (2017) found that households receiving productive-based zakat experienced significant improvements in HDI indicators compared to baseline conditions, with panel data analyses confirming the positive correlation between zakat and human development. These findings underscore the critical role of zakat—particularly in productive forms—in improving household welfare.

Despite this evidence, research examining the interaction between social spending and ZIS remains limited. Ananta et al. (2023) investigated the relationship between corruption, public spending, and human development, finding that high levels of corruption significantly reduce the effectiveness of public expenditure. Similarly, Banik et al. (2023) explored the role of governance in moderating the relationship between healthcare spending and human development. Their results indicate that while healthcare spending alone does not guarantee improved outcomes, its interaction with governance quality has varying effects: negative and insignificant in low-income countries, negative and significant in sub-Saharan Africa, but positive (though insignificant) in South Asia. Widodo (2019) contributed further by examining the integration of commercial finance, represented by Islamic banking, with social finance, represented by zakat. His findings reveal that such integration substantially reduces income inequality, with combined financial mechanisms—particularly through Islamic microfinance and banking—proving more effective in addressing inequality than when operating independently.

METHODOLOGY

Theoretical Framework

This study adopts the Cobb–Douglas production function model, as developed by neoclassical theorists led by Solow, and extends the approach of Onabote et al. (2023), who analyzed the impact of public spending on human development. The baseline production function is expressed as:

$$Y = AK^{\alpha}L^{\beta} \quad (1)$$

where Y represents total output, Kdenotes capital input, and Lrefers to labor input. Acaptures total factor productivity (TFP), while $\alpha$and βrepresent the output elasticities of capital and labor, respectively. TFP (A) is particularly significant, as it reflects the efficiency with which inputs are transformed into outputs. By simplifying the model and omitting $K$and L, A can be expressed as a function of other explanatory variables:

$$Y = f(\delta) \quad (2)$$

where δ is a vector of explanatory variables that incorporates sectoral determinants relevant to this study.

Empirical Model Specifications

Economic development is proxied by the Human Development Index (HDI) and specified as a function of sectoral public expenditure and control variables:

$$HDI_{it} = f(PS_{it}, Z_{it}) \quad (3)$$

where HDI is the human development index, PSrepresents public spending (social spending and *zakat*, *infaq*, and *sedekah* [ZIS]), and Z is a vector of control variables. Following prior studies, the control variables include investment (Castells-Quintana et al., 2019), urbanization (Castells-Quintana et al., 2019; Miranda-Lescano et al., 2023, 2024), and democracy (Haile & Niño-Zarazúa, 2018; Miranda-Lescano et al., 2023, 2024). To examine the moderating role of ZIS in the relationship between social spending and human development, the following dynamic regression model is specified:

$$HDI_{it} = \alpha + \beta_1 HDI_{i,t-1} + \beta_2 SS_{it} + \beta_3 ZIS_{it} + + \beta_4 SP * ZIS_{it} + \beta_5 INV_{it} + \beta_6 URBAN_{it} + \beta_7 IDI_{it} + \epsilon_{it} \quad (4)$$

where SS denotes social spending, ZIS represents *zakat, infaq,* and *sedekah*, INV is investment, $URBAN$ is urbanization, and IDI is the democracy index. The lagged dependent variable $HDI_{i,t-1}$ captures persistence in human development. The moderating role of ZIS can be expressed as:

$$\frac{HD_{i,t}}{SS} = \beta_2 + \beta_3 ZIS_{it} \quad (5)$$

Here, β_2 and β_3 measure the extent to which ZIS strengthens or weakens the relationship between social spending and human development. Recognizing potential endogeneity in these relationships—arising from reverse causality, omitted variable bias, or unobserved heterogeneity—this study follows Baltagi (2005) and related works (Ananta et al., 2023; Banik et al., 2023) in applying robust econometric techniques.

Data Sources and Variable Justification

This study explores the influence of social spending and *Zakat, Infaq,* and *Sedekah* (ZIS) on human development across 34 Indonesian provinces from 2013 to 2022, utilizing the most recent data available as of 2023. The primary dependent variable is the Human Development Index (HDI), sourced from the Central Bureau of Statistics (BPS). Defined by the United Nations Development Programme (UNDP, 1990), HDI is a composite indicator encompassing life expectancy, education, and standard of living. Social spending, expressed as a percentage of GDP, is obtained from the Ministry of Finance. In accordance with Law No. 19 of 2023 and definitions provided by IMF (2019), Haile and Niño-Zarazúa (2018), and Miranda-Lescano et al. (2024), social spending includes expenditures on education, healthcare, social protection, environmental protection, housing, public facilities, and economic development. These categories closely mirror the functional distribution of ZIS funds, as discussed by Çelikay (2023) and Baldacci et al. (2008).

ZIS data are collected from the National Zakat Board (BAZNAS) and measured as the annual growth rate (%) of ZIS funds. Previous studies (Akmal et al., 2020; Karuni, 2020; Nurzaman, 2017; Rusanti et al., 2023; Suprayitno et al., 2017; Wardani & Al Arif, 2020) suggest that ZIS positively contributes to human development. Investment, proxied by gross fixed capital formation and expressed as a percentage of GDP, represents capital accumulation's role in enhancing household opportunities and welfare, as noted by Castells-Quintana et al. (2019). Urbanization, measured as the percentage of the population residing in urban areas and sourced from BPS, reflects access to infrastructure and services, with prior research highlighting its positive impact on human development (Castells-Quintana et al., 2019; Miranda-Lescano et al., 2023). Lastly, democracy is captured through the Indonesia Democracy Index (IDI), also provided by BPS, which assesses civil liberties, political rights, and institutional performance. A higher IDI score indicates stronger democratic governance, consistent with findings by Haile and Niño-Zarazúa (2018).

Estimation Strategy

To ensure robustness, both static and dynamic models are employed. The static models include the Common Effects Model, Fixed Effects Model (FEM), Random Effects Model (REM), and FEM-Robust. However, static estimators may fail to address endogeneity, leading to biased results. Endogeneity can arise from measurement errors, omitted variables, or reverse causality (Baltagi, 2005).

To mitigate these issues, this study employs the Generalized Method of Moments (GMM) estimator. As noted by Arellano and Bond (1991), GMM addresses endogeneity, serial correlation, and heterogeneity. Specifically, the system GMM approach is adopted, as it reduces small-sample bias associated with weak instruments and improves estimation efficiency. Robustness is further validated through several diagnostic tests. The Sargan test is applied to confirm instrument validity, while Pooled Least Squares (PLS) and Fixed Effects (FE) estimators are compared to ensure estimator consistency. The Arellano–Bond test is additionally employed to check for autocorrelation. All analyses are conducted using STATA version 14.1.

RESULTS AND DISCUSSION

Descriptive Statistics

Before estimating the empirical models, we examined descriptive statistics to summarize the distributional properties of all variables (Table 1). The sample comprises 340 province–year observations. Mean HDI is 69.88 (SD = 4.25), with values ranging from 56.30 to 81.70. Average social spending (as a share of GRDP) is 11.56% (SD = 6.90), while ZIS growth averages 0.82% year-on-year (SD = 0.40). Investment averages 32.60% of GRDP (SD = 8.16). Urbanization averages 47.02% (SD = 18.10). The democracy index (IDI) averages 72.90 (SD = 8.64), with substantial dispersion (minimum = 0; maximum = 89.21).

Table 1. Descriptive statistics of variables

Variable	Definition	Obs	Mean	S.D	Min	Max	Skewness	Kurtosis
HDI	Human Development (index 0-100)	340	69.88	4.25	56.3	81.7	-0.011	4.014
SS	Social Spending (% total GDP)	340	11.56	6.90	0.94	35.6	1.11	3.95
ZIS	Zakat, Infak, and Sedekah (% y.t.y)	340	0.82	0.40	0.41	2.39	1.712	5.929
INVEST	Gross Fixed Capital Formation (% total GDP)	340	32.60	8.16	16.4	74.5	0.998	5.055
URBAN	population living in urban areas (% total pop)	340	47.02	18.1	20.7	100	0.945	3.405
IDI	Democracy level (index 0-100)	340	72.90	8.64	0	89.21	-3.65	30.96

(Source: Authors' Computations, 2024)

Overall, standard deviations are modest relative to the means for most variables, suggesting moderate within-panel variation and limited prevalence of extreme outliers. Skewness indicates mild asymmetry for several series (e.g., positive for SS, ZIS, INVEST, URBAN; slightly negative for HDI), while IDI shows pronounced negative skew (−3.65). Kurtosis exceeds 3 for most variables (e.g., ZIS = 5.93; INVEST = 5.06; IDI = 30.96), implying leptokurtic (fat-tailed) distributions rather than normality. These features justify the use of heteroskedasticity-robust inference in the panel regressions.

Correlation Analysis

Pearson correlations (Table 2) show that all predictors are positively associated with HDI. Pairwise correlations among regressors are generally below conventional multicollinearity thresholds.

Table 2. Correlation Matrix

Variable	HDI	SS	ZIS	INVEST	URBAN	IDI
HDI	1.0000					
SS	0.2351	1.0000				
ZIS	0.5941	0.5143	1.0000			
INVEST	0.1408	0.2148	0.1444	1.0000		
URBAN	0.4118	0.6334	0.6220	0.1906	1.0000	

Variable	HDI	SS	ZIS	INVEST	URBAN	IDI
IDI	0.1556	0.1483	0.1794	0.1769	0.0891	1.0000

(Source: Authors' Computations, 2024)

Notably, SS correlates moderately with URBAN (0.63) and ZIS (0.51), and ZIS correlates with URBAN (0.62). While these magnitudes warrant attention, they remain well below levels typically associated with severe multicollinearity; variance-inflation diagnostics in the panel models further support model adequacy.

Static Panel Estimates

We first estimated static specifications using Pooled Least Squares (PLS), Random Effects (REM), and Fixed Effects (FEM), alongside FEM with robust standard errors (Table 3). Across specifications, social spending (SS), ZIS, INVEST, and IDI display positive and statistically significant associations with HDI, broadly consistent with theory and prior evidence (Agrawal, 2015; Ananta et al., 2023; Baldacci et al., 2008; Haile & Niño-Zarazúa, 2018; Miranda-Lescano et al., 2024; Onabote et al., 2023). When the interaction term $SS \times ZIS$is included (Model 2), it is positive and significant across estimators, indicating that the marginal effect of SS on HDI increases with ZIS. Classical assumption checks (autocorrelation, heteroskedasticity, and multicollinearity) favor FEM with robust errors as the preferred static specification. Because human development is likely persistent and policy variables may be endogenous, static estimates can be biased. This motivates a dynamic panel approach.

Table 3. Panel Static Result

Variables	Model 1. Without Interaction				Model 2. With Interaction			
	PLS	FEM	REM	FEM Robust	PLS	FEM	REM	FEM Robust
SS	0.0446**	0.024***	0.0443***	0.0240***	0.0253	0.0501***	0.0840***	0.0501***
	(1.86)	(3.13)	(5.06)	(3.13)	(0.65)	(3.60)	(6.03)	(3.70)
ZIS	0.0004**	0.0004***	0.0006***	0.0004***	0.0206***	0.0238***	0.0309***	0.0238***
	(1.92)	(5.54)	(7.11)	(5.54)	(9.33)	(7.41)	(10.59)	(3.13)
Interaction SS * ZIS					0.0598***	0.0239***	0.0346***	0.0239***
					(2.66)	(3.95)	(5.48)	(3.53)
INVEST	0.0216***	0.0439***	0.0505***	0.0439***	-0.0328**	0.0952***	0.0865***	0.0952***
	(7.95)	(10.69)	(11.98)	(10.69)	(-2.11)	(4.01)	(3.79)	(2.56)
URBAN	-0.01003	0.6422***	0.0704***	0.6422***	-0.0199	0.3691***	-0.0823***	0.3691***
	(-0.77)	(11.30)	(2.9)	(11.30)	(-1.20)	(4.79)	(-3.06)	(2.49)
IDI	0.0009***	0.0005***	0.0007***	0.0005***	0.2458***	0.0994***	0.1231***	0.0994***
	(2.81)	(5.16)	(7.26)	(5.16)	(2.76)	(3.95)	(4.62)	(3.22)
Constant	3.431***	2.33***	2.476***	2.330***	3.274***	3.029***	3.076***	3.029***
	(39.96)	(19.59)	(19.37)	(19.59)	(24.97)	(41.40)	(41.17)	(19.09)
Observation	340	340	340	340	340	340	340	340
F-Test	23.79***	206.26***	653.64***	206.26***	21.90***	144.05***	710.98***	53.84***
R-Squared	0.26	0.774	0.697	0.774	0.28	0.742	0.708	0.742

*Note: *, ** as well as *** shows 10%, 5% as well as 1% level of significance respectively*

(Source: Authors' computations, 2024)

Dynamic Panel Estimates (Two-Step System GMM)

To address persistence, unobserved heterogeneity, and endogeneity, we estimate a two-step system GMM model with robust (Windmeijer-corrected) standard errors (Table 4), following

best practice in the literature (Ananta et al., 2023; Banik et al., 2023). The lagged dependent variable is positive and highly significant, confirming strong persistence in HDI.

Table 4. Estimation Result from Two-step system GMM

Variables	Model 1. Without Interaction	Model 2. With Interaction
Lag HDI	0.974*** (89.37)	0.5971*** (10.33)
SS	0.0029*** (3.49)	0.004*** (2.88)
ZIS	0.0011*** (2.23)	0.00008*** (2.58)
Interaction SS * ZIS		0.00915*** (3.02)
INVEST	-0.0011 (-0.84)	0.196** (1.85)
URBAN	-0.0016 (-1.35)	0.094** (1.82)
IDI	0.00091*** (9.69)	0.00018*** (1.85)
Constant	4.98*** (32.27)	0.4040 (1.04)
Observation	340	340
AB Test for AR1	-3.95***	-2.77***
AB Test for AR2	-1.52	-0.81
Sargan (Prob > χ2)	136.04***	154.40***
Hansen (Prob > χ2)	32.98	29.32

Note: *, ** as well as *** shows 10%, 5% as well as 1% level of significance respectively
(Source: Authors' Computations, 2024)

Specification tests

Arellano–Bond tests indicate the expected first-order serial correlation in differenced residuals (AR(1) < 0, p < .01) and no evidence of second-order correlation (AR(2) n.s.), supporting moment conditions. The Sargan statistic rejects overidentifying restrictions—common with heteroskedasticity and many instruments—whereas the Hansen test does not reject, suggesting overall instrument validity under robust estimation. We rely on the Hansen result for inference in the two-step robust context.

Direct effects

In Model 1 (without interaction), SS and ZIS are both positive and significant at the 1% level, indicating that higher social spending and stronger ZIS growth are associated with higher HDI (Ananta et al., 2023; Banik et al., 2023; Haile & Niño-Zarazúa, 2018). In Model 2 (with interaction), SS remains positive and significant; ZIS is positive and significant; and the interaction $SS \times ZIS$is also positive and significant. Substantively, this implies complementarity: social spending is more effective where ZIS activity is stronger.

Marginal (moderated) effect

The marginal effect of social spending on HDI is:

$$\frac{\partial HDI_{it}}{\partial SS_{it}} = \beta_{SS} + \beta_{SS\times ZIS} \cdot ZIS_{it}.$$

Using the Model 2 point estimates (Table 4) and the sample mean of $ZIS = 0.82$(Table 1), the implied effect is

$$0.004 + 0.00915 \times 0.82 \approx 0.0115.$$

Thus, at the average level of ZIS, a one-percentage-point increase in social spending (as a share of GRDP) is associated with roughly 0.012 HDI index points (on the 0–100 scale). This combined effect is meaningfully larger than the direct effect of SS alone.

Discussion

Social Spending and Human Development

The positive impact of social spending on HDI is consistent with both the static and dynamic estimates and aligns with prior evidence that targeted public outlays raise living standards and expand opportunities (Ananta et al., 2023; Banik et al., 2023; Haile & Niño-Zarazúa, 2018). Over the last decade, Indonesia's social spending grew rapidly (average annual growth ≈ 53.10%), though the average level remains modest at 11.57% of GRDP. Provincial case studies corroborate the mechanism: in East Java, education subsidies for low-income households improved human capital outcomes (Sari, 2023), and education expenditures more broadly are associated with quality gains (Maharda & Aulia, 2020; Sijabat, 2022). Still, health spending inefficiencies can mute impacts on HDI, underscoring the importance of spending quality alongside quantity. Similar timing and governance frictions are documented elsewhere: in Nigeria, social spending effects materialize with lags and are dampened by corruption (Onabote et al., 2023), a result consistent with cross-country evidence on governance constraints (Ananta et al., 2023; Banik et al., 2023).

ZIS, Complementarity, and Institutional Channels

ZIS (*zakat, infaq,* and *sedekah*) is positively associated with HDI, consistent with micro- and meso-level findings that ZIS improves household welfare and human capital (Karuni, 2020; Qudah et al., 2022; Rusanti et al., 2023). Indonesia's institutional framework—zakat managed by BAZNAS under Act No. 23/2011—supports scaling: potential zakat is estimated at IDR 327 trillion (BAZNAS, 2022), and collections have risen steadily with professionalization of zakat bodies. The positive and significant interaction $SS \times ZIS$indicates that public spending and ZIS are complements, not substitutes: when deployed together, they produce larger gains in HDI than either instrument alone.

This complementarity is policy-relevant where governance frictions attenuate public spending efficacy (Banik et al., 2023). Zakat institutions in Indonesia increasingly adopt Good Amil Governance and Zakat Core Principles, which may strengthen targeting, monitoring, and community trust—features that can amplify the local effectiveness of government programs. Conceptually, ZIS and social spending share an objective—poverty reduction and welfare

enhancement—as codified in Article 3 of Law No. 23/2011; ZIS thus serves as a fiscally adjacent, community-anchored instrument that can help bridge social protection gaps (Kemenkeu, 2012; Ruhana, 2019).

Controls and Broader Development Mechanisms

Control variables behave as expected. Investment is positively related to HDI, reflecting capital deepening's multiplier effects on productivity and incomes that finance better health, education, and living standards (Blanchard, 2017; Castells-Quintana et al., 2019; Ncanywa & Makhenyane, 2016). Urbanization is also positive: more urban provinces tend to have higher per-capita income and better access to health and education services, translating into higher HDI (Castells-Quintana et al., 2019; Mehmood & Sadiq, 2010; Miranda-Lescano et al., 2023). Finally, democracy (IDI) exhibits a positive association with HDI, consistent with evidence that democratic institutions can mitigate development losses associated with inequality and improve access to opportunities, although robustness may vary (Leiwakabessy & Amaluddin, 2020; Miranda-Lescano et al., 2024).

Limitations and Implications

The dynamic specification addresses persistence, unobserved heterogeneity, and simultaneity. AR(1)/AR(2) diagnostics support the absence of residual second-order correlation, and the Hansen test suggests instrument validity under robust two-step GMM. At the same time, the Sargan over-identification test rejects, an outcome that can occur in heteroskedastic panels with many instruments, thus inference should emphasize the Hansen result and maintain judicious instrument counts. As usual, coefficient magnitudes should be interpreted in light of scaling (HDI 0–100) and the units of fiscal variables.

The results highlight three policy directions. First, scale and quality of social spending both matter; improving allocative efficiency—especially in health—can raise returns to outlays (Ananta et al., 2023; Banik et al., 2023). Second, mainstreaming ZIS as a complementary social protection channel can amplify the developmental impact of public programs, particularly where governance frictions exist (Kemenkeu, 2012; Ruhana, 2019). Third, facilitating investment and managed urbanization can reinforce human development gains by expanding productivity, incomes, and service access (Blanchard, 2017; Castells-Quintana et al., 2019; Miranda-Lescano et al., 2023; Ncanywa & Makhenyane, 2016).

CONCLUSIONS

This study examined the role of social spending and Zakat, Infaq, and Sadaqah (ZIS) in shaping human development across 34 Indonesian provinces. Using a dynamic panel approach with two-step robust system GMM estimators, the analysis addressed endogeneity, reverse causality, heteroskedasticity, and serial correlation. The findings reveal that both social spending and ZIS independently contribute positively to human development, but their combined effect is significantly stronger. This suggests that integrating Islamic social finance instruments with government expenditure creates a synergistic impact that enhances development outcomes more

effectively than when each operates in isolation. Robustness checks across static and dynamic models confirmed the stability of these results.

The results carry important policy implications. They highlight the potential of leveraging ZIS as a complementary mechanism to strengthen the effectiveness of social spending in advancing human development. Policymakers, particularly the Ministry of Finance and the National Zakat Agency (BAZNAS), are encouraged to design regulatory frameworks that foster integration between government programs and Islamic financial institutions. Current ZIS collection amounts to only about 10% of its estimated potential, underscoring the need for institutional reforms, improved governance, and stronger public engagement to optimize its mobilization. Effective integration of ZIS with public expenditure can improve resource allocation and accelerate progress in addressing inequality, poverty reduction, and other human development challenges in Indonesia.

Despite these promising findings, the study has several limitations. The relatively short time span of ZIS data—less than a decade—limits the scope of the analysis and may affect the robustness of long-term projections. Future research should expand the dataset, apply alternative econometric techniques, and consider comparative analyses across countries to validate these findings further. Additionally, future studies could explore the integration of other Islamic financial resources, such as Islamic banking and sukuk, with government social expenditure. Such avenues of inquiry would provide a more comprehensive understanding of how Islamic finance can complement public policy to foster sustainable and inclusive human development.

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