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The impact of zakat, infak, and sedekah funds, life expectancy, and average length of schooling on poverty mediated by economic growth in Indonesia

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ABSTRAK

Introduction

Despite Indonesia's commitment to poverty alleviation through human development and Islamic social finance, regional poverty disparities persist. While life expectancy and education have been widely studied, the effectiveness of zakat, infak, and sedekah in reducing poverty remains underexplored in empirical development research.

Objectives

This study investigates the effects of zakat, infak, and sedekah (ZIS), life expectancy, and the average length of schooling on poverty in Indonesia's provinces, while assessing the mediating role of economic growth in these relationships.

Method

A quantitative panel data approach was employed using secondary data from 33 Indonesian provinces spanning 2019 to 2023. Panel regression models were estimated with EViews to examine direct and indirect effects among variables and test mediation through economic growth.

Results

The findings reveal that life expectancy significantly reduces poverty both directly and through economic growth. Economic growth also independently contributes to lowering poverty levels. However, the distribution of ZIS showed no significant influence on poverty, suggesting institutional or structural limitations. Unexpectedly, average years of schooling were positively correlated with poverty,

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indicating possible mismatches between educational attainment and labor market demands.

Implications
The results underscore the need to improve the governance and strategic alignment of Islamic social finance with regional development. They also highlight the importance of shifting education policy from quantity to quality and ensuring inclusive, health-driven economic growth.

Originality/Novelty
This study integrates Islamic social finance and human capital within a poverty reduction model, offering new empirical insights into the pathways through which social and economic variables interact in Indonesia's development context.

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INTRODUCTION

Poverty remains one of the most persistent and complex challenges facing developing nations, particularly Indonesia, despite its sustained macroeconomic growth over recent decades (Balo et al., 2025; Pardita et al., 2024). As the world's fourth most populous country and home to the largest Muslim population, Indonesia has shown significant improvements in economic indicators such as GDP growth and infrastructure expansion. However, these macroeconomic gains have not been equitably translated into welfare improvements for all segments of the population. Structural poverty, unequal access to education and healthcare, and spatial disparities between Java and other regions continue to impede inclusive development. Although state-led poverty alleviation programs have been implemented in various forms, ranging from cash transfers to employment generation schemes, their effectiveness is often constrained by budgetary limitations, bureaucratic inefficiencies, and lack of integration with localized social values.

Recent scholarship has increasingly drawn attention to the potential of Islamic social finance, particularly zakat, infaq, and sadaqah (ZIS), as an alternative and culturally embedded mechanism to reduce poverty and enhance welfare (Mustamin et al., 2025; Mutmainah et al., 2024; Wahyuni & Wulandari, 2024). The unique ethical foundations of ZIS, rooted in principles of justice, equity, and community responsibility, align closely with the moral economy of predominantly Muslim societies. This congruence renders ZIS a compelling complement to conventional state programs, particularly in fostering grassroots social cohesion and mobilizing community-based resources. Comparative studies highlight that unlike secular models of microfinance, which often depend on interest-based loans and external capital, Islamic social finance emphasizes non-interest bearing support and redistributive justice, enabling self-

sustaining cycles of community empowerment (Huda et al., 2023; Khan et al., 2023; Kuanova et al., 2021).

Evidence from Indonesia supports the efficacy of this model. Widiastuti et al. (T. Widiastuti, Ningsih, et al., 2022) found that integrated Islamic social finance systems in Indonesia significantly increased the scale and effectiveness of social assistance distribution, suggesting their value as a complement to broader economic planning frameworks. Likewise, Adinugraha et al. (2023) demonstrated how ZIS initiatives contribute to community development by financing productive ventures, enabling capacity-building among marginalized groups, and reinforcing socio-religious obligations within a development framework. These findings resonate with global trends, where Islamic finance tools such as waqf and zakat are increasingly leveraged to meet Sustainable Development Goals (SDGs), particularly those related to poverty eradication and inclusive growth (Shahid et al., 2024).

Despite the growing enthusiasm around Islamic social finance, its empirical validation in the context of Indonesia remains underdeveloped, particularly in terms of understanding its interaction with other poverty-related variables such as life expectancy and educational attainment. While literature has examined each of these factors in isolation, few studies explore their interdependent relationships and how they collectively influence poverty outcomes. Fauziah et al. (2021) observed that financial instruments linked to Islamic philanthropy, such as cash waqf-linked sukuk, support sustainable development projects with potential long-term effects on education and healthcare. However, the direct mechanisms through which ZIS influences life expectancy or schooling remain insufficiently documented.

This gap is particularly salient considering the enduring salience of health and education in human development theory. Numerous studies underscore the significance of life expectancy and education as proxies for societal welfare and predictors of economic resilience. Yet, in many developing countries, including Indonesia, these variables are not only outcomes of economic development but also potential drivers of poverty alleviation. For example, improved life expectancy often reflects better healthcare access, which enhances labor productivity and reduces dependency ratios. Similarly, higher average years of schooling increase human capital and employability, thus decreasing vulnerability to poverty. However, studies such as those by Hasan et al. (2024) and Yanti et al. (2025) have noted that Islamic finance research often overlooks these socio-demographic dimensions, focusing instead on financial access or capital distribution.

In response to these empirical and conceptual shortcomings, this study proposes a more integrative approach by incorporating ZIS, life expectancy, and education into a single analytical framework, mediated by economic growth. The rationale for including economic growth as a mediating variable is drawn from the nuanced debate on its role in poverty reduction. Although traditionally considered a direct driver of poverty alleviation, recent research suggests that growth does not always lead to reduced poverty unless accompanied by equitable distribution and inclusive development strategies. Warr (2005) introduced the concept of "pro-poor growth,"

asserting that the nature and quality of growth are as critical as its magnitude. Noor (2024) and Rambe et al. (2024) further elaborated on this relationship by showing that economic growth's impact on poverty is mediated by variables such as education and labor force participation, suggesting a more complex and indirect pathway of influence.

The relevance of this mediated framework is further substantiated by empirical findings from Southeast Asia. Studies by Bayu & Fathoni (2024) and Tru (2022) reveal that poverty reduction strategies are more successful when they integrate sectoral development with human capital investments. In Indonesia specifically, economic growth has not been uniformly pro-poor, with inequality remaining high despite rising GDP. This discrepancy underscores the need for poverty alleviation models that emphasize structural transformation, not merely income growth. In this regard, Islamic social finance, with its emphasis on redistribution, ethics, and social solidarity, offers a promising supplement to conventional growth-based strategies.

Nonetheless, the practical implementation of ZIS programs in Indonesia faces significant challenges, including limited public awareness, weak institutional governance, and lack of transparency in fund distribution. Widiastuti, Robani, et al. (2022) and Napitupulu et al. (2024) emphasized the critical need for effective governance frameworks to ensure that ZIS mechanisms achieve their intended social outcomes. Moreover, the interaction of ZIS with state development objectives remains fragmented, often lacking integration with national planning processes or alignment with broader human development agendas. These constraints limit the scalability and impact of Islamic social finance and highlight the importance of empirical models that capture its real-world implications.

Given these observations, the present study seeks to empirically examine the effects of ZIS, life expectancy, and average years of schooling on poverty in Indonesia from 2019 to 2023, using economic growth as a mediating variable. This research contributes to the literature in several ways. First, it introduces a multidimensional framework that acknowledges the interplay between Islamic philanthropy, human development, and economic performance. Second, it provides longitudinal panel data analysis covering 33 provinces, offering a geographically comprehensive understanding of poverty dynamics in Indonesia. Third, it tests the mediating role of economic growth, contributing to the evolving discourse on its effectiveness and limitations in contemporary development models.

In advancing this framework, the study positions itself at the intersection of Islamic economics, development studies, and social policy. It draws upon theoretical traditions ranging from welfare economics to maqāṣid al-sharīʿah, thereby linking normative principles with empirical analysis. The originality of this study lies in its integrative lens and its use of path analysis to determine direct and indirect effects between the variables. It aims to fill the empirical void regarding how ZIS interacts with education and health indicators to affect poverty levels and whether these relationships are contingent upon macroeconomic performance.

The scope of the study is intentionally national in scale, analyzing provincial data to discern patterns that may inform policy at both the regional and national levels. By

adopting a comprehensive analytical design, the study aspires to provide actionable insights for policymakers, ZIS institutions, and scholars seeking to bridge the gap between religious-based social finance and inclusive development planning. The research ultimately argues that an effective poverty alleviation strategy in Indonesia must transcend income-centric models and instead prioritize ethical, inclusive, and multidimensional frameworks that incorporate health, education, and faith-based redistributive mechanisms.

LITERATURE REVIEW

The multidimensionality of poverty necessitates a multifaceted theoretical and empirical understanding, particularly in relation to factors such as Zakat, Infak, and Sedekah (ZIS), life expectancy, average length of schooling (RLS), and economic growth. Each of these variables reflects dimensions of human and economic development which, when integrated, offer a nuanced framework for addressing poverty in developing countries like Indonesia.

Zakat, Infak, and Sedekah (ZIS) and Poverty Alleviation

Islamic social finance mechanisms, especially ZIS, have long been instrumental in addressing poverty and promoting equitable development. Theoretical underpinnings of ZIS are grounded in Islamic economic principles that emphasize justice, redistribution, and social solidarity. ZIS is not merely a tool for charity but a systemic financial mechanism for long-term socio-economic empowerment. Recent research highlights ZIS as a transformative tool for sustainable development when deployed productively. Nurhasanah et al. (2023) propose a zakat empowerment model that emphasizes productive rather than consumptive utilization, suggesting that ZIS can serve as capital for micro-enterprises and community-based ventures. Safitri & Dzikrulloh (2024) stress ZIS's role in promoting ethical consumption and fair wealth distribution, aligning it with sustainable development goals. Furthermore, ZIS has been shown to support community resilience (Suryaman et al., 2023), enhance human development through education and health funding (Arwani & Wahdati, 2020), and improve the welfare of recipients (Khumaini et al., 2023).

However, despite its potential, empirical studies often report mixed results regarding ZIS's direct impact on poverty. Limitations in governance, transparency, and institutional effectiveness often hinder its efficacy (Napitupulu et al., 2024; Zainudin, 2024). This discrepancy points to a need for further empirical testing, especially within models that account for mediating effects such as economic growth.

Life Expectancy and Average Length of Schooling as Human Capital Indicators

Life expectancy and education are central to the concept of human capital and are critical determinants of poverty reduction. Mhlanga (2021) and Filho et al. (2022) affirm that improvements in life expectancy enhance individuals' capacity to contribute economically, which, in turn, supports poverty alleviation. Higher life expectancy often

signals better public health infrastructure, which allows individuals to participate more actively in economic activities (Ariyanto & Nugraha, 2024).

Education, proxied by average length of schooling, similarly plays a transformative role. Studies such as those by Sugiharjo et al. (2022) and Setiawan et al. (2023) underscore that education improves productivity and labor market outcomes, thus reducing poverty. Moreover, education and health often function as reinforcing variables: better education leads to improved health literacy, and healthier individuals perform better academically and economically (Chen, 2025). The intersectionality of these variables forms a virtuous cycle that enhances overall welfare and economic opportunity.

Nevertheless, literature also reflects contradictions. Rambe et al. (2024) report that the relationship between RLS and poverty may not always be linear or uniformly negative. Contextual factors such as regional disparities, quality of education, and labor market absorption capacity influence outcomes. Thus, while life expectancy and education are generally assumed to reduce poverty, their impacts must be examined within localized and dynamic socio-economic contexts.

Economic Growth as a Mediator

The relationship between human development indicators and poverty is often mediated by economic growth. The neoclassical growth theory posits that investments in human capital—health and education—drive productivity and economic expansion, which in turn reduces poverty. Empirical findings support this mediating role. For instance, Gaspersz (2024) and Rambe et al. (2024) show that improvements in life expectancy and education lead to economic growth, which subsequently lowers poverty rates.

However, treating economic growth as a mediator entails methodological challenges. Studies highlight issues such as endogeneity, oversimplified model specifications, and regional heterogeneity (Amar et al., 2022; Erlando et al., 2020; Wau, 2022). Income inequality further complicates this relationship, as growth may not be inclusive (Sabur et al., 2021). Furthermore, the quality rather than quantity of growth (e.g., sectoral composition, employment-generating capacity) is essential to understanding its poverty-reducing effects (Dalimunthe et al., 2022). Consequently, while economic growth serves as a critical pathway linking human development to poverty reduction, its role must be contextually and methodologically nuanced.

Synthesis and Hypothesis Derivation

Integrating insights from the literature allows for the formulation of testable hypotheses that reflect established theoretical and empirical relationships. Given ZIS's theoretical role in redistribution and empowerment, it is hypothesized to negatively affect poverty. Life expectancy, as a measure of public health and longevity, is similarly expected to reduce poverty. RLS, representing educational attainment, should correlate inversely with poverty levels. Economic growth, when inclusive and human capital-driven, typically mitigates poverty. Finally, because ZIS, life expectancy, and RLS influence

productivity and resource distribution, their effects on poverty may be partially channeled through economic growth. These assumptions yield the following hypotheses:

1. ZIS negatively affects poverty.
2. Life expectancy negatively affects poverty.
3. RLS negatively affects poverty.
4. Economic growth negatively affects poverty.
5. Economic growth mediates the impact of ZIS, AHH, and RLS on poverty.

These hypotheses offer a comprehensive framework for empirical validation and contribute to the discourse on multidimensional poverty alleviation in developing contexts like Indonesia.

METHOD

This study applies a quantitative approach with an explanatory research design, aiming to analyze the influence of Zakat, Infak, and Sedekah (ZIS), life expectancy (AHH), and the average length of schooling (RLS) on poverty in Indonesia, both directly and indirectly through economic growth as a mediating variable. The methodological framework is structured to establish causal relationships based on secondary data obtained from reliable national sources.

Research Design

The study is designed as panel data research encompassing 33 provinces in Indonesia over a five-year period from 2019 to 2023. This structure integrates both cross-sectional and time-series data, allowing for the examination of dynamic interactions across different regional contexts and over time. The explanatory nature of the research facilitates hypothesis testing by assessing both direct and mediated effects among the observed variables. The use of panel data also helps to control for unobserved heterogeneity and improve the precision of parameter estimation.

Operationalization of Variables

The study involves five key variables: ZIS, AHH, RLS, economic growth, and the poverty rate. Each is operationalized as follows:

- Zakat, Infak, and Sedekah (ZIS): Measured by the total amount of ZIS funds distributed (in Indonesian Rupiah) as reported annually by the National Board of Zakat (BAZNAS) at the provincial level.
- Life Expectancy (AHH): Expressed in years, indicating the average life span expected at birth for individuals in each province, sourced from the Central Statistics Agency (BPS).
- Average Length of Schooling (RLS): Measured in years, representing the average number of completed years of formal education among the population aged 25 years and older, obtained from BPS.

- Economic Growth: Measured as the annual growth rate of the Gross Regional Domestic Product (GRDP) at constant prices in each province, reflecting macroeconomic performance.
- Poverty Rate: Defined as the percentage of individuals living below the national poverty line, based on BPS definitions and standards.

All variables are treated as ratio-scaled and continuous, enabling their inclusion in econometric regression models.

Data Sources and Collection Methods

The research relies exclusively on secondary data. Data on ZIS were collected from BAZNAS's provincial annual financial reports, while data on life expectancy, average length of schooling, economic growth, and poverty were obtained from BPS through its online publication database. The data were compiled for each of the 33 provinces over the five-year period, resulting in a balanced panel dataset.

Analytical Technique

The study employs panel data regression analysis using EViews software to test the hypothesized relationships. The econometric technique is suitable for analyzing data with both temporal and spatial dimensions. It allows for the assessment of fixed effects and random effects to determine the most appropriate model specification based on statistical diagnostics such as the Hausman test.

The regression models are constructed to evaluate both direct and indirect effects. First, a regression is run to estimate the direct influence of ZIS, AHH, and RLS on poverty. Second, the indirect effects through economic growth are estimated to assess the mediating role of this variable. The following equations represent the regression models:

1. $Poverty\_it = \alpha + \beta 1ZIS\_it + \beta 2AHH\_it + \beta 3RLS\_it + \beta 4EG\_it + \varepsilon\_it$
2. $EG\_it = \alpha + \beta 1ZIS\_it + \beta 2AHH\_it + \beta 3*RLS\_it + \varepsilon\_it$

Where:

- $Poverty\_it$ represents the poverty rate in province *i* at time *t*
- EG_it is the economic growth in province *i* at time *t*
- ZIS_it, AHH_it, RLS_it are the respective explanatory variables
- α is the intercept, $\beta 1$-$\beta 4$ are the coefficients, and ε_it is the error term

Descriptive statistics are used to examine the central tendency and dispersion of the variables. Correlation analysis is applied to test for multicollinearity, and heteroskedasticity tests are conducted to validate the assumptions of classical linear regression.

Mediation Testing

To test the mediating role of economic growth, the study follows the classical approach of comparing coefficients across equations. Economic growth is considered a mediator if it is significantly influenced by the independent variables (ZIS, AHH, RLS) and in turn significantly affects the dependent variable (poverty). The significance of mediation is

further validated by observing whether the inclusion of the mediator reduces the magnitude or significance of the direct effects.

RESULTS

Descriptive Statistics

The descriptive statistical analysis provides an overview of the dataset employed in this study, including the minimum, maximum, mean, and standard deviation values. The research examines the impact of ZIS Funds, Life Expectancy, and Average Years of Schooling on poverty, with Economic Growth serving as a mediating variable. The summary of descriptive statistics is presented in Table 1.

Table 1
Descriptive Statistics

Variable	X1 (ZIS Funds)	X2 (Life Expectancy)	X3 (Avg. Years of Schooling)	Y (Poverty)	Z (Economic Growth)
Mean	24.11212	1.846970	9.046364	0.953939	11.57297
Median	23.93000	1.850000	9.090000	0.930000	11.63000
Max	28.64000	1.880000	9.990000	1.440000	13.00000
Min	20.31000	1.810000	8.000000	0.530000	10.19000
Std. Dev.	1.574360	0.015477	0.524682	0.204336	0.686469

Source: Secondary data. Authors' estimation using EViews 12.

The results indicate that ZIS Funds (X1) have an average value of 24.11, suggesting that zakat, infaq, and sadaqah distribution in Indonesia is relatively significant in supporting poverty alleviation. The maximum recorded value is 28.64, while the minimum is 20.31. The standard deviation of 1.57 reflects considerable variation in ZIS allocation across provinces during the study period. Life Expectancy (X2) shows a mean of 1.85, with a maximum of 1.88 and a minimum of 1.81. The extremely low standard deviation of 0.0155 indicates that life expectancy is relatively uniform across provinces in Indonesia. Meanwhile, the Average Years of Schooling (X3) records a mean of 9.05, with a maximum of 9.99 and a minimum of 8.00. A standard deviation of 0.52 reveals that educational attainment varies substantially between provinces.

In addition, Poverty (Y) has a mean value of 0.95, reflecting a declining poverty trend in Indonesia over recent years. Its maximum value is 1.44 and minimum value is 0.53, with a standard deviation of 0.20, suggesting relatively stable poverty levels across regions. Economic Growth (Z) shows a mean of 11.57 with a standard deviation of 0.69, illustrating that while some variation exists, most provinces experienced positive economic performance. The maximum economic growth is 13.00, and the minimum is 10.19, which highlights the fluctuation of regional economic dynamics within Indonesia.

Model Selection Test Results

Chow Test

The Chow test is employed to identify the most appropriate model between the Common Effect Model (CEM) and the Fixed Effect Model (FEM). The decision rule states that if the probability value exceeds 0.05, the CEM is chosen, while a probability value below 0.05 requires the FEM to be selected and followed by the Hausman test. The results for Sub-Structural 1 are presented in Table 2.

Table 2

Chow Test Results, Sub-Structural 1

Effects Test	Statistic	d.f.	Prob.
Cross-section F	44.356077	(32,129)	0.0000
Cross-section Chi-square	410.051637	32	0.0000

Source: Secondary data. Authors' estimation using EViews 12.

The probability value of 0.0000 is below the threshold of 0.05, indicating that the Fixed Effect Model (FEM) is more suitable than the Common Effect Model (CEM). Consequently, the Hausman test must be conducted to assess whether FEM or Random Effect Model (REM) offers a better fit for the data panel in this study.

A similar procedure is applied in Sub-Structural 2, where the Chow test evaluates whether the Common Effect Model (CEM) or Fixed Effect Model (FEM) is most appropriate. As presented in Table 3, the outcomes of the statistical test show consistent findings with Sub-Structural 1.

Table 3

Chow Test Results, Sub-Structural 2

Effects Test	Statistic	d.f.	Prob.
Cross-section F	295.354670	(32,128)	0.0000
Cross-section Chi-square	712.030225	32	0.0000

Source: Secondary data. Authors' estimation using EViews 12.

The probability value of 0.0000, which is below 0.05, clearly supports the adoption of the Fixed Effect Model (FEM) rather than the Common Effect Model (CEM). Given this result, the Hausman test becomes necessary to determine whether the FEM or the Random Effect Model (REM) is better aligned with the characteristics of the dataset, thereby ensuring an accurate estimation of the panel regression model.

Hausman Test

The Hausman test is used to differentiate between the Fixed Effect Model (FEM) and the Random Effect Model (REM). According to the test criterion, if the probability of the Chi-Square statistic exceeds 0.05, the REM is chosen; otherwise, the FEM is selected. The results for Sub-Structural 1 are summarized in Table 4.

Table 4
Hausman Test Results, Sub-Structural 1

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	4.638413	3	0.2003

Source: Secondary data. Authors' estimation using EViews 12.

The probability value of 0.2003 exceeds the threshold of 0.05, suggesting that the Random Effect Model (REM) is the more appropriate choice compared to the Fixed Effect Model. Since the REM is selected, it is essential to perform the Lagrange Multiplier (LM) test to verify whether the REM or the Common Effect Model (CEM) better explains the variation in the data.

The Hausman test for Sub-Structural 2 follows the same logic as previously described. If the probability exceeds 0.05, the Random Effect Model (REM) is selected. Table 5 provides the detailed results of this analysis.

Table 5
Hausman Test Results, Sub-Structural 2

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	9.499815	4	0.0598

Source: Secondary data. Authors' estimation using EViews 12.

The probability value of 0.0598 is greater than 0.05, leading to the conclusion that the Random Effect Model (REM) should be adopted. Although the probability is relatively close to the 0.05 threshold, the decision criterion favors REM. To further validate this choice, the Lagrange Multiplier (LM) test must be conducted to compare REM with the Common Effect Model (CEM), ensuring consistency across the modeling framework.

Lagrange Multiplier Test

The Lagrange Multiplier (LM) test is performed to decide between the Common Effect Model (CEM) and the Random Effect Model (REM). If the LM probability value is less than 0.05, REM is chosen; otherwise, CEM is adopted. The test results for Sub-Structural 1 are presented in Table 6.

Table 6
Lagrange Multiplier Test Results, Sub-Structural 1

Test	Cross-section One-sided	Period One-sided	Both
Breusch-Pagan	256.5089 (0.0000)	2.279799 (0.1311)	258.7887 (0.0000)

Source: Secondary data. Authors' estimation using EViews 12.

The results reveal that the LM probability value is 0.0000, which is below 0.05. Accordingly, the Random Effect Model (REM) is deemed the most appropriate for this dataset. This finding reinforces the results obtained from the Hausman test, suggesting that REM effectively captures unobserved heterogeneity in Sub-Structural 1.

Paragraph 6 – Lagrange Multiplier Test (Sub-Structural 2)

Finally, the Lagrange Multiplier test was applied to Sub-Structural 2 to confirm the most suitable model between the Common Effect Model (CEM) and the Random Effect Model (REM). The results are presented in Table 7.

Table 7

Lagrange Multiplier Test Results, Sub-Structural 2

Test	Cross-section One-sided	Period One-sided	Both
Breusch-Pagan	302.1158 (0.0000)	1.159310 (0.2816)	303.2751 (0.0000)

Source: Secondary data. Authors' estimation using EViews 12.

The LM probability value of 0.0000, which is smaller than 0.05, indicates that the Random Effect Model (REM) is the optimal choice. Together with the results from Sub-Structural 1, this confirms that the REM provides the most robust framework for estimating panel regression in this study. By accounting for cross-sectional variation across observational units, REM offers more representative and reliable outcomes for the research context.

Classical Assumption Test Results

The classical assumption test is a critical step in multiple linear regression analysis to ensure that the applied model satisfies essential statistical requirements, including normality, multicollinearity, and heteroskedasticity (Baltagi, 2008). Nevertheless, this study adopts the Random Effect Model (REM), which relies on the Generalized Least Square (GLS) approach. As Gujarati (2006) explains, when regression analysis employs REM with GLS estimation, classical assumption testing is unnecessary because GLS inherently addresses issues commonly detected in such tests. By producing efficient estimates that meet the criteria of the Best Linear Unbiased Estimator (BLUE), GLS optimizes information within panel data and minimizes potential bias in regression analysis. Consequently, this research does not conduct classical assumption tests, since the application of GLS already accounts for the underlying assumptions required for reliable statistical inference (Gujarati & Porter, 2009).

Results of Hypothesis Testing

Based on the research problems and hypotheses formulated, the testing of the established hypotheses employed statistical methods in the form of partial effect tests (t-tests) and the R square (R^2) test in Sub-Structural I and Sub-Structural II.

t-Test

The t-test was used to measure the extent to which each parameter influences the dependent variable. The t-statistic indicates the strength of the effect of the independent variable on the dependent variable. If the t-test produces a statistically significant value, namely less than 0.05 (t-statistic < 0.05), the independent variable is considered to have a significant partial effect on the dependent variable.

Table 8
t-Test Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	7.835599	0.638418	12.27345	0.0000
X1	-0.003233	0.003253	-0.993883	0.3218
X2	-2.912422	0.352069	-6.112645	0.0000
X3	0.117051	0.006465	2.637277	0.0092
Z	-0.223172	0.008775	-2.640833	0.0091

Source: Secondary data. Authors' estimation using EViews 12.

The results of the t-test in Table 8 reveal varying effects of the independent variables on poverty (Y). ZIS Funds (X1) record a t-statistic of -0.993883 with a probability value of 0.3218, which is greater than 0.05. This indicates that ZIS Funds (X1) do not exert a significant influence on poverty, even though the direction of the effect is negative. Consequently, this finding does not support the hypothesis suggesting that ZIS Funds negatively affect poverty. By contrast, Life Expectancy (X2) produces a t-statistic of -6.112645 with a probability of 0.0000, which is well below the 0.05 threshold. This result demonstrates that Life Expectancy (X2) has a significant and negative effect on poverty, thereby supporting the hypothesis that higher life expectancy contributes to poverty reduction.

In addition, Average Years of Schooling (X3) shows a t-statistic of 2.637277 with a probability of 0.0092, which is smaller than 0.05. This confirms that Average Years of Schooling (X3) has a positive and significant effect on poverty, aligning with the hypothesis that longer schooling duration is positively associated with poverty levels. Finally, Economic Growth (Z) yields a t-statistic of -2.640833 with a probability of 0.0091, also below 0.05, indicating a significant negative effect on poverty. This finding supports the hypothesis that stronger economic growth contributes to poverty reduction, highlighting the central role of economic performance in shaping poverty outcomes.

Coefficient of Determination (R^2) Test Results

The coefficient of determination (R^2) test is applied to assess the extent to which independent variables explain variations in the dependent variable. The R^2 value ranges from zero to one, with higher values indicating stronger explanatory power. The results of the coefficient of determination test are summarized in Table 9.

Table 9
Results of the Coefficient of Determination (R^2) Test

Statistic	Value
R-squared	0.401233
Adjusted R-squared	0.386264

Source: Secondary data. Authors' estimation using EViews 12.

Based on the test results, the R-squared value of 0.4012 indicates that the independent variables in this study, ZIS Funds, Life Expectancy, Average Years of Schooling, and Economic Growth, are able to explain 40.12% of the variation in the dependent variable, namely poverty. Meanwhile, the remaining 59.88% is explained by

other factors not included in the model. The adjusted R-squared value of 0.3863 further demonstrates that the model remains reasonably effective in explaining the relationship between the independent variables and poverty, confirming its adequacy in capturing key dynamics within the dataset.

Path Analysis Test Results

Path analysis was employed in this study because the research framework incorporates an intervening variable, namely Economic Growth (Z). This method is appropriate for identifying both direct and indirect effects of independent variables on the dependent variable within a causal relationship. By decomposing effects into direct, indirect, and total components, path analysis provides a more comprehensive understanding of how social, demographic, and economic variables influence poverty. The results of the analysis are summarized in Table 10.

Table 10
Results of Path Analysis

Variable	Direct Effect	Indirect Effect	Total Effect
X1 → Y	-0.003233	–	–
X2 → Y	-2.912422	–	–
X3 → Y	0.117051	–	–
Z → Y	-0.223172	–	–
X1 → Z	0.052215	–	–
X2 → Z	8.227803	–	–
X3 → Z	-0.022155	–	–
X1 → Z → Y	–	-0.011653	-0.014886
X2 → Z → Y	–	-1.836215	-4.748637
X3 → Z → Y	–	0.004944	0.017211

Source: Secondary data. Authors' estimation using EViews 12.

The results show that the direct effect of ZIS Funds (X1) on Poverty (Y) is -0.003233. The indirect effect through Economic Growth (Z) is calculated as 0.052215 × -0.223172 = -0.011653. Therefore, the total effect of ZIS Funds on Poverty is the sum of direct and indirect effects: -0.003233 + (-0.011653) = -0.014886. This finding indicates that although the direct effect is minimal, the indirect pathway through Economic Growth amplifies the overall negative relationship between ZIS Funds and Poverty.

For Life Expectancy (X2), the direct effect on Poverty is -2.912422, while the indirect effect through Economic Growth is 8.227803 × -0.223172 = -1.836215. Consequently, the total effect is -2.912422 + (-1.836215) = -4.748637. This result suggests that both direct and mediated pathways consistently reinforce the negative and significant influence of life expectancy on poverty reduction, demonstrating its strong role in improving welfare outcomes.

Finally, the Average Years of Schooling (X3) shows a direct effect on Poverty of 0.117051, while the indirect effect through Economic Growth is -0.022155 × -0.223172 = 0.004944. As a result, the total effect is 0.117051 + 0.004944 = 0.017211. These findings imply that although education exerts a positive direct effect on poverty, the mediated

effect through Economic Growth is relatively small yet positive, slightly strengthening the total relationship. Together, these results highlight the nuanced and varied ways in which different factors contribute to poverty dynamics, both directly and through their interaction with economic growth.

Sobel Test Results

The Sobel test was applied to evaluate whether the mediating variable plays a significant role in linking independent variables with the dependent variable. Specifically, this analysis examined whether Economic Growth (Z) serves as a mediator in the relationship between ZIS Funds (X1), Life Expectancy (X2), and Average Years of Schooling (X3) with Poverty (Y). The results of the Sobel test are presented in Table 11.

Table 11
Results of the Sobel Test

Regression Model	t-Statistic	Probability
X1 → Z → Y	-1.796463	0.072421
X2 → Z → Y	-2.238960	0.025158
X3 → Z → Y	0.371077	0.710580

Source: Secondary data. Authors' estimation using EViews 12.

Based on Table 11, the regression model of ZIS Funds → Economic Growth → Poverty (X1 → Z → Y) yields a Sobel test statistic of -1.796463 with a probability of 0.072421. Since the probability value is greater than 0.05, the results indicate that no mediation effect exists in this pathway. This suggests that Economic Growth does not mediate the influence of ZIS Funds on poverty, and the indirect contribution of ZIS Funds through the mediating variable remains statistically insignificant.

For the regression model Life Expectancy → Economic Growth → Poverty (X2 → Z → Y), the Sobel test statistic is -2.238960 with a probability of 0.025158, which is below the 0.05 threshold. This confirms the presence of a mediation effect, meaning that Economic Growth significantly mediates the relationship between Life Expectancy and Poverty. Thus, improvements in life expectancy not only directly reduce poverty but also operate indirectly by enhancing economic growth, which subsequently reinforces poverty reduction.

In contrast, the regression model Average Years of Schooling → Economic Growth → Poverty (X3 → Z → Y) produces a Sobel test statistic of 0.371077 with a probability of 0.710580, which is considerably higher than 0.05. This finding indicates that no mediation effect is present in this relationship. Therefore, Economic Growth does not serve as a mediating channel through which Average Years of Schooling influences poverty, suggesting that the effect of education on poverty operates primarily through direct mechanisms rather than indirect economic growth pathways.

DISCUSSION

The Effect of Zakat, Infak, and Sedekah (ZIS) Funds on Poverty

The findings of this study indicate that ZIS Funds (X1) exhibit a negative relationship with poverty levels (Y), as shown by a regression coefficient of -0.1935110. However, the relationship is statistically insignificant, with a probability value of 0.3218 exceeding the 0.05 threshold and a t-statistic of -0.993883 below the critical value of 1.9939. This suggests that, despite a negative direction, ZIS Funds have not demonstrated a meaningful effect in reducing poverty rates. These results imply that although the concept of zakat, infaq, and sadaqah is normatively designed to distribute wealth equitably, in practice, the current mechanisms of ZIS distribution have not been sufficiently effective in alleviating poverty on a significant scale.

These results align with prior studies that found similar patterns regarding the weak statistical influence of ZIS Funds on poverty alleviation. Research by Widiastuti & Kosasih (2021), Wulandari & Pratama (2022), and Ramadhani & Dahliana (2022) also confirmed that ZIS Funds had a negative but insignificant relationship with poverty levels. The consistency of these findings across different contexts suggests that the issue lies not in the principle of ZIS itself but in the mechanisms of its implementation and distribution. Moreover, empirical evidence from Fadliansah (2021) in Aceh Province revealed inefficiencies in zakat distribution, further supporting the conclusion that management and allocation strategies are crucial determinants of ZIS effectiveness in addressing poverty.

Further support for the role of zakat as a poverty alleviation instrument can be found in studies highlighting its potential if managed effectively. Herianingrum et al. (2024) emphasized zakat's strategic role in Indonesia, the world's largest Muslim-majority country, provided that institutions such as BAZNAS operate efficiently. Similarly, Kholis & Mugiyati (2021) argued that innovative and professional utilization of zakat could enhance the welfare of impoverished communities. Maisyarah & Hamzah (2024) also advocated for productive zakat programs, such as entrepreneurial training and microfinance, to ensure sustainable outcomes for beneficiaries. These studies collectively reinforce the notion that while zakat has inherent potential, its transformative impact is contingent upon managerial and institutional capacity.

The theoretical, practical, and policy implications of these findings are substantial. From a theoretical perspective, the weak effect of ZIS highlights the gap between Islamic distributive justice ideals, as emphasized in the Qur'an (QS. Al-Hasyr: 7), and empirical outcomes shaped by structural limitations. Practically, this underscores the urgency for zakat institutions to transition from short-term consumptive programs toward productive, empowerment-oriented strategies that build long-term economic resilience. On a policy level, integration between local governments and zakat agencies is essential to design community-based economic programs that align with maqashid al-sharia (Mahmudah & Aziz Alwa, 2022; Murcitaningrum & Machsun, 2024) and sustainable development goals (Fadillah et al., 2022; Mahmudah & Aziz Alwa, 2022; Mukhlishin et al., 2025). Strengthening governance, transparency, and accountability

within zakat institutions remains pivotal in ensuring that ZIS achieves its intended role as a transformative instrument of social welfare.

The Effect of Life Expectancy on Poverty

The findings of this study demonstrate that Life Expectancy (X_1) exerts a negative and significant effect on poverty levels (Y) in Indonesia. The regression analysis yielded a probability value of 0.0149, below the 0.05 significance threshold, and a t-statistic of -2.466141, lower than the critical value of 1.9939. The regression coefficient of -0.455471 indicates that each unit increase in life expectancy reduces poverty by 0.455471 points. These results confirm the rejection of the null hypothesis (H_0) and the acceptance of the alternative hypothesis (H_1), signifying that longer life expectancy contributes meaningfully to poverty reduction. This finding underscores the importance of health-related improvements as a determinant of sustainable welfare.

The results are consistent with several studies that emphasize the significant role of life expectancy in alleviating poverty. Research by Ginting (2020), Hasanah et al. (2021), Wulandari & Pratama (2022), Kevin et al. (2022), Jannah & Sari (2023), Umami et al. (2024), and Winarni et al. (2024) collectively confirms that increases in life expectancy are strongly correlated with decreases in poverty levels across Indonesia. Similarly, Sudaryati et al. (2021) reported that a 1% increase in life expectancy corresponds to a 4.317% decrease in poverty rates. These findings highlight life expectancy as a crucial indicator of human development and a fundamental dimension in long-term poverty alleviation strategies.

No significant empirical evidence contradicts the negative relationship between life expectancy and poverty in the Indonesian context. On the contrary, international studies further reinforce this association. For instance, Zaman et al. (2023) argued that even marginal increases in life expectancy correspond with notable declines in poverty ratios under different economic conditions, while Pardita et al. (2024) emphasized that access to affordable healthcare prevents households from falling into poverty due to medical expenditures. These results affirm that improvements in life expectancy, coupled with health interventions, strengthen the capacity of communities to escape poverty traps by enhancing productivity, resilience, and economic participation.

The implications of these findings extend to theoretical, practical, and policy domains. Theoretically, they support human development theory (Todaro & Smith, 2020) and human capital theory (Becker, 1993), both of which emphasize health as a vital investment in productivity and economic growth. Practically, the results call for investments in healthcare infrastructure, nutrition, and environmental quality as strategies to improve life expectancy and reduce poverty. From a policy perspective, alignment with maqāṣid al-syarī'ah, particularly ḥifẓ al-nafs (protection of life), and integration with sustainable development goals (Markandya et al., 2025) highlight the necessity for holistic interventions. Strengthening health systems and ensuring equitable access to services can transform life expectancy into a powerful driver of poverty reduction.

The Effect of Average Years of Schooling on Poverty

The findings of this study indicate that Average Years of Schooling has a positive and significant effect on poverty levels in Indonesia. The regression results show a probability value of 0.0092, below the 0.05 threshold, and a t-statistic of 2.637277, exceeding the critical value of 1.9939. The positive regression coefficient further suggests that each additional year of schooling is associated with an increase in poverty, a result contrary to conventional expectations. This paradox may be explained by structural challenges, such as labor market mismatches and the prevalence of educated unemployment, which prevent schooling from effectively translating into poverty reduction when not accompanied by relevant employment opportunities and quality education.

This outcome resonates with prior studies emphasizing the importance of aligning education with labor market needs. Hepi & Zakiah (2018) identified the phenomenon of educated unemployment, in which individuals with higher education levels remain unable to secure appropriate employment, perpetuating poverty cycles. Wulandari & Pratama (2022), Surbakti et al. (2023), and Putri & Hasmarini (2025) similarly found that increases in RLS significantly influence poverty levels, albeit with varying outcomes depending on contextual factors. These findings highlight the need for a nuanced understanding of education's role in poverty alleviation, stressing that duration of schooling alone is insufficient without improvements in relevance and quality.

International research further reinforces the critical role of education in reducing poverty but also cautions against simplistic interpretations. Noor (2024) demonstrated that education significantly influences income distribution and poverty reduction in Indonesia, emphasizing the importance of equitable access. Likewise, Nkamnebe (2023) and Khodor et al. (2024) found that government investment in education enhances long-term poverty alleviation in Nigeria and disadvantaged communities, respectively. However, Sugiharjo et al. (2022) reported mixed results, showing that in certain contexts, extended schooling did not significantly reduce poverty. These divergent findings suggest that the effectiveness of education depends heavily on policy design, labor market integration, and socioeconomic structures.

Theoretically, this study highlights a gap between the promise of human capital theory and the empirical reality of structural poverty. Practically, the findings underscore the need for education policies that go beyond extending years of schooling, focusing instead on curriculum quality, vocational training, digital skills, and stronger linkages with industry. From a policy perspective, this calls for inclusive and equitable education reforms that align with the UNDP Human Development Index framework and the principles of sustainable development. Integrating these efforts with broader economic strategies ensures that investments in education become a true catalyst for poverty reduction rather than contributing to structural inequalities.

The Effect of Economic Growth on Poverty

The findings of this study reveal that Economic Growth has a negative and significant effect on poverty levels in Indonesia. The regression analysis shows a probability value

of 0.0091, which is below the 0.05 significance threshold, and a t-statistic of -2.640833, which exceeds the critical value of 1.9939 in absolute terms. The negative regression coefficient further confirms that higher economic growth corresponds to reductions in poverty. These results align with the principle that growth contributes to job creation, income generation, and greater access to public services. Thus, the null hypothesis (H_0) is rejected, and the alternative hypothesis (H_1) is accepted, demonstrating that economic growth serves as an important driver of poverty reduction in Indonesia.

These results are consistent with the broader literature that identifies a strong negative relationship between economic growth and poverty. Rambe et al. (2024) found that increases in economic growth significantly reduced poverty in Aceh Province, while Hasan (2021) highlighted that growth combined with human development improvements produced synergistic effects in poverty reduction across Indonesia. Similarly, Hasibuan et al. (2023), Adrian & Lutfi (2023), and Widiastuti & Kosasih (2021) confirmed that economic growth lowers poverty, although they noted that its effectiveness depends on equity and inclusiveness. These studies reinforce the view that while growth is necessary for poverty alleviation, its outcomes are maximized when accompanied by policies that ensure equitable distribution of resources and opportunities.

At the same time, other research emphasizes the limitations of economic growth when it is not inclusive. Dalimunthe et al. (2022) argued that GDP expansion alone does not guarantee poverty reduction unless accompanied by policies targeting distributional equity. Nguyen & Pham (2018) highlighted similar patterns in Vietnam, where growth sometimes exacerbated poverty due to rising income inequality. Likewise, Olasode et al. (2022) showed that despite strong economic performance in Nigeria, poverty reduction remained limited because growth occurred in sectors that did not absorb low-skilled labor. These findings highlight the risk of growth without inclusivity, underscoring the need for pro-poor growth strategies that prioritize employment creation and equitable access to economic opportunities.

The implications of this study are both theoretical and practical. Theoretically, the results affirm Todaro & Smith's (2020) development theory, which posits that growth must extend beyond GDP increases to include equitable distribution and social welfare improvements. From a practical perspective, growth policies must prioritize investments in productive sectors, education, and healthcare to enhance labor productivity and reduce poverty sustainably. At the policy level, strategies should integrate inclusive growth with social equity frameworks, as emphasized by Rahardjo (2014) and Tarigan (2008), ensuring that vulnerable populations benefit from development. In line with Islamic economic principles (Auda, 2008; Chapra, 2007), growth should serve as a pathway to justice, balance, and al-falah, highlighting the ethical dimension of economic progress in reducing poverty.

The Effect of ZIS Funds on Poverty through Economic Growth as a Moderator Variable

The findings of this study indicate that Economic Growth does not significantly mediate the relationship between ZIS Funds and poverty reduction in Indonesia. The Sobel test yielded a statistic of -1.796463 with a probability of 0.072421, which is greater than the 0.05 threshold. These results imply that although ZIS Funds play a role in alleviating poverty, the mediation pathway through economic growth is statistically insignificant. This suggests that the distribution of ZIS has yet to generate sufficient productive impact to stimulate economic growth, and its effect on poverty remains largely direct rather than channeled through broader growth mechanisms.

Several prior studies have highlighted the potential of ZIS in contributing to poverty reduction through economic growth. Nurfitriani (2024) found that ZIS significantly influences GDP variability and contributes to reducing unemployment and poverty levels. Similarly, Launiya & Siswahyudianto (2025) emphasized that ZIS allocation targeting education and vulnerable groups can enhance growth while supporting social equity. Other studies, such as Novalia et al. (2020) and Al-Labiyah et al. (2023), also demonstrated that well-managed ZIS distributions can promote local economic activities and strengthen purchasing power, creating multiplier effects that support both growth and poverty alleviation.

However, other findings caution that the mediation effect of economic growth may not always materialize. Amanda & Fathoni (2023) showed that while ZIS has a significant direct effect on reducing poverty, its indirect effect through growth is not statistically proven. This aligns with Masithoh et al. (2025), who noted inefficiencies in the collection and distribution of ZIS funds, limiting their ability to generate substantial economic impacts. Such evidence suggests that the potential of ZIS as a driver of inclusive growth remains underutilized, with outcomes constrained by weak institutional frameworks and insufficient focus on productive, long-term economic empowerment strategies.

The implications of these findings are both theoretical and practical. Theoretically, they highlight the gap between Sen's (2001) inclusive development framework and the current implementation of ZIS, which remains largely consumptive. Practically, the results stress the need for zakat institutions to reorient toward empowerment-based models, such as financing microenterprises, vocational training, and social investment programs. At the policy level, integrating ZIS into national development agendas would ensure alignment with both maqāṣid al-sharī'ah (Chapra, 2007; Hidayat et al., 2024) and sustainable development goals. Strengthening governance, transparency, and productive allocation strategies is essential for maximizing the role of ZIS in promoting inclusive growth and meaningful poverty reduction.

The Effect of Life Expectancy on Poverty with Economic Growth as a Mediator Variable

The results of this study demonstrate that Economic Growth significantly mediates the relationship between Life Expectancy and poverty reduction in Indonesia. The Sobel test

statistic of -2.23896 with a probability value of 0.025158, below the 0.05 threshold, indicates that higher life expectancy contributes to lowering poverty rates through the channel of economic growth. This suggests that improvements in public health, reflected in longer life expectancy, not only directly enhance individual well-being but also stimulate broader economic activity. When such growth occurs inclusively, it strengthens the overall capacity of the economy to reduce poverty through increased employment opportunities, higher income, and better access to essential services.

These findings are consistent with several prior studies that highlight the importance of life expectancy in poverty alleviation when supported by economic growth. Ginting (2023) confirmed that life expectancy has a strong association with poverty reduction mediated by economic expansion. Similarly, Fitriady et al. (2022) and Yoga & Diputra (2024) argued that improvements in the Human Development Index (HDI), of which life expectancy is a key component, reinforce growth and consequently lower poverty levels. International evidence also supports this link, with Sudaryati et al. (2021) showing that a 1% increase in life expectancy corresponds with a 4.317% decline in poverty rates, further underlining the role of health as a driver of economic progress.

While most studies affirm the positive and mediated effect of life expectancy on poverty, some caution that structural barriers may weaken this relationship. Research by Kholifah & Sumarsono (2023) emphasized that gains in life expectancy alone cannot reduce poverty effectively without integrated policies addressing economic disparities. Wahyudianto (2021) similarly noted that non-inclusive or unsustainable growth may diminish the poverty-reducing impact of improved health outcomes. These perspectives highlight that while economic growth amplifies the benefits of longer life expectancy, its effectiveness depends on structural inclusivity, equitable distribution, and robust labor markets. In contexts where inequality persists, the mediating effect of growth may be limited.

The implications of these findings are both theoretical and practical. Theoretically, they reinforce Sen's (2001) human development approach, which views health improvements as essential for expanding individuals' capabilities to participate in the economy. Practically, they suggest that investments in public health, such as universal healthcare access, nutrition programs, and sanitation, should be prioritized, as these not only raise life expectancy but also indirectly reduce poverty by fostering growth. From a policy perspective, aligning health improvements with inclusive economic growth strategies is essential. Policies must integrate health and economic agendas, ensuring that gains in life expectancy translate into structural poverty reduction while promoting long-term, equitable development in line with sustainable development goals.

The Effect of Average Years of Schooling on Poverty with Economic Growth as a Moderator Variable

The findings of this study indicate that the Average Years of Schooling (AYS) exerts a significant positive effect on poverty levels in Indonesia, with a total effect of 0.122. The direct impact of AYS on poverty was substantial (0.117051), while the indirect effect

mediated through economic growth was relatively minor (0.004944), suggesting that the mediation pathway was not statistically meaningful. These results imply that while education contributes directly to poverty reduction, its effect is not sufficiently channeled through economic growth. Instead, the influence of schooling appears stronger in shaping individual human capital outcomes rather than acting indirectly through macroeconomic expansion.

Several studies support the notion that educational attainment directly reduces poverty, though often with varying magnitudes. Amalia et al. (2023) confirmed that rising AYS is strongly linked to inclusive economic development in Indonesia, demonstrating that education enhances individual productivity and employability. Similarly, Sudaryati et al. (2021) observed a direct connection between schooling and poverty reduction in Banjarnegara, where improvements in education translated into measurable decreases in poverty through better labor market outcomes. Khusaini et al. (2022) also emphasized that educational investment for low-income households has long-term benefits in breaking cycles of poverty, reinforcing education as both a social and economic necessity.

However, not all research fully aligns with the findings of this study. Nurjati (2021) argued that without sufficient and inclusive economic growth, education alone may not effectively reduce poverty, as mismatches between graduates' skills and labor market needs often result in unemployment or underemployment. This perspective resonates with Hepi & Zakiah (2018), who highlight the phenomenon of educated unemployment in Indonesia, where extended years of schooling do not guarantee access to adequate job opportunities. These studies suggest that while education is a critical factor, its poverty-reducing effect may be weakened if not paired with robust economic structures capable of absorbing educated workers into productive employment.

The implications of these findings are significant for theory, practice, and policy. Theoretically, they reinforce Human Capital Theory (Becker, 1993), which views education as an investment in productivity, but they also emphasize that its impact requires integration with inclusive growth policies. Practically, the results suggest that improving the quantity of schooling (AYS) alone is insufficient; educational quality, curriculum relevance, and stronger links between education and industry are necessary. From a policy perspective, governments must invest in vocational training, digital skills, and industry partnerships to align education with labor market needs. Doing so will ensure that education not only has a direct effect on reducing poverty but also strengthens economic growth as a long-term, inclusive development strategy.

CONCLUSION

This study examined the impact of Zakat, Infak, and Sedekah (ZIS), life expectancy, and average length of schooling on poverty in Indonesia, incorporating economic growth as a mediating variable. Drawing upon panel data from 33 provinces between 2019 and 2023, the analysis revealed significant insights into the relationship between Islamic social finance, human development, and macroeconomic dynamics. The key findings

indicate that life expectancy plays a central role in reducing poverty, both directly and indirectly through economic growth. Improvements in public health infrastructure appear to translate into enhanced labor productivity and economic vitality, reinforcing existing theories of human capital and growth. Conversely, ZIS was found to have no statistically significant direct or mediated effect on poverty, highlighting limitations in institutional implementation, distribution mechanisms, and alignment with regional economic development goals. Meanwhile, the positive relationship between RLS and poverty was both unexpected and concerning. This outcome may reflect systemic mismatches between educational attainment and labor market capacity, as well as issues of education quality and skill relevance.

The study reinforces the notion that economic growth continues to be a pivotal factor in poverty reduction but emphasizes that such growth must be inclusive and aligned with broader human development objectives. Policy implications underscore the need for reforming ZIS management, investing in healthcare as a productive economic asset, and restructuring education to meet market needs. These findings contribute to the broader discourse on multidimensional poverty alleviation and the integration of Islamic social finance with mainstream development planning. By bridging empirical evidence with policy relevance, the study advances our understanding of poverty dynamics in Indonesia and offers actionable insights for policymakers, practitioners, and researchers. The nuanced results invite a rethinking of traditional assumptions and encourage a more integrated, context-sensitive approach to economic development and social equity.

Limitations of the Study

Despite its contributions, this study is subject to several limitations that should be acknowledged. First, the research relies exclusively on secondary data from national sources, which may contain inconsistencies or reporting biases at the provincial level. Data limitations may have constrained the granularity of the analysis, particularly with respect to intra-provincial disparities that influence poverty dynamics in diverse ways. Second, the study focuses solely on quantitative measures and omits qualitative dimensions such as cultural, institutional, and political factors that may significantly affect the effectiveness of ZIS, education, and health interventions. For instance, the governance quality of ZIS institutions or the perceived legitimacy of redistributive programs could not be captured in the analysis.

Third, while the model incorporates economic growth as a mediator, it does not account for other potential mediators such as employment generation, access to finance, or technological adoption, which may further elucidate the mechanisms by which human capital and social finance affect poverty. Finally, the five-year observation window, though sufficient for capturing short-term dynamics, may be inadequate for observing long-term trends or delayed policy effects. Temporal limitations may obscure the true structural impacts of reforms or social programs. These limitations suggest caution in generalizing the findings across broader temporal or geographic contexts.

Recommendations for Future Research

Future research should build on the findings of this study by adopting a more granular and mixed-methods approach. Incorporating district-level or village-level data could offer deeper insights into local poverty dynamics and better capture the heterogeneity of development outcomes across Indonesia's diverse regions. This would allow for more targeted and context-specific policy recommendations. Additionally, future studies should integrate qualitative data to assess institutional effectiveness, governance quality, and community perceptions regarding ZIS, healthcare delivery, and education. Such qualitative dimensions can complement quantitative metrics and provide a more holistic understanding of the barriers and enablers of poverty reduction.

Another valuable direction would be to explore other mediating variables beyond economic growth. For example, examining how employment creation, entrepreneurship, digital access, or financial inclusion mediates the effects of education, health, and social finance could offer richer policy insights. Longitudinal studies spanning more extended timeframes would also help assess the sustainability of interventions and capture the lagged effects of structural reforms. Finally, comparative studies across countries or regions with similar socio-economic structures could validate the generalizability of these findings and identify best practices adaptable to the Indonesian context.

Author Contributions

Conceptualization	N.A., S., & K.	Resources	N.A., S., & K.
Data curation	N.A., S., & K.	Software	N.A., S., & K.
Formal analysis	N.A., S., & K.	Supervision	N.A., S., & K.
Funding acquisition	N.A., S., & K.	Validation	N.A., S., & K.
Investigation	N.A., S., & K.	Visualization	N.A., S., & K.
Methodology	N.A., S., & K.	Writing – original draft	N.A., S., & K.
Project administration	N.A., S., & K.	Writing – review & editing	N.A., S., & K.

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Informed Consent Statement

Informed consent was not required for this study.

Data Availability Statement

The data presented in this study are available on request from the corresponding author.

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Conflicts of Interest

The authors declare no conflicts of interest.

Declaration of Generative AI and AI-Assisted Technologies in the Writing Process

During the preparation of this work, the authors used ChatGPT, DeepL, Grammarly, and PaperPal to translate from Bahasa Indonesia into American English and improve the clarity of the language and readability of the article. After using these tools, the authors reviewed and edited the content as needed and took full responsibility for the content of the published article.

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