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The Asymmetric Nexus between Economic Freedom and Islamic Social Giving Intensity in Indonesia

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Abstract

Islamic social giving, comprising zakat, infaq, and sadaqah (ZIS), represents an important mechanism for strengthening social welfare and inclusive development in Muslim-majority economies. Existing Indonesian studies have examined the role of economic freedom primarily in relation to conventional economic outcomes and Islamic financial institutions, while studies of ZIS have focused on macroeconomic, socioeconomic, and institutional determinants. However, the extent to which economic freedom influences the intensity of Islamic social giving at the national level remains unexplored. This study investigates the impact of economic freedom on Islamic Social Giving Intensity (ISGI), measured as the ratio of ZIS collection to nominal GDP, in Indonesia over the period 2002-2025. Using the Heritage Foundation's Index of Economic Freedom (IEF) and a nonlinear autoregressive distributed lag (NARDL) framework, the study examines whether positive and negative changes in IEF generate asymmetric effects on ISGI in both the short and long run. The results confirm the existence of significant asymmetry in both horizons. Positive changes in IEF significantly increase ISGI, while negative changes significantly reduce ISGI, indicating that Islamic social giving responds differently to expansions and contractions in economic freedom. The findings suggest that a more favorable economic environment can strengthen the mobilization of Islamic social resources, whereas a deterioration in economic freedom may weaken the capacity for Islamic social giving. These findings highlight the role of economic freedom in shaping Islamic social giving and inform policies to strengthen Islamic social finance in Indonesia.

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1. Introduction

Islamic social giving constitutes an important component of the Islamic socioeconomic system, particularly in Muslim-majority countries where religiously motivated transfers can complement formal social protection mechanisms and contribute to inclusive development [1]. Zakat, infaq, and sadaqah (ZIS) serve complementary functions in redistributing resources, supporting vulnerable populations, and strengthening social solidarity. While zakat represents a religious obligation subject to specific conditions, infaq and sadaqah provide broader channels for voluntary contributions, enabling individuals to support social welfare according to their financial capacity and preferences [2]. Beyond their

immediate charitable functions, these instruments can facilitate the redistribution of economic resources, expand access to basic needs, and support poverty alleviation [3, 4].

In Indonesia, the institutionalization of Islamic social finance through the National Zakat Agency (BAZNAS) and other zakat management organizations has strengthened the mechanisms for collecting and distributing these contributions [5]. The scale of this activity is reflected in BAZNAS's reported collection of approximately Rp44.7 trillion in zakat, infaq, sadaqah, and other religious social funds (ZIS-DSKL) in 2025, encompassing both on-balance-sheet and off-balance-sheet collections [6]. Although this aggregate should not be interpreted as ZIS collection alone because it includes other religious social funds, it illustrates the economic significance of organized Islamic social finance in Indonesia. Nevertheless, the contribution of Islamic social giving to inclusive development depends not only on the institutional capacity to collect and distribute funds but also on the economic conditions that shape donors' financial resources and their capacity to contribute [7].

Understanding these conditions requires examining the factors that influence the intensity of Islamic social giving relative to the size of the economy. In particular, the ratio of ZIS collection to nominal gross domestic product (GDP) provides a useful perspective because an increase in absolute collection does not necessarily indicate that Islamic social giving has become more intensive relative to overall economic activity. Collection may rise alongside nominal GDP without a corresponding increase in the proportion of economic output mobilized through Islamic social giving [8]. This distinction is especially relevant in Indonesia, where the development of Islamic social finance occurs alongside changes in income-generating opportunities, market activity, and institutional arrangements [9]. Economic conditions may affect not only the financial capacity of households and businesses to contribute but also the opportunities and incentives to channel contributions through formal zakat management institutions [10]. Accordingly, examining Islamic Social Giving Intensity (ISGI), measured as ZIS collection relative to nominal GDP, offers a basis for investigating how broader economic and institutional changes relate to the mobilization of Islamic social resources. Identifying these determinants is important for understanding whether the expansion of economic activity is accompanied by a proportional strengthening of Islamic social giving and for informing efforts to enhance the contribution of Islamic social finance to social welfare and inclusive development.

One potentially important but insufficiently examined factor is economic freedom. Economic freedom broadly concerns the institutional and policy conditions under which individuals and businesses can engage in economic activity, allocate resources, conduct transactions, and accumulate wealth [11]. In this study, economic freedom is measured using the Index of Economic Freedom (IEF) developed by the Heritage Foundation, which encompasses four dimensions: rule of law, government size, regulatory efficiency, and open markets. These dimensions capture institutional conditions extending beyond market liberalization alone, including property rights protection, judicial effectiveness, fiscal conditions, business regulation, and access to domestic and international markets [12]. The relevance of economic freedom to Islamic social giving arises from its potential influence on the economic resources available for charitable contributions and the institutional environment in which these contributions are generated and mobilized. More predictable property rights, efficient business regulations, and greater opportunities for investment and trade may expand productive activity, strengthen income-generating capacity, and increase the resources available to potential donors [13, 14]. At the same time, the relationship may depend on how economic institutions shape the distribution of economic gains and the incentives to channel resources through formal charitable organizations. Economic freedom therefore provides a broader institutional perspective for understanding Islamic social giving beyond conventional macroeconomic indicators.

Theoretically, the relationship between economic freedom and Islamic social giving can be explained through the Islamic Moral Economy (IME) framework, which emphasizes that economic activities should be guided by Islamic ethical principles, social responsibility, and distributive justice [15]. From this perspective, improvements in economic freedom may stimulate entrepreneurship, employment, investment, and market participation [16], thereby expanding the financial capacity of individuals and businesses to contribute to ZIS. More secure property rights and a predictable business environment may also facilitate wealth accumulation and management, while greater economic formalization may make financial transactions and charitable contributions easier to organize and record [17]. These mechanisms suggest that economic freedom can support Islamic social giving when the economic opportunities it creates are translated into socially responsible wealth redistribution. However, IME does not treat economic freedom or wealth accumulation as ends in themselves; their broader significance depends on

whether economic activities remain consistent with Islamic ethical values and distributive justice. Greater market openness and economic activity may generate unevenly distributed gains, while changes in government size, regulatory arrangements, and market conditions may affect different income groups unequally [18]. Moreover, the mobilization of ZIS depends not only on material resources but also on religious commitment, institutional trust, governance quality, and preferences for formal or informal charitable channels [19]. Accordingly, the IME framework provides a basis for expecting a positive relationship between economic freedom and Islamic social giving intensity while recognizing that this relationship depends on how economic opportunities interact with ethical commitments and the institutions governing ZIS collection.

Existing empirical research provides relevant foundations for investigating this relationship, but the literature has largely developed along separate lines. Research on economic freedom has examined its relationship with conventional economic outcomes [11], development indicators [20], and the functioning of financial institutions [21]. Meanwhile, studies of ZIS collection in Indonesia have primarily investigated macroeconomic and socioeconomic determinants, including income [22], economic growth [3], inflation [23], employment [24], and other indicators of economic conditions [25, 26]. For specific example, Almeyda & Rusgianto [27] examine the relationship between macroeconomic variables and ZIS collection in Indonesia, while Yanti & Parlina [28] investigate the role of economic growth, employment, GDP per capita, and minimum wages in explaining ZIS receipts. More recent research by Akbar et al. [29] and Febriandika & Rohmah [30] has also examined institutional and operational factors alongside regional economic conditions. Although these studies provide insights into the determinants of Islamic social giving, they do not directly establish whether a broader institutional construct such as economic freedom influences national Islamic social giving intensity. To the best of our knowledge, no previous empirical study has examined the asymmetric effects of economic freedom on Islamic social giving intensity in Indonesia. This gap is consequential because economic freedom encompasses institutional and regulatory conditions that may influence the capacity to generate wealth as well as the environment in which charitable resources are mobilized.

To address this gap, this study investigates the effects of economic freedom on Islamic Social Giving Intensity (ISGI) in Indonesia over the period 2002–2025. ISGI is measured as the ratio of ZIS collection to nominal gross domestic product (GDP), capturing the intensity of recorded Islamic social giving relative to the size of the national economy rather than its absolute monetary value. This distinction is important because nominal ZIS collection may increase alongside economic expansion without necessarily representing a greater relative contribution to social giving. By relating ZIS collection to nominal GDP, the study examines whether economic freedom is associated with changes in the relative intensity of Islamic social resource mobilization. The analysis employs the nonlinear autoregressive distributed lag (NARDL) framework to distinguish positive and negative changes in economic freedom and estimate their potentially asymmetric effects in both the short and long run. Unlike a conventional linear ARDL specification, which imposes symmetric responses to positive and negative changes in the explanatory variable, NARDL allows these responses to differ in magnitude and direction. This approach is particularly relevant when improvements and deteriorations in institutional conditions may affect economic activity and charitable behavior through different adjustment processes.

The study contributes to the literature in three ways. First, it extends empirical research on the determinants of Islamic social giving by introducing economic freedom as a broader institutional and economic factor, connecting the literature on economic institutions with research on Islamic social finance. Second, it shifts the analytical focus from absolute ZIS collection to Islamic social giving intensity relative to nominal GDP, providing a measure of the extent to which Islamic social giving evolves alongside the national economy. Third, by applying NARDL, the study examines whether increases and decreases in economic freedom have different short-run and long-run implications for Islamic social giving. The findings can therefore inform a more nuanced understanding of how economic institutions relate to the mobilization of Islamic social resources in Indonesia. More broadly, the study provides evidence relevant to discussions on strengthening Islamic social finance as a complement to formal social protection and inclusive development, while recognizing that the implications of economic freedom for charitable giving depend on the mechanisms through which institutional conditions influence economic capacity and contribution behavior.

2. Methodology

2.1. Data and Variables

The study uses Indonesian time-series data covering the period from 2002 to 2025 and incorporates five variables. The study period is determined by the availability of data on Islamic Social Giving Intensity (ISGI), calculated as the

Table 1. Variable synopsis.

Status	Description	Symbol	Units	Definition
Dependent	Islamic Social Giving Intensity	ISGI	Ratio	Measured as the ratio of annual ZIS (zakat, infaq, and sadaqah) collection to nominal GDP.
Main Independent	Index of Economic Freedom	IEF	Score scale from 0 to 100	Measured using the Heritage Foundation's annual index, which assesses the degree of economic freedom across multiple indicators.
Control Independent	Real GDP per Capita	RGDPC	Constant Rupiah	Measured as GDP per capita in constant local currency units (LCU), capturing real economic output per person.
	Inflation Rate	INF	Percent	Measured as the annual percentage change in the consumer price index (CPI).
	Unemployment Rate	UNEMPLOY	Percent	Measured as the percentage of the labor force that is unemployed but available and actively seeking employment.

ratio of zakat, infaq, and sadaqah (ZIS) collection to nominal GDP, reported by the National Board of Zakat of the Republic of Indonesia (BAZNAS RI). Accordingly, the period is selected to ensure the availability of consistent annual observations for constructing the dependent variable and conducting the empirical analysis.

Islamic Social Giving Intensity (ISGI) serves as the dependent variable, the Index of Economic Freedom (IEF) is the main independent variable, and real GDP per capita (RGDPP), the inflation rate (INF), and the unemployment rate (UNEMPLOY) are included as control variables. ISGI data are obtained from the BAZNAS RI [6], IEF data from the Heritage Foundation [31], and the control variables from the World Bank's World Development Indicators [32].

Detailed descriptions of the variables used in this study are provided in Table 1.

2.2. Model Specification

The study specifies Islamic Social Giving Intensity (ISGI) as a function of the Index of Economic Freedom (IEF), real GDP per capita (RGDPC), inflation (INF), and unemployment (UNEMPLOY). IEF is the main explanatory variable, while RGDPC, INF, and UNEMPLOY are included as control variables to account for other macroeconomic conditions that may be associated with ISGI. The model is formulated sequentially, beginning with the functional relationship in Equation 1.

$$ISGI = f(IEF, RGDPC, INF, UNEMPLOY) \quad (1)$$

Here, $ISGI$ represents Islamic Social Giving Intensity, IEF represents Index of Economic Freedom, $RGDPC$ represents real gross domestic product per capita, INF represents Inflation rate, and $UNEMPLOY$ represents unemployment rate.

Based on the functional relationship specified in Equation 1, the economic model of the study is formulated as shown in Equation 2.

$$ISGI_t = \beta_0 + \beta_1 IEF_t + \beta_2 RGDPC_t + \beta_3 INF_t + \beta_4 UNEMPLOY_t \quad (2)$$

The economic model in Equation 2 is then transformed into an econometric model by incorporating an error term, as presented in Equation 3.

$$ISGI_t = \beta_0 + \beta_1 IEF_t + \beta_2 RGDPC_t + \beta_3 INF_t + \beta_4 UNEMPLOY_t + \varepsilon_t \quad (3)$$

To facilitate the interpretation of the estimated coefficients in percentage terms, all variables are transformed into natural logarithmic form. For variables originally expressed as percentages, the values are first converted into decimal form before applying the natural logarithm. The final econometric specification is presented in Equation 4.

$$lnISGI_t = \beta_0 + \beta_1 lnIEF_t + \beta_2 lnRGDPC_t + \beta_3 lnINF_t + \beta_4 lnUNEMPLOY_t + \varepsilon_t \quad (4)$$

Here, ln denotes the natural logarithm, t represents the study period, β_0 denotes the intercepts, $\beta_1 - \beta_4$ represent the coefficients, and ε denotes the error term.

$$\Delta \ln(ISGI_t) = \beta_0 + \sum_{k=1}^{p} \delta_k \Delta \ln(ISGI_{t-k}) + \sum_{j=0}^{q} (\beta_{1j}^{(+)} \Delta \ln\left(IEF_{t-j}^{(+)}\right) + \beta_{1j}^{(-)} \Delta \ln\left(IEF_{t-j}^{(-)}\right)) + \sum_{j=0}^{q} \beta_{2j} \Delta \mathrm{lnRGDPC}_{t-j} + \sum_{j=0}^{q} \beta_{3j} \Delta \mathrm{lnINF}_{t-j} + \sum_{j=0}^{q} \beta_{4j} \Delta \mathrm{lnUNEMPLOY}_{t-j} + \lambda ECT_{t-1} + \varepsilon_t \quad (5)$$

$$ECT_{t-1} = lnISGI_{t-1} - \theta_1^{(+)} lnIEF_{t-1}^{(+)} - \theta_1^{(-)} lnIEF_{t-1}^{(-)} - \theta_2 lnRGDPC_{t-1} - \theta_3 lnINF_{t-1} - \theta_4 lnUNEMPLOY_{t-1} \quad (6)$$

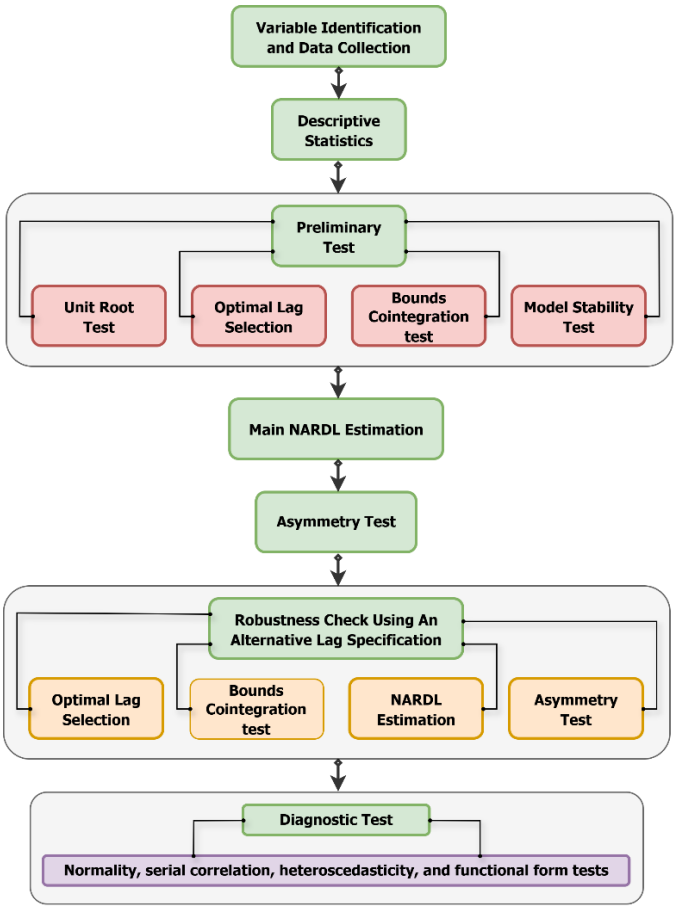


Figure 1. Study's empirical estimation procedures.

2.3. Method: Nonlinear Autoregressive Distributed Lag (NARDL)

The Nonlinear Autoregressive Distributed Lag (NARDL) approach, developed by Shin et al. [33], extends the conventional ARDL framework by allowing the effects of positive and negative changes in an explanatory variable to differ in both the short run and the long run. Unlike the standard ARDL model, which generally imposes symmetric responses to increases and decreases in an explanatory variable [34–36], NARDL decomposes the changes in the variable of interest into positive and negative partial sums. This decomposition enables the model to identify whether increases and decreases in the IEF exert statistically different effects on the dependent variable. The NARDL framework also accommodates variables integrated of order zero (I(0)) and order one (I(1)), provided that none is integrated of order two (I(2)), and allows the estimation of both short-run dynamics and long-run relationships within a single framework.

NARDL is particularly suitable for this study because the relationship between economic freedom and Islamic Social Giving Intensity may be asymmetric, such that increases in economic freedom may not produce effects of the same magnitude or direction as decreases. By separating positive and negative changes in IEF, the model provides a framework for testing this possibility rather than imposing symmetry in advance.

The NARDL model used in this study is presented in Equation 5, while the error-correction term is defined in Equation 6. In these equations, $IEF^{(+)}$ and $IEF^{(-)}$ represent the positive and negative partial sums of changes in the natural logarithm of Index of Economic Freedom. The coefficients $\theta^{(+)}$ and $\theta^{(-)}$ capture the corresponding long-run relationships, while $\beta^{(+)}$ and $\beta^{(-)}$ capture the corresponding short-run relationships. The coefficients λ measures the speed of adjustment toward long-run equilibrium. A negative and statistically significant λ generally supports convergence toward equilibrium.

2.4. Empirical Estimation Procedures

As illustrated in Figure 1, the empirical analysis begins with variable identification and data collection, followed by descriptive statistics to summarize the characteristics of the variables. Preliminary tests are then conducted, comprising the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests to examine the stationarity properties of the variables, the Akaike Information Criterion (AIC) to determine the optimal lag structure, the bounds cointegration test to assess the existence of a

Table 2. Descriptive statistics in original form.

Variables	Mean	Median	Max.	Min.	Std. Dev.	Skewness	Kurtosis
ISGI	5.28E-04	2.94E-04	1.88E-03	3.73E-05	5.50E-04	1.4321	3.8737
IEF	58.8	57.5	67.2	51.9	5.1654	0.2659	1.6064
RGDPC	32571929.41	32482167.94	47530680.22	20100604.68	8392185.49	0.1029	1.7952
INF	0.0551	0.0476	0.1311	0.0156	0.0316	0.9696	3.1570
UNEMPLOY	0.0513	0.0443	0.0806	0.0324	0.0162	0.5563	1.8398

Table 3. Descriptive statistics in natural logarithmic form.

Variables	Mean	Median	Max.	Min.	Std. Dev.	Skewness	Kurtosis
lnISGI	-8.0664	-8.1327	-6.2784	-10.196	1.0973	-0.1515	2.4085
lnIEF	4.0701	4.0517	4.2077	3.9493	0.0873	0.1965	1.5862
lnRGDPC	17.266	17.296	17.677	16.816	0.2660	-0.1903	1.7784
lnINF	-3.0537	-3.0480	-2.0319	-4.1604	0.5797	-0.1081	2.3641
lnUNEMPLOY	-3.0170	-3.1174	-2.5183	-3.4305	0.3073	0.3052	1.6839

Table 4. Results of unit root test.

Variables	Level				1st Diff.			
	ADF		*PP*		*ADF*		*PP*	
	t-Stat.	**Prob.**	**t-Stat.**	**Prob.**	**t-Stat.**	**Prob.**	**t-Stat.**	**Prob.**
lnISGI	0.6212	0.6212	-1.2845	0.6187	-4.8161***	0.0009	-4.8378***	0.0010
lnIEF	-0.3308	0.9057	-0.4432	0.8855	-4.1638***	0.0042	-4.2272***	0.0036
lnRGDPC	-1.0798	0.7057	-1.0875	0.7027	-3.9280***	0.0070	-3.9090***	0.0074
lnINF	-1.9561	0.3026	-1.8198	0.3620	-6.2632***	0.0000	-10.699***	0.0000
lnUNEMPLOY	-0.2696	0.9148	-0.3928	0.8949	-5.9698***	0.0001	-5.8731***	0.0001

Note: *** denotes significance level at 1%.

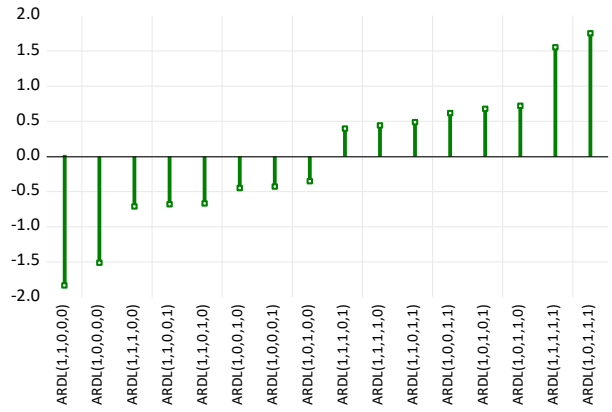


Figure 2. ARDL model selection based on the normalized Akaike Information Criterion (AIC).

long-run relationship, and the CUSUM and CUSUM of Squares (CUSUMQ) tests to evaluate model stability. Subsequently, the main NARDL model is estimated to examine the short-run and long-run effects of positive and negative changes in IEF on ISGI. Wald asymmetry tests are then performed to determine whether the effects of positive and negative changes differ significantly in the short and long run.

Robustness checks are conducted using an alternative lag specification to assess the consistency of the main findings. This procedure involves selecting the optimal lag structure using the AIC, conducting the bounds cointegration test, re-estimating the NARDL model, and performing Wald asymmetry tests under the alternative specification. Finally, diagnostic tests are conducted to assess the adequacy of the estimated model. These include the Jarque-Bera test for residual normality, the Breusch-Godfrey LM test for serial correlation, the Breusch-Pagan-Godfrey test for heteroskedasticity, and the Ramsey RESET test for functional form misspecification. Collectively, these procedures provide a systematic assessment of the reliability and robustness of the empirical results.

3. Results

3.1. Descriptive Statistics

Tables 2 and 3 present the descriptive statistics of the study variables in their original and natural logarithmic forms, respectively. The original-form statistics in Table 2 provide an overview of the variables' actual magnitudes and dispersion, while Table 3 describes their distributions after logarithmic transformation, consistent with the variables used in the NARDL estimation.

As reported in Table 2, ISGI has a mean of 0.000528 and a median of 0.000294, with values ranging from 0.0000373 to 0.00188. The mean exceeding the median, together with positive skewness (1.4321), indicates a right-skewed distribution. IEF has a mean of 58.8, ranging from 51.9 to 67.2, with a standard deviation of 5.1654, indicating relatively limited variation in economic freedom over the sample period. RGDPC has a mean of approximately IDR 32.57 million and a standard deviation

Table 5. Results of ARDL bounds cointegration test.

Test Stat.	Value	Significance	I(0)	I(1)
F-Stat.	10.272***	At 10%	2.41	3.52
		At 5%	2.91	4.19
		At 1%	4.13	5.76

Note: *** denotes significance level at 1%. The ARDL model specification is (1, 1, 0, 0, 0).

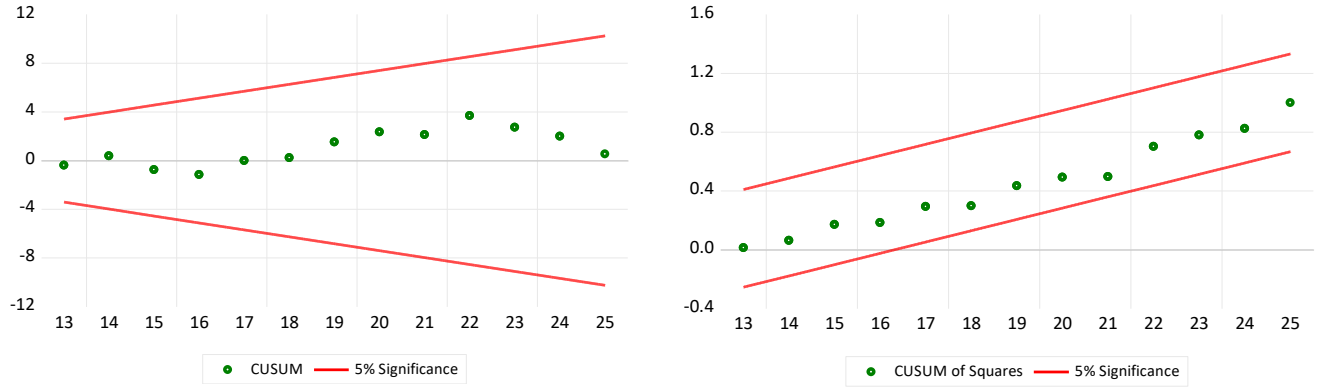


Figure 3. Results of CUSUM and CUSUMQ test.

of IDR 8.39 million. Meanwhile, INF and UNEMPLOY have mean values of 0.0551 and 0.0513, respectively, equivalent to approximately 5.51% and 5.13% if expressed as proportions. Both variables exhibit positive skewness, particularly inflation (0.9696), suggesting that higher observations extend the distributions toward the right.

Table 3 provides additional insights into the distributional characteristics of the logarithmically transformed variables. The skewness values for lnISGI, lnIEF, and lnRGDPC are −0.1515, 0.1965, and −0.1903, respectively, indicating relatively mild asymmetry. The corresponding kurtosis values are below 3, suggesting less peaked distributions than the normal distribution. For lnINF and lnUNEMPLOY, skewness values of −0.1081 and 0.3052 likewise indicate relatively modest asymmetry, while their kurtosis values of 2.3641 and 1.6839 suggest comparatively flatter distributions. Overall, the descriptive statistics provide an initial characterization of the data's central tendency, dispersion, and distributional properties. The logarithmic transformation also appears to reduce the pronounced right skewness observed in the original series.

3.2. Preliminary Test

3.2.1. Unit Root Test

As reported in Table 4, the unit root test results indicate that all variables are non-stationary in levels but become stationary after first differencing. Specifically, both the ADF and PP tests fail to reject the null hypothesis of a unit root at levels for lnISGI, lnIEF, lnRGDPC, lnINF, and lnUNEMPLOY, with all corresponding p-values exceeding conventional significance levels. After first differencing, however, both tests reject the unit-root null at the 1% level for all variables, confirming that each series is integrated of order one, I(1). This result indicates that the variables do not contain any I(2) process, satisfying an important precondition for applying the NARDL framework.

3.2.2. Optimal Lag Selection

Figure 2 presents the lag-order selection based on the normalized Akaike Information Criterion (AIC). The preferred specification is the model associated with the lowest AIC value, as a lower information criterion indicates a better balance between goodness of fit and model parsimony. As shown in the figure, the minimum normalized AIC is obtained by the ARDL(1,1,0,0,0) specification, with an AIC value of approximately -1.89. Therefore, this lag structure is selected as the baseline specification for the subsequent NARDL estimation. The selected model incorporates one lag of the dependent variable (lnISGI), one lag of the main explanatory variable (lnIEF), and zero additional lags for lnRGDPC, lnINF, and lnUNEMPLOY.

3.2.3. Bounds Cointegration Test

Following confirmation that all variables are integrated at I(1) and that the optimal lag structure has been identified, the ARDL bounds test is conducted to determine whether a long-run equilibrium relationship exists among the variables. As reported in Table 5, the selected ARDL(1,1,0,0,0) specification produces an F-statistic of 10.272, which exceeds the upper-bound critical value, I(1), at the 1% significance level (5.76), as well as the corresponding critical values at the 5% (4.19) and 10% (3.52) levels. Therefore, the null hypothesis of no long-run

Table 6. Results of NARDL estimation.

Dependent Variable: lnISGI								
Independent	Short-run				Long-run			
Variables	**Coef.**	**Std. Er.**	**t-Stat.**	**Prob.**	**Coef.**	**Std. Er.**	**t-Stat.**	**Prob.**
$lnISGI_{(-1)}$	-0.9613	0.1448	-6.6377***	0.0000	–	–	–	–
$lnIEF^{(+)}$	2.4740	0.7826	3.1611***	0.0051	–	–	–	–
$lnIEF^{(-)}$	-6.6168	0.7817	-8.4650***	0.0000	–	–	–	–
$lnIEF^{(+)}_{(-1)}$	4.2715	1.1141	3.8340***	0.0021	4.4436	1.1225	3.9586***	0.0011
$lnIEF^{(-)}_{(-1)}$	-13.509	2.2577	-5.9838***	0.0000	-14.054	1.5336	-9.1642***	0.0000
lnRGDPC	0.4248	0.7738	0.5490	0.5923	0.4420	0.7907	0.5590	0.5839
lnINF	-0.1144	0.0608	-1.8801*	0.0827	-0.1190	0.0611	-1.9472*	0.0693
lnUNEMPLOY	0.0472	0.2643	0.1787	0.8610	0.0491	0.2755	0.1783	0.8607
C	-17.129	12.998	-1.3178	0.2103	-17.820	12.758	-1.3968	0.1816
$ECT_{(-1)}$	-0.9613	0.0938	-10.252***	0.0000	–	–	–	–
R^2	0.8489							
Adj. R^2	0.8330							
F-Stat.	53.384***							
Prob. (F-Stat.)	0.0000							

Note: *** and * denote significance levels at 1% and 10%, respectively. The ARDL model specification is (1, 1, 0, 0, 0).

Table 7. Results of the Wald asymmetry test.

Stat.	*Short-run*		*Long-run*		*Joint (Short-Run and Long-Run)*	
	Value	**Prob.**	**Value**	**Prob.**	**Value**	**Prob.**
F-Stat.	11.489***	0.0048	37.029***	0.0000	19.338***	0.0001
Chi-square	11.489***	0.0007	37.029***	0.0000	38.677***	0.0000

Note: *** denotes significance level at 1%. The ARDL model specification is (1, 1, 0, 0, 0).

relationship is rejected at the 1% significance level, indicating the existence of a statistically significant long-run cointegrating relationship among ISGI, IEF, and the control variables. This finding confirms that the variables move together toward a long-run equilibrium despite their non-stationarity in levels.

3.2.4. Model Stability Test

Figure 3 presents the CUSUM and CUSUMQ tests used to assess the stability of the estimated NARDL model. The CUSUM statistic remains within the 5% significance boundaries throughout the sample period, indicating that the regression coefficients are stable and that there is no evidence of systematic structural instability. Similarly, the CUSUM of Squares (CUSUMQ) statistic remains within its corresponding 5% critical bounds, suggesting that the model does not experience significant instability in the variance of the residuals. Taken together, these results indicate that the estimated NARDL model is structurally stable over the study period.

3.3. Main NARDL Estimation

Table 6 reports the NARDL estimation results for lnISGI, using the ARDL(1,1,0,0,0) specification identified previously. The short-run estimates distinguish positive and negative partial-sum changes in the lnIEF, allowing the effects of increases and decreases in economic freedom to differ. Both the positive and negative components are statistically significant at the 1% level. The contemporaneous coefficients of $lnIEF^{(+)}$ and $lnIEF^{(-)}$ are 2.4740 ($p = 0.0051$) and -6.6168 ($p < 0.001$), respectively, while their one-period lagged coefficients are 4.2715 ($p = 0.0021$) and -13.509 ($p < 0.001$). Thus, both components contribute significantly to short-run movements in lnISGI, providing initial evidence that positive and negative changes in economic freedom have different estimated effects. However, formal evidence of asymmetry should be established using the corresponding Wald test rather than inferred solely from differences between the coefficients.

In the long run, the estimated coefficients for $lnIEF^{(+)}$ and $lnIEF^{(-)}$ are 4.4436 ($p = 0.0011$) and -14.054 ($p < 0.001$), respectively. Both coefficients are statistically significant at the 1% level, indicating that the positive and negative components of economic freedom are individually associated with the long-run equilibrium level of lnISGI. The substantial difference between the two coefficients further indicates the possibility of long-run asymmetry, although, as with the short-run results, a formal Wald test is required to statistically confirm whether the difference between the positive and negative effects is significant.

Among the control variables, lnRGDPC is statistically insignificant in both the short run ($p = 0.5923$) and long run ($p = 0.5839$). lnINF is marginally significant at the 10% level in both horizons, with coefficients of -0.1144 ($p = 0.0827$) in the short run and -0.1190 ($p = 0.0693$) in the long run. lnUNEMPLOY is statistically insignificant in both the short run and long run. These control-variable results

Table 8. Results of ARDL bounds cointegration test using the alternative lag specification.

Test Stat.	Value	Significance	I(0)	I(1)
F-Stat.	11.021***	At 10%	2.41	3.52
		At 5%	2.91	4.19
		At 1%	4.13	5.76

Note: *** denotes significance level at 1%. The ARDL model specification is (2, 1, 0, 0, 0).

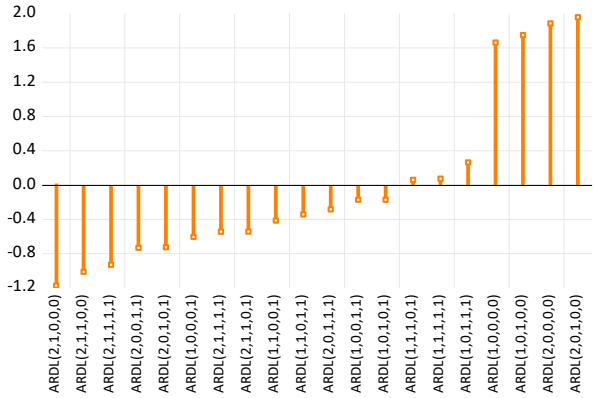


Figure 4. Alternative ARDL model selection based on the normalized Akaike Information Criterion (AIC).

are interpreted primarily in terms of their statistical significance and model dynamics.

The error-correction term ($ECT_{(-1)}$) is negative and highly statistically significant, with a coefficient of -0.9613 ($p < 0.001$). This satisfies the expected sign and significance conditions for an error-correction mechanism and confirms the presence of adjustment toward the long-run equilibrium following short-run deviations. The magnitude indicates that approximately 96.13% of a disequilibrium from the previous period is corrected within one period, implying a relatively rapid adjustment process. The coefficient is also consistent with a stable error-correction mechanism because it lies between -1 and 0. Finally, the model exhibits relatively strong overall explanatory performance, with an R^2 of 0.8489 and adjusted R^2 of 0.8330. The F-statistic of 53.384 ($p < 0.001$) indicates that the regressors are jointly statistically significant in explaining variation in lnISGI.

3.4. Asymmetry Test

Table 7 reports the Wald asymmetry tests used to formally determine whether changes in the IEF have symmetric or asymmetric effects on lnISGI. The null hypothesis is that the coefficients associated with positive and negative changes in lnIEF are equal. The results reject this null hypothesis at the 1% significance level across all three horizons. In the short run, the F-statistic is 11.489 ($p = 0.0048$), while the corresponding chi-square statistic is also statistically significant ($p = 0.0007$). Thus, the short-run effects of positive and negative changes in economic freedom are statistically different.

For the long run, the Wald test produces an F-statistic of 37.029 ($p < 0.001$) and a chi-square statistic with $p < 0.001$, providing strong evidence against long-run symmetry. Therefore, the positive and negative changes in economic freedom have statistically different long-run effects on lnISGI. The joint test also rejects symmetry, with an F-statistic of 19.338 ($p = 0.0001$) and a chi-square statistic of 38.677 ($p < 0.001$), confirming that asymmetry is present when the short-run and long-run effects are considered jointly.

Overall, the Wald tests provide formal statistical evidence that the response of Islamic Social Giving Intensity to increases and decreases in economic freedom is asymmetric in both the short and long run. This result validates the use of the NARDL specification rather than imposing a symmetric linear relationship between economic freedom and Islamic Social Giving Intensity.

3.5. Robustness Check Using an Alternative Lag Specification

3.5.1. Optimal Lag Selection Test for the Alternative Lag Specification

To assess the robustness of the baseline specification, an alternative lag selection procedure was conducted using the normalized Akaike Information Criterion (AIC). As shown in Figure 4, the ARDL(2,1,0,0,0) specification yields the lowest normalized AIC value among the alternative lag structures considered. Accordingly, this specification is selected as the alternative lag model for the subsequent robustness analysis. Compared with the baseline ARDL(1,1,0,0,0) specification, the alternative model increases the lag order of the dependent variable from one to two periods while maintaining one lag for lnIEF and zero lags for the control variables. The use of this alternative specification provides a basis for examining whether the main NARDL findings remain consistent when a different lag structure is employed.

3.5.2. Bounds Cointegration Test Using the Alternative Lag Specification

The ARDL bounds cointegration test results for the alternative ARDL(2,1,0,0,0) specification are reported in Table 8. The calculated F-statistic of 11.021 exceeds the upper-bound critical value, I(1), at the 1% significance level (5.76), as well as the corresponding critical values at the 5% (4.19) and 10% (3.52) levels. Therefore, the null

Table 9. Results of NARDL estimation using the alternative lag specification.

Dependent Variable: lnISGI								
Independent	Short-run				Long-run			
Variables	**Coef.**	**Std. Er.**	**t-Stat.**	**Prob.**	**Coef.**	**Std. Er.**	**t-Stat.**	**Prob.**
$lnISGI_{(-1)}$	-0.9229	0.1384	-6.6670***	0.0000	–	–	–	–
$lnISGI_{(-2)}$	-0.2401	0.0762	-3.1511***	0.0055	–	–	–	–
$lnIEF^{(+)}$	2.8590	0.7556	3.7839***	0.0014	–	–	–	–
$lnIEF^{(-)}$	-6.1218	0.7640	-8.0124***	0.0000	–	–	–	–
$lnIEF^{(+)}_{(-1)}$	5.0724	1.1588	4.3773***	0.0009	5.4965	1.3316	4.1276***	0.0008
$lnIEF^{(-)}_{(-1)}$	-13.514	2.1264	-6.3553***	0.0000	-14.644	1.5706	-9.3239***	0.0000
lnRGDPC	0.0584	0.7628	0.0766	0.9402	0.0633	0.8238	0.0768	0.9397
lnINF	-0.0522	0.0689	-0.7576	0.4633	-0.0565	0.0725	-0.7802	0.4466
lnUNEMPLOY	0.0801	0.2498	0.3208	0.7539	0.0868	0.2719	0.3193	0.7536
C	-10.270	12.946	-0.7933	0.4430	-11.129	13.438	-0.8281	0.4198
$ECT_{(-1)}$	-0.9229	0.0858	-10.757***	0.0000	–	–	–	–
R^2	0.8763							
Adj. R^2	0.8557							
F-Stat.	42.501							
Prob. (F-Stat.)	0.0000							

Note: *** and * denote significance levels at 1% and 10%, respectively. The ARDL model specification is (2, 1, 0, 0, 0).

Table 10. Results of the Wald asymmetry test using the alternative lag specification.

Stat.	*Short-run*		*Long-run*		*Joint (Short-Run and Long-Run)*	
	Value	**Prob.**	**Value**	**Prob.**	**Value**	**Prob.**
F-Stat.	12.631***	0.0040	44.182***	0.0000	22.952***	0.0001
Chi-square	12.631***	0.0004	44.182***	0.0000	45.905***	0.0000

Note: *** denotes significance level at 1%. The ARDL model specification is (2, 1, 0, 0, 0).

hypothesis of no long-run relationship is rejected at the 1% significance level, confirming the existence of a long run cointegrating relationship among Islamic Social Giving Intensity, the Index of Economic Freedom, and the control variables under the alternative lag specification. This result is consistent with the baseline model and indicates that the evidence of a long-run relationship remains robust to changes in the selected lag structure, supporting the use of the alternative specification for further robustness analysis of the NARDL estimates.

3.5.3. NARDL Estimation Using the Alternative Lag Specification

Using the alternative ARDL(2,1,0,0,0) specification, the NARDL estimation results in Table 9 show that the short-run coefficients of both positive and negative changes in lnIEF remain statistically significant at the 1% level. The contemporaneous coefficients are 2.8590 (p = 0.0014) for lnIEF(+) and −6.1218 (p < 0.001) for lnIEF(−), while their lagged coefficients are 5.0724 (p = 0.0009) and −13.514 (p < 0.001), respectively. The long-run coefficients also remain statistically significant at the 1% level, amounting to 5.4965 (p = 0.0008) for lnIEF(+) and −14.644 (p < 0.001) for lnIEF(−). These results are consistent with the baseline specification, indicating that the estimated effects of positive and negative changes in economic freedom remain statistically significant under an alternative lag structure. However, formal confirmation that the effects remain asymmetric requires the corresponding Wald asymmetry tests for this alternative specification.

Regarding the control variables, lnRGDPC, lnINF, and lnUNEMPLOY are statistically insignificant in both the short and long run, unlike the marginal short- and long-run significance of inflation in the baseline model. The error-correction term remains negative and statistically significant at the 1% level, with a coefficient of −0.9229 (p < 0.001), indicating that approximately 92.29% of the previous period's disequilibrium is corrected within one period. The model also exhibits strong explanatory performance, with an R^2 of 0.8763 and an adjusted R^2 of 0.8557. The overall F-statistic is 42.501 (p < 0.001), indicating that the regressors are jointly statistically significant. Overall, the alternative specification preserves the principal findings concerning the statistical significance and opposing signs of the positive and negative economic freedom components, supporting the robustness of the main results to changes in lag structure.

3.5.4. Asymmetry Test Using the Alternative Lag Specification

The Wald asymmetry test results for the alternative specification, reported in Table 10, further confirm that the null hypothesis of symmetry is rejected at the 1% significance level across all three tests. In the short run, the F-statistic is 12.631 (p = 0.0040), while the chi-square

Table 11. Results of the diagnostic tests of the main NARDL model.

Diagnostic Tests	Value	Prob.	Conclusion
Jarque-Bera	0.3052	0.8585	Residuals are normally distributed
Breusch-Godfrey LM test	0.6551	0.7207	No serial correlation exists
Breusch-Pagan-Godfrey test	7.3844	0.4958	No heteroscedasticity exists
Ramsey test	1.1239	0.3010	The model is properly specified

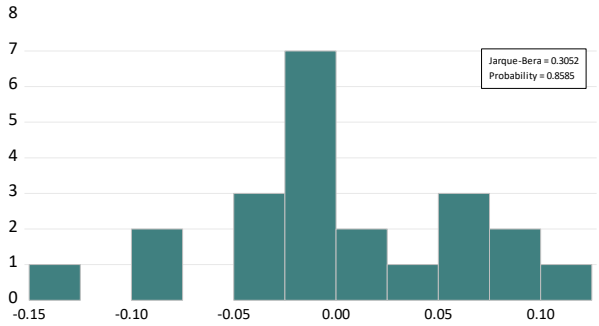


Figure 5. Results of normality test.

test yields p = 0.0004, indicating statistically significant differences between the effects of positive and negative changes in the Index of Economic Freedom. Similarly, the long-run tests produce an F-statistic of 44.182 ($p < 0.001$) and a statistically significant chi-square statistic ($p < 0.001$), confirming long-run asymmetry. The joint tests also reject symmetry, with an F-statistic of 22.952 (p = 0.0001) and a chi-square statistic of 45.905 ($p < 0.001$). These findings are consistent with the baseline specification, demonstrating that short-run and long-run asymmetry remains statistically significant under the alternative lag structure. Therefore, the evidence of asymmetric effects of economic freedom on Islamic Social Giving Intensity is robust to changes in lag specification.

3.6. Diagnostic Tests

In addition to robustness checks, diagnostic tests are conducted to assess the adequacy of the estimated main NARDL model with a specification of (1, 1, 0, 0, 0). As reported in Table 11 and Figure 5, the Jarque–Bera test yields a p-value of 0.8585, indicating that the null hypothesis of normally distributed residuals cannot be rejected. The Breusch–Godfrey LM test (p = 0.7207) provides no evidence of serial correlation, while the Breusch–Pagan–Godfrey test (p = 0.4958) indicates no significant evidence of heteroscedasticity. Furthermore, the Ramsey RESET test yields a p-value of 0.3010, suggesting no evidence of functional form misspecification. Since all p-values exceed the 5% significance level, the diagnostic results indicate that the model satisfies these key residual and specification checks, supporting the reliability of the estimated NARDL results and the associated statistical inferences.

4. Discussion

The results reveal a consistent positive relationship between economic freedom and Islamic Social Giving Intensity (ISGI) in Indonesia. Positive shocks to the Index of Economic Freedom (IEF) significantly increase ISGI, whereas negative shocks significantly reduce it. This pattern is observed in both the short and long run, suggesting that the relationship extends beyond immediate adjustments in charitable collection. The positive changes in IEF indicate that a 1% increase in the positive component of economic freedom is associated with an approximately 4.44% increase in ISGI, holding other factors constant. Conversely, the negative changes indicate that a 1% increase in the magnitude of the negative component is associated with an approximately 14.05% decrease in ISGI. The magnitude of the response to negative shocks is substantially greater than that to positive shocks, suggesting that deteriorations in economic freedom are associated with a stronger response in ISGI than comparable improvements. This interpretation is consistent with the asymmetric relationship confirmed by the Wald tests.

Theoretical explanation for these findings is that economic freedom influences the economic capacity of individuals and businesses to contribute to ZIS by shaping the conditions for entrepreneurship, investment, income generation, and market participation [37]. A more supportive economic environment may expand the resources available for religious and charitable contributions, while a deterioration in economic freedom may constrain these resources more substantially [38]. This interpretation is consistent with Lawson et al. [14], whose quantitative review finds that economic freedom is generally positively associated with economic growth, income, and investment. It is also consistent with Cai et al. [17], who identify economic freedom as one channel connecting institutional and cultural characteristics with charitable giving across countries. Although these studies do not examine Indonesia's ZIS/GDP ratio directly, they provide relevant theoretical and empirical support for the mechanism underlying the present findings.

The positive response of ISGI to improvements in economic freedom also suggests that the institutional environment may matter for Islamic social finance beyond its influence on aggregate economic

performance [39]. Economic freedom, as measured by the IEF, encompasses several dimensions, including property rights, government integrity, regulatory efficiency, and market openness [12]. Improvements in these dimensions may support the creation and accumulation of wealth and facilitate economic transactions, potentially expanding the capacity to contribute to ZIS [38]. Moreover, the relationship between economic freedom and philanthropy may reflect more than an income effect. Cai et al. [17] find that economic freedom contributes to charitable giving through an indirect institutional channel, while Jackson & Beaulier [13] report a positive association between economic freedom and philanthropy using US state-level data. These findings reinforce the possibility that institutional arrangements conducive to economic activity can coexist with, and potentially support, charitable behavior.

The negative effect of deteriorations in economic freedom provides an equally important insight. When economic freedom declines, ISGI also decreases, indicating that adverse changes in the economic and institutional environment may weaken the relative intensity of Islamic social giving. This response may arise when less favorable conditions constrain business activity, investment, income generation, or the accumulation of resources available for charitable contributions [14]. The larger absolute long-run elasticity associated with negative changes in IEF suggests that ISGI may be particularly sensitive to deteriorations in economic freedom. One possible explanation is that adverse institutional and economic conditions constrain the resources available for giving, whereas the benefits of improvements may take longer to translate into additional charitable contributions [40]. However, this explanation remains a proposed mechanism rather than a directly tested finding. Moreover, because ISGI is measured as ZIS collection relative to nominal GDP, a decline in ISGI does not necessarily mean that nominal ZIS collection has fallen; it may also occur when ZIS collection grows more slowly than nominal GDP. Accordingly, the results indicate a reduction in the relative intensity of recorded Islamic social giving rather than necessarily a decline in the absolute volume of contributions.

The short-run estimates reinforce this interpretation. Positive changes in IEF indicate that a 1% increase in the positive partial-sum component is associated with increases in ISGI ranging from approximately 2.47% to 4.27% across the reported short-run effects. In contrast, negative changes indicate that a 1% increase in the magnitude of the negative partial-sum component is associated with decreases in ISGI ranging from approximately 6.62% to 13.51%. These ranges suggest that the estimated responses to negative changes are larger in absolute magnitude than those to positive changes in both the short and long run. The variation across short-run coefficients reflects the dynamic adjustment captured by the NARDL specification rather than a single instantaneous response.

The significant short-run effects indicate that ISGI responds to changes in economic freedom within the adjustment period captured by the NARDL model. This may reflect the sensitivity of charitable contributions to changing economic conditions, particularly when those conditions affect current income, business performance, and donors' available resources [41, 42]. The significant long-run effects further indicate that the relationship persists beyond short-term adjustments. The error correction term (ECT) provides additional evidence regarding the speed at which deviations from the estimated long-run relationship are corrected. The estimated coefficient is negative, statistically significant, and less than one in absolute value, indicating that approximately 96.13% of the disequilibrium from the previous period is corrected within one period, leaving approximately 3.87% uncorrected, conditional on the model's dynamics. Given the annual frequency of the data, the estimate indicates a rapid adjustment of ISGI toward its long-run equilibrium relationship following short-run disturbances. The result complements the significant short-run and long-run coefficients by suggesting that deviations from the estimated equilibrium relationship are corrected relatively quickly.

In Indonesia, the mobilization of ZIS is shaped by institutional, organizational, and behavioral factors, in addition to broader economic conditions. Adinugraha et al. [10] highlight the opportunities for Islamic social finance to empower society, while identifying institutional and operational challenges that constrain its development. Similarly, Ardani & Pujiyono [8] examine the priority problems and potential solutions for optimizing zakat collection in Indonesia, emphasizing the importance of addressing collection-related challenges through more effective institutional strategies. At the organizational level, Amar et al. [19] find that digital fundraising, organizational capabilities, and religiosity are positively associated with zakat collection at LAZISMU, while institutional reputation mediates the effects of several organizational and behavioral factors. These studies suggest that the mobilization of Islamic social resources depends not only on donors' economic capacity but also on the effectiveness, credibility, and accessibility of zakat management institutions. The

present findings complement this literature by demonstrating that the broader economic and institutional environment, as reflected in economic freedom, is also associated with ISGI.

Finally, the robustness checks using an alternative lag specification confirm the principal findings, including the positive effects of positive IEF shocks, the negative effects of negative IEF shocks, and the presence of asymmetry. This consistency suggests that the central conclusions are not driven exclusively by the baseline lag structure. Together, the short-run and long-run elasticities, the significant error correction term, the Wald asymmetry tests, and the alternative-lag results provide converging evidence that economic freedom is an important correlate of Islamic social giving intensity in Indonesia. From a policy perspective, the findings suggest that efforts to strengthen Islamic social finance should consider the broader economic and institutional conditions affecting donors' capacity to contribute, alongside improvements in zakat governance, fundraising capabilities, and institutional credibility.

5. Conclusions and Policy Recommendations

Using annual data for Indonesia over the period 2002–2025, this study finds that positive changes in economic freedom significantly increase Islamic Social Giving Intensity (ISGI), whereas negative changes significantly reduce it in both the short and long run. The Wald tests confirm statistically significant asymmetry, indicating that the effects of improvements and deteriorations in economic freedom differ significantly. Furthermore, the negative and statistically significant error correction term indicates that approximately 96.13% of the disequilibrium from the previous period is corrected within one year. Robustness checks using an alternative lag specification further confirm the consistency of the main findings. Overall, the results highlight the importance of accounting for the direction of changes in economic freedom when examining the dynamics of ZIS mobilization in Indonesia.

The findings suggest that Indonesian policymakers should integrate economic institutional stability into strategies for strengthening Islamic social finance. Specifically, the government should prioritize predictable business regulations, consistent investment policies, and stronger property-rights protection to avoid institutional deterioration that may constrain the economic capacity to contribute to ZIS. Given the stronger estimated response of ISGI to negative changes in economic freedom, relevant ministries and regulatory agencies should establish periodic assessments of major regulatory changes to identify potential disruptions to business activity and household income. In parallel, BAZNAS and licensed zakat management organizations should develop contingency fundraising plans that can be activated during periods of economic or regulatory uncertainty, including expanding accessible digital payment channels, diversifying donor bases, and maintaining transparent reporting on collection and fund utilization to sustain public trust. These measures should be accompanied by regular monitoring of ZIS collection relative to nominal GDP, rather than collection totals alone, so that policymakers can distinguish an actual strengthening of Islamic social giving intensity from increases that merely accompany nominal economic expansion.

This study has several limitations that offer opportunities for future research. First, the analysis focuses exclusively on Indonesia, limiting the generalizability of the findings to other national contexts. Future studies could examine other Muslim-majority countries to determine whether the relationship between economic freedom and Islamic social giving varies across institutional and socioeconomic settings. Second, the use of national time-series data restricts the analysis to aggregate dynamics. If sufficiently consistent and comparable data become available, future research could employ provincial-level panel data to investigate regional heterogeneity within Indonesia. Third, although the NARDL framework captures asymmetric short- and long-run responses to positive and negative changes in economic freedom, future studies could apply quantile autoregressive distributed lag (QARDL) or quantile nonlinear autoregressive distributed lag (QNARDL) approaches to examine whether these relationships vary across different quantiles of Islamic social giving intensity. Finally, this study uses the composite Index of Economic Freedom, which may obscure the distinct effects of its underlying dimensions. Future research could therefore investigate the four pillars of economic freedom separately to identify which institutional and economic dimensions are most influential in shaping Islamic social giving.

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