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Aligning Indonesia's economic goals with SDGS: Strengthening Qur'anic principles in Islamic finance

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Abstract

Purpose – This research examines the relationship between Islamic bank financing aligned with the Sustainable Development Goals (SDGs) and economic growth, incorporating Qur'anic principles in Islamic finance.

Methodology – Quarterly time-series data from Q1 2014 to Q1 2022 were analyzed using the cointegration and ARDL approaches. Data sources include the PSIFIs for Islamic Banks (IFSB Database), Indonesia's GDP (BPS), and the Financial Services Authority (OJK).

Findings – Long-term analysis reveals that Islamic financing in SDG sectors such as SDG1 (No Poverty), SDG2 (Zero Hunger), SDG3 (Good Health and Well-being), SDG4 (Quality Education), and SDG11 (Sustainable Cities and Communities) positively correlate with economic growth, while SDG8 (Decent Work and Economic Growth) shows an inverse relationship. In the short term, financing in SDG2, SDG3, SDG8, and SDG9 (Industry, Innovation, and Infrastructure) positively impacts economic growth, whereas SDG6 (Clean Water and Sanitation) exhibits a negative association. These findings highlight Islamic finance's potential to address socio-economic challenges rooted in Qur'anic values, such as Surah al-Nisā' [4]: 29 and al-Baqarah [2]: 261.

Implications – Policymakers are encouraged to promote Islamic microfinance for SMEs and invest in rural sanitation infrastructure (SDG6). Furthermore, financing renewable energy projects (SDG7) aligns with sustainable development goals.

Originality – This study bridges Islamic finance and sustainable development by integrating a Qur'anic perspective into the SDG framework, offering insights into leveraging Islamic finance to achieve sustainability and economic growth, while adhering to Islamic ethical principles.

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Introduction

The achievement of the Sustainable Development Goals (SDGs) marks a significant milestone in global efforts to address social, economic, and environmental challenges worldwide (Biglari et al., 2022; Diaz-Lopez et al., 2021). Established by the United Nations in 2015, the SDGs encompass 17 goals aimed at eradicating poverty, combating inequality, and addressing climate change (Racioppi et al., 2020; Redek et al., 2020). The primary focus is ending poverty in all forms by ensuring equal access to economic, social, and natural resources (Leal Filho., 2021; Monaco, 2024b). The SDGs also

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aim to eliminate global hunger by enhancing food security, improving nutrition, and supporting sustainable agriculture (Mensi & Udenigwe, 2021; Mrabet, 2023; Saravanakuma et al., 2020). Environmental issues, such as ecosystem protection, sustainable resource management, and climate change mitigation, are central (Dickens et al., 2020; Ermolina et al., 2021).

Social justice is a core element of the SDGs, emphasizing equal access to economic opportunities, basic services, and legal protection for all, including marginalized groups (Cox, 2020; Monaco, 2024a). The United Nations encourages international cooperation among governments, the private sector, civil society, and other organizations to address these complex challenges (Rasche, 2020; Saxena et al., 2021). Overall, the SDGs provide a comprehensive framework for sustainable development, focusing on human well-being, environmental protection, and social inclusion (Cernev & Fenner, 2020; Halkos & Gkampoura, 2021), with 2030 targets guiding national and international initiatives (Fallah Shayan et al., 2022).

Indonesia, as the world's largest Muslim-majority country, has demonstrated a strong commitment to achieving the SDGs (Shaikh & Hassan, 2020). The SDGs serve as a critical foundation for addressing challenges such as poverty, socioeconomic inequality, and environmental pressure. One primary challenge in Indonesia is fostering inclusive and sustainable economic growth, as disparities between urban and rural areas and across islands remain significant (De Zwart, 2022; Putri et al., 2022). Islamic economics offers an appealing alternative in this context.

Islamic economics, rooted in Quranic values, emphasizes justice, sustainability, and social responsibility in economic activities (A'la Mawdudi, 2013; Abojeib et al., 2018). Its principles, including the prohibition of usury and speculative practices, align with SDGs' goals of inclusive economic growth, benefiting all community layers. The successful implementation of Islamic economics in Indonesia, particularly through Islamic financial institutions, such as Sharia-compliant banks, has expanded financial access, promoted sustainable investments, and added social and economic value (Menne et al., 2023). By integrating these principles with national development strategies, Indonesia can optimize its economic potential while ensuring positive social and environmental impacts (Supriani et al., 2021; Wartoyo & Haida, 2023).

The rapid growth of Islamic finance in Indonesia has strengthened its financial inclusion, particularly in underserved areas (Iskandar et al., 2020; Menne et al., 2023). Islamic finance supports sustainable projects, including renewable energy and environmental conservation, through instruments such as green sukuk (Anggraini, 2018; Azwar, 2023; Iskandar & Aqbar, 2019). These efforts align with the Sharia principles, emphasizing justice and sustainability (Harahap et al., 2023; Purwati & Komalla, 2023). Additionally, Islamic banking promotes SME financing via the Mudarabah and Musharakah models, stimulating job creation and poverty reduction in line with SDG1 (Alhammadi, 2024; Kurniawan et al., 2023).

Islamic banks also utilize Zakat and Sadaqah for health initiatives and sukuk to fund health infrastructure, contributing to SDG3 by improving health services (Jan et al., 2021; Mukhid, 2024). Similarly, they support SDG4 by funding education programs, scholarships, and infrastructure improvements, ensuring inclusive and quality education for all (Piliyanti & Awirya, 2022; Razak, 2020; Rohmana, 2023). Through these contributions, Islamic finance significantly advances the achievement of the SDGs in Indonesia.

Islamic banks, through Sharia-compliant financing options that avoid exploitative practices, promote ethical business practices and support the creation of decent jobs (Andespa et al., 2024). Financing models such as Ijarah (leasing) and Murabaha (cost-plus financing) enable business growth and align closely with SDG 8, which emphasizes sustainable economic growth, productive employment, and decent work. Islamic banking contributes to poverty alleviation, health, education, and sustainable urban development, promoting comprehensive and sustainable growth in line with SDGs. This highlights its potential to drive positive global social and economic outcomes.

Further research is necessary to explore how Islamic finance can better integrate with SDGs, enhancing financial system efficiency, economic inclusiveness, and sustainable solutions to challenges. Prior studies have shown that Islamic banking significantly impacts economic growth, as evidenced by research on funding contributions to GDP (Bougatef et al., 2020; Gani & Bahari, 2021; Siddique et al., 2020). However, some scholars argue that GDP growth alone is insufficient

to achieve the SDGs, emphasizing the need for broader measures of progress (Adrangi & Kerr, 2022; Coscieme et al., 2020). Given this debate, particularly in Indonesia, this research investigates the relationship between Islamic bank financing aligned with SDGs and economic growth, grounded in the Qur'anic principles of Islamic finance.

The pursuit of Sustainable Development Goals (SDGs) is vital for addressing global, social, economic, and environmental challenges. Indonesia, the country with the largest Muslim population, has a unique opportunity to leverage Islamic finance to support the SDGs. The rapid growth of Islamic financial institutions in Indonesia highlights their potential to address economic disparities, particularly in underserved regions, and to contribute to sustainable development. Given Indonesia's significant population and persistent issues, such as poverty, inequality, and environmental degradation, integrating Islamic finance with the SDGs is crucial. With its emphasis on social justice, ethical practices, and sustainability, Islamic finance offers a culturally relevant framework for addressing these challenges. However, its role as a catalyst for achieving the SDGs in Indonesia remains underexplored.

While many studies explore the impact of Islamic banking on economic growth, few address its alignment with the SDGs, particularly in emerging economies such as Indonesia. Research by Kassim (2016), Bougatef et al. (2020), and Yusof and Loong (2020) highlights the economic contributions of Islamic finance, but often prioritizes GDP over socio-environmental impacts. Additionally, the application of Islamic financial principles to inclusivity, poverty reduction, and environmental sustainability remains underexplored, especially in Indonesia's unique sociocultural and geographic contexts.

This study bridges these gaps by examining the alignment of Islamic banking with the SDGs in Indonesia, focusing on the mechanisms that link ethical finance to sustainable development goals. It uniquely integrates Quranic principles with modern financial practices, providing insights into how Islamic finance can drive inclusive and sustainable growth. This research aims to inform policymakers on integrating Islamic finance into national SDG strategies, stimulate innovation in financial instruments to address social and environmental challenges, and enhance the financial system's efficiency and inclusiveness. These findings are expected to advance both theory and practice by aligning Islamic finance with sustainable development.

Literature Review

Islamic banking and economic growth

Early studies on the relationship between Islamic financial development and economic growth focused on exploring the causality between Islamic banking and economic growth. Abduh and Omar (2012), Bougatef et al. (2020), Gani & Bahari (2021), Kassim (2016), and Yusof and Loong (2020) emphasized the role of Islamic banks in fostering economic growth. These studies highlight the significant impact of Islamic bank financing on GDP, which is a traditional measure of economic progress. However, scholars such as Adrangi and Kerr (2022) and Coscieme et al. (2020) critique GDP growth as an insufficient indicator of sustainable development, arguing that it neglects the social and environmental dimensions essential for achieving Sustainable Development Goals (SDGs). They proposed a shift toward a more inclusive approach that emphasizes sustainability, equity, and community well-being.

This study addresses these debates by situating Islamic banking within the sustainable development framework. It argues that Islamic finance principles, such as equity, justice, and welfare maximization, provide a holistic approach to achieving the SDGs. By bridging traditional economic growth metrics and critiques of GDP, this study explores how Islamic banking can support sustainable, long-term economic progress, while addressing the limitations of conventional growth measures. It positions Islamic finance as an ethical and effective alternative to advancing the SDGs.

The SDGs and economic growth

Achieving economic growth is a key objective of the 17 Sustainable Development Goals (SDGs), with Goal 8 specifically targeting a minimum of 7% annual GDP growth in the least developed

countries. However, this high target may compromise social and environmental concerns. For example, labor-intensive exports can increase GDP while suppressing wages, while wood exports can drive growth at the expense of environmental sustainability (Abdul-Hamid & Aziz, 2022). Coscieme et al. (2020) also highlighted the trade-offs inherent in using GDP as an SDG 8 indicator, noting that unchecked GDP growth conflicts with finite natural resources, and may hinder overall SDG achievement.

Adrangi and Kerr (2022) examine the relationship between GDP and SDGs in emerging economies using FGLS and SUR regression models on BRIC countries' data from 2000 to 2017. Their findings suggest that prioritizing GDP growth alone does not ensure progress toward broader SDGs. Similarly, Eu-umweltbuero (2020) observed that quality of life and societal well-being are increasingly valued; however, GDP-focused metrics fail to capture societal complexity. Costanza et al. (2016) argue that relying on GDP as the sole measure of a country's well-being exacerbates environmental degradation, inequality, and climate change. Stiglitz et al. (2009) proposed expanding GDP metrics to include non-market activities, such as domestic work and childcare, emphasizing wealth, income, and consumption at the household level. They cautioned that GDP per capita might rise while household income falls, thus increasing inequality. This approach aligns with the calls to redefine economic indicators to better support sustainable development.

The critiques outlined above underscore the urgent need to reevaluate reliance on GDP as a primary metric for economic growth and sustainability. This study extends the discussion by exploring how the principles of Islamic finance, guided by *Maqasid al-Shariah* (the higher objective of Islamic law), can provide a transformative alternative framework for achieving Sustainable Development Goals (SDGs). Unlike conventional approaches, which often prioritize economic growth at the expense of social equity and environmental integrity, Islamic finance emphasizes justice, ethical practices, and balanced welfare, which resonates with the multidimensional goals of the SDGs. This study hypothesizes that the ethical and welfare-oriented foundations of Islamic finance enable a more integrated approach to sustainable development, aligning economic objectives with environmental stewardship and social equity. By positioning Islamic finance as a viable paradigm to address the limitations of GDP-focused growth, this study seeks to bridge the gap between theory and practice. In doing so, it contributes to the broader discourse on creating inclusive, equitable, and sustainable economic models, reinforcing the relevance of Islamic finance to contemporary global challenges.

SDGS in Islamic perspective

Shariah is defined as divine laws governing belief, worship, ethics, transactions, and the overall conduct of life, regulating the relationship between humans, their creators, and the universe (Al-Zarqa, 1998). This includes commandments related to beliefs and conduct, which are compulsory for achieving welfare in the community. Shariah is not merely a set of laws; it also embodies welfare objectives reflected in ethical and moral values aimed at ensuring human well-being. Al-Gazālī emphasized that the purpose of Shariah is to safeguard faith, life, intellect, lineage, and wealth, and to promote public interest (Kamali, 1998). Similarly, Ibn al-Qayyim highlighted that Shariah is based on justice, mercy, wisdom, and the common good, rejecting any rulings that replace these values with injustice or harm (Auda, 2008).

Therefore, the objectives of Shariah (*maqāṣid al-Syari'ah*) entail a holistic approach that aims to elevate humanity to the highest rank by making them upright, spreading virtue among them, establishing public interest, fighting the promotion of harm, and ensuring balanced relationships between the self, community, and universe in which people live. One of the trends in Shariah is ensuring the sustainability of life on Earth, preservation of the environment, and several socio-economic development issues. These considerations are in line with the objectives of Shariah, which aim to bring benefits to mankind and prevent harm from them, and are also part of the broad ethical values propagated by Shariah.

In other words, Islam is a religion of peace with its ultimate goal of being a blessing for humankind persuaded nations 1,400 years ago to implement SDGs, such as preserving the environment, promoting fairness and establishing justice in all aspects, community development and human capital development, consumer protection, and good governance. In Islam, the

preservation of the environment, for instance, entails preserving the environment's resources by properly utilizing and maintaining them and by prohibiting their extravagant use, destruction, or depletion without necessity or significant need.

Hypothesis development

This study hypothesizes that Islamic banks' financing, guided by the principles of Maqasid al-Shariah, aligns with sustainable development goals (SDGs) and contributes positively to economic growth and social welfare in Indonesia, both in the short run and the long run. The hypotheses are developed as follows:

- H_1: Islamic banks' financing aligned with SDG1 (No Poverty) has a positive effect on economic growth in Indonesia in the short run and the long run.
- H_2: Islamic banks' financing aligned with SDG2 (Zero Hunger) has a positive effect on economic growth in Indonesia in the short run and the long run.
- H_3: Islamic banks' financing aligned with SDG3 (Good Health and Well-Being) has a positive effect on economic growth in Indonesia in the short run and the long run.
- H_4: Islamic banks' financing aligned with SDG4 (Quality Education) has a positive effect on economic growth in Indonesia in the short run and the long run.
- H_5: Islamic banks' financing aligned with SDG6 (Clean Water and Sanitation) has a positive effect on economic growth in Indonesia in the short run and the long run.
- H_6: Islamic banks' financing aligned with SDG9 (Industry, Innovation, and Infrastructure) has a positive effect on economic growth in Indonesia in the short run and the long run.
- H_7: Islamic banks' financing aligned with SDG11 (Sustainable Cities and Communities) has a positive effect on economic growth in Indonesia in the short run and the long run.
- H_8: Islamic banks' financing aligned with SDG16 (Peace, Justice, and Strong Institutions) has a positive effect on economic growth in Indonesia in the short run and the long run.

These hypotheses reflect the categorization of Shariah-compliant financing into eight SDGs based on the quarterly data of banks' value of Shariah financing, as reported by the International Financial Services Board (2020). The study seeks to explore the dynamic relationship between Islamic finance and sustainable economic growth, emphasizing its immediate and long-term impacts.

Research Methods

Data sources and variables measurements

Quarterly data on Islamic Banks' value of Shariah financing in different sectors of the Indonesian Islamic banking industry were collected from the prudential and structural Islamic financial indicators (PSIFIs) for Islamic Banks of IFSB Database and categorized based on Sustainable Development Goals (SDGs) and used in the study analysis from Q1 2014 to Q1 2022. In particular, the quarterly data of banks' value of Shariah financing have been categorized into eight SDGs: SDG1 (no poverty), SDG2 (Zero Hunger), SDG3 (Good Health and Well-Being), SDG4 (Quality Education), SDG6 (Clean Water and Sanitation), SDG9 (Industry, Innovation and Infrastructure), SDG11 (Sustainable Cities and Communities), and SDG16 (Peace, Justice and Strong Institutions) (International Financial Service Board, 2020). Data on Gross Domestic Product (GDP), on the other hand, were collected from the Statistics Centre Agency of Indonesia (*Badan Pusat Statistik*, BPS) and the Financial Services Authority of Indonesia *Otoritas Jasa Keuangan* OJK).

The period from Q1 2014 to Q1 2022 was selected for this study for several reasons. It includes complete and reliable data from the PSIFIs to ensure an accurate analysis. This period also captures significant economic variations, including growth, stability, and challenges, such as market fluctuations and economic policy changes. Additionally, it covers the implementation of the SDGs starting in 2015, allowing for an evaluation of Shariah's financial contribution to the SDG achievement in Indonesia. Furthermore, the period coincided with significant growth in Indonesia's Shariah financial industry, including the launch of the Shariah Banking Indonesia Roadmap 2015–2019. Therefore, this timeframe ensures relevant data and a comprehensive understanding of the relationship between Shariah bank financing, economic growth, and the SDGs.

However, the data selection may be biased. Reliance on reports from Islamic financial institutions and SDG indicators could introduce reporting biases or inconsistencies. Using quarterly data may not capture real-time fluctuations or short-term impacts and focusing on PSIFIs may exclude other relevant institutions. To mitigate these biases, this study used data from reputable sources and cross-reference multiple points. These limitations should be considered when interpreting our findings.

The variables measurement was based on the SDGs objectives with cross section of Islamic banks Shariah compliant financing in different sectors in the countries (Abdul-Hamid & Aziz, 2022). These sectors were chosen because they directly align with specific SDGs, and the financing data collected from these sectors allowed us to assess the contribution of Islamic finance in meeting these global goals. These variables are measured based on the value of Shariah-compliant financing provided to each sector.

Method of analysis

This study used the autoregressive distributed lag (ARDL) model introduced by Narayan (2005), Pesaran et al. (1996), and Pesaran and Shin (1995), which includes steps such as lag determination, the bound test, and estimation of long-run and short-run coefficients. The ARDL model is suitable because it can handle regressors that are I(0), I(1), or cointegrated, avoiding issues with non-stationary time series data (Pesaran et al., 2001), and performs well with small sample sizes (Narayan, 2005).

The ARDL model is particularly effective in examining the link between Sharia bank financing and SDG achievement for several reasons. First, it can analyze non-stationary time-series data without requiring stationarity tests, which is useful, given that the data on Sharia bank financing and SDGs may not be stationary. Second, it uses a bound-testing approach to test for co-integration, helping identify stable long-term relationships between Sharia bank financing and SDG progress (Pesaran et al., 2001). Third, ARDL estimates both long-term and short-term coefficients, which helps assess the immediate and long-term effects of Sharia bank financing on SDG indicators. Fourth, ARDL is robust to small sample sizes, which is important given the limited quarterly data available in this study (Sehrawat & Giri, 2015).

Testing for cointegration

After determining the optimal lag length for each variable by searching the $(p+1)^{k+1}$ in different ARDL models, the study applied "The Bound Test" to examine whether there is existence of cointegration relationships among variables under study using the F-statistics in the conditional unrestricted ARDL model as illustrated in equation as follow:

H_0: $\delta 1 = \delta 2 = \delta 3 = \delta 4 = \delta 5 = \delta 6 = \delta 7 = \delta 8 = \delta 9 = \delta 10 = \delta 11 = 0$
H_1: $\delta 1 \neq 0, \delta 2 \neq 0, \delta 3 \neq 0, \delta 4 \neq 0, \delta 5 \neq 0, \delta 6 \neq 0, \delta 7 \neq 0, \delta 8 \neq 0, \delta 9 \neq 0, \delta 10 \neq 0, \delta 11 \neq 0$

The null hypothesis states that there is no long-run relationship among the variables in the ARDL model, whereas the alternative hypothesis states the existence of a long-run relationship between the identified variables in the model. The computed F-statistic value was evaluated using the critical values generated by the conditional unrestricted ARDL model. If the value of the F-statistic lies above the upper-bound critical value for a given significance level, the decision is that cointegration relationships exist among the variables. If the value of the F-statistic falls below the lower-bound critical value, the inference is that cointegration relationships do not exist among the variables. However, if the computed F-statistic falls within the lower and upper bounds, the results are inconclusive (Narayan, 2005).

Long-run and short-run dynamics

After the cointegration is confirmed between the dependent and exploratory variables in the bound test, the estimated coefficients of the long-run relationship are measured using the following ARDL (m1, m2, m3, m4, m5, m6, m7, m8, m9) model (Abdul-Hamid & Aziz, 2022):

$$GDP_t = \alpha_0 + \sum_{i=1}^{m1} \alpha_1 GDP_{t-1} + \sum_{i=1}^{m2} \alpha_2 SDG1_{t-1} + \sum_{i=1}^{m3} \alpha_3 SDG2_{t-1} + \sum_{i=1}^{m4} \alpha_4 SDG3_{t-1} + \sum_{i=1}^{m5} \alpha_5 SDG4_{t-1} + \sum_{i=1}^{m6} \alpha_6 SDG6_{t-1} + \sum_{i=1}^{m7} \alpha_7 SDG9_{t-1} + \sum_{i=1}^{m8} \alpha_8 SDG11_{t-1} + \sum_{i=1}^{m9} \alpha_9 SDG16_{t-1} + \mu_t \quad (1)$$

Where α_0 denotes the costants term, $\alpha_1 \ldots \alpha_9$ refers to the coefficient of the long-run relationships of the variables, [$m_1, m_2, m_3, m_4, m_5, m_6, m_7, m_8, m_9$] denotes the lag orders for each individual variable in the model, μ_t refers to the residual error term, *t-* denotes the time and *i* refers to time of the previous observation value.

The short-run estimated coefficients were derived using the Error Correction Model of the following formula (Abdul-Hamid & Aziz, 2022):

$$\Delta GDP_t = \beta_0 + \sum_{i=1}^{p-1} \beta_1 \Delta GDP_{t-1} + \sum_{i=1}^{p-1} \beta_2 \Delta SDG1_{t-1} + \sum_{i=1}^{p-1} \beta_3 \Delta SDG2_{t-1} + \sum_{i=1}^{p-1} \beta_4 \Delta SDG3_{t-1} + \sum_{i=1}^{p-1} \beta_5 \Delta SDG4_{t-1} + \sum_{i=1}^{p-1} \beta_6 \Delta SDG6_{t-1} + \sum_{i=1}^{p-1} \beta_7 \Delta SDG9_{t-1} + \sum_{i=1}^{p-1} \beta_8 \Delta SDG11_{t-1} + \sum_{i=1}^{p-1} \beta_9 \Delta SDG16_{t-1} + \psi ECM_{t-1} + \mu_t \quad (2)$$

Where, all variables are as previously defined, β_0 represents the constant term, $\beta_1 \ldots \beta_9$ indicates the coefficient of the first difference variables, ψ represents adjustment coefficient of the error correction term (ECM_{t-1}), which is derived from the long-run relationship estimated in equation above. *p* represents the maximum number of lags lengths, μ_t refers to the white noise residual, *t-* represents the time and *i* denotes the time of the previous observation value.

Diagnostics tests

Finally, diagnostic tests were conducted to ensure the validity, stability, and reliability of the ARDL model. These tests are crucial for verifying the assumptions underlying the model and ensuring that the results are not biased or misleading (Abdul-Hamid & Aziz, 2022).

First, normality tests were performed on the residuals of the ARDL model to check whether they were normally distributed. The Jarque-Bera test was used to assess the normality of the residuals. A non-significant result (p-value > 0.05) indicates that the residuals follow a normal distribution, which is an essential assumption for the validity of hypothesis testing in ARDL models.

Second, the presence of heteroscedasticity, which refers to unequal variance of residuals, was tested using the Breusch-Pagan-Godfrey test. This test ensures that the residuals do not exhibit a systematic variance pattern, which could lead to inefficient coefficient estimates. A nonsignificant result from the heteroscedasticity test (p-value > 0.05) suggests that the assumption of homoscedasticity holds.

Additionally, Cumulative Sum of Recursive Residuals (CUSUM) and Cumulative Sum of Squares of Recursive Residuals (CUSUMsq) tests will be conducted to assess the stability of the ARDL model. The CUSUM test checks whether the coefficients of the model are stable over time by plotting the cumulative sum of residuals. The CUSUMsq test checks for stability in terms of the variance of residuals. If the plots of these tests remain within the critical bounds, then the model is stable and does not suffer from structural instability.

The diagnostic tests will be interpreted as follows: a p-value greater than 0.05 in the normality test suggests that the residuals follow a normal distribution. In the heteroscedasticity test, a non-significant p-value (> 0.05) indicated no issue with variance. Regarding the model stability, if the CUSUM and CUSUMsq tests show that the recursive residuals lie within the critical bounds, the model is considered stable. By performing and interpreting these diagnostic tests, we ensure the robustness and reliability of the ARDL model in examining the relationship between Sharia bank financing and the achievement of the SDGs.

Results and Discussion

Unit root tests

Application of the ARDL approach to cointegration requires that the variables be integrated of order zero or one, that is, I(0) or I(1), or a combination of both. However, the ARDL approach is

inappropriate if one of the variables is integrated of order two, that is, I(2). As noted by Ouattara (2004), this is because the presence of I(2) variables renders the computed F-statistics provided by Pesaran et al. (2001) invalid. Therefore, it is necessary to conduct stationarity tests to verify that none of the variables are integrated of order two, that is, I(2). Thus, augmented Dickey–Fuller (ADF) and Phillips-Perron (PP) tests for stationarity were employed.

Table 1. The result of unit root test

Name of Variables	Level [I(0)]		First Difference [I(1)]		Stationarity Status
	Individual Intercept and Trend		Individual Intercept and Trend		
	ADF	PP	ADF	PP	
	Prob.		Prob.		
GDP	0.5630	0.6108	0.0011*	0.0000*	I(1)
SDG1	0.0000*	0.0000*	0.0000*	0.0000*	I(0)
SDG2	0.0000*	0.0000*	0.0000*	0.0000*	I(0)
SDG3	0.0000*	0.0000*	0.0000*	0.0000*	I(0)
SDG4	0.0000*	0.0000*	0.0029*	0.0000*	I(0)
SDG6	0.0000*	0.0000*	0.0000*	0.0000*	I(0)
SDG9	0.0000*	0.0000*	0.0000*	0.0000*	I(0)
SDG11	0.2637	0.2643	0.0001*	0.0001*	I(1)
SDG16	0.3270	0.3591	0.0000*	0.0000*	I(1)

* Significance at 1 % level. MacKinnon (1996) one-sided p-values.
Source: Author's calculation (2024)

The results of the unit root test, as reported in Table 1, reveal that the logs of SDG1, SDG2, SDG3, SDG4, SDG6, and SDG9 are stationary at level, that is, they have no unit roots at their levels and are integrated of order zero, I(0). On the other hand, the logs of GDP, SDG11, and SDG16 have unit roots at their levels. They become stationary upon taking the first difference, and thus integrated of order one, I(1). This combination of I(0) and I(1) variables justified the use of the ARDL approach to cointegration, which accommodate such a situation.

Results of the cointegration test: Bounds F-test

As noted earlier, the bounds test approach to cointegration was adopted in this study, and the results are presented in Table 2.

Table 2. Result of ARDL bound tes

Test Statistic	Value	k
F-statistic	491.2814	9
Critical Value Bounds		
Significance	I(0) Bound	I(1) Bound
10%	1.63	2.75
5%	1.86	3.05
2.5%	2.08	3.33
1%	2.37	3.68

Source: Author's calculation (2024)

The results in Table 2 indicate that the calculated F-statistics are higher than the upper critical bounds at 1% level of significance (491.28 > 3.68). Accordingly, there is strong statistical evidence for the existence of a long-run relationship between the variables in this study. This result suggests that Indonesian Islamic banks' financing, based on the objectives of the SDGs, has a long-run relationship with economic growth.

Estimation of the long-run relationship

Table 3 presents the results of the estimated model for long-run relationships.

Table 3. Long-run relationship estimation using the ARDL Approach, ARDL (2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2)

Long Run Coefficients***				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
SDG1	0.039719	0.004655	8.533302	0.0743**
SDG2	0.180547	0.021904	8.242717	0.0769**
SDG3	0.379725	0.008676	43.767859	0.0145*
SDG4	0.758304	0.090553	8.374143	0.0757**
SDG6	-0.009051	0.015595	-0.580396	0.6652
SDG8	-1.161412	0.158932	-7.307604	0.0866**
SDG9	0.218015	0.044560	4.892558	0.1284
SDG11	0.110751	0.009480	11.682477	0.0544**
SDG16	-0.059804	0.048671	-1.228756	0.4349

* Significance at 5 % level; ** Significance at 10 % level; # MacKinnon (1996) one-sided p values.
*** The authors use the 5% and 10% of significance. This is because there is no standard for determining the cutoff value of the p-value (significance). It depends not only on the sample size but also on the disciplines. The sample size in the current study may not be sufficient, but can hardly be considered sizeable for the analyses (because of the small sample size or the low representativeness of the sample). In this case, it will be quite reasonable to relax the significance level from 5 % to 10 % (Stevens, 2012). Therefore, a cutoff *p*-value of 10 % also will be used to interpret the results of the present study.
Source: Author's calculation (2024)

The results for the long-run coefficients of the regressors are mixed. While coefficients for SDG8 were found to have statistically significant negative impact on economic growth in the long-run, SDG1, SDG2, SDG3, SDG4, and SDG11 on the other hand was found to have statistically significant positive impact on economic growth in the long-run. For instance, at 10% level of significance, a 1% change in Indonesian Islamic banks' financing in line with SDG8 (Decent Work and Economic Growth), leads to a 1.16% decrease in economic growth in the long-run.

The negative impact of SDG8 on economic growth is somewhat counterintuitive, as projects aligned with SDG8 are intended to promote job creation and economic prosperity. One possible explanation is the misallocation of resources that may arise from prioritizing projects linked to SDG8. Although financing for SDG8 is well-intentioned, it could lead to short-term inefficiencies, where resources are diverted from more immediately productive sectors to longer-term projects that require significant adjustment before yielding returns. For example, capital may be directed towards labor-intensive industries or infrastructural projects aimed at sustainable growth that may not immediately contribute to GDP growth. This could result in a delay before such investments begin to generate the expected returns, during which the economy may experience slower growth. Additionally, the negative relationship could stem from the transitional costs associated with shifting towards a more sustainable economy. The reallocation of financial resources into sectors focused on SDG8 could cause short-term disruptions, as industries or businesses adapt to new priorities. In this process, there may be a temporary reduction in economic growth, while the economy adjusts to the changes, especially as labor markets and industries transition to more sustainable practices. Therefore, the negative impact of SDG8 on economic growth might reflect an adjustment phase during which the economy undergoes restructuring. Over time, as investments in SDG8-related projects mature and begin to bear fruit, long-term benefits could outweigh short-term costs, contributing positively to economic growth in subsequent periods.

Conversely, in the case of SDG1, at 10% level of significance, a 1% change in Indonesian Islamic banks' financing in line with SDG1 (No Poverty) leads to 0.39% increase in economic growth. Similarly, with regard to SDG2, at 10% level of significance, a 1% change in Indonesian Islamic banks' financing in line with SDG2 (Zero Hunger) leads to 1.8% increase in economic growth in the long-run. At 5% level of significance, a 1% change in Indonesian Islamic banks' financing in line with SDG3 (Good Health and Well-Being) leads to 3.79% increase in economic growth in the long-run. The significant impact of the regressors on economic growth corroborates some studies in the literature (Gani & Bahari, 2020; Bougatef et al., 2020; Yusof & Loong, 2020; Kassim, 2016; Abduh & Omar, 2012).

These findings indication that SDG1, SDG2, SDG3, SDG4, and SDG11 were found to have a positive impact on economic growth in the long run. The financing from Islamic banking for agriculture, forestry, hunting and fishing, accommodation and food service activities, human health and social work activities, education, public administration and defense, and compulsory social security could be the reasons for the positive relationship between SDG1, SDG2, SDG3, SDG4, and SDG11 and economic growth. The results of this study imply that Islamic finance can be considered a potential solution for poverty and a means of enhancing social and economic development, including education and healthcare. SDGs are aligned with the philosophy of Islamic finance and can play an active role in achieving most goals.

These findings demonstrate the crucial role of Islamic finance in addressing social issues by promoting ethical and sustainable financial practice. The Qur'an provides guidance on economic principles that emphasize fairness, equity, and accountability in financial transactions. These principles are foundational to Islamic finance and serve to address social issues such as poverty, education, and health. By adhering to these principles, Islamic financial institutions can contribute to the creation of a more inclusive and just society.

In the Qur'an, there are several verses that touch on this matter. For example, in terms of justice in financial transactions, Allah said:

يَٰٓأَيُّهَا ٱلَّذِينَ ءَامَنُواْ لَا تَأۡكُلُوٓاْ أَمۡوَٰلَكُم بَيۡنَكُم بِٱلۡبَٰطِلِ إِلَّآ أَن تَكُونَ تِجَٰرَةً عَن تَرَاضٖ مِّنكُمۡۚ وَلَا تَقۡتُلُوٓاْ أَنفُسَكُمۡۚ إِنَّ ٱللَّهَ كَانَ بِكُمۡ رَحِيمٗا ٢٩

Meaning:

"O you who believe! do not devour your property among yourselves falsely, except that it is trading by your mutual consent; and do not kill your people; surely Allah is Merciful to you." (Surah al-Nisā [4], 29)

This verse emphasizes the importance of fair, transparent financial transactions. "Falsely " refers to fraudulent, dishonest, and unfair practices in acquiring wealth. This includes fraud, theft, usury, and other forms of illegitimate wealth acquisition. Islam places strong emphasis on justice in all aspects of life, including finance. In Islamic finance, transactions must be conducted with honesty and mutual consent between the parties involved. This principle ensures that no party is harmed or coerced during the transaction. Conducting business with mutual consent reflects fairness and transparency, which are core values of the Islamic economic system.

The verse also mentions, "Do not kill your people; surely Allah is Merciful to you." This can be interpreted as a warning against actions that harm oneself or others, including in a financial context. Unfair or exploitative transactions can cause significant financial and moral harm to both individuals and society.

In the modern financial context, this verse is relevant to transparent and ethical financial practice. For instance, Islamic financial institutions must ensure that all their products and services comply with Shariah principles, which prohibit usury (interest) and emphasize risk-sharing and fairness in all transactions (Tarantang & Astiti, 2023). This helps to prevent exploitation and injustice, ensuring that all parties engage in transactions fairly and transparently. By following these principles, Islamic finance aims to create a more just and inclusive economic system, where wealth is not concentrated among a few, but is distributed fairly for the welfare of the entire society.

Similarly, regarding economic empowerment and assistance to those in need, Allah said:

مَّثَلُ ٱلَّذِينَ يُنفِقُونَ أَمۡوَٰلَهُمۡ فِي سَبِيلِ ٱللَّهِ كَمَثَلِ حَبَّةٍ أَنۢبَتَتۡ سَبۡعَ سَنَابِلَ فِي كُلِّ سُنۢبُلَةٖ مِّاْئَةُ حَبَّةٖۗ وَٱللَّهُ يُضَٰعِفُ لِمَن يَشَآءُۚ وَٱللَّهُ وَٰسِعٌ عَلِيمٌ ٢٦١

Meaning:

"The parable of those who spend their property in the way of Allah is as the parable of a grain growing seven ears (with) a hundred grains in every ear, Allah multiplies for whom He pleases, and Allah is Ample-giving, Knowing." (Surah al-Baqarah [1], 261)

This verse illustrates the immense and multiplied reward for those who spend their wealth on Allah's way. Among other things, by spending wealth, Muslims can help those in poverty by providing financial assistance that can be used to meet basic needs or start small businesses. Funds from charity and alms can be used to finance the education of children from less-fortunate families, giving them the opportunity to receive proper education. This assistance can also be used to fund healthcare services for those who cannot afford them, ensuring access to the medical care they need.

In this context, with the values and principles of economic empowerment and assistance to those in need, Islamic finance can play its role by providing various Shariah-compliant financing products to support SMEs, such as offering fair and interest-free financing that can help low-income individuals start businesses and increase their income, thereby reducing poverty.

Waqf and zakat funds are also among the main pillars that should be examined as dominant factors of Islamic financial instruments. In addition, unlocking the potential of Islamic finance by introducing innovative products such as waqf, zakat, and Islamic microfinance could improve financial inclusion and financial sector stability and ultimately enhance the contributions of Islamic finance to the SDGs. In particular, waqf is an important Islamic instrument that can be directly used for poverty alleviation and financing other SDGs, mainly the education and healthcare sectors. This was clearly established over 1,400 years ago, whereby Islamic social finance such as zakat, waqf, and sadaqah had a great impact on poverty alleviation and the enhancement of social and economic development, including education, health care, and infrastructure development. Therefore, establishing waqf-based microfinance would help reduce the vulnerability of the poor and boost their capabilities through innovative business models (Rosyidah et al., 2023).

Based on this, the study proposed the integration of waqf and zakat with the financial sector, which can play a major role in realizing SDGs, such as reducing the vulnerability of the environment and the poor, and developing the education and health sectors. Furthermore, the application of zakat and waqf can be expanded to protect the non-poor, who are vulnerable to becoming poor due to adverse shocks. Waqf and zakat are not only foundational elements of Islamic finance, but are also powerful tools for promoting sustainable development. By leveraging these traditional instruments and introducing innovative Islamic finance products, there is significant potential to improve financial inclusion, stability, and contribution to the SDGs. The historical success of Islamic social finance in poverty alleviation and social development underscores its potential to address contemporary challenges and to support global development goals.

Estimation of short-run relationship and the error correction model

The results of the impact of Indonesian Islamic bank financing based on the SDGs on economic growth in the short run are presented in Table 4.

Table 4. Short-run relationship and the error correction model estimation

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GDP(-1))	1.141498	0.440423	2.591825	0.0291*
D(SDG1)	-0.008316	0.007302	-1.138842	0.2842
D(SDG1(-1))	-0.009817	0.005831	-1.683550	0.1266
D(SDG2)	0.015682	0.005703	2.749685	0.0225*
D(SDG2(-1))	0.002250	0.004261	0.528085	0.6102
D(SDG3)	0.007676	0.004074	1.884278	0.0922**
D(SDG3(-1))	-0.008095	0.005323	-1.520673	0.1627
D(SDG4)	-0.001714	0.006690	-0.256150	0.8036
D(SDG4(-1))	-0.005229	0.006576	-0.795044	0.4470
D(SDG6)	-0.017385	0.007173	-2.423743	0.0384*
D(SDG6(-1))	-0.001992	0.005313	-0.374879	0.7164
D(SDG8)	0.271363	0.124796	2.174454	0.0577**
D(SDG8(-1))	0.075050	0.053265	1.408998	0.1924
D(SDG9)	0.011856	0.009402	1.260979	0.2390
D(SDG9(-1))	0.025365	0.009874	2.568914	0.0302*
D(SDG11)	0.005359	0.004494	1.192558	0.2635
D(SDG11(-1))	0.005159	0.004378	1.178459	0.2688
D(SDG16)	0.033654	0.030384	1.107635	0.2967
D(SDG16(-1))	-0.046401	0.035924	-1.291633	0.2287
ECT(-1)	-1.069468	0.329583	-3.244911	0.0101*
C	-0.012765	0.008542	-1.494316	0.1693

* Significance at 5 % level; ** Significance at 10 % level; # MacKinnon (1996) one-sided p values.
Source: Author's calculation (2024)

The findings reveal that SDG2, SDG3, SDG8, and SDG9 have a significant positive impact on economic growth in the short run, while SDG6 has a significant negative impact on economic growth in the short run. This significant effect of the regressors on economic growth in the short run is in line with the findings of Gani and Bahari (2020) in Malaysia, but contrary to Abduh and Omar (2012), and Kassim (2016), among others. The error correction term (-1.069) has a negative sign and statistically significant at 5%, indicating the existence of an adjustment toward equilibrium.

Hence, thoughtful policies to encourage Islamic banks' financing in line with the SDGs while coping with slow economic growth will be imperative for achieving the SDGs in the long run. This is because with just eight years to go until the SDGs deadline of 2030, policymakers and Islamic banking regulators need to act quickly by formulating strategies that will shift emphasis on GDP growth to financing the SDGs. More importantly, an all-inclusive representation of the true scale of financing in line with the SDGs, taking into account the extra costs of reaching the deprived and most vulnerable people as well as the full costs of transitioning to more equitable financing models, is needed to ensure the realization of the 2030 agenda.

The findings of this study are highly relevant to the conditions of Islamic banking and efforts towards achieve Sustainable Development Goals (SDGs) in Indonesia. In Indonesia, Islamic banking is growing rapidly as part of the financial system that adheres to Islamic principles. This research underscores the importance of Islamic banking in supporting the SDGs. By demonstrating that Islamic banking financing aligned with the SDGs can significantly impact economic growth, this study provides deeper insights into how Islamic banking can act as a catalyst to achieve development goals in Indonesia.

Indonesia has committed to achieving the SDGs through various policies and initiatives, including those within the financial sector. By showing that SDG-aligned Islamic banking financing can significantly influence economic growth, this study lays a foundation for governments and regulators to direct more resources and support towards sustainable Islamic finance. It also encourages the expansion of inclusive financial initiatives that support sustainable economic growth and creation of decent jobs. Thus, this research not only contributes academically, but also has important practical implications for the development of sustainable Islamic banking and the achievement of SDGs in Indonesia.

In general, the results of this study are consistent with those of previous studies (Abduh & Omar, 2012; Gani & Bahari, 2021; Kassim, 2016; Yusof & Loong, 2020). However, on the other hand, this research is also different from other research in that it uses a different methodology. This study uses the autoregressive distributed lag (ARDL) approach and the border test approach for co-integration to analyze the impact of Sharia bank financing in line with the SDGs on economic growth in Indonesia. Many other studies use different methods, such as vector autoregression (VAR), ordinary least squares (OLS), or other econometric methods, to assess the impact of financing or investment on economic growth and achievement of the SDGs. For example, Demirgüç-Kunt and Klapper (2012) used cross-country data to analyze financial inclusion and economic growth, often using simple linear regression methods or data panels.

In terms of focusing on the object of the study, the study specifically assessed ten SDG indicators and their impact on economic growth, finding that some SDGs such as SDG1, SDG2, SDG3, SDG4, and SDG11 have long-term positive impacts, while SDG8 has negative impacts. While other studies may focus on one or two SDGs alone or on the overall impact of social investment on economic growth, for example, studies by D'Adamo et al. (2022) and Huan et al. (2021) are more focused on SDG evaluations in general across countries without a specific analysis of each SDG and its relationship to growth. Furthermore, in terms of results and implications, the findings show that Sharia bank financing in line with a number of SDGs has a significant impact both in the short and long term on economic growth and highlight the importance of justice, equity, and accountability as core principles taken from the Qur'an. For example, Abduh and Omar (2012) found that Sharia banking has a positive relationship with economic growth in Indonesia, but does not explicitly link this to the achievement of the SDGs.

Results of diagnostic tests

The results of the diagnostic tests in Figures 1, 2, and 3, as well as in Table 5, indicate that the model passed all diagnostic tests of normality, stability, and heteroscedasticity. The results of the normality test for residual data in this study were a Jarque Bera value of 1.256 with a p-value of 0.53, where > 0.05 so that it rejected H_1 or which means the residuals were normally distributed (Figure 1). This suggests that the residuals are normally distributed, which supports the validity of the model because normality is essential for ensuring unbiased and consistent coefficient estimates.

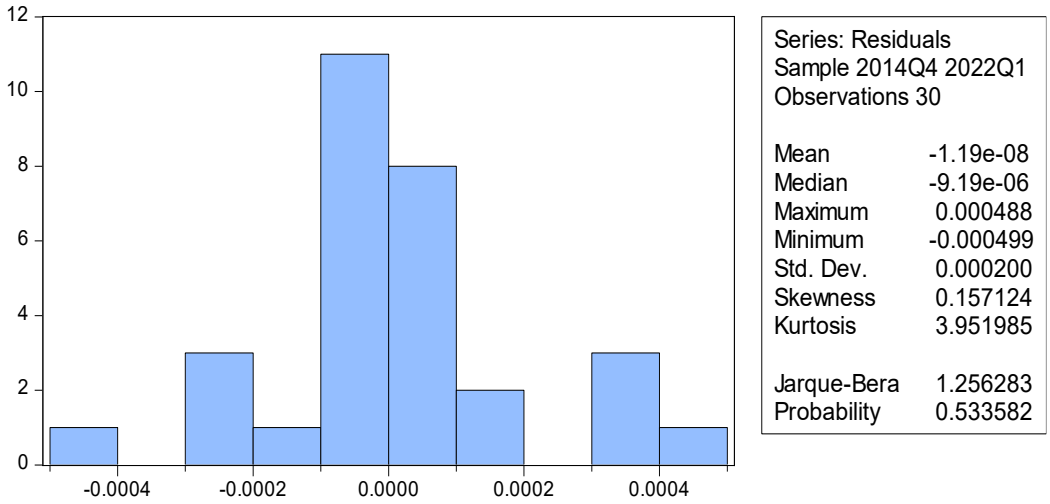

Figure 1. Result of normality tests
Source: Author's calculation (2024)

Cumulative sum of recursive residuals (CUSUM) and cumulative sum squares of recursive residuals (CUSUMSQ) tests were performed to test for structural stability. The results demonstrated that all plots of the CUSUM and CUSUMSQ statistics were within the critical bounds of the 5 percent significance level.

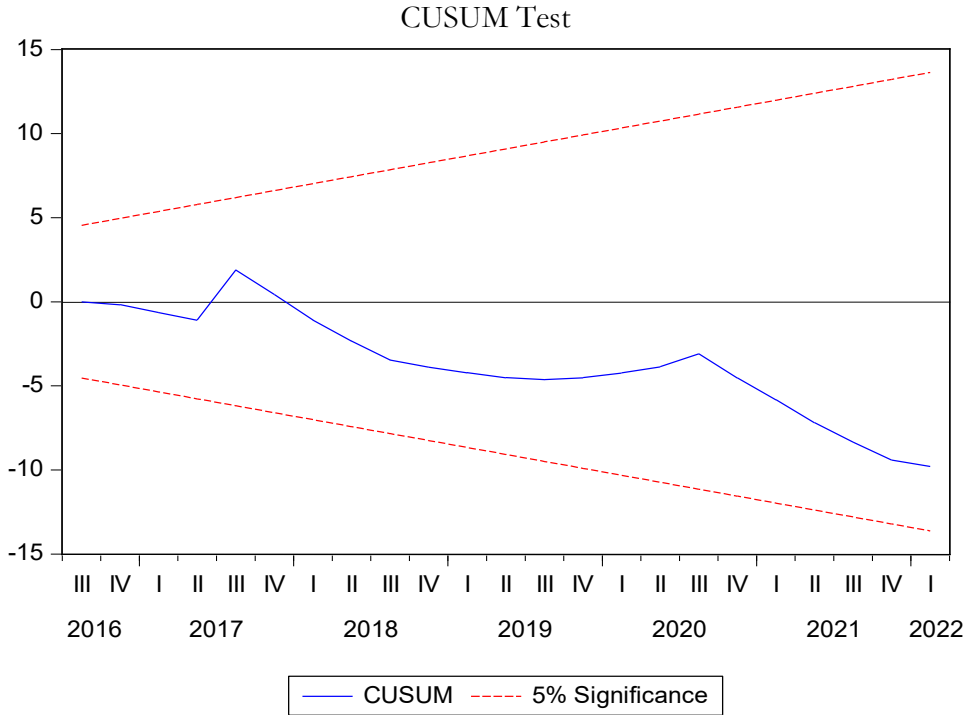

Figure 2. Result of CUSUM tests
Source: Author's calculation (2024)

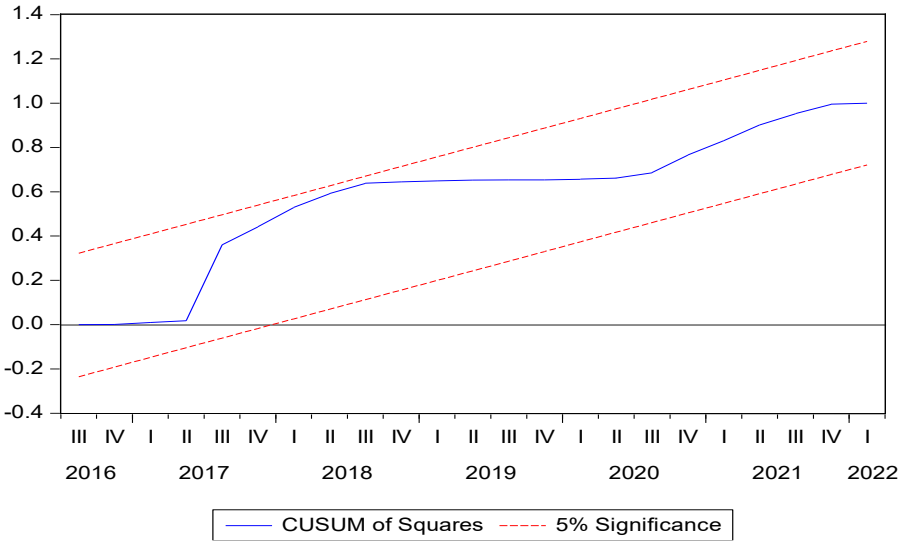

Figure 3. Result of CUSUM of square test
Source: Author's calculation (2024)

The results of both tests, as shown in Figures 2 and Figure 3, indicate that the CUSUM and CUSUMSQ plots remained within the critical bounds at the 5% significance level. This confirms that the model's coefficients are stable over time and the null hypothesis that all coefficients are stable cannot be rejected. Therefore, the results of the model can be considered reliable for policymaking.

To test for heteroscedasticity (non-constant variance of errors), the Breusch-Pagan-Godfrey heteroscedasticity test was conducted. Table 5 presents the test statistics are reported in Table 5.

Table 5. Result of heteroskedasticity test

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	0.562018	Prob. F(10,19)	0.8242
Obs*R-squared	6.848264	Prob. Chi-Square(10)	0.7397
Scaled explained SS	0.011231	Prob. Chi-Square(10)	1.0000

Source: Author's calculation (2024)

Based on the results of the heteroscedasticity test above, the p-value is obtained, as shown by the Prob value. chi square(2) on Obs*R-Squared was 0.7397 or > 0.05, respectively (Table 5). Thus, H_0 was accepted, and we failed to reject the null hypothesis of homoscedasticity, meaning that there was no evidence of heteroscedasticity in the model. This indicates that the variance of the residuals was constant, further supporting the reliability of the model and ensuring the validity of the regression results.

In summary, the results of the diagnostic tests for normality, stability, and heteroscedasticity provided strong evidence that the model met all essential assumptions. The normality test confirmed that the residuals followed a normal distribution, ensuring unbiased and consistent coefficient estimates. Stability tests demonstrate that the model's coefficients are robust over time, indicating that the relationships identified are reliable and not subject to structural changes. Additionally, the heteroscedasticity test shows that the variance of the residuals remains constant, further validating the integrity of the model. Taken together, these findings strongly support the reliability and validity of the results and provide a solid foundation for the conclusions drawn. Therefore, the model's findings can be confidently used to inform policy recommendations as they reflect stable, accurate, and consistent relationships between the variables.

Conclusion

Given the pressing need to achieve the SDGs, the growing market share of Islamic banking in Indonesia, increasing assets, and the significance of the industry in the country necessitate an

evaluation of the role the sector plays in contributing to economic growth through the SDGs. This study employs the autoregressive distributed lag (ARDL) approach and bounds testing approach to co-integration to empirically investigate the impact of Islamic banks' financing aligned with SDGs on economic growth in Indonesia. The findings revealed that, overall, six and five out of the eight SDG indicators analyzed in this study were found to have statistically significant impacts on economic growth in the long and short run, respectively. These indicators were SDG1, SDG2, SDG3, SDG4, SDG8, and SDG11 in the long run, and SDG2, SDG3, SDG6, SDG8, and SDG9 in the short run. Particularly, in the long run, SDG1, SDG2, SDG3, SDG4, and SDG11 were positively associated with economic growth, while SDG8 remained inversely related to economic growth. These findings show the prospects of Islamic finance in overcoming social problems based on the principles of the Qur'an, namely justice, equity, and accountability, as mentioned in Surah al-Nisā' [4]: 29) and al-Baqarah [1]: 261. In the short run, SDG2, SDG3, SDG8, and SDG9 were positively associated with economic growth, while SDG6 was negatively associated with economic growth. Focusing on the long run, continuous financing based on most of the SDGs objectives will eventually lead to an increase in economic growth in the long run.

The findings of this study have significant implications for policymakers and regulators in the Islamic financial sector. By identifying the SDGs with positive and negative impacts on economic growth, this study lays the groundwork for developing focused policies to promote sustainable financing. Recommendations include prioritizing financing for SDGs with long-term positive effects, such as microfinance for SMEs supporting SDG8 (Decent Work and Economic Growth), investments in sanitation and clean water for SDG6 (Clean Water and Sanitation), and renewable energy projects for SDG7 (Affordable and Clean Energy). Policymakers should shift their focus from GDP growth to SDG financing with fiscal policies such as tax reductions for banks financing sustainable projects. Given the 2030 SDG deadline, urgent action is required.

Although valuable, this study has some limitations. It focuses on specific empirical data and may not cover all factors influencing the relationship between Islamic banking and economic growth. In addition, the ARDL method and bounds testing have assumptions that should be considered. Future research could explore the impact of Islamic banking financing on job creation, productivity, and economic inequality, compare results across countries, and examine the role of Islamic finance principles in creating more inclusive and sustainable financing models.

Author contribution

Conceptualization: Azwar
Data curation: Azwar
Formal analysis: Azwar
Investigation: Azwar, Abur Hamdi Usman
Methodology: Azwar, Abur Hamdi Usman
Project administration: Azwar
Supervision: Azwar, Abur Hamdi Usman
Validation: Azwar, Abur Hamdi Usman
Visualization: Azwar
Writing – original draft: Azwar
Writing – review & editing: Azwar, Abur Hamdi Usman

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