

THE CAUSAL IMPACT OF ISLAMIC FINANCIAL INCLUSION ON HUMAN DEVELOPMENT: A REGRESSION DISCONTINUITY ANALYSIS OF INDONESIAN PROVINCES

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ABSTRACT

This study examines whether Islamic financial inclusion contributes to improvements in the Human Development Index (HDI) in Indonesia during the period 2020–2024. While previous studies generally report positive associations between financial inclusion and development outcomes, evidence regarding whether Islamic financial inclusion improves human development remains limited, particularly from a causal perspective and in the context of regional disparities. To address this gap, this study measures Islamic financial inclusion using the Islamic Financial Inclusion Index (IFII) based on the dimensions of accessibility, availability, and usage following Sarma (2012), and employs a Regression Discontinuity Design (RDD) to provide stronger evidence on its causal impact. The results show that Islamic financial inclusion in Indonesia remains low and uneven across provinces. Most provinces are in the low category, except Aceh, which is classified as high (0.719), and DKI Jakarta as moderate (0.548). The RDD estimation indicates a negative relationship between IFII/IFII and HDI (−4.1893), but no statistically significant discontinuity is found around the cutoff. This finding suggests that improvements in Islamic financial inclusion have not yet translated into measurable gains in human development outcomes during the study period, possibly because the benefits of financial inclusion require longer adjustment periods and supportive structural conditions before being reflected in HDI indicators. These findings indicate that financial inclusion alone may be insufficient to improve human development outcomes. Its effectiveness appears to depend on complementary factors such as financial literacy, infrastructure quality, institutional capacity, and the productive utilization of financial services.

1 Introduction

Human development inequality remains a persistent paradox amid Indonesia's sustained economic growth (Mardiyah, 2024). Although the country is recognized as one of the largest economies in Southeast Asia, substantial disparities in income distribution persist, leaving a significant proportion of the population vulnerable to poverty despite continued economic expansion (Hall, 2021). Structural constraints, including limited access to quality education, inadequate healthcare services, rural isolation, and uneven regional development, continue to restrict employment opportunities and income generation, thereby hindering improvements in the Human Development Index (HDI) (Sarjito, 2024). These conditions suggest that economic growth alone is insufficient to enhance human development outcomes. Rather, improving HDI requires development mechanisms capable of expanding access to productive resources and economic opportunities (Djokoto, 2022). However, whether such mechanisms can effectively improve human development in the presence of persistent structural barriers remains an open empirical question.

Within the human development framework, financial inclusion is often viewed as a mechanism for expanding access to productive resources, reducing vulnerability, and improving welfare outcomes. Through access to savings, financing, payment services, and credit, financial inclusion can support income generation, smooth household consumption, strengthen resilience against economic shocks, and ultimately contribute to improvements in human development outcomes (Le et al., 2019; Mhlanga, 2022; Siswa & Agustin, 2020). However, the developmental effectiveness of financial inclusion remains subject to debate. Access to financial services is crucial for enhancing human development, however its effectiveness is significantly undermined by structural constraints such as low educational attainment, weak infrastructure, limited economic opportunities, and poor institutional quality. Research indicates that while access to finance can promote economic activities and improve health and education outcomes, the benefits are contingent upon the quality of institutions in place (Kamalu, 2023). In such contexts, financial participation may remain superficial, limiting its ability to generate meaningful improvements in human capital and living standards.

This debate becomes particularly relevant in the context of Islamic financial inclusion. Unlike conventional financial systems, Islamic financial inclusion operates through Sharia-compliant institutions and financial products that may attract different groups of users and shape distinct patterns of financial participation (Hasmawati, 2024). These characteristics suggest that Islamic financial inclusion may influence human development through channels that extend beyond financial access alone (Hassan, 2015; Mirakhor & Iqbal, 2012). Nevertheless, existing studies frequently treat Islamic and conventional financial inclusion as conceptually similar, leaving unresolved whether Islamic financial inclusion provides a distinct pathway toward human development or remains constrained by the same structural barriers faced by conventional financial systems.

Despite its potential, Islamic financial inclusion in Indonesia remains relatively low and unevenly distributed across regions. Building on the multidimensional framework developed by Sarma (2008), which measures financial inclusion through accessibility, availability, and usage dimensions, studies by Umar (2017) and Ali et al. (2019) reveal that Islamic financial inclusion in Indonesia remains limited and concentrated in only a few

provinces, indicating substantial regional disparities in access to and utilization of Islamic financial services. A growing body of literature highlights the developmental benefits of financial inclusion. Omar et al. (2020) find that financial inclusion significantly reduces poverty and income inequality in developing countries, while Matekenya et al. (2021) (Park and Mercado Jr. (2018), and Abdelghaffar et al. (2023) show its positive association with welfare improvement and broader development outcomes. Similarly, Ameziane (2024) reports that Islamic financial inclusion contributes positively to economic growth across OIC countries. While these findings suggest that financial inclusion can promote socioeconomic development, most studies focus on poverty alleviation, inequality reduction, or economic growth rather than human development outcomes measured by the Human Development Index (HDI).

Moreover, existing research rarely distinguishes the developmental effects of Islamic financial inclusion from those of conventional financial inclusion. While conventional financial inclusion focuses primarily on expanding access to formal financial services, Islamic financial inclusion operates through Sharia-compliant financial institutions and products that may attract different segments of the population and influence patterns of financial participation. Consequently, the relationship between Islamic financial inclusion and human development cannot be assumed to mirror that of conventional financial inclusion and requires separate empirical investigation.

More importantly, the empirical evidence remains constrained by methodological limitations. Most previous studies rely on correlation-based approaches, including panel regressions, fixed-effects models, and cross-country analyses, which are vulnerable to endogeneity and unobserved regional heterogeneity. Provinces with higher HDI often possess stronger institutions, better infrastructure, and greater financial access, creating the possibility that financial inclusion is a consequence rather than a driver of development. Consequently, although previous studies generally report positive associations, the causal impact of Islamic financial inclusion on human development remains insufficiently understood, particularly in Indonesia's context of persistent regional disparities and structural inequalities. Without addressing these identification challenges, policy recommendations risk being based on misleading associations rather than genuine causal mechanisms.

Therefore, a research design capable of strengthening causal identification is required. To address these gaps, this study constructs an Islamic Financial Inclusion Index for 33 provinces in Indonesia based on the dimensions of accessibility, availability, and usage following Sarma (2008), and examines its relationship with the Human Development Index (HDI). More importantly, this study employs a Regression Discontinuity Design (RDD) to provide more credible evidence regarding the causal impact of Islamic financial inclusion on human development.

This study contributes to the literature in three ways. First, it extends the literature on Islamic financial inclusion by examining human development outcomes measured through HDI, rather than focusing solely on poverty reduction, income inequality, or economic growth. Second, it contributes theoretically by examining Islamic financial inclusion as a distinct form of financial participation rather than treating it as an extension of conventional financial inclusion. This distinction is particularly relevant in Indonesia, where participation in Islamic financial services is shaped by different institutional,

regulatory, and socio-cultural factors. From a policy perspective, the findings may provide insights into the extent to which Islamic financial inclusion can contribute to human development and the structural conditions necessary for its effectiveness. Such evidence is particularly relevant for designing policies aimed at expanding financial access, improving financial literacy, reducing regional disparities, and promoting more inclusive development in Indonesia (KNEKS, 2024)

2 Literature Review

2.1. Financial Inclusion

Financial inclusion refers to the access to and provision of financial services for all members of society, particularly low-income and marginalized groups (Ozili, 2020). It is commonly defined as the availability of affordable financial services, including banking access for underserved populations (Dev, 2006), as well as the access and usage of formal financial services (Sahay et al., 2018). These definitions emphasize a central principle: all individuals should have equal opportunities to access financial systems. Furthermore, financial inclusion involves the provision of affordable financial products and services that enable low-income households to participate more effectively in economic activities (Lenka & Barik, 2018). Over time, financial inclusion has evolved into a global development agenda aimed at extending formal financial services to unbanked populations (Bongomin et al., 2020).

Financial inclusion seeks to ensure that all segments of society have access to essential financial services, including savings, credit, insurance, and payment systems that are safe, affordable, and appropriate. It also highlights the importance of financial literacy in enabling individuals to use financial services effectively. As such, financial inclusion is not only an economic agenda but also a strategic instrument for social development and empowerment (Rozalinda et al., 2024). From a theoretical perspective, Ozili (2020) outlines several frameworks for understanding financial inclusion. The public good theory considers financial services as public goods that should be widely accessible, with governments playing a key role in facilitating access, although sustainability remains a challenge (Ozili, 2020b).

The dissatisfaction theory explains exclusion as a result of negative past experiences with financial institutions, suggesting that re-inclusion is possible but limited in explaining first-time exclusion (Ozili, 2020b). The vulnerable group theory focuses on marginalized populations, emphasizing financial inclusion as a tool for economic protection and social resilience, though it may create dependency risks (Ozili, 2020). Lastly, systems theory highlights the importance of coordination between financial institutions, regulators, and infrastructure, suggesting that inclusion depends on systemic integration rather than isolated interventions (Ozili, 2020b).

Financial inclusion can be measured through demand-side and supply-side approaches (World Bank, 2015). The demand-side approach relies on surveys to capture user experiences and barriers, while the supply-side approach uses institutional data to assess service availability, outreach, and usage. In developing countries, financial inclusion has become a key policy priority, with governments implementing various strategies such as simplified account opening, digital financial services, and direct benefit transfers to

expand access (Allen et al., 2016). In Indonesia, financial inclusion is supported through the National Strategy for Financial Inclusion (SNKI), formalized under Presidential Regulation No. 82 of 2016 and updated by Regulation No. 114 of 2020. This framework aims to accelerate economic growth, reduce inequality and poverty, and improve overall welfare by expanding access to financial services across regions.

Financial inclusion is theoretically situated within the Inclusive Development Theory, which posits that economic growth is only sustainable if its benefits are broadly shared (Ozili, 2020). However, mere access to financial services is an instrumental, rather than an intrinsic, value. Following the Capability Approach (Sen, 1999), financial inclusion should be viewed as a mechanism to expand the "choice set" of individuals. In this view, having a bank account is not a development outcome in itself; it only improves Human Development Index (HDI) outcomes if it enhances an individual's capability to invest in health, education, and productive activities.

2.2. Islamic Financial Inclusion Index

A critical gap in existing studies is the failure to distinguish between conventional and Islamic financial inclusion. Conventional frameworks are primarily rooted in maximizing efficiency and profit. In contrast, Islamic financial inclusion is theoretically grounded in Islamic Welfare Economics and Maqashid Sharia (objectives of Sharia), which prioritize *Falah* (well-being in this world and the hereafter) over profit maximization (Ali et al., 2019; Beik & Arsyanti, 2016).

From an Islamic perspective, financial inclusion refers to efforts to expand access to Sharia-compliant financial services, enabling individuals to manage financial resources in accordance with Islamic principles (Beik & Arsyanti, 2016). It aims to enhance public participation in financial activities while promoting social justice and equitable resource distribution. Islamic financial inclusion also contributes to poverty alleviation, economic growth, and financial resilience (Fitri et al., 2021). Sarma (2012) developed a widely used Financial Inclusion Index based on three key dimensions: accessibility, availability, and usage of financial services.

First, accessibility (financial penetration) reflects the extent to which individuals are integrated into the financial system, often measured by the number of bank accounts per adult population. Second, availability refers to the physical presence of financial services, including bank branches and ATMs, indicating the ease of geographic access. Third, usage captures the extent to which financial services are utilized, typically measured by credit and deposit ratios relative to GDP. In the Islamic context, these dimensions include the use of Sharia-compliant financial products such as profit-sharing accounts and Islamic financing instruments.

2.3. Human Development Index

The Human Development Index (HDI) is a composite indicator that measures average achievements in three dimensions: health, education, and standard of living (United Nations Development Programme, 2024). It is calculated as the geometric mean of normalized indices for life expectancy, education, and income. The health dimension is measured by life expectancy at birth, while education is assessed through mean years of schooling and expected years of schooling. The standard of living is represented by Gross National Income (GNI) per capita, adjusted for purchasing power parity. HDI serves as

an important tool for evaluating development outcomes and policy effectiveness. However, it does not capture all aspects of human development, such as inequality, poverty, and empowerment, which are addressed through complementary indicators (United Nations Development Programme, 2024).

In the context of financial inclusion, access to financial services is increasingly recognized as a key driver of human development. Financial inclusion enables households to stabilize consumption, invest in productive activities, and finance education and healthcare. Empirical studies across countries show a positive relationship between financial inclusion and HDI, indicating that improved access to financial services contributes to better health, education, and income outcomes (Ky et al., 2025). In Indonesia, financial inclusion is associated with increased savings and credit distribution, which strengthens regional economic capacity (Mapuasari & Naufa, 2022). Moreover, financial inclusion enhances financial resilience, enabling individuals and businesses to withstand economic shocks and maintain their standard of living (Juniyar et al., 2023). It also supports inclusive economic growth by increasing per capita output and reducing regional disparities (Az-Zahra & Sukmalengkawati, 2022). Despite these benefits, challenges remain, particularly in terms of unequal access and limited financial infrastructure. Therefore, targeted policy interventions are required to expand financial inclusion and ensure its effectiveness in improving human development outcomes.

Conceptual Framework: Linking Inclusion to HDI

Building on the multidimensional framework of Sarma (2012), this study synthesizes the dimensions of financial inclusion through accessibility, availability, and usage with human development outcomes. The framework posits that:

1. Accessibility (penetration) provides the *entry point* for inclusion.
2. Availability (geographic reach) reduces the transaction costs of participation.
3. Usage (actual utilization of Sharia-compliant products) is the *channel* through which economic empowerment occurs.

However, the connection between these dimensions and HDI is not linear. It is a mediated relationship. This research contributes to the literature by testing whether the Islamic financial inclusion index (IFII), when measured through these three dimensions, holds a *causal* relationship with HDI improvements or whether this relationship is merely a byproduct of underlying regional development, a distinction often obscured by the correlational focus of previous studies.

3 Research Methods

3.1. Research Design and Data

This study employs a quantitative explanatory design to examine the effect of Islamic financial inclusion on the Human Development Index (HDI) in Indonesia. The analysis uses secondary panel data at the provincial level covering the period 2020–2024, sourced from official publications of the Financial Services Authority (OJK) and Statistics Indonesia (BPS). Data from OJK include Islamic banking third-party funds (DPK), the number of Islamic bank branch offices, and Islamic financing. Meanwhile, BPS provides data on population, Gross Regional Domestic Product (GRDP), and average years of schooling. These variables are used to construct the Islamic Financial Inclusion Index

(IFII/IFI) across three dimensions accessibility, availability, and usage and to analyze its relationship with HDI.

To measure Islamic financial inclusion, this study adopts the Financial Inclusion Index (IFI) developed by Sarma (2012), which is widely recognized for its robustness and comparability across regions. The index consists of three dimensions: accessibility (D1), availability (D2), and usage (D3). Accessibility is measured by the ratio of Islamic banking deposits to population, availability by the number of Islamic bank branches per population, and usage by the ratio of Islamic financing to GRDP.

Each dimension is normalized using the following formula:

$$d_i = w_i \frac{(D_i - m_i)}{(M_i - m_i)}$$

where D_i represents the actual value, m_i and M_i denote the minimum and maximum values, and w_i is the weight assigned to each dimension. Following Sarma (2012), equal weights are applied across all dimensions. The composite index is then calculated using a geometric approach:

$$IFI = \frac{1}{2} (X_1 + X_2)$$

The resulting index ranges between 0 and 1 and is classified into three categories: low (<0.3), medium (0.3–0.6), and high (0.6–1) (Sarma, 2012).

Regression Discontinuity Design (RDD)

To estimate the causal effect of Islamic financial inclusion on HDI, this study employs a Regression Discontinuity Design (RDD), a quasi-experimental method widely used in development economics due to its strong internal validity (Shadish & Luellen, 2005; Tanner, 2002).

In this framework, the Islamic Financial Inclusion Index (IFII) serves as the running variable, while HDI is the outcome variable. A cutoff point of $c = 0.6$ is applied, following Sarma's classification, to distinguish provinces with relatively high inclusion (treatment group) from those with lower inclusion (control group). Provinces with $IFII \geq 0.6$ are categorized as treated, while those below the threshold serve as controls. In addition to its theoretical basis, the cutoff is empirically relevant because it differentiates provinces with relatively more advanced Islamic financial development from those with lower inclusion levels.

However, the distribution of IFII across Indonesian provinces is highly skewed, with most observations concentrated in the low to medium inclusion categories. Consequently, the number of observations around the 0.6 threshold is relatively limited. Therefore, the estimated effect should be interpreted as a local treatment effect applicable only to provinces near the cutoff rather than to all provinces in Indonesia. This limitation also reduces the strength of causal inference, as the estimates become more sensitive to bandwidth selection and model specification.

The RDD model is specified as:

$$HDI_i = \beta_0 + \beta_1 IIKS_i + \beta_2 D_i + \beta_3 (IIKS_i - c) D_i + \epsilon_i$$

where D_i is a treatment dummy equal to 1 if $IIKS_i \geq c$, and 0 otherwise. The coefficient β_2 captures the discontinuity at the cutoff and represents the local causal effect of Islamic financial inclusion on HDI. RDD relies on the assumption that observations near the cutoff are comparable. Thus, any discontinuity in HDI at the threshold can be interpreted as the causal effect of inclusion.

Robustness and Validity Tests

To ensure the consistency of the estimation results, this study conducted several robustness and validity tests. First, a bandwidth sensitivity analysis was performed using several alternative bandwidths (e.g., $h = 0.25$ and $h = 0.35$) to ensure that the estimation results did not depend entirely on a specific range of observations. The relatively consistent results indicate that the direction of the effect remained stable despite change in bandwidth.

Second a placebo test was conducted using alternative cutoffs such as 0.55 and 0.65. This test aimed to ensure that discontinuities did not appear randomly at other points outside the main cutoff. When significant results appeared only at the main cutoff, this strengthened the argument that change occurred around the 0.6 threshold.

Third, the McCrary density test is used to detect possible manipulation of observations around the cutoff. In this study, the test results indicate limitations because the distribution of observations around the threshold is not fully symmetrical. This condition suggests that the continuity assumption in RDD should be interpreted with caution, particularly since the number of observations around the cutoff is relatively small. Therefore, the causal interpretation in this study is limited and not as robust as that of a pure experimental design.

Fourth, a covariate balance test was conducted using the variables of average years of schooling and per capita GDRP to ensure that the baseline characteristics across provinces remained relatively balanced around the cutoff. In addition, a functional form test was conducted using alternative polynomial specifications to ensure that the results were not sensitive to a specific model form.

The consistency of results across these various tests indicates that the estimates obtained are relatively stable, although they must still be understood within the context of data limitations and uneven distribution of observations.

3.2. Population and Sample

The study population covers all provinces in Indonesia. However, due to data limitations, the study sample consists of 33 provinces for the 2020-2024 period. New provinces and regions with incomplete Islamic banking data were excluded from the analysis. This study focuses on measuring Islamic financial inclusion is Islamic banking institutions, which consist of Islamic Commercial Banks (*Bank Umum Syariah*/BUS), Islamic Business Units (*Unit Usaha Syariah*/UUS), and Islamic Rural Banks (*Bank Pembiayaan Rakyat Syariah*/BPRS).

3.3. Data Collection

All data was obtained from official public sources, namely the OJK and BPS. The dataset includes information on third-party funds, Islamic financing, branch networks, population size, GDRP, and education indicators. This data serves as the basis for the development of the Islamic Financial Inclusion Index (IFII) and the analysis of its impact on Human Development Index (HDI).in Indonesia.

4 Results and Discussion

4.1. Result

Measurement of the Sharia Financial Inclusion Index

This study employs the Sarma (2008, 2012) methodology to compute the Sharia Financial Inclusion Index (IFII) for Indonesia (2020–2024), aggregating three core dimensions: accessibility (D1) (Third-Party Funds per population), availability (D2) (Sharia bank branches per population), and usage (D3) (Sharia financing per Gross Regional Domestic Product). Normalization uses the min-max approach with IFII formula, data sourced from Otoritas Jasa Keuangan (OJK) and Badan Pusat Statistik (BPS).

This research findings indicate that Indonesia’s Islamic Financial Inclusion Index (IFII) for the 2020–2024 period remains at a relatively low level, with a national average of 0.113. Although the index shows a moderate upward trend, this increase is still insufficient to place Indonesia in the medium inclusion category. This finding indicates that the expansion of Islamic financial service in Indonesia remains concentrated in specific regions and has not yet achieved widespread and equitable distribution across provinces.

a. Accessibility Dimension (D1)

The **Accessibility Dimension (D1)** measures the extent to which Islamic banking services reach the population through the mobilization of **Third-Party Funds (TPF)** relative to population size. This dimension reflects the ability of Islamic banking institutions to attract public participation in financial intermediation and serves as a proxy for market penetration. Higher values indicate greater accessibility and broader outreach of Islamic banking services within a region. The calculation results of the Accessibility Dimension across Indonesia’s major island groups during the 2020–2024 period are presented in Table 1.

Table 1 Accessibility Dimension Calculation Results

No.	Island/Archipelago	Accessibility Dimension					Avg. Annual Growth
		2020	2021	2022	2023	2024	
1.	Sumatera	0,081	0,076	0,085	0,089	0,083	0,00051
2.	Jawa	0,216	0,215	0,212	0,216	0,218	0,00040
3.	Bali & Nusa Tenggara	0,035	0,033	0,033	0,036	0,038	0,00077
4.	Kalimantan	0,063	0,058	0,058	0,060	0,063	-0,00003
5.	Sulawesi	0,019	0,018	0,017	0,019	0,020	0,00023
6.	Maluku & Papua	0,017	0,015	0,015	0,014	0,024	0,00165

Source: OJK and BPS data, reprocessed by the author (2024)

The accessibility dimension (D1) is measured using the ratio of Islamic banking third-party funds (DPK) to population. The results indicate that Java consistently records the highest accessibility values (above 0.20) throughout the 2020–2024 period, confirming its role as the primary center of Islamic financial penetration. Sumatera and Kalimantan follow in second and third positions, respectively, although their values remain significantly below Java, indicating substantial regional disparities.

In terms of growth, most regions exhibit positive trends, except Kalimantan, which shows a slight negative growth rate. The highest growth is observed in Maluku & Papua

and Bali & Nusa Tenggara, suggesting that efforts to expand Islamic financial access in eastern and island regions are beginning to yield results. Meanwhile, more mature regions such as Java and Sumatra experience slower growth rates. At the provincial level, accessibility remains highly uneven. Most provinces record low D1 values (approximately 0.01–0.10), while only a few regions stand out. DKI Jakarta consistently achieves the maximum normalized value (1.00) across all years, making it a clear outlier and reflecting the concentration of Islamic banking activities and fund mobilization in the national economic center. This dominance also influences the normalization process, causing other provinces to appear relatively lower.

Aceh demonstrates relatively high accessibility compared to most provinces, although its value declines from 0.37 in 2020 to 0.28 in 2023–2024. This suggests that while the Islamic banking base in Aceh remains strong, its growth does not outpace that of other regions. Several provinces show gradual improvement, such as Banten (0.06 to 0.10) and Riau (0.07 to 0.13). The increase in Riau is closely linked to institutional strengthening, particularly following the conversion of Bank Riau Kepri into Bank Riau Kepri Syariah in 2022, which enhanced Islamic financial penetration and fund mobilization. In contrast, many provinces especially outside major economic centers, exhibit persistently low and stagnant accessibility levels. Regions in Sulawesi, Maluku, and Bali remain at minimal levels, reflecting limited Islamic banking fund accumulation relative to population. Although slight improvements are observed in eastern regions such as Papua and West Papua, the magnitude remains insufficient to significantly reduce overall disparities.

b. Availability Dimension (D2)

The Availability Dimension (D2) captures the physical presence of Islamic banking institutions by measuring the normalized ratio of Islamic bank branch offices relative to population size. A higher score indicates greater accessibility of Islamic banking services through a wider branch network. The calculation results of the Availability Dimension across Indonesia's major island groups from 2020 to 2024 are presented in Table 2.

Table 2 Availability Dimension Calculation Results

No.	Island/Archipelago	Availability Dimension					Avg. Annual Growth
		2020	2021	2022	2023	2024	
1.	Sumatera	0,196	0,184	0,247	0,249	0,244	0,012
2.	Jawa	0,136	0,118	0,128	0,130	0,131	-0,001
3.	Bali & Nusa Tenggara	0,097	0,076	0,075	0,074	0,073	-0,006
4.	Kalimantan	0,112	0,097	0,090	0,087	0,086	-0,007
5.	Sulawesi	0,072	0,065	0,063	0,060	0,058	-0,003
6.	Maluku & Papua	0,052	0,048	0,049	0,041	0,072	0,005

Source: OJK and BPS data, reprocessed by the author (2024)

The Availability Dimension (D2), which proxies the physical density of Sharia banking services through the normalized ratio of bank branches to population, reveals significant disparities across Indonesian regions from 2020 to 2024. At the island level, Sumatra consistently recorded the highest scores (average 0.22), outperforming Java (average 0.13), with positive annual growth of 1.2 percent, while only Maluku and Papua exhibited modest gains (0.5 percent); all other regions experienced negative trends, signaling office network

consolidation or a pivot toward digital service models. Provincially, Aceh maintained dominance with a normalized score of 1.00 throughout the period, underpinned by robust local Sharia institutions. Notable surges occurred in Riau, rising from 0.10 in 2020 to 0.38 by 2023–2024 following the August 2022 conversion of Bank Riau Kepri to a full Sharia entity, and in Kepulauan Riau, which increased from 0.16 to 0.53–0.56 post-2021. Mid-tier provinces like West Sumatra (0.10–0.12), DI Yogyakarta (0.14–0.16), Banten (0.10–0.11), and South Kalimantan (0.09–0.10) displayed relative stability, indicative of incremental enhancements in existing services rather than aggressive physical expansion. Declines were evident in East Kalimantan (0.21 to 0.15) and Bangka Belitung (0.09 to 0.05), while eastern regions lagged severely, with NTT at 0.00 consistently and Maluku falling from 0.03 to 0.01; Papua showed late improvement to 0.08 in 2024, and West Papua to 0.11. These patterns underscore entrenched infrastructural imbalances, moderated by regional policies and digital transitions (OJK and BPS, processed 2024).

c. Usage Dimension (D3)

The **Usage Dimension (D3)** measures the extent to which Islamic banking services are actively utilized by the population. This dimension is constructed using indicators that capture the intensity of Islamic banking activities, reflecting not only access to financial services but also the actual adoption and utilization of Islamic financial products. Higher values indicate a greater level of engagement with Islamic banking services and, consequently, a deeper degree of Islamic financial inclusion. The calculation results of the Usage Dimension across Indonesia’s major island groups for the period 2020–2024 are presented in Table 3.

Table 3 Usage Calculation Results

No.	Island/Archipelago	Usage Dimension					Avg. Annual Growth
		2020	2021	2022	2023	2024	
1.	Sumatera	0,174	0,179	0,198	0,198	0,199	0,006
2.	Jawa	0,140	0,144	0,157	0,158	0,151	0,003
3.	Bali & Nusa Tenggara	0,154	0,172	0,188	0,192	0,188	0,009
4.	Kalimantan	0,095	0,100	0,103	0,100	0,103	0,002
5.	Sulawesi	0,049	0,055	0,060	0,059	0,063	0,004
6.	Maluku & Papua	0,021	0,023	0,025	0,032	0,034	0,003

Source: OJK and BPS data, reprocessed by the author (2024)

The Usage Dimension (D3), which measures the intensity of Sharia financing utilization relative to regional gross domestic product (PDRB) after normalization, highlights pronounced inter-regional disparities in Indonesia from 2020 to 2024. At the island level, Sumatra ranked highest with an average of 0.19 and annual growth of 0.6 percent, followed by Bali-Nusa Tenggara with an average of 0.18 and growth of 0.9 percent, and Java with an average of 0.15 and growth of 0.3 percent. Kalimantan, Sulawesi, and Maluku-Papua lagged below 0.10, indicating limited Sharia intermediation relative to local economic activity (OJK and BPS, processed 2024).

Provincially, Aceh consistently dominated as an outlier with a score of 1.00 throughout the period, reflecting strong institutional and regulatory support for Sharia finance. West Nusa Tenggara showed robust growth from 0.41 to 0.52-0.53, positioning it as a progressive hub. DKI Jakarta maintained high usage at 0.32-0.38 but trailed Aceh, underscoring regional dominance over urban financial centrality. Mid-tier provinces exhibited moderate gains, including DI Yogyakarta at 0.17-0.19, West Java at 0.11-0.12, Banten rising from 0.10 to 0.13, Bengkulu reaching 0.14, West Sumatra advancing from 0.11 to 0.15 driven by local entities like Bank Nagari Syariah with a 40.35 percent financing share in 2024 and Kalimantan variants such as South Kalimantan stable at 0.15, West Kalimantan at 0.17-0.18, Riau and Kepulauan Riau at 0.12-0.17 following 2022 ecosystem strengthening.

Eastern provinces remained critically low: NTT at 0.00-0.01, West Papua at 0.00, Papua at 0.00-0.04, and Maluku at 0.02-0.04, signaling negligible Sharia intermediation. Overall, D3 reveals entrenched inequalities, with Aceh and NTB as leaders. Achieving equitable Sharia financial inclusion demands not only enhanced access and availability but also targeted strategies to boost productive utilization.

d. Results of the Islamic Financial Inclusion Index

The Islamic Financial Inclusion Index (IFII), which is a composite of the dimensions of accessibility (D1), availability (D2), and usage (D3), indicates that the level of Islamic financial inclusion in Indonesia during 2020-2024 period remains in the low category, with a national average of 0.113. Although there is a trend of gradual improvement, the increase remains relatively limited and has not yet been sufficient to propel Indonesia into the medium level inclusion category. This situation indicates that the development of the national Islamic finance sector is still in its early stages and has not yet been fully supported by equitable infrastructure, accessible services, and productive financial utilization.

Table 4 Results of the Islamic Financial Inclusion Index

No.	Province	Islamic Financial Inclusion Index					Avg	Category
		2020	2021	2022	2023	2024		
1.	Aceh	0,739	0,725	0,711	0,710	0,709	0,719	High
2.	Sumatera Utara	0,074	0,072	0,073	0,072	0,070	0,072	Low
3.	Sumatera Barat	0,094	0,094	0,106	0,107	0,110	0,102	Low
4.	Riau	0,076	0,077	0,215	0,222	0,219	0,162	Low
5.	Jambi	0,084	0,077	0,073	0,074	0,075	0,077	Low
6.	Sumatera Selatan	0,082	0,080	0,078	0,081	0,082	0,081	Low
7.	Bengkulu	0,103	0,097	0,095	0,095	0,100	0,098	Low
8.	Lampung	0,046	0,042	0,042	0,041	0,042	0,043	Low
9.	Kep. Bangka Belitung	0,061	0,058	0,059	0,054	0,054	0,057	Low
10.	Kepulauan Riau	0,111	0,103	0,300	0,316	0,287	0,223	Low
11.	DKI Jakarta	0,547	0,531	0,552	0,559	0,552	0,548	Moderate
12.	Jawa Barat	0,086	0,083	0,087	0,085	0,083	0,085	Low
13.	Jawa Tengah	0,055	0,052	0,055	0,054	0,054	0,054	Low
14.	DI Yogyakarta	0,143	0,136	0,144	0,145	0,145	0,143	Low
15.	Jawa Timur	0,061	0,056	0,059	0,056	0,057	0,058	Low
16.	Banten	0,089	0,094	0,098	0,106	0,108	0,099	Low
17.	Bali	0,039	0,035	0,038	0,035	0,035	0,036	Low
18.	Nusa Tenggara Barat	0,259	0,263	0,276	0,286	0,283	0,273	Low
19.	Nusa Tenggara Timur	0,001	0,001	0,002	0,000	0,000	0,001	Low
20.	Kalimantan Barat	0,081	0,089	0,099	0,094	0,091	0,091	Low

21.	Kalimantan Tengah	0,050	0,045	0,038	0,032	0,035	0,040	Low
22.	Kalimantan Selatan	0,114	0,109	0,110	0,111	0,113	0,111	Low
23.	Kalimantan Timur	0,131	0,114	0,106	0,107	0,110	0,114	Low
24.	Sulawesi Utara	0,027	0,024	0,029	0,027	0,026	0,027	Low
25.	Sulawesi Tengah	0,054	0,050	0,049	0,046	0,045	0,049	Low
26.	Sulawesi Selatan	0,071	0,068	0,070	0,072	0,075	0,071	Low
27.	Sulawesi Tenggara	0,066	0,063	0,055	0,056	0,058	0,060	Low
28.	Gorontalo	0,040	0,046	0,050	0,045	0,045	0,045	Low
29.	Sulawesi Barat	0,037	0,042	0,044	0,046	0,046	0,043	Low
30.	Maluku	0,020	0,020	0,024	0,022	0,023	0,022	Low
31.	Maluku Utara	0,071	0,072	0,074	0,061	0,061	0,068	Low
32.	Papua Barat	0,027	0,024	0,024	0,024	0,053	0,030	Low
33.	Papua	0,010	0,007	0,007	0,019	0,052	0,019	Low
INDONESIA		0,108	0,105	0,116	0,117	0,118	0,113	Low

Source: OJK and BPS data, reprocessed by the author (2024)

Regionally, the research findings reveal significant disparities among provinces. Most provinces remain in the low inclusion category, while only Aceh has achieved the high inclusion category, and DKI Jakarta falls into the medium category. Aceh's dominance reflects the success of strengthening then Islamic financial ecosystem through local regulatory support, the conversion of banking institutions, and the public's high preference for Islamic services. Meanwhile, DKI Jakarta's position is more influenced by the concentration of national economic and financial activities, which strengthens fund mobilization and the penetration of Islamic banking services in urban areas.

Outsides these two regions, several provinces such as West Nusa Tenggara, the Riau Islands, and Riau, have shown relatively better progress compared to most other regions. The improvement in Riau occurred primarily following the conversion of Bank Riau Kepri into an Islamic bank in 2022, highlighting the importance of institutional support in accelerating the growth of Islamic financial inclusion. However, most other provinces still exhibit low and largely stagnant levels of Islamic financial inclusion, particularly in eastern Indonesia, such as Maluku, Papua, and East Nusa Tenggara. This situation indicates that the development of the national Islamic financial sector remains concentrated in regions with more advanced economic capacity and infrastructure.

These findings show that the development of Islamic finance in Indonesia remains confined to enclave and has not yet spread evenly across the country. This disparity indicates that the expansion of Islamic financial assets and institutions has not automatically led to meaningful financial inclusion across all regions. Thus, the main challenge in developing Islamic finance in Indonesia lies not only in expanding access but also in ensuring equitable utilization of financial services capable of supporting economic development and social welfare in a more inclusive manner. Policies to strengthen Islamic financial literacy, ensure equitable digital infrastructure, and increase productive financing are crucial to reducing regional disparities and expanding the developmental impact of Islamic financial inclusion (OJK and BPS, processed 2025).

Regression Discontinuity Design: Impact of Sharia Financial Inclusion Index (IFII) on Human Development Index (HDI)

To examine whether a threshold level of Islamic financial inclusion generates a measurable impact on human development outcomes, a Regression Discontinuity Design (RDD) analysis was employed. The model uses a cutoff value of 0.60 for the Islamic Financial Inclusion Index (IFII) to identify potential discontinuities in the Human Development Index (HDI) around the threshold. Under the RDD framework, observations located just below and just above the cutoff are assumed to be comparable, allowing the estimation of the local causal effect of Islamic financial inclusion on human development. The estimation results are presented in Table 5.

Table 5 Regression Discontinuity Estimates: Impact of IFII on HDI

Cutoff c = .6	Left of c	Right of c	Number of obs	=	165
Number of obs	160	5	BW type	=	Manual
Eff. Number of obs	5	5	Kernel	=	Triangular
Order est. (p)	1	1	VCE method	=	NN
Order bias (q)	2	2			
BW est. (h)	0,150	0,150			
BW bias (b)	0,150	0, 150			
Rho (h/b)	1,000	1,000			
	Point Estimate	Robust Inference			
		z-stat	P> z	[95% Conf. Interval]	
RD Effect	-4,1893	0,8261	0,409	-62,576	153,754

Source: Data processed by the author (2025)

This study employs Regression Discontinuity Design (RDD) with a cutoff of 0.6 on IFII to identify causal effects on HDI across Indonesian provinces (2020–2024). Main results (Table 4.12; bandwidth $h=0.15$, triangular kernel) yield an RD estimate of -41.893 ($p=0.409$; 95% CI: -62.576 to 153.754), statistically insignificant despite a negative point estimate suggesting lower HDI just above the cutoff. Effective observations are limited (5 left, 5 right of cutoff), yielding imprecise estimates with wide CIs due to data sparsity and mass points. The RD plot confirms no sharp discontinuity, implying gradual rather than abrupt effects.

Robustness Checks

To assess the reliability and validity of the main Regression Discontinuity Design (RDD) results, several robustness checks were conducted. These tests include bandwidth sensitivity analysis and placebo cutoff tests. Robustness checks are essential in RDD studies to determine whether the estimated treatment effect remains stable under alternative specifications and whether the observed results are driven by the chosen cutoff rather than by random discontinuities in the data.

Bandwidth Sensitivity

A bandwidth sensitivity analysis was performed to examine whether the estimated treatment effect is robust to alternative bandwidth selections. In RDD estimation, the bandwidth determines the range of observations included around the cutoff point. If the estimated effect remains relatively stable across different bandwidths, the findings can be considered more reliable. The results of the bandwidth sensitivity test are presented in Table 6.

Table 6 Bandwidth Sensitivity

No.	Bandwidth	Point Estimate	P> z
1.	0,25	-5,0668	0.462
2.	0,35	-3,9412	0.321

Source: Data processed by the author (2025)

Wider bandwidths (h=0.25: -5.0668, p=0.462; h=0.35: -3.9412, p=0.321;) maintain negative, insignificant estimates with wide CIs, confirming instability from sparse right-side data (5–13 effective observations left vs. 5 right).

To further validate the RDD results, placebo cutoff tests were conducted using alternative thresholds where no treatment effect is theoretically expected. If significant discontinuities are detected at arbitrary cutoff points, the validity of the original RDD design may be questioned. Conversely, insignificant placebo estimates provide evidence that the observed findings are not driven by spurious discontinuities in the data. The results of the placebo cutoff tests are presented in Table 7.

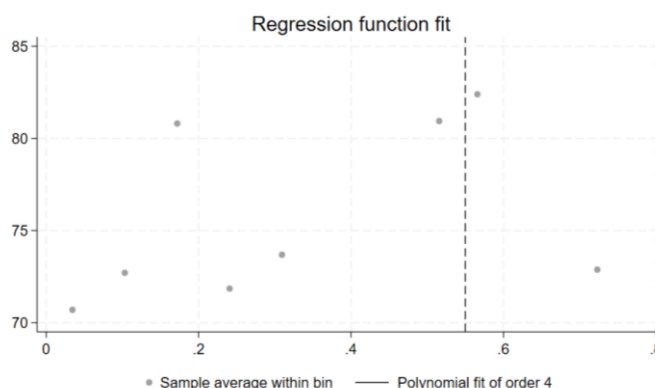
Table 7 Placebo Cutoff Tests

No.	Cutoff	Point Estimate	P> z
1.	0,55	1,697	0,159
2.	0,65	-10,998	0,775
3.	0,30	5,2267	0,131

Source: Data processed by the author (2025)

Placebo tests at irrelevant cutoffs (0.55: 1.697, p=0.159; 0.65: -10.998, p=0.775; 0.30: 5.2267, p=0.131; Table 4.14) yield insignificant results, supporting no random discontinuities. The 0.30 cutoff shows a positive trend (suggesting a potential low-to-medium threshold relevant for Indonesia's low-IFII distribution), with RD plots indicating gradual HDI gains without sharp jumps.

Figure 1 RD Plot at Cutoff 0.55

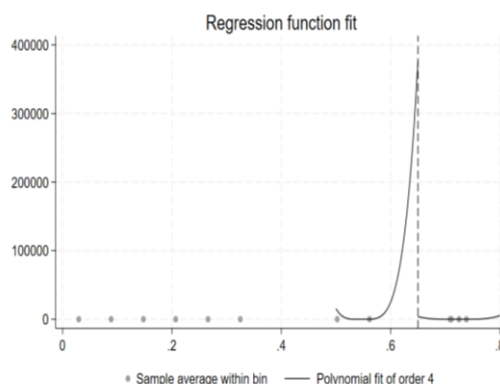


Source: Author's calculation (2025)

The RD plot at cutoff 0.55 (bandwidth 0.15) shows no significant discontinuity or sharp HDI jump, supporting gradual Sharia inclusion effects on human development rather than abrupt changes. Sparse observations limit precision, requiring complementary quantitative analysis (author's data, 2025). At placebo cutoff 0.65 (h=0.15), the RD estimate

is -10.998 ($p=0.775$; 95% CI: -135.16 to 100.73), insignificant with high uncertainty from limited effective observations (5 left, 5 right).

Figure 2 RD Plot at Cutoff 0.65

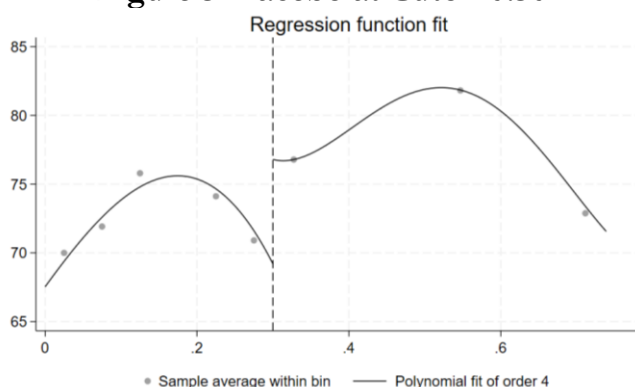


Source: Author's calculation (2025)

The RD plot reveals highly volatile, unstable regression patterns around 0.65, with no clear HDI discontinuity, indicating inadequate local data for reliable causal identification of Sharia inclusion effects on human development (author's data, 2025).

Overall, placebo tests at 0.55 and 0.65 confirm no significant or stable HDI discontinuities. Despite data constraints, these implicitly validate the main RDD design at 0.60, affirming that detected effects are not artifacts of cutoff selection.

Figure 3 Placebo at Cutoff 0.30



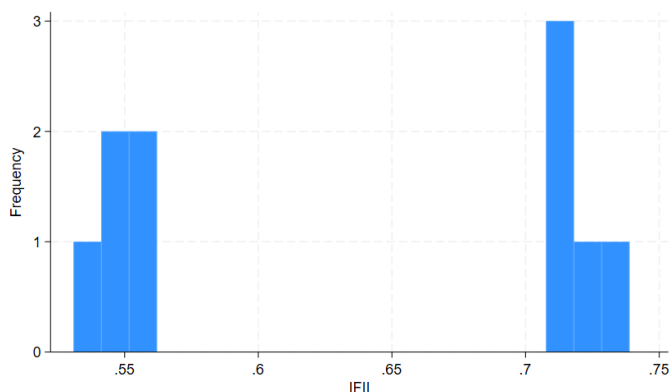
Source: Author's calculation (2025)

A lower placebo cutoff of 0.30 empirically relevant given Indonesia's low-IFII concentration yields an RD estimate of 5.2267 ($p=0.131$), insignificant at 5% but with a positive sign suggesting higher HDI just above the threshold. This indicates a potential low-to-medium turning point more applicable to Indonesia than higher cutoffs (0.55–0.65), though precision suffers from distributional imbalances and wide CIs. The RD plot (4th-order polynomial) depicts a clear HDI increase right of 0.30, with gray bins as binned averages and black line as smoothed trend. Fluctuations imply non-linear, dynamic relations, with gradual rather than extreme discontinuities, consistent with sustained Sharia inclusion benefits. Right-side sparsity necessitates statistical corroboration for causal validity (author's data, 2025).

In summary, placebo tests across 0.30, 0.55, and 0.65 show no random HDI discontinuities, bolstering main cutoff 0.60 validity. For Indonesia's skewed IFII

distribution, alternative operational cutoffs (e.g., 0.30) are recommended alongside 0.60 to better monitor low-level inclusion dynamics in policy classification (Chapter 5).

Figure 4 Density Test (McCrary)



Source: Author’s calculation (2025)

McCrary test fails due to insufficient observations ("not enough observations" error). Histogram reveals clustered mass points (<0.55 and 0.71–0.74) with a gap around 0.6, violating continuity assumptions and confirming data limitations.

One of the key assumptions of the Regression Discontinuity Design (RDD) is that observations located just below and just above the cutoff are comparable in terms of their observable characteristics. To evaluate this assumption, a covariate balance test was conducted using selected socioeconomic variables that are closely associated with human development outcomes, namely **Average Years of Schooling** and **Gross Regional Domestic Product (GRDP) per Capita**. If these covariates do not exhibit significant discontinuities at the cutoff, it provides evidence that the treatment and control groups are locally balanced. The results of the covariate balance test are presented in Table 8.

Table 8 Covariate Balance

No.	Variabel	Point Estimate	P> z
1.	Average Years of Schooling	-1,1434	0,642
2.	GRDP per Capita	-3,2e+05	0,572

Source: Author’s calculation (2025)

Covariates (years of schooling: -1.1434, p=0.642; per capita GRDP: -320,000, p=0.572; Table 4.15) show no significant discontinuities (wide CIs), supporting local balance despite right-side sparsity (160 left vs. 5 right observations).

To examine whether the estimated treatment effect is sensitive to the functional form specification, additional RDD estimations were conducted using higher-order polynomial functions of the running variable. Polynomial order sensitivity tests are commonly employed to assess the robustness of RDD results and to determine whether the findings depend on the chosen model specification. The results using quadratic and cubic polynomial specifications are presented in Table 9.

Table 9 Polynomial Order Tests

No.	Polinomial	Point Estimate	P> z
1.	Quadratic Polynomial (Order 2)	45,589	0,318
2.	Cubic Polynomial (Order 3)	1.709,9	0,968

Source: Author’s calculation (2025)

Higher-order polynomials (quadratic: 45.589, $p=0.318$; cubic: 1,709.9, $p=0.968$; Table 4.16) produce insignificant positive estimates with wide CIs, robust to functional form but constrained by sparse local data.

Taken together, the robustness checks—including bandwidth sensitivity analysis, placebo cutoff tests, covariate balance tests, and polynomial order sensitivity analysis—provide consistent evidence supporting the validity of the RDD design. The placebo tests reveal no spurious discontinuities at alternative thresholds, the covariate balance tests confirm the comparability of observations around the cutoff, and the alternative bandwidth and polynomial specifications do not alter the substantive conclusions of the study.

4.1. Discussion

4.2.1. Disparities in Sharia Financial Inclusion Index (IFII) across Indonesia

The research findings indicate that the Islamic Financial Inclusion Index (IFII) in Indonesia is still characterized by significant regional disparities in the dimensions of accessibility (D1), availability (D2), and usage (D3). In general, western Indonesia particularly Java and Sumatra continues to dominate the development of Islamic finance, while eastern Indonesia exhibits relatively low levels of inclusion. This condition reflects that the development of the Islamic finance industry in Indonesia remains centralized and is not yet spatially equitable, consistent with Sarmas's (2012) findings, which state that financial inclusion in developing countries tends to be concentrated in regions with more advanced economic infrastructure.

In the accessibility dimension (D1), Java consistently recorded the highest score compared to other regions. The high level of accessibility in this region reflects the concentration of Islamic banking assets, third party funds, and national economic activity, which remains centered in major urban areas such as Jakarta. This finding supports the research by Novereska and Arundina (2024), which indicates that regions with high levels of urbanization and economic activity tend to have better penetration of Islamic financial services. Conversely, the low accessibility in eastern Indonesia indicates that the expansion of Islamic financial services has not yet fully reached areas with limited economic and digital infrastructure. This suggests that an increase in the number of financial service does not automatically result in inclusive access for all regions.

In contrast to the accessibility dimension, the availability dimension (D2) shows relatively stronger performance in the Sumatera regions, particularly in Aceh. Institutional and regional regulatory factors are the primary explanatory factors, especially following the implementation of Sharia policies and the conversion of Bank Aceh into a Sharia bank. This finding aligns with the research by Anzira et al.(2022), which states that the conversion of Bank Aceh Syariah successfully increased the number of customers and expanded the penetration of Islamic financial services in the region. Additionally, Suseno and Fitriyani (2019) emphasize that regulatory support is a crucial factor in strengthening Islamic financial inclusion in OIC member states. However, the decline in the number of branch offices in some regions also indicates a shift in industry strategy toward digital based

services. Unfortunately, disparities in digital literacy and limited internet infrastructure in rural areas remain barriers to equitable access to Islamic finance.

Meanwhile, the usage dimension (D3) indicate that the utilization of Islamic financial services remains relatively low compared to improvements in their accessibility and availability. Although some regions, such as Sumatera and Bali-Nusa Tenggara, show an increase in the use of Islamic financing, most provinces still have limited utilization rates. This finding supports the research by Herawati and Listyawati (2017), which indicates that the use of Islamic financial services is influenced not only by religiosity but also by service quality, ease of access, and the economic benefits perceived by the public. Low Islamic financial literacy, the dominance of conventional finance, limited product innovation, and weak integration of Islamic financing with productive sectors such as MSMEs, education, and health are factors that limit the contribution of Islamic financial inclusion to human development.

Overall, Indonesia's average IFII score during the study period was only 0.113 and remains in the low category. This value is relatively consistent with various previous studies, such as those by Umar (2017) and Ali et al. (2019) who found an average index of around 0.127, as well as Novreska and Arundina (2024), who recorded a value of 0.082. This consistency indicates that the development of Islamic financial inclusion in Indonesia is still proceeding gradually and has not yet been transformational. Aceh is the only province to reach the high inclusion category, while DKI Jakarta falls into the medium category. Most other provinces are still classified as low, indicating that the development of national Islamic finance remains enclave like and concentrated in specific regions only.

Aceh's strengths are primarily driven by supportive local regulations, high public preference for Sharia services, and the strengthening of financial institutions following the conversion of Bank Aceh Syariah. Meanwhile, DKI Jakarta benefits from its position as the national economic and financial center with relatively higher financial literacy and better service quality. Dibah et al. (2021) explain that public preference for sharia banking service in urban areas is strongly influenced by service quality, branding, and financial literacy levels. NTB's rise reflects Bank NTB Syariah's post-2018 role in UMKM financing, CSR, and green finance (El Badriati & Mulhimmah, 2025). Conversely, NTT trails (0.001 average), consistent across studies (Novreska & Arundina, 2024: 0.005; others ~0.000–0.002), due to sparse institutions (OJK, 2024), high poverty (19.96%; Pramesty & Parulian, 2025), informal economy dominance, and non-Muslim majority limiting demand.

When compared globally, Indonesia's IFII score still lags behind countries with more mature Islamic financial ecosystems, such as Malaysia, Turkey, and Kuwait. Suseno and Fitriyani (2019) show that the average Islamic financial inclusion index of OIC countries remains in the low category due to weak access to and utilization of Islamic financial services, despite the industry's continued asset growth. This finding indicates that the growth of Islamic financial assets and institutions is not yet sufficient to create quality inclusion without being accompanied by improved financial literacy, equitable infrastructure, and the utilization of more productive financing. Thus, the main challenge

in developing Islamic finance in Indonesia is not only expanding access but also ensuring that Islamic financial services can generate a more inclusive and sustainable impact on welfare (author's data, processed 2025).

4.2.2. Impact of Sharia Financial Inclusion Index (IFII) on Human Development Index (HDI) in Indonesia

Theoretically, financial inclusion plays a role in promoting poverty reduction and improving well-being by expanding access to financial services that enable people to make productive investments, increase their income, and maintain stable spending on education and health. In this context, financial inclusion should contribute directly to improvements in the components of the Human Development Index (HDI), particularly in the dimensions of education, health, and standard of living. However, the empirical results of this study indicate that Islamic Financial Inclusion Index (IFII) in Indonesia does not have a significant positive effect on the HDI based on the Regression Discontinuity Design (RDD) approach. Negative and insignificant estimated coefficients at the 0.6 cutoff suggest that increased Islamic financial inclusion has not yet been able to produce direct and significant changes in well-being.

These findings indicate that the development of Islamic financial inclusion in Indonesia still faces various structural obstacles that limit its impact on human development. Although some regions, such as Aceh and Jakarta, exhibit relatively high IFII levels, most provinces remain in the low inclusion category. This disparity results in the national Islamic financial sector tending to be enclave-like and concentrated in specific regions. This situation demonstrates that inter-provincial HDI convergences is not entirely driven by the development of Islamic financial inclusion, but is also influenced by other factors such as institutional quality, education levels, infrastructure development, and regional economic capacity.

In addition, low levels of Islamic financial literacy, limited penetration of financial services in rural areas, the dominance of urban centered services, and the weak integration of Islamic financing with the productive sector have resulted in Islamic financial inclusion not yet optimally supporting human development. In many regions, the expansion of the Islamic finance industry remains more focused on institutional and asset growth rather than strengthening productive financing capable of generating increase income, job opportunities, and community economic empowerment. This situation indicates that access to financial services has not automatically translated into productive economic utilization.

The non-significant RDD estimates at the 0.6 cutoff also indicate that there is no strong local discontinuity in the relationship between IFII and HDI. This is due to the highly skewed distribution of observations, in which only a few provinces are near or above the high inclusion threshold, while the majority of provinces still have IFII values below 0.3. This distribution skewness causes an imbalance between the treatment and control groups, making the estimates more sensitive to sample limitations and data noise. Furthermore, the use of provincial level macro data also indicates that the impact of

financial inclusion on human development tends to be gradual and requires indirect transmission mechanisms, such as increased household income, spending on education and health, savings, and the effectiveness of productive financing.

The findings of this study differ from those of Ali et al. (2019), who found a positive relationship between Islamic financial inclusion and human development using Pearson's correlation approach. In that study, provinces with high IFII levels, such as DKI Jakarta, East Java, and Aceh, tended to have higher HDI's. However, the correlational approach only captures average associations and is not yet capable of identifying local causal effects, unlike the RDD approach in this study. Thus, the positive relationship previously found likely reflects the socioeconomic advantages of developed regions rather than direct impact of Islamic financial inclusion itself.

The findings of this study are also consistent with Zahara (2021), who found that the accessibility dimension does not have a significant effect on the HDI, while the availability dimension actually has a significant negative effect due to the low productive utilization of financial services. This indicates does not necessarily lead to usage that improves community well-being. Furthermore, Novreska and Arundina (2024) found that Islamic financial inclusion has a positive impact on human development through a fixed-effects panel approach; however, this effect is only significant in provinces with high HDI levels and better economic capacity. This demonstrates that the effectiveness of Islamic financial inclusion is heavily influenced by a region's structural readiness, including literacy levels, institutional quality, and the community's economic capacity.

From an Islamic economic perspective, the results of this study indicate that the development of Islamic financial inclusion in Indonesia has not yet fully realized the objectives of *maqhasid al-sharia*, particularly in terms of creating distributive justice, inclusive welfare, and sustainable social development. Normatively, Islamic finance aims not only to expand access to financial services but also to create *maslahah* (public interest), economic empowerment of the community, and a more equitable distribution of welfare. However, the empirical findings of this study indicate that the current development of Islamic finance in Indonesia still tends to function as a symbolic financial expansion rather than a substantive transformation of welfare. The dominance of a commercial orientation, low integration with the real sector, and limited productive financing have resulted in the social and ethical functions of Islamic finance not yet operating optimally.

More broadly, this study suggests that financial inclusion policies in developing countries can not focus solely on expanding access and the growth of financial institutions. Financial inclusion will only yield human development impacts if it is supported by improved financial literacy, equitable digital infrastructure, strengthened institutional quality, and the integration of financing with productive economic sectors. Thus, the main challenge in developing Islamic financial inclusion in Indonesia is not merely increasing the number of access points and financial institutions, but ensuring that these services are truly capable of creating inclusive and sustainable welfare transformation (author's data, processed 2025).

5 Conclusion

This study found that Indonesia's Islamic Financial Inclusion Index (IFII) for the 2020-2024 period remains at a relatively low level and exhibits significant disparities across provinces. The development of Islamic finance still exhibits enclave characteristics, concentrated primarily in Aceh and urban economic centers such as Jakarta, while most other provinces remain in the low inclusion category. This disparity indicates that the expansion of Islamic finance in Indonesia has not been accompanied by equitable development distribution across regions.

Further RDD estimates indicate that Islamic Financial Inclusion does not have a significant effect on the Human Development Index (HDI) at a cutoff of 0.6. This finding not only indicates statistical insignificance but also has important theoretical implications. The research results indicate that the current stage of development of Islamic financial inclusion in Indonesia is still insufficient to bring about substantive improvements in welfare. Increased accessibility and availability of Islamic financial services have not automatically improved education, health, or living standards without support for productive utilization and institutional strengthening.

From an Islamic economic perspective, these findings indicate that Islamic financial inclusion in Indonesia has not yet fully realized the objectives of *maqashid al-sharia*, particularly in terms of creating distributive justice, inclusive well-being, and sustainable development. Islamic finance still tends to be dominated by institutional expansion and market penetration rather than functioning as an integrated mechanism for socioeconomic empowerment.

From a policy perspective, strengthening Islamic financial inclusion requires strategies that go beyond simply expanding branch networks or increasing account ownership. Greater attention must be given to the allocation of productive financing, particularly for SMEs and community based economic sectors. Additionally, enhancing Islamic financial literacy is crucial so that access to finance can be translated into effective and productive utilization. The government and financial authorities also need to strengthen the digital Islamic financial ecosystem to reduce financial infrastructure disparities across regions, particularly in eastern Indonesia and rural areas.

This study also underscores the need for development policies that better integrate the Islamic financial sector with education, health, poverty alleviation, and regional economic empowerment programs. Without broader structural reforms, financial inclusion policies may fail yield significant human development outcomes.

Future research is recommended to employ a mixed methods approach to capture structural and regional heterogeneity more comprehensively. A longer observation period is also needed to assess long-term development impacts. Additionally, future research could incorporate mediating variables such as institutional quality, poverty reduction, the effectiveness of productive financing, digital inclusion, and household well-being to gain a deeper understanding of the transmission mechanisms between Islamic financial inclusion and human development.

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