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Original Research Article

Analyzing the Role of Qard al-Hasan Funds in Enhancing Financial Inclusion in Iran: A Structural Equation Modeling Approach

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In recent decades, financial inclusion has been recognized as a key pillar of sustainable development and economic justice in developing countries. This study analyzes the performance of Qard al-Hasan funds as community-based Islamic financial institutions in promoting financial inclusion in Iran. Three core dimensions—access, usage, and quality—were examined in relation to macroeconomic variables such as poverty reduction and economic stability. Using structural equation modeling (SEM), time-series data for 2017–2024 (1396–1403 in the Iranian calendar) were collected from the Central Bank of Iran and the Statistical Center of Iran. The findings showed that Qard al-Hasan funds significantly improved financial inclusion, which mediated reductions in multidimensional poverty and enhanced stability. Access to financial services ($\beta = 0.529$) and quality of services ($\beta = 0.639$) had the strongest impact on poverty reduction, while inflation and unemployment ($\beta = 0.240$) affected fund performance. By mobilizing deposits, fostering investment, and reducing financial volatility, the funds assumed a pivotal role in sustainable development. The results emphasize the need to integrate modern financial technologies with the traditional structure of these institutions and highlight policy reforms to strengthen their social and economic effectiveness. By providing an applied empirical model, the study offers a basis for designing comprehensive financial policies to promote justice and inclusive development in Iran. All analyses were conducted under sanction conditions (2017–2024), directly reflecting the funds' role in managing economic constraints. Notably,

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even amid international sanctions—when access to external finance and banking resilience were severely restricted—Qard al-Hasan funds contributed meaningfully to financial inclusion. Iran's experience can thus serve as a practical model for other countries facing international pressures.

Keywords: Financial Inclusion, Qard al-Hasan Funds, Microfinance, Multidimensional Poverty, Economic Stability, Islamic Banking, Structural Equation Modeling
JEL Classification*:* G21, O16, C39

1 Introduction

Financial inclusion, as one of the fundamental pillars of economic and social development, refers to universal access to formal, affordable, secure, and high-quality financial services—services that sustainably and responsibly meet the financial needs of individuals and businesses (World Bank, 2018). This concept is assessed across various dimensions, including access, usage, and quality of financial services. Empirical findings indicate that promoting financial inclusion can contribute to poverty reduction, empowerment of vulnerable groups, enhanced resilience against economic shocks, and ultimately, economic growth (Ahmad et al., 2021; Sethi & Acharya, 2018). Consequently, over the past two decades, financial inclusion has attracted growing attention from economic policymakers and international organizations such as the G20, which have identified it as a central component of sustainable development.

In recent decades, financial inclusion has evolved into a foundational element of sustainable development and social justice in emerging economies. Equitable access to financial services for low-income and marginalized populations not only enables economic empowerment but also plays a critical role in reducing poverty, enhancing social welfare, and improving economic stability (El-Nahal, 2025). In line with this, Ratnawati (2020) emphasized that financial inclusion—through its direct impact on variables such as inequality, poverty, and social justice—is considered a key instrument in realizing sustainable development goals.

Within this context, Qard al-Hasan funds, as Islamic and community-based financial institutions with a long-standing tradition in microfinance, possess significant potential to enhance financial inclusion in Iran. Despite this potential, there has been limited scientific and systematic evaluation of the performance of these funds in relation to key financial inclusion indicators, particularly within the framework of macroeconomic variables and evolving digital transformations. Numerous studies at both the international and national levels have examined various dimensions of financial inclusion, highlighting the crucial role of modern technologies (FinTech, blockchain,

artificial intelligence), Islamic financial institutions, localized policymaking, financial literacy, and digital banking in deepening financial inclusion. In particular, research by Aloulou et al. (2024), Mishra et al. (2024), and Sant'Anna and Figueiredo (2024), along with domestic studies such as Ehsanfar (2023), Khajavand Salehi (2023), and Adamifard (2024), all underscore the necessity of effectively integrating technology, regulation, social accountability, and non-bank financial structures to ensure the sustainable development of the financial system. These studies directly align with the objective of the present research, which is to analyze the role of Qard al-Hasan funds' performance in promoting financial inclusion in Iran.

Accordingly, this study aims to explore the causal relationships between the performance of Qard al-Hasan funds and the three dimensions of financial inclusion (access, usage, quality), as well as to examine the mediating role of financial inclusion in the influence of these institutions on two macro-level variables: poverty reduction and economic growth and stability. For this purpose, the research adopts a structural equation modeling (SEM) approach using Smart PLS software and analyzes comprehensive data from the years 2017 to 2024, drawn from official national sources such as the Central Bank of Iran and the Statistical Center of Iran. The findings of this study reveal both direct and indirect relationships among key variables and, by providing an analytical model of the impact mechanism of Qard al-Hasan funds, offer a basis for more targeted policymaking in the areas of financial inclusion, poverty alleviation, and economic stability. Thus, this research seeks to address existing gaps in the national literature by leveraging empirical data, advanced statistical analysis, and engagement with contemporary theoretical discourse, ultimately offering actionable recommendations to enhance the role of these institutions within the national financial system.

The remainder of this article is organized as follows. Section 2 reviews the relevant literature on financial inclusion, Islamic finance, and the role of Qard al-Hasan funds in economic development. Section 3 explains the research methodology, data sources, variables, and structural equation modeling approach employed in the study. Section 4 presents the empirical findings and statistical analyses. Finally, Section 5 discusses the conclusions, policy implications, limitations of the study, and suggestions for future research.

2 Literature Review

In recent decades, financial inclusion has emerged as a fundamental component of sustainable development and poverty reduction, gaining increasing attention in scholarly literature. Prior studies have demonstrated

that non-bank financial institutions, especially of Qard al-Hasan funds, play an effective role in improving access to financial services for marginalized populations. Researchers have examined a variety of contributing factors—including fintech innovations, financial literacy, Islamic financial mechanisms, and localized policymaking—that facilitate enhanced financial inclusion. Within this framework, the current review of selected literature focuses on the position and impact of Qard al-Hasan funds in advancing financial inclusion in Iran.

Research by Qizam et al. (2025) revealed that the halal value chain, acting as a mediator via Islamic institutions, enhances entrepreneurial attitudes and social inclusion in Indonesian Islamic schools, highlighting the intermediary role of religious financial institutions in promoting financial inclusion. Eshun and Kočenda (2025) found that the quality dimension of financial inclusion across 69 countries depends on institutional factors such as financial literacy and banking efficiency—particularly within digital contexts. Sukmana and Trianto (2025) demonstrated that improving Islamic financial literacy, alongside strengthening Islamic financial inclusion, significantly enhances the economic performance of micro, small, and medium-sized enterprises (MSMEs) in Indonesia, facilitating business growth and access to capital and driving creative economic development.

Mbodj and Laye (2025) documented that financial inclusion across different poverty strata reduces poverty by improving economic security. Sebai et al. (2025), in a study covering 26 developing countries, identified a nonlinear (inverted U shaped) relationship between financial inclusion and financial sustainability—in early phases, inclusion enhances stability, but beyond a certain threshold, it may generate risk.

Mishra et al. (2024) systematic review of 325 articles proposed a framework for sustainable financial inclusion centered on technology and vulnerable populations. Sant'Anna and Figueiredo (2024) observed that fintech increases financial access but, without adequate regulation, can threaten financial stability, underscoring the crucial role of regulatory bodies. Aloulou et al. (2024) showed that the adoption of fintech, the metaverse, and artificial intelligence in UAE banks leads to improved digital financial inclusion and competitiveness. Adeoye et al. (2024), using data mining and AI analysis, emphasized that such technologies enhance financial inclusion among underserved communities by enabling personalized services and risk assessment. Amnas et al. (2024) similarly found that digital financial literacy combined with fintech and effective oversight increases participation in formal financial services.

Bai et al. (2024) concluded that digital financial inclusion—by reducing financial constraints—boosts innovation in technology-driven non-profits and enterprises. Yang & Masron (2024) indicated that digital transformation, through enhanced financial inclusion, reduces credit risk and elevates financial stability within banks. Oyewole et al. (2024) analyzed the combined effects of financial inclusion and energy efficiency on socio-economic indicators, stressing the importance of context-sensitive policy design. Falaiye et al. (2024) highlighted the pivotal role of digital wallets and mobile banking in overcoming traditional barriers and improving financial access in emerging markets. Osabutey & Jackson (2024), reviewing mobile money experiences in Africa, pinpointed infrastructural challenges and underscored the necessity of blending technology with indigenous knowledge. Bello (2024) and Kamble et al. (2024) demonstrated how data analytics and tailored financial services can extend financial justice in developing economies. Lee et al. (2023) found that digital financial inclusion reduces poverty and supports sustainable development in China, with the effect being regional and poverty severity dependent. Zhang et al. (2023) emphasized that digitalization reduces information asymmetry in SMEs, thereby enhancing financial access and inclusion. Ozdemir et al. (2023), in their study on participation banks in Turkey, demonstrated that integrating micro-investment practices with Islamic financial principles can improve financial inclusion among low-income groups. Daud (2023) emphasized the complementary role of digital technology in amplifying the impact of financial inclusion on economic growth. Similarly, Anthony-Orji et al. (2023) found that financial inclusion leads to meaningful economic growth only when it synergizes with other components of financial development. Adedokun and Ağa (2023), focusing on Sub-Saharan Africa, confirmed the presence of a long-term positive relationship between financial inclusion and economic growth, while also noting that, in the short run, economic growth itself can drive the expansion of financial inclusion. Together, these studies highlight the importance of institutional frameworks, technology, local policymaking, and Islamic financial instruments in enhancing financial inclusion and driving economic development—an insight closely aligned with the current study's focus on the role of Qard al-Hasan funds in Iran's financial inclusion landscape.

Esmaeilpour Moghadam and Karami (2023) revealed that fintech empowers women financially, but only in contexts with low gender discrimination. Patel and Satapathy (2023) emphasized that digital banking reduces service costs and improves financial access for disadvantaged groups. Chuc et al. (2022), drawing on data from 60 countries, showed that financial

inclusion amplifies the growth effects of remittances. Pal et al. (2022) identified women's financial participation as a driver of income generation and access to social support. Murthy et al. (2022) pointed to education, gender, and income as key factors in enhancing financial awareness and adaptation.

El-Nahal (2025) proposed a six-pillar framework in which financial inclusion plays a central role in promoting social justice. Siddiqui et al. (2021) argued that low-income individuals are more inclined to use Islamic financial services. Lal (2021) noted that barriers such as illiteracy and negative perceptions of banks hinder marginalized groups from accessing formal financial services. Ait Lahcen, and Gomis-Porqueras, (2021) highlighted that monetary policies and unequal financial access can lead to consumption inequality. Serrao et al. (2021) confirmed the positive impact of bank access on improving the economic conditions of vulnerable households. Ofosu-Mensah Ababio et al. (2021) emphasized the bidirectional relationship between human development and financial inclusion.

Ratnawati (2020) found that financial inclusion influences growth, poverty, and inequality, though its effect varies across countries. Akhtar et al. (2020) and Awais (2020) examined the role of Islamic banking in promoting financial inclusion in Pakistan and globally. Khmous and Besim (2020) also reported that Islamic banking has proven effective in the MENA region, especially among religious populations in middle-income countries. Gyasi et al. (2019), in a study in Ghana, found that financial inclusion positively impacts elderly health outcomes. Shinkafi et al. (2019) highlighted the importance of technology and institutional commitment as key enablers of Islamic financial inclusion. Finally, Le et al. (2019) observed that despite the expansion of financial inclusion across Asia, it has had a negative impact on financial efficiency.

Having reviewed the broader international and regional literature, we now turn our focus to domestic research conducted within Iran to examine how national-level studies have addressed financial inclusion and the role of Qard al-Hasan funds in socio-economic development. In a systematic review of the literature, Adamifard (2024) investigated the opportunities and challenges associated with the adoption of blockchain technology in Iran’s digital banking sector. Their findings indicated that modern technologies, by enhancing transparency and reducing transaction costs, could provide a foundation for expanding financial inclusion. Khajavand Salehi (2023) focused on enhancing credit scoring systems and proposed mechanisms that integrate both traditional and non-traditional data to improve credit allocation, arguing that financial inclusion can be facilitated through reduced risk in the

banking network. Jafari Dehkordi & Hassanpour (2023), employing a correlational approach, demonstrated that corporate social responsibility positively affects banks' financial inclusion by improving financial health and access for low-income groups. Majbouri Yazdi and Kimasi (2022) also confirmed the positive relationship between social responsibility and financial inclusion, highlighting the expansion of banking services and increased public trust at the institutional level. Ehsanfar (2023), using a stochastic frontier analysis, evaluated the technical efficiency and market power of Qard al-Hasan funds and, by pointing to their non-monopolistic structure, underlined their significant role in microfinance and promoting financial inclusion within society. Afghahi et al. (2022), through a mixed-methods approach, proposed a systematic model for the non-bank microfinance supply chain. By strengthening community-based and local institutions, their model contributes significantly to deepening financial inclusion and reducing dependence on banks. Goodarzi Farahani & Karkhaneh (2023), based on empirical evidence and panel data analysis, showed that Qard al-Hasan loans support not only economic growth but also enhance financial inclusion through production and employment support mechanisms. Collectively, these studies focusing on advanced technologies, efficient credit scoring systems, corporate social responsibility, and the operational efficiency of Qard al-Hasan funds establish a clear connection with the present study's objective, which investigates the role of Qard al-Hasan funds in advancing financial inclusion in Iran. Mirzaei and Shirazian (2019) found that financial inclusion and financial literacy significantly influence the perceived value of investments, while also establishing that financial literacy positively impacts financial inclusion. Mohaqqeqnia and Akbari Bavafa Gholian (2017), using the Delphi method, identified resource mobilization tools, credit allocation methods, and implementation requirements for microfinance, emphasizing the central role of Qard al-Hasan funds in expanding financial inclusion. Tari (2014) argued that Qard al-Hasan funds, by leveraging the strengths of global microfinance institutions and reforming operational mechanisms, can contribute meaningfully to employment, production growth, and the expansion of financial inclusion. Lastly, Mousavian (2004), in light of managerial challenges faced by Qard al-Hasan funds, proposed a comprehensive restructuring framework involving classification, oversight, control, and legal structuring to improve their governance and impact.

Table 1

A Comprehensive Review of Recent Studies on Financial Inclusion and the Role of Financial Institutions in Economic Development

Author(s) and Year	**Research Method**	**Research Objective**	**Key Findings Related to Financial Inclusion / Poverty / Stability / Economic Growth**
Qizam et al., (2025)	Quantitative - Structural Equation Modeling	Investigating the impact of the halal value chain and Sharia-compliant financial inclusion on socio-economic transformation	Sharia-compliant and digital financial inclusion indirectly enhance quality of life, entrepreneurship, and social inclusion. Strengthening the halal financial system at national and international levels is also observed.
Eshun & Kočenda, (2025)	Dynamic Panel Data Analysis	Identifying determinants of financial inclusion in Africa and OECD countries	Institutional, economic, and technological factors influence various dimensions of financial inclusion. Financial inclusion positively affects service quality, access, and usage. Fintech and banking efficiency play a key role.
Mbodj & Laye, (2025)	Quantile Regression	Analyzing the effect of financial and financial development on poverty reduction	Financial inclusion contributes to poverty alleviation, enhanced economic security, and financial participation of low-income groups. Financial system stability and development are key factors.
Sukmana & Trianto, (2025)	Structural Equation Modeling	Assessing the role of Islamic financial literacy and inclusion in small business performance	Islamic financial inclusion and financial literacy lead to growth of micro-businesses, improved access to finance, and development of the creative economy.
Sebai et al., (2025)	Panel Smooth Transition Regression	Analyzing the relationship between financial inclusion and financial stability	Inverted-U relationship: financial inclusion initially promotes stability, but excessive inclusion may lead to instability. Emphasis is placed on balanced policy-making.
Mishra et al., (2024)	Systematic Literature Review	Exploring dimensions of financial inclusion and its socio-economic effects	Financial inclusion is effective in poverty reduction, women empowerment, sustainable development, and bridging the digital divide. The role of modern financial technologies is also emphasized.
Sant'Anna & Figueiredo ., (2024)	Systematic Review	Investigating the impact of fintech on financial inclusion and stability	Fintech promotes financial inclusion and reduces poverty; however, in the absence of regulation, it may threaten financial stability. Effective policy is essential.
Aloulou et al., (2024)	Quantitative - Survey Analysis	Assessing fintech's impact on digital financial inclusion in UAE banking	Fintech adoption has fostered digital financial inclusion, improved banking performance, and increased financial resilience during crises (e.g., COVID-19).

Author(s) and Year	Research Method	Research Objective	Key Findings Related to Financial Inclusion / Poverty / Stability / Economic Growth
Adeoye et al., (2024)	Review and Analytical Study	Role of Artificial Intelligence (AI) and data analytics in financial inclusion in developing countries	AI and data mining contribute to inclusive and sustainable financial development by facilitating credit assessment, personalized financial services, and better access for marginalized populations.
Amnas et al., (2024)	PLS-SEM Modeling	Investigating the role of fintech and digital financial literacy in financial inclusion	Trust, service quality, and security increase fintech usage. Digital financial literacy mediates the relationship between fintech and inclusion; regulatory support plays a moderating role.
Bai et al., (2024)	Fixed Effects Panel Model	Impact of supply chain finance and digital financial inclusion on firm innovation	Digital financial inclusion reduces financial constraints and enhances innovation, especially in non-state and high-tech enterprises.
Yang & Masron (2024)	Generalized Method of Moments (GMM)	Examining the link between digital transformation, financial inclusion, and bank credit risk	Digital transformation reduces banks' credit risk, with financial inclusion reinforcing this effect.
Falaiye et al., (2024)	Trend and Market Studies	Impact of emerging technologies on financial inclusion in emerging markets	Mobile banking, digital wallets, and blockchain have improved financial access for underserved groups and proved effective during crises.
Osabutey & Jackson., (2024)	Literature Review	Analyzing challenges and policies of mobile money and financial inclusion in Africa	Issues such as security, infrastructure, and unequal coverage have led mobile money to benefit urban affluent groups more than poor communities.
Bello , (2024)	Case Study & Analytical Research	Exploring the role of data analytics in promoting financial inclusion	Data analytics improves risk assessment and customer profiling, facilitating better access to financial services for underserved populations.
Kamble et al., (2024)	Instrumental Variable Regression	Investigating the relationship between financial inclusion, digital financial literacy, and financial well-being	Both factors positively influence financial well-being, with financial inclusion having a stronger effect.
Oyewole et al., (2024)	Quantile Panel Regression	Examining the effects of financial inclusion and energy efficiency on socio-economic performance	Financial inclusion improves social indicators but has limited impact on employment in developing countries; energy efficiency has stronger effects in developed nations.
Lee et al., (2023)	Spatial Durbin Model & Mediation Regression	Digital financial inclusion and poverty reduction in China	Digital financial inclusion positively impacts poverty reduction. A U-shaped relationship is observed with positive spillovers through income growth.

Author(s) and Year	Research Method	Research Objective	Key Findings Related to Financial Inclusion / Poverty / Stability / Economic Growth
Zhang et al., (2023)	Empirical Analysis	Digitization and financing of SMEs	Reduces information asymmetry and facilitates access to finance for SMEs. Highlights the importance of financial institutions' digital transformation.
Ozdemir et al., (2023)	Conceptual Model Proposal	Financial inclusion through Islamic microfinance in Turkey	Participatory banks should integrate micro-investment into their development agendas.
Daud, (2023)	Empirical Analysis	Digital technology, financial inclusion, and economic growth	Digital technology amplifies the positive impact of financial inclusion on economic growth.
Anthony-Orji et al., (2023)	Multiple Regression	Financial inclusion and economic growth in Nigeria	Positive correlation between financial inclusion, financial development, and economic growth; rural credit is impactful.
Adedokun & Ağa., (2023)	Dumitrescu-Hurlin Causality Test	Financial inclusion and economic growth in Sub-Saharan Africa	Bidirectional causality between financial inclusion and growth; calls for policies to enhance financial access.
Chuc et al., (2022)	Principal Component Analysis	Financial inclusion and enhanced impact of remittances	Financial inclusion amplifies the positive effects of remittances on economic growth.
Esmaeilpour Moghadam & Karami., (2023)	Correlation Analysis	Fintech and women's financial empowerment	Positive in countries with low gender discrimination; ineffective in highly discriminatory environments.
Patel & Satapathy., (2023)	Qualitative and Prescriptive Analysis	Fintech solutions and financial inclusion in developing countries	Digital banking reduces cost and enhances access for underserved populations.
Paul et al., (2022)	Empirical Analysis	Women's empowerment through financial inclusion	Financial participation and access to social services empower women economically.
El-Nahal, (2025)	Conceptual Analysis	The role of financial inclusion in social justice	Financial inclusion positively affects six dimensions of social justice (education, health, anti-discrimination, etc.).
Pal et al., (2022)	International Analysis	Impact of financial inclusion on economic growth and stability	Financial inclusion contributes to economic growth, financial development, banking profitability, and system stability.
Lal, (2021)	Mediation Model	Financial inclusion and economic development in marginalized communities	Financial inclusion fosters economic development in disadvantaged areas through social empowerment.
Siddiqui et al., (2021)	Comparative Analysis	Islamic financial inclusion in India	Low-income individuals and those in unstable jobs show a preference for using Islamic financial systems.

Author(s) and Year	Research Method	Research Objective	Key Findings Related to Financial Inclusion / Poverty / Stability / Economic Growth
Ait Lahcen, & Gomis-Porqueras, (2021)	Theoretical Modeling	Endogenous financial inclusion and monetary policy	Monetary policy with direct transfers to accounts reduces consumption inequality.
Serrao et al., (2021)	Field Analysis	Status of financial inclusion in vulnerable regions of India	Financial inclusion improves household economic status. A model for inclusive financial systems is proposed.
Ofosu-Mensah Ababio et al., (2021)	Empirical Analysis	Financial inclusion and human development in frontier markets	Financial inclusion supports human development and improves living standards, health, and literacy in less-developed countries.
Khmous and Besim, (2020)	Probit Model – World Bank Data	Effect of Islamic banking on financial inclusion in MENA	Financial inclusion is below the global average in middle-income countries. Islamic banking is more effective among religious populations. Education has no significant effect.
Gyasi et al., (2019)	Descriptive-Analytical	Effect of financial inclusion on health and health behavior among the elderly in Ghana	Financial inclusion enhances access to healthcare and improves health outcomes in the elderly. Emphasizes integrating financial inclusion strategies into health policy.
Shinkafi et al., (2020)	Theoretical Approach	Identifying drivers of financial inclusion in Islamic economies	Strong technology infrastructure, regulatory commitment, and awareness of Islamic financial services are key to enhancing financial inclusion.
Li et al., (2019)	Principal Component & Generalized Least Squares	Impact of financial inclusion on financial efficiency and sustainability in Asia	Financial inclusion negatively affects financial efficiency. Evidence on financial sustainability is mixed and inconclusive.
Adamifard, (2024)	Systematic Literature Review	Opportunities and challenges of blockchain in Iran's digital banking	Blockchain fosters financial inclusion by enhancing transparency and reducing transaction costs.
Khajavand Salehi, (2023)	Mechanism Proposal	Improving credit assessment systems for optimal credit allocation	Using both traditional and alternative data in credit scoring reduces banking network risk and enhances financial inclusion.
Jafari Dehkordi & Hassanpour., (2023)	Correlational Approach	Impact of corporate social responsibility (CSR) on financial inclusion in banks	CSR improves financial health, increases access for low-income groups, and promotes financial inclusion.
Majbouri Yazdi & Kimasi, (2022)	Analytical–Descriptive	Evaluating the relationship between social responsibility and financial inclusion	Positive relationship confirmed between banks' social responsibility, expanded services, public trust, and financial inclusion.

Author(s) and Year	Research Method	Research Objective	Key Findings Related to Financial Inclusion / Poverty / Stability / Economic Growth
Ehsanfar, (2023)	Stochastic Frontier Analysis	Technical efficiency and market power of Qard al-Hasan funds	Non-monopolistic structure of Qard al-Hasan funds facilitates microfinance and promotes financial inclusion.
Afghahi et al., (2022)	Mixed Methods Approach	Designing a model for non-bank microfinance supply chains	Strengthening local institutions and reducing dependency on banks deepens financial inclusion.
Goodarzi Farahani & Karkhane, (2023)	Panel Data Analysis	Impact of Qard al-Hasan facilities on economic growth and financial inclusion	Qard al-Hasan lending supports production and employment, thus enhancing economic growth and financial inclusion.
Mirzaei & Sharazian, (2019)	Correlational Study	Relationship between financial literacy, financial inclusion, and perceived investment value	Financial inclusion and literacy significantly influence perceived investment value. Financial literacy strengthens inclusion.
Mohaqqeqnia & Akbari Bavafa Gholian(2017)	Delphi Method	Identifying tools and requirements for microfinance provision	Qard al-Hasan funds play a pivotal role in expanding financial inclusion.
Tari, (2014)	Analytical Study	Role of Qard al-Hasan funds in employment and production growth	Structural reforms and leveraging global experiences in Qard al-Hasan funds lead to expanded financial inclusion.
Mousavian, (2004)	Structural Design	Organizing Qard al-Hasan funds	Legal classification, supervision, and control of these funds provide a foundation to strengthen their role in the financial system.

Within the framework of institutional economics (North, 1990), Qard al-Hasan funds can be regarded as informal, community-based institutions capable of compensating for the institutional gaps of the formal banking system. By reducing transaction costs, enhancing social trust, and creating localized mechanisms for resource allocation, these institutions contribute to stabilizing economic relations in contexts characterized by weak institutional structures (Mousavian, 2004; Afghahi et al., 2022). From this perspective, Qard al-Hasan funds are not merely financial tools but complementary institutional entities that deepen financial inclusion within underdeveloped settings (Mohaqqeqnia & Akbari Bavafa Gholian, 2017; Tari, 2014).

In addition, within the framework of Maqasid al-Sharia (objectives of Islamic law), the primary goal of Islamic financial activities—including Qard al-Hasan funds—is to realize social justice, alleviate poverty, and enhance

public welfare (Siddiqui et al., 2021; El-Nahal, 2025). Recent studies have demonstrated that access to Islamic microfinance services is aligned with reducing inequality and empowering disadvantaged groups (Khmous & Besim, 2020; Ozdemir et al., 2023).

Moreover, the theory of sustainable development and the inclusive finance approach clearly underscore that equitable access to financial resources is a necessary condition for empowering marginalized groups and fostering inclusive economic growth (Mishra et al., 2024; Pal et al., 2022). The literature further suggests that the integration of modern financial technologies with indigenous financial institutions such as Qard al-Hasan funds can strengthen financial sustainability, social justice, and technological innovation simultaneously (Adeoye et al., 2024; Falaiye et al., 2024; Amnas et al., 2024).

In the Iranian context, sanctions operate as a major institutional constraint, which further amplifies the importance of community-based institutions such as Qard al-Hasan funds.

A comprehensive review of both domestic and international literature indicates that financial inclusion is a strategic pillar in achieving sustainable development, fostering social justice, and reinforcing economic foundations in emerging economies. Within this context, microfinance particularly when provided through community-based institutions such as Qard al-Hasan funds and rooted in the framework of Islamic economics serves as an effective mechanism to enhance financial access for marginalized populations. These institutions play a pivotal role in poverty alleviation, improving economic well-being, and strengthening household financial health. Numerous studies further suggest that integrating the traditional operational models of such institutions with modern financial technologies including fintech, blockchain, and artificial intelligence can significantly enhance the quality of services, facilitate access, and increase usability, thereby expanding the overall level of financial inclusion in society. However, research also underscores that realizing these benefits requires the reinforcement of regulatory oversight, restructuring of financial governance systems, and the development of balanced policy frameworks to mitigate the potential risks associated with the uncontrolled expansion of microcredit. In this regard, Qard al-Hasan funds recognized as one of the primary tools for microfinance in Iran possess substantial potential to actively contribute to the advancement of the three core dimensions of financial inclusion: access, usage, and quality. This potential can be more fully realized if their performance is assessed using contemporary analytical approaches and if their operations are redefined in alignment with macroeconomic imperatives and ongoing digital transformations.

Accordingly, it may be concluded that the strategic utilization of Qard al-Hasan funds, in tandem with the adoption of financial technologies, constitutes one of the most critical pathways for promoting financial justice and reducing socio-economic disparities in Iran. The present study, grounded in data-driven analysis and structural modeling, represents a step toward addressing this necessity by proposing a practical framework for enhancing the effectiveness of these institutions within the national financial system.

3 Research Method

In this study, structural equation modeling (SEM) was employed to examine the causal relationships among independent, dependent, control, and mediating variables. Data analysis was conducted using Smart PLS software in order to simultaneously assess the complex and multivariate relationships among the selected indicators. It should be emphasized that the methodological orientation of this research is *structural modeling* rather than *dynamic econometric analysis*. Accordingly, unlike approaches such as differential equations, dynamic relations, or Granger causality tests, the present study did not aim to predict or estimate time series econometrically. Instead, the focus was on clarifying how the performance of Qard al-Hasan funds influences the dimensions of financial inclusion (access, usage, and quality), and how this inclusion, in turn, contributes to poverty reduction and economic stability.

In the first stage, the effects of economic variables—including urban population, budget deficit, gross domestic product, public debt, money supply, consumer price index, and producer price index—were assessed as control variables on the performance of Qard al-Hasan funds (measured through the number of funds, branches, loan volumes, and financial resources). Subsequently, the performance of these funds, as the independent variable, was analyzed with respect to the three dimensions of financial inclusion. Financial inclusion, acting as a mediating variable, transmitted the impact of fund performance to two dependent variables: the poverty index and the economic growth and stability index.

The indicators of financial inclusion included the number of bank branches, POS terminals, ATMs, active bank accounts, digital banking users, number of depositors, Gini coefficient, household income levels, international transfer volumes, and financial literacy rates. Poverty was measured using poverty headcount, multidimensional poverty, per capita income, and the Human Development Index (HDI). Economic growth and stability were assessed using indicators such as the ratio of liquid assets to short-term

liabilities, ratio of high-risk assets, inflation rate, exchange rate, unemployment rate, interest rate, loan-to-deposit ratio, and capital adequacy ratio.

Data covering the period 2017–2024 (1396–1403 in the Iranian calendar) were collected from official sources, including the Central Bank of Iran, the Statistical Center of Iran, and national financial information systems. To preprocess time-series data and enhance analytical accuracy, the moving average method was applied. This technique, by smoothing data and reducing random fluctuations, facilitated the identification of stable trends and yielded more reliable interpretations of inter-variable relationships, thereby improving SEM performance (Brockwell & Davis., 2016). The methodological objective was to uncover both direct and indirect relationships among variables and to elucidate the mediating role of financial inclusion in explaining the effects of Qard al-Hasan funds on poverty reduction and economic stability. The SEM results identified causal pathways and correlation coefficients, providing a basis for practical policy recommendations.

The chosen time frame was not only appropriate for accessing consistent data but also coincided with the period of renewed sanctions and economic instability. Accordingly, all data were collected and analyzed within the context of sanction-imposed constraints. Additionally, a preliminary Granger causality test was conducted; however, due to limitations in the time-series data, the results were unstable and thus not reported in this article. Overall, the modeling framework was developed under the persistent influence of sanctions, underscoring the role of Qard al-Hasan funds in maintaining financial inclusion amid external constraints.

4 Data Analysis

Given the objectives of the present study, a structural and statistical analysis of the relationships among variables—namely the performance of Qard al-Hasan funds, financial inclusion, and macro-economic indicators such as economic growth, poverty reduction, and financial stability—was deemed essential. Since the conceptual framework of the study was based on multidimensional constructs and latent variables, Structural Equation Modeling (SEM) using the Partial Least Squares approach (PLS-SEM) was employed as a robust method for analyzing causal and simultaneous relationships among variables.

The statistical analysis was organized into several stages. In the first step, the indicators representing the main constructs—including the three dimensions of financial inclusion (access, usage, and quality), performance of

Qard al-Hasan funds, and the dependent economic variables (growth and poverty)—were extracted and calculated. Subsequently, the Kolmogorov–Smirnov test was conducted to assess the normality of data distribution and ensure the assumptions required for parametric testing were met.

Next, the reliability and validity of the model constructs were evaluated using measures such as Composite Reliability (CR), Factor Loadings, and Average Variance Extracted (AVE) to ensure that the measurement instruments were both accurate and dependable. Upon confirming the adequacy of the measurement model, the analysis proceeded to the structural model phase, where causal relationships among independent, mediating, and dependent variables were examined. In the final stage, the model's predictive power was assessed through the Q^2 (Stone-Geisser's Q-square) statistic to determine the model's capacity in explaining the variance of the dependent variables.

The subsequent sections provide a step-by-step and detailed explanation of the computational process and analysis of all variables, indicators, and model paths.

4.1 Section One: Calculation and Explanation of Research Constructs and Components

This section presents a systematic explanation and analysis of the latent variable components in order to clarify the conceptual constructs of the study. These constructs include financial inclusion, performance of Qard al-Hasan funds, economic indicators (growth, stability, and poverty reduction), and relevant economic control variables. The elements of each construct are described separately. The analysis was carried out with the aim of calculating annual indices for each construct over the period from 2017 to 2024 (1396–1403 in the Iranian calendar).

After standardizing the extracted data and inputting them into Smart PLS software, they were integrated into the measurement model as reflective indicators for the latent variables and subsequently analyzed using structural equation modeling. Constructs and Dimensions Analyzed Include:

4.1.1 Access Dimension of Financial Inclusion

The access dimension represents one of the core pillars of financial inclusion, reflecting the ease and extent to which the general population can access banking and financial services across the country. This index is defined based on components that represent the physical and electronic infrastructure of the

financial system. Five primary components were used to assess this dimension:

1) **Approximate Number of Bank Branches:** Indicates the physical dispersion of banking services throughout the country. The gradual decline in this number in recent years is likely associated with the expansion of electronic banking.
2) **Number of Branches per 1,000 Square Kilometers:** Serves as an indicator of the geographical density of banking services, which is particularly significant in rural and underserved areas.
3) **Number of Point-of-Sale (POS) Devices per 10,000 People:** Reflects the development of digital banking and the reduced reliance on cash in economic transactions. An upward trend in this index points to improvements in electronic infrastructure.
4) **Number of ATMs per 1,000 Square Kilometers:** Indicates geographical access to basic banking services through automated systems. The growth of this index is especially relevant in regions lacking physical bank branches.
5) **Number of Active Bank Accounts per 1,000 People:** Measures the level of public participation in the formal financial system. An increase in this index contributes to enhancing deposit absorption capacity and improving the efficiency of the banking system.

Data for these components were collected for the 2017–2024 period. The observed increasing or decreasing trends in each component reflect changes in public access to financial services in Iran.

Table 2
Financial Inclusion - Access Indicators (2017–2024)

Year	Approximate Number of Bank Branches	Number of Branches per 1,000 km²	Number of POS Devices per 10,000 People	Number of ATMs per 1,000 km²	Number of Active Bank Accounts per 1,000 People
2017	25,000	10	650	33.4	6,000
2018	24,500	9.8	720	35.2	6,200
2019	24,000	9.7	800	37.6	6,500
2020	23,500	9.5	900	40.0	6,900
2021	23,000	9.3	1,000	42.5	7,200
2022	22,000	9.1	1,100	44.6	7,500
2023	21,000	9.0	1,200	45.5	7,734
2024	19,167	8.2	1,300	47.3	7,900

Source: Central Bank of Iran, Statistical Center of Iran, Ministry of Economic Affairs and Finance, Shaparak Company (compiled by the researcher)

4.1.2 Financial Inclusion – Usage Dimension

The *usage* indicator represents the second dimension of financial inclusion and refers to the actual and active utilization of formal financial services by individuals and businesses. Unlike mere access, this dimension emphasizes effective participation in services such as digital banking, credit facilities, savings, and investment. According to the World Bank (2018), effective use of financial services plays a critical role in reducing economic inequality and enhancing overall public welfare.

In this study, the financial inclusion usage index is measured based on the following four components:

1) **Number of digital banking users (in millions):** This component reflects the level of adoption of financial technologies and the expansion of digital banking services across society. An increase in this figure has led to lower transaction costs, improved accessibility, and reduced geographical barriers in the delivery of financial services.
2) **Number of financial facility users per 1,000 people:** This metric represents individuals' actual access to credit resources. Its growth contributes to enhanced investment capacity, business development, and improved household economic resilience.
3) **Number of depositors per 1,000 people:** This indicator captures the degree of public participation in the banking system and their inclination to save. A rise in this figure signifies growing public trust in the banking sector and strengthens the capacity for financial resource mobilization within the country.
4) **Number of granted credit facilities (in millions):** This component indicates the volume of lending activities within the banking system. An increase in this figure facilitates economic development, the expansion of productive activities, and improved financing options for enterprises.

The data related to these components were collected for the period spanning 2017 to 2024 (1396 to 1403 in the Iranian calendar). Trend analysis of these indicators reveals significant growth in the usage of formal financial services throughout the country.

Table 3
Financial Inclusion – Usage Indicators (2017–2024)

Year	Approximate Number of Digital Banking Users (in millions)	Number of Financial Facility Users per 1,000 People	Number of Depositors per 1,000 People	Number of Granted Credit Facilities (in millions)
2017	25	210	560	9.5
2018	30	230	575	10.2
2019	35	250	590	11.0
2020	40	280	610	12.5
2021	45	300	630	13.3
2022	50	320	645	14.0
2023	55	340	660	14.0
2024	60	360	675	15.5

Source: Compiled by the researcher based on data from the Central Bank of Iran, Statistical Center of Iran, Ministry of Economic Affairs and Finance, and Shaparak Company.

One of the potential concerns in measuring the dimensions of financial inclusion is the overlap of indicators. For instance, the "number of active bank accounts" may appear relevant to both the access and usage dimensions. In this study, following the World Bank framework (2018), a conceptual distinction between these indicators was established. Within the access dimension, an active bank account is considered as the individual's potential capacity to enter the formal financial system, whereas within the usage dimension, the "number of depositors" reflects the actual and active utilization of this capacity. Thus, although a superficial similarity exists, analytically and conceptually two distinct functions are taken into account.

4.1.3 Quality of Financial Inclusion Index

The third dimension of financial inclusion pertains to the *quality* of financial services, emphasizing the effectiveness of these services in enhancing economic well-being and reducing social inequalities. Unlike the quantitative dimensions of *access* and *usage*, this index focuses on efficiency, effectiveness, and equity in the distribution of financial services. The World Bank ,2018 has also highlighted that high-quality financial systems can play a pivotal role in fostering economic stability and narrowing income disparities. In this study, the quality of financial inclusion was measured using three main components:

1) **Gini Coefficient (Income Inequality):** This index reflects the degree of inequality in income distribution within a society. A decline in the Gini coefficient indicates greater economic equity. High-quality financial

inclusion can help reduce this inequality by improving access to financial services for low-income groups.

2) **Household Income Level (in million Tomans):** Changes in household income are considered indicators of economic empowerment through access to loans and financial tools. An upward trend in this index suggests that the financial system is succeeding in enhancing the standard of living for citizens.
3) **Volume of International Financial Transfers (in million USD):** The amount of remittances sent from abroad to the country serves as a means of financial support for households. Improved access to banking infrastructure and reduced transaction costs can strengthen this flow of resources and contribute to inequality reduction.

Data for each of these components were collected for the period 2017 to 2024 (1396 to 1403 in the Iranian calendar), and the observed trends indicate the relative effectiveness of financial policies in improving the quality of financial services in the country.

Table 4
Financial Inclusion Quality Components (2017–2024)

Year	Gini Coefficient (Income Inequality)	Household Income Level (Approximate Change – Million Tomans)	Approximate Volume of International Financial Transfers (Million USD)
2017	40.45	36.6	1300
2018	41.31	43	1400
2019	39.92	54	1500
2020	40.06	76	1600
2021	39.38	112	1750
2022	39.18	128	1900
2023	38.18	141	2050
2024	37.29	164	2200

Source: Compiled by the researcher based on data from the Central Bank of Iran, Statistical Center of Iran, Ministry of Economic Affairs and Finance, and Shaparak Company

4.1.4 Performance Index of Qard al-Hasan Funds

Qard al-Hasan funds, as interest-free financial institutions based on Islamic principles, play a significant role in promoting financial justice, reducing poverty, and financing underserved populations. The performance of these funds has been evaluated to assess their impact on financial inclusion and economic growth, using four main components:

1) **Number of Qard al-Hasan Funds**: This reflects the extent of these institutions' operations across the country. An increase in the number of

funds indicates the expansion of institutional structures and a stronger commitment to providing microfinance services to those in need.

2) **Number of Fund Branches**: This serves as an indicator of geographical accessibility to the services of these institutions. A rise in the number of branches implies greater outreach of the funds across various regions and easier access to their services.
3) **Amount of Loans Granted (Thousand Billion Tomans)**: This component represents the volume and scope of the credit activities of the funds. A continuous increase in this index suggests an active role of these institutions in meeting microfinance needs and improving the economic conditions of households.
4) **Approximate Financial Resources (Thousand Billion Tomans)**: This index shows the ability of the funds to attract deposits and mobilize resources. Growth in financial resources indicates a higher capacity to provide loans and expand service coverage.

The data for these components were collected for the period 2017 to 2024 (1396 to 1403 in the Iranian calendar), and the growth trend reflects the increasing capacity and expanding role of Qard al-Hasan funds within the national financial system.

Table 5
Qard al-Hasan Funds Component Data from 2017 to 2024

Year	Number of Qard al-Hasan Funds	Number of Qard al-Hasan Fund Branches	Amount of Loans Granted (Thousand Billion Tomans)	Approximate Financial Resources (Thousand Billion Tomans)
2017	2400	2700	115	126
2018	2600	3000	138	151
2019	2479	2950	156	173
2020	2700	3200	197	224
2021	3000	3600	231	273
2022	3200	3850	269	302
2023	3400	4100	453	522
2024	3500	4300	510	604

Source: Ministry of Economic Affairs and Finance, Central Bank of Iran, Statistical Center of Iran, and published financial reports

4.1.5 Economic Growth and Stability Index

To assess the macroeconomic outcomes of financial inclusion, it is especially important to examine its impact on economic growth and stability. This index reflects the capability of the financial system to support sustainable

development, maintain macroeconomic balance, and respond to economic fluctuations. In this study, the evaluation of this construct is based on eight key components:

1) **Ratio of Liquid Assets to Short-Term Liabilities**: This is an indicator for assessing banks' liquidity and their ability to meet immediate obligations. Financial inclusion, through deposit mobilization, can strengthen this ratio.
2) **Ratio of Risky Assets to Total Assets**: This indicates the level of risk tolerance within the banking system. Expanding financial inclusion may influence the composition of asset portfolios and banks' credit policies.
3) **Inflation Rate**: Broader access to financial resources can lead to increased demand. This indicator helps examine the relationship between financial inclusion and long-term inflation control.
4) **Exchange Rate (Toman/USD)**: Expanding financial inclusion by attracting capital and reducing capital outflows can contribute to exchange rate stability and improved economic competitiveness.
5) **Unemployment Rate**: Greater access to financial resources and credit can help reduce unemployment through the creation or expansion of small businesses.
6) **Bank Interest Rate**: The development of financial services and increased banking competition may lead to lower interest rates, which in turn supports investment growth.
7) **Loan-to-Deposit Ratio**: This reflects the extent to which banks utilize mobilized funds. An increase in this ratio can promote economic growth, provided that risk is managed effectively.
8) **Capital Adequacy Ratio**: This is an indicator of banks' resilience against financial shocks. Growth in financial inclusion, if properly managed, can lead to a strengthened capital structure.

Data for these components have been extracted for the period from 2017 to 2024 (1396–1403 in the Iranian calendar), and their changes over time reflect the impacts of financial policies and the level of financial inclusion in the national economy.

Table 6
Economic Stability Components Data from 2017 to 2024

Year	Ratio of Liquid Assets to Short-Term Liabilities	Ratio of Risky Assets to Total Assets	Inflation Rate (%)	Exchange Rate (Toman/USD)	Unemployment Rate (%)	Bank Interest Rate (%)	Loan-to-Deposit Ratio	Capital Adequacy Ratio
2017	25	40	9.6	3,700	12.1	15	85.0	7.5
2018	20	45	26.9	9,500	12	18	88.0	6.8
2019	22	50	34.8	13,000	10.7	18	90.0	5.4
2020	18	55	36.4	22,000	9.6	18	92.0	4.0
2021	16	60	40.2	25,000	9.2	18	94.0	3.5
2022	15	65	49.9	33,000	8.9	20	96.0	2.8
2023	14	70	46.5	50,000	9	20	98.0	1.9
2024	13	75	32.5	68,942	7.6	23.9	84.8	1.75

Source: Financial and Economic Data, Iranian Parliament Research Center, Ministry of Cooperatives, Labor and Social Welfare

4.1.6 Poverty Reduction Index

Poverty reduction is one of the fundamental objectives of social and economic policymaking within the framework of sustainable development. This study, in order to analyze the impact of financial inclusion on improving living conditions, has employed four key components to assess the state of poverty:

1) **Poverty Rate (Percentage):** An indicator that determines the proportion of the population whose income or consumption falls below the defined poverty line. Increased access to formal financial resources and banking facilities can be effective in reducing this rate.
2) **Multidimensional Poverty Index:** A comprehensive approach that, in addition to the economic dimension, also includes aspects such as health, education, and quality of life. Financial inclusion, by providing tools for risk management and investment in human capital, can help alleviate multiple forms of deprivation.
3) **Human Development Index:** A composite measure that includes life expectancy, education level, and per capita income, reflecting the overall level of societal well-being. The expansion of financial services and reduction of access barriers play a key role in improving this index.
4) **Per Capita Income (USD):** An indicator used to measure the average income per person, representing the economic well-being of a society. Facilitating the participation of low-income groups in economic activities through financial inclusion can lead to an increase in per capita income.

Data for these four components have been collected over the period from 2017 to 2024. The changes observed — from an increase in the poverty rate and multidimensional poverty index to a decline in the human development index and per capita income — reflect economic pressures, structural

fluctuations in income distribution, and the effects of development policies and the level of financial inclusion in the country's economy.

Table 7
Poverty Reduction Indicators (2017–2024)

Year	Poverty Rate (%)	Multidimensional Poverty Index	Human Development Index	Per Capita Income (USD)
2017	20	0.10	0.798	5,500
2018	25	0.12	0.796	4,800
2019	30	0.14	0.794	4,500
2020	38	0.18	0.79	4,200
2021	30.4	0.19	0.788	4,000
2022	35	0.18	0.785	3,800
2023	30.1	0.17	0.783	3,600
2024	30	0.15	0.78	2,326

Source: Statistical Center of Iran, Central Bank of Iran, Ministry of Cooperatives, Labour, and Social Welfare

Given that indicators related to poverty and inequality (such as the Gini coefficient or the Multidimensional Poverty Index) are composite in nature, the data used in this study were obtained from reputable national and international sources (Statistical Center of Iran, n.d; World Bank, 2025; UNDP, 2025), where weighting and aggregation methods had already been standardized. Therefore, recalculating weights within the scope of this article was not necessary. Nevertheless, in order to mitigate the risk of overreliance on a single indicator, multiple measures were employed simultaneously (poverty headcount, Multidimensional Poverty Index, Human Development Index, and per capita income). This diversity served as an implicit form of sensitivity analysis. Accordingly, the convergence of results across different indicators strengthened the validity of the findings. Future research is recommended to enhance robustness by conducting formal sensitivity analyses or by applying alternative weighting methods such as AHP or entropy.

4.1.7 Index of Economic Control Variables

To more accurately assess the impact of macroeconomic factors on financial inclusion, a set of control variables has been used. These indicators play an important role in analyzing the level of access, usage, and quality of financial services across the country. In this study, economic control variables are evaluated based on the following seven key components:

1) **Urban Population (in millions):** This variable indicates the concentration of population in urban areas. As the urban population grows, financial infrastructure tends to expand, increasing the likelihood of access to banking and financial services.
2) **Budget Deficit (Thousand Billion Tomans):** A budget deficit can weaken the government's ability to support financial infrastructure and provide public funding, which may negatively impact the development of financial inclusion.
3) **Gross Domestic Product (GDP) (Thousand Billion Tomans):** This index reflects the level of economic activity in the country. GDP growth is typically associated with increased investment in financial services and enhanced financial inclusion.
4) **Public Debt (Thousand Billion Tomans):** High government debt may divert financial resources away from development sectors, including finance, and create limitations in providing inclusive financial services.
5) **Money Supply (Thousand Billion Tomans):** An increase in money supply, especially if well-managed, can improve access to financial resources. However, excessive growth may lead to inflation and have negative effects on financial inclusion.
6) **Consumer Price Index (CPI):** This indicator reflects the inflation rate from the consumer's perspective. High inflation can erode purchasing power and drive low-income groups away from financial services.
7) **Producer Price Index (PPI):** An increase in this index reflects cost pressures on businesses, which may eventually reduce their ability to access financial services.

Data for these components have been collected over the period from 2017 to 2024 (1396 to 1403 in the Iranian calendar), and their variations reflect the impact of economic conditions and macroeconomic policies on the trajectory of financial inclusion in the country.

Table 8
Information on Economic Control Variable Components (2017–2024)

Year	Urban Population (Million)	Budget Deficit (Thousand Billion Tomans)	Gross Domestic Product (Thousand Billion Tomans)	Public Debt (Thousand Billion Tomans)	Money Supply (Thousand Billion Tomans)	Consumer Price Index	Producer Price Index
2017	58.174	49	694	625	1529	9.6	12.9
2018	58.648	137	713	736	1882	26.9	47.5
2019	59.3	175	614	1168	2470	34.8	50
2020	60.187	180	725	1500	3476	36.4	46.7
2021	63.876	464	756	2831	4832	40.2	54.3
2022	64.148	437	811.9	3138	6337	45.8	36.1
2023	64.941	593	815	4223	7877	40.69	30.3
2024	66	280	834.6	5023	9942	32.5	27.5

Source: Statistical Center of Iran, Central Bank of Iran, Planning and Budget Organization, Iranian Parliament Research Center

4.2 Testing for Normality of the Data

To ensure the appropriate selection of statistical tests for data analysis, it was first necessary to determine the distribution of the variables under investigation. A key assumption for conducting parametric tests is that the data are normally distributed. In the present study, the Kolmogorov-Smirnov test was employed to assess the normality of the data distribution. This test is used to compare empirical data with a normal distribution to determine whether the data conform to a normal distribution.

Table 9
Normality Test of the Statistical Population Using the Kolmogorov–Smirnov Test

Research Variables	K-S Statistic	Significance Level (p-value)	Test Result
Dependent Variable: Financial Inclusion			
Access to Financial Inclusion Index			
Approximate Number of Bank Branches	0.081	0.200	Normal
Number of Branches per 1,000 km²	0.094	0.191	Normal
Number of POS Devices per 10,000 People	0.103	0.174	Normal
Number of ATMs per 1,000 km²	0.088	0.200	Normal
Number of Active Bank Accounts per 1,000 People	0.127	0.088	Normal
Usage of Financial Inclusion Index			
Approximate Number of Digital Banking Users (million)	0.101	0.198	Normal
Number of Financial Facility Users per 1,000 People	0.119	0.186	Normal
Number of Depositors per 1,000 People	0.117	0.173	Normal
Number of Loans (million)	0.096	0.152	Normal
Quality of Financial Inclusion Index			
Gini Coefficient (Income Inequality)	0.211	0.741	Normal

Household Income Level (Approx. in million)	0.239	0.618	Normal
Approximate Volume of International Transfers (million USD)	0.302	0.567	Normal
Independent Variable: Performance of Qard al-Hasan Funds			
Number of Qard al-Hasan Funds	0.259	0.701	Normal
Number of Qard al-Hasan Fund Branches	0.281	0.636	Normal
Amount of Facilities Granted (thousand billion tomans)	0.225	0.728	Normal
Approximate Financial Resources (thousand billion tomans)	0.318	0.515	Normal
Economic Control Variables			
Urban Population (million)	0.205	0.755	Normal
Budget Deficit (thousand billion tomans)	0.261	0.637	Normal
Gross Domestic Product (thousand billion tomans)	0.311	0.589	Normal
Public Debt (thousand billion tomans)	0.336	0.543	Normal
Money Supply (thousand billion tomans)	0.213	0.727	Normal
Consumer Price Index (CPI)	0.164	0.791	Normal
Producer Price Index (PPI)	0.289	0.644	Normal
Target Variable: Economic Growth and Stability Index			
Ratio of Liquid Assets to Short-Term Liabilities	0.141	0.812	Normal
Ratio of Risky Assets to Total Assets	0.277	0.648	Normal
Inflation Rate (%)	0.238	0.691	Normal
Exchange Rate (Toman/USD)	0.348	0.509	Normal
Unemployment Rate (%)	0.217	0.735	Normal
Interest Rate (%)	0.176	0.782	Normal
Loan-to-Deposit Ratio	0.296	0.627	Normal
Capital Adequacy Ratio	0.353	0.564	Normal
Target Variable: Poverty Measurement Index			
Poverty Rate (%)	0.701	0.249	Normal
Multidimensional Poverty Index	0.761	0.203	Normal
Human Development Index	0.819	0.154	Normal
Per Capita Income (USD)	0.608	0.299	Normal

Source: Research Findings

The hypotheses of the Kolmogorov-Smirnov test were as follows:

Null Hypothesis (H_0): The data follow a normal distribution.

Alternative Hypothesis (H_1): The data do not follow a normal distribution.

According to the results of the test, if the significance level (p-value) was greater than 0.05, the null hypothesis was not rejected, indicating no sufficient evidence against the assumption of normality. The results of the Kolmogorov-Smirnov test in this study showed that the significance level for all variables exceeded 0.05. Therefore, based on these findings, the null hypothesis was accepted, and it was concluded that the distribution of all the studied variables was normal. This indicated that the necessary conditions for applying parametric statistical tests were met (Field, 2018).

4.3 Validity Indices for Research Data

4.3.1 Construct Reliability

In the present study, construct reliability was examined as a fundamental component of evaluating the structural equation model. To assess this reliability, the Composite Reliability (CR) index was used, and the results were reported in the corresponding table. This index reflects the internal consistency between the construct and its indicators and is widely recognized as one of the most reliable measures of construct reliability in structural equation modeling. A CR value greater than 0.7 was considered indicative of acceptable construct reliability, demonstrating that the indicators measured the associated construct effectively and coherently (Hair et al., 2019).

Table 10
Composite Reliability of Constructs in the Structural Equation Model

Construct (Latent Variable)	Composite Reliability
Poverty Measurement Indicators	0.925
Economic Growth and Stability Indicators	0.790
Access to Financial Inclusion	0.942
Usage of Financial Inclusion	0.887
Quality of Financial Inclusion	0.866
Performance Indicators of Qard al-Hasan Funds	0.915
Economic Control Variables	0.842

Source: Research Findings

4.3.2 Assessment of Discriminant Validity (Average Variance Extracted Index)

In this study, the discriminant validity of the constructs was assessed using the Average Variance Extracted (AVE) index. This index reflects the ability of indicators to distinctly differentiate each construct from the others. The AVE values for all constructs were reported to be above 0.5, which is considered an acceptable threshold for confirming discriminant validity. For instance, constructs such as "Access to Financial Inclusion" (0.733), "Performance of Qard al-Hasan Funds" (0.714), and "Poverty Measurement Indicators" (0.699) exhibited relatively high values, indicating that the observed variables effectively explained the variance of their respective constructs. Furthermore, constructs such as "Quality of Financial Inclusion" (0.653), "Use of Financial Inclusion" (0.584), and "Economic Stability and Growth" (0.527), despite having relatively lower AVE values compared to others, still fall within the acceptable range. Even the construct "Economic Control Variables," with an

AVE value of 0.537, surpassed the required threshold. Overall, the findings indicate that the model possesses appropriate discriminant validity and successfully establishes meaningful distinctions among different constructs.

Table 11
Assessment of Average Variance Extracted (AVE) Values for Discriminant Validity

Construct (Latent Variable)	Average Variance Extracted (AVE)
Poverty Measurement Indicators	0.699
Economic Growth and Stability Indicators	0.527
Access to Financial Inclusion	0.733
Usage of Financial Inclusion	0.584
Quality of Financial Inclusion	0.653
Performance Indicators of Qard al-Hasan Funds	0.714
Economic Control Variables	0.537

Source: Research Findings

4.4 Structural Equation Modeling

In this study, in order to examine the relationships between the research variables, Structural Equation Modeling (SEM) based on the Partial Least Squares (PLS) method was employed. This approach was selected due to its advantages, such as the ability to analyze multiple latent variables simultaneously, its suitability for medium-sized sample populations, and its capability to test complex models with multilayered causal structures.

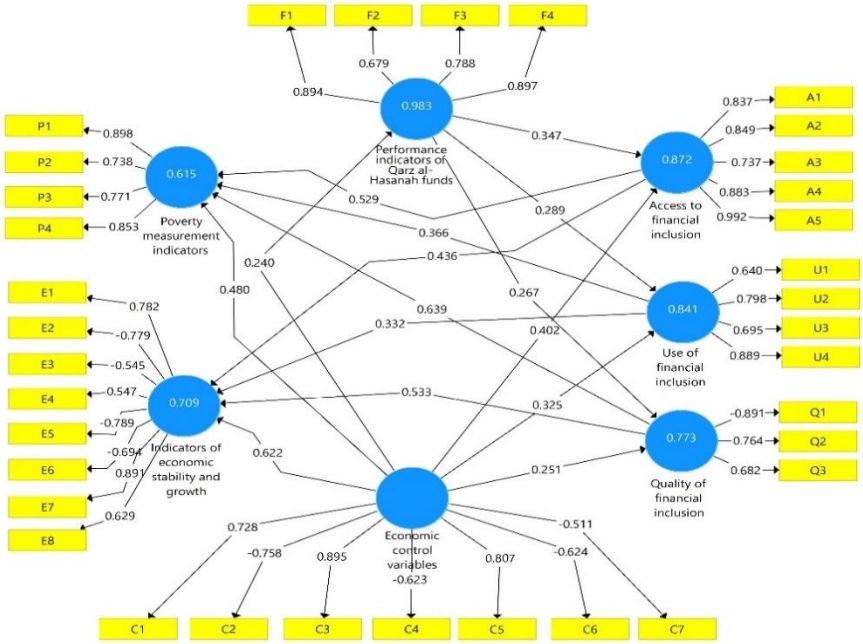
The structural equation model consisted of two main components:

The measurement model, which evaluates the reliability and validity of constructs using indicators such as Cronbach's alpha, composite reliability, and Average Variance Extracted (AVE).

The structural model, which examines causal relationships among the constructs via path analysis.

The final model included key constructs such as *Financial Inclusion* (in its three dimensions: access, usage, and quality), *Performance of Qard al-Hasan Funds*, *Economic Control Variables*, *Poverty Measurement*, and *Economic Growth and Stability*. As depicted in the corresponding figure, both direct and indirect pathways between these variables were analyzed, and the structural model was extracted accordingly.

The implementation of the model was carried out using SmartPLS software. Prior to running the model, the Kolmogorov–Smirnov test was applied to verify the normality of the variable distributions, ensuring the statistical assumptions necessary for structural equation modeling were met.



Dependent Variables, Including the Role of Control and Target Variables

Source: Research Findings

4.5 Evaluation of Model Fit and Predictive Validity in the Structural Equation Model

4.5.1 Q^2 Index (Predictive Relevance of Latent Variables)

In the Partial Least Squares (PLS) approach, the Q^2 (Stone-Geisser's Q-square) index is used to assess the predictive relevance of the model. This index indicates how well the model can predict the values of dependent variables based on independent variables. A Q^2 value greater than zero implies that the model has predictive power.

Q^2 values are interpreted as follows:

Above 0.35: Indicates strong predictive relevance,

Between 0.15 and 0.35: Indicates moderate predictive relevance,

Between 0.02 and 0.15: Suggests weak but acceptable predictive relevance,

Below 0.02: Reflects insufficient predictive power and signals a need for model revision.

Overall, the higher the Q^2 value, the stronger the model's predictive validity, and the better it can explain the variance in the dependent variables.

Table 12
Predictive Relevance Index (Q^2) for Latent Variables

Variable	SSE	SSO	$Q^2 = (1 - SSE/SSO)$
Approximate Number of Bank Branches	498.9954	1000	0.5010
Number of Branches per 1,000 km²	331.5028	650	0.4900
Number of POS Devices per 10,000 People	472.553	950	0.5026
Number of ATMs per 1,000 km²	241.8699	550	0.5602
Active Bank Accounts per 1,000 People	376.5912	800	0.5293
Approximate Number of Digital Banking Users (million)	279.4383	650	0.5701
Users of Financial Facilities per 1,000 People	558.8369	1200	0.5343
Number of Depositors per 1,000 People	673.7852	1400	0.5187
Number of Loans (million)	740.9705	1500	0.5060
Gini Coefficient (Income Inequality)	417.8251	850	0.5084
Household Income Level (approx., million tomans)	499.5952	1050	0.5242
Approximate Volume of International Transfers (million USD)	746.3367	1650	0.5477
Number of Qard al-Hasan Funds	718.6822	1400	0.4867
Number of Qard al-Hasan Fund Branches	340.4455	800	0.5744
Amount of Loans Granted (thousand billion tomans)	291.3511	700	0.5838
Approximate Financial Resources (thousand billion tomans)	411.723	900	0.5425
Urban Population (million)	541.4737	1150	0.5292
Budget Deficit (thousand billion tomans)	697.0496	1350	0.4837
Gross Domestic Product (thousand billion tomans)	373.854	850	0.5602
Public Debt (thousand billion tomans)	297.6709	650	0.5420
Money Supply (thousand billion tomans)	466.944	950	0.5085
Consumer Price Index (CPI)	538.3594	1100	0.5106
Producer Price Index (PPI)	358.7277	800	0.5516
Poverty Rate (%)	305.6709	700	0.5633
Multidimensional Poverty Index (MPI)	376.7198	850	0.5568
Human Development Index (HDI)	429.4929	950	0.5479
Per Capita Income (USD)	478.296	1050	0.5445
Ratio of Liquid Assets to Short-Term Liabilities	358.9265	700	0.4872
Ratio of Risky Assets to Total Assets	480.8346	950	0.4939
Inflation Rate (%)	252.4528	550	0.5410
Exchange Rate (Toman/USD)	401.6047	800	0.4980
Unemployment Rate (%)	274.9451	600	0.5418
Bank Interest Rate (%)	538.639	1150	0.5316
Loan-to-Deposit Ratio	661.7837	1400	0.5273
Capital Adequacy Ratio	659.1807	1500	0.5605

Source: Research Findings

To conduct a more in-depth analysis of the cases where values in the predictive relevance index (1 – SSE/SSO) are relatively high or low, logical explanations must be provided based on the characteristics of each variable.

This analysis is grounded in the nature of the variables, their predictability, and the factors influencing their variance within the model.

4.5.2 Comparative Fit Index (CFI)

The Comparative Fit Index (CFI) is one of the key indicators used to assess model fit in structural equation modeling. It evaluates the improvement of the proposed model in comparison to a baseline model that assumes no relationships between the variables. The CFI ranges from 0 to 1, with values closer to 1 indicating a better fit of the model to the observed data. A CFI value above 0.90 is generally considered the threshold for an acceptable model fit, signifying that the model is suitably aligned with the data.

Calculation:

Using the chi-square (χ^2) values and degrees of freedom (df) for both the structural model and the baseline model, the CFI is calculated using the following formula:

$$\mathbf{CFI} = \mathbf{1} - \frac{\boldsymbol{\chi^2}\text{structural model} - \boldsymbol{df}\text{structural model}}{\boldsymbol{\chi^2}\text{baseline model} - \boldsymbol{df}\text{baseline model}} \quad (1)$$

Assuming the following values:

Chi-square of the structural model: χ^2=147.9

Degrees of freedom of the structural model: *df=128*

Chi-square of the baseline model: χ^2_{baseline} =380

Degrees of freedom of the baseline model: $df_{baseline}$ =140

Substituting into the formula:

The resulting value for the Comparative Fit Index (CFI) is 0.917, indicating that the structural model has an acceptable level of fit compared to the baseline model. This value falls within the standard and acceptable range, confirming that the relationships between the latent and observed variables in the model align well with the observed data. Therefore, it can be concluded that the proposed model demonstrates statistically valid and adequate fit.

4.5.3 Standardized Root Mean Square Residual (SRMR)

The Standardized Root Mean Square Residual (SRMR) is another key indicator for evaluating model fit. It measures the average squared difference between the observed correlation matrix and the model-implied correlation matrix. This index ranges from 0 to 1, with values less than 0.08 generally indicating a good model fit. The closer the SRMR value is to zero, the better the model's predictive fit with the actual data.

Calculation:

SRMR is computed using the following formula:

$$SRMR = \sqrt{\frac{\sum_{i=1}^{n}(r_{\hat{\imath}j} - r_{ij})^2}{n}} \quad (2)$$

In this formula:
r_{ij}:observed correlation matrix values between variables
$r_{\hat{}ij}$:predicted correlation matrix values by the model
n: total number of relationships between variables

Assuming that the standardized root mean square difference equals 0.058:
Standardized Root Mean Square Residual (SRMR)=0.058

The calculated value of SRMR is 0.058, which is below the threshold of 0.08. This indicates that the difference between the observed and predicted correlation matrices is very small, and the structural model has provided a good prediction of the relationships between the variables. Therefore, based on the SRMR index, it can be confirmed that the model demonstrates an acceptable and desirable fit.

4.6 Path Analysis of the Effects of Economic and Structural Variables on Poverty and Economic Growth via Financial Inclusion

In this section, the effects of economic and structural variables on the study's key indicators are analyzed. Variables such as the exchange rate and budget deficit are inherently influenced by multiple external and macroeconomic shocks, making them economically more volatile and complex. Nevertheless, the Q^2 results reported in Table 12 indicate that the proposed PLS-SEM model still demonstrates acceptable to strong predictive relevance for these variables. In contrast, controllable variables such as financial resources or granted credit facilities generally exhibit more stable behavioral patterns within the model.

Path analysis has been used to examine the relationships among the variables. This includes evaluating direct, indirect, and total effects. A direct effect occurs without mediation, whereas an indirect effect is transmitted through one or more intermediary (mediating) variables. The following table presents the magnitude of these effects separately, helping clarify the role of each variable in explaining indicators such as poverty, stability, and economic growth. The final model successfully explains these complex relationships.

Table 13
Direct, Indirect, and Total Effects in the Structural Equation Model

Independent Variable	Dependent Variable	Significance (t-value)	Standardized Coefficient

Economic Control Variables	Qard al-Hasan Fund Performance		2.79	0.240
Economic Control Variables	Financial Inclusion – Access		3.82	0.402
Economic Control Variables	Poverty Index		4.53	0.480
Qard al-Hasan Fund Performance	Financial Inclusion – Access		4.19	0.347
Financial Inclusion – Access	Poverty Index		6.04	0.529
Path 1	Direct Effect	Indirect Effect via Access	Three-step Indirect Effect	Total Effect
Via Access to Financial Inclusion (Poverty Index)	0.480	0.213	0.044	0.737
Independent Variable	Dependent Variable		Significance (t-value)	Standardized Coefficient
Economic Control Variables	Qard al-Hasan Fund Performance		2.79	0.240
Economic Control Variables	Financial Inclusion – Usage		2.77	0.325
Economic Control Variables	Poverty Index		4.53	0.480
Qard al-Hasan Fund Performance	Financial Inclusion – Usage		2.26	0.289
Financial Inclusion – Usage	Poverty Index		3.58	0.366
Path 2	Direct Effect	Indirect Effect via Usage	Three-step Indirect Effect	Total Effect
Via Usage of Financial Inclusion (Poverty Index)	0.480	0.119	0.025	0.624
Independent Variable	Dependent Variable		Significance (t-value)	Standardized Coefficient
Economic Control Variables	Qard al-Hasan Fund Performance		2.79	0.240
Economic Control Variables	Financial Inclusion – Quality		2.81	0.251
Economic Control Variables	Poverty Index		4.53	0.480
Qard al-Hasan Fund Performance	Financial Inclusion – Quality		2.26	0.267
Financial Inclusion – Quality	Poverty Index		5.73	0.639
Path 3	Direct Effect	Indirect Effect via Quality	Three-step Indirect Effect	Total Effect
Via Quality of Financial Inclusion (Poverty Index)	0.480	0.160	0.041	0.681
Independent Variable	Dependent Variable		Significance (t-value)	Standardized Coefficient
Economic Control Variables	Qard al-Hasan Fund Performance		2.79	0.240
Economic Control Variables	Financial Inclusion – Access		3.82	0.402
Economic Control Variables	Economic Stability & Growth Index		4.01	0.622
Qard al-Hasan Fund Performance	Financial Inclusion – Access		4.19	0.347
Financial Inclusion – Access	Economic Stability & Growth Index		4.27	0.436
Path 4	Direct Effect	Indirect Effect via Access	Three-step Indirect Effect	Total Effect
Via Access (Economic Stability & Growth)	0.622	0.175	0.036	0.833
Independent Variable	Dependent Variable		Significance (t-value)	Standardized Coefficient
Economic Control Variables	Qard al-Hasan Fund Performance		2.79	0.240
Economic Control Variables	Financial Inclusion – Usage		2.77	0.325
Economic Control Variables	Economic Stability & Growth Index		4.01	0.622
Qard al-Hasan Fund Performance	Financial Inclusion – Usage		2.26	0.289
Financial Inclusion – Usage	Economic Stability & Growth Index		3.52	0.332

Path 5	Direct Effect	Indirect Effect via Usage	Three-step Indirect Effect	Total Effect
Via Usage (Economic Stability & Growth)	0.622	0.108	0.023	0.753
Independent Variable	Dependent Variable		Significance (t-value)	Standardized Coefficient
Economic Control Variables	Qard al-Hasan Fund Performance		2.79	0.24
Economic Control Variables	Financial Inclusion – Quality		2.81	0.251
Economic Control Variables	Economic Stability & Growth Index		4.01	0.622
Qard al-Hasan Fund Performance	Financial Inclusion – Quality		2.26	0.267
Financial Inclusion – Quality	Economic Stability & Growth Index		3.47	0.533
Path 6	Direct Effect	Indirect Effect via Quality	Three-step Indirect Effect	Total Effect
Via Quality (Economic Stability & Growth)	0.622	0.134	0.034	0.790

Source: Research Findings

Based on the results presented in the table above, the indices used to examine the validity and adequacy of the model indicate that the research model has a strong explanatory power. After confirming the model's adequacy and validity, the analysis proceeds to examine the direct, indirect, and total effects of the research variables. In this regard, the impacts of economic control variables, Qard al-Hasan fund performance, and financial inclusion on poverty measurement and economic stability and growth indices are comprehensively analyzed.

Path One: In this path, economic control variables have influenced the poverty measurement index through the mediation of the performance of Qard al-Hasan funds and access to financial inclusion. The direct effect was estimated at 0.480, the indirect effect through access at 0.213, the three-step indirect effect at 0.044, and the total effect at 0.737. These results indicate that strengthening the infrastructure for access to financial services can play a significant role in poverty reduction—especially when such access is facilitated through intermediary institutions like Qard al-Hasan funds.

Path Two: In this path, economic control variables have impacted the poverty measurement index via the performance of Qard al-Hasan funds and the use of financial services. The direct effect was 0.480, the indirect effect through usage was 0.119, the three-step indirect effect was 0.025, and the total effect was reported as 0.624. The findings suggest that mere access to financial services is not sufficient; rather, the active and effective use of these services plays a key role in improving household livelihoods.

Path Three: In this path, economic control variables have influenced the poverty measurement index through the performance of Qard al-Hasan funds

and the quality of financial inclusion. The direct effect was 0.480, the indirect effect via quality was 0.160, the three-step indirect effect was 0.041, and the total effect amounted to 0.681. Accordingly, improving the quality of financial services—such as transparency, efficiency, and responsiveness of the financial system—can significantly contribute to poverty alleviation.

Path Four: In this path, economic control variables have impacted the indicator of economic stability and growth through the mediation of Qard al-Hasan fund performance and access to financial inclusion. The direct effect was calculated at 0.622, the indirect effect through access at 0.175, the three-step indirect effect at 0.036, and the total effect at 0.833. These results indicate that expanding financial access can contribute to economic growth and stability by facilitating investment, optimizing consumption, and encouraging savings.

Path Five: In this path, economic control variables have affected the indicator of economic stability and growth via the performance of Qard al-Hasan funds and the use of financial inclusion. The direct effect was estimated at 0.622, the indirect effect through usage at 0.108, the three-step indirect effect at 0.023, and the total effect at 0.753. These findings demonstrate that optimal and sustained use of financial services can enhance economic efficiency and promote financial sustainability.

Path Six: Finally, in this path, economic control variables have influenced the indicator of economic stability and growth through the mediation of Qard al-Hasan fund performance and the quality of financial inclusion. A direct effect of 0.622, an indirect effect through quality of 0.134, a three-step indirect effect of 0.034, and a total effect of 0.790 were obtained. These results emphasize the importance of improving the quality of financial services—especially in deprived and underserved regions—as service quality can increase trust, participation, and the financial system's impact on economic growth.

Overall, the findings indicate that the performance of Qard al-Hasan funds shaped by economic control variables and mediated through various dimensions of financial inclusion plays a vital role in reducing poverty and enhancing economic stability and growth. Notably, access to financial services demonstrates the greatest indirect impact in pathways related to both poverty reduction and economic stability and growth.

5 Research Findings

In this section, path analysis was conducted to examine the direct, indirect, and total effects of economic control variables on the performance of Qard al-

Hasan funds, financial inclusion, poverty, and economic growth indicators. The results are explained across six causal paths.

In the first path, it was found that improvements in macroeconomic indicators—such as increased liquidity and market stability—directly enhanced the performance of Qard al-Hasan funds. This improvement contributed to broader coverage of financial services and better credit allocation mechanisms; however, the findings should be interpreted with caution, as some financial stability indicators reported in Table 6—such as the decline in the capital adequacy ratio and the increase in risky assets—suggest the existence of structural vulnerabilities within the financial system. Ultimately, these developments were associated with improvements in poverty-related indicators.

In the second path, it was observed that the improved performance of Qard al-Hasan funds in a stabilized economic environment encouraged greater economic participation among low-income groups, improved household financial management, and reduced economic pressures on these populations.

The third path analysis showed that a mere quantitative increase in financial services was not sufficient. Instead, qualitative improvements—such as professional financial counseling and process transparency—played a vital role in building customer trust, fostering economic empowerment, and achieving sustainable poverty reduction.

In the fourth path, enhanced performance of Qard al-Hasan funds in an improved economic environment increased access to financial services, promoted wider economic participation, and was associated with improvements in economic growth indicators within the estimated structural model. Nevertheless, these findings do not necessarily imply full macroeconomic stability, particularly given the deterioration observed in some banking risk indicators presented in Table 6.

The fifth path confirmed that more effective use of financial services by vulnerable groups—driven by the improved performance of the funds—increased household economic capacity and stimulated local markets, thereby supporting economic stability and growth.

In the sixth path, it was found that improving the quality of services offered by Qard al-Hasan funds—through increased transparency, better consultation, and effective supervision—boosted customer trust and satisfaction, contributing to sustainable economic development.

The analyses demonstrated that economic control variables had a significant impact on the performance of Qard al-Hasan funds. As an intermediary factor, this performance played a key role in enhancing financial

inclusion, reducing poverty, and strengthening economic stability and growth. However, the results should be interpreted as evidence of statistically significant relationships within the proposed PLS-SEM framework rather than definitive proof of complete financial stability under all macroeconomic conditions. The findings emphasized that improving the performance of these microfinance institutions can serve as a foundation for designing social and economic policies aimed at reducing inequalities and achieving sustainable development.

In this section, the impact of economic control variables on the performance of Qard al-Hasan funds, financial inclusion, poverty, and economic growth and stability was analyzed through six causal paths. The findings revealed that improvements in macroeconomic indicators enhanced fund performance, which in turn led to the expansion of financial services and improved the living conditions of low-income groups. Additionally, improvements in service quality—through effective counseling and greater transparency—increased customer trust and played a significant role in economic empowerment and long-term poverty reduction. Optimal use of financial services also contributed to greater economic participation, better household financial management, and local market development.

At the same time, caution is required in interpreting these findings because some raw financial indicators presented in Table 6, including the reduction in the capital adequacy ratio and the increase in risky assets, indicate that certain dimensions of financial vulnerability remained present during the study period. Therefore, the positive effects identified in the structural model should be interpreted within the context of relative improvements rather than absolute macroeconomic or banking-sector stability.

Ultimately, the results showed that the improved performance of Qard al-Hasan funds is a key driver in promoting financial inclusion and achieving sustainable development. This analysis examined the direct, indirect, and total effects of economic control variables, Qard al-Hasan fund performance, and the three dimensions of financial inclusion (access, quality, and usage) on poverty, growth, and economic stability indicators. The goal was to identify key influential paths and determine the relative importance of each variable in the conceptual model.

The research findings indicated that improved performance of Qard-al-Hasan funds plays a key role in enhancing financial inclusion and achieving sustainable development. In this analysis, the direct effects of economic control variables, the performance of Qard-al-Hasan funds, and the three dimensions of financial inclusion (access, quality, and usage) on the indicators

of poverty, growth, and economic stability were examined to identify the influencing pathways and the relative importance of variables within the study's conceptual model.

The results revealed that the quality of financial inclusion, with a standardized coefficient of 0.639 and a significance level of 5.73, had the strongest effect on poverty reduction. High-quality financial services—such as transparency, professional consulting, and ease of access—have contributed to the economic empowerment of low-income groups and increased public trust. Access to financial services, with a coefficient of 0.529 and significance of 6.04, was the second most influential factor in reducing poverty, emphasizing the importance of developing financial infrastructure in underprivileged areas. Use of financial services, with a coefficient of 0.366 and significance of 3.58, had a positive but comparatively weaker impact on poverty reduction, suggesting that in the absence of proper access and quality, its effectiveness is limited.

Regarding economic growth and stability, the quality of financial inclusion again had the strongest effect, with a coefficient of 0.533 and significance of 3.47, highlighting the role of high-quality financial services in attracting deposits, improving investment, and reducing economic fluctuations. Access to financial services, with a coefficient of 0.436 and significance of 4.27, also showed a positive effect on economic growth. Use of financial services, with a coefficient of 0.332 and significance of 3.52, had a meaningful yet relatively lesser impact compared to the other dimensions.

Finally, macroeconomic variables such as inflation and unemployment had a direct effect on the performance of Qard al-Hasan funds, with a coefficient of 0.240 and significance level of 2.79. This finding underscores that the success of microfinance institutions is contingent upon macroeconomic stability at the national level.

Table 14
Standardized Coefficients and Significance Values of the Causal Paths Between Research Variables

Type of Effect	Independent Variable	Dependent Variable	Standardized Coefficient	Significance T-Value	Summary Interpretation
Direct	Economic Control Variables	Performance of Qard al-Hasan Funds	0.240	2.79	Better economic conditions → stronger performance of funds
Direct	Financial Inclusion – Access	Poverty Measurement	0.529	6.04	Increased access → reduced poverty
Direct	Financial Inclusion – Quality	Poverty Measurement	0.639	5.73	High-quality services → high effectiveness in reducing poverty
Direct	Financial Inclusion – Usage	Poverty Measurement	0.366	3.58	Useful usage, but less impact than other dimensions
Direct	Financial Inclusion – Access	Economic Stability and Growth Index	0.436	4.27	Access infrastructure → economic growth
Direct	Financial Inclusion – Quality	Economic Stability and Growth Index	0.533	3.47	Quality services → trust and economic sustainability
Direct	Financial Inclusion – Usage	Economic Stability and Growth Index	0.332	3.52	Financial participation → relatively limited economic growth

Source: Research Findings

In In conclusion, the findings of this study highlight that enhancing the quality of financial services, equitable development of access infrastructure, and strengthening macroeconomic foundations constitute the three fundamental pillars for poverty reduction, the sustainability and improved performance of Qard al-Hasan funds, and the realization of sustainable economic growth. Nevertheless, these conclusions should be interpreted alongside the observed deterioration in certain banking-sector risk indicators, implying that while the structural relationships identified in the model are statistically significant, some aspects of financial fragility still persisted during the study period.

6 Comparative Analysis with Previous Financial Inclusion Studies

The results of this study demonstrated that financial inclusion, across its three dimensions—*access*, *usage*, and *quality*—exerts a positive, significant, and substantial impact on both poverty reduction and economic growth and stability. Among these, the *quality* dimension of financial inclusion, with the highest coefficient, emerged as the most critical factor in improving socio-

economic indicators. These findings indicate that the mere existence of financial services is not sufficient; rather, the quality of service delivery—such as transparency, accountability, ease of access, and the provision of professional advisory support—plays a decisive role in effectiveness. Furthermore, equitable access to financial services and the active utilization of such services by diverse social groups can enhance household welfare, stimulate investment, and foster economic dynamism at both micro and macro levels.

Path analysis further revealed that macroeconomic control variables such as inflation, unemployment, and income levels exert a direct influence on the performance of Qard al-Hasan funds. This implies that macroeconomic stability underpins the efficiency and financial sustainability of these small yet influential institutions. In more stable economic environments, loan repayments are made on time and liquidity circulation functions properly, ultimately strengthening the role of these funds in economic development. A comparison with prior research underscores the alignment of the findings. For example, Patil and Satapathy (2023) highlighted the pivotal role of digital banking in enhancing financial performance, consistent with this study's emphasis on service quality and ease of use. Likewise, Lee et al. (2023) and Mhlanga (2022) confirmed the impact of financial inclusion on poverty reduction, while Anthony-Orji (2023) and Fernandes et al. (2021) provided evidence of the direct link between expanded financial inclusion and sustainable economic growth.

From the perspective of non-banking institutions, the results correspond with studies such as Aloulou et al. (2024) and Falaiye et al. (2024), which emphasize that emerging technologies such as fintech and digital wallets expand financial inclusion by enhancing accessibility and eliminating traditional barriers. Particularly in developing countries, the role of small and indigenous institutions such as Qard al-Hasan funds becomes more prominent when combined with modern financial technologies. Similarly, Qizam et al. (2025) underscored the role of Islamic financial institutions in advancing both social and financial inclusion, thus reinforcing the findings of this study in a faith-based institutional context. Research by Amnas et al. (2024) and Sukmana & Trianto (2025) demonstrated that strengthening financial literacy, especially Islamic financial literacy, alongside digital infrastructure, promotes greater participation in formal financial services. This aligns with the current study's emphasis on empowering users to make optimal use of Qard al-Hasan services. In a broader sense, the findings of Eshun and Kočenda (2025) on the importance of banking efficiency and financial education underscore the

institutional and cultural foundations critical for the success of financial inclusion policies.

Moreover, studies such as Sant'Anna & Figueiredo (2024) and Yang & Masron (2024) on the effects of digital transformation and fintech on financial stability highlight the necessity of effective supervision and regulatory frameworks, echoing this study's conclusion on the decisive role of institutional and policy environments in the effective performance of Qard al-Hasan funds. Similarly, Mishra et al. (2024), through a comprehensive literature review, emphasized the role of technology and vulnerable groups in achieving sustainable financial inclusion—a theme central to the present research.

Overall, the findings highlight the strategic and multidimensional role of financial inclusion. They demonstrate that simultaneously strengthening its three dimensions—access, usage, and quality—alongside improving macroeconomic conditions, financial literacy, and technological infrastructure, constitutes an effective national policy strategy for poverty alleviation, enhancing the performance of community-based financial systems such as Qard al-Hasan funds, and accelerating the trajectory of sustainable economic growth. Furthermore, the results emphasize that financial inclusion policies must be designed in accordance with each country's cultural, institutional, and technological contexts (Oyewole et al., 2024; Osabutey & Jackson, 2024) in order to maximize their effectiveness in advancing sustainable economic development and financial justice.

Macroeconomic Context and Poverty: During the study period (2017–2024), Iran faced persistently high inflation (peaking above 40%) and weak GDP growth, which substantially constrained household purchasing power and limited the savings capacity of vulnerable groups. These macroeconomic pressures reduced the real value of Qard al-Hasan loans and restricted the mobilization of deposits, thereby weakening the poverty-reduction potential of such funds. For example, while the number of active financial accounts and digital users increased, rising inflation eroded the effectiveness of credit facilities in improving real income. Similarly, low GDP growth and fiscal deficits reduced the scope for job creation, making the intermediation role of Qard al-Hasan funds even more critical in sustaining financial access under adverse conditions. This revised analysis highlights that financial inclusion outcomes must be interpreted in the broader macroeconomic environment, where inflation and growth dynamics directly shape the capacity of funds to alleviate poverty.

Clarification of Financial Intermediation Role: The intermediary role of Qard al-Hasan funds does not uniformly affect all aspects of poverty reduction. Our findings suggest two main channels: (1) direct impact on income poverty, as interest-free microloans foster self-employment and household resilience; and (2) contribution to multidimensional poverty reduction, by increasing access to formal financial services, enhancing social trust, and facilitating participation in economic activities. However, in dimensions such as health and education, the effect is indirect and contingent on complementary public policies. Recognizing this distinction clarifies that Qard al-Hasan funds play a partial yet crucial role in alleviating poverty, which is strengthened when combined with broader social policy interventions.

Integration of FinTech and Digital Infrastructure: Although the initial manuscript mentioned FinTech as a potential driver of inclusion, we now provide additional evidence regarding Iran's digital infrastructure. National data indicate a steady growth in digital banking users (from 25 million in 2017 to 60 million in 2024), POS terminals (from 650 to 1,300 per 10,000 people), and ATM coverage. These trends suggest that a solid baseline infrastructure exists to support the adoption of FinTech solutions. Nevertheless, successful integration requires enhanced cyber-security, regulatory oversight, and digital financial literacy among users. Thus, while the potential for FinTech–Qard al-Hasan synergy is real, its effectiveness depends on bridging infrastructural gaps and strengthening governance frameworks.

7 Recommendations for the Development of Financial Inclusion in the Country

Based on the conducted analyses, the development of financial inclusion as an effective tool for reducing economic inequalities and achieving sustainable development requires a multidimensional and coordinated approach. In this regard, the following recommendations are proposed as policy and practical strategies:

1) **Development of financial and digital infrastructure**: Expanding bank branches in underserved areas and advancing digital banking services can facilitate public access to financial services. However, the high costs of investment in communication infrastructure and constraints arising from international sanctions must be considered, as they may hinder the rapid adoption of modern technologies in Iran.
2) **Empowerment through financial education**: Implementing financial literacy programs for vulnerable groups, while requiring initial investment

and culturally contextualized content design, can reduce long-term costs associated with bankruptcy and financial mismanagement and generate high social returns.

3) **Reform of policymaking and supervisory frameworks**: Strengthening regulatory systems through technologies such as blockchain and artificial intelligence enhances transparency and public trust. At the same time, legal and regulatory limitations in Iran—particularly concerning cryptocurrencies and cross-border financial services—should be taken into account to ensure that proposed solutions do not conflict with existing laws.
4) **Enhancing transparency and access to financial information**: Establishing comparative information platforms for evaluating the quality and cost of financial services can foster healthy market competition. Nonetheless, such initiatives involve significant operational and security costs that must be weighed against the benefits of improved market efficiency.
5) **Designing tailored services for specific groups**: Developing financial products adapted to the needs of women, youth, rural populations, and other disadvantaged groups—particularly through fintech solutions—can enhance productivity. However, infrastructural barriers in less developed regions and limited access to high-speed internet remain key challenges to the implementation of this recommendation.
6) **Strengthening cross-sectoral and social collaborations**: Promoting interaction among government institutions, banks, fintech companies, and community-based organizations requires legal and institutional coordination. While such collaborations entail substantial operational and supervisory costs, they can ultimately enhance the sustainability of microfinance institutions such as *Qard al-Hasanah* funds and increase public trust.

In summary, the realization of financial inclusion in Iran necessitates a rigorous cost–benefit assessment and feasibility analysis of each proposed policy within the country's actual context. This requires simultaneous attention to infrastructural, regulatory, and international constraints to ensure that innovative and technology-driven solutions, such as fintech applications, achieve practical viability and effectiveness.

8 International Experiences of Qard al-Hasanah Funds and Comparative Perspectives

In recent decades, financial inclusion has increasingly attracted scholarly and policy attention as a key component of sustainable development and poverty reduction. Studies have demonstrated that non-bank financial institutions, particularly Qard al-Hasan funds, play an important role in enhancing access to financial services for low-income groups (Ehsanfar, 2023; Goodarzi Farahani & Karkhane, 2023). Within this framework, reviewing selected experiences of Islamic countries in applying Islamic microfinance instruments helps position Iran within a comparative context. Countries were selected based on institutional diversity and operational experience: Indonesia with its *Baitul Maal wat Tamwil* (BMT) model, Bangladesh with its extensive Islamic microfinance network, and regional examples from Malaysia and Turkey.

1) Indonesia – BMT Model:

The BMT model combines two functions: *maal* (mobilization of charitable resources such as zakat and waqf) and *tamwil* (provision of microfinance facilities through Islamic contracts such as *murabaha* and *mudaraba*). These institutions, typically organized as local cooperatives, relied on a networked form of Shariah governance that strengthened both social trust and penetration into microenterprises. Findings by Sukmana & Trianto (2025) confirm that enhancing Islamic financial literacy in Indonesia has expanded access to finance for small and medium enterprises, thereby facilitating the growth of the creative economy.

2) Bangladesh – Islamic Microfinance alongside the Grameen Model:

Bangladesh's experience was rooted in organizing group-guaranteed microloans with a focus on women's empowerment. Islamic microfinance institutions in the country integrated Shariah compliance—through contracts such as deferred sale (*bay' bi al-thaman al-'ajil*), *murabaha*, and limited *Qard al-Hasanah*—with operational efficiency. A core strength of this model was linking loans with skill training and rigorous beneficiary screening. This illustrates that gender inclusion and skills development are pivotal to the social impact of Islamic microfinance funds (Pal et al., 2022).

3) Malaysia and Turkey – Policy and Institutional Integration:

In Malaysia, synergy among microfinance institutions, zakat agencies, and Islamic banking created a conducive platform for reaching vulnerable groups. In Turkey, participatory banking and waqf-based funds, supported by national Shariah frameworks, opened pathways for expanding microfinance services. Research by Ozdemir et al. (2023) shows that integrating micro-investments with Islamic finance principles in Turkey significantly improved financial

inclusion for low-income populations. In both countries, national policy and centralized regulation were critical to scalability and service standardization.

Similarities and Differences with Iran:

Iran also benefits from a rich social capital base of Qard al-Hasan and an extensive fund network. However, institutional fragmentation and the absence of unified standards hinder scalability. While compliance with the usury-free banking law offers strong potential, diversity in Shariah oversight at the microfund level remains a challenge—unlike Indonesia and Malaysia, which rely on nationwide Shariah boards and standardized guidelines. In terms of social impact, Iran's experience, like that of other countries, is centered on low-income households, but with less emphasis on women and skills training compared to Bangladesh. At the macroeconomic level, structural inflation and volatility reduce the real value of microloans in Iran, whereas relative stability in certain periods in Indonesia and Malaysia supported medium-term planning.

Comparative Synthesis:

Drawing from international experiences and previous findings (e.g., Mishra et al., 2024; Sant'Anna & Figueiredo., 2024; Aloulou et al., 2024), three key lessons for Iran can be identified:

a) Networked and platform-based standardization of funds (inspired by Indonesia's BMT);

b) Strengthening gender inclusion and linking credit to skills training (inspired by Bangladesh);

c) Policy alignment among charitable institutions, Islamic banking, and regulators (as in Malaysia and Turkey).

These lessons suggest that upgrading Qard al-Hasan funds in Iran could simultaneously enhance institutional efficiency, Shariah accountability, and pro-poor social impact within the country's indigenous framework.

Table 15
Comparative Analysis Table: Financial Inclusion and the Role of Qard al-Hasanah Funds

Country / Model	Institutional Structure	Shariah Governance	Social Impact	Macroeconomic Function	Key Lessons for Iran
Iran	Extensive but fragmented fund network; lack of unified standards	Usury-free banking law; diverse Shariah oversight across microfunds	Focus on microloans; limited emphasis on women and skills training	High inflation and economic volatility; reduced real loan value	Need for platform-based networking, standardization, and policy alignment
Indonesia (BMT)	Local cooperatives with network-based architecture and semi-unified framework	Local and national Shariah boards; harmonized guidelines	Broad microenterprise coverage; high social trust	Relative macroeconomic stability in some periods; medium-term planning possible	Adopt networked structures to reduce supervisory costs
Bangladesh (Islamic MFIs)	Wide microfinance network with Grameen background	Islamic contracts (murabaha, deferred sale, limited Qard al-Hasan) alongside group-lending mechanisms	Systematic focus on women's empowerment and skill-linked loans	Lower inflation than Iran; relative dependence on foreign aid	Strengthen gender inclusion and integrate loans with training
Malaysia	Synergy of zakat, microfinance institutions, and Islamic banking	Centralized Shariah oversight and standardized frameworks	Coverage of vulnerable groups supported by policy	Relative macroeconomic stability; scalable, standardized services	Importance of national policy and institutional synergy
Turkey	Participatory banks and waqf-based funds with social orientation	National Shariah framework; aligned with financial policy	Social–charitable services for low-income groups	More stable macroeconomy compared to Iran	Utilize waqf and charitable potential for microfinance

Source: Research Findings

Institutions

Previous studies on financial inclusion consistently emphasize its three dimensions—access, quality, and usage—as critical to poverty reduction and sustainable economic growth. International literature highlights that the quality of financial services—particularly in terms of transparency, professional advisory, and accountability—represents the strongest driver of

public trust and economic empowerment. Equitable infrastructural access, especially in underserved areas, forms the foundation for reducing inequalities and expanding economic participation. Active usage of financial services, although with relatively weaker impact, nonetheless contributes meaningfully to household welfare when supported by quality and access dimensions. Moreover, macroeconomic stability—particularly in inflation, unemployment, and liquidity levels—plays a decisive role: in stable environments, loan repayment and liquidity circulation are more efficient, amplifying the positive effects of financial inclusion. The findings of the present study align with this body of research, confirming that quality of services exerts the strongest impact on poverty alleviation and economic growth, followed by access, which underscores the urgency of investing in banking and digital infrastructure in disadvantaged regions. While usage showed weaker standalone effects, when reinforced by access and quality, it can enhance household participation and local market dynamism. Accordingly, this study emphasizes a three-layered strategy: improving service quality, ensuring equitable access, and fostering macroeconomic stability. Together, these can form the foundation for effective policy design to strengthen the performance of Qard al-Hasanah funds and, at the macro level, advance sustainable economic development and reduce structural poverty.

9 Limitations and Suggestions for Future Research

One of the main limitations of this study lies in its focus on quantitative indicators of the performance of Qard al-Hasan funds (number of branches, loan volume, and financial resources). This selection was made due to the homogeneity of data and the feasibility of analysis within the framework of structural equation modeling. Qualitative indicators such as loan default rates, repayment efficiency, social trust, and socio-cultural effects are undoubtedly important for a comprehensive evaluation; however, they were excluded from this study for two reasons: first, the lack of reliable and consistent time-series data for the period 2017–2024; and second, the need to preserve the coherence of the quantitative model. Thus, this issue is identified as one of the limitations of the research.

Another limitation concerns the relatively short time span of the data (eight years), which constrained the application of conventional econometric tests such as stationarity, cointegration, or Granger causality. Consequently, the present research relied on structural equation modeling (PLS-SEM) instead of classical econometric analysis. Nevertheless, nonlinear relationships

highlighted in the literature—for example, the inverted U-shaped relationship between financial inclusion and financial stability reported by Sebai et al. (2025)—were not tested in this study and can be addressed in complementary research.

In addition, the data were collected during a period when the Iranian economy was heavily influenced by international sanctions. As a result, the variable "sanctions" was implicitly reflected across all variables as an underlying contextual factor, yet it could not be modeled as an independent variable. Future research is encouraged to gather more precise quantitative indicators related to the intensity and dimensions of sanctions in order to examine their direct effects on fund performance and financial inclusion indicators.

Moreover, the limited availability of regional data (urban–rural or provincial) restricted the analysis to the national level. Although some indicators, such as the number of branches per geographic area or ATM devices per capita, partially reflected geographical heterogeneity, these measures remain insufficient. Future studies could employ regional or survey-based datasets to shed more light on the geographical dimensions of financial inclusion.

Finally, the absence of survey data prevented the direct measurement of subjective and behavioral aspects of financial inclusion (e.g., financial literacy levels or trust in financial institutions). Integrating such data with macro-level indicators could serve as a valuable complement for developing a more comprehensive understanding of the dynamics of financial inclusion.

Based on these considerations, the following avenues are suggested for future research:

1) Collecting field and social data to capture qualitative dimensions of Qard al-Hasan funds' performance.
2) Utilizing longer time-series datasets and applying advanced methods to analyze causal relationships and test nonlinear patterns.
3) Designing models to quantify environmental variables such as the intensity of sanctions or macroeconomic shocks.
4) Employing regional and survey-based data to better clarify geographical and behavioral variations in financial inclusion.

By pursuing these directions, future research will be able to provide a more comprehensive and dynamic picture of the role of Qard al-Hasan funds in enhancing financial inclusion and reducing poverty within the Iranian economy.

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