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Message from
EDITOR IN CHIEF

Dear Readers,

It is my distinct honour to present to you Volume 1, Issue 2 of the Journal of Islamic Banking, Economics and Policy (JIBEP)—a publication driven by the belief that Islamic finance can serve as both a moral compass and a practical guide in addressing some of the world's most pressing financial and economic challenges. This issue is especially meaningful to us. As we continue to build the identity and scholarly presence of JIBEP, we are deeply aware that publishing is not just about disseminating research; it is about cultivating dialogue, shaping policy, and bridging the gap between theory and practice. Each article in this issue contributes toward that mission.

From the role of Takaful in sustainable agriculture to the application of blockchain in emerging markets, each article in this issue explores real-world challenges with thoughtful, Shariah-aligned solutions. Our contributors, academics, researchers, and practitioners, have addressed issues ranging from consumer behaviour to macroeconomic stability, showcasing the versatility and depth of Islamic finance in today's global economy. Collectively, these contributions represent a diverse blend of methodological approaches, geographies, and perspectives, all united by their grounding in Shariah principles.

I would like to take this opportunity to thank our dedicated reviewers, advisory board, interns from Queen Mary University of London, and most importantly, the authors who trusted us with their scholarly work. I also express my gratitude to those readers and institutions who have encouraged our journey by offering their support, feedback, and partnership.

As a new journal with high aspirations, our roadmap includes gaining indexation in DOAJ, Scopus, and Web of Science. This will not only enhance the discoverability of our contributors' work but will also help build global recognition for high-quality research emerging from and for the Islamic finance ecosystem. Our vision for JIBEP is not only to publish research but to become a trusted platform where academia, industry, and policy intersect to influence meaningful change. We welcome collaborations, special issue proposals, and institutional partnerships that can help amplify the journal's reach and impact.

Thank you once again for joining us in this journey. We hope you find this issue both intellectually enriching and practically inspiring.

Warm regards,

Dr. Faiza Raza
Editor-in-Chief
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The editorial team of JIBEP gratefully acknowledges the valuable contributions of our peer reviewers, editorial board members, and institutional supporters who have dedicated their time and expertise to maintain the academic quality and integrity of this issue.

We extend special thanks to all authors and researchers who entrusted JIBEP with their scholarly work, and to the Islamic Finance Review (IFR) for providing a platform that fosters critical dialogue and innovation in the fields of Islamic banking, economics, and policy.

Your efforts have been instrumental in the successful publication of Volume 1, Issue 2 | June 2025.

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Blockchain Adoption Challenges and Solutions in Bangladesh

Dr. Maryam Saeed[1]
Dr. Noman Arshed[2]

ABSTRACT

Background: The idea of insurance was discovered several millennia before Christ (BC). In the second and third millennia BC, traders from China and Babylonia practiced shifting or dispersing risks. Today, insurance is the foundation of the economy, but expanding its penetration is difficult in emerging nations. The fourth insurance industry revolution in the developed world was sparked by the recent advent of Blockchain, IoT, Big Data, and InsurTech.

Objective: To boost insurance coverage in Bangladesh, this study examines the problems with and potential solutions to blockchain technology.

Research Methodology: To identify the themes and factors pertaining to problems and solutions in implementing blockchain in Bangladesh insurance business, this study used a systematic literature review. To find pertinent material from Google Scholar, several keywords were employed. The filtered studies were examined based on inclusion and exclusion standards.

Findings: This report outlined many obstacles to blockchain adoption in the Bangladesh insurance sector as well as potential remedies. The proposals could help policymakers improve the insurance industry's service delivery.

Keywords: blockchain, Insurance Industry**,** Digital Technologies, Bangladesh.

JEL Classification: G22

Paper Type: Systematic Literature Review (SLR) / Review Article

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1. Introduction

1.1 Background

Blockchain technology has emerged as a foundational innovation in the Fourth Industrial Revolution (4IR), redefining the structure of data management and secure digital transactions. Operating as a decentralized and immutable digital ledger managed by a distributed network of computers, blockchain eliminates the need for third-party intermediaries. Every transaction is transparent, permanently recorded, and validated through consensus algorithms using cryptographic hashes, thereby fostering trust and data integrity across a wide range of sectors. These characteristics make blockchain applicable not only in digital finance but also in sectors such as healthcare, supply chain management, market monitoring, intelligent energy systems, and personal data privacy.

In the context of Bangladesh, blockchain adoption is gaining momentum as the country aims for sustainable development and digital transformation. However, the broader implementation of this technology remains hindered by multiple structural and policy-related challenges. While various sectors such as governance, healthcare, farming, information authentication, security, internet architecture, and data management have shown interest in exploring blockchain's potential, they have not yet been able to fully capitalize on its benefits (Hussain et al., 2022).

1.2 Research Problem

Despite the growing global momentum in blockchain deployment, Bangladesh lacks a well-structured Blockchain Technology Acceptance Model (TAM) that could facilitate systematic adoption. This absence has resulted in fragmented efforts by developers and researchers, with most published work remaining at the conceptual or theoretical level. The current regulatory environment further exacerbates this issue. The Bangladesh Bank, under the Foreign Exchange Regulation Act (FERA) of 1947 and the Money Laundering Prevention Act (MLPA) of 2012, deems Bitcoin and other cryptocurrencies as illegal, posing significant hurdles to implementation efforts (Hussain et al., 2022).

Moreover, there is a scarcity of expert researchers, a lack of technical resources, and poor awareness about blockchain among the wider population. These gaps have limited progress in integrating blockchain into key development areas. While blockchain technology can contribute to reducing corruption through cryptocurrency-enabled transparency, the current policy landscape has severely restricted such avenues. This policy-induced stagnation is further compounded by infrastructure limitations and a lack of formal strategic direction (Hussain, 2022).

1.3 Blockchain and the Insurance Sector in Bangladesh

Blockchain's relevance to Bangladesh is particularly evident in the insurance sector, which functions under a dual system comprising conventional insurance and Islamic insurance (Takaful), regulated by the Insurance Development and Regulatory Authority (IDRA). The current insurance system suffers from inefficiencies, lack of transparency, and poor trust among the population. Specific challenges facing the Takaful industry include the scarcity of professionals skilled in both insurance and Shariah law, lack of standardized practices, and conflicting regulatory approaches (Zhang et al., 2021).

Blockchain offers a promising solution to many of these challenges. Through secure and shared digital records, automation of manual tasks via smart contracts, and efficient transaction validation, blockchain can significantly improve the delivery of both conventional and Takaful insurance services. It also enables the mobilization of savings, Halal investment vehicles, and transparent Zakat distribution mechanisms—enhancing financial inclusion in a predominantly Muslim population (Zhang et al., 2021).

The manual nature of the claim settlement process in Bangladesh could be completely restructured with blockchain-based systems. Smart contracts would ensure automated execution of terms and real-time disbursement of funds to policyholders. Similarly, reinsurance operations could be streamlined through secure data sharing between insurers and reinsurers. However, challenges remain, particularly in the integration of blockchain with existing IT systems. The lack of universal standards and interoperability, coupled with high implementation costs, makes this transition complex (Nusrat, 2021).

1.4 Institutional and Socioeconomic Barriers

The insurance industry in Bangladesh is also grappling with broader institutional and socioeconomic constraints. Mamun (2016) identified four core problem areas: marketing, human resource management, operational inefficiencies, and ethical concerns. Among these, marketing failures—including unqualified agents, poor public understanding of policies, and negative perceptions of insurance—pose significant barriers to growth. Additional issues include weak IT support, lack of technical knowledge, and unethical practices such as agent malpractice (Mamun, 2015; 2016).

Ali (2018) highlighted how legal limitations and the volatile capital market deter insurers from making high-return investments, contributing to the sector's stagnation. Moreover, insurance companies are concentrated in urban areas, leaving rural populations underserved. Cultural and religious misconceptions, especially among the 90% Muslim population, further reduce demand for insurance products (Reza & Iqbal, 2007). Inadequate marketing budgets, lack of trained personnel, and minimal investment in talent development continue to limit the sector's scalability (Islam, 2019).

Nevertheless, with Bangladesh's GDP growing from 5.57% in 2010 to 7.8% in 2019, and increasing literacy and income levels, the long-term demand for insurance is likely to rise. Blockchain presents an opportunity to bridge these gaps—particularly in rural and agricultural sectors—by enabling low-premium microinsurance and simplified loan services for farmers (Ali, 2020).

1.5 Research Objectives

To address the identified gaps, this study is guided by the following objectives:

1. To review the status and theoretical discussions of blockchain adoption in Bangladesh across major sectors.
2. To identify the challenges and limitations inhibiting its application, with a focus on the insurance industry.
3. To analyze how blockchain technology can enhance insurance services, particularly Takaful offerings.
4. To suggest actionable strategies and policy recommendations to foster blockchain integration in Bangladesh.

1.6 Research Questions

This research aims to explore the following questions:

- What are the key technical, regulatory, and socio-cultural challenges in adopting blockchain technology in Bangladesh?
- How can blockchain be effectively implemented in the Bangladeshi insurance sector?
- What policy interventions and infrastructural support are required to overcome existing barriers and promote blockchain adoption?

1.7 Significance of the Study

This study offers a comprehensive assessment of blockchain's potential role in transforming Bangladesh's insurance sector. By drawing attention to policy gaps, technical constraints, and institutional inefficiencies, it proposes a way forward for the sustainable adoption of this emerging technology. The research contributes to academic literature by filling the void in practical and sector-specific blockchain studies in the South Asian context. It also informs policymakers, technology developers, and financial institutions about how to overcome adoption hurdles through regulatory reform, awareness campaigns, and technical capacity-building.

2. Literature Review

2.1 Immaturity and Lack of Standardization

Blockchain technology remains in its developmental phase globally, and this immaturity presents a major barrier to its widespread adoption in Bangladesh. The lack of standardized programming languages for blockchain development is a significant challenge. According to the University Grants Commission (UGC), the undergraduate curriculum in Bangladesh is limited to programming languages such as C, C++, Java, C#, PHP, and Python. While these are foundational, they may not be sufficient to support advanced blockchain applications (Hussain et al., 2022).

Scalability issues in major public blockchain platforms also hinder adoption. Although private blockchain networks theoretically offer better scalability, they are often inaccessible to the public and limit broader innovation. Moreover, implementation costs are substantial, and compatibility with existing legacy systems remains a persistent technical constraint. Expertise, infrastructure, and public awareness about blockchain are all currently insufficient to support adoption at scale in Bangladesh.

Table 1: Characteristics of reviewed blockchain adoption studies in Bangladesh insurance sector

No.	Journal name/ Conference Name	Paper topic/ Conference paper Name	Method	Year	Author
1	UIU Institutional Repository	Problems and Prospects of Blockchain Technology in Bangladesh Economy.	Exploratory	2020	(Tasnim, 2020)
2	Emerging Technology in Computing, Communication and Electronics	Smart Grid Implementation with Consortium Blockchain: A Proposed Model for Bangladesh.		2020	(Rhydwan et al., 2020)
3	23rd International Conference on Computer and Information Technology	Towards Using Blockchain Technology for Microcredit Industry in Bangladesh		2020	(Asaduzzaman et al., 2020)
4	Electronic Research Journal of Social Sciences and Humanities	Use of Blockchain Technology in Banking in Bangladesh; Usefulness, Hurdles and Recommendations		2021	(Syeda, 2021)
5	Third World Quarterly	Will blockchain emerge as a tool to break the poverty chain in the Global South?		2017	(Kshetri, 2017)
6	Corporate Governance and Organizational Behavior Review	Digital Opportunities in the Healthcare Enterprises during COVID-19: An Empirical Analysis of the Developing Country	Quantitative	2021	(Mahboob, 2021)
7	Journal of King Saud University - Computer and Information Sciences	A Blockchain-based Land Title Management System for Bangladesh	Exploratory	2020	(Kazi et al., 2020)
8	2nd International Conference on Robotics, Electrical and Signal Processing Techniques	A Novel Framework for Blockchain Based Driving License Management and Driver's Reputation System for Bangladesh		2021	(Mazumder et al., 2021).

9	Tbs news	Blockchain technology: Bangladesh perspective		2020	(Ariful, 2020)

2.2 Infrastructure, Implementation Cost, and Piracy

Internet scarcity presents another critical limitation. Despite an increase in internet users—from 54.12 million in December 2015 to 108.19 million in August 2020—Bangladesh ranked 98th out of 175 countries in internet speed. This limits the practicality of deploying blockchain systems, which require stable, high-bandwidth infrastructure (BTRC, 2020).

Moreover, implementing blockchain incurs high costs, especially since most software must be imported. With a 92% software piracy rate, local developers often rely on unauthorized software, reducing reliability and security. The domestic software industry has not yet matured to the level where blockchain solutions can be developed and maintained locally. These factors further raise the barriers to adoption for both public and private institutions.

2.3 Awareness, Education, and Law Enforcement

Public awareness and digital literacy regarding blockchain remain very low in Bangladesh. Many people, including professionals, are unfamiliar with blockchain's purpose, functioning, and potential applications. Weak law enforcement, low income levels, and moral degradation further contribute to this gap. Without national awareness campaigns and educational programs, blockchain adoption will remain limited to isolated use cases.

A significant impediment is also the absence of a regulatory framework that provides legal guidance and incentives for adopting new technologies. The lack of clearly defined regulations causes uncertainty, making investors and organizations reluctant to experiment with blockchain solutions (Hussain et al., 2022).

2.4 Review Approach and Thematic Analysis

The authors conducted a systematic literature review to extract themes from recent academic studies and technical papers focused on blockchain adoption in Bangladesh. The review collected metadata from each article, including author name, year of publication, country, publication type, and findings. From this analysis, a narrative synthesis was developed to identify recurring challenges and proposed solutions.

Table 2: **Blockchain adoption in Bangladesh Insurance Industry: Issues & Solutions**

No. of Studies	Issues	Solutions
Study 1	• Vendor lock-in occurs when a vendor's system fails for any reason. • Bangladesh also lacks blockchain experts to fully use the technology. • Its implementation is hampered by a lack of resources, such as cash • Many businesses are unaware of the advantages of blockchain technology, which hinders adoption. • Indefinite uncertainties prevent a regulatory framework. • Radical shift in business models will deter firms from adopting it. • Integration with legacy systems required to match with the business' computer system.	• Expanding blockchain knowledge • Establishing blockchain research institutes and finding blockchain experts to raise awareness and knowledge in Bangladesh • Before using blockchain, companies must grasp the governance model.
Study 2	• Maintaining data privacy and defending the system from cyber-attacks is difficult.	• Nil

Study 3	• Database technology is insecure, unchangeable, and concerns trust and privacy.	• Nil
Study 4	• Interfaces for blockchain ledgers are not user-friendly • Inefficient system • A lack of blockchain standards • Cyber-threat • Lack of privacy and security trust • Understanding of this technology • No hard and fast rules. • Interoperability across platforms and other IT systems is currently lacking.	• Blockchain has to be scalable enough to handle massive user transactions quickly. • Encryption needs both public and private keys. The user who saves and processes the keys protects the keys. • Setting up "appropriate data models and blockchain-enabled business processes" with "authentication and communication protocols" is required. • Collaboration is essential to pilot “high levels of projected change,” create trust, and detect and manage repercussions. • Developers and companies must educate regulators and establish blockchain use guidelines. Industry groups must create cryptocurrency standards and practises. • “Embed sustainable issues into the growing industry code of conduct,” industry groups must do.
Study 5	• Blockchain applications are still in their infancy. • Regulators and state authorities' responsibilities are unclear. • The blockchain's functionality may potentially clash with regulatory constraints, such as the inability to modify or erase data held in a public ledger. • Miners had to do repeated calculations (called hashing) to get a 'magic number' that made the block genuine and acceptable to other participants. • The hardware affects energy usage. • Data miners keep their hardware hidden. • Transactions require network bandwidth. GS economies with network congestion may be worse.	• Nil

	• Many GS economies lack technical advancement. • Lack of information & Lack of user-friendly applications • Blockchain has a bad reputation because to its relationship with bitcoin, which has been used for criminal operations including money laundering and drug trafficking	
Study 6	• Robotics and blockchain would demand a large initial investment in Bangladeshi healthcare.	• Nil
Study 7	• Widespread digital illiteracy	• Government must enact new Blockchain policies and legislation. • They should train authorities and the public to implement this high-tech solution. • Security attack simulation and deterrent may be added to the system.
Study 8	• Nil	• Simplifying Fabric network core protocols and execution processes will boost scalability.
Study 9	• Regulatory issue • Lack of trust • Technology cost • Data safety • Investment in integrating new technology with legacy systems	• Nil

The synthesis of the selected studies revealed several common themes. These include vendor lock-in, lack of expert personnel, insufficient financial resources, and limited awareness of blockchain's benefits. Moreover, the absence of a governance model and lack of integration with legacy systems further inhibit adoption.

Cybersecurity and privacy risks, non-user-friendly interfaces, the absence of blockchain standards, and a lack of interoperability across platforms and IT systems were also frequently cited. These issues are intensified by a shortage of technical knowledge and minimal regulatory clarity on data protection, record-keeping, and system upgrades (Syeda, 2021; Kshetri, 2017).

In sectors like healthcare, robotics and blockchain integration demand large investments, which pose a significant hurdle in Bangladesh. Regulatory issues, lack of trust, high technology costs, and data safety concerns persist in nearly all reviewed sectors. To address these, the reviewed literature recommends expanding blockchain knowledge, establishing dedicated research institutions, training public officials, and implementing a comprehensive national blockchain strategy (Tasnim, 2020; Kazi et al., 2020).

3. Research Methodology

3.1 Methodological Approach

The literature review addressing the challenges and solutions in adopting IoT in Pakistan was conducted using a Systematic Literature Review (SLR) methodology. Relevant articles were identified based on the keywords listed in Table 3 and were selected according to the inclusion and exclusion criteria outlined in Table 4. The SLR approach facilitates the identification, selection, and critical appraisal of existing research to answer a clearly defined research question (Dewey & Drahota, 2016).

Table 3 Keywords Selections

Block chain	Literature and conference proceedings on blockchain in the Bangladesh financial industry, particularly insurance and health insurance.	Studies not in English Magazine, newspaper, thesis, report data Studies in non-financial fields including education, manufacturing	Papers publishing platforms such as Google scholar and emerald were opted as the exploring means for this review. Following blend of search, terms are applied: Blockchain * AND (insurance sector*) AND (challenge* OR obstacle* OR issue* OR disadvantage* OR threat). The exploration was

Past works available since 2020 Primary and secondary research	Large-scale data analytics and other technologies	carried out between 2020 to 2021.

Table 4 Selection Criteria

Technology	Criteria	Bangladesh
Blockchain	**Identification**	15
	Screening	13 after removing 2 duplicates
	Eligibility	12 after removing 1 archive
	Included	9 after removing 3 full articles

4. Findings of the Included Studies

The systematic literature review identified a wide range of challenges that hinder the adoption of blockchain technology in Bangladesh's insurance sector. Through content analysis, the issues were thematically categorized based on frequency and relevance. The findings indicate that both technical and non-technical barriers exist at multiple levels, including infrastructure, regulatory frameworks, business culture, and user literacy.

One of the foremost challenges is **vendor lock-in**, which arises when systems are tied to a particular vendor and become vulnerable in the event of vendor failure (Tasnim, 2020). Compounding this is the **shortage of blockchain experts**, which severely limits the capacity for blockchain development and deployment within the country (Tasnim, 2020). Financial constraints also emerge as a significant barrier; integrating robotics and blockchain into sectors such as healthcare requires substantial upfront investment, which is not readily available (Mahboob, 2021). The high cost of installing and integrating new technologies remains one of the most frequently cited concerns (Ariful, 2020).

A widespread **lack of awareness** among companies regarding blockchain's benefits further limits adoption. Additionally, blockchain's association with illicit activities such as hacking, money laundering, and drug trafficking has contributed to a **negative public perception**, undermining trust and acceptability (Kshetri, 2017). The **absence of clear regulations** is another pressing issue. Regulatory bodies and state authorities often have unclear responsibilities, and immutable public ledgers conflict with the legal right to data erasure, commonly referred to as the "right to be forgotten" (Kshetri, 2017). Open, permissionless distributed ledger systems currently lack regulatory oversight, although private or permissioned blockchains are more manageable through administrator control or outsourcing contracts. While some global authorities have initiated Distributed

Ledger Technology (DLT) research, a coherent DLT regulatory framework is yet to emerge (World Bank Group, 2017).

The need for **fundamental changes to existing business models** is another major deterrent (Tasnim, 2020). Distributed ledger interfaces are typically non-intuitive, and full compatibility with existing systems demands industry-wide coordination and costly infrastructure overhauls (World Bank Group, 2017). Most blockchain networks remain **incompatible** with one another, as the 6,500+ existing blockchain platforms generally operate as stand-alone systems without common communication protocols. Security features also vary significantly, creating further integration barriers. Establishing **industry-wide blockchain standards** could promote collaborative application development, proof-of-concept trials, and more seamless integration (Finextra, 2020).

Other technical limitations include **low system efficiency**, **high transaction latency**, and **excessive energy consumption** (Syeda, 2021). The absence of **official blockchain protocols** and central authorities managing protocol governance leads to inconsistencies in the way data is transmitted and verified (Syeda, 2021). Additionally, **technology illiteracy** among users remains a significant concern, as blockchain adoption requires advanced understanding of encryption, hash functions, and decentralized storage (Syeda, 2021; Shams & Aswini, 2020).

The lack of standardized **interoperability** mechanisms is another critical issue. Without commonly accepted data models and secure communication protocols, it is difficult to integrate blockchain into existing IT ecosystems. Interoperability also influences competition; allowing users to switch providers encourages market competitiveness and cost-efficiency (itransition, 2020). As blockchain is still in its **infancy stage**, especially in developing countries, it suffers from limited pilot applications and low institutional readiness (Kshetri, 2017).

In addition to these constraints, **energy consumption in proof-of-work consensus mechanisms**—which require miners to compute resource-intensive hashes—poses environmental and logistical concerns. Mining hardware requires substantial power and is often hidden, raising additional transparency issues (Kshetri, 2017). Limited **network bandwidth** also affects transaction throughput, especially in GS (Global South) economies with infrastructural bottlenecks (Kshetri, 2017).

A **shortage of skilled blockchain developers** further exacerbates the issue. The global supply-demand gap in blockchain expertise is particularly pronounced in countries like Bangladesh. Technical professionals are often reluctant to relocate, making recruitment even more difficult (Shams & Aswini, 2020). Finally, **digital illiteracy**, especially in rural and underserved regions, severely restricts the reach of blockchain-based solutions. As

Tasnim (2020) notes, raising awareness, building research institutions, and nurturing local blockchain talent are essential to addressing this gap.

Other critical issues include the need for **robust blockchain governance** models, which determine how people, institutions, and protocols interact in a decentralized system (Tasnim, 2020). Blockchain also needs to be **scalable** enough to handle large volumes of user transactions. Since every node store and verifies each transaction, public blockchain systems often face performance bottlenecks. On-chain scaling methods such as **sharding**—which divides the blockchain network into smaller, parallelizable pieces—can improve efficiency and throughput (Leewayhertz, 2021). Moreover, blockchain relies on **public and private key encryption**, placing the burden of key security on users themselves (Syeda, 2021).

Ultimately, **interoperability**, **authentication standards**, and **communication protocols** are necessary for integrating blockchain into existing ecosystems. Successful pilot programs require stakeholder **collaboration** to manage risks, build trust, and track implementation outcomes. Developers and firms must also take responsibility for **educating regulators** and establishing clear user guidelines. Furthermore, **industry consortia** should work toward developing ethical codes of conduct and setting **cryptocurrency and DLT standards** (Syeda, 2021). Finally, government support is critical: comprehensive blockchain legislation and training for public administrators are urgently needed to enable sustainable deployment of this high-potential technology (Kazi et al., 2020).

Table 5: Blockchain Adoption Challenges in Bangladesh Insurance Industry

Vendor lock-in
Bangladesh lacks blockchain experts
A lack of investment funding
Unaware of the potential of blockchain technology
Regulatory vacuum
This technology is transforming business paradigms dramatically.
Interfaces for blockchain ledgers are not user-friendly
Inefficient system
A lack of blockchain standards
Misunderstanding of technology
No clear criteria exist.
Blockchain applications are still in their infancy.
The miners' proof-of-work consensus requires a lot of energy.
Additional bandwidth is necessary to relay network transactions.
Minimal tech skills
E-illiteracy

5. Proposed Solutions

To address the multifaceted challenges surrounding blockchain adoption in Bangladesh's insurance industry, the literature proposes several strategic and policy-level solutions. A primary recommendation is the development of blockchain expertise through the establishment of specialized research institutes and targeted training programs. These institutions would serve as hubs for innovation, workforce development, and technical leadership in blockchain application across sectors (Tasnim, 2020).

Regulatory reform also emerges as a critical enabler. The government must enact comprehensive blockchain legislation that clearly outlines the legal framework, defines stakeholder responsibilities, and introduces institutional oversight. Such regulatory clarity would reduce uncertainty, build investor confidence, and create an enabling environment for innovation (Kazi et al., 2020). Alongside regulation, public awareness campaigns are essential. Educating citizens and businesses about the nature and benefits of blockchain through mass media, academic forums, and grassroots outreach could dispel misconceptions and promote informed adoption, especially in rural and underserved communities.

Another important solution lies in establishing national and sector-specific standards for blockchain systems. Industry-wide collaboration is required to develop interoperable data models, authentication protocols, and secure communication standards. These efforts would ensure compatibility between blockchain platforms and existing IT systems, thereby enhancing system efficiency and scalability (Syeda, 2021). Furthermore, the deployment of blockchain-based smart contracts can streamline insurance operations by automating claims management processes. This would not only reduce administrative delays but also enhance transparency and customer satisfaction.

Pilot projects with clear governance mechanisms are also recommended to test blockchain implementations in controlled environments before full-scale deployment. Such initiatives can help stakeholders assess technical feasibility, operational efficiency, and regulatory compliance. Moreover, blockchain presents a transformative opportunity for inclusive finance. Insurance providers can use blockchain to develop low-premium microinsurance products and simplified loan facilities tailored for farmers and rural populations, thereby addressing financial exclusion and risk vulnerability (Ali, 2020).

To overcome the blockchain developer shortage, the literature calls for academic-industry partnerships, scholarships, and professional incentives that encourage students and professionals to specialize in blockchain technologies. Finally, international collaboration with established blockchain networks, consortia, and knowledge hubs can accelerate capacity-building and expose Bangladeshi stakeholders to global best

practices. Collectively, these solutions offer a roadmap for integrating blockchain into Bangladesh's insurance sector in a manner that is efficient, inclusive, and future-ready.

Table 6: **Blockchain Adoption Solutions in Bangladesh Insurance Industry**

Expanding blockchain knowledge.
Establishing blockchain-focused research centres.
Identifying blockchain experts to educate and teach Bangladeshis.
Before adopting blockchain, companies must grasp the governance model.
Blockchain has to be scalable enough to handle massive user transactions quickly.
The user who saves and processes the keys protects the keys.
Collaboration is essential to pilot "high levels of projected change," create trust, and detect and manage repercussions.
Developers and companies must educate regulators and help set blockchain use guidelines. Industry groups must create cryptocurrency standards and practises.
Government must create new Blockchain policies and legislation.
They should teach authorities and educate the public to properly implement this high-tech solution.

6. Conclusion

The adoption of blockchain technology in Bangladesh's insurance sector presents a transformative opportunity to enhance transparency, efficiency, and financial inclusion. However, as highlighted by the literature, realizing this potential requires a holistic approach to overcoming key barriers such as limited expertise, regulatory ambiguity, interoperability issues, and low public awareness.

The proposed solutions emphasize the importance of institutional support through the development of blockchain-focused research centers, regulatory reforms that foster legal clarity and investor confidence, and robust public education campaigns to build grassroots understanding. Technical measures such as standardization, smart contract integration, and the initiation of pilot programs are essential to ensure practical, scalable, and secure implementation.

Moreover, by fostering academic-industry partnerships and promoting international collaboration, Bangladesh can address the skills gap while aligning its strategies with global best practices. If implemented effectively, these measures can pave the way for a blockchain-enabled insurance ecosystem that is not only technologically advanced but also equitable, customer-centric, and resilient to future challenges.

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Application of Takaful in Addressing the Green Agriculture Concept in Pakistan

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ABSTRACT:

The agriculture sector is considered to be the backbone of any economy. Unlike other developed or Muslim countries, conventional banks, Islamic banks, microfinance institutions, and the government are not providing suitable insurance facilities to the sector in Pakistan. This is the main reason farmers are poor and the agriculture sector is feeble. This study aims to provide a suitable Takaful framework that helps to improve the green (or organic) agriculture concept in Pakistan and is ultimately useful to preserve the environment and support the poor farmers. The current study uses the qualitative research approach and concludes the results based on previous empirical studies and semi-structured interviews. The interviews were conducted with 10 Pakpattan and Vehari farmers in Punjab province, Pakistan, who are cultivating a minimum of 5 acres of crops. The study findings concluded that farmers are interested in availing of the Takaful facility and agree to cultivate using an organic method. The farmers will be happy if the Shariah-compliant insurance (Takaful) framework using the Mudarabah model is offered in the market. However, there are some challenges, such as the machinery required to make organic fertilizer, cheap water, and availability of organic fertilizers and the need for educational programs. The first limitation of the study was that interviews were conducted only in two districts of the Punjab region. This study is fruitful for Takaful companies to enter this kind of project. This study will help academicians and scholars for further research and will be beneficial for the government and policymakers to develop more agricultural strategies.

Keywords: Takaful, Green Agriculture, Farmers, Punjab, Pakistan.

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1 Introduction

The growth and development of most countries somehow depend on their agricultural sector (McArthur & McCord, 2017). The agriculture sector is not only crucial for food security but also for rural development, poverty alleviation, and overall economic stability. It is a significant source of income and employment for a large portion of the population (Chand, 2019). It is fundamental to the country's economic stability, food security, and rural development (Nolte & Ostermeier, 2017).

The agriculture sector's importance in Pakistan cannot be overstated. The agriculture sector holds a pivotal role in Pakistan's economy and society. Agriculture is the primary source of livelihood for rural communities (Rusmayandi et al., 2023). It fosters rural development by creating employment opportunities, generating income, and improving living standards. The agriculture sector contributes 19.5 per cent to the Gross Domestic Product (GDP) and involves about 42.3 per cent of the workforce (Economic Survey of Pakistan, 2022, cited in Hussain, 2023). It is estimated that 65 per cent population of Pakistan is indirectly or directly related to agriculture (Rasheed et al., 2024).

The countries are trying to increase the available resources to meet the needs and necessities of their citizens. However, sometimes maximum utilization of resources only increases the profit or short-term advantages, which may have negative or adverse impacts in the long term (Tay & Diener, 2011). In the case of Pakistan, the major problem the government sees is short-term benefits and does not positively utilize the resources; thereby, the utilization of natural resources is uncontrolled (Mumtaz, Mitha & Tahira, 2013).

The purpose of highlighting the problem is backed by the concept of green farming with a green economy (Loiseau et al., 2016). According to the United Nations Environment Programme (UNEP) 2022, the green economy concept is an economic development model that seeks to balance economic growth with environmental sustainability and social equity. This concept emphasizes the importance of reducing environmental risks and ecological scarcities while promoting economic well-being and social inclusivity. In the context of agriculture, a green economy focuses on sustainable farming practices, resource efficiency, and environmental conservation to ensure long-term economic and ecological health (Mishra, 2017).

Ahmed et al. (2015) conducted a study regarding the potential of Takaful to become one of the financial tools supporting green agriculture initiatives. This study examines how Takaful could be fitted into the agricultural sector to curtail, or at least reduce, the financial risks faced by farmers for sustaining eco-friendly practices of farming. The findings reveal that the Takaful system can offer a viable alternative to conventional

insurance in terms of complying with the ethical values of the Muslim farmers and sustainable agricultural farming practices. Further, with proper support and policy framework, Takaful may act as a medium to further green agriculture, especially contributing towards environmental sustainability and economic resilience.

In Pakistan, farmer thinks if they use more inorganic pesticides and fertilizers on their farms, it will increase the production of yield and be more beneficial for crops and planting (Raheem, Rasul & Harun, 2020). This mindset or thinking style of farmers frequently uses inorganic fertilizers on land farms and ignores organic fertilizers. Siddique et al. (2014) ascertain that organic has many more advantages when compared to inorganic. The major advantage of organic farming is that it saves and preserves the environment, which is beneficial to agriculture and directly impacts human life and livestock. The other advantage of organic inputs increase in the quality of crops or goods output. According to Abdollahzadeh, Sharifzadeh and Damalas (2015), when the output or crops have high quality, it will increase their demand and farmers receive more money compared to inorganic agriculture.

Agriculture is a crucial sector in Pakistan, underpinning the economy and livelihoods of a significant portion of the population. Despite its importance, the sector faces numerous challenges, particularly in terms of insurance facilities. Conventional and Islamic banks, microfinance institutions, and government agencies have not provided adequate insurance services to support farmers, contributing to persistent poverty and sectoral weaknesses. This study proposes a Takaful framework to promote green (organic) agriculture, aiming to preserve the environment and support impoverished farmers.

1.1 Importance of the Study

The introduction of Takaful in the agricultural sector is vital for several reasons. Firstly, it is an insurance scheme that would go in tandem with the ethical and religious orientation of Muslim farmers and therefore would be more acceptable (Yusuf et al., 2022). According to Saleeh et al. (2023), encouraging green agriculture through Takaful can lead to sustainable farming practices for the environment and the public's health in the long term. Finally, Takaful for farmers can assist in enhancing the economic sustainability of farmers and further promote organic farming practices that will enhance productivity and resilience in the farm sector (Hussain et al., 2021).

This study is vital as it specifically links to the urge for a rigorous Takaful framework, made-to-measure for the agricultural sector in Pakistan. The study aims to provide much-needed financial protection and stability to farmers, who normally are left in a lurch due to the lack of appropriate insurance options, with special focus on green and organic farming. The research not only tends to support the agricultural sector—second to none in supporting the economy of Pakistan—but also benefits from environmental

sustainability. Further, it can set the stage for empowering farmers with Shariah-compliant financial tools toward creating a more resilient, prosperous, and green agricultural landscape in Pakistan.

1.2 Problem Statement

The agricultural sector in Pakistan suffers from inadequate insurance coverage, which exacerbates the vulnerability of farmers to various risks (Fahad & Wang, 2018). Conventional insurance products often do not meet the specific needs and ethical considerations of Muslim farmers. Consequently, the sector remains underinsured, limiting farmers' ability to invest in sustainable and environmentally friendly practices. There is a need for an appropriate Takaful framework that can address these issues and promote the concept of green agriculture.

1.3 Research Aim

This study aims to provide a suitable Takaful framework that helps to improve the green (or organic) agriculture concept in Pakistan and is ultimately useful to preserve the environment and support the poor farmers.

1.4 Research Objectives

The study addresses the following objectives:

- To provide a conceptual Takaful framework that helps to improve the (organic) or green agriculture in Pakistan.
- To focus on Islamic banks and microfinance institutions to enter in agriculture sector and provide Islamic insurance.

2 Literature Review

The literature on Takaful, particularly in its application to the agricultural sector, is both evolving and gaining significance as researchers and practitioners explore its potential to provide sustainable financial solutions that align with Islamic principles (Rehman et al., 2023). Takaful is based on the principles of cooperation, mutual responsibility, and ethical investments, and encompasses a new concept of Islamic insurance within which a distinct framework for managing farmers' risks in countries with Muslim majorities can be designed (Cahyandari et al., 2023). This is particularly important in view of the inadequacies of conventional products to meet the ethical and practical requirements of farmers following Islam because a high risk is often associated with weather variability, pests, and market fluctuations (Saleh, 2016).

One of the primary works from this area is that of Ahmed (2016), which focuses on Takaful in managing the peril of agriculture. The study drew the conclusion that there has to be an Islamic option available to conventional insurance during times of unpredictable situations. In this contention, several Islamic-based scholars argue that Takaful is a Shariah-compliant alternative in contract-friendly insurance that many Muslim farmers take away from due to its inhibitory elements of riba and gharar. It lays out the modification of Takaful structures, such as Mudarabah (profits-sharing) and Wakalah (agency) in devising insurance units that are not only Shariah-compliant but also suit the specific needs of the agricultural sector.

Elaborating further, Salman and Kawata (2020) provide general economic implications of Takaful in the context of agriculture. From their study, Takaful changes the level at which poor farmers access financial inclusion by providing affordable and available insurance services for everyone. It can stabilize farmers' income, build their confidence to invest in improved farming techniques, and reduce the economic impact of crop failure. The work also looks at the ability of Takaful and working hurdles to be able to operate in the rural domain; for instance, it includes adequate distribution channels, and finally, educating the farmer about the utility and its operations.

Sulaiman (2023) has researched the practical ability to integrate green agriculture initiatives with Takaful. The work accentuates the ecological and social advantages of resorting to Takaful with sustainable agricultural enterprises. They argue that Takaful can finance organic farming, conservation agriculture, and other eco-friendly farming methods by providing financial security against the inhospitable risks associated with these practices. Following up on such a premise, in this study, the researchers conducted semi-structured interviews with stakeholders, including farmers, policymakers, and Takaful providers, to assess the feasibility and impact of such integrations. This study found that farmers will certainly prefer such sustainable alternatives when they are provided with Takaful products that mitigate the risk of less financial loss while fostering environmental protection and agricultural productivity.

Furthermore, a comparative study of conventional insurance and Takaful in their applications regarding agriculture based on their benefits and salient weaknesses was carried out by Obaidullah (2015). The study found that traditional insurance companies have largely failed to penetrate the masses of Muslim farmers because their system was not accommodating to the religious values of the people who wish for an alternative. The study therefore observes that Takaful's mutual sharing of risks resonates well with the social and mutual structure of rural farming communities, bringing a sense of regard and shared accountability. However, it also identified the barriers to the growth of its operations among other problems encountered in scaling, such as regulatory

impediments, the need for Shariah-compliant investment, and the devising of practical actuarial models aiming at agricultural risks.

In addition to empirical studies, theoretical research has derived implications that are highly effective in formulating the role that Takaful can play in agriculture. Iqbal and Molyneux (2005) study the underlying principles of Islamic finance theory and its application to other industries, including agriculture. They state the principles of risk-sharing and ethical investment as the basis of Takaful, making it most suitable in sectors such as agriculture, which are in their very nature risky and ethically bound for the management of resources. Their work covers a comprehensive framework under which Takaful can be designed to support sustainable agricultural development, including the use of Islamic instruments of finance like Sukuk to finance large-scale agricultural projects.

More recently, research has started investigating technological innovations to improve the implementation of Takaful in agriculture. For example, Abd Rahman and Bakar (2019) point to the role of fintech in improving the operations of Takaful. They claim that the digital platforms can offer so much to simplify the distribution of Takaful products, increase their transparency, and hence reduce operational costs. For example, blockchain enhances trust and efficiency in Takaful transactions by implementing immutable records of all contributions and claims. Such technological integration becomes more significant in reaching the border farming communities that are underserved.

Hasim (2014) presents that Takaful can help in social poverty alleviation and social development. Takaful can enable farmers to invest in productivity-enhancing technologies and practices by providing them access to protective finance and credit. This, in turn, can lead to higher incomes, improved livelihoods, and greater food security. Another aspect that the study brings out is the role Takaful plays in developing social cohesion and trust among farming communities, given that the mutual nature of Takaful fits the cooperative ethos of most rural societies.

Ahmed (2019) examined the integration of Takaful with national agricultural policies to attain sustainable development goals. The authors argue that governments can play a major role in significantly encouraging the rise of Takaful through regulatory support, subsidies, and public awareness campaigns. The other proposal, which too has some potential, is the use of public-private partnerships directed at optimally using and exploiting the unique advantages of both the public and private sectors, thus enabling Takaful to expand into the agricultural domain.

2.1 Research Gap

The literature on Takaful and its applications in agriculture is relatively limited but growing. Studies have highlighted the potential of Takaful to provide ethical and Shari'ah-compliant insurance solutions for Muslim farmers. For instance, Ahmed (2019) found that Takaful could offer significant benefits in mitigating agricultural risks and supporting farmers' livelihoods. Additionally, research by Khan and Bashir (2018) suggested that Takaful could enhance farmers' financial inclusion and resilience. However, there is a gap in the literature regarding the specific application of Takaful in promoting green agriculture, particularly in the context of Pakistan.

3 Research Methodology

This is a qualitative research-based approach that drew upon the available empirical study findings and semi-structured interviews to derive the result of the present research. The interviews comprised 15 farmers from the districts of Pakpattan and Vehari in the Punjab province of Pakistan, with a holding of at least 5 acres under cultivation of crops. The qualitative data from the interviews explains the opinion of these farmers regarding Takaful and organic agriculture and the issues related to its implementation.

4 Findings and Discussion

Takaful is derived from the root Arabic word "Kafalah" which means "to guarantee each other" in respect (Habib & Shaukat, 2016). It is an Islamic insurance concept grounded on cooperation, whereby members pool money and contribute money that is held to offer a guarantee to each other and share in protecting people against loss or damage. On the other hand, the Mudarabah model is a profit-sharing partnership between the capital provider (Rab al-Mal) and the entrepreneur (Mudarib). Under this structure, the Takaful company is the Mudarib that invests in the funds contributed by the participants, who are the providers of capital.

The flowchart of a Takaful framework, using the Mudarabah structure for the delivery of farming contracts, elucidates a Shariah-compliant insurance model of supporting the farmers committed to using organic fertilizers and chemicals that are not harmful to the sustainability of life in society. This approach is geared towards improving the quality of agricultural products that are not in any way harmful to the environment. The system involves the already existing Mudarabah model that has already been introduced to the agricultural sectors in the likes of Brunei and Indonesia.

The framework suggests that farmers interested in the Takaful scheme contribute periodic instalments to the Takaful fund. These contributions are divided into two accounts: (a) Deposit Account (A/C), which holds the portion of the contribution that is invested to generate returns, and (b) Tabarru’ Account (A/C), which holds the donation

portion, which is used to support participants who suffer losses. The combined contributions from all participating farmers create the Total Fund Pool, which is managed by the Takaful company. The Takaful company, acting as the Mudarib, invests the funds in various Shari'ah-compliant ventures. The investment returns are then shared between the Takaful company and the participants based on a pre-agreed profit-sharing ratio (e.g., 70:30). Hence, the profit generated from investments is credited to the Deposit Account of the participants, while the Tabarru' fund is used to cover the losses of the participants. In the event of a loss, participants can claim compensation from this account. Further, a portion of the investment returns is allocated to cover the operational costs of the Takaful company.

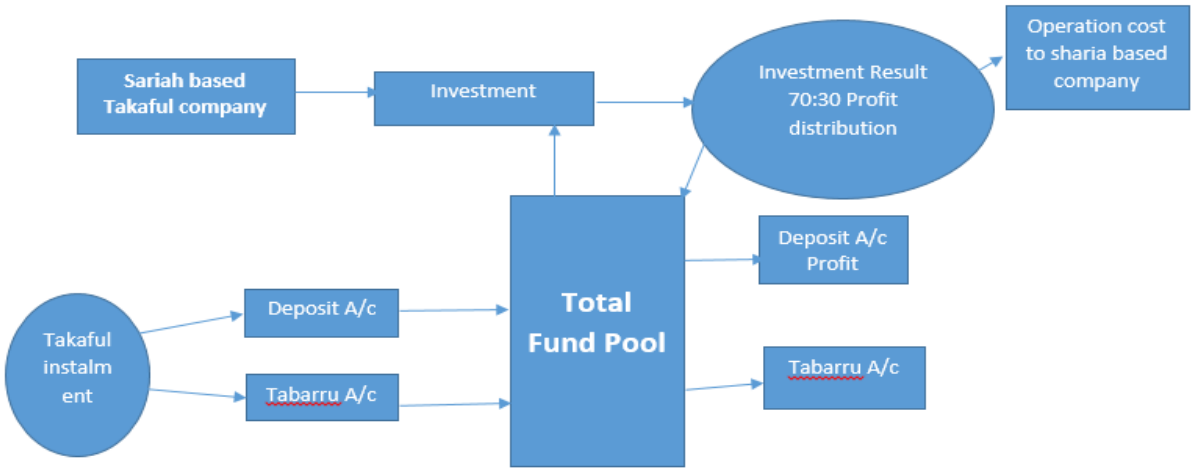

Fig 1. Takaful Framework using Mudarabah in Green Agriculture

Undoubtedly, the application of the Mudarabah model in Takaful for green agriculture has also generated very promising results in countries such as Brunei and Indonesia (Abd Rahman, Md Zabri & Ali, 2022). For instance, Brunei has a quite well-established Takaful industry that previously integrated the principles of Mudarabah. According to Ariffin, Ahmed and Jalil (2024), the implementation of Takaful in Brunei's agricultural sector has led to increased adoption of organic farming practices. The farmers have, in general, reported increased yields and quality, leading to improved incomes and livelihoods. Takaful's mutual support system has also afforded farmers greater financial stability by reducing the need to purchase expensive loans from conventional lending systems.

According to Nugraheni and Muhammad (2020), Takaful is applied to a great extent to support the agricultural sector in Indonesia. The use of the Mudarabah model in Takaful has encouraged more farmers to increase their investment in better farming practices. Because of the profit-sharing nature of this model, there is an interest alignment between the Takaful company and the participants, promoting transparency and trust. It found

that farmers under Takaful schemes were more resilient to financial shocks caused by natural disasters, pests, and market fluctuations.

The adoption of Takaful in green agriculture has benefits not only for the farmers but also for the environment and society (Sulaiman, Bunu & Alkassim, 2023). Organic farming practices reduce the use of harmful chemicals and thus contribute to sustaining good soil health and biodiversity. Besides, organic fertilizers reduce the emission of greenhouse gases. According to Gomiero, Pimentel and Paoletti (2011), the wider community of those areas where high adoption of organic farming is practised demonstrated improved air and water quality. Takaful also provides small and marginal farmers with integrated financial coverage, which usually remains beyond the reach of conventional insurance products (Ahmed, 2016). Through this scheme, farmers pool their resources to share the risks.

Although the framework of Takaful using Mudarabah in green agriculture turns out to be very positive, there are still problems that must be addressed. In the first place, farmers ought to be educated on the benefits and details of Takaful, so more people participate. In the second place, the government has to provide a supportable and conducive regulatory environment that drives the growth of Takaful in the agricultural sector. The Takaful firms should, lastly, innovate products to suit farmers' needs. There exist several other opportunities for further growth, basically through the use of technology to make Takaful services more efficient and accessible. Mobile applications and digital platforms could simplify the process of contribution and claims from the Takaful fund, increasing its convenience for farmers.

5 Conclusion

The implementation of a suitable Takaful framework could play a crucial role in transforming Pakistan's agriculture into a more resilient and environmentally friendly sector. The study underscores the potential of Takaful to support the adoption of green agriculture in Pakistan. Takaful can offer farmers financial protection and incentives to invest in sustainable farming practices by providing Shariah-compliant insurance. The findings indicate that farmers in Pakpattan and Vehari are keen to avail themselves of Takaful facilities and are open to adopting organic farming methods. The respondents expressed satisfaction with the idea of having an Islamic insurance option that supports their agricultural activities. However, several challenges were identified, including the need for machinery to produce organic fertilizer, affordable water sources, readily available organic fertilizers, and educational programs to enhance their understanding and skills in organic farming. These barriers must be addressed to make the transition to green agriculture viable. While the study's findings are promising, they are limited to two districts in Punjab, suggesting the need for broader research to generalize the results. The study's implications are significant for Takaful companies, policymakers, and academics,

as they highlight the need for targeted strategies to develop the agricultural sector and promote environmental sustainability.

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Can Islamic Financing Ease in Monetary Policy Uncertainty – A Proposal for Islamic Monetary Policy

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ABSTRACT

Purpose: The impact of monetary policy uncertainty in Pakistan on economic conditions, financial markets, and investor confidence is substantial. Historically, the conventional monetary system has failed to manage inflation, which has led to an uncertain monetary policy environment. The primary objective of this document is to offer a comprehensive analysis of monetary policy uncertainty determinants using the quadratic function of Islamic financing.

Methods: The bound-testing ARDL assessment confirmed a U-shaped effect of overall producer and consumer financing on uncertainty.

Findings: The results highlight that Islamic financing management can help reduce monetary policy uncertainty, while increasing production can assist in exacting gains from Islamic financial development for monetary policy effectiveness.

Originality/Value: This study is instrumental in highlighting the ability of the Islamic financial system to reduce monetary policy uncertainty.

Keywords: Equity Financing; Inflation targeting policy; Islamic financial development

JEL Classification: E52, G21

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1. Introduction

Monetary policy uncertainty pertains to the extent of unpredictability and lack of clarity surrounding the future actions undertaken by central banks or monetary authorities in relation to various elements of monetary policy, such as interest rates, money supply, and the implementation of other monetary tools (Bouri et al., 2020). It stems from the uncertainty that envelops the decision-making process and subsequently influences economic conditions, financial markets, and investor sentiments. The level of monetary policy uncertainty exhibits fluctuations driven by diverse factors, including economic conditions, political dynamics, global events, and the overall effectiveness and communication of policy measures (Fernandez et al., 2015). Essentially, it denotes the inherent ambiguity and unpredictability inherent in monetary policy's future actions and outcomes, leading to heightened uncertainty among market participants and economic actors (Bloom et al., 2014).

Pakistan holds a prominent position as a significant emerging economy, making it crucial to examine the role of uncertainty within its economic landscape. The country's history of receiving 22 International Monetary Fund (IMF) bailouts and its relatively low credit-to-GDP ratios in South Asia highlight the importance of understanding and addressing Uncertainty (Choudhary et al., 2020). In the research conducted by Bloom et al. (2014), the authors emphasize the relevance of monetary policy uncertainty (MPU) specifically for emerging economies like Pakistan. They argue that such economies often exhibit distinct characteristics, including non-diversified sectors, volatile goods prices, and political instability, all salient features observed in Pakistan's economic environment. Pakistan's economy heavily relies on a limited range of sectors, rendering it vulnerable to external shocks and fluctuations in global market conditions. This lack of diversification amplifies the country's exposure to uncertainty, as any disruptions or uncertainties in key sectors can have profound repercussions on its overall economic performance. Additionally, Pakistan faces challenges in managing goods prices, influenced by global commodity price volatility and domestic supply-demand dynamics. Fluctuations in the prices of vital commodities, such as oil, agricultural products, and raw materials, contribute to economic uncertainty, impacting investment decisions, business planning, and overall economic Stability (Choudhary et al., 2020).

In times of increased uncertainty, households often adopt a more cautious approach by curbing their discretionary spending. This response arises from a genuine concern to protect their financial security in light of unpredictable economic circumstances that lie ahead. Factors such as uncertain employment prospects, volatile income stability, or an ambiguous economic outlook contribute to a sense of unease among households, prompting them to exercise prudence by reducing their expenditures on non-essential items and services (Fernandez et al., 2015).

Political instability is another significant factor contributing to economic uncertainty in Pakistan. The country has witnessed political turmoil and transitions, which can disrupt policy continuity, implementation, and decision-making processes. The uncertainty arising from political factors impedes long-term planning, investment, and sustainable economic growth. By recognizing the specific characteristics of Pakistan's economy and its exposure to uncertainties associated with non-diversified sectors, volatile goods prices, and political instability, policymakers and researchers can gain deeper insights into the challenges and develop appropriate strategies to address economic policy uncertainty. The study by Bloom et al. (2014) offers valuable insights into the implications of Uncertainty for Pakistan's emerging economy, facilitating well-informed policies to promote stability and sustainable growth.

From a time-series perspective, Gulen and Ion (2016) provide insights into how policy uncertainty influences investment decisions. According to them, the effects of policy uncertainty on investment extend up to eight quarters into the future. Notably, their examination shows a gradual intensification of the adverse effect within the first four to five quarters. Nevertheless, the impact gradually wanes as time progresses and eventually turns positive at longer intervals. This observed pattern implies that businesses augment their investments to meet pent-up demand once uncertainty is resolved. The findings of their study emphasize the substantial duration of the rebound process, spanning a period of two to three years, which indicates the time required for the economy to fully recover from the negative consequences of policy uncertainty. Their research highlights the importance of these findings in gaining insights into investment behavior dynamics and comprehending the impact of policy uncertainty on economic outcomes.

1.1. Islamic monetary policy and stability

Islamic finance exhibits promising prospects in several key aspects. Firstly, it can potentially enhance financial inclusion, particularly among underserved Muslim communities. Secondly, its focus on asset-backed financing and risk-sharing mechanisms makes it a suitable avenue for supporting SMEs and facilitating investment in public infrastructure projects. Lastly, due to its risk-sharing nature and prohibition of speculative practices, Islamic finance may inherently present a lower systemic risk level than conventional finance. These dimensions make Islamic finance a compelling and potentially beneficial addition to the global financial landscape (Yasmin & Ayaz., 2023).

Inappropriate monetary policies can lead to economic instability and crises, both domestically and globally. It is crucial for policymakers to carefully assess the prevailing economic conditions and implement suitable monetary measures to address challenges. The impact of monetary policy on economic stability is significant, and effective policy responses are necessary to mitigate risks and promote sustainable growth. Monetary

policy is crucial in maintaining economic stability and promoting growth in conventional and Islamic economies.

In the context of Islamic economics, monetary policy has been a significant policy since the inception of Islam. The foundations of Islamic monetary policy can be traced back to the time of the Prophet Muhammad (peace be upon him) and the early days of Islam. One notable aspect of Islamic monetary policy is the use of specific currencies, such as the Dinar and Dirham, which were established as a medium of exchange during the early Islamic period. Adopting these currencies helped facilitate trade and economic activities within the Muslim community (Zalloom, 1988). Furthermore, an essential component of Islamic monetary policy is the prohibition of usury, known as riba, in both sale and lending transactions. This prohibition is a fundamental principle in Islamic finance and serves as a key aspect of monetary policy in Islamic economics. The aim is to prevent exploitative practices and ensure fairness in financial transactions. Due to the prevalence of riba in traditional monetary instruments, it holds great significance for Islamic economists to actively pursue the development and innovation of new monetary instruments that adhere to Shari'ah law (Bidabad et al., 2011). By adhering to the principles of Islamic monetary policy, Islamic economies strive to create an environment that promotes economic stability, social justice, and ethical conduct in financial matters.

The objective of the study is to explore the role of Islamic consumer and producer financing types as a proposed monetary policy instrument and explore its nonlinear role in determining the monetary policy uncertainty in the case of Pakistan. This study anticipates that an increase in Islamic financing substitutes the fiat currency-based usurious monetary expansion, which has been deemed more effective in controlling inflation in the economy.

Following the introduction, this study delves into the literature exploring the links between conventional lending and monetary policy effectiveness. Section 3 explores the methods pertaining to the set objectives, followed by section 4 of results and discussions. In the last section, the study's conclusion is provided with policy implications.

2. Literature review

The concept of uncertainty holds significant importance in economic literature, with its origins traced back to the works of Keynes (1921) and Knight (1921). These scholars distinguished uncertainty from insurable risk and emphasized its impact on economic outcomes. According to Keynes and Knight, the presence of uncertainty about the future leads to underemployment as economic agents hesitate to commit their irreversible resources.

Bernanke (1983) made a noteworthy contribution by documenting the adverse relationship between uncertainty and investment and employment decisions. His research highlighted that heightened uncertainty tends to deter investment and hiring activities in the economy. This finding aligns with the argument put forth by Keynes (1921) and Knight (1921) regarding the inhibitory effects of uncertainty.

According to Rodrik (1991), in the realm of economic policy uncertainty, implementing reforms in developing countries can prompt a postponement of investment decisions. This delay arises from the reluctance of investors to commit their resources until the uncertainties surrounding the reform's efficacy and ultimate outcomes are resolved. Uncertainty regarding the success and sustainability of the reform measures leads investors to adopt a cautious stance, temporarily suspending their investment activities. Hassett and Metcalf (1999) examined the adverse effects of uncertainty in areas such as monetary policy, fiscal policy, and regulatory policy. Their studies highlight how uncertainty in these policy domains can disrupt economic stability, impede business planning and investment, and hinder economic growth.

Byrne and Davis (2004) contribute to the literature by providing empirical evidence on the impact of uncertainty, suggesting that uncertainty can influence non-residential fixed investment in the United States through a monetary policy mechanism. Specifically, they observe that the temporary component of inflation uncertainty has a more pronounced negative impact on investment compared to the permanent component. Sim et al. (2011) shed light on the relationship between policy uncertainty and its economic impact. Their research reveals that policy uncertainty contributes to an increase in the cost of finance, which subsequently deters firms from making investment decisions. Pastor and Veronesi (2012) state that policy uncertainty raises the cost of finance, reduces investment, and exacerbates economic downturns, highlighting the negative consequences of uncertainty on investment decisions and their broader implications for the overall economy. Mumtaz and Zanetti (2013) investigate the impact of monetary policy volatility using a structural vector autoregression (SVAR) model with stochastic volatility. Their analysis reveals that increased volatility in monetary policy leads to a decline in the nominal interest rate, output growth, and inflation. They also develop a dynamic stochastic general equilibrium (DSGE) model with stochastic volatility to provide a theoretical basis for these findings. The study highlights the adverse effects of uncertainty in monetary policy on key macroeconomic variables.

Fernandez et al. (2015) highlight a tangible manifestation of the detrimental impact of uncertainty through their examination of precautionary spending cutbacks by households. In times of heightened uncertainty, households tend to exercise caution and reduce their discretionary spending, thereby dampening economic activity. This empirical observation emphasizes the direct link between uncertainty and the cautious

financial behavior of households, contributing to a broader economic slowdown. Moreover, the repercussions of uncertainty extend beyond individual households and permeate various policy domains, leading to adverse economic consequences. Uncertainty can impede effective decision-making processes in areas such as monetary policy, fiscal policy, and regulatory frameworks. The resulting ambiguity and unpredictability hinder policy formulation and implementation, leading to inefficiencies and suboptimal outcomes. Therefore, acknowledging and effectively addressing uncertainty is crucial for fostering stability, enhancing economic performance, and enabling sustainable growth across these policy domains.

Utilizing a comprehensive dataset of U.S. companies, Gulen and Ion (2016) employ various econometric methods to analyze the effects of policy uncertainty on investment levels. Their findings reveal a negative association between higher policy uncertainty and corporate investment, indicating that increased uncertainty leads to reduced business investment. This underscores the significance of policy stability and predictability for firms, as uncertainty can hinder investment decisions and delay capital expenditures.

Literature on uncertainty dates back to the ground-breaking contributions of Keynes (1921) and Knight (1921) and highlights its profound influence on economic outcomes. Subsequent research by scholars such as Bernanke (1983), Fernandez et al. (2015), and Hassett and Metcalf (1999) has further expanded the understanding of the detrimental effects of uncertainty on various economic agents and policy domains. These studies, conducted in different years, have investigated the intricate relationship between uncertainty and key economic variables, shedding light on how uncertainty shapes economic behavior and influences policy decisions.

Several factors determine the monetary policy uncertainty in which transparency and credibility of the banks are most prominent (Amisano & Tristani, 2019). The prevalent inflation expectations and interest rates contribute to monetary policy uncertainty (Cascaldi-Garcia et al., 2023; Stulz, 1986). Under the current conventional banking system, there is a trade-off between inflation management and financial stability whereby inflation-deterring monetary policy may destabilize financial markets (Brunnermeier, 2023; Borio & Hofmann, 2017). Correspondingly, Islamic banks are resilient during financial crises (Farooq & Zaheer, 2015). The non-reliance on interest rates in the monetary policy transmission in Islamic banking makes it a better option for creating real change (Zaheer et al., 2013; Ogiji, 2023). Islamic banking can ensure low inflation and rule-based monetary policy, as evidenced in Muslim countries (Hossain, 2015), ensuring financial stability in a 10-country comparison having dual banking (Ibrahim & Rizvi, 2018).

A study by Gheeraert and Weill (2015) on 70 countries between 2000 and 2005 showed that Islamic financing follows an inverted U-shaped effect on macroeconomic efficiency.

Managing credit supply from Islamic banks can help improve the effectiveness of monetary policy in Malaysia (Rashid et al., 2020). Because of its specific characteristics, the expansion of Islamic financing in Pakistan may impact monetary policy uncertainty. Islamic finance's prohibition on interest and emphasis on stability may limit speculative behavior, boosting economic stability and predictability. However, the unique interest rate dynamics, altered policy transmission mechanisms, liquidity management challenges, and the need for regulatory adjustments may complicate monetary policy decision-making and implementation, potentially increasing uncertainty about the effectiveness of policy tools and market reactions to changes in interest rates and regulations (Bouri et al., 2020).

The capital provided by Islamic banks to producers can impact uncertain monetary policies. Islamic banks follow different rules than their conventional counterparts, focusing on risk sharing and ethics (Abduh et al., 2012). This may help stabilize the economy but also complicate how the government governs liquidity. Because Islamic banks function in distinct ways, it may affect how interest rates and policies operate, making forecasting how the economy will react more challenging (Chandio et al., 2016). As a result, while Islamic banking contributes to stability, it may also pose new challenges to how the government implements policies (Yasmin et al., 2022). Through its unique characteristics, Islamic banks' financing to consumers and households is funded on moral precepts that might influence the unpredictability of monetary policy. The absence of interest in Islamic banking may make it more difficult to forecast how changes in interest rates affect consumer borrowing and spending habits, even though this practice promotes financial stability by preventing risky borrowing and prioritizing justice (Manzoor & Arshed, 2021). Due to this uniqueness, policymakers may struggle to manage the economy and control inflation if interest rate-based monetary policy measures are ineffective. The requirement for specialized regulatory strategies for Islamic financial products may also add complexity and uncertainty to how these products interact with more general economic policies, potentially influencing the nature of the monetary policy uncertainty.

While discussing the control variables, the exchange rate significantly impacts monetary policy uncertainty because it’s linked to economic dynamics and policy choices. Its impact is manifested through import-export dynamics, in which currency depreciation may boost exports (Nino et al., 2011) while intensifying inflation concerns, necessitating a complex trade-off. Furthermore, fluctuating exchange rates directly impact inflation control since changes in import costs need interest rate changes, but the magnitude of these shifts is unpredictable due to factors such as exchange rate pass-through. The sensitivity of capital flows to exchange rates adds complexity since it necessitates policy responses that balance domestic goals with external impacts (Habib et al., 2017). Similarly, uncertainty regarding economic stability, growth prospects, and inflation

pressures can be transmitted through fluctuations in industrial output, complicating policymakers' decisions. The delayed impact of policy actions on production and the implications on foreign investment and employment complicate policy development. The transition from agricultural to industrial economies raises concerns about labor-market adaptations and resource allocation (Yasmin et al., 2022). Overall, the diverse impact of industrial production heightens monetary policy uncertainty as policymakers attempt to balance economic forces for stability and growth. Moreover, Shaheen et al. (2022) investigated the impact of equity-based and debt-based financing of Islamic banks on economic stability in twelve Islamic countries from 2014Q1 to 2019Q4. They have applied the GARCH volatility approach and a nonlinear ARDL model for statistical analysis. Empirical findings demonstrate an inverted U-shaped outcome between equity-based financing and output instability, whereas both types of financing have little impact on price volatility. As per the above literature review, these insights can be useful for regulators and policymakers looking to optimize Islamic financing techniques for specific economic stability goals.

Our research proposes that expanding Islamic financing could serve as a potential solution to reduce policy uncertainty. This is primarily due to the distinctive nature of asset-based contracts utilized in Islamic finance, prioritizing achieving predefined objectives rather than relying on interest-based and speculative instruments commonly found in conventional banking. By adopting a more transparent and ethical approach, Islamic financing aims to address the uncertainty associated with traditional banking practices, fostering greater stability and trust within the financial system.

3. Methods

Aligned with the set objectives, we further establish the framework of the study, and in this section, the relevant information is discussed.

3.1. Variables and Data Sources

This study explores the quadratic impact of Islamic financing on monetary policy uncertainty in Pakistan. In this context, a set of six variables has been utilized. It considers monetary policy uncertainty as a dependent variable, whereas overall Islamic financing, Islamic producer financing, Islamic consumer financing, exchange rate, and industrial production index is taken as independent variables in the study. Data from 2010Q4 to 2022Q3 is collected from reliable sources, including Policyuncertainty.com, the State Bank of Pakistan's Islamic banking quarterly bulletins, and international finance statistics presented below. All financial variables were logarithmically transformed for analysis.

Monetary policy uncertainty (MPU) index: This index is a tool used to assess the unpredictability of choices made on economic policy in a certain country. This EPU index

attempts to capture the ambiguity around economic policies, regulations, and governmental initiatives and the potential implications on many aspects of the economy. These include things like consumer spending, investments, and the overall soundness of the economy (Husted et al., 2017). This data is taken from policyuncertainty.com.

Overall Islamic Financing (IFIN): Sum of Shari'ah-compliant financing arrangements conducted by the Islamic financial system in Pakistan. The data is acquired from the Islamic Banking Bulletin – State Bank of Pakistan.

Islamic Producer Financing (IPF): Sum of Shari'ah-compliance financing to producers by the Islamic financial system in Pakistan. The data is acquired from the Islamic Banking Bulletin – State Bank of Pakistan.

Islamic Consumer Financing (ICF): Sum of Shari'ah-compliance financing to consumers by the Islamic financial system in Pakistan. The data is acquired from the Islamic Banking Bulletin – State Bank of Pakistan.

Exchange Rate (ER): End of time period value of rupees per dollar. This data is acquired from International Financial Statistics.

Industrial Production Index (IPI): Index of industrial production in the country. This data is acquired from International Financial Statistics.

Structural Break: An unknown break in the time series is calculated using Bai and Perron (2003) in order to stabilize the equation.

Following are the parameterized equations used to analyze determinants of monetary policy uncertainty in the context of Islamic financing. Equations 1, 2, and 3 use the quadratic function of overall financing, producer financing, and consumer financing. The quadratic function of financing is used in expectation that, since Islamic financing is risk-sharing and asset performance-based, over-extension of this form of money may have diminishing returns. Kalim and Arshed (2018) showed a nonlinear effect of Mudarabah financing on bank efficiency in the case of 53 Islamic banks globally. Manzoor and Arshed (2021) confirmed in the case of Pakistan that consumer and producer financing has a nonlinear effect on inflation. Lastly, a study by Sohail and Arshed (2022) confirmed the case of 16 countries that Islamic debt-based financing has a nonlinear moderating effect on the financial development-entrepreneurship relationship.

$$MPU_t = \alpha_0 + \alpha_1 IFIN_t + \alpha_2 IFIN_t^2 + \alpha_3 ER_t + \alpha_4 IPI_t + \alpha_5 Dum_t + \varepsilon_t \quad (1)$$

$$MPU_t = \alpha_0 + \alpha_1 IPF_t + \alpha_2 IPF_t^2 + \alpha_3 ER_t + \alpha_4 IPI_t + \alpha_5 Dum_t + \varepsilon_t \quad (2)$$

$$MPU_t = \alpha_0 + \alpha_1 ICF_t + \alpha_2 ICF_t^2 + \alpha_3 ER_t + \alpha_4 IPI_t + \alpha_5 Dum_t + \varepsilon_t \quad (3)$$

In order to model monetary policy uncertainty within the context of Islamic decomposed financing stationarity, ADF and KPSS tests are evaluated. Moreover, the widely adopted approach of ARDL bounds testing approach by Pesaran et al. (2001) is employed to uncover both short-run and long-run nonlinear associations among the selected variables. CUSUM and CUSUM Square tests, as recommended by Pesaran et al. (2001) carried out to ensure the statistical stability of the selected models of the study.

4. Results and Discussions

Figure 1 compares the time evolution of overall Islamic financing and monetary policy uncertainty. Here it can be seen that there is a mixed association between them, whereby it was negative till 2015 while having a positive association in 2021. Figure 2 compares the time evolution of Islamic producer financing and monetary policy uncertainty. Here it can be seen that there is a mixed association between them, whereby it was negative till 2015 while having a positive association beyond it.

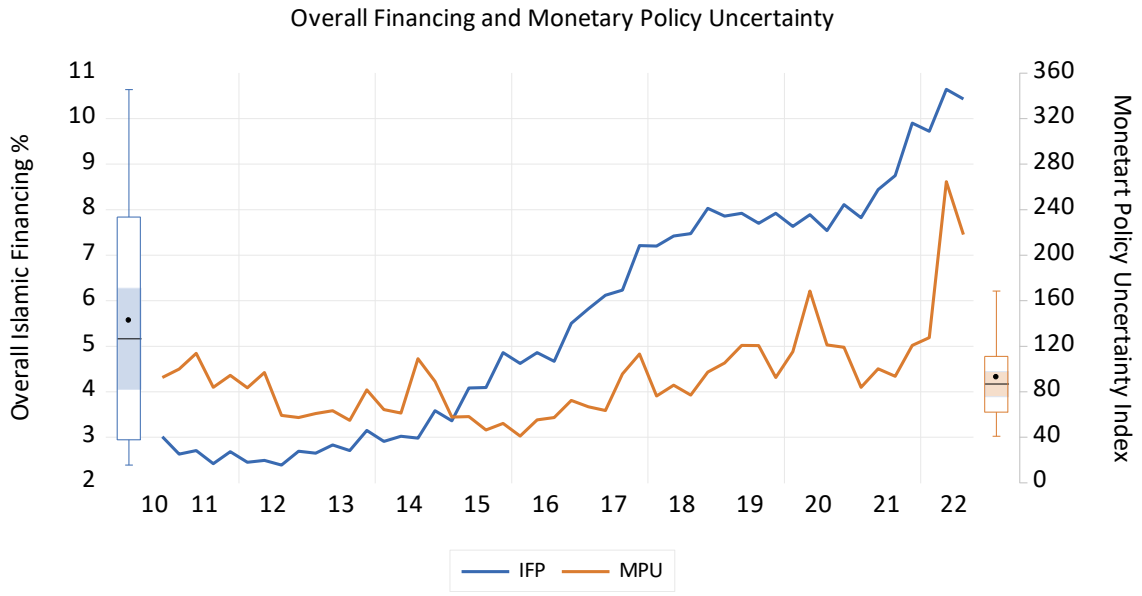

Figure 1 – Line chart of overall financing and monetary policy uncertainty

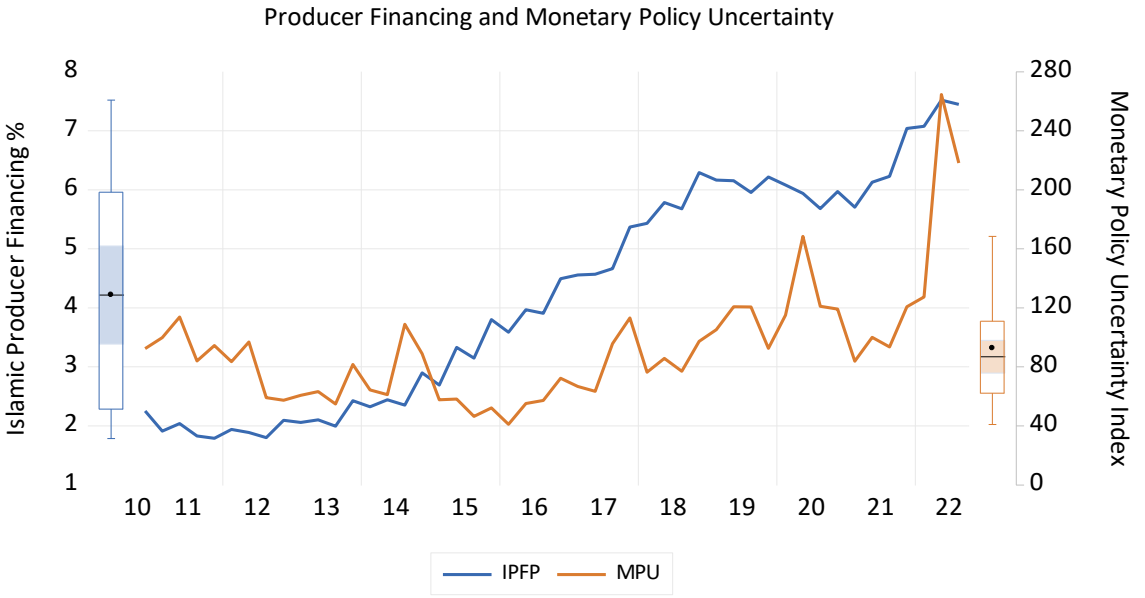

Figure 2– Line chart of producer financing and monetary policy uncertainty

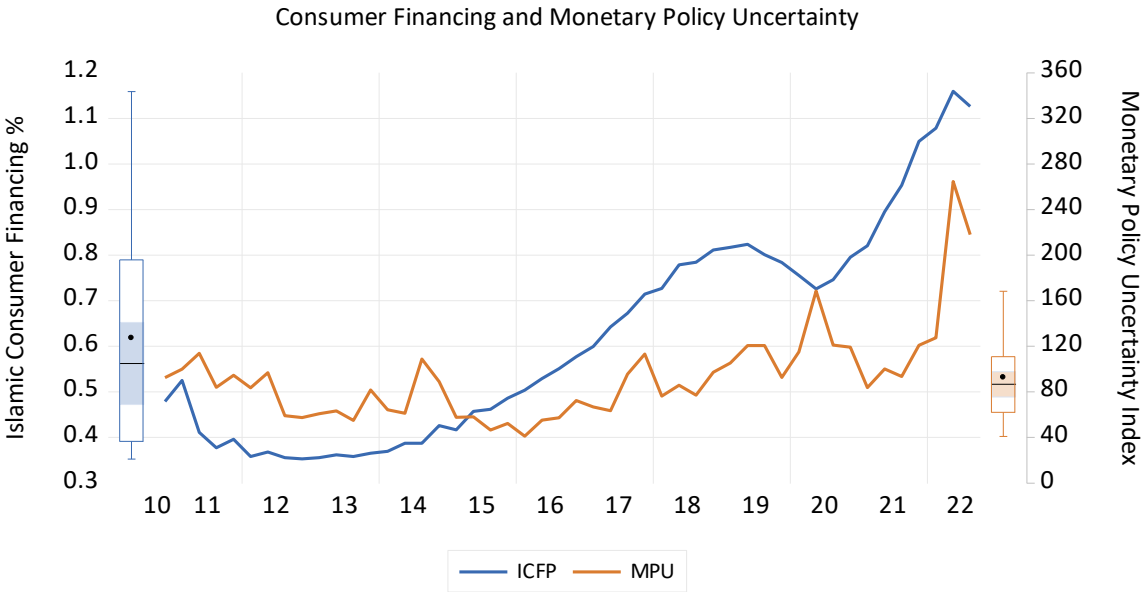

Figure 3– Line chart of consumer financing and monetary policy uncertainty

Figure 3 compares the time evolution of Islamic consumer financing and monetary policy uncertainty. Here it can be seen that there is a mixed association between them, which seems to have a positive association.

Table 1 reports the Bai and Perron (2003) test for determining unknown structural breaks. It is shown that there is only one break in the data in 2019Q1. Using this information, the structural break dummy variable has been constituted and used in the model as an exogenous variable. The ARDL bounds test is conducted on the specification

in equations 1, 2, and 3. Table 2 shows that the test values are higher than critical values at 1%, confirming a long-run relation in the mixed order of integration variables.

Table 1 – Structural Break Determination

Bai-Perron Tests for Structural Breaks

Break test	**F Statistic**	**Critical Value**
0 vs 1	31.69	8.58
1 vs 2	3.57	10.13
Break Dates	Sequential	Repartition
1	2019Q1	2019Q1

Table 2 – Bounds test for cointegration

F bounds Test

Test	**IFIN Model**		**IPF model**		**ICF model**	
F Statistic	5.596		8.572		10.831	
Significance value	I(1) 10%	3.09	I(1) 2.5%	3.87		
	I(1) 5%	3.49	I(1) 1.%	4.37		

Table 3 – Long run relation

Long Run Effects

	IFIN Model	**IPF Model**	**ICF Model**
Variable	**Coef. (Prob)**	**Coef. (Prob)**	**Coef. (Prob)**
IFIN	-42.665 (0.003)		
$IFIN^2$	5.042 (0.004)		
IPF		-65.052 (0.085)	
IPF^2		9.793 (0.088)	
ICF			-248.92 (0.119)
ICF^2			337.72 (0.034)
IPI	-0.704 (0.105)	-3.211 (0.034)	-6.601 (0.011)
ER	0.336 (0.606)	1.560 (0.034)	2.552 (0.016)
C	197.607 (0.034)	369.436 (0.008)	566.761 (0.011)

Since the variables are cointegrated, table 3 reports the long-run relationship. In the three models, the intercept is positive, showing that generally, EPU tends to increase, which validates the selection of variables in the model in anticipation of reducing EPU where no further possibility of EPU is left.

While comparing the controlling variables, a 1% increase in IPI, there is a fall in MPU at 0.7%, 3.21%, and 6.60% in the overall financing, producer financing, and consumer financing models, respectively. This shows that if there is an increase in production, generally, there is an increase in consistency in monetary policy, especially in the consumer financing model where the financing by the banks promotes consumption for the produced goods. Our findings are aligned with Manzoor and Arshed (2021), explaining that consumer financing options like lease financing, credit cards, and overdraft facilities contribute towards more spending and demand for goods and services.

For the exchange rate, a 1% depreciation leads to an increase in EPU by 0.336%, 1.56%, and 2.552% in overall producer and consumer financing models, respectively. This higher intensity in the consumer financing model is logical, whereby consumers are being promoted to consume and buy at higher exchange rates increasing the demand for foreign currency (Manzoor & Arshed, 2021) and weakening the domestic currency and efficiency of monetary policy. These findings align with the work of Di Nino et al. (2011), indicating that currency depreciation has certainly boosted the country's exports, particularly in high-productivity sectors such as manufacturing.

While discussing the effect of overall financing, the effect of IFIN is -42.665, while the effect of $IFIN^2$ is 5.04, which depicts a U-shaped relation as shown in Figure 4. This concludes that up to a certain level of Islamic producer financing, it has a certainty promoting effect on monetary policy, but beyond it will increase uncertainty. Our findings concur with those of Yasmin et al. (2022), who also contend that the impact would turn negative after reaching a certain point.

While discussing the effect of producer financing, the effect of IPF is -65.05, while the effect of IPF^2 is 9.79, which depicts a U-shaped relation, as shown in Figure 5. This concludes that up to a certain level of Islamic financing, it has a certain promoting effect on monetary policy, but beyond that, it will increase uncertainty. Arcand et al. (2015) also depict the same thing: the effect of financing might be negative.

While discussing the effect of producer financing, the effect of ICF is -248.9 while the effect of ICF^2 is 337.72, which depicts a U-shaped relation as shown in Figure 6. This concludes that up to a certain level of Islamic financing, it has a certain promoting effect on monetary policy, but beyond that, it will increase uncertainty. These outcomes are aligned with the findings of Yasmin and Ayaz (2023).

Observing the short-run estimates in Table 4 shows that the selected variables can explain MPU by 67%, 84%, and 84% in overall producer and consumer financing models,

respectively. Further, the counter (-1) is negative and significant in all models, showing convergence in all models.

These results depict that monetary policy can improve its effectiveness by optimizing the financing levels at the current level of Islamic financing in Pakistan. Though this model adds an upper limit to financing to reduce uncertainty, this also points towards increasing IPI to accommodate a higher level of Islamic financing.

Table 5 provides the regression diagnostics. Here, we can see that other than the RESET test in the overall financing model, all other statistics support the validity of the model at a 5% level. The CUSUM and CUSUMsq charts are showing the mean and variance of the model are stable in response to structural changes.

Figure 4 – Quadratic effect of Islamic financing on MPU

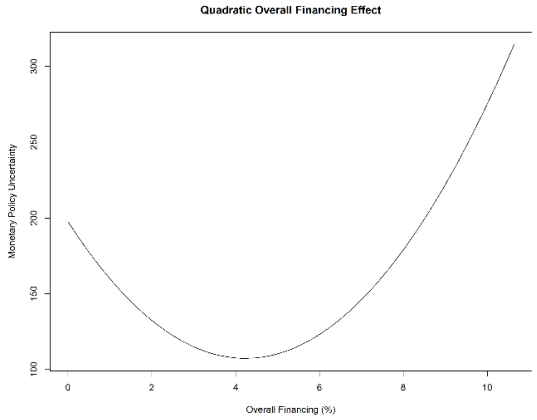

Figure 5 – Quadratic effect of Islamic producer financing on MPU

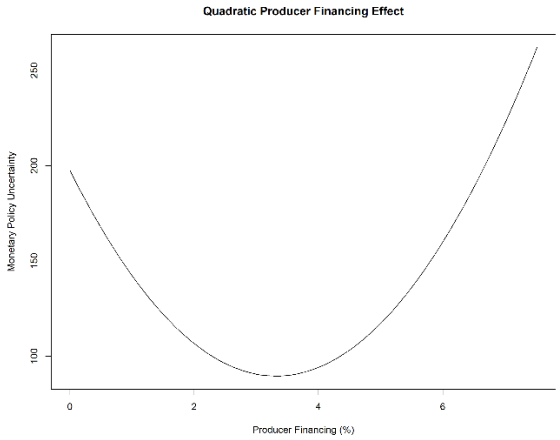

Figure 6 – Quadratic effect of Islamic consumer financing on MPU

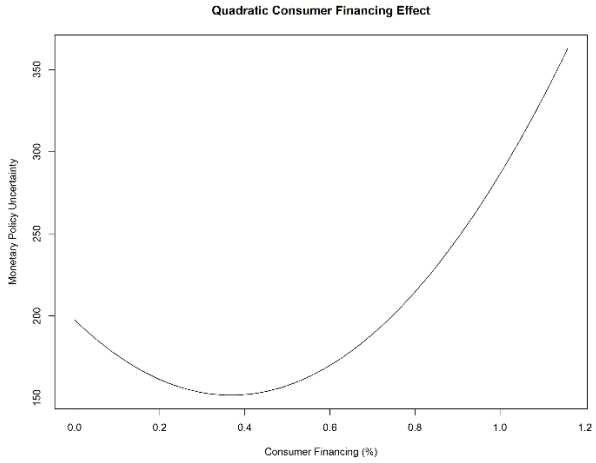

Table 4 – Short-run effects

Short Run Effects

	IFIN model	IPF Model	ICF Model
Variable	**Coef. (Prob)**	**Coef. (Prob)**	**Coef. (Prob)**
IFIN	2.725 (0.000)		
$IFIN^2$	-2.646 (0.000)		
IPF		-4.87 (0.855)	
IPF_{-1}		-47.224 (0.062)	
IPF_{-2}		-143.214 (0.000)	
IPF^2		2.124 (0.434)	
IPF^2_{-1}		3.338 (0.203)	
IPF^2_{-2}		18.516 (0.000)	
ICF			-616.780 (0.024)
ICF_{-1}			-228.649 (0.003)
ICF_{-2}			-198.181 (0.032)
ICF^2			871.164 (0.000)
IPI		-1.083 (0.001)	-1.277 (0.000)
IPI_{-1}			1.819 (0.000)
IPI_{-2}			0.902 (0.002)
ER		-1.159 (0.013)	0.745 (0.059)
ER_{-1}		-2.105 (0.000)	-1.382 (0.012)
ER_{-2}		-4.285 (0.000)	-2.955 (0.000)
DUM	-7.606 (0.200)	10.780 (0.027)	12.231 (0.083)
CointEq(-1)	-0.638 (0.000)	-0.647 (0.000)	-0.508 (0.000)
R Squared	0.67	0.84	0.84
Durbin Watson	1.85	2.38	2.16

Table 5 – Post regression tests

Post Regression Diagnostics

	IFIN Model	IPF Model	ICF Model
Jarque Bera (Prob)	0.99 (0.60)	4.79 (0.09)	1.65 (0.44)
BG Autocorrelation LM Test	0.39 (0.67)	1.48 (0.24)	0.97 (0.39)
BPG Heteroskedasticity Test	1.96 (0.08)	1.09 (0.40)	0.73 (0.74)
RESET t stat	2.18 (0.03)	1.62 (0.11)	0.19 (0.84)
CUSUM	Stable	Stable	Stable
CUSUMsq	Stable	Stable	Stable

5. Conclusion and Policy Implications

In conclusion, this comprehensive study delves into the multifaceted realm of monetary policy uncertainty and its impact on emerging economies, focusing on Pakistan. As early economists Keynes and Knight outlined, uncertainty has far-reaching implications for economic behavior, policy formulation, and stability. The research highlights the significance of monetary policy uncertainty (MPU) and its intricate interplay with various factors shaping economic outcomes.

Pakistan's economic landscape, marked by limited sector diversification, volatile goods prices, and political instability, is particularly susceptible to uncertainty. The country's history of IMF bailouts and low credit-to-GDP ratios underscore the need to comprehend and address these challenges effectively. The adverse effects of uncertainty ripple through households, curtailing their spending and, consequently, dampening economic activity. Moreover, political instability disrupts policy continuity, inhibits investment, and hampers sustainable growth.

Islamic finance emerges as a promising avenue for mitigating uncertainty's adverse effects. By adhering to ethical and risk-sharing principles, Islamic finance has the potential to enhance financial inclusion, support SMEs, and reduce systemic risk. In contrast to conventional monetary policy mechanisms, Islamic finance promotes stability and resilience by prohibiting interest and asset-backed financing.

However, the expansion of Islamic finance introduces its complexities to the economic landscape. The distinctiveness of Islamic banks' practices, such as their focus on risk sharing and ethics, can influence monetary policy transmission, making forecasting and

policy implementation more intricate. While Islamic finance contributes to stability, specialized regulatory strategies and the absence of interest-based monetary policy instruments may introduce new uncertainties into policy decisions.

Given these insights, the research proposes that expanding Islamic financing could help alleviate monetary policy uncertainty. The asset-based contracts and ethical principles inherent in Islamic finance may be a transparent and stable alternative to conventional banking practices, fostering greater predictability and trust within the financial system.

This study has applied the ARDL model to estimate the long- and short-run quadratic effects of disaggregated Islamic Financing on Monetary Policy Uncertainty from 2010Q4 to 2022Q3. The results showed a U-shaped effect of disaggregated Islamic financing on uncertainty. This outcome iterates that proper Islamic financing portfolio management and regulatory support can help monetary policymakers reduce uncertainty.

By recognizing the distinctive characteristics of such economies and considering the potential of Islamic finance, policymakers can address the challenges posed by uncertainty and pave the way for economic stability and sustainable growth. This comprehensive exploration of uncertainty's implications and its interactions with Islamic finance provides valuable insights for guiding policy decisions and promoting financial resilience in dynamic economic landscapes.

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Consumer behavior towards the acceptance of Islamic home financing.

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ABSTRACT:

Purpose - The purpose of this study is to examine whether consumers in Pakistan are aware of Islamic home financing and to identify the factors that influence customers to choose Islamic home finance facilities. The basic model employed is the Theory of Planned Behavior (TPB) to measure consumer acceptance of Islamic home finance. This study also analyzes the factors related to the Islamicity of the product.

Design- The design of this study adopted qualitative analysis and aimed to conclude the results with the help of academia, households, and small businessmen through live interviews. The analysis focused on the factors that influenced the acceptance of Islamic home finance.

Finding- The core finding of this study is that factors such as attitude, subjective norm, perceived control, and Islamicity of the product, along with demographic factors like age, gender, job, and income, influence consumer acceptance of Islamic home financing.

Research limitation/implication- There are some limitations to this study. It is conducted only in Lahore, Pakistan. Currently, only four major Islamic banks are operating in Pakistan. Another limitation is that conventional banks offering Islamic services through branches and Islamic windows are excluded. The practical implication of this study is to support the growth of the Islamic home financing sector in Pakistan and to identify the issues faced by people adopting Islamic home financing. This study will also help to determine the demand for Islamic home financing.

Keywords:

Islamic home financing; Theory of Planned Behavior (TPB); Consumer acceptance; Shariah compliance; Islamicity of product

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1. Introduction:

The core function of an Islamic bank is to offer their services and products in accordance with Shariah compliance and standards. Islamic banks offer their products and services completely dependent on fatwas and interpretations provided by Shariah scholars based on the Quran and Sunnah. According to Islam, Riba is prohibited, and charging extra fees and dealing with Haram goods are not permitted. The primary difference between Islamic and conventional banking systems is the process of financing. In the Islamic banking sector, there is no concept of borrower and lender. Instead, the culture of Islamic banks involves customers and bankers working together, promoting the concept of partnership. (Usman, Sara & Atif, 2015).

The Islamic banking sector gained fame rapidly all over the world. The reason for its popularity is the wide range of sharia-compliant products, as well as the increasing demand for sharia-based investments among people in the Middle East and Asia (Newell and Osmadi, 2009). The emergence of large new Islamic financial centers has also contributed to its popularity in countries like Malaysia, Iran, Saudi Arabia, UAE, Kuwait, Bahrain, and Qatar (The City UK, 2012).

According to the Pakistan financial report (2016), there are a total of 35 banks operating in Pakistan. Of these, 5 are Islamic banks, and 17 are conventional banks that have Islamic windows and branches. To strengthen the Islamic banking sector in Pakistan, a new Shariah governance framework was introduced, which was developed in 2014. The total share of Islamic banking assets was Rs 1.625 trillion in March 2016. Between 2010 and 2015, the Islamic banking industry experienced an annual growth rate exceeding 30%, both in assets and liabilities. The Islamic banking branch network operates throughout Pakistan, totaling 2,082 branches as of March 2016.

Islamic home financing facilities depend on the rules of “Musharakah -mutanaqisah, bay-bithaman ajil, and ijarah-muntahiyah bittamlik.” These facilities are based on Islamic laws governed by Shariah. They have different names and vary from bank to bank based on policies. The reason behind the different home financing options offered by banks is to create a competitive advantage that leads to higher profits (Amin et al. 2014). In the context of Pakistan, four full-fledged Islamic banks offer home financing facilities. Their home financing mechanism is the same, but the names of the facilities differ. Meezan Bank offers a home facility called Meezan Easy Home. Al Baraka offers Al Bait Home Financing. BIPL offers MUSKUN Home Financing, and DIBP offers Dubai Islamic Home Financing.

The Pakistani regulatory authority has taken additional steps to attract investors to the property market by offering low-interest rates, increasing transparency in land records, and establishing a mortgage market. In 2015, the mortgage rate in Pakistan ranged from 18 to 18 percent, compared to Japan's 2.7 percent. In India, it was 8-12 percent, and in

China, 7-8 percent. (Dawn Economics and Business, 2015). This report further states that in Pakistan, the property market generated $3 billion.

The basic and initial problem that encourages this study is "What factors determine consumer acceptance of Islamic home financing products?" Although there is evidence of high growth in this area, the share of Islamic home financing is very small when compared to other conventional sector home loans. People who use home financing acknowledge the benefits of Islamic home financing in terms of financial advantages and religious benefits. However, at the same time, the involvement in choosing Islamic home financing is hindered by factors such as the Islamic nature of the product, transaction costs, and influence from others (Wan-Ahmad et al., 2008).

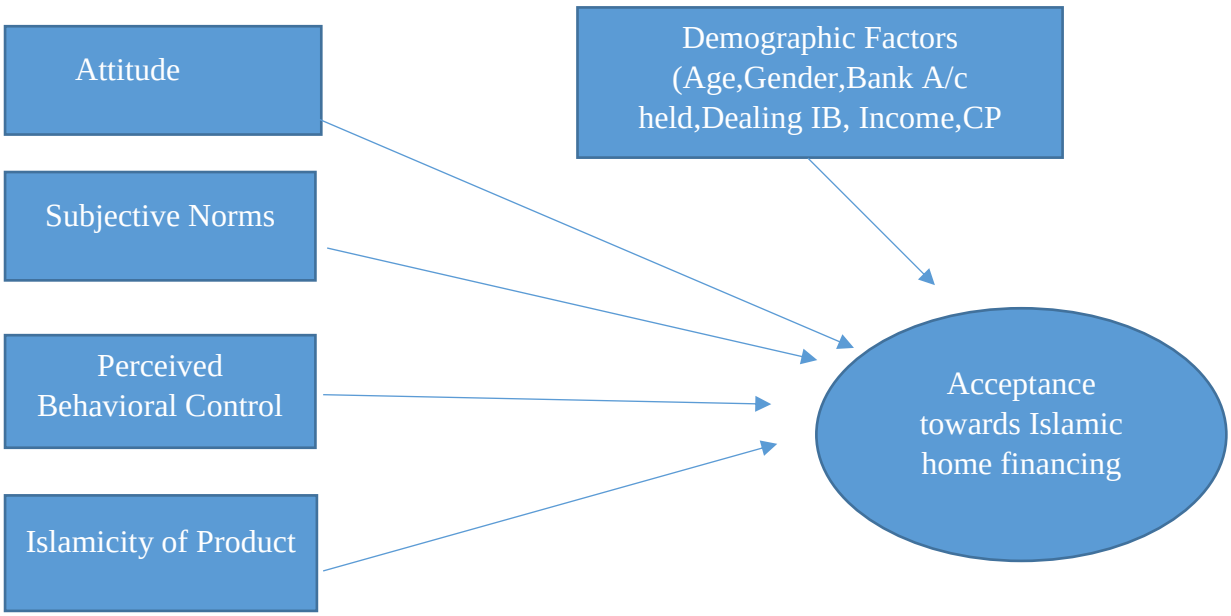
In the past, several studies have been conducted on consumer preferences in Islamic home finance. "(Amin et.al. 2009; Amin, 2008; Jalil et.al. 2010; Ford and Jones, 2001; Lymperopoulos et.al. 2006; Devlin, 2002a, 2002b; Hamid and Masood, 2011)." These studies used various factors and variables to examine consumer acceptance of Islamic home financing, such as service quality and standards, religion, profit ratios, and other demographic aspects like age, location, income, and marital status. According to (Thean, 2009), customers are more attracted to conventional bank home loans because of their attractive prices compared to Islamic home financing options. However, in the context of Islamic banking, customers are also aware of the religious benefits and have the intention to adopt Shariah-based products. Nowadays, understanding consumer behavior towards Islamic home financing often involves the Theory of Planned Behavior (TPB), which is based on factors that influence consumer intentions.

1.1 Theoretical development:

This study uses a model of TPB to examine customer attractiveness toward Islamic home financing. The reason for choosing the TPB approach is based on its successful implementation in previous studies. Several studies have explained consumer intentions toward Islamic home financing (Lobbe et al., 2007; Gopi and Ramayah, 2007; Amin et al., 2014). In these studies, the authors are satisfied and motivated to adopt this model by examining consumer intentions regarding Islamic home financing. Ajzen (1991) was the first to introduce the model of the theory of planned behavior (TPB), which was a new approach compared to the TRA (theory of reasoned action) model (Ajzen and Fishbein, 1980). In 1991, Ajzen further explained the TPB framework and addressed the limitations of the TRA framework. The theory of planned behavior is more successful because it adds a new factor, perceived behavioral control. The TPB model is based on three factors: subjective norm, attitude, and perceived behavioral control, which influence individuals' intentions. The factor of perceived behavioral control bridges the gap left by the TRA model.

In our study, the addition of two more factors to the TPB model includes one being the islamicity of the product and the other being demographic factors such as age, income, and marital status. According to (Wan-Ahmad et al., 2008), the islamicity of a product essentially reflects the individual's adherence to being free from Riba, qimar, and gharar. However, in our study, the term “Islamicity of product" refers to the concept of Halalness in Islamic banking products, meaning they are free from Riba, gharar, maisir, and other illegal business investments and partnerships. The factor of islamicity of the product is also discussed in various Islamic banking studies (Kazi and Halabi, 2006; Khan, 2010; Muneeza et al., 2011).

Figure 1: TPB MODEL



2. Literature Review:

2.1 Financing concept in Islam:

The religion of Islam promotes a cycle of wealth distribution. Those who have excess wealth circulate it to those in need, which helps the development of the entire Muslim community. “First time Islamic financing was channelized money”, money transfer to wealthy persons to deficit units. “Secondly, it fulfills the basic needs of people and allows the Muslim community to grow its wealth”. (Khaf and Khan, 1992).

2.2 What is Islamic home financing?

Islamic home financing offered by Islamic banks operates strictly according to Sharia rules and regulations (Amin 2008; Haroon, 2005). Islamic home financing ensures that it

is free from interest and gharar elements, unlike the conventional banking sector, which is based on interest payments on the principal amount (Tse, 1997). Islamic banks adhere to Sharia compliance rules and regulations, which is why they charge a flat rate or profit rate rather than interest (Amin 2008). In this scenario, monthly payments remain the same, and the rate does not fluctuate, even with inflation. The Islamic home financing process involves consumers providing specifications for the house, such as location and price. The Islamic bank then purchases the house at market price from the seller and resells it to the consumer, charging an agreed-upon profit margin. The customer is required to make payments in the form of monthly installments (Maali et al., 2006). The income of Islamic institutions is primarily derived from the difference between the cost and the selling price of the home. This method is considered useful, according to Rosely (1991).

2.3 Empirical studies on Islamic home financing:

Some old studies on Islamic home financing facilities have not fully targeted the factors of subjective norms, attitude, perceived behavioral control, and the religiosity of the product related to consumer acceptance of Islamic home financing. (Amin, 2008; Nayeem et al., 2009; Hanaffi and Kasim, 2006; Taib et al., 2008; Abdul-Razak et al., 2008; Jalil et al., 2010; Amin et al., 2014)

According to (Nayeem et al, 2009), U.S. studies have some conflicts of purpose in Islamic home financing. In the U.S., a total of three Islamic banks offered Islamic home financing facilities, but all three adopted different mechanisms for Islamic home financing. They were concluded to provide guidelines of residencia; LLC offered an Islamic ally loan for home financing based on “declining Musharaka,” and the University of Islamic Financial Corporation adopted mechanisms of “Murabaha and Ijara wal Iqtina.” American finance house “LARIBA” also provides different types of mechanisms. However, the gap in this study is that it only provides the transaction model and financing modes and ignores consumer acceptance in Islamic home finance.

According to (Amin, 2008), Islamic home financing facilities mainly target people with low salaries or monthly income, focusing on Riba-free banking, Sharia compliance, and the genuine practices of Islamic banks. In this study, factors such as branch location, product range, and time period have very little effect on consumer acceptance of Islamic home financing. However, this study also does not sufficiently explain consumer behavior towards Islamic home financing. The study by (Hanaffi and Kasim, 2006) analyzes the use of “Bay bithamanajil” and “Istsina” in Islamic home financing. The results show that “Bay bithamanajil” is a successful method for Islamic home financing, especially for newly constructed houses, while “Istsina” is considered the best model for houses under construction.

Md-Taib et al. (2008) explained the elements of diminishing Musharaka in the context of customer acceptance of Islamic home financing facilities. The gap in this study is that it adopts the TRA model and ignores the TPB model. In this study, the attitude factor is made to have more influence on consumer acceptance of Islamic home financing.

In the context of Abdul-Razak et al. (2008) adopting the mode of "bithamanajil" to examine consumer intention towards Islamic home finance, the results of this study show that the "bithamanajil" mode has very little impact on consumer acceptance of Islamic home financing facilities. In another context, the Muslim population primarily concerns itself with "bithamanajil" and sharia-compliant products, while non-Muslim customers respond positively. Another study (Jalil et al., 2010) explained customer selection criteria for Islamic home financing and conventional home loans in Malaysia. This study shows that customers give positive feedback and express full interest in Islamic home finance. However, it does not explain the theoretical framework that accounts for consumer intention towards Islamic home financing.

3. Methodology:

This study uses a qualitative method, and the results are based on interviews and previous studies conducted on the TPB model. The measures used in the interviews to conclude this study include Attitude, Subjective Norm, Perceived Behavioral Control, Islamicity of the product, and demographic factors. For the attitude questions, the study by (Taib et al., 2008) was used. The subjective norm questions were based on studies by (Hansen et al., 2004; Venkatesh and Davis, 2000), and the perceived behavioral control questions were selected from the study by (Taylor and Toud, 1997). The factor of Islamicity of the product was chosen from the study by (Wan-Ahmad et al., 2008).

4. Conclusion and Future Implications:

This study purely targets consumer acceptance of Islamic home financing. It also shows that previous studies using the TBP approach have been successful. This research indicates that factors such as attitude, the Islamicity of the product, subjective norms, and demographic factors influence consumer acceptance of Islamic home financing. Based on interviews and previous studies, perceived behavior and the Islamicity of the product are the most influential factors affecting consumer acceptance. In the context of Pakistan, the Islamic nature of the product truly matters to consumers because the majority of the population is Muslim. Although the TPB model is flexible and related to measuring Islamic home financing.

The most important factor I analyze in this study through interviews is the feedback on the Islamicity of the product, as it is the key factor in choosing Islamic home financing because its home financing involves a long-term policy. In Pakistan, the tenor ranges from

3 years to 25 years, and the majority of people avoid conventional home financing due to interest and religious considerations. Compared to Islamic home finance, it makes it easier for those who need home financing. In the interviews, most people are willing to use Islamic home financing because Pakistan Islamic Bank offers long-term tenors, and other factors increase demand, such as home repairing facilities provided to consumers.

There is some problem found through interviews and previous studies: people are a bit confused about the mechanism of Islamic home financing and conventional home financing.

The practical implication of this study will support the growth of the Islamic banking home financing sector in Pakistan. It also identifies issues faced by people adopting Islamic home financing, such as confusion about the mechanisms of conventional versus Islamic home financing in Pakistan. In the future, this study will help determine the demand for Islamic home financing, as my research shows a clear interest among consumers. Additionally, this study will assist Islamic bank managers in understanding consumer behavior towards Islamic home financing. Moreover, it will aid in the pre-development and post-development stages and help formulate home financing plans using the TPB theory.

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Appendix

Question using in interviews

1. I like Islamic Home financing because it is Shariah Compliant (free from riba).

2. Engaging in Islamic home financing is good because of its product advantages.

3. I like Islamic Home financing because of its beneficial to me (profit rate).

4. Taking Islamic home financing would be good for me.

5. Having Islamic home financing would be peace of mind to me (nor fluctuation in repayment amount).

Subjective Norm

1. Most people who are important me support me taking Islamic home financing.

2. Most of my friends/colleagues have taken Islamic finance agreed that Islamic finance is better than conventional.

3. When it comes to a matter of home financing, I would like to be like my friends.

4. I choose Islamic home financing based on recommendation from friends and relatives.

Perceived Behavioural Control

1. I am confident that I would take Islamic home financing for my next home purchase.

2. I am confident that I would like Islamic home financing even if is more expensive.

3. I am confident that I would take Islamic home financing even if the bank personnel advise me take conventional financing.

4. I am sure I would be able to undertake Islamic home financing.

5. Taking Islamic home financing is entirely within my control.

6. I have resources, knowledge and ability to undertake Islamic home financing.

Islamicity of product

1 Islamic home financing is free from gharar (Uncertainty).

2. I try to follow Islamic conjunctions in all matters of my life.

3. I always try to avoid minor and major sin.

Role of Islamic Finance in Reducing Domestic Debt

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ABSTRACT:

Purpose: This paper explores the role of Islamic finance in mitigating domestic debt in developing countries. As traditional interest-based borrowing systems continue to burden public finances, there is a growing need to consider ethical and sustainable alternatives rooted in Islamic financial principles.
Background: Islamic finance offers a Shariah-compliant framework that emphasizes asset-backed transactions, risk-sharing, and the prohibition of interest (riba). These features position it as a promising solution for reducing reliance on conventional debt mechanisms, particularly through instruments such as sukuk.
Aims and Methodology: The study aims to assess how Islamic finance can contribute to more sustainable debt management. Using a dataset covering 30 countries between 1980 and 2023, it applies descriptive and correlational analysis to examine the relationship between GDP, Gross Fixed Capital Formation (GFCF), and Central Government Debt (CGD). The analysis focuses on evaluating the potential of Islamic financial mechanisms to foster economic stability without accumulating interest-bearing liabilities.
Findings and Contribution: The findings suggest that while the relationship between Islamic finance proxies and GDP is not strongly linear, there are clear trends indicating that sukuk and other Shariah-compliant instruments contribute to more stable fiscal frameworks in countries where Islamic finance is integrated. This paper adds to the discourse by demonstrating that Islamic finance is not only theoretically sound but also practically relevant in shaping national debt strategies.

Keywords: Domestic Debt Reduction, Sukuk and Asset-backed Instruments, Shariah-compliant Debt Management, Islamic Finance.

JEL Classification: H63, G18

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1. Introduction to Islamic Finance and Domestic Debt:

The function of Islamic finance mainly depends on Shariah principles. It discourages riba and emphasizes ethical investing and risk-sharing activities. The growth of Islamic finance is primarily a technique to address domestic debt and financial stability. This review explores different techniques to manage domestic debt and contribute to reducing it (Chapra, 2008; Iqbal & Mirakhor, 2013).

A major challenge for various economies and developing countries is managing domestic debt. The main approach to handling domestic debt is discussed by Chapra (2008) and Iqbal & Mirakhor (2013). Domestic debt usually involves government borrowings within its borders, which are managed through interest-based mechanisms. Conversely, Islamic finance strongly advocates for reducing the domestic debt burden. (Zulkhibri, 2015; El-Gamal, 2006).

The growth of Islamic finance among policymakers worldwide is driven by the desire to reduce their debt compared to countries that use conventional finance. Islamic finance is well-known due to its financial system and remains sustainable because of its integration with the national financial system. This system functions very effectively in Muslim countries like Saudi Arabia and Malaysia, where they have leveraged it to manage their debt without relying on interest-based instruments (Iqbal & Molyneux, 2005; Ariff & Iqbal, 2011).

Domestic debt has become a significant issue for many countries due to fiscal instability and economic challenges (State Bank of Pakistan, 2020). This method is newly introduced, but previously, most countries relied on traditional debt financing methods, which heavily depend on interest-based transactions, making life more difficult for these nations. They often find themselves trapped in a vicious cycle of debt accumulation (Ahmad, 2010).

Islamic finance, which avoids interest but encourages a risk-sharing approach (Chapra, 2008), and managing domestic debt involve integrating with the financial system as a key to growth (Iqbal & Mirakhor, 2011).

Research Problems:

Effectiveness of Islamic Finance Mechanisms: How do Islamic instruments such as sukuk and other schemes contribute to reducing domestic debt in developing economies? This question is complex, as sukuk provide a stable source of financing without necessarily limiting debt levels (El-Gamal, 2006; Cakir & Raei, 2007).

Labor Force Participation and Economic Growth: Participation in the labor force would play a crucial role in Islamic finance, so there is a question about what role Islamic

finance could have in reducing domestic debt. Ethical investment would be considered as a way to increase employment rates and economic growth (Iqbal & Mirakhor, 2011).

Capital Formation through Islamic Finance: For sustainable capital formation, Islamic finance has been used for gross fixed capital formation, which influences economic growth and domestic debt levels. So, how does the use of Islamic finance affect gross fixed capital formation? Interest and speculative activities are employed to boost economic activities and sustain capital formation (Chapra, 2008).

Government Debt Management: How does Islamic finance offer a sustainable solution to limit or restrict the national debt and its impact on GDP per capita? The debt management technique aligns with ethics through the principle of risk sharing (Jobst et al., 2008).

Comparative Analysis with Conventional Finance: What is the role of Islamic finance in reducing domestic debt compared to the conventional financial system? The main difference is the prohibition of interest, which may help sustain debt more effectively than traditional finance (Za/mir & Mirakhor, 2007).

Policy Implications: What would be the policy implications of incorporating Islamic finance into the local framework for promoting sustainable growth and reducing domestic debt? Islamic funding policies provide the structure that stabilizes economic development (Khan & Bhatti, 2008).).

2. Literature Review: The Role of Islamic Finance in Reducing Domestic Debt:

Theoretical Foundations of Islamic Finance

Islamic finance is rooted in Shariah principles that emphasize fairness, risk-sharing, and the prohibition of interest (riba), making it fundamentally distinct from conventional financial systems. This ethical framework encourages financial transactions that are linked to real economic activity and discourages speculative behavior (Chapra, 2008; Iqbal & Mirakhor, 2011). Central to Islamic finance are contracts based on profit-and-loss sharing and asset-backed structures, which promote equitable wealth distribution and reduce the reliance on debt-based financing (El-Gamal, 2006). These foundational principles offer a compelling basis for rethinking public sector debt strategies, particularly in developing economies that are heavily burdened by interest-based domestic borrowing.

Sukuk as a Tool for Debt Management

One of the most widely applied instruments in Islamic finance is the sukuk, which serves as a Shariah-compliant alternative to conventional bonds. Unlike traditional debt

securities, sukuk are structured around ownership of tangible assets or investment in real projects, and they involve shared risk between issuers and investors (Usmani, 2002). Sukuk instruments have become an integral part of sovereign debt management in countries such as Malaysia, Saudi Arabia, Indonesia, and Turkey. Their asset-backed nature makes them attractive for public infrastructure development without accumulating interest-bearing liabilities (Jobst et al., 2008; Cizakca, 2011; Abdullah, Sidek, & Adnan, 2012).

Empirical studies support their effectiveness in managing domestic debt. For instance, Ahmed and Houssain (2017) note that sukuk issuance has contributed to more sustainable fiscal practices in developing countries. The Turkish government's reliance on sukuk has helped reduce dependency on conventional borrowing (Ergec & Arslan, 2013), while Malaysia's consistent use of sukuk has stabilized its domestic debt profile (Muhammad & Chong, 2007; Abdullah, Sidek, & Adnan, 2012). Bahrain has also leveraged sukuk to manage public debt in a Shariah-compliant manner (Al-Saeed, 2012).

Islamic Finance and Economic Stability

Beyond debt instruments, Islamic finance contributes more broadly to macroeconomic stability through its promotion of ethical investment and fixed capital formation. Because Islamic finance prohibits speculative transactions and encourages the use of productive assets, it inherently supports sustainable development and limits systemic financial risk (Chapra, 2008; Khan & Bhatti, 2008). This becomes especially relevant during economic downturns. During the 2008 global financial crisis, Islamic financial institutions demonstrated greater resilience than their conventional counterparts due to their avoidance of derivatives and interest-based instruments (Hasan & Dridi, 2010; El-Gamal, 2006).

The role of Islamic finance in enhancing employment and productive investment is also significant. Iqbal and Mirakhor (2011, 2013) argue that Shariah-compliant financing supports labor-intensive growth by prioritizing real-sector activities. This focus has implications for increasing labor force participation and GDP growth, which in turn can help reduce domestic debt levels over time.

Empirical Evidence from Emerging Economies

Several emerging markets have adopted Islamic financial instruments as part of their public finance strategies. In Malaysia, for example, the widespread issuance of sukuk has not only supported infrastructure development but also contributed to steady domestic debt ratios (Abdullah, Sidek, & Adnan, 2012; Muhammad & Chong, 2007). Similarly, Saudi Arabia and Qatar have used Islamic finance to fund national projects while avoiding the pitfalls of interest-based borrowing (Ahmed, 2006; Ahmed & Houssain, 2017).

Turkey offers another case where Islamic finance has become integral to public debt management. Ergec and Arslan (2013) observe that Turkey's successful sukuk programs have diversified government financing and strengthened investor confidence. In Bahrain, the integration of Islamic finance into national economic policy has facilitated ethical borrowing and reduced reliance on conventional instruments (Al-Saeed, 2012). Pakistan and Sudan have also explored the use of sukuk to manage domestic debt, finding it more accessible and affordable than traditional debt options (Cevik & Charap, 2011).

Challenges in Implementation and Standardization

Despite its advantages, Islamic finance faces notable challenges that hinder its full integration into domestic debt strategies. One of the primary issues is the lack of standardization across jurisdictions, which creates legal and operational uncertainties for investors and policymakers (Thomas, Cox, & Kraty, 2005). Different interpretations of Shariah compliance and the absence of a unified regulatory framework limit the scalability of Islamic financial products (Dusuki & Abdullah, 2007). These inconsistencies not only complicate cross-border transactions but also deter institutional investment.

Nevertheless, efforts are underway to address these challenges. International financial institutions and standard-setting bodies, such as AAOIFI and IFSB, are working to harmonize practices and promote the global credibility of Islamic finance (Zulkhibri, 2015). As more governments recognize the economic and ethical benefits of Shariah-compliant financing, the momentum toward greater standardization and integration into mainstream financial systems is likely to continue.

3. **Research Methodology:**

Data Collection:

Data should be descriptive, which can be summarized using mean, median, standard deviation, and trend analysis over time (Field, 2013). The relationship between the variables is examined through correlation analysis (Dancey & Reidy, 2007). The connection between domestic debt and the independent variables is calculated using regression analysis, possibly multiple linear regression (Tabachnick & Fidell, 2013). The sources considered in this analysis include the World Bank, IMF, local reports, and IFI. This can be calculated using STATA software.

The dataset will be sourced from reliable databases such as the World Bank, International Monetary Fund (IMF), or other credible economic data sources (World Bank, 2023). A fixed or random effects model is applied where country-specific effects need to be accounted for (Greene, 2012), and to ensure the robustness of the model, diagnostic tests for multicollinearity, heteroscedasticity, and autocorrelation will be implemented

(Gujarati & Porter, 2009). Hypothesis testing will be used to assess the impact of variables on domestic debt. All relevant tests, including t and F tests, will be performed to check the significance of the variables and whether the model is a good fit, and these will also be applied to the regression model (Montgomery, Peck, & Vining, 2012). Coefficients will be calculated to understand the impact of independent variables on domestic debt (Wooldridge, 2015).

Variables:

- **Dependent Variable**: GDP
- **Independent Variables**:
  - Labor force participation rate
  - Gross fixed capital formation
  - Central government debt

Hypotheses:

- **H1**: For H1, Islamic finance shows a negative impact on domestic debt levels.
- **H2**: Shows a positive correlation between labor force participation rate and GDP.
- **H3**: Depicts how fixed capital formation affects the GDP in an acceptable way.
- **H4**: Central government debt has a negative impact on GDP that can be overcome by Islamic finance principles.

Research Objectives:

- To assess the effect of Islamic finance on diminishing domestic debt?
- To examine how Islamic finance principles, with the contribution of Islamic financial instruments, reduce the debt levels?
- To analyse the connection between labor force participation rate and GDP, and how this change affects the GDP in Islamic finance?

- To investigate the impact of gross fixed capital formation on GDP within an Islamic finance framework?

- To assess the impact of government debt levels on GDP and how it is overcome through Islamic finance?

Research Question:

- What is the impact of Islamic finance on reducing the domestic debt burden?
- In what ways do Islamic finance principles and Islamic financial instruments contribute towards minimizing the debt burden?
- What is the connection between the Labor Force Participation rate and GDP, and how does this connection affect the GDP within the Islamic finance framework?
- How does gross fixed capital formation impact GDP within the context of the Islamic finance framework?
- What is the implication of government debt levels on GDO, and how would the impact be mitigated by Islamic finance?

Research Design:

The research design is that the study is quantitative, focusing on numerical data to assess the connection between the dependent and independent variables with a descriptive and correlational study approach (Creswell, 2014). The data would be secondary, collected from websites, annual reports, the World Bank, IMF, and local annual financial statements or reports. It also includes a comparative analysis of 30 countries (Bryman, 2012). The analysis in recent years involves cross-sectional data, while a longitudinal study examines data over time. This research is based on a longitudinal study, which analyses changes and trends over time from 1980 until 2023 (Menard, 2002). A longitudinal study has examined several decades, from 1980 to 2023, categorizing almost 30 countries with relevant data factors.

4. Results and Analysis:

Descriptive Statistics

The Descriptive Statistics table provides a summary of the statistical measurements of variables used in the study, such as GDP, Labor Force (LF), Gross Fixed Capital Formation (GFCF), and Central Government Debt (CGD). The GDP data, based on 8021 observations, shows a standard deviation of 20,343.75 and an average value of 13,311.358 units, indicating significant variability. The GDP values range from a low of 164.059 to a high of 228,667.93, reflecting considerable economic disparities or inconsistencies among the countries and periods covered in the dataset.

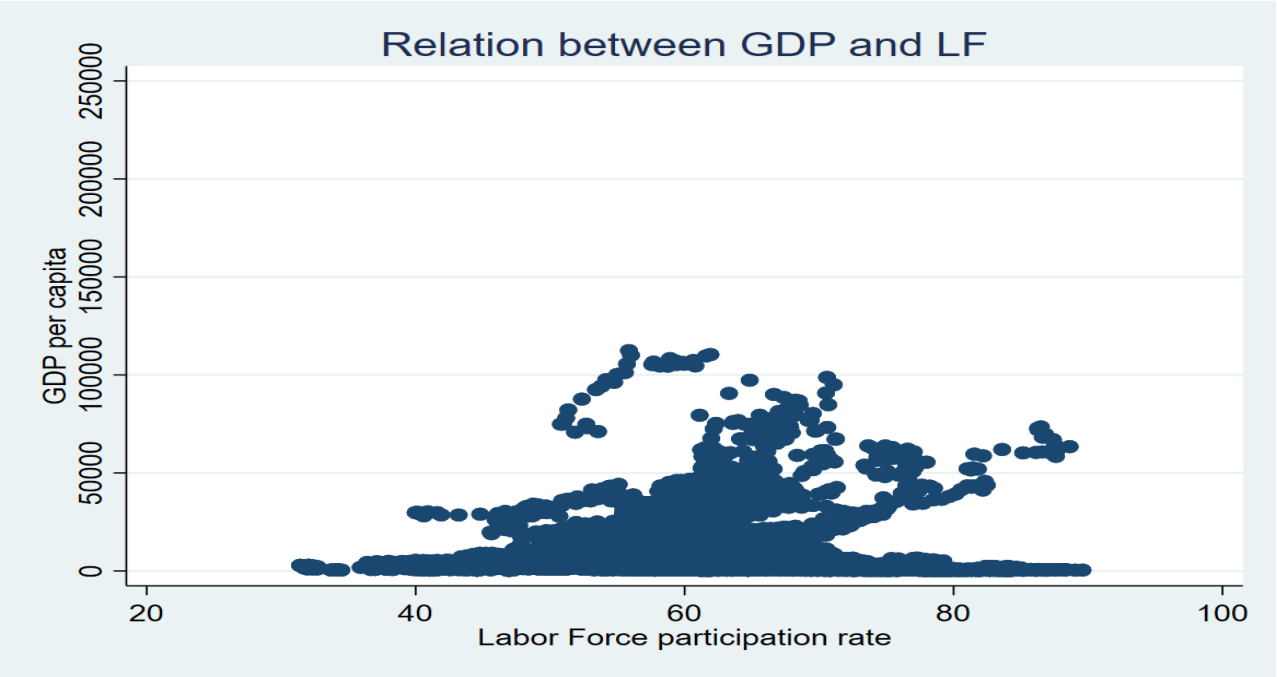
The Labor Force (LF) data has a total of 6201 observations, showing an average labor force participation rate of 61.019, with a standard deviation of 10.259. The labor force value ranges from 31.402 to 89.587, indicating moderate variations across different countries or time periods. Gross Fixed Capital Formation (GFCF) has a total of 6435 observations, with an average value of 22.427 and a standard deviation of 7.989, reflecting some variation in capital formation, although it is less pronounced compared to GDP. Central Government Debt (CGD) is observed in 1,909 instances.

This is an occasion where the mean value is 59.012, and the standard deviation has increased to 70.277, indicating substantial differences in debt levels. The range of the CGD is from a minimum of 1.846 to a maximum of 2002.51. These statistics purely provide an indication of economic indicators accessed in the study, highlighting the variability and ranges within the dataset.

Table -1: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
GDP	8021	13311.358	20343.75	164.059	228667.93
LF	6201	61.019	10.259	31.402	89.587
GFCF	6435	22.427	7.987	-2.424	93.547
CGD	1909	59.012	70.277	1.846	2002.51

Figure -7: Pairwise correlations:



The pairwise correlation data shows the strength and relationship between the variables. This indicates that there are weak correlations among the variables, which reflects the specific values of the extracts provided. This suggests that the relationships between GDP, Labor Force, GFCF, and CGD are not strongly linear. It also indicates that other factors significantly influence these economic indicators. The lack of correlation highlights the complexity of economic factors, where simple pairwise correlation cannot capture the full range of interdependencies among these key variables.

Table-2: Correlations

Variables	(1)	(2)	(3)	(4)
(1) GDP	1.000			
(2) LF	0.081	1.000		
(3) GFCF	0.035	0.020	1.000	
(4) CGD				1.000

*Figure **Error! No text of specified style in document.**-8: Scatter plot showing the relationship between GDP per capita and Gross Fixed Capital Formation (GFCF).*

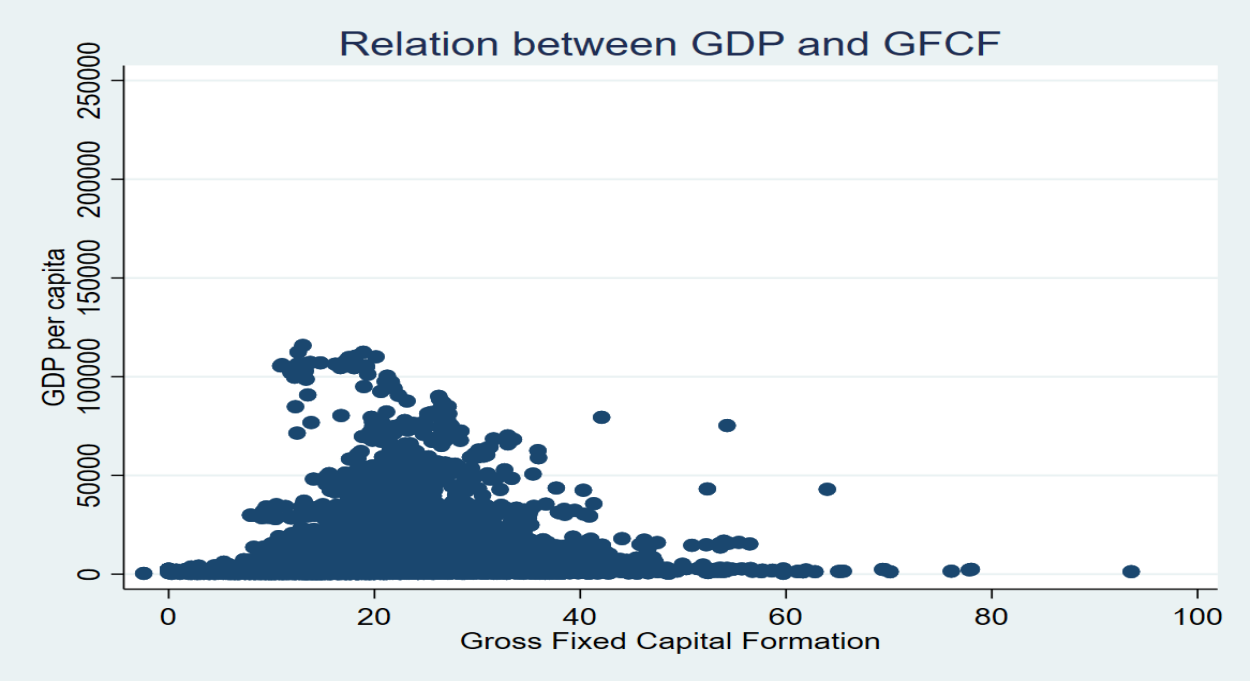


Figure 2 illustrates the scatter plot showing the relationship between GDP per capita and Gross Fixed Capital Formation (GFCF). The plot reveals a concentrated cluster of observations between 0 and 40 percent GFCF, where the majority of countries exhibit relatively moderate to low levels of capital formation. Within this range, GDP per capita varies significantly, suggesting that while GFCF is associated with economic activity, the relationship is not strictly linear. There is a noticeable density of data points at lower levels of GDP, indicating that countries with minimal capital formation tend to experience limited economic output. However, some outliers suggest that a few economies have managed relatively higher GDP despite modest GFCF levels, possibly due to other contributing macroeconomic factors.

Figure -9: Scatter plot showing the relationship between GDP per capita and Central

Government Debt (CGD).

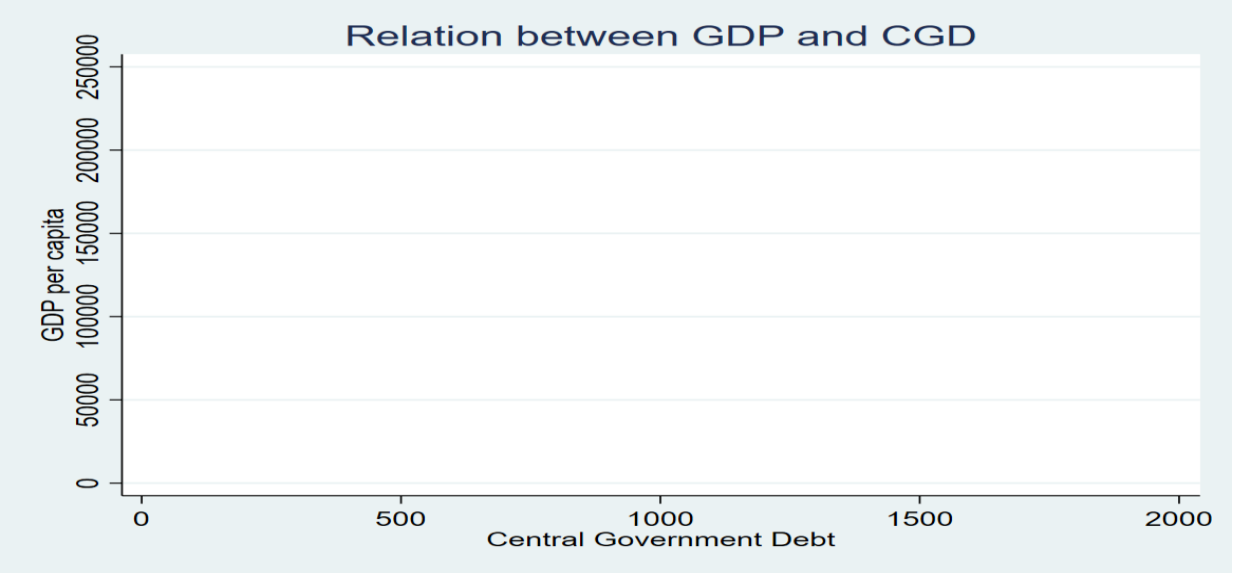


Figure 3 presents the scatter plot showing the relationship between GDP per capita and Central Government Debt (CGD). The plot displays a wide spread of CGD values, ranging from very low to above 1,500 percent of GDP in some cases. However, the visual pattern suggests a weak or inconclusive relationship between CGD and GDP per capita. Unlike the GFCF-GDP relationship, there is no visible clustering that would suggest a predictable trend. Some countries appear to maintain high levels of GDP despite substantial central government debt, while others show low economic output even with minimal debt. This dispersion indicates that central government debt, in isolation, may not be a reliable predictor of economic performance without considering additional fiscal and institutional variables.

Together, these figures support the premise that while capital formation is more directly tied to real economic activity, the effect of government debt on GDP is more complex and context-dependent. These findings underscore the importance of ethical, asset-backed financing strategies—such as those promoted under Islamic finance—which focus on productive investment rather than accumulation of interest-bearing liabilities.

5. Conclusion

This study has examined the role of Islamic finance in reducing domestic debt, particularly in the context of developing economies where conventional interest-based mechanisms have led to fiscal instability. Through its foundational principles of risk-sharing, asset-backing, and the prohibition of riba, Islamic finance offers an alternative

framework that prioritizes ethical investment and long-term sustainability (Chapra, 2008; Iqbal & Mirakhor, 2011).

Evidence from countries such as Malaysia, Saudi Arabia, Turkey, and Bahrain indicates that instruments like sukuk have been effectively utilized to manage public sector borrowing without resorting to interest-bearing debt (Ahmed & Houssain, 2017; Ergec & Arslan, 2013). These tools not only provide a compliant funding source but also foster transparency, stability, and fiscal discipline. The comparative advantage of Islamic finance lies in its alignment with real economic activity, which reduces exposure to speculative risks and promotes productive capital formation.

The correlation-based findings of this study suggest that while Islamic finance does not eliminate debt entirely, it has the potential to reshape debt management strategies through more stable and ethical practices. The inclusion of labor force participation and capital formation as variables further highlights how Islamic finance can influence broader economic outcomes, contributing to GDP growth and long-term development goals (Iqbal & Mirakhor, 2013; Khan & Bhatti, 2008).

For policymakers, these insights point to the importance of institutionalizing Islamic financial frameworks within national economic systems. As global interest in ethical finance grows, Islamic finance offers a practical model for achieving both fiscal responsibility and inclusive growth. Future research could extend this work by incorporating regression-based analysis to explore causal relationships and by evaluating sector-specific applications of Islamic financial instruments.

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