DOCTORAL (Ph.D.) DISSERTATION

ADIL SALEEM

Hungarian University of Agriculture and Life Sciences

Szent István Campus

Gödöllő

Hungary

2024

THE DIFFERENTIAL IMPACT OF ISLAMIC BANKING ADOPTION ON ECONOMIC GROWTH: A SYNTHETIC CONTROL METHOD APPROACH

Hungarian University of Agriculture and Life Sciences

Doctoral School of Economic and Regional Sciences

Ph.D. Dissertation

Prepared by

Adil Saleem (EWB2TQ)

Supervisors
Dr. habil. Judit Sági

Dr. habil. Judit Bárczi

Hungarian University of Agriculture and Life Sciences

The PhD School

Name: Doctoral School of Economic and Regional Sciences

Discipline: Management and Business Administration

Head: **Professor Dr. Zoltán Bujdosó**

               Doctoral School of Economic and Regional Sciences

               Hungarian University of Agriculture and Life Sciences

               Institute of Economic Sciences

Supervisor(s): **Dr. habil. Judit Sági**

               Associate Professor,

               Department of Finance,

               Budapest Business University

               Dr. habil. Judit Bárczi

               Associate Professor,

               Doctoral School of Management and Business Administration,

               Neumann János University

....

Approval of the Head of Doctoral School   Approval of the Supervisor(s)

(__NB__: The doctoral dissertation has to be submitted in four copies bound with the original signatures and the ten theses with the photocopied signatures to the Office of the Ph.D. School concerned.)

Table of Contents

List of Tables

List of Figures

List of Abbreviations

2SLS	Two-stage Least Square
ADF	Augmented Dickey fuller
ARDL	Autoregressive distributed lag
CFD	Conventional financial depth
CFI	Conventional financial intermediation
CISS	Composite indicators of systematic stress
CRE_FI	Private credit by financial institution
DID	Difference in Differences
ECM	Error Correction method
FDI	Foreign direct investment
GDP	Gross domestic product
GCC	Gulf Cooperation Council
GMM	Generalized methods of moments
HDI	Human Development Index
IDB	Islamic Development Bank
IFI	Islamic financial intermediation
IFD	Islamic financial depth
IFDI	Islamic financial development indicators
IFSB	Islamic Financial Service Board
IFS	International financial statistics
IMF	International Monetary Fund
IP	Industrial production
IR	Interest rate
IRF	Impulse Response Function
KIBOR	Karachi Interbank offered rate
MPO	Murabaha to the purchase orderer
NPA	Non-performing assets
NPL	Non-Performing Loans
Non-PLS	Non-Profit and Loss sharing (alternatively used as non-participatory or debt contract)
OIC	Organization of Islamic Countries
OLS	Ordinary least square
PLS	Profit and Loss Sharing (alternatively used as participatory or Equity contracts)

PS	Political Stability
RMSPE	Root mean square prediction error
RQ	Regulatory Quality
SBP	State Bank of Pakistan
SCM	Synthetic Control Method
SSB	Shari'a Supervisory Board
UNDP	United Nationals Development Program
VBI	Value-based intermediation
VDC	Vector decomposition
VECM	Vector error correction method
VAR	Vector Autoregressive
VIF	Variance inflation factor
WDI	World development indicators

1   INTRODUCTION

To understand the underlying principles of Islamic finance, we need to trace its origins. The instigation of Islamic finance in the late nineteenth century opened a new paradigm in the financial world, which gave rise to the adoption of Islamic banking in place of interest-based banking. The Islamic banking system was first coined in the late 1950s (WILSON, 1983). However, the experimental model was first seen in 1963 in Egypt and was founded by Ahmed El Najjar. The operating model was based on an investment bank working on the profit and loss sharing (PLS) model (ARIFF, 1988). The second phase of Islamic banking development started in 1974 with the formation of the global regulatory body, the Islamic Development Bank (IDB) by the Organisation of Islamic Countries (OIC) (ABDEL-HAQ, 1989). The wave of Islamic finance was not limited to Southeast Asia and the Middle East but also extended to developed economies, including the US, the UK, and Europe, starting its journey from one bank in 1970 to 300 banks in the first decade of the 21st century (EL QORCHI, 2005). The first landmark of Islamic finance in the European region was witnessed in Luxembourg with the foundation of the Islamic Finance House in 1978 (ARIFF, 1988). Although the concept of an Islamic financial system was initiated in South Asia and Arab countries in the 20th century, the question of its stability and efficiency was raised. It is worth noting that the overall progress of a country's financial and economic progress is dependent mainly on the stability, soundness, and efficiency of its financial sector. Banking systems are directly responsible for the overall strength of the financial structure in a country (NOSHEEN and RASHID, 2021). Furthermore, the ability of the banking sector to withstand and endure external shocks, crises, or stress is reflected in the financial system (HUSSEIN, 2010). In the past two decades, the world experienced two major economic setbacks caused by the credit crunch in 2007-09 and COVID-19 in 2020, and the Islamic financial sector played exceptionally well in times of stress.

The credit crisis of 2007-09 hit the Islamic banks differently as opposed to non-Islamic counterparts. The credit creation process of interest-based loans having no clear linkage with tangible assets inflated the effect of subprime mortgages. According to the estimates, the complex securitization using collateralized debt obligations with the absence of actual mortgages multiplied the impact of the credit bubble to 4 times from USD 160 billion in 2001 to USD 600 billion in 2006 (MIZEN, 2008). On the contrary, the global Islamic financial assets grew during the crisis. The total Islamic financial assets were estimated with an increase of 25% from 2007 to 2008, yielding USD 951bn from USD 758bn, and a growth of 75% from 2006 to 2007, growing from USD 549bn (MCKENZIE, 2010). It is worth noting that the Islamic financial market grew 15-20

percent more than its conventional counterparts during the crisis. The evidence shows that Islamic banks were more financially stable than interest-based banks (HASAN and DRIDI, 2010). The proponents of Islamic finance even argue that the crisis could be prevented if the essence of Islamic banking was established (HASSAN and KAYED, 2009). Nevertheless, the industry faced some impact from the economic shock, showing that some potholes need to be looked after that can make the financial sector vulnerable (OUERGHI, 2014). Given the structural and operational differences in banking models, Islamic banks are expected to handle the external crisis resiliently and have a better survival rate (BECK et al., 2013). According to ČIHÁK and HESSE (2010), Islamic banks are better at mitigating credit risk and relatively stronger than conventional banks. The ultimate use of an asset-backed structure and profit and loss sharing (PLS) system makes these banks financially stronger than conventional ones. It is worth noting that Islamic banks performed tremendously well during the credit crunch compared to non-Islamic peers (BECK et al., 2013). According to BOURKHIS and NABI (2013), Islamic banks are supposed to keep their financial soundness even during the financial crisis as tangible assets back their products. Nevertheless, due to complicated asset structure and limitations in permissible/non-permissible investing activities, Islamic banks face liquidity issues and challenges in mitigating credit risk (BECK et al., 2013; ČIHÁK and HESSE, 2010).

After the global financial crisis, the outbreak of COVID-19 opened a new discussion of the economic turmoil triggered by the pandemic. The effects of the pandemic were not only limited to social and personal lives, but it reached every aspect of social settings. Hence, the banking sector is no exception (CARNEVALE and HATAK, 2020; DONTHU and GUSTAFSSON, 2020). On a global scale, the banking companies' performance was primarily affected, coupled with risks connected to the financial stability of financial institutions (ELNAHASS et al., 2021). The destructive impact of the pandemic has been witnessed over the global banking sector irrespective of geographic regions (Middle East, Greater Arabia, Europe, Africa), countries, level of income generation, the effect of bank type, and bank size (ELNAHASS et al., 2021). Importantly, it was expected to have a differential impact on Islamic banking due to enhanced investment scrutiny, asset-backed investment, change of business, and operational model. For instance, prior studies (BECK et al., 2013; ČIHÁK and HESSE, 2010) also confirmed that Islamic banks have shielded exogenous shocks due to the complexity of the business model. During the recent pandemic, Islamic and conventional banks experienced low financial performance and a higher risk of insolvency and financial instability (ABDELSSALAM et al., 2022). However, Islamic banks showed marginally better financial performance and slightly lower operation risks during the

COVID-19 crisis. This implies the presence of significant differences in both counterparts in stability measures (ELNAHASS et al., 2021).

The advocates of Islamic banking supported this differential behavior with the help of a dual and tighter governance structure, which includes traditional corporate governance by the board of directors and a dedicated Sharia governance ensured by the Shari'a Supervisory Board (SSB). It is worth noting that global Islamic financial assets showed double-digit growth despite the pandemic. The assets grew from USD 2.961 trillion in 2019 to USD 3.390 trillion in 2020 (IFSB, 2022). Furthermore, it gave a tremendous rise of 17% in 2021, reaching almost USD 4 trillion, with projected statistics of USD 5.90 trillion by the end of 2026 (IFSB, 2022). The Islamic financial sector is not only growing vertically (growth in assets in existing markets) but also an exceptional addition to other countries have been seen in the past decade in 136 countries (IFSB, 2022). The breakup of global Islamic financial share is as follows: GCC leading from the front with 40.8% share, MENA with 32.8%, Southeast Asia contributes 20.3%, from the western side, Europe is leading with 2.86%, followed by South Asia at 2.7%, Americas with around 1%, Sub-Saharan and others less than 1%. The trend shows steady growth in the Islamic financial sector even at the time of stress, which reflects its resilience (MENSI et al., 2020), considerably better performance compared to counterparts (ELNAHASS et al., 2021), and financial stability (PAPPAS et al., 2017).

Financial resilience and the ability to withstand economic turmoil are exceptional traits of Islamic banks. The followers of this system take support from the argument that the underlying principles and business model are completely different from the interest-based banking system. The working of Islamic banks is based on Islamic Shari'a law. Most importantly, an Islamic bank's liability and asset side is governed by different Islamic contracts, either backed by participatory or sale-based contracts. The asset side of Islamic banks primarily focuses on actual trading activity by using Murabaha, Ijarah, Istisna, Diminishing Musharaka, and Salam[1] (TABASH and DHANKAR, 2014). Since all the contracts are based on actual trading activities, which help boosting economic growth. According to RAFAY and FARID (2017), Islamic banks drive real economic activity. As a result, many authors, including CAPORALE and HELMI (2018), LEHNERT (2019), and

---

[1] Murabaha refers to a contract where cost and profit is disclosed to the buyer. Musharakah refers to the partnership contract between Islamic bank and its customers. Diminishing Musharakah is an extended form of partnership where a bank withdraws its share in the property gradually. Istina and Salam are the sale transaction where delivery of the product is deferred, and payment is made in advance. Whereas Ijaraha is an alternative to the lease contract.

TABASH (2019), have suggested a strong causal relationship between Islamic banking and economic growth.

1.1 Introduction of Islamic financial system

Islamic banking is a system that follows some rules of permissibility and some limitations as governed by Shari'a – the Islamic law. There are a few prohibitions in the eye of Shari'a, which are primarily infused in the conventional banking system. The most important of them is dealing in interest-based debt transactions. In addition to non-permissibility of interest, financial contracts with increased uncertainty, such as gambling or speculative activities, are forbidden (OMAR et al., 2013). Moreover, the growing challenge of investment ventures in Islamic banking is the selection of the right channel, which is ethically allowed as per Shari'a. For instance, industries selling or producing alcohol, pork, pornography, gambling, or any unethical subject are not options for investment as per Islamic law (ABASIMEL, 2023; USMANI, 1998). This limitation sets up the real challenge for the interest-free banking system. On a broader aspect, the prime objective of Islamic banking revolves around the idea of socio-economic benefit and bringing justice within the society in which it operates. Therefore, despite being dependent on interest-based contracts, Islamic banks can be fairly handy in promoting socioeconomic development and eradication of poverty. The objective can be achieved by implementing the concepts of profit and loss-sharing contracts instead of extending debts on interest (EL-GALFY and KHIYAR, 2012). Lending and borrowing are the critical functions of a bank as per classical theory, where a bank borrows funds in the form of deposits and lends them to clients on interest. The spread between borrowing and lending interest rates is the lucrative proportion for banks. However, the challenge comes here when Islamic banks perform similar business without the involvement of interest (KHAKI and SANGMI, 2011).

1.1.1 Difference between Islamic and conventional banking

Islamic banks structure the contracts as per customers' needs and make an effort to devise a product that categorically involves real assets or sharing of risk. Therefore, in exchange for their investment, the investors gain a pre-agreed profit and lose the investment in case of losses undertaken (BALAZS et al., 2021). Moreover, from the liability to asset side, it is evident that the underlying contracts of each product are different (PRABAKARAN and PREMKUMAR, 2019). Meanwhile, in conventional banks, both asset and liability sides are governed by interest-based loan transactions (ANWAR, 2003). Intrinsically, Islamic banking is much different from interest-based banking. According to IQBAL and MIRAKHOR (2011), the transactions in Islamic banks are carefully designed to be free from predetermined interest rates; instead, each product is backed by either asset or trading activity that gives rise to sharing the risk and reward associated with each

transaction. According to RAFAY and FARID (2017), real economic activity is enabled by Islamic banks. HANIF (2014) argued that an essential aspect of Islamic banking is recognising the key differences between its products and interest-based financing.

There are two differential features of Islamic financing. Firstly, Islamic banks take an active part in sharing the risks and rewards of assets attached to a particular product. This makes the Islamic banking model unique from conventional products. It also strongly links Islamic financings in spurring real economic activities. Secondly, in the case of Mudaraba (financing based on partnership), the funds are effectively channelled from a dead end to a productive partnership contract. Moreover, the banks are pivotal in directing funds toward safe and skilful hands. Therefore, many authors regarded Islamic banks as trading agents; meanwhile, as a by-product, the Islamic banking industry is playing the function of intermediation on its own (IQBAL and MIRAKHOR, 2011). Islamic banks are not only financial intermediaries but are classified as trading agents (SHAMSUDIN et al., 2015). As a result, many authors (CAPORALE and HELMI, 2018; LEHNERT, 2019) have argued that Islamic banking products facilitate real economic activities and result in sustained growth.

It is evident that Islamic banks are conceptually and operationally different from conventional banks. Moreover, studies (CAPORALE and HELMI, 2018; LEHNERT, 2019; TABASH, 2019; TABASH and DHANKAR, 2014) claimed that along with intermediation, Islamic banks actively participate in real economic activities by sharing in risk and reward in banking transactions. The role of financial intermediation with the instigation of asset-backed banking appeared to arise stronger compared to traditional banking. The other aspect of differences in operational models resulted in several benefits observed in the Islamic banking industry. BABER (2018) reviewed and analysed the theoretical aspects of Islamic banking performance compared with conventional banks during and after the credit crisis of 2007-09. The author found that due to the nature of asset-backed products and sharing in risk and reward, Islamic banks became more stable and efficient than conventional banks. Furthermore, the capacity of Islamic banks to withstand external shocks is far greater than that of non-Islamic banks. In addition, other studies documented empirical evidence in favour of Islamic banks' stability and efficiency (HASAN and DRIDI, 2010; PAPPAS et al., 2017). Moreover, the capital structure and asset quality of the banking sector play an important role in defining their stability. For instance, HASSAN and HUSSEIN (2003) examined the asset side of Islamic banks and argued that the nature of asset-backed financing and the sharing of risk in financing make Islamic banks better at mitigating risk and maintaining the quality of assets. In continuation, Islamic banks have better liquidity and lower-risk positions due to the nature of profit- and loss-sharing contracts (SAMAD and HASSAN, 2006).

Therefore, the nature of underlying contracts used by Shari'a-based banking makes them stable, efficient, less risky, and resilient in times of shocks. All these perks enjoyed by Islamic banks are mainly due to their nature of being closely related to trading agents. Further, it helps the Islamic financial sector to promote economic activities in real terms from surplus hands towards entrepreneurs. The connection between the nature of underlying contracts and their operationality and Islamic financial products is argued to be a stimulus for the manufacturing process, facilitating the real sector to grow (RAFAY and FARID, 2017).

1.2 Statement of the Problem and Research objectives

Islamic finance has progressed significantly beyond its initial phases, and the world has experienced exceptional growth in the modern banking system from the 1960s till now. Ever since its inception in the Middle East, Islamic banking is still at the growing stage. Also, the Islamic financial assets had shown tremendous growth over the years from $160 billion in 2001, $600 billion in 2006, grossing up $951 in 2008 (MCKENZIE, 2010), to $1.7 trillion by the end of 2013 (ERNST and YOUNG, 2016). However, recent statistics showed the total size of global Islamic financial assets to be $4.0 trillion, intending to achieve a projected growth of almost $6.0 trillion by the end of 2026 (IFSB, 2022). Moreover, considering the fact highlighted in the IFSB (2022) report, there are fifteen countries in the world where Islamic banking share in the local market is more than 15%, which further contributes to global Islamic banking assets of at least 1.5% (IFSB, 2021). In local markets, Iran and Sudan have 100% of Islamic banking, followed by Saudi Arabia with 68%, Brunei at 61.9%, and Kuwait and Malaysia at 42% and 28.9%, respectively. Moreover, there are countries with more than 15% contribution of Islamic banking in the local financial sector, including Qatar (27.7%), Djibouti (25%), Pakistan (24.3%), Bangladesh (21.9%), UAE (19.0%), Jordan (17.9%), Palestine (16.5%), and Oman (14.2%). The popularity of the Islamic financial system is not only witnessed in Muslim countries, but non-Muslim countries are no exception. With the recent development of the Islamic development index introduced by Refinitiv – the world's leading business and intelligent data provider, a list of 136 countries is included based on the level of development and maturity of the Islamic financial sector (IFSB, 2022). The index is referred to as the Islamic Financial Development Indicator (herein after IFDI), which gives the indication of the presence, size, growth, and inclusion of Islamic financial assets as part of the ecosystem of the financial sector in a given country. IFDI is measured based on ten different indicators that include but are not limited to financial performance, the structure of governance, level of sustainability, knowledge produced, Shari'a scholar, and the level of awareness (IFSB, 2022).

Various areas of the Islamic financial sector have been studied by many scholars, including Islamic investment finance, financial stability, business models, challenges and future prospects, and the finance-growth relationship (AGGARWAL and YOUSEF, 2000; BECK et al., 2013; CAPORALE and HELMI, 2018; NARAYAN and PHAN, 2019; TABASH, 2019). However, having discussed the conceptual and operational differences and enormous growth of Islamic finance, there is reasonable room to revisit the Islamic finance-growth nexus from a different perspective. Notably, prior to the adoption of Islamic banking, all countries had only relied on the conventional banking system. However, at the end of the nineteenth century, a dual banking structure was established where Islamic and conventional banks operated alongside. Current research attempts to examine the Islamic finance-growth nexus in four ways. Firstly, the functioning of the Islamic financial sector in the presence of a dual banking system is explored. Secondly, considering that Islamic banks operate on two major financing types, the impact of each type is discussed in the context of the finance-growth nexus. Third, the existing literature shows a conspicuous lack of research that empirically estimates the differential impact of the adoption of Islamic banking models on financial and economic growth. This research aims to fill the gap by analysing the differential effect of the adoption of Islamic banking on economic growth and financial development. Lastly, keeping in view the entrepreneurial abilities, real-time involvement in trading activities, and the social objective of Islamic finance, the study also put effort into answering whether implementing Islamic banking indeed contributes to achieving the better living standard poverty alleviation.

Based on above arguments, the study sets out the following objectives:

1. To measure the impact of Islamic financial depth on economic growth of Pakistan.
2. To examine the relationship of different modes of Islamic financing and real economic output.
3. To investigate the differential impact of financial sector on economic growth after adoption of Islamic banking in Pakistan.
4. To study the differential impact of Islamic financing on poverty alleviation in Pakistan.

1.3   Significance of the study

The study contributes to the existing body of knowledge in four dimensions. Islamic financial markets operate parallel to the conventional financial system, and the demand for Islamic financial assets continues to grow over time (MCKENZIE, 2010; ERNST and YOUNG, 2016; IFSB, 2022). First, this study aims to provide insights into the relative importance of Islamic financial depth in countries with a prevalent dual banking system. According to IFSB (2022), Pakistan is among the top nine countries globally, with most Islamic financial assets contributing over 25% to the local

financial market. Therefore, exploring the relative impact of Islamic financial depth on economic progress is essential. Secondly, Islamic banks have diverse modes of financing on their asset side, including profit and loss sharing (PLS) modes and non-risk sharing (non-PLS) modes. This study aims to dissect Islamic banks' financing side and identify the impact of risk-sharing and non-risk-sharing modes on real economic output. Such an analysis would provide insights into strengthening the financing side of Islamic banks, which can contribute to fostering real economic activities. Moreover, decomposing the financing side offers a comprehensive view of the use of legitimate Islamic financing contracts, such as Mudaraba and Musharaka, and will embody the spirit of Islamic financing by involving risk-sharing partners and encouraging entrepreneurs to engage in business. The impacts on the economy and manufacturing activities are expected to provide insights into productivity, which holds relevance for key stakeholders, including regulatory bodies, central banks, top management, and policymakers.

This study aims to provide novel results regarding the differential impact of Islamic banking adoption on economic growth within the context of Pakistan. The findings concerning the incremental impact of adopting Islamic banking are expected to offer guidance to countries with little or no Islamic banking presence, encouraging them to implement or promote Islamic financial assets on a larger scale. Moreover, it realizes Sustainable Development Goal 8, centered on achieving economic growth. On the econometric front, this study extends the use of the Synthetic Control Method (SCM). To the best of the author's knowledge, this model is expected to be used for the first time in the context of Islamic finance and growth relationships. Its application will enrich the literature regarding statistical modelling and provide new insights into the differential impact of adopting a new banking system. Furthermore, the study will provide evidence regarding whether the adoption of Islamic finance has led to social welfare improvements and raised the population's living standards. The evidence of poverty alleviation is expected to be a distinguishing feature of this study and will contribute to its value. Additionally, it will provide evidence of progress toward achieving Sustainable Development Goal 1, which focuses on Poverty alleviation and better living standards.

2   REVIEW OF LITERATURE AND HYPOTHESIS DEVELOPMENT

This section reviews existing literature and the development of hypotheses in line with the research objectives. Firstly, it provides a theoretical background following the empirical literature discussing the finance-growth nexus. In the next part, literature relating to Islamic finance and economic growth is discussed, along with the discussion of financial instability and poverty alleviation and the development of hypotheses.

2.1 Theoretical background

Financial sector growth and its impact on economic development have been debatable in the literature. The idea was first pitched referring to British industrialization, and it was observed that the financial sector impacts economic growth by promoting productive trades (BAGEHOT, 1873). After a long pause of four decades, the phenomenon was revisited by SCHUMPETER (1912) with the provision of finance flowing from the financial sector to business owners. It was considered the first seed in the finance-growth nexus in modern finance, which highlighted the significance of external financing for entrepreneurs. According to that, financial companies extend funding to industries with higher growth perspectives, which ultimately helps the economy to grow. Thus, the first theory in the domain of the finance-growth nexus was coined by SCHUMPETER (1934), referring to the productive allocation of funds, channelizing savings that transformed into investments. Therefore, it acts as the primary driving force for the economic growth. Hence, the theory was referred to as the supply-leading hypothesis. Several studies afterwards advocated the strength of the supply-leading hypothesis, such that GURLEY and SHAW (1955) criticized the Keynesian model for measuring the financial aspect of growth. In short, the Keynesian approach ignored the long-term effect of the accumulation of investments and the transformation of savings and investments. Hence, financial intermediaries play an imperative role in credit creation, facilitating directing the funds from surplus to deficit hands. Likewise, GOLDSMITH (1969) claimed similar results with American economic experience. It has been argued that the growth in financial assets gives rise to aggregate national assets through financial intermediation. Furthermore, intermediation plays a quantifiable role in portraying the economic structure and development at a national scale. Later, the Schumpeterian hypothesis realized considerable empirical support from various world regions, such as SHAW (1973) and MCKINNON (1973). Compared to previous studies, a relatively stronger and more detailed work was done by (KING and LEVINE, 1993). The research suggested with the validation of Schumpeterian hypothesis, further the authors complemented the process of innovation through financial intermediation. The study provided the most generalizable results compared to SHAW (1973) and MCKINNON (1973), giving empirical evidence from 80 countries. The study concluded that financial intermediation enhances physical capital accumulation, which in turn improves the efficiency of capital utilization. Hence, the final effect is reflected in the economic growth.

Considering supply-leading theory, several studies were conducted to test the phenomenon in different economic settings. In contrast, one of the seminal works by ROBINSON (1952) got attention when he came up with a completely reverse theory, stating that the financial sector depends on economic growth (ROBINSON, 1952). The theory was later referred to as the demand-following hypothesis, which states that financial development is a function of economic growth.

If the economy is growing, it facilitates major sectors instinctively; hence, the financial sector is one of them. Moreover, ROBINSON (1952) believed that when the economy grows, it creates demands for goods and services, production, and even natural resources. Likewise, it increases the demand for financial services to meet the financial needs of consumers, investors, and entrepreneurs. The presence of the demand-following theory was empirically observed in 56 sets of countries with industrialized developed and developing countries (JUNG, 1986). Furthermore, the author stressed that the causality in the finance-growth nexus mainly depends on the proxy of financial development. According to this study, if broad money M2 is used for financial development, it reflects the broader aspects of financial intermediation that move from income to investment. Certainly, it had a natural effect on the accumulation of wealth and income, which turned into a division of labour, savings, and production, hence the financial intermediation as the economy started to grow.

The debate on finance-growth hypotheses generated contradictory results. The phenomenon was extensively studied in developed and developing economies, enriching the literature with other theories. For instance, the theory of mutual dependence states that finance and growth complement each other depending upon the stage of growth (PATRICK, 1966). According to Patrick, at the first stage, when there is a lack of demand for banking services, the economy precedes financial growth. It implies that as the economy grows, it allows the real sector to develop, creating more demand for production, employment, and other financial services. Notably, at the beginning of economic growth, the financial sector acts passively to fulfil the growing demand of the economy. On the contrary, while channelling funds from savers to investors, the financial sector signifies the innovative investment that spurs economic growth. In the second pattern, the financial sector precedes economic growth. However, the question of causality in finance-growth nexus is dependent on the stage of development in growth. The theory is called the 'Mutual dependence' theory, which complements the mutual association of the financial sector and economic growth. PATRICK (1966) postulated that the financial sector spurs economic growth at the initial stages of growth as it facilitates innovation in investment, which fosters economic growth. On the other hand, as the economic growth level is sustained for the long term, the importance of supply-leading becomes less significant, and the finance-growth nexus starts following the demand-following pattern. Later, it was considered one of the important developments in theoretical economics and particularly in less developed countries, the supply-leading hypothesis seemed to prevail. In developed countries, financial growth follows the growth pattern (JUNG, 1986).

A relatively recent addition to literature coined by LUCAS (1988) infers that economic growth is immune to the financial sector of any economy and states the finance-growth nexus as an

overstressed phenomenon. Lucas argued that no single growth model seems to conform to every economy and finance-growth theories are unnecessarily overstressed. Importantly, poorer economies tend to remain poor, as their growth rates are unlikely to surpass those of rich countries. In conclusion, as LUCAS (1988) suggested, a comprehensive finance-growth model is needed to capture the effects on economic growth effectively.

2.2 Empirical literature on conventional Finance - growth nexus

Four main hypotheses persist in literature so far that gained immense popularity. However, the empirical research provided conflicting results in different economies. MCKINNON (1973) and SHAW (1973) turned out to be the significant advocates of the Schumpeterian finance-growth hypothesis; their view was the same as Schumpeter suggested, i.e., financial development serves as a key driver in spurring economic growth. Similarly, literature gathered support from several other studies from the 1970s to 1990s, specifically on developed economies. Importantly, the liberal view of financial systems facilitates saving and lending for productive uses. The banks mobilize the savings to produce physical capital, which increases the productivity of accumulated capital and its volume. Therefore, financial systems play a vital role in liberalizing funds and helping the economy grow. In classical literature, many renowned authors validated the significance of financial systems (KAPUR, 1976; MATHIESON, 1980). Though the prime focus of the mentioned studies was developed nations. However, supply-leading theory persisted in less developed countries (LDCs), including India, Colombia, Costa Rica, Sri Lanka, Thailand, Greece, Burma, Korea, Malaysia, Philippines, Taiwan, and Singapore. The positive effect of demand for money and economic growth has been found in the selected LDCs, giving the reason for the application of McKinnon's complementary assumption (FRY, 1982).

A comprehensive study confirms the supply-leading hypothesis in all countries, subject to the availability of data, segregated in developing and developed countries (GRAFF, 2003). The results suggested a strong relationship flowing from financial development and economic growth in developed and less developed countries. However, due to the unavailability of data on countries with less than a million population, the study was comprehensive enough to validate the assumption of the Schumpeterian hypothesis. Furthermore, GRAFF (2003) argued that due to Petro-dollar uncertainty and the oil price shock, this relationship has become weak, but no evidence of a demand-following hypothesis was found in the study. One of the pioneer studies in the recent two decades proved the evidence in favour of the supply-leading theory. Furthermore, it evidenced that the total factor productivity is sensitive to substantial and positive financial development, which accumulates private savings and physical capital and helps the economy grow (BECK et al., 2000). The finance-growth nexus got further attention regarding large financial

institutions functioning parallel to small banks and the financial sector in low-income and high-income countries. For instance, BECK et al. (2013) argued that the long-run uncertainty in economic growth in low-income countries becomes stable with increased involvement of financial intermediation. The authors further argued that in the short run, financial input is unable to deal with the volatility of the market. However, large financial institutions play a significant role in stabilizing economic growth in low-income countries. Several studies have been conducted in conventional financial markets that support Schumpeterian theory in developed, less developed, and middle-income countries. However, the strength and the magnitude of the relationship are mediated by many factors that include but not be limited to oil exporters, financial repression, liberalization, inflation, political instability, and many others (BANDURA, 2022; SOEDARMONO et al., 2017; SWAMY and DHARANI, 2021). In the Hungarian context, a positive relationship between private and retail credit to economic growth is confirmed in support of the supply-leading theory. However, besides total private credit, the EU funding also greatly contributed to capital formation, increased production, and enhanced the under-utilized capacities to help grow the economy (VARGA et al., 2019).

In the finance-growth nexus, it is difficult to argue whether the financial sector leads the economy or otherwise. However, the phenomenon is dynamic in nature, and the studies showed mixed results. For instance, in many studies, the role of financial institutions precedes growth; on the other hand, some showed economic growth drives financial development (GHIRMAY, 2004; ODHIAMBO, 2008). The causation flowing from growth to finance is evident from recent empirical studies. It is important to mention that the lack of financial growth indicates lower demand for financial services in low-income countries. However, when the economy starts to grow, it creates demand for real economic and financial activities, which helps the financial sector grow (AGBETSIAFA, 2004). On the empirical front, the development of the real sector was found to have a strong connection with the development of financial sectors. Countries with higher growth in the real sector create new demands for banking to extend funds to the private sector, showing a greater demand for innovative financial solutions (ODHIAMBO, 2008). The results of this study conformed to Patrick's Mutual dependence hypothesis, which says that the finance-growth relationship is dependent on the stage of economic growth. Therefore, supply-leading phenomena tend to exist in developing economies where the real economic sector is relatively less developed (ODHIAMBO, 2008). Meanwhile, the demand-following pattern is observed in advanced nations. In addition, the real sector facilitates bridging the gap between financing and corporate needs (ONWUMERE et al., 2012). Therefore, entrepreneurial innovation is critical in spurring financial development caused by economic growth (CHENG and HOU, 2022).

On empirical grounds, mutual dependence is considered one of the stable models in the finance-growth nexus. As per the mutual dependence hypothesis, financial development and economic growth complement each other. However, the relationship is dependent on the level of growth within the economy (PATRICK, 1966). The mutual association of finance and growth was further explored by GREENWOOD and SMITH (1997), confirming that at the early stages of economic growth, growth precedes financial development by creating new paradigms for investment, which is also dependent on the inflation rate. However, the finance-led phenomenon became dominant soon after the economic growth became stable in the long run. Furthermore, several studies confirmed that financial development derives economic growth in developing countries. On the other hand, in economies with relatively stable growth and real sectors, economic growth plays a leading role in developing financial growth through innovation (APPIAH-OTOO and SONG, 2022). It is pertinent to note that several other factors affect the finance-growth relationship, which is not limited to the stage of development, the proxies of variables used, inflation, innovation, industrialization, financial repression, and liberalization. In connection to the discussion, the latest addition to this family is the neutrality hypothesis, which infers that economic progress is immune to the financial system and suggests that financial growth is an overstressed dilemma (LUCAS, 1988). Several recent studies also confirmed the inactiveness of the financial sector in connection with economic growth (CEVIK and RAHMATI, 2020; DAWSON, 2010).

A relatively undiscovered theory of threshold finance effect towards economic growth draws attention in the early 21st century. It states that the financial sector stimulates the economy until a certain level; however, later, it becomes detrimental to the economy (ARCAND et al., 2015). The authors argued that GDP is sensitive to financial development when the private credit reaches 110% of the gross domestic product; after that, financial growth negatively affects economic growth. The study suggested a threshold limit for developed and less developed countries where any further increase in financial depth causes a negative effect on economic growth. However, the threshold limit may vary from country to country, such as 110% for developed countries (ARCAND et al., 2015), 87% for a pool of developed and developing countries (LAW and SINGH, 2014), and 107% sensitivity in case of G-7 countries (SWAMY and DHARANI, 2021). Ever since the inception and development of financial theories, the debate in classical and contemporary finance has continued. However, the introduction of the Islamic financial system in the late 20th century opened a new horizon in the finance-growth nexus. Although the results are not generalized even in traditional financial setups, Islamic financial systems opened a new challenge for economists and researchers. Furthermore, the experts argued that the Islamic financial sector works on an entirely different model, which gained popularity within a short span of time due to

its stable nature (HASAN and DRIDI, 2010). Therefore, the essence of Islamic banking is pertinent to be explored in detail.

2.3   Defining Islamic banks

Islamic banking can be defined in several ways. According to AYUB (2013), Islamic banking can be defined as banking activities conducted without the involvement of interest and speculation as directed by Shari'a laws. Moreover, the contracts are designed to encourage risk-sharing rather than risk-transferring (AYUB, 2013). Therefore, the banking activity following the Shari'a law is also called Shari'a-compliant banking. Furthermore, Islamic banks also referred to as profit-and-loss sharing banks, where the depositors and the borrowers are considered the sharing partner with the bank, which allows Islamic financial institutions to operate as a trading partner based on risk-sharing rather than any speculative measures (USMANI, 1998). However, the element of intermediation is still there as the prime objective of Islamic banks to bridge the gap between the lenders and the borrowers. Though the outlook of Islamic banks seems similar to conventional banks, each product is intrinsically different due to its asset-backed nature. Therefore, it is also termed as assets-backed banking (IQBAL and MOLYNEUX, 2016).

2.4   Islamic banking model and underlying contracts

Islamic banking assets are classified into two main categories: debt-based and equity-based contracts. When examining the balance sheet, it is important to note that the assets and liabilities of Islamic banks differ conceptually from those of conventional banks. The asset side, which includes financing and loans to customers, is primarily operated through sale/debt/non-participatory contracts. On the other hand, the liability side primarily consists of equity/participatory contracts (AYUB, 2013). This means that regardless of whether it is an asset or a liability, every contract of an Islamic bank is backed by a tangible asset. These contracts are further divided into three main types: debt or sale-based contracts (also known as non-participatory contracts), trustee contracts (Mudaraba - where funds are invested by one party), and equity/participatory contracts (Musharakah - Partnership) (LEWIS and ALGAOUD, 2001; VARGA, 2017). To fully understand the structure and organization of Islamic banks, it is necessary to separate and analyse each side of the balance sheet.

2.4.1   Liability Side/Deposit side

The banking business is debt-intensive, where banks work on high leverage by using deposit funds on interest-based loans. However, Islamic banks maintain the deposit/liability side in an entirely different way.

2.4.1.1 Qard

Qard is a Shari'a-compliant product based on the concept of a loan. The bank accepts a certain amount of money from the customers (depositors) as a loan contract, payable fully or partially on demand from the outstanding value (AYUB, 2013). The current account operates on a Qard basis, which means depositors do not receive any remuneration or profit. It's worth noting that both Islamic and conventional banks follow this principle for their current account product. The only distinction lies in how these banks utilize these funds.

2.4.1.2 Mudaraba/Trustee contract

Mudaraba/Trustee contract is considered the most popular contract in the Islamic banking industry around the globe. It refers to a contract where one party invests the funds as an investing partner (also known as Rab-ul-Mal), and the second party acts as a working partner who deploys his skills to generate profit (AYUB, 2013; USMANI, 1998). Mudaraba is also referred to as the purest form of Islamic financial contract, where one partner invests funds and the second party offers entrepreneurial skills to run a business. The profit earned from the business is shared by both partners as per the agreed ratio. However, the loss is borne as per investment. Therefore, in Mudaraba, only one party invests; the loss is born by the investor only, while the working partner loses their share in profit and loss of efforts (IQBAL and MIRAKHOR, 2011). Most Islamic banks employ Mudaraba on the liability side, such as saving accounts, term deposits, saving certificates, and other profit-yielding deposit products (AYUB, 2013; USMANI, 1998). However, the use of Mudaraba on financing is the ideal use of trustee contracts, which is evident in Modaraba companies (AFZA and ASGHAR, 2014). In this sense, Islamic banks are sometimes called Mudaraba companies who act as entrepreneurs and gather funds from investors.

2.4.2 Asset Side/Financing side

The asset side of an Islamic bank is governed by the different Islamic contracts, which are either participatory (profit and loss sharing) or sale-based contracts (non-profit and loss sharing). Islamic banks primarily focus on real trading activity using Murabaha, Ijarah, Istisna, Diminishing Musharaka, and Salam (TABASH and DHANKAR, 2014). The types of contracts are further divided into participatory and non-participatory contracts.

2.4.2.1 Participatory or equity-based contract

Participatory or equity-based contracts (also known as Musharkah) are the typical partnership agreement between an Islamic bank and the client. Where both the parties invest funds to carry out a business activity. The profit of the business is subject to distribution as per the agreed ratio. However, the loss is shared by both partners up to the amount of money invested, hence known as

profit-and-loss sharing contracts (PLS). Islamic banks use this contract on the asset side of their balance sheet. For instance, running finance, imports and exports, and house financing are financed through Musharakah (AYUB, 2013; USMANI, 2007, 1998). On practical grounds, Musharkah meets the needs of running finance or overdraft facilities (USMANI, 1998), where Islamic banks allow their clients to access the finance on a pre-agreed profit and loss sharing ratio. If the customer earns profit, it will be shared per agreed terms; however, the loss is born as per the invested capital. In addition, there is an extension of Musharakah, known as Diminishing Musharakah. It is like an ordinary partnership, but one of the partners withdraws its part of the share gradually over the course of the period. Diminishing Musharkah is widely used for house financing (ANWAR, 2003), where the client and bank acquire a property with joint ownership. The bank sells its property shares to the client and withdraws its part gradually with time until the client becomes the complete owner.

2.4.2.2 Non-participatory or debt-based contract

Islamic banks commonly utilize sale and debt-based contracts, also known as non-participatory or non-profit-and-loss sharing (non-PLS) contracts. The asset side of Islamic banks is mainly comprised of both PLS and non-PLS contracts. Multiple contracts fall under sale-based contracts and are categorized on the asset side (LEWIS and ALGAOUD, 2001). Sale-based contracts provide a broad selection of Islamic financing products that meet the needs of modern customers (ANWAR, 2003).

2.4.2.3 Murabaha

Murabaha is one of the most common contracts Islamic banks use to fulfil corporate client's financing needs (AYUB, 2013; USMANI, 1998). Murabaha is a sale contract where an Islamic bank discloses the cost and the profit margin to the customer with a deferred payment option. In theory, it is a simple trade financing contract where the price of the product is fixed with disclosed profit to both the parties. However, in practice, it is a contract between the final buyer (customer) and the financier (the Islamic bank) where the customer approaches the bank with the requested goods. Islamic banks arrange the goods and sell them to the customer on a cost-plus-profit basis with a deferred payment option (ABASIMEL, 2023). This distinct type of Murabaha is also known as 'Murabaha to the purchase orderer' (MPO). MPO is excessively used in Islamic banks to offer financing facilities to acquire raw materials and other goods. Furthermore, the import contract and letter of credit are practical examples of MPO (IQBAL and MOLYNEUX, 2016).

2.4.2.4 Istisna and Salam

In Islamic economics, Shari'a law prohibits the trade of goods that no longer exist (ANWAR, 2003; AYUB, 2013). However, there are two exceptions to this rule as per Islamic law. The first exception is Istisna contracts, which involve orders for manufacturing even before the goods are ready for sale. Istisna is commonly used for financing needs that require manufacturing. Clients request that Islamic banks order goods for manufacturing, and in return, the bank charges a reasonable profit margin over the cost (ABASIMEL, 2023). The Islamic bank bears the risk of the asset until it is sold to the customer. Secondly, Salam contracts are similar to Istisna, but they are not orders for manufacturing. They are used to purchase specific goods that can only be delivered in the future. Salam is primarily used for import and export financing, where the quality, quantity, and other details of the goods are specified with no ambiguity. The goods are sold with an advance on-spot payment, and the product is delivered based on pre-agreed time and delivery method (ANWAR, 2003; AYUB, 2013; IQBAL and MIRAKHOR, 2011).

2.4.2.5 Ijarah

In comparison to the leasing contract, Islamic bank offer an Ijarah contract, where Islamic bank transfers the usufruct of the assets to the client and receives rental income as compensation. The bank takes part in all risks and rewards of rented assets throughout the rental period, which is not observed in conventional leases (AYUB, 2013). In modern banking, Ijarah is practiced with the help of Ijarah-wa-Iktana, the alternative contract for hire-purchase agreement. The client first hires the asset from the bank on rent and then promises to buy it after an agreed period at an agreed price. Ijarah-wa-Iktana is widely used for car financing by Islamic banks (ANWAR, 2003; AYUB, 2013; USMANI, 1998). Furthermore, another extension of Ijarah agreement is its blend with diminishing Musharkah (ABASIMEL, 2023), where the bank and customer form a joint partnership in an asset. The customer agreed to pay the rent of using the bank's part of the asset and also agrees to buy the bank's share gradually in each period. Ijarah with diminishing Musharkah is practically seen in car finance and house financing in Islamic banks.

2.5 Empirical literature on Islamic finance - growth nexus

Islamic banking has emerged as a viable and effective alternative to traditional banking systems, contributing significantly to the financial market. Unlike interest-based banks, Islamic banks simultaneously serve as financial intermediaries and trading agents (SHAMSUDIN et al., 2015). Furthermore, based on production and intermediation banking approaches, Islamic banks have been shown to be economically efficient compared to their conventional counterparts (MUSA et al., 2021). Businesses facilitated by Islamic banks, which engage in real trading of assets, have the potential to create new job opportunities and promote capital formation. As such, it is critical for

Islamic banks to actively promote economic growth by participating with their clients as trading partners. This section provides a comprehensive literature review on Islamic finance and its impact on economic growth. Building on the theoretical background presented in the previous section, the literature review is divided into four parts that support each finance-growth theory.

2.5.1 Literature supporting supply - leading hypothesis

Islamic finance literature also supports the first theory in the finance-growth nexus. Similar to conventional finance, many studies hold the Schumpeterian hypothesis in several countries where the Islamic financial industry is developed. CHOWDHURY et al. (2018) suggested a positive and linear relationship between Islamic financial development and economic growth in Bangladesh. The study was conducted on full-fledged Islamic banks in Bangladesh from 1984 to 2014. The authors analysed the impact of Islamic financial development on economic growth using autoregressive distributed lag (ARDL) and error correction method (ECM). The economic growth was proxied through GDP, while Islamic financial development was measured by two variables, i.e., PLS financings and non-PLS financing. However, other control variables such as inflation, trade openness, gross fixed capital formation, and government expenditure were also considered to make the model robust. The result suggested that financing made in PLS mode is healthy for boosting economic growth. Meanwhile, sale-based financing negatively affected economic growth in the long run. Together with the findings, the results supported the supply-leading hypothesis. Although the concentration of Islamic financial depth in Bangladesh is insignificant, the risk-sharing instruments are still conducive to economic growth. In Malaysia, MAJID and KASSIM (2015) conducted a study on the level of Islamic financial intermediation, measured by total financing as a percentage of nominal GDP, total deposit as a percentage of nominal GDP, and volatility of the Dow Jones Islamic index of Malaysia. Using quarterly data from 1997-2009 and controlling for other variables, the authors examined the impact of Islamic financial development on economic growth (real GDP) through ARDL, vector error correction method (VECM), and variance decomposition (VDC) methods. The findings indicated a significant positive correlation between Islamic financial development and economic growth, supporting the Schumpeterian hypothesis. This suggests that funds were efficiently utilized to stimulate real economic activities and boost the economy. However, the authors also noted that financial resource allocation did not appear to have any effect on growth.

Malaysia has been an early adopter of the Islamic financial system, resulting in many seminal works. One such study by HACHICHA and BEN AMAR (2015) explored three measures of Islamic financial development: PRIVATE, PRIVIS, and ENVIS. These measures were used to quantify total Islamic financing to the private sector, Islamic financial depth as a percentage of

GDP, and capital accumulation through Islamic financing, respectively. To measure economic growth, real GDP was used. Analysing quarterly data from 2000-2011 using Johansen and Juselius cointegration (JOHANSEN and JUSELIUS, 1990) and ECM models, the study revealed varying elasticities with respect to the Islamic financial indicators used. Notably, finance extended to the private sector seemed to have less impact on long-term economic growth compared to the short-term. However, as a financial intermediary, the Islamic financial sector promoted capital accumulation and economic growth. Similarly, a relatively more extensive group of countries in the MENA region yielded comparable results. The study, which spanned the period of panel data from 2000 to 2014, investigated 13 countries. It was discovered that Islamic financial depth, measured by Islamic financing/GDP, was instrumental in driving economic growth. The panel cointegration model confirmed that Islamic financial development was conducive to long-term economic growth. However, the relationship between the Islamic finance-growth nexus in the MENA region was influenced by institutional development. The research also found no distinction between oil-rich exporting and non-exporting countries (BOUKHATEM and BEN MOUSSA, 2018).

Furthermore, a panel ARDL model was employed to investigate the supply-leading hypothesis in Southeast Asia using quarterly data from 2000 to 2012. The findings revealed a robust and statistically significant impact of Islamic financial development on long-term economic growth. Notably, the authors underscored a unique relationship between major Islamic banks and their substantial influence on economic progress (LEBDAOUI and WILD, 2016). Given the growing popularity of the Islamic financial industry, more sophisticated research has been conducted on the interplay between financial development and economic growth. For instance, other studies have also presented similar supportive evidence for the Schumpeterian theory of the finance-growth nexus (ABEDIFAR et al., 2016; ALI and AZMI, 2017).

2.5.2 Literature supporting demand - following hypothesis

The demand-following hypothesis, as proposed by Robinson, is a well-known theory in the finance-growth nexus. Even in Islamic finance, where it is believed that Islamic financing modes are inherently designed to promote economic growth, empirical findings have produced contradictory results. For example, in their seminal work examining quarterly time series data from the Malaysian Islamic banking industry, FURQANI and MULYANY (2009) found that economic growth had a significant impact on the development of Islamic banking. Using total Islamic bank financing as a measure of Islamic financial development and real GDP as a proxy for economic growth, the authors employed control variables to minimize omitted variable bias. Their findings strongly supported the demand-following theory, indicating that economic growth impacted

Islamic banking development. Furthermore, the study showed that the development of Islamic financial assets was effective in accumulating capital, highlighting the effective financial intermediation of the banking sector in Malaysia. While strong evidence of long-run cointegration was established, the causal relationship was observed from growth to finance rather than the other way around. Despite Malaysia being considered one of the pioneers in developing the Islamic banking industry, similar studies have yielded different findings (FURQANI and MULYANY, 2009; HACHICHA and BEN AMAR, 2015). This gave a need to dig deeper and produce a generalizable result. In this connection, the United Arab Emirates (UAE) experienced the demand-following approach in the context of Islamic finance and economic growth (ZARROUK et al., 2017). Using a bivariate vector autoregressive model, a strong connection of Islamic financial development and economic growth was found in the UAE. However, the results suggested a causal relationship from growth to Islamic financial development, with no evidence of a reverse effect. The study used a comprehensive set of data from 1990-2012, GDP per capita was used as an indicator of economic growth, M2 (money and deposits) as a percentage of GDP was used to represent the total financial depth, domestic credits as a percentage of GDP used as a measure of financial intermediation, and total Islamic financial investment as a percentage of GDP was used as measure of Islamic financial development. In the case of UAE, the development in the financial sector followed the growth pattern, as suggested by the authors; the development in the real sector started with the revival of fundamental macroeconomic dynamics of the country. Rich in oil reserves, political stability, and other factors contributed to stabilized growth and positively contributed to Islamic financial investments. Moreover, (HASSAN et al., 2011) also argued in favour of Robinson's approach.

2.5.3 Literature supporting mutual dependence hypothesis

Regardless of excessive literature on the finance growth nexus, a generalizable development made by Patrick in 1966 referred to the finance-growth relationship as mutual dependence. Several studies in conventional finance supported the argument that finance and growth complement each other depending upon the stage of growth. Similarly, Islamic finance is no exception. For example, ANWAR et al. (2020), using ARDL, VECM, VDCs, and Impulse response function (hereafter IRF), investigated the impact of Islamic financial development on economic growth in Indonesia. The data collected in quarterly time series from 2009 to 2019 representing Islamic financial development is represented by total Islamic banking deposits, total Islamic finances, and number of Islamic banking branches. However, real GDP is used to represent economic growth. The results indicated a bidirectional causal relationship between development of Islamic finance in Indonesia and economic growth. The findings supported the tenets of Islamic finance, which state that

Islamic finance promotes real trading activities by channelling funds from savers to investors. Furthermore, the study implied to have implications for policymakers to facilitate the growth of Islamic banking that will help to create a continuous conducive environment for economic growth. The development of Shari'a financing got attention from around the globe. Certainly, producing robust and efficient findings in productivity of the Islamic financial industry.

Contrary to TABASH and DHANKAR (2014) and ZARROUK et al. (2017) concluded entirely different results for UAE economy. Taking private financing to the private sector through modes of Islamic financing as an independent variable, real GDP as economic growth. The cointegration model supported Patrick's mutual dependence theory. Since the results were consistent with recent literature but provided another insight into the same country. The reason suggested by many scholars is the immaturity of this sector. It is pertinent to mention that the majority of studies conducted on the finance growth nexus support the mutual dependence hypothesis. ARDL bound testing approach using quarterly data from 2003 to 2010 in Indonesia documented another evidence of mutual dependence (ABDUH and AZMI OMAR, 2012). The study used a log of total Islamic financing as a proxy of Islamic finance in Indonesia and two variables to represent economic growth, i.e., GDP and GFCF. ARDL and VDC models suggested a strong significant relationship between growth in Islamic financial assets and economic growth in Indonesia. It is inferred that Islamic financing promotes financial liberalization by enhancing business and economic activities, consequently stimulating economic growth. However, the notion also supported mutual dependence theory when granger causality model concluded two-way causality. The authors additionally provided implication for the Indonesian government to promote asset based shariah banking by encouraging foreign banks to operate on Islamic principles.

GANI and BAHARI (2021) recently added valuable results to the literature by investigating the Malaysian economy. Quarterly data from 1998-2017 is used to investigate the causal link between Islamic financial development and growth factors in Malaysia. ARDL bounds testing model was used to test the hypotheses of the study. The findings suggested contrary results to (FURQANI and MULYANY, 2009; HACHICHA and BEN AMAR, 2015) and documented a bidirectional relationship for shariah banking development and economic growth in Malaysia. Notably, the short run relationship of Islamic finance represented by total deposit and finance, found insignificant. However, in the long run, growth complements Islamic finance and vice versa. Together with findings, capital accumulation is found to be significant because of the development of Islamic finance. It was inferred that the sector facilitates capital accumulation that will act as a catalyst in fostering growth. Moreover, NAZ and GULZAR (2022) suggested a bidirectional relationship between Islamic financial assets, deposits, and Islamic bonds on the economic growth of a panel

of countries. The study included Muslim-majority countries Indonesia, Malaysia, Pakistan, Bahrain, and Qatar. The authors employed newer statistical models, which include Panel group mean regression and Panel ARDL on ten years of cross-sectional and time series data.

2.5.4 Literature supporting neutrality hypothesis

The above-discussed literature provided several aspects of empirical findings and conformed to different theories. The formation of firm and consistent results is still difficult to get. Hence, a newer addition to finance growth-growth nexus postulated by LUCAS (1988) governed the idea of insusceptibility of economic growth to financial development. Many recent additions provided consistent results to Lucas' theory of neutrality. YÜKSEL and CANÖZ (2017) employed vector autoregressive (VAR) model on Turkish Islamic banking industry and industrial output. Loans extended by Shari'a banks in Turkey were taken as a measure of Islamic financial development, GDP, and industrial production were chosen to represent the economic growth within the country. VAR model was applied on quarterly 10-year data; the results concluded that Islamic finance in Turkey does not contribute to economic growth either in enhancing GDP or in production output in industries. However, the authors argued to support inconclusive results that the share of Islamic finance in Turkey is considerably low, and several other factors facilitate economic progress. The study gave implications for central banks to enhance the development of Shari'a-based banking. Similarly, HYE ADNAN and ISLAM (2012) also implied the overstressed finance and economic growth phenomenon in Bangladesh. The authors developed a financial development index using principal component analysis and concluded insusceptible evidence in the context of economic growth and financial development. Similar findings were supported in many other studies as well. For instance, (SAMARGANDI et al., 2014) in Saudi Arabia, (ADENIYI et al., 2015) in Nigeria, and (SKARE and PORADA-ROCHOŃ, 2019) in the Czech Republic.

2.6 Hypothesis development

In the backdrop of the above discussion, many countries have adopted Islamic financial systems expecting marginal economic benefits due to structural and governance differences (IFSB, 2021; EL QORCHI, 2005). According to IFSB (2021), the increased output, enhanced stability, and less risky nature of Islamic banks make them prevalent in many Muslim and non-Muslim countries as well. However, only a few countries have well-established or fully developed Islamic banking systems, while others operate dual banking systems (where Islamic banks co-exist with traditional banks). The studies showed that Islamic banks are intrinsically different from their conventional counterparts and able to withstand external shocks (ANWAR, 2003; CAPORALE and HELMI, 2018; HANIF, 2014; LEHNERT, 2019; RAFAY and FARID, 2017; TABASH and DHANKAR, 2014). It is relevant to propose that in the presence of interest-based banking, Islamic banks

promote economic growth stronger than their conventional counterparts. Following the same logic and addressing the Objective 1, our first hypothesis (H1) is given below:

- H1: Islamic financial depth has a positive effect on the economic growth of Pakistan.
  - H1a: The positive effect of Islamic financial depth is greater than the conventional financial depth on the economic growth of Pakistan.

The essence of Islamic finance is to create opportunities for investors to invest their funds on a profit and loss sharing basis and yet utilize the banking services (AZMAT et al., 2015). However, the structure of Islamic banking products is not that simple every time. There is a blend of participatory/PLS and non-participatory/non-PLS contracts, which vary from clients' financing requirements (AYUB, 2013; LEWIS and ALGAOUD, 2001). As discussed above, participatory/equity-based/PLS contracts are categorized as Musharakah, Mudarabah, and diminishing Musharakah. The PLS contracts shadow the true ideology of Islamic finance, which advocates the creation of equal opportunities and help enhance social and economic justice (ASUTAY, 2007; KHALED and KHANDKER, 2015). Therefore, it is posited that promoting equitable means of investment, wealth creation, optimum allocation of resources, and enabling real economic activities is largely connected to PLS financing (CHOWDHURY et al., 2018). Based on the mentioned arguments and Objective 2 of this study, the following hypotheses (H2 and H3) are developed.

- H2: Risk-sharing financing positively affects the real economic output.

On the contrary, although the debt-based financing contracts are often categorized as less Islamic or sometimes completely non-Islamic but non-PLS financing is extensively used by Islamic banks (SIDDIQI, 2011). The criticism of debt-based products is due to the fact that they provide the sceptical back door of involvement of interest similar to conventional financing. According to USMANI (1998) and SIDDIQI (2011), sale/debt-based contracts are the only way to devise instruments to help Islamic banks escape interest-based activity. However, the scholars propound only a limited use of these contracts with several restrictions. As a result, the double layer of governance (board of directors and Shari'a board) protects and oversees the practical aspects of all financing products (ELNAHASS et al., 2021; GRASSA, 2013). On the corporate front, it is found that industries prefer Islamic financial products, either PLS or non-PLS, due to reduced asymmetry, which helps them to reduce agency conflicts (ALJIFRI and KHANDELWAL, 2013). For an Islamic bank, it is critically essential to be transparent, specific, and more defining in sale-based contracts. This is because fixing the price of a selling product is important to avoid any uncertainty – referred to as gharar. Therefore, companies rely on non-PLS-based products as they

help them reduce information asymmetry and agency issues (AHMED and AASSOULI, 2022). Based on the above arguments, the demand of industries is expected to promote non-PLS financing, which helps the real economic activity to grow.

- H3: Non-risk-sharing financing positively affects the real economic output.

Given the theoretical, structural, and governance differences between Islamic banks and their conventional counterparts, current literature suggests that Islamic banks have proven to be more profitable (BECK et al., 2013; HANIF et al., 2012; SAMAD, 2013), efficient (BECK et al., 2013; PARSA, 2022), financially stable (ABDELSSALAM et al., 2022; ELNAHASS et al., 2021), resilient to external shocks (MENSI et al., 2020; VARGA and CSEH, 2018), and possess a distinctive survival rate (PAPPAS et al., 2017). In addition, risk-sharing contracts are designed to facilitate fair investment practices, generate wealth opportunities, and allocate funds to productive members of society. As such, the implementation of an Islamic financial system is expected to have a positive impact on a country's economy. With this in mind, it is anticipated that the adoption of Shari'a banking will result in differential effects on the financial sector, ultimately contributing to economic growth. Given the current literature, identified research gaps, and objectives 3 of this study, we propose the following hypothesis (H4):

- H4: There is an incremental impact of financial development on economic growth after adoption of Islamic banking.

2.7 Credit risk and financial stability

The banking industry's financial stability and credit risk is the most concerned topic of discussion among economists and policymakers. The detrimental effect of the global financial crisis was mainly due to the lack of financial stability and enhanced systematic risk. The smooth functioning of financial intermediation is directly linked to the level of systematic risk and the extent of financial instability within the banking sector (European Central Bank, 2017). The literature discusses financial instability and economic growth in two ways. First, the weaker the stability measures the lower would be the effect of financial sector on economic growth. The second approach suggests that exogenous economic shocks may affect the financial stability of banking sector. Supporting the first theory, the effect of financial instability starts with lower payments from the debtors (in this case, bank clients), resulting in less production and ultimately affecting the economic indicators (BATUO et al., 2018). Also, DUPREY et al. (2017) studied the periods of instability caused by credit defaults in European banks and found a negative relationship with economic growth. In addition, several other studies confirmed the same relationship between instability measures and their impact on the economy, such as Asia and Pacific regions (KIM and

MEHROTRA, 2017), MENA (NEAIME and GAYSSET, 2018), and BRICS (MISATI and NYAMONGO, 2012).

One of the prominent and comprehensive works on financial instability and economic growth models was done by CREEL et al. (2015). The authors used GMM and included two key indices to measure financial instability i.e., micro- and macro-prudential indicators. Micro-prudential measures include the intrinsic measures of the banks, such as the non-performing loans ratio to gross loans (ČIHÁK and SCHAECK, 2010; FOGLIA and ANGELINI, 2020), the z-score measure, and the stability indicator published by IMF. On the other hand, the macro-prudential measure indicates the practical use of composite indicators of systematic stress (CISS) – as suggested by the European Central Bank (2007). The results indicated that both measures negatively impact economic growth irrespective of the degree of financial depth. Similar results were suggested by ALSAMARA et al. (2019), where loan loss provision, taken as a measure of financial instability, was found to have a negative effect on economic growth in Qatar. Furthermore, the results indicated that better asset quality is a reliable measure of financial stability, which ensures the regular flow of payment from both ends, i.e., banks to customers and vice versa. Hence, better asset quality is crucial for smooth functioning of the economy in the long run. Another supporting evidence came from the African region where MANU et al. (2011) studied the financial stability–growth nexus by taking several indicators as measures of financial stability (including asset quality, capital structure, and liquidity). The finding was consistent with (CREEL et al., 2015); it is worth noting that even though there is strong evidence of the presence of the finance-growth theory, the unstable financial sector still imparts a negative impact on economic growth.

The role of financial sector as the intermediary is like a heart in an economy where the money is supplied to the productive hands of the society i.e., manufacturers, investors, entrepreneurs, and the corporate sector. Financial intermediation with sustainable asset quality is a real challenge, where banks need to ensure the recovery of the financed amount along with the profit as well as finding the prime customers (POWER, 2007). Stable financial assets are important not only for banks but also for external stakeholders, including manufacturers, companies, customers, and others, to build trust in the banking sector and work on high leverage (SUYANTO, 2021). As a result, the client looks for the stability to rely on financing from banks. Therefore, the lending growth of a bank is negatively affected by the selection of adverse/non-prime customers where the likelihood of default is higher (AYSAN and OZTURK, 2018). The same rationale goes with the credit defaults where higher non-performing loans impede the bank's profitability (DAS and UPPAL, 2021; HUNJRA et al., 2020), ultimately enhancing the financing cost and reduces the

supply of future credit. On the other hand, the corporate sector uses the same information to expand or contract their credit exposure, where the firm predicts the future credit default of banks and measures the risk of failure (BORDALO et al., 2018). This is the reason why credit policy and lending growth are cyclical in nature. A financial system with poor asset quality is a burden on both the financial institution and the customer. Banks experience lower growth in future credits, while borrowers face reposited collateral or unclaimed deposits. The process is complex, as lower-quality assets (high non-performing assets) adversely affect the bank's profitability. This, in turn, has a negative impact on future credit growth, limiting the finances available to the corporate sector and weakening overall market forces, resulting in lower economic growth (CUCINELLI et al., 2018). Therefore, a measure of financial instability, known as poor asset quality, is expected to moderate the relationship between financing and economic output for two reasons. Firstly, better asset quality is likely to facilitate future credit growth, as borrowers tend to trust financial institutions when relying on credit (THORNTON and DI TOMMASO, 2021). Secondly, better asset quality indicates responsible clientele, where companies fulfil their financial obligations with the expectation of facing fewer financial constraints in the future. Based on the above arguments, it is posited that a financially stable bank, in this case, Islamic banks, is likely to intervene in the finance-growth nexus.

- H5: Better asset quality positively moderates the relationship between Islamic finance and aggregate economic output.

2.8   Islamic finance and poverty alleviation

Financial intermediation through Islamic banks is grounded on value-based intermediation (referred as VBI herein after). VBI is not only concerned with channelization of funds, Shari'a compliant products, and contribution to economy but is a broader concept that also takes care of the social well-being and poverty reduction. It is worth noting here that building a true value-based intermediation by Islamic banks is not possible on a radical basis while operating in an interest-based banking system. However, there is a differential contribution from Islamic banks with a periodic increase in market share. In this context, the development of the Islamic financial sector can be seen in the form of commercial Islamic banks, non-banking Islamic financial institutions, and Islamic microfinance banks (HANESTI et al., 2018). The social element of VBI, particularly poverty alleviation and social well-being, has been an integral part of Islamic microfinance banks that engage with the local community and extend financing on a PLS basis with a prime focus on social well-being (FARRAR and UDDIN, 2020).

After the success of Grameen Bank in Bangladesh, FARRAR and UDDIN (2020) argued that if Islamic microfinance is established and operated in full capacity, the socio-economic objective of the Islamic economic system can be met within no time. The authors further argued that Islamic bank financing would have a bigger impact if they developed a dedicated policy to maintain socio-economic development. Furthermore, the operation of Islamic microfinance banks goes one step closer to the end users i.e., the entrepreneurs, thus enabling society to take part in the productive allocation of resources, resulting in a better standard of living and a reduction of poverty. One reason for the popularity of Islamic microfinance banks is their devotion to non-commercial objectives. HANESTI et al. (2018) shed light on the key objectives of Microfinance banks, namely commercial objectives (similar to commercial banks and conventional finance to produce profit). The second objective stresses the importance of non-commercial activities i.e., gratuitous payments in Zakat and Waqf. Zakat referred to the compulsory annual payment from excess hands to people experiencing poverty as charity. Waqf is the voluntary contribution to people in need as a mutual help for the sustenance of an equitable standard of living.

Ethical financing is a vital aspect of Islamic finance that focuses on Shari'a social objectives. However, it remains an underdeveloped field in commercial banking. Fortunately, Islamic microfinance banks have taken the lead by offering interest-free loans (known as Qard al Hassan) to support struggling entrepreneurs. These loans are offered without any expectation of repayment unless the individual chooses to do so. In Islamic microfinance banks, the core operation is the provision of machinery, raw materials, or equipment using Murabaha/Ijarah without formal creditworthiness checks on clients (RAHMAN and AHMAD, 2010). The defining difference between Islamic and conventional microfinance is the risk-taking ability and the role of ethical financing. This difference enables Shari'a based microfinance banks to make poor businessmen a part of society by providing them with money without any consideration (in the form of Qard ul Hassan) or by providing resources/equipment on easy terms (through the use of Islamic contracts). The entire process works on trust and morals, which play an incredible role in eradicating poverty (OBAIDULLAH, 2008). Furthermore, OBAIDULLAH (2008) explained that the financing structure is not straightforward, and not all borrowers receive gratuitous payments (in the form of Zakat). In Shari'a, there are set principles for finding a rightful person for Zakat. For example, those with zero assets and living below the poverty line are most likely to receive financing from Zakat funds, which are not meant to be returned. On the other hand, Qard ul Hassan is given to entrepreneurs with slightly better economic conditions, and the return of it is conditional on the availability of funds. Therefore, in Islamic microfinance banks, capital is provided in different forms, considering the borrower's economic situation, standard of living, income level, and degree

of financial resources. Based on empirical evidence, similar conclusions have been drawn from studies conducted in Pakistan (SHIRAZI, 2014) and Bangladesh (RAHMAN and AHMAD, 2010). The authors argued that while there was an economic impact, the social impact was even more significant and positive in comparison to the financial reward. For example, by making it easier for poor farmers in Bangladesh to access credit, RAHMAN and AHMAD (2010) found that providing loans to these farmers increased household income and increased employment rates. It was also discovered that there was a significant increase in the number of poor borrowers compared to economically stable customers, which made a significant contribution to poverty alleviation and improved the standard of living for over 3000 families in Pakistan (SHIRAZI, 2014).

A well-functioning financial system has the potential to reduce income disparity and alleviate poverty by providing easy access to credit for those in need. The banking sector plays a critical role in facilitating the flow of funds from depositors to those seeking financing. However, less developed countries face challenges in achieving market perfection due to issues such as information asymmetry and high fixed costs for obtaining small loans, which can lead to moral hazards and hinder the selection of borrowers for productive and profitable businesses (STIGLITZ, 1993). Despite these challenges, a well-developed financial system can encourage poverty alleviation and increase living standards both directly through formal financial access for the poor and indirectly through the trickle-down effect of economic growth and wealth redistribution (SHAW, 1973; MCKINNON, 1973). In addition to credit facilities, the financial sector can also create saving opportunities for those with limited means (MCKINNON, 1973). On the other hand, advocates of the demand-following hypothesis (ROBINSON, 1952; JUNG, 1986) contend that financial intermediation indirectly promotes income distribution among the less privileged through economic expansion. This theory emphasizes the importance of generating demand from growth, which then leads to opportunities for capital accumulation, increased employment, and ultimately, the circulation of wealth among the poor. Additionally, the "trickle down" hypothesis also supports the idea that the financial sector indirectly contributes to poverty reduction through economic growth (AGHION and BOLTON, 1997). This theory suggests that the benefits of financial development are distributed among the masses, even if formal financial services are only accessible to a select few.

In the broader context, numerous studies have explored the relationship between financial development and poverty reduction. The growth of the financial sector facilitates the efficient allocation of funds and acts as an intermediary between surpluses and deficits, leading to increased household consumption and an improved standard of living, ultimately reducing poverty (BECK

et al., 2007). This aligns with the finance-growth hypothesis, which suggests that financing drives economic growth. As economic progress increases, so does prosperity, resulting in reduced disparities between rich and poor and an overall improvement in living standards. The evidence suggests that an increase in financial development can lead to poverty reduction (BAYAR, 2017). However, measuring poverty remains a challenge. For example, MAJID et al. (2019) used total household consumption as a proxy for poverty and found a positive and significant impact of financial sector growth on household consumption in Indonesia. This study revealed that poverty measures may not accurately reflect poverty head count. Nevertheless, MAJID et al. (2019) confirmed the results of ELLAHI (2011), where poverty head count ratio was used as a measure of poverty. The findings indicate that the growth of the financial sector is a crucial factor in bringing about economic and social prosperity. However, the commercial banking model differs significantly from that of microfinance banks. Commercial banks focus solely on profit-making ventures, which can lead to exploitation or misuse of resources, particularly for those living below the poverty line. This drawback of commercial banking can result in a negative impact and widen the income gap (ELLAHI, 2011). In the finance-growth nexus, the banking sector leads to growth, resulting in increased economic output, consumption, employment, and external investment. These changes, when combined, have a synergistic effect, resulting in prosperity and a reduction in poverty (UDDIN et al., 2014). A recent study by PAREWANGI and ISKANDAR (2020) documented evidence of poverty reduction with an increase in Islamic financings, but the causal direction was inconclusive. The authors suggest that these inconclusive results may be market imperfections between Shari'a-based banking and conventional banking. Nevertheless, the authors believe that there is a significant gap in the market where asset-backed banking can operate and be accessible to the general public, resulting in a marginal impact on poverty alleviation. Furthermore, several studies have confirmed the positive impact of Islamic financial development on poverty alleviation (ABBA and NGAH, 2020; AGUSTINA et al., 2022; GINANJAR and KASSIM, 2020; ERLANDO et al., 2020; SIDDIQUE et al., 2020).

The social aspect of Islamic economics is often associated with Zakat and charitable donations, while the commercial nature of Islamic banks is often overlooked. However, Islamic banks' economic model have a more significant impact on improving living standards compared to conventional banks in several ways. For instance, Islamic banks actively participate in risk and reward through PLS financing, which creates business opportunities and promotes real trading activities. As a result, Islamic banks' credit financing indirectly facilitates the creation of more employment opportunities, leading to income redistribution from the rich to the poor. Additionally, the use of non-PLS financing modes such as Murabaha, Salam, and Ijarah reduces information

asymmetry, which is crucial for the smooth functioning of the banking and corporate sectors. This promotes equitable allocation of resources, improves income levels among underprivileged individuals, and reduces poverty. Based on these considerations and Objective 4 of the study, we propose the following hypothesis.

- H6: Islamic financial development has a differential impact on poverty alleviation/raising the standard of living.

3   METHODOLOGY

This section provides the comprehensive overview of the materials and methods employed in this study. The first part explains the epistemological underpinnings of the research, while the second section outlines the research design and its expected implementation. The final section offers a detailed description of the research methods adopted in this study. Additionally, it provides a clear definition of variables and measurements, data collection resources, and the proposed econometric models.

3.1   Epistemological foundation/Research Philosophy

The development of research paradigm and selection of research philosophy is dependent on researcher's perception of reality, the approach to explain the phenomenon of their worldview, beliefs, and the mindset for the research model. One's belief and perception to reality derives their argumentative power and ability to provide reasoning for a certain problem to reach a desired outcome. Therefore, these aspects are highly correlated to research outcome (WIERSMA and JURS, 2009) and hence essential to define and select an appropriate research philosophy. In the field of social science, laying a concrete foundation of research philosophy is critical where the research not only connected to the problem statement itself but greatly dependent on research assumption, researcher's knowledge, and perception to reality (SAUNDERS et al., 2007). The research sometimes referred as the outcome of underlying assumptions (HITCHCOCK et al., 1989).

Epistemological position acts as a bridge between ontology and methodological research assumptions (EASTERBY-SMITH et al., 2012; HOLDEN and LYNCH, 2004), which help the researcher to select the conscientious and relevant research direction. Ontology referred to the general assumption of how an individual perceive the reality or the nature of reality (WHITEHEAD, 2006). Furthermore, O'GORMAN and MACINTOSH (2015) categorized the nature of reality in two broad categories i.e., objective ontology and subjective ontology. Objective ontology suggest that the reality exist irrespective of individual's understanding, and that it is

possible to understand and explain the societal miracles in a repetitive manner using certain methods. However, the subjective ontology sees the world in a different way which is shaped by persons' own perception, experience, observation, interpretation, behaviours, and attitudes. Therefore, the reality is approached in multiple ways subjective to event of happening, time, place, and observation. For the current study, objective ontological stance is opted as the author believe in existence of reality and universal laws that are independent of social actors. The data is collected from the real-world scenario in order to test the existing the causal relationship between set of variables. Based on the selected objectivism, the following discussion provides the selection of epistemological approach for the current study.

Epistemology philosophy states the assumption and approach of how the nature of reality can be explained (EASTERBY-SMITH et al., 2012). It is regarded as the process and approach of obtaining valid knowledge and communicating with others (BURRELL and MORGAN, 1979). There are several epistemological approaches suggested many authors, however *positivist, interpretivist, pragmatist, and realistic* research philosophies are widely used in social sciences (COHEN et al., 2007). Positivist research philosophy addressed the concern raised by objective ontology, and states the assumption that social world can be explained in an objective way, on the basis of it, the researchers and scientists have objective analytical approach to study the principals of nature (O'GORMAN and MACINTOSH, 2015). The opposite of positivist research paradigm is interpretivism, where the researchers are of the view the it is not possible to understand the nature of reality. The approach further states that explaining the nature of reality is subjective to researcher's own perception and experiences (EASTERBY-SMITH et al., 2012). The pragmatist is not directly following any philosophical system of reality. It gives the freedom to the scientist to adopt any method or research design to produce the outcome. Pragmatism is more of result-oriented approach where the research philosophy is chosen based on the problem statement, and to make sure the results can be achieved (LANCASTER, 2007). The fourth type is a blend of positivist and interpretivist where the mixture of objective and subjective ontology is overlapped (LANCASTER, 2007). Realistic approach is based on the assumption that there are interventions necessary to explain the nature of reality.

Based on above explanation and chosen objective ontological stance, this study is based on positivist research philosophy, since the objective of this study is to explain the link between Islamic financial depth, economic growth, and engagement of better economic activities. The authors believe that the Islamic finance-growth nexus exist in reality and can be explained using suitable research methods and instruments. Therefore, the data collection, analytical techniques are chosen based on the opted positivist approach.

3.2 Research methods

Social scientists use two main research methods that differ based on the research objective and the researcher's research philosophy i.e., quantitative and qualitative methods (BLUMBERG et al., 2014; SEKARAN and BOUGIE, 2016). When the research objectives require numerical, quantifiable data to produce scientific, empirical results, researchers typically use quantitative methods (ZIKMUND et al., 2013). Conversely, when researchers take an interpretivist approach and are more interested in exploring the subjectivity of the problem statement, they are more likely to use qualitative methods (SEKARAN and BOUGIE, 2016). In this study, we aim to evaluate the finance-growth nexus in the context of Islamic financial development, which requires empirical testing of the phenomenon in a real economic setting. To achieve this outcome, the author has chosen to use quantitative methods based on our ontological and epistemological research stance.

3.3 Materials and Econometric methods

Based on the research objectives, quantitative research methods were used to test the hypothesis and draw conclusions. However, the present study has four objectives and six hypotheses. The materials and statistical method are designed separately for each objective. The current study is divided into four sections mentioned as follows: Section I, the first section takes into account the impact of Islamic financial depth on economic growth of Pakistan operating a dual banking system. Section II analyses the decomposition of the financing side and its relative impact on economic activity. In sections III & IV, the differential impact of the adoption of Islamic finance on economic growth and standard of living is examined. Based on the research objectives, each section lays out the suitable econometric models.

3.3.1 Section I: Islamic financial depth and economic growth

The first objective addresses hypotheses H1 and H1a to explore the Islamic financial depth – working in a dual banking system – facilitate economic growth. In the first stage, Pakistan is selected for the data analysis to test the hypothesis (H1 & H1a) regarding the relevance of the financial depth of Islamic and conventional banking systems. Over a couple of decades, the Islamic financial sector in Pakistan has gained double-digit growth not only domestically but also contributed to global financial assets (IFSB 2022). Furthermore, according to IFSB (2022), Pakistan is the top 10 contributor to global Islamic financial assets, with a contribution of 16% in 2022. Therefore, considering the country's unique financial and economic setting, it is highly relevant to explore the importance of the depth of the Islamic financial sector in the context of economic growth while comparing it with the parallel input from conventional counterparts.

3.3.1.1 Data and variables

I. Data

Data for this section is collected in quarterly time series from 2015 to 2022 (Q1-Q4). The bank-specific variables have been sourced from the State Bank's quarterly performance review reports (SBP - State Bank of Pakistan) and the quarterly Islamic banking bulletins of SBP. The macroeconomic variables are collected from the World Development Indicator (WDI) and the International Financial Statistics of IMF (International Monetary Fund). Table 3.1 provides the variables used for the first objective of the study.

Table 3.1: Variable notation, and source of data collection

Variables	Notation	Data Collected	Literature support
Economic Growth	GDP	World Development Indicator (WDI)	(ANWAR et al., 2020; HACHICHA and BEN AMAR, 2015; SHAH et al., 2020)
Islamic financial Depth	IFD	SBP's Islamic Banking bulletin	(ANWAR et al., 2020; SHAH et al., 2020; ZARROUK et al., 2017)
Islamic financial Intermediation	IFI	SBP's Islamic Banking bulletin	(ANWAR et al., 2020; SHAH et al., 2020)
Asset Quality Islamic	NPA	SBP's Islamic Banking bulletin	(ALSAMARA et al., 2019; ČIHÁK and SCHAECK, 2010; FOGLIA and ANGELINI, 2020)
Conventional financial Depth	CFD	SBP's Quarterly Banking review	(FARAHANI and DASTAN, 2013; HACHICHA and BEN AMAR, 2015)
Conventional financial Intermediation	CFI	SBP's Quarterly Banking review	(ANWAR et al., 2020)
Asset Quality Conventional	NPL	SBP's Quarterly Banking review	(ALSAMARA et al., 2019; ČIHÁK and SCHAECK, 2010; FOGLIA and ANGELINI, 2020)
Inflation	INF	IMF's International Financial Statistics	(HACHICHA and BEN AMAR, 2015; KHAN and SSNAHDJI, 2001; SHAH et al., 2020)
Interest Rate	IR	IMF's International Financial Statistics	(HACHICHA and BEN AMAR, 2015; SHAH et al., 2020)

II. Variables:

The measure of economic progress is represented by real GDP (following (ABDUH and AZMI OMAR, 2012; ANWAR et al., 2020; BOUKHATEM and BEN MOUSSA, 2018; BOURKHIS and NABI, 2013; FARAHANI and DASTAN, 2013; FURQANI and MULYANY, 2009; SHAH

et al., 2020). It is considered one of the relevant and efficient variables to reflect the economic progress in any country.

The following measures are used in this study to represent Islamic financial growth. For instance, to represent the relative strength of Islamic finance in the country, Islamic financial depth is taken as the total Islamic banks' financing in percentage of GDP (ANWAR et al., 2020; BOUKHATEM and BEN MOUSSA, 2018; ZARROUK et al., 2017). The second important variable to represent financial development is the degree of financial intermediation. The total number of branches of each financial sector (Islamic and conventional) is considered as the measure of financial intermediation (ANWAR et al., 2020; FURQANI and MULYANY, 2009). Besides, the number of branches measure the ability of the financial sector to increase the availability of banking facilities to the masses, which ultimately helps to smoothen financial intermediation (ANWAR et al., 2020). In this study, the micro-prudential instability indicator is used to examine the relationship between asset quality within the financial sector and economic progress in the country (ALSAMARA et al., 2019; ČIHÁK and SCHAECK, 2010; FOGLIA and ANGELINI, 2020). In addition to financial depth (Islamic and conventional), intermediation, and asset quality, other control variables such as inflation (measured by consumer price index), and interest rate have been used in the model. Table 3.2 shows the description of the variables of Model 1.

Table 3.2: Model 1 (Description of variables)

Variables	Measure	Description
Dependent Variable		
Economic Growth	Real Gross Domestic Product	The overall economic progress is measured by real GDP, which is considered one of reliable indicator of economic growth.
Independent Variable		
Islamic financial depth	Total Islamic financing as percentage of GDP	The depth of Islamic financial sector is taken as the independent variable, which reflects the degree of total financing made by Islamic banks in connection to GDP to show the overall depth in the economy.
Conventional financial depth	Total loans by conventional banks	Conventional financial depth typically refers to the level of development and accessibility of traditional financial services and institutions in

	as percentage of GDP	an economy, which is taken as percentage of GDP.
Control Variables		
Islamic financial intermediation	Total number of branches of Islamic banks	The extent of Islamic banks to act as a financial intermediary is taken as a count of total number of Islamic banking branches. The more the number of branches indicate the greater ability of Islamic banks to act as bridge between depositors and borrowers.
Conventional financial intermediation	Total number of branches of conventional banks	The ability of tradition banking to act as a financial intermediary is taken as number of branches to represent how convenient is to access the finances from the banking channels.
Asset Quality	Non-performing loan/total loans	In this study micro-prudential instability indicator is used to examine the relationship of financial instability within financial sector and economic progress in the country.
Inflation	Consumer price index	A reasonable amount of inflation is necessary for economic progress (KHAN and SSNAHDJI, 2001). As long as the threshold effect is not there, inflation below threshold is essential for economy to grow.
Interest Rate	KIBOR (Karachi interbank offered rate)	Interest rate is taken as a control variable which is essential part of financial growth. Banks' financing side is affected by the rate of interest set by central bank. A lower interest rate encourages masses to borrow funds from the bank and make the productive contribution in overall economic growth.

3.3.1.2 Econometric specification (Section I)

The general form of the selected model is given in the equation (i) and (ii), where two separate models are considered. The first one studies the impact of Islamic financial depth on economic growth while the second one explores the impact of conventional financial depth.

$$GDP = f \text{ (IFD, IFI, NPA, INF, IR)} \qquad \text{(i)}$$

$$GDP = f \text{ (CFD, IFI, NPA, INF, IR)} \qquad \text{(ii)}$$
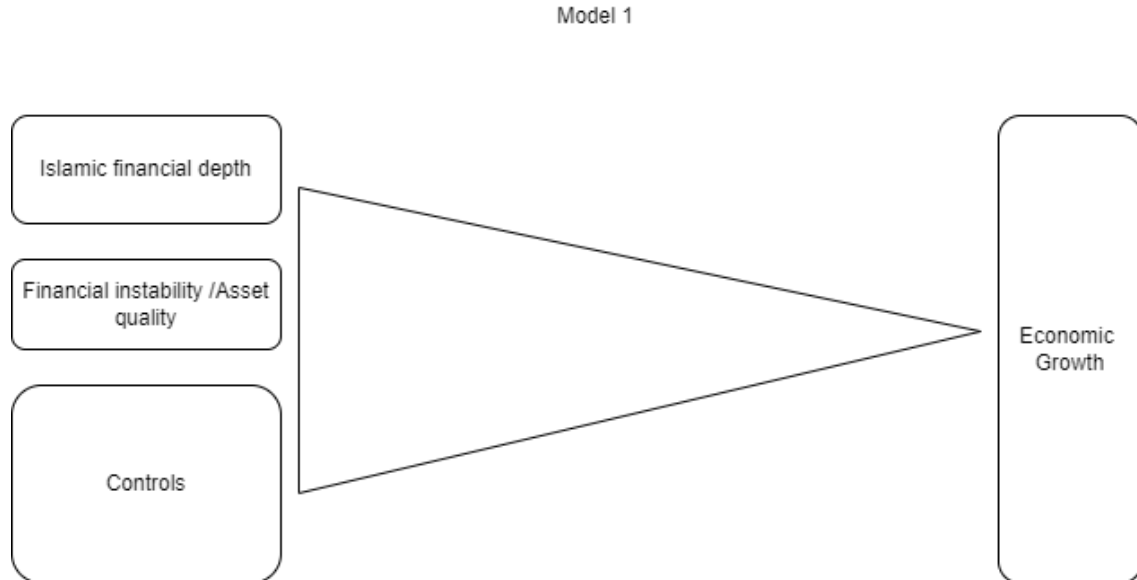
Model 1

Figure 3.1: Islamic financial depth and Economic growth (Model 1)
Source: Author own construction

I. *Autoregressive distributed lagged (ARDL)*

Based on a review of the literature (ABDUH and AZMI OMAR, 2012; ANWAR et al., 2020; FARAHANI and DASTAN, 2013) and the nature of the data, this study has chosen the Autoregressive Distributed Lag (ARDL) model to test the hypotheses. Compared to cointegration model proposed by JOHANSEN and JUSELIUS (1990), the ARDL (PESARAN et al., 2001) offers several advantages and is capable of producing robust and efficient results. Moreover, the ARDL provides a single equation that can capture both long-run and short-run coefficients. Importantly, it allows for the specification of different lag structures for each variable, which makes it possible to apply the most appropriate and robust model, even with a limited number of observations (NARAYAN, 2005). Despite the smaller sample size and different lag structures, the model can produce unbiased results, control for endogeneity, and provide valid t-statistics (NARAYAN, 2005).

The application of cointegration models on time series data is always critical. The process is carried out in three steps: (i) determining the stationarity of the series, (ii) examining the presence of cointegration, and (iii) estimating long and short-run estimates. The process started with examining the unit root in the time series of selected variables. To check for the stationarity of

data, Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) are being used. The level of integration of all variables helps to decide about the appropriate model selection. According to SHRESTHA and BHATTA (2018), if all the variables are stationary at level, meaning that they are of order I(0), the ordinary least square (OLS)/Vector autoregressive (VAR) model would be considered suitable. On the other hand, if the order of integration among variables is non-stationary at level and stationary at first difference, i.e., I(1), Johansen and Juselius cointegration (JOHANSEN and JUSELIUS, 1990) model is applicable to data set. However, in the case of mixed order of integration among variables i.e., stationary at the level I(0) and first difference I(1). In that case, PESARAN et al. (2001) ARDL approach is considered appropriate. Once the order of stationarity is confirmed, the next step is testing the presence of cointegration using ARDL bound test with null hypothesis of no cointegration. The general equation (iii) form for ARDL is given below:

$$
\Delta(Y)_t = \delta_0 + \sum_{q=1}^{p1} \sigma_{1r} \Delta(Y)_{t-r} + \sum_{q=0}^{p2} \sigma_{2r} \Delta(X_2)_{t-r} + \sum_{q=0}^{p3} \sigma_{3r} \Delta(X_3)_{t-r} + \alpha_1 (Y)_{t-1}
$$
$$
+ \alpha_2 (X_2)_{t-1} + \alpha_3 (X_3)_{t-1}
$$
$$
+ \varepsilon_t \qquad\qquad (iii)
$$

Y represents the dependent variable at time t. p_i is the max lag length, ε_t is the error term. X_2, X_3 are the regressors. The null hypothesis of no cointegration is tested as $H_0 : \alpha_1 = \alpha_2 = \alpha_3 = 0$, against the alternate of presence of cointegration among the variables of interest. However, after rejecting the null hypothesis of no cointegration, the following equation (iv) is used to estimate long-run estimates.

$$
Y_t = \delta_0 + \sum_{q=1}^{p1} \sigma_{1q} (Y)_{t-r} + \sum_{q=0}^{p2} \sigma_{2q} (X_2)_{t-r} + \sum_{q=0}^{p3} \sigma_{3q} (X_3)_{t-r} + \pi_t \qquad (iv)
$$

The coefficients in above equation represents the long run estimates. Using Error correction (ECM) method, short run estimates will be measured by following equation (v).

$$
\Delta Y_t = \delta_0 + \sum_{q=1}^{p1} \omega_{1q} \Delta(Y)_{t-r} + \sum_{q=0}^{p2} \omega_{2q} \Delta(X_2)_{t-r} + \sum_{q=0}^{p3} \omega_{3q} \Delta(X_3)_{t-r} + \omega_t ECT_{t-r} + \pi_t \quad (v)
$$

$\omega_{1q}, \omega_{2q}, \omega_{3q}$, and ω_{nq} are the short run coefficient which are captured with the equilibrium coefficient of ω_t, referred as error correction term. The error correction term shows the correction

of disequilibrium in the long run, which is supposed to be negative in direction (MENEGAKI, 2019; NARAYAN, 2005).

3.3.2 Section II: PLS vs non-PLS financings and real economic output

Section II takes into account the Objective 2 following the hypotheses H2, H3, & H5. A larger sample is chosen based on the top contributors to Islamic financial assets globally. According to IFSB (2022), 15 countries were found to have indigenous double-digit growth in Islamic finance as well as a top contributor in global Islamic financial assets. In order to have a broader picture of the Islamic financial sector and economic output, the second part of this study considers 15 countries (following IFSB, 2022), namely Pakistan, Egypt, Oman, Palestine, Jordan, UAE, Bangladesh, Djibouti, Qatar, Malaysia, Saudi Arabia, Kuwait, Brunei, Sudan, and Iran. Furthermore, to have a balanced panel dataset, due to data limitation four countries were excluded from the analysis (namely Brunei, Qatar, Bahrain, and Egypt).

3.3.2.1 Data and variables

I. Data

Quarterly data from 2014 to 2022 have been sourced from several sources (See Table 3.3). The bank-related data have been collected from the latest database of the Islamic Financial Service Board (IFSB), and the macroeconomic indicators were collected from the World Development Indicators (WDI) and IMF's International Financial Statistics (IFS). In addition, the Statistical Bureau of Iran, Bangladesh Bank (Central Bank of Bangladesh), and Central Bank of Kuwait were also accessed to collect the bank-specific data for Iran, Bangladesh, and Kuwait, respectively. Table 3.3 provides details of the selected variables; the abbreviation used the sources of data collection, and the supporting literature.

Table 3.3: Variable notation, and source of data collection

Variable	Notation	Data source	Literature support
Industrial Production	IP	International financial statistics (IFS)	(BOUGATEF et al., 2020; MASRIZAL and TRIANTO, 2022)
Profit and loss sharing	PLS	Financial Service Board (IFSB)	(BOUGATEF et al., 2020; GUIZANI and AJMI, 2021; MASRIZAL and TRIANTO, 2022)
Non profit and loss sharing	Non-PLS	Financial Service Board (IFSB)	(SHABAN et al., 2014)
Conventional Financing	CF	World bank dataset (WDI)	(FARAHANI and DASTAN, 2013; HACHICHA and BEN AMAR, 2015)
Exports	Ex	World bank dataset (WDI)	(MENSI et al., 2020; PAPPAS et al., 2017; RAFAY and FARID, 2017)

Inflation	Inf	World bank dataset (WDI)	(ANWAR et al., 2020; HACHICHA and BEN AMAR, 2015; SHAH et al., 2020)
Capital formation	GFCF	World bank dataset (WDI)	(MENSI et al., 2020; PAPPAS et al., 2017; RAFAY and FARID, 2017)
Non-performing assets	NPA	Financial Service Board (IFSB)	(ALSAMARA et al., 2019; ČIHÁK and SCHAECK, 2010; FOGLIA and ANGELINI, 2020)
Imports	Im	World bank dataset (WDI)	(MENSI et al., 2020; PAPPAS et al., 2017; RAFAY and FARID, 2017)

II. *Variables*

To represent the real economic output, total industrial output is taken as the dependent variable (BOUGATEF et al., 2020; MASRIZAL and TRIANTO, 2022). Industrial production plays a vital role in the calculation of GDP and has a direct link to bank funding and deposits. Companies often seek financing to maintain a stable capital structure and benefit from some degree of financial leverage. Consequently, the financial sector significantly influences manufacturing companies. Over the past two decades, the emergence of Islamic banking has led to the development of the concept of risk sharing financing. Islamic financing agreements enhance firm transparency and help mitigate agency issues (SHABAN et al., 2014). Based on the aforementioned discussion, industrial production serves as an accurate indicator of real economic activities.

The independent variable is divided into two categories: PLS financing (participatory/risk-sharing financing) and non-PLS financing (non-participatory/non-risk-sharing financing). The segregation of PLS and non-PLS financing follows prior research by BOUGATEF et al. (2020) and GUIZANI and AJMI (2021). However, this study adds value by considering Musharakah, Mudaraba, and diminishing Musharakah as a single category representing PLS financing. Diminishing Musharakah was previously ignored in previous studies despite arguments favouring the participatory contract due to its nature (AYUB, 2013). All other sale/debt-based/non-participatory contracts are included in the non-PLS financing. Interestingly, apart from risk-sharing contracts, which entrepreneurs are more likely to rely on, non-PLS financing has been considered suitable for resolving agency conflicts in the corporate sector (SHABAN et al., 2014).

The relationship between financing and economic output is influenced by the asset quality of Islamic banks. Non-performing assets (NPAs) are considered proxies for asset quality, which significantly impact Islamic banks' profitability and sustainability. Furthermore, it is argued that Islamic banks outperform conventional banks in terms of asset quality due to their structural and underlying contracts (MENSI et al., 2020). It is hypothesized that better asset quality has a cyclical

relationship with finance-growth dynamics. A lower NPA level is expected to strengthen this relationship, as high-quality assets indicate responsible clientele, which helps banks maintain better credit ratings. Consequently, a better credit rating enhances the banks' future credit growth, enabling them to disburse more loans and ensure timely repayment.

In addition to asset quality and inflation, several other variables are included as control variables (HACHICHA and BEN AMAR, 2015; SHAH et al., 2020). Inflation plays a vital role in influencing a country's economic performance. If there is no threshold effect in play, it is anticipated that industrial production will experience a decline due to inflation as long as it remains below the 3% mark (KHAN and SSNAHDJI, 2001). Furthermore, conventional financial depth is taken as a control variable by considering the total loans extended to the private sector as a percentage of GDP. Moreover, imports and exports are considered as measures of trade openness. Imports are expected to negatively affect industrial production (economic output) as more imports indicate a greater reliance on imported products, thereby triggering lower industrial growth. On the other hand, exports are expected to complement the manufacturing index as they reflect more production, revenue, and total economic output of a country. The economic output is also highly correlated with capital formation in a country. Therefore, gross fixed capital formation (GFCF) is taken as a measure of capital formation with the expectation of a complementary relationship with economic output. Additionally, total deposits are taken as an additional control variable for robustness checks. The chosen control variables are based on prior studies (BOUGATEF et al., 2020; GUIZANI and AJMI, 2021; MASRIZAL and TRIANTO, 2022; MENSI et al., 2020; PAPPAS et al., 2017; RAFAY and FARID, 2017; ZARROUK et al., 2017). Table 3.4 describes the variables used in the model above.

Table 3.4: Model 2 (Description of variables)

Variables	Measure	Description
Dependent Variable		
Real economic output	Total industrial production	Industrial production plays a vital role in the calculation of GDP and has a direct link to bank funding and deposits. Companies often seek financing to maintain a stable capital structure and benefit from some degree of financial leverage. Hence, industrial production serves as an accurate indicator of real economic activities.

Independent Variable

PLS financing	Sum of participatory financing	The participatory contract Musharakah, Mudaraba, and diminishing Musharakah are clubbed together to represent the PLS financing. Diminishing Musharakah was ignored in the previous studies, which has been argued in favor of participatory contract by its nature(AYUB, 2013).
Non-PLS financing	Sum of all non-participatory modes of financing	All other sale/debt-based/non-participatory contracts are included in non-PLS financing side of Islamic banks. The contracts include but not limited to Murabaha, Ijraha, Istina, Musawama, Salam, and others.

Control Variables

Conventional Financing	Total loans to the private sector as measure of percentage of GDP.	Conventional financial depth typically refers to the level of development and accessibility of traditional financial services and institutions in an economy, which is taken as percentage of GDP.
Exports	Total exports	Exports expected to complement the manufacturing index as it shows more production, revenue, and total economic output of a country.
Inflation	Consumer Price index	The rate of change in consumer price index is taken as a gradual rise in the price of consumer products in a country.
Capital formation	Gross Fixed capital formation	The economic output is also highly correlated to the capital formation in a country. Therefore, gross fixed capital formation (GFCF) is taken as a measure of capital formation with the expectation of complementary relationship with economic output.

Imports	Total Imports	Imports is expected to have a negative relationship with industrial production (economic output) as more imports refer to more reliance on imported products hence triggering lower industrial growth.
Moderating Effect		
Asset Quality	Non-performing Loans/total	The relationship of financings to economic output is intervened by asset quality of Islamic banks. Non-performing assets (NPAs) are considered as proxy of asset quality which largely impact the profitability and business sustenance of Islamic banks and the loan growth of banking sector.

3.3.2.2 Econometric specification (Section II)

Estimating an endogenous growth model is always critical to analyse since it brings many choices of control variables. However, BROCK and DURLAUF (2001) suggested a suitable solution of open-ended hypothesis and provided with the 90 potential control variables that are suitable for estimating an efficient growth model. The objective of this section is not to test for the reliability of economic growth models but to test the economic impact of PLS and non-PLS financing in selected countries.
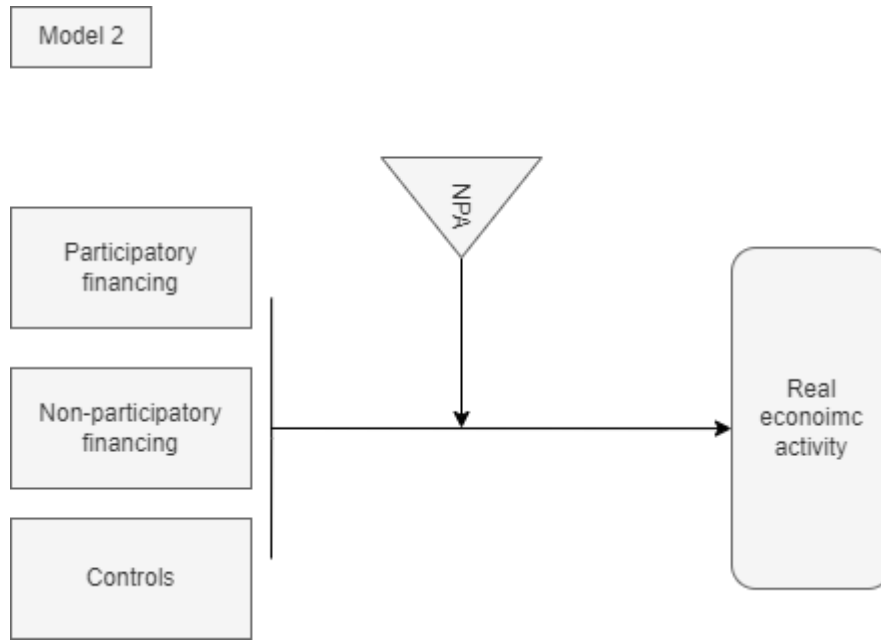
Figure 3.2: PLS vs non PLS financing and real economic output (Model 2)
Source: Author own construction

I.   *Panel regression model*

Following the prior studies on Islamic finance impact on real economic output (GUIZANI and AJMI, 2021; LEBDAOUI and WILD, 2016; LEDHEM and MEKIDICHE, 2022), and the nature of dataset i.e., balanced panel, a panel regression model is considered for this section. Furthermore, the dataset is not suitable for dynamic panel model as suggested by (HAYAKAWA, 2007) as there are limited number of N (number of units i.e., countries) and large n (number of periods i.e., quarters). Therefore, ordinary least square panel regression is applied by implementing the year and country fixed effect with clustered standard errors (BALTAGI, 2013; HSIAO, 2014). The analysis involves a selection process that typically begins with the Pooled Ordinary Least Squares (OLS) method. Equation (vi) provides the general mathematical form used in this process.

$$y_{it} = \alpha_0 + \beta_1 X_{1,it} + \beta_2 X_{2,it} + \ldots + \beta_n X_{n,it} + \varepsilon_{it} \qquad (vi)$$

According to HSIAO (2014), the pooled effect disregards firm-specific characteristics and combines all individual effects into a single intercept. Additionally, this model assumes that all firms share the same slopes and constant regression coefficients, and that the non-stochastic errors are uncorrelated with the independent variable $cov\ (\varepsilon_{it}, X_{nit}) = 0$, and the error term is normally distributed with $\varepsilon_{it} = (0, \sigma^2)$. However, the pooled OLS can provide consistent results provided that following assumptions are met.

$$E(\varepsilon_{it}) = 0 \text{ (Zero mean)}$$

$$var\ (\varepsilon_{it}) = E(\varepsilon_{it}^2) = \sigma_\varepsilon^2 \text{ (error are homoscedastic)}$$

43

$$cov\left(\varepsilon_{it}, \varepsilon_{pq}\right) = E\left(\varepsilon_{it}, \varepsilon_{pq}\right) = 0, where\ i \neq p\ \&\ t \neq q, \text{which refers that error are not correlated}$$

$$cov\left(\varepsilon_{it}, X_{nit}\right) = 0\ (\text{error are not causing endogeneity})$$

If all the assumptions are satisfied in pooling the data, pooled OLS is consistent in generating unbiased estimates. However, combining the individual country-specific characteristics together can hinder the fixed effect of firms (BALTAGI, 2013; HSIAO, 2014). Moreover, by creating a country dummy variable, the individuality effect can be tested. Together with all the assumptions and a country-specific value, the unobserved heterogeneity is likely to be subsumed in the error term ε_{it}, which was assumed as white noise. However, the problem of endogeneity may emerge i.e., $cov\left(\varepsilon_{it}, X_{nit}\right) \neq 0$. If the model is producing biased estimators, that may lead towards erroneous inference. This study also considers other panel models to ensure the robustness of results.

To account for the unobserved heterogeneity, a fixed effect panel model allows a different intercept for each cross-section/firm/country. However, the slope of each cross-section is considered constant. The model further differentiates the unobserved heterogeneity, which was part of the error term in Pooled OLS, as a separate firm-dependent error term (BALTAGI, 2013; HSIAO, 2014). As a result, the error term got decomposed into a firm-dependent error term that will capture cross-sectional heterogeneity i.e., ω_i, and the idiosyncratic error term v_{it}. The fixed effect can be represented as follows:

$$y_{it} = \alpha_0 + \beta_1 X_{1,it} + \beta_2 X_{2,it} + \ldots + \beta_n X_{n,it} + \varepsilon_{it} \qquad (vi)$$

$$y_{it} = \alpha_0 + \beta_1 X_{1,it} + \beta_2 X_{2,it} + \ldots + \beta_n X_{n,it} + \omega_i + v_{it} \qquad (vii)$$

$$y_{it} = \alpha_{0i} + \beta_1 X_{1,it} + \beta_2 X_{2,it} + \ldots + \beta_n X_{n,it} + v_{it} \qquad (viii)$$

The equation (*viii*) represents the fixed effect model, where the cross-sectional characteristics are time-invariant and vary over cross-sections. The selection of the models is done with highest R squared value and looking at the Durbin Watson statistics.

The assumption of unobserved heterogeneity considered in the fixed effect model may lead to misleading results, if the random sample consists of similarly characterized firms/countries (GUJARATI, 2008; HSIAO, 2014). To address this problem, the random effect model may also be considered. The random effect model is also known as the error component model, where the firm specific error term ω_i measures the random deviation of each cross-sectional intercept and develops an average intercept for all firms α_0.

$$y_{it} = \alpha_0 + \beta_1 X_{1,it} + \beta_2 X_{2,it} + \ldots + \beta_n X_{n,it} + \boldsymbol{\omega_i} + \boldsymbol{v_{it}} \qquad (vii)$$

$$y_{it} = \boldsymbol{\alpha_0} + \beta_1 X_{1,it} + \beta_2 X_{2,it} + \ldots + \beta_n X_{n,it} + \boldsymbol{\varepsilon_{it}} \qquad (viii)$$

α_0 is the average intercept taking account of random differences within the country-specific intercepts. Moreover, the random effect model goes with the usual assumptions of uncorrelated error terms with non-autocorrelation across the time and cross-section.

II. Selection of model

There are three pre-requisite tests to analyse and decide about the panel model selection. In general, if the idiosyncratic errors are correlated with regressors, fixed effect is considered appropriate. However, the decision about model selection is dependent on the series of tests i.e., Chow test (CHOW, 1960), Hausman test, Lagrange Multiplier tests (ENGLE, 1984; HAUSMAN, 1978). Gregory's Chow test is performed with the null hypothesis of the cross-sectional intercepts being the same i.e., $H_0: \alpha_1 = \alpha_2 \ldots \ldots \ldots = \alpha_{n-1} = 0$. If the country specific intercepts are the same, the test would imply that the data can be pooled and thus the pooled OLS would be appropriate. The Chow test is performed using an F-test of two equivalent regressions with restricted and unrestricted models. The Hausman test (BALTAGI, 2013; HAUSMAN, 1978) is performed with a null hypothesis favouring the random effect model. The test examines the correlation between error term and regressors. If the null hypothesis is rejected it gives a decision in favour of the fixed effect. Based on Chow and Hausmann test fixed effect model is adopted.

$$y_{it} = \alpha_{0i} + \beta_1 X_{i.t} + \beta_2 W_{i.t} + \beta_3 X_{i.t} * Q_{i.t} + \varepsilon_{it} \ldots\ldots\ldots (vi - a)$$

Based on the second model, the moderating effect is accounted for in this model. The left-hand side of the equation (vi-a) shows the dependent variable i.e., real economic output proxied by total industrial output. $X_{i.t}$ represents the independent variable i.e., PLS financing and non-PLS financing. Control variables are represented as $W_{i.t}$. β_3 measure the moderating role of asset quality i.e., non-performing assets. i and t are the country and period specific subscripts.

3.3.3 Section III & IV: Differential impact of adoption of Islamic banking on economic growth and poverty alleviation

Change of regime or policy intervention effect on aggregate entity, firm, organization, or even a country by applying experimental design is the most important advancement in the economic research (ATHEY and IMBENS, 2017). This section uncovers the incremental economic impact caused by the new intervention in the form of adopting Islamic banking model. The treatment/intervention effect of adoption of new banking model on economic growth of treated country is estimated in this section. As per the third and fourth objectives (hypotheses H4 & H6), Pakistan is taken as a treated unit where the Islamic financial system was implemented in 2002 (SBP, 2020). In order to have a comparison with untreated units (countries where Islamic banking

does not exist), Eikon-Refinitiv's Islamic banking development indicators (referred to as IFDI rating Index) ranking (IFDI, 2022) is used to select the countries based on the degree of development of Islamic banking in each country. IFDI (2022) gives the stakeholder the detailed analysis of key drivers of Islamic financial ecosystem in a country based on governance, sustainability, awareness, financial performance, and knowledge of Islamic banking system. Until now, 136 countries have been ranked by Eikon-Refinitiv based on development and progress of Islamic financial sector, which shows that almost 136 countries have adopted Shari'a banking system with Malaysia and Saudi Arabia being at the top in terms of Islamic financial development. Pakistan comes in top 10 countries of have the most developed Shari'a based banking system (IFDI 2022). IFDI ratings are taken as a base for the selection of untreated/control groups for this section.

3.3.3.1 Data and variables

I. Data

Annual data is collected from 1990 to 2021 from several sources. Pakistan is chosen as treated country to estimate if the adoption of Islamic banking model helped the country to attain incremental economic impact compared to the un-intervened countries. For the selection of control group (countries with no Islamic banking), Eikon-Refinitiv IFDI rating index is used. The criteria for selection of the untreated countries are as follows: (I) all countries not included in IFDI's rating index, (II) countries with lowest index i.e., below the value of 10, (III) countries with data availability from 1990 to 2021 to cover the pre- and post- adoption affect from the date of adoption (i.e., 2002 in case of Pakistan). Following the aforementioned three-fold criteria, 51 countries are selected to form a donor pool that will serve as an untreated/control group. Macroeconomic and financial development indicators for the selected countries are collected from World development indicator (WDI). Measure of total deposit is gathered from Global financial indicators of WDI. Human development index (HDI) is taken as measure of poverty alleviation and a proxy of standard of living is collected from United Nations Development Program (UNDP) (UNDP, 2022). Furthermore, our research controlled the model with additional country level governance variables i.e., political instability and regulatory quality (gathered from World Governance Indicators by WDI). Table 3.5 shows the selected 51+1 countries whereas Table 3.6 shows the selected variables and data collection source.

Table 3.5: List of selected countries for control group

Sr. No.	Country name	Treated/Untreated	Ranking	Index
1	Albania	Untreated unit	74	3.628
2	Argentina	Untreated unit	Not in ranking	No IFDI Index

3	Armenia	Untreated unit	Not in ranking	No IFDI Index
4	Austria	Untreated unit	124	1.39
5	Barbados	Untreated unit	Not in ranking	No IFDI Index
6	Belarus	Untreated unit	Not in ranking	No IFDI Index
7	Belgium	Untreated unit	120	1.771
8	Bhutan	Untreated unit	Not in ranking	No IFDI Index
9	Brazil	Untreated unit	134	0.504
10	Bulgaria	Untreated unit	70	3.708
11	Cameroon	Untreated unit	65	3.944
12	Colombia	Untreated unit	Not in ranking	No IFDI Index
13	Croatia	Untreated unit	95	3.105
14	Czechia	Untreated unit	Not in ranking	No IFDI Index
15	Denmark	Untreated unit	121	1.657
16	Dominica	Untreated unit	Not in ranking	No IFDI Index
17	Ecuador	Untreated unit	Not in ranking	No IFDI Index
18	Estonia	Untreated unit	Not in ranking	No IFDI Index
19	Finland	Untreated unit	118	1.897
20	France	Untreated unit	133	0.886
21	Ethiopia	Untreated unit	49	8.678
22	Greece	Untreated unit	104	2.754
23	Hungary	Untreated unit	103	2.911
24	Iceland	Untreated unit	Not in ranking	No IFDI Index
25	India	Untreated unit	41	9.108
26	Israel	Untreated unit	Not in ranking	No IFDI Index
27	Italy	Untreated unit	122	1.569
28	Jamaica	Untreated unit	Not in ranking	No IFDI Index
29	Latvia	Untreated unit	78	3.526
30	Lithuania	Untreated unit	Not in ranking	No IFDI Index
31	Madagascar	Untreated unit	Not in ranking	No IFDI Index
32	Mexico	Untreated unit	132	0.903
33	Moldova	Untreated unit	Not in ranking	No IFDI Index
34	Mongolia	Untreated unit	Not in ranking	No IFDI Index
35	Myanmar	Untreated unit	112	2.355
36	Montenegro	Untreated unit	Not in ranking	No IFDI Index

37	Nepal	Untreated unit	106	2.642
38	Norway	Untreated unit	114	2.196
39	Panama	Untreated unit	Not in ranking	No IFDI Index
40	**Pakistan**	**Treated unit**	**7**	**46.383**
41	Paraguay	Untreated unit	Not in ranking	No IFDI Index
42	Peru	Untreated unit	Not in ranking	No IFDI Index
43	Portugal	Untreated unit	115	2.088
44	Philippines	Untreated unit	53	5.493
45	Romania	Untreated unit	111	2.387
46	Slovakia	Untreated unit	Not in ranking	No IFDI Index
47	Slovenia	Untreated unit	62	4.244
48	Spain	Untreated unit	130	0.966
49	Sweden	Untreated unit	126	1.329
50	Uruguay	Untreated unit	Not in ranking	No IFDI Index
51	Vietnam	Untreated unit	125	1.383
52	Zimbabwe	Untreated unit	82	3.423

Table 3.6: Variable notation, and source of data collection

Variable	Notation	Data source	Literature support
Gross domestic product	GDP	World Development Indicators	(BOUGATEF et al., 2020; MASRIZAL and TRIANTO, 2022)
Poverty Alleviation	HDI	United Nations Development Program (UNDP)	(ALVAN, 2009; HANESTI et al., 2018; NOGUEIRA and MADALENO, 2021)
Private credit by financial institution	Cre_FI	World Development Indicators	(BECK et al., 2007, 2000; KING and LEVINE, 1993)
Trade openness	Open	World Development Indicators	(SHABAN et al., 2014)
Capital formation	GFCF	World bank dataset (WDI)	(MENSI et al., 2020; PAPPAS et al., 2017; RAFAY and FARID, 2017)
Inflation	Inf	World bank dataset (WDI)	(ANWAR et al., 2020; HACHICHA and BEN AMAR, 2015; SHAH et al., 2020)
Unemployment rate	UER	World bank dataset (WDI)	(REHMAN et al., 2019; ZHANG et al., 2022)
Deposits	Dep	Global financial indicators	(BECK et al., 2000; MISATI and NYAMONGO, 2012)
Foreign investments	FDI	World bank dataset (WDI)	(HERMES and LENSINK, 2003; TANG et al., 2008)
Government	N_exp	World bank dataset	(MUSAMALI et al., 2014)

expenditure		(WDI)	
Regulatory quality	RQ	World Governance Indicators	(CHIANG et al., 2022; KHAN et al., 2022)
Political stability	PS	World Governance Indicators	(EASTERLY and LEVINE, 1997; RAMADHAN et al., 2016)

II. Variables

Economic growth is taken as the outcome variable, which represents the economic prosperity through well-functioning of Islamic financial sector. Gross Domestic Product (GDP) is a widely used measure of economic growth and the overall economic activity of a country or region. It represents the total monetary value of all goods and services produced within a country's borders during a specific time period, usually measured annually or quarterly. GDP is a key indicator in economics and provides valuable insights into the health and performance of an economy (BLANCHARD and SHEEN, 2013). Furthermore, to see the differential impact of Islamic finance on raising the standard of living, deciding on the accurate proxy to measure poverty alleviation has been a challenge in the prior literature. Various indicators have been used to measure poverty or income inequality. For example, the GINI index has been widely used as a measure of income inequality or poverty (DEININGER and SQUIRE, 1996; SOLT, 2016). Some studies have used per capita consumption expenditure as a proxy for poverty and standard of living (SEHRAWAT and GIRI, 2014). However, poverty from a socio-economic perspective can be defined as the deprivation of capital, job opportunities, access to healthcare, and quality education (HA et al., 2019). Therefore, in the context of the financial development and poverty nexus, the Human Development Index (HDI) has been widely used to measure poverty alleviation and the general standard of living in many studies (ALVAN, 2009; HANESTI et al., 2018; NOGUEIRA and MADALENO, 2021).

The independent variable (predictor variable) is the total private credit issued by financial sector. Total private credit represents the total financing made by financial sector, which also include the total financing by Islamic banks in the period of post adoption of Shari'a banking system. WDI provides the aggregate financial data which is collected from the country's central banks, it includes the total financing in a country (ZARROUK et al., 2017). Furthermore, total deposit (Dep) as percentage of GDP is taken as the second predictor of financial development. We used inflation, GFCF, and trade openness as control variables/covariates. However, additional covariates have been selected for robust result estimations, i.e., total government expenditure and foreign direct investment. Government expenditure stimulates demand through public investments in infrastructure, education, healthcare, and research. These investments enhance productivity, attract private sector participation, and foster innovation, contributing to long-term economic

development (BARRO, 1990). Similarly, FDI fosters competition, and encourages domestic businesses to innovate and improve efficiency, which leads to increased exports and overall economic growth (BORENSTEIN et al., 1998). Moreover, country's regulatory quality and political stability measures are also considered to account for the country's governance structure. Table 3.7 provides the variables used, the selected proxies and a brief description.

Table 3.7: Model 3 and 4 (Description of variables)

Variables	Measure	Description
Dependent variable		
Economic Growth	Real Gross Domestic Product	The overall economic progress is measured by real GDP, which is considered one of reliable indicator of economic growth.
Poverty Alleviation/Standard of Living	Human Development Index	HDI in capturing multiple dimensions of poverty and its role in assessing the overall standard of living. It has been widely used to measure poverty alleviation and a general standard of living in many studies.
Independent variable		
Financial Depth	Private credit by financial institution as percentage of GDP	Private credit by financial institutions is used as a measure of financial development. It is considered an important indicator of the functioning and depth of the financial system. The availability of credit from financial institutions to the private sector is seen as a crucial factor in promoting economic growth and development.
Financial Depth	Total deposit as percentage of GDP	Total deposits to GDP as a measure of financial development. This ratio provides an indication of the size and depth of the banking sector within an economy.
Covariates / Control variables		
Trade openness	Sum of imports and exports as percentage of GDP	It captures the total value of international trade activities of a country, reflecting the degree of engagement in global trade.

Unemployment rate	Rate of unemployment	The unemployment rate is a commonly used measure to assess the level of unemployment within an economy. It represents the percentage of the labour force that is unemployed and actively seeking employment.
Inflation	Consumer Price index	The rate of change in consumer price index is taken as a gradual rise in the price of consumer products in a country.
Capital formation	Gross Fixed capital formation	The economic output is also highly correlated to the capital formation in a country. Therefore, gross fixed capital formation (GFCF) is taken as a measure of capital formation with the expectation of complementary relationship with economic output.
Foreign investments	Foreign direct investment	FDI is considered an important driver of economic growth and development as it brings in capital, technology, managerial expertise, and access to new markets.
Government expenditure	Net government expenditure	Government expenditure refers to the total amount of money spent by the government on various goods, services, and programs.
Regulatory quality	RQ	It reflects the ability of regulatory bodies to develop and enforce rules that promote transparency, accountability, and fairness in various sectors of the economy.
Political stability	PS	It reflects the ability of a government to maintain law and order, uphold institutions, and provide a predictable and secure environment for economic activities.

3.3.3.2 Econometric specification (Section III & IV)

The differential impact of adoption of Islamic banking on economic growth and poverty alleviation is measure by applying Synthetic Control Method (SCM). The motivation of the study rests with the ability of Islamic financial system in accelerating real trading activities, enhance consumption,

supply of money, creation of job opportunities impacting economic growth and reducing the income disparity.
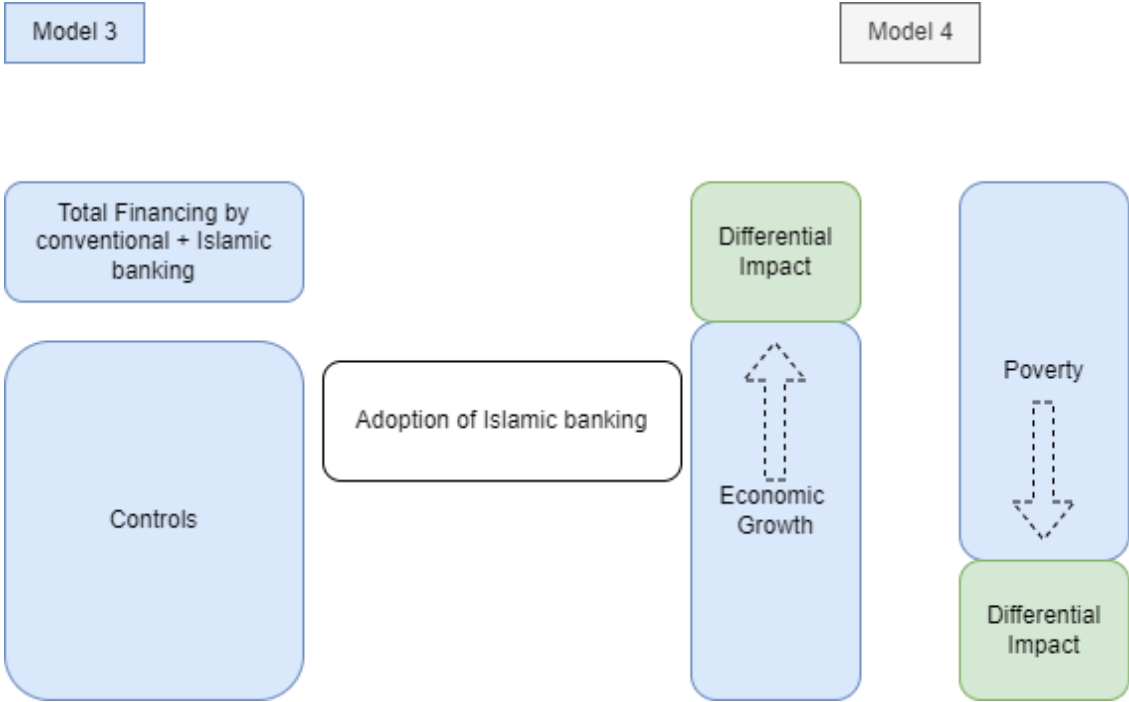
Figure 3.3: Differential impact on Economic growth and poverty alleviation (Model 3 & 4)
Source: Author own construction

I.   *Synthetic control method (SCM)*

The differential impact of a policy change is commonly measured using the data-driven method to find the best counterfactual effect by Difference-in-Differences (DID) regression. DID is the research method specifically designed to measure the impact of certain interventions, events, or changes in policy in an economy (LECHNER, 2010). The method allows the researcher to choose a comparison group that mimics the counterfactual outcome of the treatment group (where treatment is made). However, the 'time' of intervention, identification of control group, and comparison with pre- and post-intervention with treatment group is always critical in DID method (ABADIE and GARDEAZABAL, 2003). Moreover, there are higher chances of selecting an inappropriate control group that does not show similar trajectory outcome variables. The limitations of DID were resolved by ABADIE and GARDEAZABAL (2003), developing a new model to analyse the incremental/differential effect of intervention in treated countries compared to an untreated group of countries, known as the Synthetic control method (SCM). The model was further refined (ABADIE et al., 2015, 2010) in terms of creating a donor pool of untreated countries with weighted average. Further, SCM requires identifying the time of intervention and selection of untreated countries with suitable weights so that in the pre-intervention period, the covariates resemble the treated country. After creating the synthetic control group (donor pool of

untreated countries with weighted average), the performance of the treated country and the synthetic control group would look similar in the pre-treated period. The post-treatment effect is taken as the counterfactual outcome of SCM, where the difference in the outcome of the treated country and control group would capture the 'dynamic treatment effect'.

In order to establish statistical form of SCM, it is supposed that we have K+1 countries, where the country 1 adopts the Islamic banking i.e., Pakistan in this study. Whereas K is the other potential group of untreated/control countries that will make a donor pool (ABADIE et al., 2015, 2010). Table 5 represents the list of 51 countries as per the set criteria for creation of donor pool/synthetic group. T_0 is the time of adoption of Islamic banking i.e., 2002 (SBP, 2020). The pre-adoption period for treated country would be $\leq T_0$, whereas post intervention will be $> T_0$. The time condition can be written as $1 \leq T_0 < T$, and the total time period represented as $t = 1 \ldots T$. The outcome variable (i.e., economic growth) of the country i after adoption of Islamic financial system ($T_0 + 1\ to\ T$) is represented by Y_{it}^A. Whereas the outcome variable of the country i before adoption of Islamic banking (where t is $1 \leq T_0$) is denoted by Y_{it}^{NA}. The effect of adoption is reflected as the difference between pre and post adoption outcome variable $Y_{it}^{NA} - Y_{it}^A$. The difference indicator is denoted as D_{it} where i takes the value of unity if the country has adopted Shari'a banking system at a certain time t.

$$Y_{it} = \begin{cases} Y_{it}^{NA} \\ Y_{it}^A = Y_{it}^{NA} + \tau_{it} D_{it} \end{cases} \qquad (ix)$$

τ_{it} represents the effect of adoption of Islamic banking on outcome variable ($\tau_{it} = Y_{it}^A - Y_{it}^{NA}$) of the observed country i at time t. Also $D_{it} = 1$, if $t > T_0$ & $i = 1$, and otherwise $D_{it} = 0$. For any treated country (i.e., Pakistan in this study), the measure of differential impact is captured by τ_{it}. However, the counterfactural outcome varible Y_{it}^{NA} of synthetic control group countries that will reflect the similar results as of treated country before adoption. For Y_{it}^{NA}, linear factor modelling is used that is given below.

$$Y_{it}^{NA} = \emptyset_t + \beta_t X_i + \lambda_t \mu_i + \varepsilon_{it} \qquad (x)$$

$\emptyset_t$ is the unknown constant factor common among donor countries. X_i is a vector of observed covariates of countries in SCM, with vector (r x 1) with no connection to the intervention i.e., adoption of islamic banking within donor pool. β_t is time variable unobserved vector with dimension of (1 x F). Whereas, λ_t is the vector (F x 1) of unobserved common factors and μ_i is vector of unknown parameters of countries in donor pool. Unlike DID, SCM allow to have the impact of confounders on the outcome variable. The graphical representation of SCM is shown

below. The composition of weight selection is done considering a vector (K x 1) vector of weights i.e., $W = (w_2,,,,w_{k+1})$ in a way that $w_k \geq 0$ for K = (2,,,, K+1) provided that the total sum of all weights is unity i.e., $w_2+,,,,+w_{k+1} = 1$. For each particular country the W gives the weights to match the pre-adoption trend in order to form synthetic donor group, in order to estimate and take difference from counterfactual outcome to observed output (ABADIE et al., 2015). The extension of linear factor modeling equation giving outcome of Y_{it}^{NA} with W synthetic group to compare with pre- and post-intervension.

$$\sum_{k=2}^{k+1} w_k Y_{it}^{NA} = \emptyset_t + \beta_t \sum_{k=2}^{k+1} w_k X_i + \lambda_t \sum_{k=2}^{k+1} w_k \mu_i + \sum_{k=2}^{k+1} w_k \varepsilon_{it} \quad (xi)$$

The graphical representation of SCM is given in Figure 3.4.
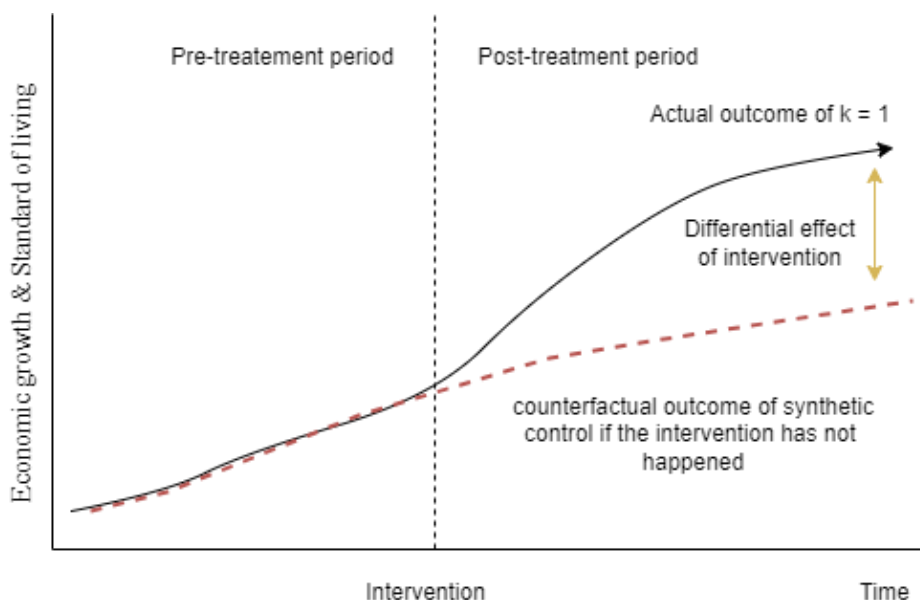
Figure 3.4: Synthetic control method graphical representation
Source: Author own source

4   RESULTS AND DISCUSSION

This chapter is divided into four sections, which provide detailed results and discussions for each model (1-4) as described in the methodology. Additionally, each section includes descriptive statistics following the complete results and discussion.

The first section presents the results of Model 1, covering the impact of Islamic financial depth on economic growth. The second section focuses on the results of the decomposition of the Islamic

financing side and its relative importance in fostering real economic output (Model 2). The third and fourth sections uncover the differential impact of the adoption of the Islamic banking system on economic growth and poverty alleviation (Models 3 & 4).

Furthermore, robustness and post-estimation tests are performed and presented at the end of each section. A summary of the acceptance and rejection of hypotheses is provided at the end of the results and discussion. It is important to note that the data analysis was conducted using STATA 14.2 software.

4.1   Section I - Islamic financial depth and economic growth

To investigate whether the depth of Islamic finance, operating within a dual banking system, serves as a catalyst for economic growth. The Islamic financial sector in Pakistan has experienced significant growth over the past few decades, both domestically and in terms of its contribution to global financial assets (IFSB, 2022). In this context, the relevant importance of Islamic financial depth is estimated in comparison to conventional finance. This section explains and interprets the results obtained from the first statistical model, i.e., Autoregressive distributed lag (ARDL). Initially, the author provided the base framework of the key statistical tests that enabled the author to choose the suitable cointegration model. Secondly, for the selection of an appropriate cointegration model, unit root tests are performed. Once the order of stationarity is determined, the appropriate econometric model is applied and provided in this section.

4.1.1   Model specification and Bounds testing

To examine the presence of cointegration among the variables being examined, the degree of integration using a unit root analysis is analysed. In this study, Augmented Dickey-fuller (ADF) and Phillips-Perron (PP) unit root tests are performed, and the results are found to be favourable for the application of the autoregressive distributed lag (ARDL) model. Table 4.1 displays the results obtained from the ADF unit root tests, which indicate the presence of a combination of variables that are integrated at level I(0) and the first difference I(1). This mixed integration of time series is a necessary condition for the use of the ARDL method (NARAYAN, 2005; PESARAN et al., 2001).

Table 4.1**:** Unit Root

Variables	Islamic financial depth				Conventional financial depth			
	I(0)		I(1)		I(0)		I(1)	
	ADF	PP	ADF	PP	ADF	PP	ADF	PP
	(t & c)	(t & c)	(t & c)	(t & c)	(t & c)	(t & c)	(t & c)	(t & c)
GDP	-0.5818	-1.762	-11.38*	-10.402*	-0.581	-1.874	-11.38*	-10.40*
	(0.866)	(0.792)	(0.000)	(0.000)	(0.866)	(0.792)	(0.000)	(0.000)
IFD/CFD	3.891	0.875	-7.396*	-7.985*	0.1819	-2.662	-10.32*	-9.266*
	(1.000)	(0.242)	(0.000)	(0.000)	(0.969)	(0.841)	(0.000)	(0.000)
IFI/CFI	-5.483*	-7.632*	-	-	-1.366	-2.434	-7.556*	-9.325*
	(0.000)	(0.000)			(0.592)	(0.057)	(0.000)	(0.000)
NPA/NPL	-1.626	-2.009	-9.727*	-4.698*	-1.237	1.266	-6.607*	-6.779*
	(0.463)	(0.691)	(0.000)	(0.000)	(0.653)	(0.803)	(0.000)	(0.000)
INF	0.982	-1.784	-4.022*	-2.391*	-	-	-	-
	(0.996)	(0.749)	(0.003)	(0.008)				
IR	-1.565	-1.058	-4.337*	-5.253*	-	-	-	-
	(0.494)	(0.788)	(0.001)	(0.006)				

*Denotes significance at 1%, Note**:** above test is conducted based on Schwarz Info criterion with intercept (c) and trend (t), ADF = Augmented Dickey Fuller & PP = Phillip Perron
Source: Authors' calculations using Stata 14.2

As shown in Table 4.1, the time series data for both the Islamic and conventional sides demonstrate integration at either level I(0) or first difference I(1). The non-parametric ADF and PP unit root test has resulted in the rejection of the null hypothesis favouring the presence of a unit root for all variables at first difference I(1), except for IFI, which exhibits stationarity at level I(0). To continue with the cointegration estimation, both the Islamic and conventional models have been set for ARDL bounds tests in two different ways, i.e., with and without the inclusion of control variables.

Table 4.2: Cointegration test results

Model	IFD(a)[1]	IFD(b)[2]	CFD(a)[3]	CFD(b)[4]
Bounds Tests				
F-Statistics	4.4647*	43.2523*	12.3147*	14.3109*
Asymptotic Critical Values	K 3	K 5	K 3	K 5

	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
10%	2.37	3.20	2.08	3.0	2.37	3.2	2.08	3.0
5%	2.79	3.67	2.39	3.38	2.79	3.67	2.39	3.38
2.5%	3.15	4.08	2.70	3.73	3.15	4.08	2.70	3.73
Diagnostic tests								
LM BG χ^2	0.751		0.402		0.761		1.096	
	(0.415)		(0.533)		(0.410)		(0.243)	
RESET χ^2	1.093		0.069		2.481		1.831	
	(0.301)		(0.793)		(0.122)		(0.183)	
Jarque Bera χ^2	1.506		0.186		4.911		0.528	
	(0.471)		(0.911)		(0.085)		(0.768)	
LM BP χ^2	3.046		1.355		1.941		0.932	
	(0.061)		(0.221)		(0.088)		(0.482)	

*,**,*** denotes significance at level 10%, 5%, 1% respectively
[1] F(GDP|IFD, IFI) ARDL [1,2,1] optimal lags are selected based on SIC criteria
[2] F(GDP|IFD, IFI, NPA, INF, IR) ARDL [4,3,0,0,2,4] optimal lags are selected based on SIC criteria
[3] F(GDP|CFD, CFI) ARDL [1,2,1] optimal lags are selected based on SIC criteria
[4] F(GDP|CFD, CFI, NPL, INF, IR) ARDL [1,3,1,0,1,1] optimal lags are selected based on SIC criteria
Source: Authors' calculations using Stata 14.2

Table 4.2 presents the empirical findings indicating the presence of long-term cointegration in all the examined models, represented as IFD (a) & (b) and CFD (a) & (b). In the initial iteration of the Islamic Financial Depth (IFD) model, two separate models were applied to validate the robustness of long-term cointegration between Islamic financial depth and economic growth. Initially, the control variables were excluded from both the models, i.e., IFD(a) – without controls, IFD(b) with controls, and CFD(a) – without controls and CFD(b) with controls. Subsequently, all five predictive variables were incorporated to assess the long-run integration between Islamic finance and GDP. Similarly, the same approach is adopted to analyse the Conventional Financial Depth (CFD) in order to evaluate the degree to which conventional financial depth is cointegrated with economic growth. The non-standard asymptotic F-statistic for bounds tests, the obtained value of F-statistics is compared with the critical values at both the lower and higher limits at a 5% significance level. The presence of cointegration between the explanatory and dependent variables in the ARDL model is inferred if the values of F-statistics stay above the upper critical value I(1) (following the PESARAN et al. (2001). Conversely, when the value decreases below the lower critical value I(0), it indicates the absence of cointegration. However, inconclusive

cointegration may also occur if the computed F-statistics lies between I(0) and I(1) (PESARAN et al., 2001).

The long-term cointegration between the Islamic financial sector and economic growth is tested in two models as specified in the above section, i.e., IFD(a) and IFD(b). The F-statistics for model IFD(a) and IFD(b) are 4.464 and 43.252, respectively. The values exceed the upper critical value I(1) at a significance level of 5%, which is 3.67 and 3.38, respectively. The values suggested evidence of long-run integration between Islamic financial depth and Islamic financial intermediation with the country's economic growth. The bounds test of both the models showed the significance and presence of cointegration even when control variables are included in it, depicting the robustness of our results. In conjunction with the depth of Islamic finance, the degree of integration between conventional financial depth and economic growth is also divided into two distinct models, i.e., CFD(a) and CFD(b). The F-statistics obtained from the ARDL bounds test for both models are 12.314 and 14.310, respectively. The findings indicate that the upper bound critical values at 5% level of significance for both models are 3.67 and 3.38, respectively. The values are unquestionably lower than the estimated F values. Therefore, the null hypothesis of the bounds test, which states that there is no cointegration, is rejected in all of the models. There exists strong evidence indicating a significant correlation between the long-term integration of Islamic financial depth and conventional financial depth and their ability to forecast economic growth in Pakistan.

4.1.1.1   Long-run impact of Islamic financial depths on economic growth

Once the cointegration has been established, long-term relationship is estimated using the ARDL long-run equations (iv) as outlined in the methodology section. The long-term estimates of the first model IFD(a) for Islamic financial depth with economic growth are presented in Table 4.3 column 1. The appropriate lag structure was selected based on Schwartz info criteria (SIC), i.e., [1,2,1]. The results showed a significant long-term association between IFD (Islamic financial depth) and economic growth, with a statistical significance level of 5% with a coefficient of 0.0162. The finding suggested that a one percent rise in the level of Islamic financial depth will result in a corresponding 1.6% increase in economic growth. In addition, the Granger causality test indicates a statistically significant one-way causality flowing from IFD to GDP, as presented in Table A-1 (appendix). The findings of this study pertaining to the impact of depth of Islamic financing are consistent with the previous findings (BOUKHATEM and BEN MOUSSA, 2018; HACHICHA and BEN AMAR, 2015; MAJID and KASSIM, 2015). Similarly, the capacity of Islamic financial institutions to encourage the process of intermediation is assessed by the increasing number of branches that the Islamic banks operate. In line with the findings of ANWAR et al. (2020), it is

revealed that Islamic financial intermediation (IFI) has a positive and significant long-run impact on economic growth and a significant Granger causal relationship from GDP to IFI. The findings were found to be consistent with one another. According to the results, a shift of just one percentage point (1%) in the indicator of Islamic financial intermediation is likely to result in a change of roughly six percentage points (6%) in the rate at which the economy is growing. However, the coefficient corresponding to Non-Performing Assets (NPA) is negative, indicating that NPA could potentially hinder economic growth. Nevertheless, it is noteworthy that this negative impact fails to reach statistical significance. The negative relationship concurs with previous results, as indicated by ALSAMARA et al. (2019). The primary statistical model employed for long-term integration, referred to as IFD(b), is estimated using lag structure [4,3,0,0,2,4] based on SIC. The findings suggest that after accounting for control variables, there is a positive and statistically significant relationship between Islamic financial depth (IFD) and long-term economic growth, which also confirms the finding in the first model, i.e., without controls. This confirmed the study's first hypothesis, i.e., H1, suggesting that Islamic financial depth positively contributes to the country's economic growth. Furthermore, the coefficients for the IFD and IFI are 0.0213 and 0.0358, respectively. Both coefficients are statistically significant at the 1% level. It is worth noting that the predictive power of the statistical models has increased with the inclusion of control variables. The magnitude of IFD increased from 0.0162 to 0.0213, and the significance increased from 5% to 1%. Moreover, a negative relationship exists between non-performing assets (NPA) and interest rates (IR) with respect to gross domestic product (GDP) over the long-run period. Additionally, it is noteworthy that interest rates have a substantial influence on the growth of the economy. While inflation has often been considered a reactive factor in long-term economic growth, the analysis revealed a coefficient of 0.0014 at a 1% significance level. Unexpectedly, despite the weak influence of inflation on GDP, it established a positive and statistically significant long-term relationship with economic growth. This positive association contradicts the findings of previous studies (BOUKHATEM and BEN MOUSSA, 2018; MAJID and KASSIM, 2015) but aligns with the theories of Keynesian and neo-Keynesian economic thought and the results are in harmony with the findings of SALEEM and ASHFAQUE (2020), which asserts that well-predicted inflation can indeed have a positive impact on financial performance and, consequently, on long-term economic growth.

Table 4.3: Long-run estimates

Model	IFD(a)[1]	IFD(b)[2]	CFD(a)[3]	CFD(b)[4]
IFD/CFD	0.0162 (2.522)**	0.0213 (16.101)***	0.0195 (0.588)	0.0393 (2.403)**
IFI/CFI	0.0579 (2.870)***	0.0358 (5.097)***	1.141 (10.999)***	0.672 (2.179)**
NPA/NPL	-	-0.0003 (-0.140)	-	-0.0023 (-0.425)
INF	-	0.0014 (6.430)***	-	0.0001 (0.098)
IR	-	-0.0097 (-3.752)***	-	-0.0078 (-1.949)*
C	21.247 (154.62)***	21.318 (371.55)***	11.352 (13.262)***	15.334 (5.741)***

*,**,***denotes significance at level 10%, 5%, 1% respectively
[1] F(GDP|IFD, IFI) ARDL [1,2,1] optimal lags are selected based on SIC criteria
[2] F(GDP|IFD, IFI, NPA, INF, IR) ARDL [4,3,0,0,2,4] optimal lags are selected based on SIC criteria
[3] F(GDP|CFD, CFI) ARDL [1,2,1] optimal lags are selected based on SIC criteria
[4] F(GDP|CFD, CFI, NPL, INF, IR) ARDL [1,3,1,0,1,1] optimal lags are selected based on SIC criteria
Source: Authors' calculations using Stata 14.2

Section I further examined the long-run relationship between conventional financial depth and economic growth. Two long-run autoregressive distributed lag (ARDL) models are employed: CFD(a) and CFD(b) with the optimal lag structures [1,2,1] and [1,3,1,0,1,1], respectively, which are determined using the SIC. As per the first model, i.e., CFD(a), the long-term estimates of conventional financial depth showed a positive and statistically insignificant relationship, suggesting that loans provided by conventional banks do not have a meaningful impact on economic growth over time. On the other hand, the analysis has shown that the relationship between conventional financial intermediation and economic growth over the long run is strong and significant at 1%, with a coefficient of 1.141. However, when control variables were considered (as of in CFD(b)), the CFD has a positive and significant long-run association with economic growth. Interestingly, the coefficient is greater than the Islamic financial depth, and both relationships are significant at a 5% level. Therefore, the first sub-hypothesis, i.e., H1a, is rejected. The provision of financial intermediation, either through Islamic or conventional banking channels, makes a long-term contribution that is both beneficial and important to the expansion of the economy. The coefficient of the conventional financial intermediation (CFI) is 0.672, indicating statistical significance at the 1% level. The interest rate significantly and negatively impacts long-term economic growth in both Islamic and conventional financing models. However, IR turned out to have a weaker impact on economic growth. Furthermore, the results found no significant long-term impact on GDP from inflation and non-performing loans (NPLs). The long-term impact of both Islamic and conventional financial depth in both models is significant and

beneficial for the economy. Nevertheless, it is worth noting that the coefficient associated with Islamic financial depth (IFD) exhibits a significantly smaller magnitude than that of conventional financial depth (CFD). This difference implies that an only 1 percent shift in CFD would yield an even greater impact on long-term economic growth compared to Islamic banking impact over economic growth. The results imply that the conventional financial sector imparts a greater impact on achieving economic growth. The possible rationale for greater impact is characterized by the relative share of interest-based financing within the economy. Though the market share of Islamic banking is overgrowing in Pakistan, the Islamic financing market still covers almost 25% of the market share in the banking sector (IFSB 2022). The roots of interest-based system are more profound compared to Shari'a based banking, which is why the significant factor of economic growth in dual banking system are conventional banks. To sum up altogether, the first hypothesis (H1) is accepted stating that Islamic financial depth is healthy for economic prosperity. However, the sub-hypothesis H1a is rejected where it was posited that Islamic banks impart a greater impact on the economy compared to conventional banks.

4.1.1.2 Short-run impacts using error correction method (ECM)

The short-term dynamics estimations are made using the Error Correction Model (ECM) method. Error correction models provide insights into the short-term relationship between explanatory variables and the dependent variable. This model facilitates the derivation of inferences regarding the speed of adjustment from short-run disequilibrium to long-run equilibrium. Table 4.4 provides the short-term coefficients of both models of Islamic (IFD(b)) and conventional (CFD(b)) financial depth. For simplicity and precise information, the first models without controls are dropped at this stage. The error correction term is represented as ECT(-1), which is negative in direction and statistically significant at 5%, implying speed of adjustment from short-run disequilibrium to long-run stability.

Table 4.4: Short Run results

Differenced Variables	IFD(b)[1]		CFD(b)[2]
D(GDP(-1)	-0.0103 (-0.0646)	D(GDP(-1))	0.0788 (0.6769)
D(GDP(-2))	-0.1336 (-1.1915)	D(GDP(-2))	-
D(IFD)/(CFD)	0.0131 (2.7721)[*]	D(CFD)	0.0245 (0.3123)
D(IFD/CFD(-1))	0.00328 (0.7914)	D(CFD(-1))	0.00214 (1.4799)
D(IFI)/(CFI)	- 0.0107 (0.8587)	D(CFI)	-0.6150 (0.0017)

D(IFI/CFI(-1))	-	D(CFI(-1))	-
D(NPA)	-0.0018 (-0.8362)	D(NPL)	0.00121 (0.3178)
D(NPA(-1))	-	D(NPL(-1))	-
D(INF)	-0.0029 (-3.500)*	D(INF)	-0.0038 (-3.7602)
D(INF(-1))	-0.0028 (-2.9840)*	D(INF(-1))	-
D(IR)	-0.00111 (-0.5919)	D(IR)	0.00305 (1.1787)
D(IR(-1))	0.00528 (2.5690)*	D(IR(-1))	-
C	0.0272 (6.0540)*		0.02352 (5.6808)*
ECT(-1)	-0.7987 (-4.5593)*	ECT(-1)	-0.4236 (-3.4756)*
Adjusted R^2	0.8615		0.6800
Log likelihood	208.7563		184.8972
F-statistic (prob = 0.00)	23.8144		14.2236
AIC[3]	-6.8842		-6.1367
SIC[3]	-6.3055		-5.7783

* denotes significance at level 5%
[1] F(GDP|IFD, IFI, NPA, INF, IR) ARDL [4,3,0,0,2,4] optimal lags are selected based on SIC criteria.
[2] F(GDP|CFD,CFI,NPL,INF, IR) ARDL [1,3,1,0,1,1] optimal lags are selected based on SIC criteria.
[3] Akaike Info criteria, Schwarz info criteria.
Source: Authors' calculations using Stata 14.2

The presence of a negative coefficient of error correction term indicates the speed of adjustment at which adjustments occur to achieve long-term equilibrium. In the first model, it is seen that around 80% of the deviations from disequilibrium in the short-term are likely to be adjusted in the following quarter, leading to a convergence towards long-term equilibrium. In contrast, the non-Islamic financial depth model observed a steadier rate of adjustment, as shown by a value of -0.423, which is 42.3% of the variations. In accordance with the concept of equilibrium, the Islamic banking sector had a faster rate of convergence towards equilibrium. Nevertheless, it has been observed that the rate at which conventional financial depth converges is 50% lower than that of Islamic depth. In the short term, there exists a strong relationship between Islamic financial depth (0.0131), inflation (-0.0029), and interest rate (0.0053) with economic growth, as indicated by the coefficients being statistically significant at 5%. This suggests that the involvement of Islamic financial operations has the potential to assist in achieving short-term economic growth. Nevertheless, the short-term GDP elasticity for non-Islamic financial depth and intermediation exhibits a lack of magnitude and statistical significance. Moreover, the short-term effect coefficient of Islamic financing shows a much weaker magnitude when compared to the coefficient

observed in the long run. Therefore, the findings of HACHICHA and BEN AMAR (2015) indicate inconsistency in the sensitivity of GDP elasticity. In contrast, our short-term estimates align with the prior economic research conducted by MAJID and KASSIM (2015) in Malaysia, ZARROUK et al. (2017) in the United Arab Emirates, YUSOF and BAHLOUS (2013) in the Gulf Cooperation Council (GCC), and (ABDUH and AZMI OMAR, 2012) in Indonesia. In the CFD(b) model, economic growth is solely linked to the interest rate. Moreover, it is found that there exists a negative relationship between the asset quality of Islamic banks and conventional banks and economic growth, as concurred (ALSAMARA et al., 2019; CREEL et al., 2015). However, it should be noted that the observed results do not reach statistical significance.

4.1.2 Robustness check (Section I)

In order to assess the robustness of the employed model, we conducted several statistical tests. Specifically, we utilized the LM Breusch-Godfrey (BREUSCH and GODFREY, 1981) test to examine autocorrelation, the LM Breusch-Pagan (BREUSCH and PAGAN, 1979) test to assess heteroscedasticity, the Jarque-Bera (JARQUE and BERA, 1980) to evaluate normality, and the Ramsey RESET (RAMSEY, 1969) test at level (1) to validate the correctness of the functional form of the selected models [1(a), 1(b), 2(a), 2(b)]. The significance of F-statistics and probability chi-square values are provided. Therefore, it is concluded that the probability of χ^2 being greater than 5% indicates that all the estimates are considered accurate. Consequently, all diagnostic tests provided sufficient evidence to support the assumptions of normality, homoscedasticity, absence of autocorrelation, and appropriate functional form of the model.

In addition, the assessment of model stability involved the use of the cumulative sum of recursive residuals (CUSUM) method, as proposed by (PESARAN et al., 2001; BROWN et al., 1975). This approach is employed to verify the stability of both models for Islamic and conventional. Additionally, the results of other diagnostic tests are included in Table 4.2, which provided favourable results, thereby rendering our model suitable for analysis. Figure 4.1 displays the graphical depiction of the CUSUM tests conducted for equation (i) and equation (ii), referring to methodology section I, exhibiting statistical significance at a 5% level of significance.
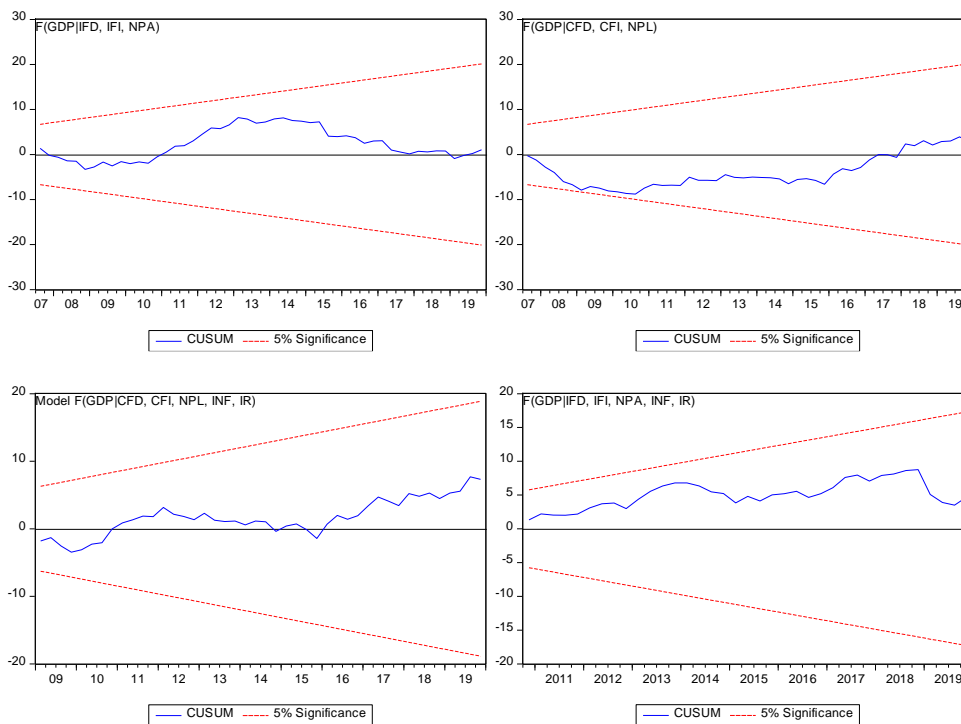
Figure 4.1
Source: Authors calculations using Stata 14.2

4.2 Section II - Decomposed Islamic financings and its Impact on economic output

To understand the dynamics of the asset side of Islamic banks, this part focuses on decomposed Islamic financing divided into two main parts, i.e., PLS financing (alternatively known as participatory modes of financing) and non-PLS financing (sale/debt-based financing). In finance-growth nexus, financial intermediation is of key importance for the economic growth, which helps the economy to channelize the financial resources from excess hands to entrepreneurs, giving rise to productivity in the form of manufacturing and trading activities. Furthermore, in most cases, the financing facilities offered by the banking system are enjoyed by the manufacturing and corporate sectors. Hence, industrial productivity is one of the key pillars of economic growth, i.e., GDP. As per research objective 2 and hypotheses (H2, H3, & H5), this section provides detailed results and discussion on how different modes of Islamic financing facilitate real economic productivity as measured by industrial production.

4.2.1 Descriptive statistics

Descriptive statistics of the selected variables are shown in Table 4.5. The mean value and the standard deviation for the industrial production shows a steady growth in the manufacturing activity. The lower deviation of 1.179, suggesting that industrial output remains fairly stable over time, ranging from a minimum of 21.197 to a maximum of 25.551. Meanwhile, the Non-PLS

financing have a higher mean of 12.833 with a wider spread (Std. dev. of 2.32), indicating more variability in this sector's performance, which ranges from 8.283 to 18.232. On the other hand, the PLS financing has a lower mean of 9.888 but a larger standard deviation of 3.803, implying even greater volatility in PLS financing indicating the practical use of participatory contracts are not the same in each country over the time, the range spanning from 0.693 to 15.998. Conventional financing (CF) shows substantial volatility, with a mean of 25.966 and a wide Std. dev. of 12.671, indicating that the depth of conventional financing varies over time. This also gives insights of growing trend of Islamic financing in selected countries. Exports (Ex) have a relatively stable mean of 9.835 with a low Std. dev. of 1.014, suggesting consistent export levels, fluctuating within the narrow range of 7.35 to 13.729. Inflation (Inf) is minimal on average (mean of 0.011), but it can be volatile (Std. dev. of 0.02), occasionally dipping below zero. Gross Fixed Capital Formation (GFCF) has a moderate mean of 9.416 and a reasonable Std. dev. of 1.13, indicating relatively stable capital investment levels across observations, spanning from 6.95 to 11.38. Non-Performing Assets (NPA) have a mean of 0.038, suggesting that, on average, only a small portion of assets are non-performing, but this can vary considerably (Std. dev. of 0.032), occasionally reaching up to 0.143. Finally, Imports (Im) exhibit a consistent mean of 9.704 with a low Std. dev. of 0.867, indicating stable import levels between 8.204 and 11.302.

Table 4.5: descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
IP	396	23.733	1.179	21.197	25.551
non-PLS	396	12.833	2.32	8.283	18.232
PLS	396	9.888	3.803	.693	15.998
CF	396	25.966	12.671	8.86	62.580
Ex	396	9.835	1.014	7.35	13.729
Inf	396	.011	.02	-.03	.156
GFCF	396	9.416	1.13	6.95	11.38
NPA	396	.038	.032	0	.143
Im	396	9.704	.867	8.204	11.302

Source: Authors' calculations using Stata 14.2

In summary, this dataset offers valuable insights into various aspects of the economy. While Industrial Production, Exports, Gross Fixed Capital Formation, and Imports seem to maintain relative stability over time, the non-PLS, PLS, CF, and Non-Performing Assets exhibit greater variance, potentially signalling areas of economic concern. Additionally, the presence of inflation, though generally low, may require attention when it occasionally dips below zero. These descriptive statistics provide an essential foundation for further analysis and statistical inferences.

4.2.2 Pairwise correlation and multicollinearity

In the correlation matrix, Industrial Production (IP) exhibits a positive correlation with both PLS and non-PLS financing. Specifically, PLS financing shows a positive and significant correlation of 0.269 with IP, indicating that an increase in participatory lending tends to coincide with higher industrial production. Similarly, non-PLS financing demonstrates a stronger positive correlation of 0.185 with IP, suggesting that increase in debt-based lending activities are associated with a boost in industrial production. Notably, there are high positive correlations between Exports and IP (0.844), as well as between GFCF and IP (0.785). These findings imply that a rise in industrial production tends to be strongly linked to increased exports and gross fixed capital formation, which can be indicative of a robust and expanding industrial sector in the economy. Furthermore, the NPA seemed to be negatively correlated with IP, which was as per the expectation based on the rationale that NPA reduces the future financing growth for the banks. Importantly, the high correlation among independent variable may give rise to problem of multicollinearity. To make sure the absence of multicollinearity, the results of variance inflation factor (VIF) and tolerance level are given in Table 4.6. The VIF value of all the variables seemed to be under the value of 10, hence the selected model is free from the issue of multicollinearity (O'BRIEN, 2007).

Table 4.6: Pairwise correlation and multicollinearity

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)			VIF	1/VIF
(1) IP	1.000										Im	5.744	0.174
(2) non-PLS	0.185***	1.000									PLS	5.560	0.180
	(0.001)												
(3) PLS	0.269***	0.759***	1.000								CF	5.124	0.195
	(0.000)	(0.000)											
(4) CF	0.595***	0.254*	-0.115	1.000							n-PLS	4.372	0.229
	(0.000)	(0.051)	(0.091)										
(5) NPA	-0.100	0.126**	0.452**	-0.614***	1.000						Ex	4.322	0.231
	(0.079)	(0.027)	(0.050)	(0.001)									
(6) Ex	0.844***	0.161***	0.229***	0.068	0.021	1.000					GFCF	3.744	0.267
	(0.000)	(0.005)	(0.000)	(0.231)	(0.150)								
(7) Inf	0.038	0.359***	0.434***	0.490***	-0.099*	-0.475***	1.000				NPA	1.906	0.525
	(0.503)	(0.000)	(0.000)	(0.000)	(0.081)	(0.001)							
(8) GFCF	0.785***	0.428*	0.581***	0.221***	0.689***	0.118**	0.315**	1.000			INF	1.600	0.625
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.038)	(0.021)						
(9) Im	-0.749***	0.022	0.213***	0.108*	0.855***	-0.143**	-0.727***	0.682**	1.000		Mean VIF	4.065	-
	(0.000)	(0.707)	(0.000)	(0.058)	(0.000)	(0.012)	(0.000)	(0.006)					

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

VIF: Variance inflation factor

Source: Authors' calculations using Stata 14.2

4.2.3   Regression results

This section provides the results and analysis of pooled regression model for PLS and non-PLS financing and its impact on economic activity. Based on the Chow and Hausmann tests, the clustered standard error (country level) with fixed effect panel regression model is applied, presented in Table 4.7. The analysis proceeds in two distinct models; the first covers PLS financing and its impact on fostering real economic activity. At the same time, the second model uncovers the impact of non-PLS financing on industrial output. For the robustness findings, the analysis started from the bivariate model where PLS and non-PLS are regressed with industrial production. As the next step, the controls are added with country and year fixed effect to analyse if the impact of PLS and non-PLS changes with the additional control variables. Furthermore, the author introduced another variable in the model, i.e., total deposits, for the robustness check. Importantly, to test for the moderating effect of financial constraints and asset quality, as the third step, the interaction term is added in both models to examine how asset quality affects the modes of financing – economic output nexus. Four regression models are used for PLS as well as for non-PLS. The results of bivariate models without control variables PLS(a) and non-PLS(a) are given in columns (1) and (5). PLS(b) and non-PLS(b) provide the results with control variables, as shown in columns (2) and (6). The addition of the moderating effect of asset quality is present in column (3) for PLS(c) and column (7) for non-PLS(c). Similarly, the robustness check with an additional control variable is given in model PLS(d) in column (4) and for non-PLS(d) in column (8). Deposits and savings play a phenomenal role in financial intermediation; the financial sector is directly dependent on the amount of savings kept by the public and hence helps in the productivity of economic activities (RIBAJ and MEXHUANI, 2021). Also, less consumption of income tends to increase the saving rate in the country, which ultimately affects the aggregated economic activities (OMOREGIE and IKPESU, 2017). All four panel regression models gave the consistent results where both PLS financing and non-PLS financing appeared to have positive and significant relationship with industrial production. However, the results of PLS financing become more sensitive with the addition of controls and moderating variables, which showed that other factors also determine the economic activities within an economy. Whereas the magnitude of non-PLS financing consistently grew from the model (a) to (d), representing that non-PLS financing is a more powerful determinant of real economic activities.

Table 4.7: Regression Results

VARIABLES	(1) PLS(a)	(2) PLS(b)	(3) PLS(c)	(4) Robustness check-PLS(d)	(5) non-PLS(a)	(6) non-PLS(b)	(7) non-PLS(c)	(8) Robustness check- non-PLS(d)
PLS	0.0834*** (4.885)	0.0699*** (6.440)	0.00232* (1.981)	0.00828* (1.974)	-	-	-	-
non-PLS	-	-	-	-	0.0938*** (3.285)	0.0905*** (5.443)	0.137*** (6.708)	0.154*** (7.914)
Ex	-	0.749*** (13.37)	-0.0221 (-0.644)	0.00102 (0.0330)	-	0.827*** (14.17)	0.0353 (1.273)	0.0514 (1.414)
Inf	-	6.471*** (3.940)	2.987*** (5.762)	-0.307 (-0.511)	-	4.547*** (2.851)	1.411*** (3.254)	-1.238*** (-3.487)
CF	-	-0.517** (-2.014)	0.435** (2.207)	0.522*** (3.377)	-	0.711*** (4.254)	0.543*** (3.544)	-0.479*** (-5.224)
Dep	-	-	-	-0.0350 (-1.608)	-	-	-	0.0302 (0.113)
GFCF	-	0.594*** (12.15)	0.278*** (4.039)	0.401*** (6.356)	-	0.550*** (11.50)	0.185*** (3.367)	0.300*** (5.370)
Im	-	-0.207*** (-2.870)	-0.00144 (-0.0435)	0.00969 (0.327)	-	-0.309*** (-3.866)	-0.00155 (-0.0587)	0.00342 (0.150)
NPA	-	-	-13.94*** (-3.381)	-11.31*** (-3.060)	-	-	-	-
PLS*NPA	-	-	0.772** (2.218)	0.635** (2.040)	-	-	-	-
NPA	-	-	-	-	-	-	-32.40*** (-8.438)	-24.20*** (-6.061)
non-PLS*NPA	-	-	-	-	-	-	2.228*** (7.777)	1.682*** (5.991)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	22.91***	13.39***	22.62***	21.33***	22.53***	14.53***	21.04***	19.75***
	(126.7)	(40.32)	(30.11)	(31.00)	(60.48)	(37.98)	(32.66)	(27.61)
Year effect	NO	YES	YES	YES	NO	YES	YES	YES
Country effect	NO	YES	YES	YES	NO	YES	YES	YES
Observations	396	396	396	440	396	396	396	440
R-squared	0.072	0.520	0.687	0.790	0.034	0.513	0.692	0.794
F-Value	23.86***	273.4***	1332***	1581***	10.79***	261.9***	2090***	6741***
LM test	-	-	0.079			0.156		-
Prob. > χ^2								
Breusch-Pagan	-	-	0.216	-	-	0.114	-	-
Hausmann Test	-	-	18.647			23.088		
			(0.005)			(0.001)		

*** $p<0.01$, ** $p<0.05$, * $p<0.1$
Source: Authors' calculations using Stata 14.2

4.2.3.1 Participatory modes vs non-participatory modes

The impact of PLS financing on industrial production in all of the estimated models is statistically significant and positive. However, the strength of the relationship kept on decreasing as more predictors were added to the regression models. PLS(c) is considered the complete estimation with all predictors and moderating effects, where the coefficient of PLS financing is 0.00232, i.e., significant at 10%. However, in the robustness check, i.e., PLS(d), the impact was greater compared to PLS(c). The results showed that Islamic banks' profit and loss financing plays a defining role in promoting trading and real economic activities. This confirms the second hypothesis, H2, stating that PLs financing significantly promotes real economic activities. However, the magnitude of PLS financing seemed weaker than the conventional financial depth, i.e., 0.435 significant at 5%. This implies that the relative strength and growth of PLS financing in the selected countries is not higher than the conventional financial depth. Yet, participatory modes have a significant impact on facilitating economic activities. Furthermore, the corporate sector prefers to rely on profit and loss sharing investment rather than bearing all the potential risk alone. At the same time, the popularity of PLS financing still could not reach the level of conventional financing. The results concurred with the previous studies (BOUGATEF et al., 2020; SALEEM et al., 2021). The present research also revealed aspects that are in contradiction to the findings reported in the prior studies and produced statistically significant outcomes with a significance level of 10% for PLS financing. It is important to note that previous research (BOUGATEF et al., 2020; GUIZANI and AJMI, 2021) has mostly examined aggregated time series data from one country, for instance, Malaysia. On average, the participatory financing constitutes approximately 10-15% of the overall Islamic financial sector in Malaysia. With the inclusion of countries with a PLS share exceeding 50% (such as Pakistan, Iran, and Indonesia IFSB (2021)), this study revealed reliable and robust outcomes. Importantly, the reduced share of PLS financing is due to heightened risk and moral hazards prevalent in society (BECK et al., 2013).

Firms rely on financing with less hidden information in it. For instance, capital structure and the firm's dependence on debt largely depend on the degree of information asymmetry. The variation in the interest rate affects the firms' decision on choosing type of financing. One of the greatest tools to deal with agency conflicts and information asymmetry is a non-PLS/sale-based contract, which comes in very handy in this situation. Firms showed more interest in non-PLS financing compared to PLS as well as conventional financing due to reduced asymmetry (EBRAHIM and SHEIKH, 2016; SHABAN et al., 2014). Naturally, debt-based contracts are fixed at the time of the agreement, which is not subject to change even though the rate of interest fluctuates. The reason is that Islamic banks do not give loans but rather make contracts of sale or rent where the total cost

and relevant conditions are pre-agreed with the firms. The result of non-PLS financing is also in favour of the above argument and the third hypothesis (H3), which showed a significant positive impact on production. The results are consistent with the previous finding (GUIZANI and AJMI, 2021). Although the results favour prior studies and the agency theory (on the corporate front), religious scholars often discourage the increased growth only on debt-based financing (USMANI, 2007). Together with the results, this study implicates that dual governance (Corporate and Shari'a) of Islamic banks should oversight the process flow of each financing product to reduce the risk of morale hazards caused due to personal priorities of banking staff (ATAL et al., 2022). Overall, both the PLS and non-PLS modes of financing play a critical role in facilitating the corporate sector, which confirms the hypothesis H2 and H3.

4.2.3.2 Control variables

The base regression for both models, PLS(c) and non-PLS(c) showed a positive significant relationship with economic productivity and inflation. Interestingly, inflation turned out to be beneficial for economic activities. The results showed conformity with the threshold effect hypothesis (KHAN and SSNAHDJI, 2001). The level of inflation and the threshold limit depends on the economic stage of selected countries. For the selected dataset and countries, low to medium inflation can be termed creeping inflation, which is necessary for the economy to grow (KHAN and SSNAHDJI, 2001). Furthermore, it further implies that the adjustment of inflationary effect in the PLS and non-PLS financing contracts has been predicted reasonably well. Also, theoretically Islamic banks are not working with interest-based loans, which may mislead the effect of inflation. However, the real assets are traded and priced accordingly, resulting in increased productivity. According to the results, the relationship between exports and industrial production happens to be insignificant with mixed directional coefficients, i.e., -0.022 and 0.0353 for PLS and non-PLS models, respectively. According to the findings of (SALTARELLI et al., 2020), the possible explanation for this phenomenon can be drawn from the fact that at the aggregate level, exports offer a good indicator of industrial production. Despite that, there is a likelihood that the correlation between exports and production will weaken as a result of the differences between the ratio of exports of services and exports of material goods. The theoretical foundation of the export-production nexus may be impacted by differences across countries as well as particular classes of exports, such as those originating from the service sector. The relationship of exports and economic production cannot be generalised based on the results. On the other hand, both PLS(c) and non-PLS(c) produced negative coefficients for imports (-.00144 and -0.00155), which confirmed the expected import-production relationship (SURI and CHAPMAN, 1998), stating that higher imports tend the general public to rely more on imported products rather than buying local

goods. It is pertinent to mention that the results are insignificant, which means imports are not the key driver of IP. The capital formation within the economy found to be a good predictor in both the models with coefficient of 0.278 and 0.185, respectively. This implies that the flow of capital from unproductive hands to entrepreneurs enables the business to meet the product production cycle without facing capital constraints. The results conform to the previous findings of (SANKARAN et al., 2021).

4.2.3.3 Moderating effect

The interaction term of type of financing (i.e., PLS and non-PLS) and non-performing loans have been introduced to capture the moderation effect of asset quality on finance-output nexus. A lower value of NPA shows the efficient recovery policies and stricter credit compliance implemented by Islamic banks. Furthermore, previous studies also showed the tendency of Islamic financing contracts to provide the hedging from default due to dual governance i.e., board of directors and Shari'a board. The negative coefficients of asset quality -13.94 and -32.40 in PLS(c) and non-PLS(c) show that the ratio of non-performing loans is declining with time, and results concurred with the previous findings (ALSAMARA et al., 2019; HASSAN and HUSSEIN, 2003; MENSI et al., 2020). Nonetheless, our findings revealed a significant positive moderating impact stemming from asset quality on Islamic finance–industrial production nexus. Furthermore, Islamic financing appears to amplify its impact on economic activity, particularly with better asset quality. The robust and statistically significant coefficients observed in both models (0.772 and 2.228, with a significance level of 1%) provide solid confirmation of our fifth hypothesis (H5), indicating the presence of a moderating effect of asset quality. These results suggest that the prompt recovery of receivables is not solely beneficial for the asset growth of Islamic banks, as studies by PRATAMA et al. (2019), but also extends its benefits to firms. On the corporate side, companies that meet their debt obligations on time strengthen their financial soundness, thereby reducing potential financial constraints in the future. Moreover, a well-established credit policy has a cyclical impact on loan growth, meaning that banks with a commendable credit recovery are more likely to attract a larger clientele of corporate borrowers (BORDALO et al., 2018). Similarly, financial institutions uphold internal and external credit assessments for their clientele. Companies bearing lower credit ratings often struggle with more financial limitations in comparison to those enjoying more favourable ratings, as demonstrated in studies (BOTTAZZI et al., 2014; LAGHARI and CHENGANG, 2019). Consequently, improved asset quality contributes to the overall economic output by enabling companies to conduct their operations seamlessly, offering them the confidence to access credit resources for the private sector with greater ease.

4.2.4 Robustness check (Section II)

The robustness of our findings was assessed through three distinct approaches. Firstly, we added an additional control variable, i.e., total deposits, as a measure of savings to conduct a robustness check. Notably, the impact of both PLS and non-PLS financing modes remained consistent across these robustness checks, as illustrated in Table 4.8. In comparison to the primary model, these robustness checks unveiled more robust coefficients for both financing modes. It is worth noting that the relationship between modes of Islamic financing and economic output may also be subject to the influence of endogeneity. Endogeneity concerns can often distress panel models, primarily due to two factors: omitted variable bias and reverse causality (BARROS et al., 2020; GREENE, 2003; LESZCZENSKY and WOLBRING, 2022).

The omitted variables and reverse causality are the primary reasons for endogeneity problems in panel data. In this study, for the robustness of the applied models, two separate econometric techniques have been used to address the issues of endogeneity. For both PLS and non-PLS, the lagged independent variables have been applied to check the presence of reverse causality (LESZCZENSKY and WOLBRING, 2022). Conversely, the omitted variable biased is tests by using the 2 stage least square regression (2SLS). In real-world scenarios, determining the instrument variable is of great importance. For the current analysis, the theory of financial intermediation (following (KEYNES, 1936)) is being used to determine the most appropriate instrument variable. As per the theory, the financing side of banks is endogenously determined by deposits, which directly influence the loan growth in banking companies (MASOOD and ASHRAF, 2012). The models are further checked for robustness using the reverse causality and 2SLS approach.

4.2.4.1 Reverse causality

To further investigate the relationship, we conducted independent variable lagged regression using the lagged values of PLS and non-PLS against the current-year Industrial Production (IP). Keeping all other variables, as well as year and country constants, the outcomes are presented in Table 4.8, specifically in columns (1) and (4) for PLS and non-PLS, respectively. In both models, we observed a positive and statistically significant impact (0.0297 and 0.0161) at significance levels of 5% and 1%, respectively, originating from the financing side of Islamic banks towards industrial production. This suggests unidirectional causality, indicating the flow of impact stems from the financing to the production capacity of firms rather than the other way around.

4.2.4.2 Alternate approach - 2SLS

Deposit is chosen as the instrumental variable (I.V.) for the 2-stage least square method. The selection of I.V. is conditional to two restrictions (IWASHYNA and KENNEDY, 2013). The selected instrument should fulfil the relevance condition, which states the independent variable should be endogenously determined by the instrument (PLS and non-PLS financing in our case). Secondly, the condition of exclusion restriction should be met, which refers to the dependent variable being affected by the instrument but only through the independent variable (PLS and non-PLS in this case). The results of 2SLS are provided in Table 4.8 in column (2) for PLS and (5) for non-PLS. The first stage of regression is run by taking the instrumental variable as an explanatory variable, while PLS and non-PLS are taken as predicted variables to find the fitted values. The coefficient for deposits shows statistical significance in both PLS (0.104) and non-PLS (-0.400) models. This signifies those deposits serve as a key predictor for Islamic financing. The second condition for the validity of the Instrumental variable is justified by the F-value of first-stage regression and also from the F-statistics of Cragg-Donald Wald tests, which is more than 0.10 (CRAGG and DONALD, 1993; STOCK and YOGO, 2005). Furthermore, the PLS-fitted and non-PLS-fitted values obtained from the first stage are regressed against the industrial production to see if the coefficient is still positive and significant. We found the consistent results. Further, for the validity of the instrument variable, the Sargan (SARGAN, 1958) test is performed to ensure that the I.V., is uncorrelated with the error term. In addition, to check for model fitness, favourable results are produced from the applied LM test (ENGLE, 1984), Breusch–pagan, and Chi-squares.

Table 4.8: Robustness and alternate analysis

VARIABLES	(1) IP Reverse	(2) PLS First-step	(3) 2SLS Second-step	(4) IP Reverse	(5) non-PLS First-step	(6) 2SLS Second-step
	PLS				non-PLS	
PLS/nPLS	-	-	-	-	-	-
PLS/nPLS(-1)	0.0297**	-	-	0.0161*	-	-
	(2.472)			(1.918)		
Fitted (PLS/nPLS)	-	-	0.330	-	-	6.843***
			(1.901)			(7.559)
Dep	-	-0.104**	-	-	0.400*	-
		(-2.376)			(1.992)	
Ex	0.814***	-0.254	-0.0835***	0.0171	-0.223**	1.551***
	(14.30)	(-0.760)	(-2.641)	(0.581)	(-2.560)	(7.564)
INF	8.376***	12.37*	3.854***	1.566***	4.070**	-28.61***
	(4.662)	(1.900)	(8.109)	(3.381)	(2.399)	(-7.115)
CF	0.912***	-1.055	0.144**	-0.783***	0.988	-0.119*
	(4.797)	(0.569)	(2.014)	(-2.214)	(4.574)	(-1.988)
GFCF	0.619***	0.286	0.496***	0.214***	0.476***	-2.931***
	(12.81)	(0.423)	(7.444)	(3.664)	(2.702)	(-6.976)
Im	-0.334***	-0.494	-0.157***	0.00855	0.0624	-0.415***
	(-4.233)	(-1.533)	(-4.511)	(0.303)	(0.742)	(-6.742)
NPL	20.73***	-	-11.97***	-42.28***	-	-36.96***
	(4.591)		(-3.251)	(-11.26)		(-10.49)
PLS/nPLS*NPA	-1.561***	-	0.703**	2.897***	-	2.556***
	(-4.878)		(2.276)	(10.17)		(9.626)
Constant	13.23***	14.13*	26.10***	21.41***	9.879***	-47.27***
	(40.26)	(1.952)	(33.24)	(35.96)	(5.236)	(-5.178)

Year effect	YES	YES	YES	YES	YES	YES
Country effect	YES	YES	YES	YES	YES	YES
Observations	395	395	395	395	395	395
R-squared	0.528	0.483	0.690	0.449	0.579	0.534
F	205.4	146.4	1666	33.63	888.3	47.32
Cragg-Donald	-	11.57	-	-	15.06	-
Sargan test (p-value)	-	-	0.124	-	-	0.113

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Source: Authors' calculations using Stata 14.2

4.3 Section III - Differential impact of adoption of Islamic finance

This section provides a detailed analysis of the differential impact on economic growth resulting from the adoption of Islamic banking systems. To implement the quasi-experimental approach, as outlined in the methodology section, the synthetic control method (SCM) is employed to create a control unit, known as the synthetic control unit, derived from the donor pool consisting of 51 untreated countries. The construction of the synthetic control unit is achieved by applying a weighted average to untreated countries from the donor pool. This process aims to replicate the characteristics of the treated unit (Pakistan) before adoption. Once the comparable unit is created, Pakistan's pre- and post-adoption outcomes are compared with those of the synthetic unit to determine if there is evidence of a differential impact on the outcome.

Economic growth (GDP) is taken as the primary outcome variable. However, for the sensitivity of the results, two different proxies are used to represent the financial development from 1990 to 2021, i.e., total private credit by financial institutions and the total deposits held by financial institutions, both are taken on aggregate level (ABADIE, 2021). Secondly, this section is divided into two parts; the first one provides the main results using SCM along with placebo and inferences (ABADIE et al., 2015, 2010; SCOTT, 2021); then, the second one reproduces the results with additional predictors and covariate to control the political instability and regulatory quality within the countries.

4.3.1 Synthetic control results on economic growth

4.3.1.1 Implementation

As explained above, the synthetic group is formulated with a weighted average of the predictors and outcome variables of the donor pool countries (i.e., 51 in this study), replicating the pre-intervention trend of the outcome variable of the treated country (i.e., Pakistan). The matching trend constructed by the synthetic group is named synthetic-Pakistan, producing the lowest possible root mean squared prediction error (RMSPE), showing the difference between the treated unit and the synthetic group. The cross-validation technique is used to select the appropriate weights based on the predictors from the time frame from 1990 to 2001. The weights chosen by the cross-validation method show the relative importance of each predictor/covariate, which also minimizes the prediction error. Table 4.9 shows the weights determined for the construct the control group from the 51 selected donor countries. Two synthetic control groups are formulated; Group A represents the weights chosen for the predictor of private credits from the financial institutions, while Group B is selected based on deposits chosen as the key predictor. The pre-treatment trend constructed by weighted average synthetic control groups A and B is produced by

copying the actual trend of the treated country. In group A, Austria, Croatia, France, India, Moldova, Mongolia, Myanmar, Nepal, Slovak Republic, and Vietnam have been selected with weighted averages of 0.24, 0.001, 0.223, 0.079, 0.084, 0.045, 0.108, 0.209, and 0.011, respectively. In contrast, all other countries are given the weight of 0. On the other hand, the construct of the synthetic group is changed when the deposit is selected as a key predictor variable. In group B, Brazil with 0.003, Croatia with 0.026, Ecuador with 0.132, France with 0.190, India with 0.04, Mexico with 0.231, Moldova with 0.031, Myanmar with 0.055, Nepal with 0.171, Panama with 0.090, Portugal with 0.027, Slovak republic is chosen with a weight of 0.04 to produce a synthetic trend of pre-treatment that is similar to the actual pre-treatment trend of Pakistan. The prediction errors of both A and B are 0.00621 and 0.01857, respectively, which shows the lowest possible gap between the actual observations in the pre-treatment period of synthetic control groups with Pakistan.

Table: 4.9: Countries weights for synthetic – Pakistan

Countries	SCM group A (Private credit as predictor)	SCM group B (Total deposits as predictor)	Countries	SCM group A (Private credit as predictor)	SCM group B (total deposits as predictor)
Albania	0	0	Israel	0	0
Argentina	0	0	Italy	0	0
Armenia	0	0	Jamaica	0	0
Austria	0.24	0	Latvia	0	0
Barbados	0	0	Lithuania	0	0
Belarus	0	0	Madagascar	0	0
Belgium	0	0	Mexico	0	0.231
Bhutan	0	0	Moldova	0.084	0.031
Brazil	0	0.003	Mongolia	0	0
Bulgaria	0	0	Myanmar	0.045	0.055
Cameroon	0	0	Montenegro	0	0
Colombia	0	0	Nepal	0.108	0.171
Croatia	0.001	0.026	Norway	0	0
Czechia	0	0	Panama	0	0.09
Denmark	0	0	Paraguay	0	0
Dominica	0	0	Peru	0	0
Ecuador	0	0.132	Portugal	0	0.027
Estonia	0	0	Philippines	0	0
Finland	0	0	Romania	0	0
France	0.223	0.19	Slovakia	0.209	0.004
Ethiopia	0	0	Slovenia	0	0
Greece	0	0	Spain	0	0
Hungary	0	0	Sweden	0	0
Iceland	0	0	Uruguay	0	0

India	0.079	0.04	Vietnam	0.011	0
Zimbabwe	0	0	-	-	-
RMSPE	0.00621	0.01857	-	-	-

Source: Authors' calculations using Stata 14.2

Based on the selected synthetic control groups the predictors and covariates pre-treatment means are shown in Table 4.10. Both models A and B show that the pre-intervention characteristics of synthetic Pakistan are similar to the mean values of actual Pakistan in the pre-intervention period, i.e., 1990 – 2021. In group A, the mean value of GDP at ten different lags is almost similar to the Pakistan GDP with similar lags. The mean of private credit in 1990 is 24.157 for Pakistan and 24.547 for synthetic-Pakistan, whereas, the value slightly deviates from treated unit for private credit in 1995. Similarly, the mean values of trade openness, gross fixed capital formation, inflation, unemployment rate, foreign direct investment, net government expenditures, and total money supply closely imitate the mean value of the actual value of the treated country before the adoption of Islamic banking. The predictors are chosen on different lags and the average of 1990-2021, as shown in Table 4.10. Similar to group A, the synthetic group B produces better and even closer mean characteristics of the pre-adoption, leaving a comparatively narrower gap between the synthetic control and the treated group. However, the combination of predictors is different from that of group A, as shown in Table 4.10. In sum, both groups gave robust pre-adoption matching results.

Table 4.10: Outcome predictors balance

Group A				Group B			
Predictors	Treated	Synthetic control	Average of 51 countries	Predictors	Treated	Synthetic control	Average of 51 countries
GDP(1990)	25.3237	25.3384	24.3669	GDP(1990)	25.3237	25.3492	
GDP(1991)	25.3731	25.3750	24.3727	GDP(1992)	25.4473	25.4271	24.3754
GDP(1992)	25.4473	25.4403	24.3754	GDP(1994)	25.5015	25.5012	24.4389
GDP(1994)	25.5015	25.5041	24.4389	GDP(1997)	25.6073	25.6047	24.5644
GDP(1995)	25.5499	25.5456	24.4806	GDP(1998)	25.6325	25.6442	24.5973
GDP(1997)	25.6073	25.6134	24.5644	GDP(1999)	25.6684	25.6689	24.6543
GDP(1998)	25.6325	25.6435	24.5973	GDP(2000)	25.7102	25.7120	24.6543
GDP(1999)	25.6684	25.6718	24.6167	GDP(2002)	25.7699	25.7616	24.7089
GDP(2000)	25.7102	25.7080	24.6543	Dep*	30.2142	32.5331	36.7040
GDP(2002)	25.7699	25.7726	24.7089	Dep(1993)	31.4638	29.9231	34.8674
cre_fi(1990)	24.1573	24.5475	29.3540	Dep(1994)	32.6887	31.3851	34.1361
cre_fi(1995)	24.2071	28.9114	31.8411	Dep(1996)	33.8694	33.8142	35.4409
Open*	35.7857	39.2190	182.178	Dep(1997)	36.7144	36.2208	37.0368
GFCF(1990)	20.1358	15.8638	32.1268	Dep(1999)	32.9956	34.3526	39.0054
GFCF(1991)	19.7788	22.4904	31.2804	Open*	35.7857	36.8452	182.178
GFCF(1995)	19.6568	21.2933	40.3019	Open(1991)	34.0388	30.6795	167.664
GFCF(1999)	16.2529	20.4746	55.2273	Open(1993)	42.7070	32.5586	168.103

INF*	8.7227	8.50505	18.2270	Open(1995)	37.2422	36.4679	167.512
UER*	1.3106	16.9546	17.3863	Open(1997)	36.8496	39.1014	185.040
FDI(1992)	0.6883	0.9922	1.22741	GFCF*	18.7713	20.2851	46.3265
FDI(1995)	1.1917	1.4252	1.91843	GFCF(1991)	19.7788	19.7541	31.2804
N_exp*	111.034	99.8911	247.604	GFCF(1993)	20.7172	19.4661	36.4269
M3*	42.7152	36.0446	45.9729	GFCF(1995)	19.6568	18.5429	40.3019
				FDI*	0.8041	2.1938	2.59948
				FDI(1993)	0.6727	1.3674	1.30423
				FDI(1995)	1.1917	1.9339	1.91843
				M3*	42.7153	43.1031	45.9729

*Represents the mean value of whole pre-adoption period i.e., 1990-2002

Furthermore, Figure 4.2 provides the comparison of economic growth trends of the treated countries and the collective donor pool consisting of 51 countries. For the comparative analysis, the donor pool is not a suitable group to compare the differential impact of the adoption of Islamic banking in Pakistan. Even before the adoption of Islamic finance, there is a significant difference in the outcome variable in both the treated and donor pool groups. Interestingly, the trend of donor pool and Pakistani GDP is rising with time, which shows a steady growth in the GDPs of selected countries as well as the intervention unit. In the Figure, the slope of the GDP of Pakistan looks steeper compared to the donor pool; still, both lines are incomparable due to asymmetric patterns and other socioeconomic differences among the countries. Furthermore, the parallel trajectory is a pre-requisite of difference-in-differences regression, where the pre- and post-trends are differenced to analyse how much the effect came as a result of policy change (ABADIE, 2021; ABADIE and GARDEAZABAL, 2003; ANGRIST and PISCHKE, 2009). Working with real-world data, finding a comparison group that establishes a point-to-point comparison with a treated unit is nearly impossible. Thus, the limitation is resolved with the development of Synthetic control groups (ABADIE, 2021; ABADIE et al., 2010; ABADIE and GARDEAZABAL, 2003).

Figure 4.2 – Trend of GDP of Pakistan and Mean GDP of countries in donor pool
Source: Authors' calculations using Stata 14.2

4.3.1.2 The effect of adoption of Islamic financial system

I. Synthetic group A

Based on the data setup for the synthetic control in the prior section, the differential impact of the adoption of Islamic financing system is discussed in this section. Figure 4.3 displays the trajectory of the GDP of Pakistan and synthetic Pakistan in the pre- and post-Islamic banking adoption period for group A (where private credit is taken as a proxy of financial development). The pre-adoption slop of Pakistan and synthetic-Pakistan is closely tracked together, which shows pre-adoption characteristics of outcome variable of treated country closely resembles with the control group. This is why the root mean square prediction error is relatively small for group A, i.e., 0.006216. The graph shows that both curves diverge mutually at several points, which shows the accurate and valid approximation of the pre-treatment period. The close fit of GDP Pakistan and the GDP of Synthetic-Pakistan before 2002 provided the base for the substantive predictive power of the selected model and best-suited comparative groups. However, difference-in-differences fail in many cases where comparative groups are not similar in characteristics (ABADIE, 2021; ABADIE and GARDEAZABAL, 2003).

Since the time of adoption, the GDP of Pakistan significantly risen compared to the synthetic-Pakistan where Islamic banking system does not exist. The gap stayed smaller in the first 2-3 years following a sharp increase in GDP from 2004 till 2008 with a sharp jump upwards compared to the comparison synthetic-Pakistan. It is worth noting that from 2008 till 2013, the growth of Pakistani GDP seemed slower compared to pre-2008 and post-2013. The possible explanation for

this is the change of political regime in the country (MIRZA and MUNIR, 2023). The government faced several setbacks after the democracy took over the parliament after a long gap of 9 years of martial law (MIRZA and MUNIR, 2023). On the other hand, 2008 was the year of credit-crunch as well, which affected the global economy adversely (BEZEMER, 2011), as reflected by the sharp decline in the synthetic-Pakistan trajectory. From 2013 onwards, the gap between treated and untreated units continue to rise. The results gave us satisfactory outcomes on the differential impact of Islamic banking adoption on the economic growth of Pakistan. Hence, the results confirm hypothesis H4, holding there is an incremental impact of Islamic banking adoption on economic growth.
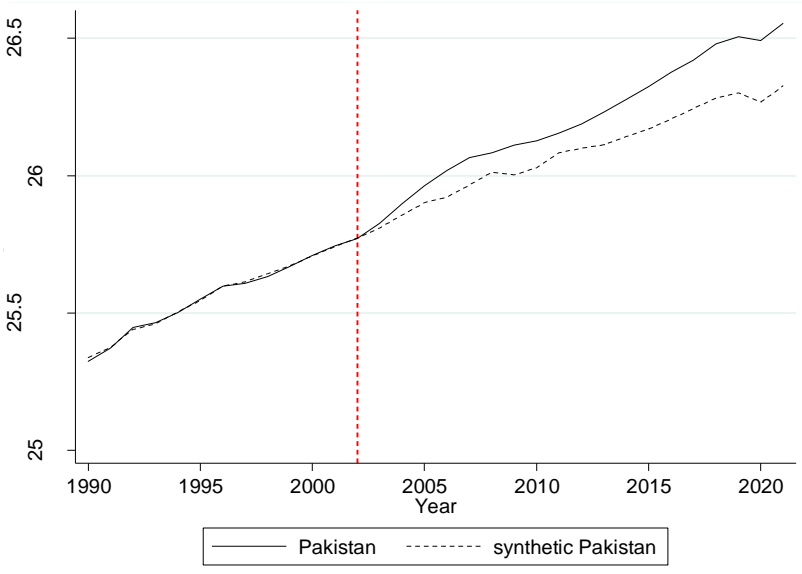
Figure 4.3 – Synthetic control group results of economic growth (group A)
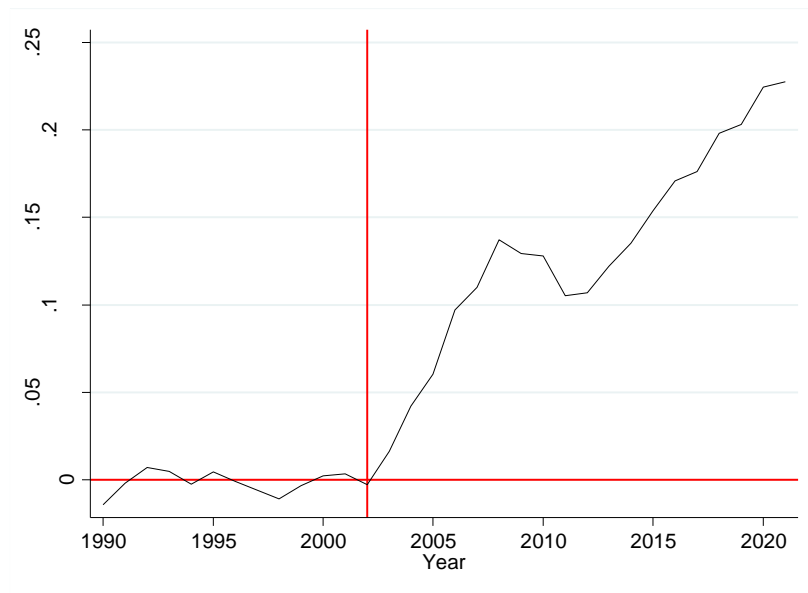Source: Authors' calculations using Stata 14.2

Figure 4.4 -Gap between GDP of Pakistan and synthetic Pakistan (group A)
Source: Authors' calculations using Stata 14.2

Figure 4.4 shows the gap between the synthetic control group and Pakistan in the pre- and post-adoption period, i.e., 2002. The distance between the points of the curve and the x-axis shows the GDP gap between Pakistan and synthetic-Pakistan. As shown in the Figure, the gap substantially increased from 2002 onwards till 2008 and continued to rise from 2013 till 2021. From the results, it is inferred that after the adoption of the Islamic banking system, the GDP of Pakistan grew almost 23% more compared to those countries where the asset-backed system is not implemented. However, the immediate impact could not be realized as the effect of Shari'a based banking is sometimes referred similar to conventional banking. In essence, the growing popularity of Islamic finance helps the economy to boost entrepreneurial start-ups, active participation in trading, creating employment, increased consumption, and ultimately nurturing economic growth.

II. Synthetic group B

The second model produced even better results compared to group A. Figures 4.5 and 4.6 show the incremental impact of the adoption of the Islamic financial system on economic growth. Group B is modelled with additional covariates with a prime focus on deposits measuring the financial development within the economy (as shown in Table 4.10). The results from synthetic group B produced better results than group A. The overall findings are similar to the model A. However, the gap between the outcome of Pakistan and synthetic-Pakistan in group B is wider than in the previous group. The credibility of the synthetic control group is directly dependent on its ability to have a close fit in the pre-treatment trend (ABADIE, 2021; ABADIE et al., 2010). There are some fluctuations that can be observed starting from 2008 till 2013 that are similar to the previous findings in group A. Moreover, when the outcome is predicted with total deposits, GDP is

predicted to have around 32% incremental impact compared to the group where Islamic banking system is not adopted.
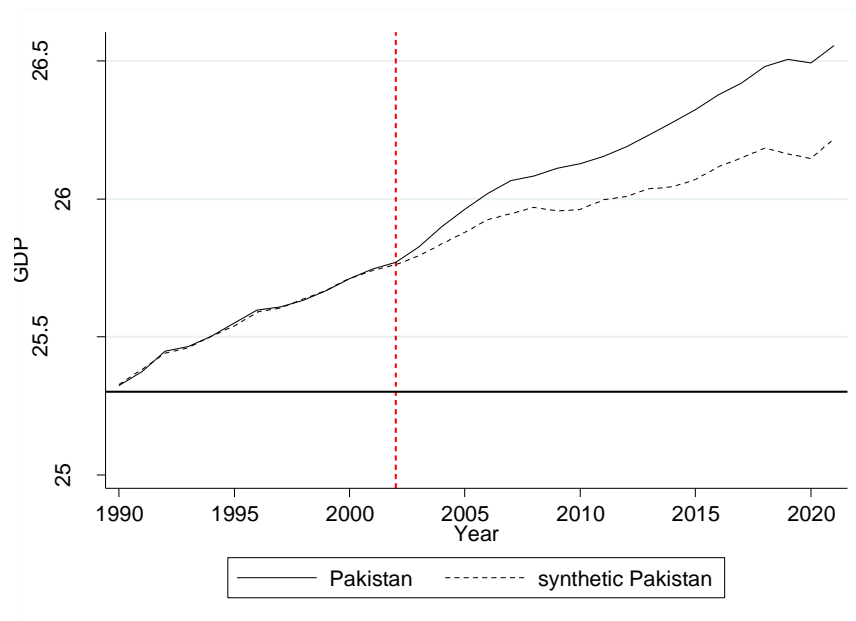

Figure 4.5 – Synthetic control group results of economic growth (group B)
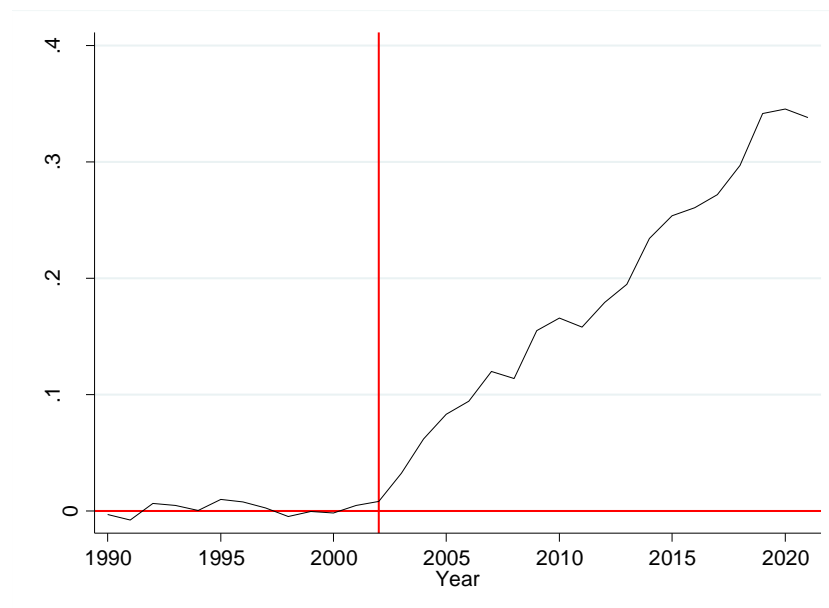Source: Authors' calculations using Stata 14.2

Figure 4.6 – Gap between GDP of Pakistan and synthetic Pakistan (group B)
Source: Authors' calculations using Stata 14.2

Following ABADIE (2021), the robustness of the results is checked by considering different sets of predictors of outcome. However, synthetic control group B is constructed with a transformed set of countries choosing a unique weighted average.

In the following section, we employ the placebo tests to draw stronger inferences about the economic growth of Pakistan in the post-adoption period. The inferences are carried out by taking each country independently as a treated unit, assuming that each unit had undergone the treatment, i.e., adoption of Islamic finance. Furthermore, to accurately conclude the results, it is postulated whether the incremental impact of the adoption of Islamic finance is obtained by chance or it's because of the treatment effect of Shari'a banking.

4.3.1.3   Inference and placebo tests about adoption of Islamic finance and economic growth

The inference and placebo tests are conducted on both models separately. The first subsection discusses the results of placebo tests to determine the significance and reliability of the findings based on private credit by financial institutions taken as a predictor of GDP. The second part briefly shows the result of group B, where total deposits are used.

I.   Group A - private credit as predictor

To evaluate the robustness of the results obtained in synthetic groups A and B, placebo tests are used to see if the incremental impact on GDP occurred by a matter of chance. Following ABADIE (2021) and ABADIE and GARDEAZABAL (2003), each country (where the Islamic banking system is not adopted) is considered a treated unit, and separate synthetic control group models are run to see if the magnitude of post-adoption, i.e., the year 2002 is similar to what we got in model A and B. If the gap between each countries' GDP and synthetic control unit is similar in direction and magnitude, the results obtained in group A and B cannot be considered reliable. On the other hand, if the placebo tests provide evidence of random positive or negative gaps with a lower magnitude than that of Pakistan (mode A and B), then the results obtained in the case of the Pakistani economy are significant and provide evidence of the incremental impact on GDP due to adoption of Islamic financial system.

To estimate the results, a series of placebo tests are conducted iteratively by applying the same synthetic control method (which is applied in Pakistan on the adoption of Islamic banking) on each of the countries in the donor pool. It is assumed that each country adopted Islamic banking in 2002. In each placebo test, all of the 51 countries are reassigned the appropriate weights to construct a synthetic control unit to compare the outcome difference in pre- and post-adoption. The gap between the treated country and the constructed synthetic control unit is measured and plotted in the graph. The result of placebo tests is shown in Figure 4.7. The grey lines represent the results of each country out of 51 donor pool countries where Islamic banking was not adopted. The results show the pre- and post-adoption gap between each country and iteratively generated synthetic control unit. Whereas the black line shows the original results of Pakistan obtained from the first

model where private credit by financial institutions was taken as a predictor. The results show that the majority of countries in placebo tests appeared to be closely fit to the synthetic control unit, which shows the validity of the employed method. The root mean square prediction error in the pre-adoption period for Pakistan is 0.00845, whereas the median RMSPE is 0.02854, which shows a good fit to the synthetic line in the pre-adoption period. The closely fit treated and untreated unit lines are essential for the training and validity of SCM (ABADIE, 2021). At the first step, the highest pre-adoption prediction error is obtained in Bhutan with 0.6741, Dominica with prediction error of 0.3493, and Armenia with 0.1675. Moreover, 11 countries with noisy pre-adoption fit are removed from the results to see how it gives the final image.
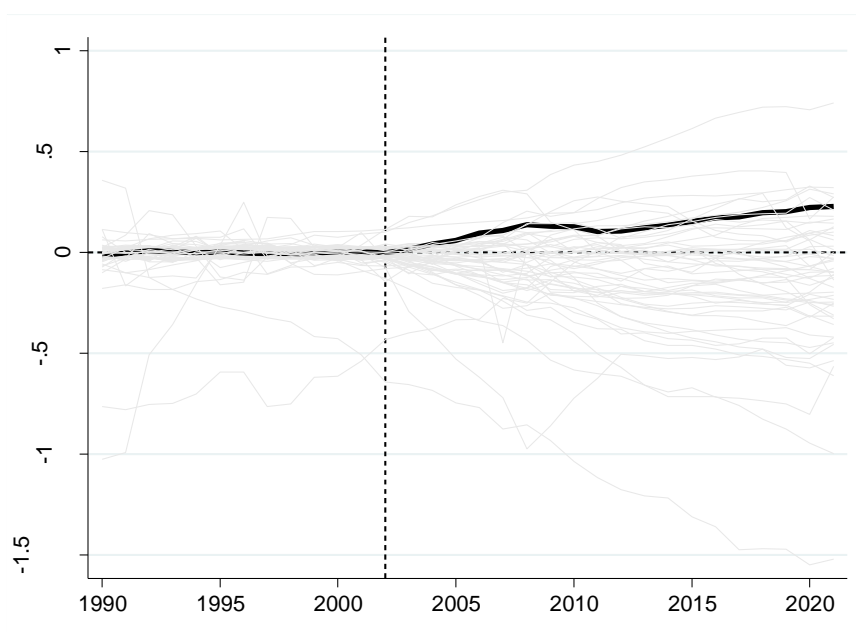

Figure 4.7 – Placebo tests taking each country from the donor pool as treated unit (group A)
Source: Authors' calculations using Stata 14.2

Table 4.11: Post- and Pre- Root mean square prediction errors

Unit ID	Country name	Pre-RMSPE	Post-RMSPE	Post/Pre-Ratio
1	Albania	0.07255	0.35214	4.85330
2	Argentina	0.06252	0.05195	0.83104
3	Armenia	0.16752	0.17653	1.05375
4	Austria	0.02695	0.04935	1.83070
5	Barbados	0.02023	0.60578	29.9366
6	Belarus	0.09785	0.15591	1.59322
7	Belgium	0.02068	0.02036	0.98492
8	Bhutan	0.67410	0.24615	0.36515
9	Brazil	0.01821	0.11159	6.12680
10	Bulgaria	0.07712	0.14787	1.91720
11	Cameroon	0.02613	0.15542	5.94808
12	Colombia	0.02724	0.09227	3.38616

13	Croatia	0.03388	0.22961	6.77692
14	Czechia	0.02284	0.01816	0.79524
15	Denmark	0.02919	0.22484	7.70222
16	Dominica	0.34932	1.16624	3.33854
17	Ecuador	0.02715	0.07533	2.77460
18	Estonia	0.02156	0.17176	7.96673
19	Finland	0.00918	0.24295	26.4538
20	France	0.08213	0.24086	2.93267
21	Ethiopia	0.03008	0.47871	15.9109
22	Greece	0.02272	0.30404	13.3806
23	Hungary	0.03007	0.12794	4.25439
24	Iceland	0.02870	0.06042	2.10508
25	India	0.07050	0.51990	7.37354
26	Israel	0.01544	0.06988	4.52485
27	Italy	0.01711	0.16811	9.82181
28	Jamaica	0.01679	0.39773	23.6855
29	Latvia	0.06865	0.17015	2.47823
30	Lithuania	0.02951	0.04382	1.48491
31	Madagascar	0.03347	0.20586	6.15017
32	Mexico	0.03314	0.19118	5.76848
33	Moldova	0.07669	0.08600	1.12145
34	Mongolia	0.02584	0.54390	21.0451
35	Myanmar	0.05226	0.58219	11.1385
36	Montenegro	0.09301	0.34163	3.67303
37	Nepal	0.01158	0.08777	7.57564
38	Norway	0.00224	0.18189	81.0024
39	Pakistan	0.00621	0.14542	23.3959
40	Panama	0.01518	0.24261	15.9814
41	Paraguay	0.02944	0.14530	4.93494
42	Peru	0.01899	0.10431	5.49137
43	Portugal	0.02838	0.32058	11.2927
44	Philippines	0.00564	0.17703	31.3484
45	Romania	0.03441	0.09765	2.83735
46	Slovak Republic	0.03870	0.03451	0.89155
47	Slovenia	0.00818	0.09415	11.5076
48	Spain	0.02928	0.20186	6.89346
49	Sweden	0.02832	0.08919	3.14893
50	Uruguay	0.02233	0.06199	2.77594
51	Vietnam	0.02697	0.16309	6.04565
52	Zimbabwe	0.03344	0.59804	17.8822

Source: Authors' calculations using Stata 14.2

Figure 4.8 shows the placebo test results after removing the outliers. Countries with a prediction error of more than 0.070 (as shown in Table 4.11) are removed from the placebo as the synthetic control method is significantly dependent on how the data is trained and validated in the pre-

intervention period (ABADIE, 2021). It is pertinent to mention here that synthetic Pakistan and real Pakistan GDP stayed the closest to one another and produced consistent results. The second layer of removing outliers gave the results in favour of incremental impact on the economic growth of Pakistan after adoption. Furthermore, the comparison of 41 countries in Figure 4.8 depicts an unusual effect on countries where Islamic banking is not implemented. The majority of the economies fell or stayed near the synthetic untreated unit, which further signifies the findings in favour of Pakistan.
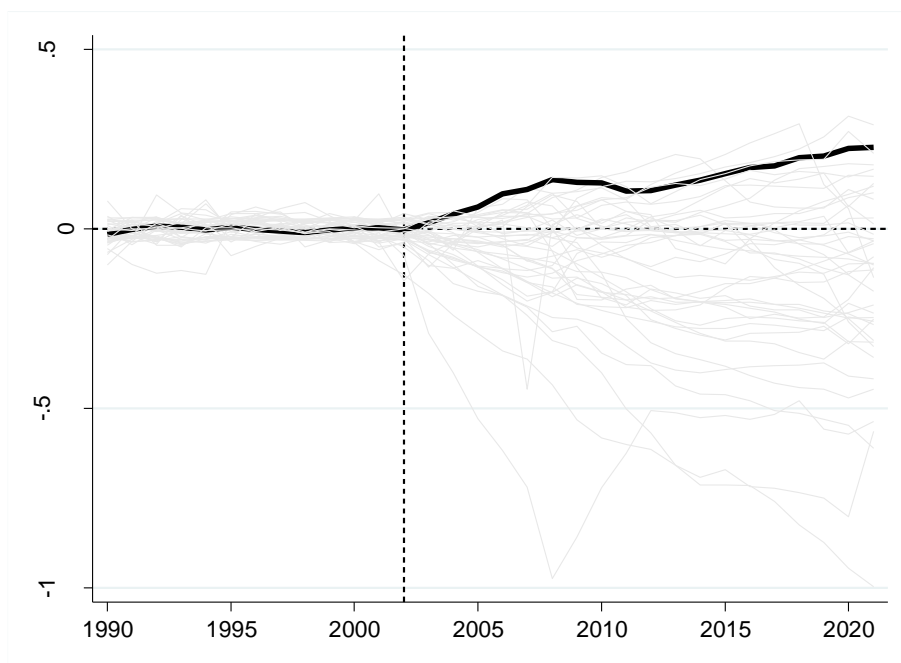
Figure 4.8 – Placebo tests after removing the outliers (group A)
Source: Authors' calculations using Stata 14.2

In the third step, the countries included in the IFDI rating index are laid off. According to Thomson Reuters's Islamic financial development indicator ranking, an index value below 10 shows only the level of awareness and knowledge of Islamic finance due to the Muslim population. However, Islamic banks do not exist in countries like Albania, Austria, Belgium, Brazil, Bulgaria, Cameroon, Croatia, Denmark, Finland, France, Ethiopia, Greece, Hungary, India, Italy, Latvia, Mexico, Nepal, Norway, Portugal, Philippines, Spain, Sweden, Uruguay, Zimbabwe, and Romania. For instance, India, being at the top among these countries with an index value of 9.108, could not opt for Islamic banking despite the fact it is the third-largest Muslim-majority country. Though there is a huge inclination of the masses to implement Islamic banking still, the country lacks efforts from the government (ISLAM and RAHMAN, 2017). The reason why India secures the index above 9 points is the other pillars of ranking i.e., knowledge, awareness, and Islamic capital market. Due to this fact, the results of the placebo tests are considered unbiased from the first stage of the outlier's removal. However, a clear picture is displayed in Figure 4.9. Furthermore, the ratio

of Post-/Pre-RMSPE of Pakistan is the 3rd highest in the dataset, which further evidence the reliability of the results (see Figure 4.10).
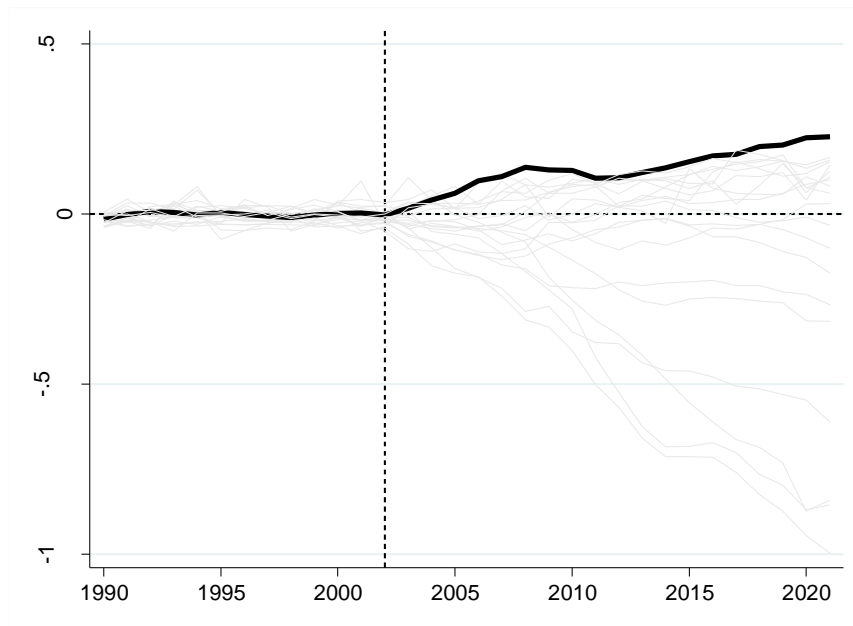

Figure 4.9 – Placebo tests after removing the countries with lowest IFDI index (group A)
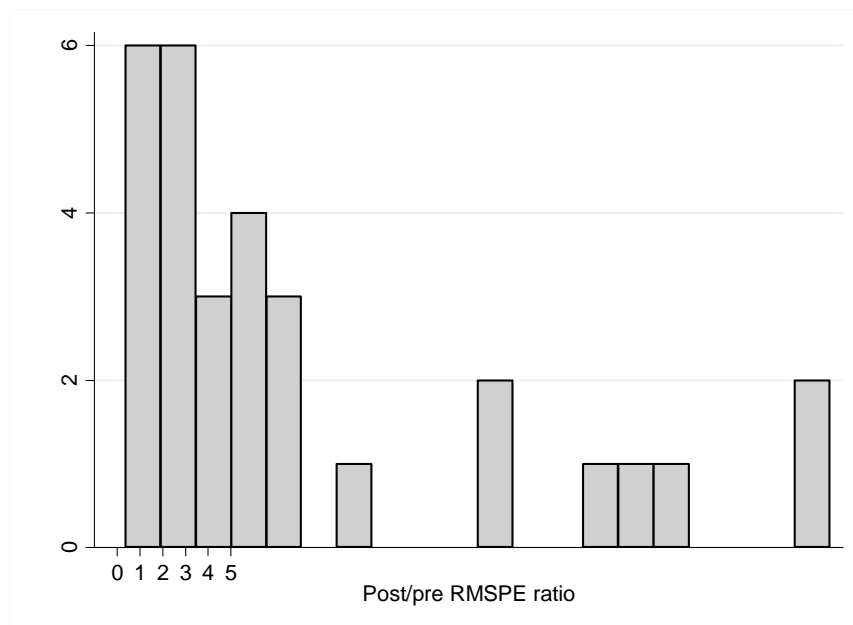Source: Authors' calculations using Stata 14.2

Figure 4.10 – Frequency distribution of Post/Pre-RMSPE ratio
Source: Authors' calculations using Stata 14.2

II.   *Group B - total deposits as predictor*

Similar to the placebo tests for group A, several iterative placebo tests are carried out for group B, where the different sets of predictors are taken to form synthetic Pakistan. All of the 51 countries

are taken as treated countries, assuming that actual adoption happened there. At the first step the outliers are laid off with the highest RMSPE value (shown in Figure 4.12). Figure 4.11 shows the initial results of placebo, and Figure 4.12 represents the result after removing outliers and following the removal of countries with IFDI rating below 10, as shown in Figure 4.13. Surprisingly, the post-/pre-RMSPE ratio for Pakistan stands out the maximum (Figure 4.14). This shows confirmation of hypothesis H4 and the results obtained in first set of placebo tests and the significant findings on incremental impact of adoption of Islamic financial model on economic growth.
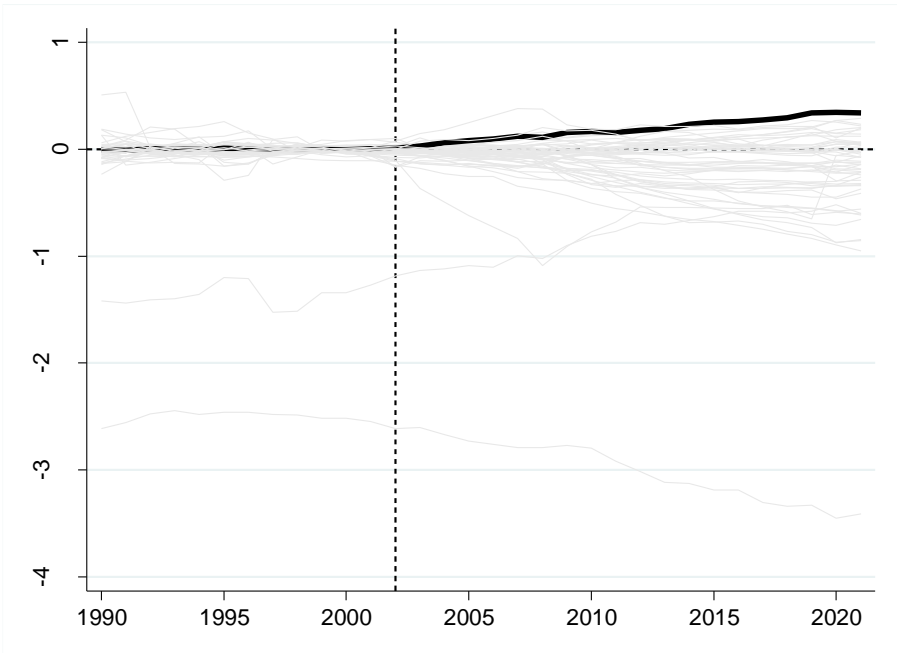

Figure 4.11 – Placebo tests taking each country from the donor pool as treated unit (group B)
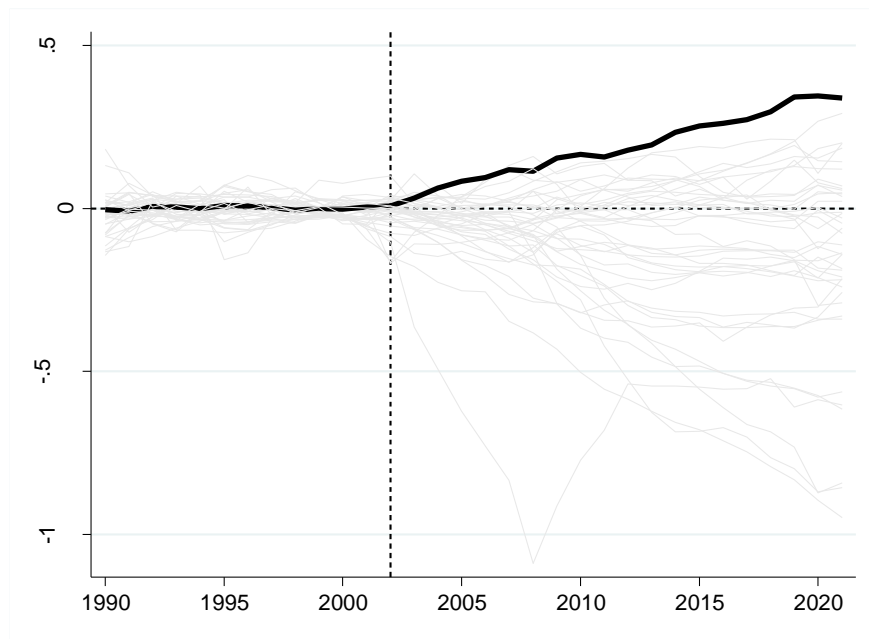Source: Authors' calculations using Stata 14.2

Figure 4.12 – Placebo tests after removing the outliers (group B)
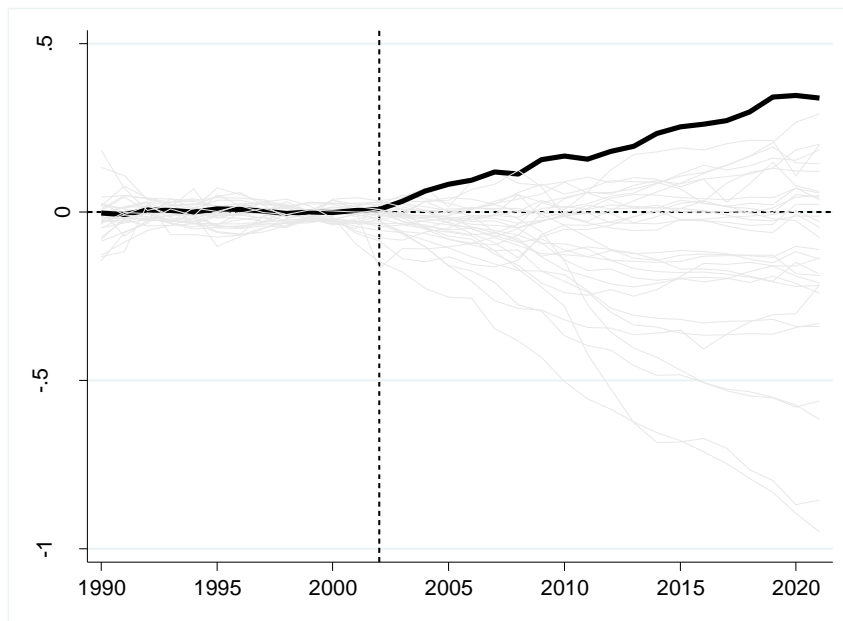Source: Authors' calculations using Stata 14.2

Figure 4.13 – Placebo tests after removing the countries with lowest IFDI index (group B)
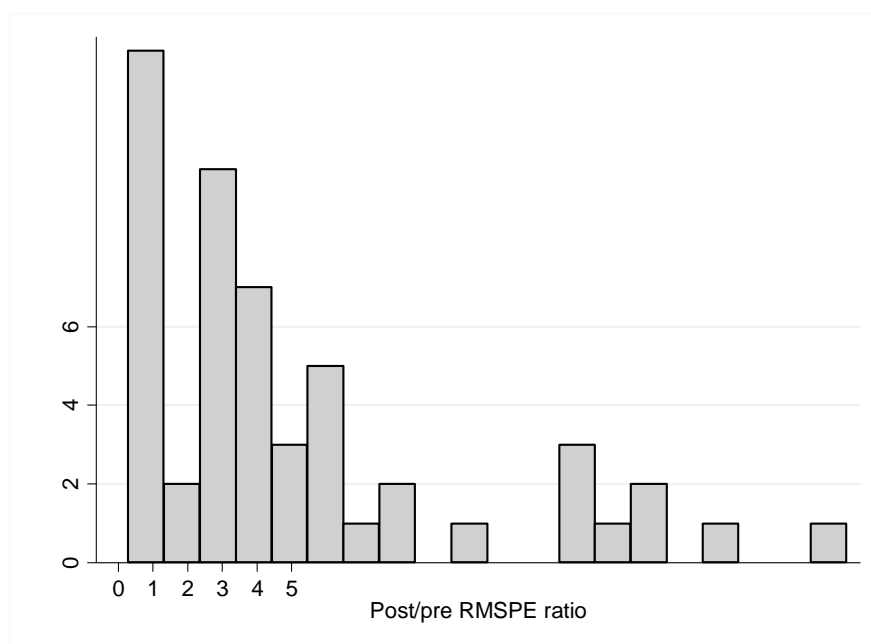Source: Authors' calculations using Stata 14.2

Figure 4.14 – Frequency distribution of Post/Pre-RMSPE ratio
Source: Authors' calculations using Stata 14.2

4.3.2 Sensitivity and robustness check (Section III)

In order to test the sensitivity of the results, two additional covariates to control the political instability and regulatory quality are added to predict the outcome variable of Pakistan's GDP and constructed as synthetic control unit to have the comparison. Similar to the main model, the placebo tests are conducted by taking every single country as treated unit to falsify the inference against the incremental impact of adoption of Islamic banking. Table A-3, A-4, A-5 in appendix provide the results of chosen weights for synthetic-Pakistan, outcome variable balance between treated country and synthetic-treated country, and the post and pre-RMSPE ratio to see how much the magnitude of the effect compared to synthetic-treated country after the adoption happen. Furthermore, Figure A-1 to A-6 (appendix) represents the complete results. We test the model in different ways and got the consistent results. This confirms that the incremental/differential impact did not come randomly by chance, but it is the impact appeared after adopting asset-backed banking.

4.4 Section IV - Differential impact of Islamic finance on poverty alleviation

This section explores the fourth objective of the study and tests the final hypothesis (H6), i.e., Islamic financing helps in poverty alleviation and raising general standard of living. In the prior literature, several indicators are used to measure the poverty or the income gap. For instance, the GINI index has been widely used to measure income inequality or poverty (DEININGER and SQUIRE, 1996; SOLT, 2016). The GINI index, also known as the Gini coefficient or Gini ratio, is a measure of income inequality within a population. It quantifies the dispersion of income or

wealth among the individuals or households in a given area or country. The Gini index ranges from 0 (perfect equality, where everyone has the same income) to 1 (perfect inequality). The second measure of poverty is the poverty headcount ratio below \$1.90 per day consumption (CHEN and RAVALLION, 2004; REWILAK, 2018). Moreover, few studies used per capita consumption expenditure as a proxy for poverty and standard of living (SEHRAWAT and GIRI, 2014). However, if we take poverty from a socio-economic perspective, it can be the deprivation of capital, job opportunities, access of healthcare, and quality education (HA et al., 2019). Therefore, in the context of financial development and poverty nexus, the Human development index has been widely used to measure poverty alleviation and general standard of living in many studies (ALVAN, 2009; HANESTI et al., 2018; NOGUEIRA and MADALENO, 2021). The Human Development Index (HDI), published by the United Nations Development Programme (UNDP) (UNDP, 2022), is a composite indicator that measures human well-being and development. It considers key factors such as life expectancy, education (measured by mean years of schooling and expected years of schooling), and income level. The HDI is a valuable tool for assessing progress in poverty alleviation because it reflects not only economic conditions but also health and education, which are critical components of a higher quality of life. Based on data availability and missing data limitations, HDI is used as a measure of poverty alleviation; the value of HDI close to 0 reflects a lower living standard with limited exposure to health, education and income in a country. Whereas a value close to 1 shows a lower gap in the living standard of the people living in a given economic setting.

This section presents a comprehensive analysis to determine if there is the differential impact on poverty alleviation/raising the overall standard of living resulting from the adoption of Islamic banking systems. Utilizing the quasi-experimental approach, the synthetic control method (SCM) is modelled by assigning appropriate weights to replicate the poverty trajectory of the treated country, in this case, Pakistan. SCM is modelled similarly to section III with a donor pool of 51 countries where Islamic banking has not been introduced as of yet. The outcome variable for section IV is HDI, taken as a proxy of poverty alleviation and standard of living. To ensure result robustness, two alternative sets of covariates are used to predict the outcome variable in the pre-adoption period. Furthermore, this section is divided into two parts. The first part presents the main results derived from SCM analysis, while the second part includes the placebo tests and inferences as proposed by ABADIE et al. (2010) and SCOTT (2021).

4.4.1 Synthetic control results for poverty alleviation

4.4.1.1 Implementation

Two synthetic control groups are modelled in order to test the sensitivity of SCM (following(ABADIE, 2021)). Group C shows a prediction error of 0.00819, while Group D's prediction error of 0.00337. The assigned weights for the construction of synthetic-Pakistan for poverty alleviation are given in Table 4.12 for group C and D. Based on the prediction error, group D is considered the appropriate which satisfy the pre-training and validation condition of SCM ((ABADIE, 2021; ABADIE and GARDEAZABAL, 2003). The synthetic-treated unit for group C took Croatia with 0.034, Dominica with 0.004, Ethiopia with 0.53, and India with a weighted average of 0.432. Whereas, group D is created by taking Bhutan, Croatia, Ethiopia, Italy, Montenegro, Peru, and Slovenia with wights 0.247, 0.041, 0.007, 0.167, 0.098, 0.004, 0.01, 0.312, and 0.114, respectively.

Table: 4.12: Countries weights for synthetic – Pakistan

Countries	SCM group C	SCM group D	Countries	SCM group C	SCM group D
Albania	0	0	Israel	0	0
Argentina	0	0	Italy	0	0.098
Armenia	0	0	Jamaica	0	0
Austria	0	0	Latvia	0	0
Barbados	0	0	Lithuania	0	0
Belarus	0	0	Madagascar	0	0
Belgium	0	0	Mexico	0	0
Bhutan	0	0.247	Moldova	0	0
Brazil	0	0	Mongolia	0	0
Bulgaria	0	0	Myanmar	0	0
Cameroon	0	0	Montenegro	0	0.004
Colombia	0	0	Nepal	0	0
Croatia	0.034	0.041	Norway	0	0.01
Czechia	0	0	Panama	0	0
Denmark	0	0	Paraguay	0	0
Dominica	0.004	0.007	Peru	0	0.312
Ecuador	0	0	Portugal	0	0
Estonia	0	0	Philippines	0	0
Finland	0	0	Romania	0	0
France	0	0	Slovakia	0	0
Ethiopia	0.53	0.167	Slovenia	0	0.114
Greece	0	0	Spain	0	0
Hungary	0	0	Sweden	0	0
Iceland	0	0	Uruguay	0	0
India	0.432	0	Vietnam	0	0
Zimbabwe	0	0	-		-

RMSPE	0.003368	0.00819	-	-	-

Source: Authors' calculations using Stata 14.2

Table 4.13 gives the predictors balance for synthetic groups C and D, the treated unit (i.e., Pakistan), and the mean value of 51 countries of the chosen covariates. The difference between Pakistan and the constructed synthetic-Pakistan in group D shows a near perfect close fit in pre-intervention period group, which further confirms the validity of better estimates in group D.

Table 4.13: Outcome predictors balance

Group C				Group D			
Predictors	Treated	Synthetic control	Average of 51 countries	Predictors	Treated	Synthetic control	Average of 51 countries
HDI-Pov*	0.3043	0.3044	0.6538	HDI-Pov	0.3043	0.3052	0.6538
GDP*	25.551	25.028	24.521	GDP*	25.551	23.866	24.521
Cre FI*	23.516	16.770	34.605	Cre FI*	23.516	22.025	34.605
Dep*	30.214	28.504	36.704	Cre FI(1999)	25.474	26.083	37.015
Open*	35.785	37.314	182.17	Cre FI(1997)	24.646	23.757	34.842
Inf*	8.7227	6.9357	18.227	Cre FI(1996)	24.693	22.848	32.542
N_exp*	111.03	97.163	247.60	Dep*	30.214	28.355	36.704
GFCF*	18.771	21.590	46.326	Open*	35.785	38.253	182.17
FDI*	0.8041	0.9276	2.5994	Open(1991)	34.038	31.590	167.66
M3*	42.715	33.139	45.972	Open(1995)	37.242	42.172	167.51
				Inf*	8.7227	6.4414	18.227
				Inf(1993)	9.9736	7.9246	22.917
				Inf(1999)	4.1426	4.0467	13.101
				N_exp*	111.03	103.60	247.60
				N_exp(1991)	107.73	97.125	207.33
				N_exp(1993)	112.43	100.87	229.06
				N_exp(1995)	110.70	98.930	237.70
				GFCF*	18.771	16.500	46.326
				GFCF(1991)	19.778	20.464	31.280
				GFCF(1995)	19.656	21.001	40.301

*Represents the mean value of whole pre-adoption period i.e., 1990-2002

Source: Authors' calculations using Stata 14.2

Figure 4.15 illustrates the poverty alleviation trends in Pakistan compared to the mean value of the donor pool of 51 countries. However, the donor pool is an inappropriate reference group due to substantial initial disparities in HDI. Both Pakistan and the donor pool show an upward trend over time, indicating that there is a gradual increase in the general standard of living. Yet, these patterns differ due to various socio-economic factors. Achieving a parallel trajectory, a requirement for difference-in-differences regression, but challenging with real-world data. However, for SCM, the point-to-point match between treated and untreated units is needed.
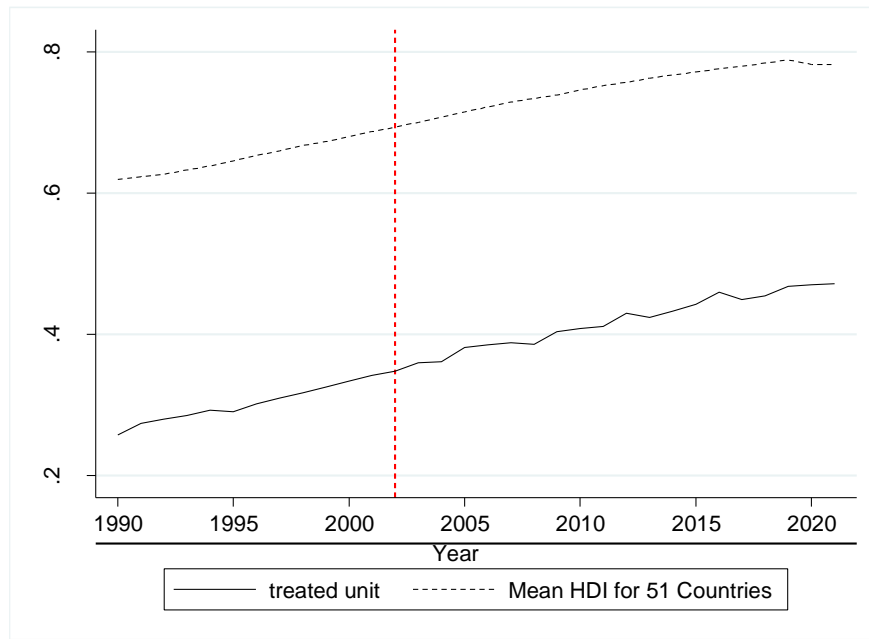
Figure 4.15 – Trend of standard of living in Pakistan and Mean of countries in donor pool
Source: Authors' calculations using Stata 14.2

4.4.1.2 The effect of adoption on poverty alleviation

As per the setup data as stated above, synthetic control group results are discussed here. Figures 4.16 and 4.17 show the results of poverty alleviation in post adoption period for group C and D, respectively. In pre-adoption period, the trend of Pakistan and synthetic-Pakistan are closely tracked to each other. However, synthetic group D is closely fit, leaving a lower prediction error, as documented in RMSPE of 0.00336. In both the groups, the trend of synthetic-Pakistan followed the similar trajectory, which shows the sensitivity of our model. Therefore, even with the changed predictors, the untreated unit appeared to have comparable movements. The results show that in post-adoption period, the living standard of Pakistan did not change. However, the untreated unit (synthetic-Pakistan) showed a continuous rise in HDI, causing substantially higher living standards and ultimately alleviating poverty. The gap between Pakistan and the synthetic line is shown in Figure 4.18. Results came opposite to the postulated hypothesis H6: there is an incremental impact of the adoption of Islamic finance in poverty alleviation.
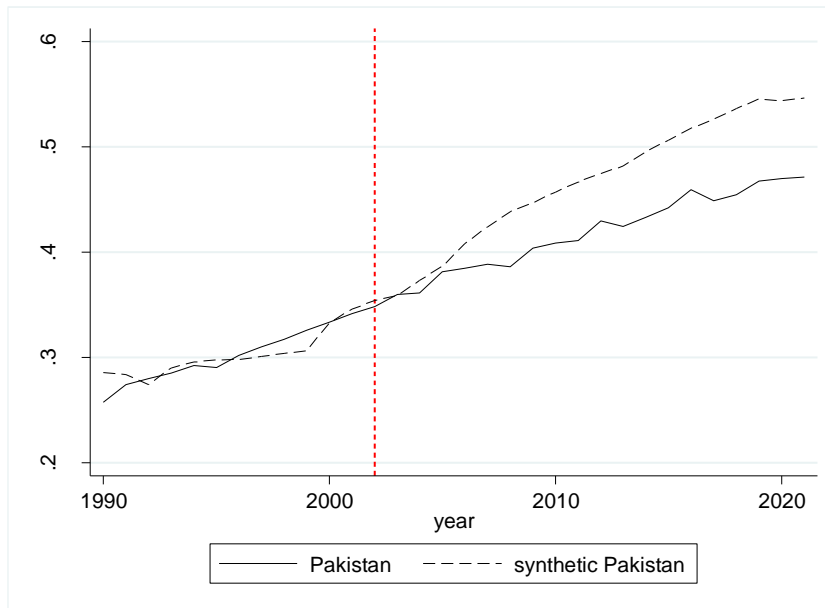
Figure 4.16 – Synthetic control group results of poverty alleviation (group C)
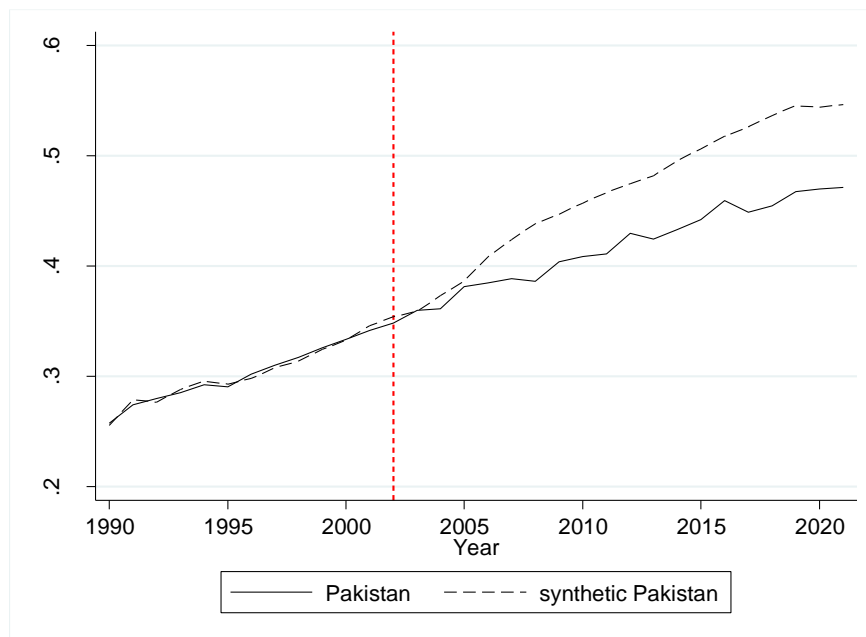Source: Authors' calculations using Stata 14.2

Figure 4.17 – Synthetic control group results of poverty alleviation (group D)
Source: Authors' calculations using Stata 14.2

The results are inconsistent with the previous finding that financial development did not raise the living standard or lower the poverty gap (MAJID et al., 2019; PAREWANGI and ISKANDAR, 2020; SHAUKAT and ZHU, 2021). Prior studies argued that Islamic financial development helps spur the investing activities that give rise to the real sector to grow. Furthermore, credit expansion plays a vital role in raising overall living standards in an economy. The larger access to credit enhances investments, creates job opportunities, increases household consumption, and hence improves the quality of life. However, the results in previous studies are confined to specific

countries. For instance, the majority of work is done in Indonesia (MAJID et al., 2019; PAREWANGI and ISKANDAR, 2020), where the role of small and medium enterprises and their access to easy credit is encouraged. However, Pakistan stays quite behind in financial inclusion or Islamic financial inclusion; for instance, in 2021 there, 57% of people borrowed money from financial institutions in Indonesia and 13% of it was requested via mobile banking applications (WDI Findex Index data-based 2021). Whereas in Pakistan, the ratio is 30%, and only 4% of them were using mobile banking. The ease of credit access to the poor should be the prime focus in order to have a collective rise in the poverty level. Moreover, the inconsistency of results to findings of (SHAUKAT and ZHU, 2021) is due to the fact that the author developed the Zakat index by incorporating domestic investment, human capital, exchange rate, savings, and trade openness. The study provided an alternate solution by implementing a 2.5% rate of Zakat on the constructed Zakat index and its potential impact on poverty alleviation.
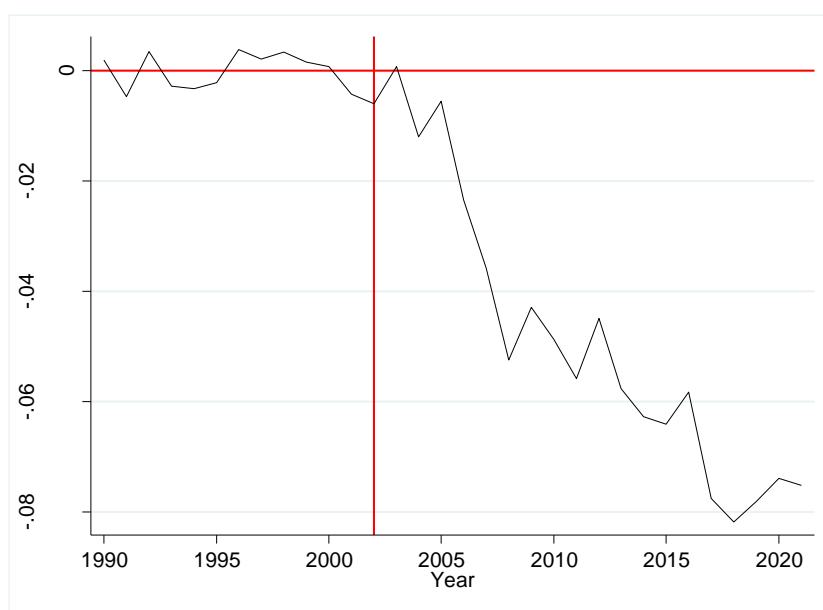

Figure 4.18 – Poverty alleviation gap of Pakistan and synthetic Pakistan (group D)
Source: Authors' calculations using Stata 14.2

On the microfinance front, the result of poverty alleviation is also not consistent with seminal works by (CHOUDHURY et al., 2017; HASSAN, 2014; MOHSENI-CHERAGHLOU, 2017) which stressed the micro-credit and working on the financial needs of the poor by giving gratuitous loans (Qard al Hassan), and sometimes easy credit facilities for small farmers and small medium enterprises. However, commercial Islamic banking is different from microfinance, where the commercial aspect is prevalent and the well-being aspect of Islamic finance is compromised (AYUB, 2013; USMANI, 1998). The plausible reason for the rejected hypothesis for incremental

impact on poverty alleviation is twofold. Firstly, the public's voluntary exclusion from the finance net (MOHSENI-CHERAGHLOU, 2017; NAVEED et al., 2020) due to a lack of awareness and trust in financial institutions. For most of the people, it is hard to trust the Islamization of banking services in Pakistan. Secondly, there is still a larger part of the country which is unbanked due to poor fintech infrastructure. Furthermore, the ease of access to credit on convenient payment terms is still lacking behind in the context of Islamic commercial banking. Although the progress of the Islamic financial sector is exponentially growing, the focus is given to the corporate giants.

4.4.2 Robustness check (Section IV)

4.4.2.1 Inference and placebo tests about adoption of Islamic finance and poverty alleviation

In order to check for the reliability of the results obtained in the above section, we conducted placebo tests to falsify the inference that the impact on poverty alleviation was not because of the adoption of the Islamic financial model. Each country from the donor pool is taken as the treated unit to see if the projection of poverty alleviation and standard of living is similar to what Pakistan got after adoption. If the gap between Pakistan and each chosen treated country is substantially different, then it can be inferred that the results in the first section are not valid. On the other hand, as the synthetic control group showed an incremental impact in the post-adoption period, it is expected that the majority of the gaps would be positive. Figure 4.19 provides the results from the placebo tests. The results show that with few exceptions, the trend in the pre-adoption period is a closely fit and mimics the relative synthetic control group created for each country. This is one validation of the appropriately selected model. Furthermore, the level of living standard is mainly maintained in the majority of the countries with few exceptions. For instance, Norway, Slovenia, Estonia, Israel, and Mexico had experienced exceptionally better living standard than other countries. Whereas, the Post/Pre-adoption ratio of majority of the countries lies near the synthetic line i.e., x-axis. Table 4.14 provide the Pre and post prediction errors and the ratio of Post- to Pre-RMSPE, which gives a better picture of the placebo tests.
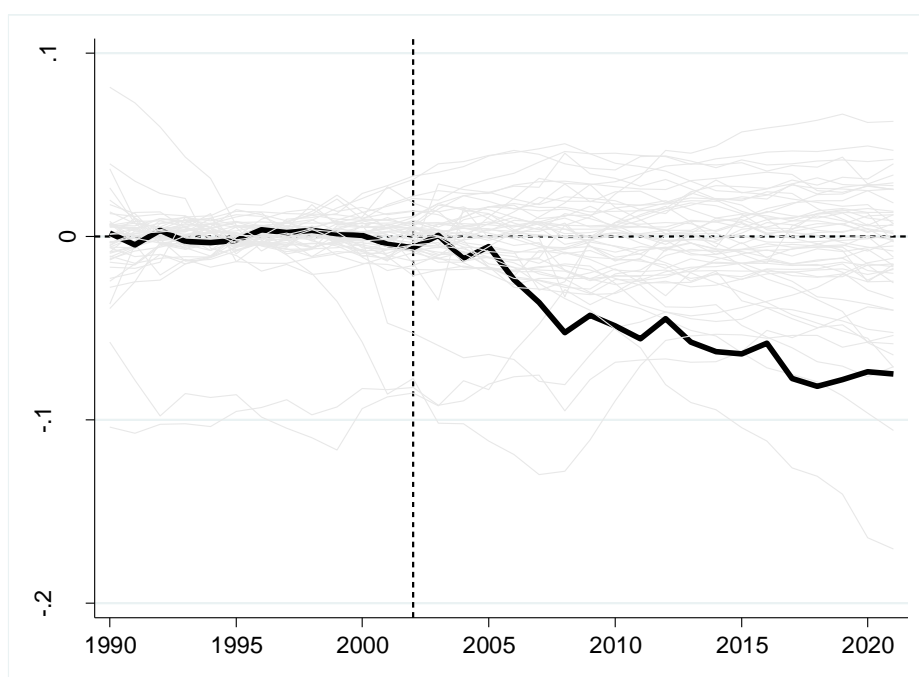
Figure 4.19 – Placebo tests taking each country from the donor pool as treated unit (group D)
Source: Authors' calculations using Stata 14.2

Table 4.14: Post- and Pre- Root mean square prediction errors

Sr No	Countries	Pre RMSPE	Post RMSPE	Post/Pre RMSPE ratio
1	Albania	0.00862	0.04315	5.00616
2	Argentina	0.00702	0.01018	1.45000
3	Armenia	0.01347	0.03213	2.38408
4	Austria	0.00829	0.01876	2.26391
5	Barbados	0.00826	0.03718	4.50093
6	Belarus	0.00454	0.02690	5.92227
7	Belgium	0.00727	0.00689	0.94852
8	Bhutan	0.02008	0.05109	2.54447
9	Brazil	0.00444	0.01857	4.17739
10	Bulgaria	0.00800	0.02465	3.07993
11	Cameroon	0.00434	0.01821	4.18819
12	Colombia	0.00770	0.01397	1.81379
13	Croatia	0.00446	0.02200	4.92904
14	Czechia	0.01124	0.02840	2.52561
15	Denmark	0.00284	0.00809	2.84191
16	Dominica	0.09549	0.06881	0.72058
17	Ecuador	0.00568	0.01207	2.12479
18	Estonia	0.01671	0.04092	2.44834
19	Finland	0.01112	0.00452	0.40625
20	France	0.00976	0.01959	2.00696
21	Ethiopia	0.09272	0.04217	0.45480
22	Greece	0.00411	0.01004	2.44038
23	Hungary	0.00493	0.00668	1.35513

24	Iceland	0.00506	0.01849	3.64855
25	India	0.01348	0.01413	1.04839
26	Israel	0.00428	0.02008	4.68229
27	Italy	0.00316	0.00962	3.04342
28	Jamaica	0.00415	0.02895	6.96514
29	Latvia	0.00383	0.01425	3.71583
30	Lithuania	0.01938	0.04521	2.33247
31	Madagascar	0.00783	0.04432	5.65915
32	Mexico	0.00245	0.01590	6.48219
33	Moldova	0.02034	0.01780	0.87554
34	Mongolia	0.00975	0.02322	2.38082
35	Myanmar	0.01562	0.01183	0.75702
36	Montenegro	0.00831	0.02572	3.09487
37	Nepal	0.01036	0.01050	1.01416
38	Norway	0.00440	0.05711	12.9749
39	Pakistan	0.00336	0.05560	16.5075
40	Panama	0.00429	0.00784	1.82784
41	Paraguay	0.01758	0.01021	0.58091
42	Peru	0.00640	0.01558	2.43393
43	Portugal	0.00727	0.00644	0.88566
44	Philippines	0.00779	0.01291	1.65640
45	Romania	0.00772	0.01220	1.57960
46	Slovak Republic	0.01113	0.03039	2.72839
47	Slovenia	0.00461	0.09353	20.2843
48	Spain	0.00646	0.00693	1.07274
49	Sweden	0.01578	0.00573	0.36341
50	Uruguay	0.00316	0.02374	7.49419
51	Vietnam	0.00619	0.03137	5.06361
52	Zimbabwe	0.05334	0.08498	1.59316

Source: Authors' calculations using Stata 14.2

Figure 4.20 shows the results of placebo results after excluding the outliers with highest pre-adoption prediction errors. The frequencies distribution of post/pre ratio is given in Figure 4.21.
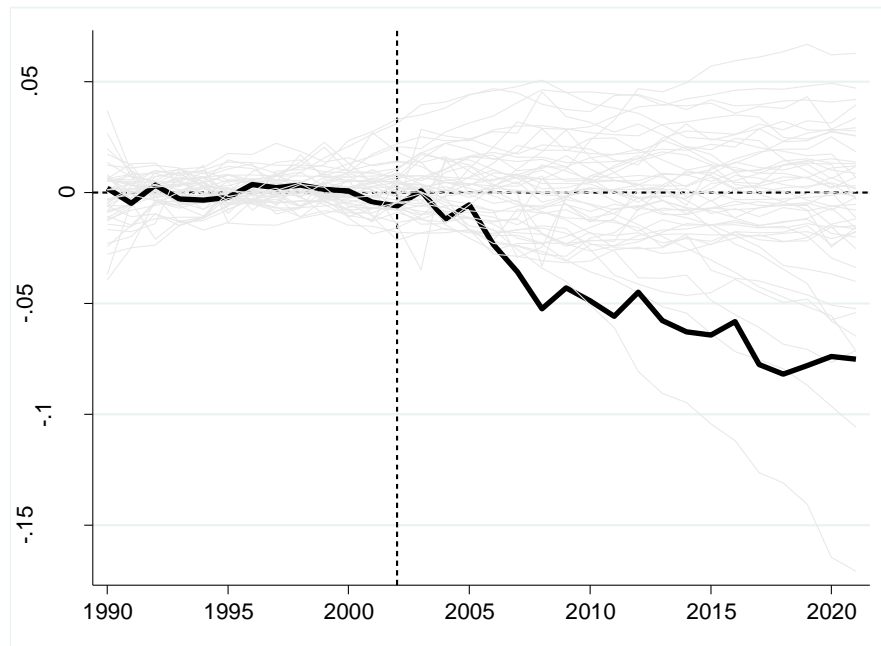
Figure 4.20 – Placebo tests after removing the outliers (group D)
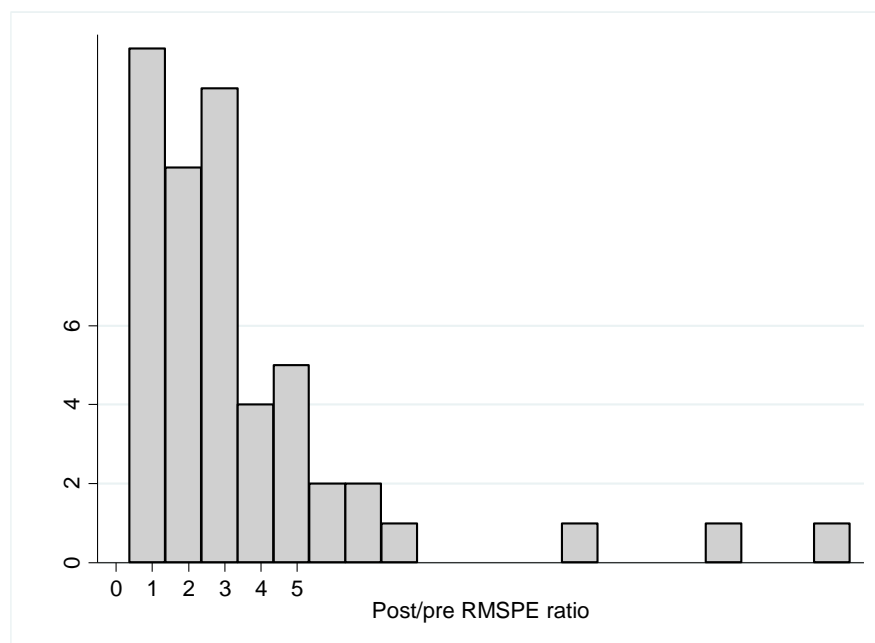Source: Authors' calculations using Stata 14.2

Figure 4.21 – Frequency distribution of Post/Pre-RMSPE ratio
Source: Authors' calculations using Stata 14.2

4.5 Summary of hypothesis acceptance and rejection

Based on the results obtain in section I, II, III, and IV, Table 4.15 shows the final standings of all six hypothesis.

Table 4.15: Summary of Hypothesis acceptance and rejection

Objectives	Postulated Hypothesis	Result
Objective 1	**H1:** Islamic financial depth has positive effect on economic growth of Pakistan	Accepted
	H1a: The positive effect of Islamic financial depth is more than the conventional financial depth on economic growth Pakistan	Rejected
Objective 2	**H2:** Risk-sharing financing positively affects real economic output	Accepted
	H3: Non-Risk sharing financing positively affects real economic output	Accepted
	H5: Better asset quality positively moderates the Islamic finance and aggregate economic output relationship	Accepted
Objective 3	**H4:** There is an incremental impact of financial development on economic growth by adopting Islamic banking.	Accepted
Objective 4	**H6:** Islamic financial development has a differential positive impact on poverty alleviation	Rejected

5   CONCLUSION, POLICY IMPLICATION, AND LIMITATION

This section aims to summarize the results obtained in the previous section. Furthermore, based on the findings, the policy implications are discussed. Lastly, the limitations of this research are briefly described.

5.1   Key findings

The thesis focused on exploring the dynamics of the Islamic finance-growth nexus in the presence of a conventional banking system. To achieve this, the study was divided into four objectives, with the development of six hypotheses tested using appropriate econometric modeling techniques.

The first objective (Objective 1) aimed to examine the relative importance of Islamic financial depth in comparison to conventional finance and its impact on economic growth. The second objective (Objective 2) sought to assess the effects of different Islamic financing modes on real economic output, which were divided into two main types: profit and loss financing and debt-based financing. The moderating effect of asset quality on the Islamic finance-growth nexus was explored alongside the analysis of decomposed Islamic financing modes. The third and fourth objectives (Objectives 3 & 4) utilized quasi-experimental design to investigate causal relationships. Objective 3 aimed to determine if there was an incremental impact on economic

growth resulting from the adoption of an Islamic banking system. Objective 4 focused on assessing the impact on raising the living standard and hence the poverty alleviation.

5.1.1 Islamic financial depth and economic growth

The results of the first section concluded that a healthy presence of Islamic financial assets within the economy positively influence economic growth. This finding confirms the first hypothesis (H1), which supports the idea that Islamic financial depth benefits economic growth. Interestingly, it is revealed that the traditional banking model is equally important in a country with a dual banking system. The results indicate that the relationship between finance and growth is more sensitive in the case of the interest-based banking system (conventional banking). In a dual banking system, the impact of conventional banking on economic growth is significantly amplified compared to Islamic finance, leading to the rejection of the sub-hypothesis (H1a). Furthermore, it is observed that the causality flows from finance to growth, suggesting that both banking models align with the supply-leading hypothesis.

In addition to the banks' ability to extend loans to the private sector, the degree of financial intermediation yields similar results. The total number of branches in Islamic and conventional banks is used to measure financial intermediation. Conventional financial intermediation plays a defining role in shaping the economy prosperously. The results imply that there is strong evidence supporting the supply-leading theory in Pakistan. However, the impact originating from the conventional banking system is much stronger and impactful than that of Islamic banking. As a result, it is indicated that Shari'a-based banking is still in its early stages. Although Pakistan is one of the key contributors to global Islamic financial assets (IFSB 2022), its accessibility to the general public remains imperfect. Therefore, it is clear that the roots of the interest-based system run more profound in the economy compared to Shari'a-based banking, which is why the significant factor contributing to economic growth in a dual banking system consists of conventional banks.

5.1.2 Decomposed Islamic financings and real economic output

Based on the second objective, the asset side of Islamic banks is decomposed into two key elements, i.e., PLS financing and non-PLS financing (answering H2 & H3). The core difference in Islamic banking is the underlying contracts of each product offered, which make it suitable for enhancing real economic activities. The findings indicate that the PLS financing component of Islamic banks plays a pivotal role in boosting trade and real economic activities. Nevertheless, the extent of profit and loss sharing (PLS) financing appears to be comparatively less compared to conventional counterparts. This suggests that the relative strength and expansion of PLS financing

in the given economies does not surpass that of conventional financial systems. Furthermore, it also conforms to the findings in the previous section, where economic growth was more sensitive to conventional banking operations. Nevertheless, the result came in favour of second hypothesis (H2) and contradiction to prior findings (BOUGATEF et al., 2020; GUIZANI and AJMI, 2021). This implies that the corporate side, largely connected to manufacturing and industrial output within the country, prefers to choose PLS financing facilities offered by Islamic banks. Hence, Islamic finance focuses on risk-sharing rather than transferring the risk to the borrower (just like interest-based loans). The sharing of risk in case of loss encourages the corporate sector to rely on PLS financing rather than choose interest-based loans, where risk is transferred to the borrower.

On the other hand, sale-based financing contracts (non-PLS financing) turned out to be catalytic in promoting real economic output (validating third hypothesis H3). Industries seemed to rely more on sale-based Islamic financing contracts and have a greater impact on total economic output. There are two key insights from this finding. Firstly, there is a lower impact of PLS financings due to the Islamic bank's reluctance owing to prevailing societal moral hazards. Secondly, non-PLS financing carries few advantages over PLS financing. For instance, sale-based financing contracts provide strong hedging tools to firms, protecting them from agency conflict due to reduced information asymmetry. Naturally, all non-PLS financing contracts fix the cost of capital for the firms, which is absent in both PLS and interest-based financing. Therefore, economic output is more prone to changes with the change of non-PLS market share within the economy.

Together with the findings, the research concludes a moderation flowing from better asset quality towards Islamic finance – output nexus (hypothesis H4). The results imply that banks with good quality financial assets are beneficial for the survival of both, i.e., the Islamic banks and the borrowers. A lower default rate helps the Islamic banks have better financial performance and grow their credit portfolios. On the other hand, financial institutions uphold both internal and external credit assessments for their clientele. Companies bearing lower credit ratings often struggle with more financial limitations in comparison to those enjoying more favourable ratings.

5.1.3 Differential impact of adoption of Islamic finance on economic growth
Based on the quasi-experimental approach, the synthetic control method concluded that there is an incremental impact on the economic growth of Pakistan compared to the donor pool of 51 countries where the Islamic banking system was not implemented (thus accepting hypothesis H5). To the best of the author's knowledge, this is the first study that attempts to find the marginal impact on economic growth after the adoption of Islamic banking. It further confirms that when predicting economic growth using private credit issued by the financial sector, there is a 23% increase in

GDP output compared to countries where the asset-backed banking system was not implemented. Furthermore, the impact is amplified to 32% when predicting economic growth using total deposits within the financial sector. This result implies that the ability of Islamic banks to promote entrepreneurial activities, encourage trading with a share of risk and reward, and create employment collectively triggers overall economic growth. Hence, there is a marginal impact on the country's economic growth in the post-adoption period.

Furthermore, the economic impact is not immediate, as the effect of asset-backed financing becomes evident with an increase in market share. The results remain robust when additional predictors are considered and each country from the donor pool (with no Islamic banking) is treated as a recipient country (assuming they adopted this model). These results provide significant insights and a pathway for countries to consider adopting the Shari'a banking system. Additionally, while the findings do not directly align with previous research, they receive support from prior literature, confirming that Islamic banks are profitable (BECK et al., 2013; HANIF et al., 2012; SAMAD, 2013), efficient (BECK et al., 2013; PARSA, 2022), more resilient (MENSI et al., 2020; PAPPAS et al., 2017), exhibit better asset quality (ABDELSSALAM et al., 2022; ELNAHASS et al., 2021), and promote real economic activities. Consequently, the synergetic effect of Islamic banks' efficiency, resilience, and performance translates into an incremental impact on economic growth.

5.1.4 Differential impact of adoption of Islamic finance on Poverty alleviation

The results of Section IV conclude that during the post-adoption period, there was no differential increase in living standards when compared to countries that did not adopt the Islamic banking system. This result led to the rejection of hypothesis H6, which suggested that the adoption of Islamic banking would marginally contribute to poverty alleviation (raising living standards). It is important to note that the overall trend in the standard of living is on an upward slope. However, there is no evidence of an incremental rise during the post-adoption period.

These findings shed light on two critical insights. Firstly, it becomes evident that the reach of Islamic financial institutions to small and medium-sized enterprises in Pakistan is remarkably low. A significant portion of the financing is directed toward large corporate entities, while smaller sectors, such as sole proprietors, farmers, and small to medium-sized entrepreneurs, struggle to access financing opportunities that could genuinely contribute to poverty alleviation. This lack of customer outreach is also reflected in the 2021 WDI Findex Index data. Secondly, due to extreme religious beliefs, there exists a misconception among the general public that Islamic banking is merely a change in nomenclature, resulting in the perception that Islamic banking products are

similar to interest-based financial activities. This misconception leads to the voluntary exclusion of a majority of small farmers and entrepreneurs from the Islamic financing network. In summary, the study's findings indicate that while living standards are generally improving, the adoption of Islamic banking has not led to a significant uplift in living standards in the post-adoption period. This may be attributed to the limited access of small and medium-sized enterprises to Islamic financial services and the misunderstanding surrounding Islamic banking products.

5.2   Policy Implication

Based on the obtained results, the findings provide practical implications in four ways: Firstly, the results suggest the need for significant policy changes for the central bank to promote Islamic banking's share within the country. On a macro level, there is a need to increase the market share of Islamic financial assets. As a regulatory body, the central banks could expedite the process of Islamization of existing conventional banks. The government can also play a role by introducing asset-backed securitization or purchasing Sukuks (Islamic alternatives to bonds that provide direct ownership of assets), as was done in Indonesia (FATHAN and ARUNDINE, 2019). However, it is important to note that converting conventional banks into Islamic banks is typically a complex process involving regulatory changes, restructuring, and a gradual transition to Sharia-compliant operations.

Secondly, it is further implied that there is a dire need for innovation and implementing FinTech in the Islamic banking industry, particularly on the financing side. This responsibility falls primarily on regulatory bodies, such as central banks, which should encourage commercial banks to adopt cutting-edge technology and participate in global competition in the use of FinTech. Moreover, commercial bank management should invest more in innovation related to FinTech. This investment can help banks expand their share in the future financing network and experience more significant asset growth on their balance sheets. By doing so, the unbanked population, especially in rural areas, can be better served. Targeting small and medium enterprises, farmers, and sole proprietors can also improve the living standard and the overall economy.

Thirdly, on micro level, bank management can shift their focus towards profit and loss financing modes rather than relying heavily on debt-based financing. Importantly, the primary criticism of Islamic banking revolves around its dependence on non-risk-sharing modes of financing. This flaw can be overcome by prioritizing profit and loss sharing (PLS) financing at the corporate level. This shift can also foster entrepreneurial innovation within the economy (Chandler, 2022). Furthermore, the results suggest that Islamic banks have maintained a healthy level of asset quality. To sustain

this, the credit administration department should collaborate closely with Shari'a principles and the credit screening process to maintain a lower level of asset quality.

Lastly, the novel findings regarding the incremental impact on economic growth have significant implications for countries where interest-based banking is the prevailing norm, providing a pathway for them to adopt and implement asset-backed banking. While previous studies have yielded affirming results regarding the stability, efficiency, resilience, and financial performance of Islamic banking, the evidence of a marginal impact on overall economic growth has not been studied previously. Additionally, export-oriented countries with a higher manufacturing index could potentially experience marginal benefits from adopting the Islamic banking system.

5.3   Limitation of the study

The thesis explored the Islamic finance and growth nexus from various angles, the study could have been enhanced if it had not encountered some limitations. In line with the study's objectives, aggregate data sufficed for the analysis and hypothesis testing. However, the availability of bank-specific data could have yielded more profound insights at the operational level. Additionally, in the second section of the results, it is worth noting that despite achieving a 100% Islamic banking system, Sudan had to be excluded from the sample due to data unavailability.

The banking aspect of Islamic finance is important, however, it is essential to recognize that other parameters of Islamic finance, such as Sukuk (Islamic bonds) and the Islamic stock markets, can also serve as indicators for measuring Islamic financial development. Furthermore, it is crucial to delve into the corporate side of Islamic finance and explore their preference for Profit and Loss Sharing (PLS) and non-PLS financing in the future. Addressing these aspects can effectively bridge the gap between the financial needs of the corporate sector and the growth of Islamic finance. Consequently, countries with a majority Muslim population and a relatively lower share of Islamic finance can identify growth opportunities to expand their market share. The element of religiosity can play a pivotal role in closing this gap. By considering the selection of debt products based on religious faith, researchers may uncover the underlying reasons why Muslim-majority countries still lag in terms of implementing Islamic financial solutions.

Lastly, the measure of poverty and income disparity could be considered in the future. In Sections III and IV, when selecting countries from the donor pool, we encountered a significant limitation in finding proxy for poverty, such as the poverty headcount ratio below $1.90 per day, the population living below the poverty line, or the GINI index. Consequently, we chose to employ the Human Development Index as a measure of poverty alleviation and the standard of living.

6   NEW SCIENTIFIC RESULTS

The thesis explored the dynamics of the Islamic finance-growth nexus in the presence of a conventional banking system, consisting of four objectives and six hypotheses tested using econometric modeling techniques. This section provides the new scientific results obtained in all four sections of this study. Section I explored the objective 1 (addressing hypotheses H1 & H1a), section II examined the objective 2 (testing the hypothesis H2, H3, & H5), and section III & IV addressed the objective 3 & 4 (following the hypotheses H4 & H6), respectively. Below are the key new scientific results:

6.1   Influence of Islamic financial depth on economic growth

- The study confirmed that a healthy presence of Islamic financial sector in the economy positively influences economic growth. Furthermore, results showed that the causality flow from finance to growth, aligning with the supply-leading hypothesis.
- In the dual banking system, where both Islamic and conventional banking coexist, it was found that conventional banking had a significantly greater impact on economic growth compared to Islamic finance.

6.2   Role of PLS and non-PLS financing

- PLS financing in Islamic banks plays a pivotal role in boosting trade and real economic activities, However, the extent of PLS financing in Islamic banking is comparatively less than in conventional banking.
- Sale-based financing contracts (non-PLS financing) have a significant impact on promoting real economic output. Non-PLS financing contracts offer advantages such as hedging tools and fixed cost of capital for firms, making them attractive to industries.
- Good quality financial assets in Islamic banks are beneficial for both the banks and borrowers, which showed the lower default rates enable Islamic banks to perform better and promote higher loan growth.

6.3   Incremental impact on economic growth with Islamic banking:

- The synthetic control method showed an incremental impact on Pakistan's economic growth compared to a pool of 51 countries without Islamic banking, supporting. Furthermore, Islamic banking increased GDP output by 23% when using private credit and 32% when using total deposits to predict economic growth.

6.4 Living standards and Poverty alleviation:

- The adoption of Islamic banking did not lead to a significant increase in living standards in the post-adoption period.

7 SUMMARY

The thesis aimed to explore the dynamics of Islamic finance and economic growth within the context of a coexisting conventional banking system. It set out four primary objectives and tested six hypotheses through econometric modeling. The first objective aimed to assess the influence of Islamic financial depth in comparison to conventional finance on economic growth. The second objective explored the effects of different Islamic financing modes, specifically profit and loss and debt-based financing, on real economic output, while considering the moderating role of asset quality. The third and fourth objectives employed quasi-experimental design to investigate the causal links between the adoption of an Islamic banking system and its incremental impact on economic growth, as well as its influence on poverty alleviation.

Based on the research aims, three different econometric methods have been used to achieve the objectives and test the hypotheses. The first objective is addressed using the autoregressive distributed lag (ARDL) regression. For the second objective, Panel fixed effect regression with clustered robust standard errors is used. Finally, the third and fourth objectives, which focus on the marginal impact of adopting Islamic banking on economic growth and poverty alleviation, are examined using the synthetic control method (SCM).

In summary, the findings show that Islamic financial assets positively influence economic growth, but in dual banking systems, conventional banking has a more significant impact. PLS financing in Islamic banks is essential for risk-sharing but lags behind conventional financing. Sale-based financing contracts have a strong impact on economic output. This indicates that while PLS financing is preferred by the corporate sector for risk-sharing, conventional financing remains more dominant. Good asset quality benefits both Islamic banks and borrowers. The adoption of Islamic banking has an incremental impact on economic growth, but it does not lead to a significant increase in living standards due to limited outreach and misconceptions. These results provide valuable insights into the dynamics of Islamic finance within the broader financial system and its impact on economic growth and living standards in Pakistan. The results implies that Islamic financial institutions have limited outreach to small and medium-sized enterprises in Pakistan, with a focus on large corporate entities. Also, there is a huge amount of misconception among the

general public that Islamic banking products are similar to interest-based financial activities leads to the exclusion of small farmers and entrepreneurs from the Islamic financing network.

The findings of the thesis offer vital policy implications in four key areas. First, central banks should consider significant policy changes to promote Islamic banking within their countries, increasing the market share of Islamic financial assets. Second, the adoption of FinTech in Islamic banking, especially on the financing side, needs to be encouraged by regulatory bodies and the banking sector, which can extend banking services to unbanked populations and small businesses. Third, banks should prioritize profit and loss sharing (PLS) financing modes to enhance entrepreneurial innovation and ensure better asset quality. Finally, the thesis presents an opportunity for countries with interest-based banking systems to explore the potential benefits of transitioning to asset-backed Islamic banking, as previous research has shown the efficiency and resilience of Islamic banking with along with our novel emphasis on its incremental impact on economic growth. Export-oriented nations, in particular, may stand to gain from adopting the Islamic banking model.

8 APPENDICES

8.1 A1 - Bibliography

ABADIE, A., 2021. Using Synthetic Controls: Feasibility, Data Requirements, and Methodological Aspects. J Econ Lit 59, 391–425.

ABADIE, A., DIAMOND, A., HAINMUELLER, J., 2010. Synthetic Control Methods for Comparative Case Studies: Estimating the Effect of California's Tobacco Control Program. J Am Stat Assoc 105, 493–505.

ABADIE, A., DIAMOND, A., HAINMUELLER, J., 2015. Comparative Politics and the Synthetic Control Method. Am J Pol Sci 59, 495–510.

ABADIE, A., GARDEAZABAL, J., 2003. The Economic Costs of Conflict: A Case Study of the Basque Country. American Economic Review 93, 113–132.

ABASIMEL, N.A., 2023. Islamic Banking and Economics: Concepts and Instruments, Features, Advantages, Differences from Conventional Banks, and Contributions to Economic Growth. Journal of the Knowledge Economy 14, 1923–1950.

ABBA, R.A., NHAG, B.B., 2020. The potentials of Islamic banking on poverty alleviation in Nigeria. International Journal of Research and Innovation in Social Science, 6(8), pp.438-443.

ABDEL-HAQ, M.K., 1989. Islamic development bank: An analytical study. Yarmouk University.

ABDELSSALAM, O., ELNAHASS, M., AHMED, H., WILLIAMS, J., 2022. Asset securitizations and bank stability: Evidence from different banking systems. Global Finance Journal 51, 100551.

ABDUH, M., AZMI OMAR, M., 2012. Islamic banking and economic growth: the Indonesian experience. International Journal of Islamic and Middle Eastern Finance and Management 5, 35–47.

ABEDIFAR, P., HASAN, I., TARAZI, A., 2016. Finance-growth nexus and dual-banking systems: Relative importance of Islamic banks. J Econ Behav Organ 132, 198–215.

ADENIYI, O., OYINLOLA, A., OMISAKIN, O., EGWAIKHIDE, F.O., 2015. Financial development and economic growth in Nigeria: Evidence from threshold modelling. Econ Anal Policy 47, 11–21.

AFZA, T., ASGHAR, M.J.-E.-K.A., 2014. Efficiency of Modaraba and Leasing Companies in Pakistan. Procedia Soc Behav Sci 109, 470–482.

AGBETSIAFA, D., 2004. The finance growth nexus: evidence from sub-Saharan Africa. Savings and Development 28, 271–288.

AGGARWAL, R.K., YOUSEF, T., 2000. Islamic Banks and Investment Financing. J Money Credit Bank 32, 93.

AGHION, P., BOLTON, P., 1997. A theory of trickle-down growth and development. The review of economic studies, 64(2), pp.151-172.

AGUSTINA, M., MAJID, M.S.A., MUSNADI, S., FAISAL, F., HAFASNUDDIN, H., SURIANI, S., 2022, March. Islamic banking, economic growth, and poverty reduction in Indonesia. In 2022 International Conference on Decision Aid Sciences and Applications (DASA) (pp. 1249-1253). IEEE.

AHMED, H., AASSOULI, D., 2022. Entrepreneurial finance, agency problems and Islamic ethics: complementarities and constraints. Venture Capital 24, 25–46.

ALI, M., AZMI, W., 2017. Impact of Islamic Banking on Economic Growth and Volatility: Evidence from the OIC Member Countries. In: Islamic Banking. Springer International Publishing, Cham, pp. 15–32.

ALJIFRI, K., KHANDELWAL, S.K., 2013. Financial Contracts in Conventional and Islamic Financial Institutions: An Agency Theory Perspective. Review of Business & Finance Studies 4, 79–88.

ALSAMARA, M., MRABET, Z., JARALLAH, S., BARKAT, K., 2019. The switching impact of financial stability and economic growth in Qatar: Evidence from an oil-rich country. The Quarterly Review of Economics and Finance 73, 205–216.

ALVAN, A., 2009. Forging a Link Between Human Development and Income Inequality: Cross-Country Evidence . Review of Social, Economic & Business Studies 7, 31–43.

ANGRIST, J.D., PISCHKE, J.-S., 2009. Mostly harmless econometrics: An empiricist's companion. Princeton University Press.

ANWAR, M., 2003. Islamicity of banking and modes of Islamic banking. Arab LQ .

ANWAR, S.M., JUNAIDI, J., SALJU, S., WICAKSONO, R., MISPIYANTI, M., 2020. Islamic bank contribution to Indonesian economic growth. International Journal of Islamic and Middle Eastern Finance and Management 13, 519–532.

APPIAH-OTOO, I., SONG, N., 2022. Finance-growth nexus: New insight from Ghana. International Journal of Finance & Economics 27, 2682–2723.

ARCAND, J.L., BERKES, E., PANIZZA, U., 2015. Too much finance? Journal of Economic Growth 20, 105–148.

ARIFF, M., 1988. Islamic banking. Asia Pac Econ Lit 2, 48–64.

ASUTAY, M., 2007. Conceptualisation of the second best solution in overcoming the social failure of Islamic finance: Examining the overpowering of homoislamicus by homoeconomicus. IIUM Journal of Economics and Management 15, 167–195.

ATAL, J.P., CUESTA, J.I., GONZÁLEZ, F., OTERO, C., 2022. The Economics of the Public Option: Evidence from Local Pharmaceutical Markets. Cambridge, MA.

ATHEY, S., IMBENS, G.W., 2017. The State of Applied Econometrics: Causality and Policy Evaluation. Journal of Economic Perspectives 31, 3–32.

AYSAN, A.F., OZTURK, H., 2018. Does Islamic banking offer a natural hedge for business cycles? Evidence from a dual banking system. Journal of Financial Stability 36, 22–38.

AYUB, M., 2013. Understanding Islamic finance. Gramedia Pustaka Utama.

AZMAT, S., SKULLY, M., BROWN, K., 2015. Can Islamic banking ever become Islamic? Pacific-Basin Finance Journal 34, 253–272.

BABER, H., 2018. How crisis-proof is Islamic finance? Qualitative Research in Financial Markets 10, 415–426.

BAGEHOT, W., 1873. Lombard Street: A description of the money market. HS King & Company.

BALAZS, J., VARGA, J., FALUS, O., 2021. The Working Mechanism of the Islamic Banking System. Civil Szemle, p.79.

BALTAGI, B.H., 2013. Panel Data Forecasting. pp. 995–1024.

BANDURA, W.N., 2022. Financial openness, trade openness and financial development: Evidence from sub-Saharan Africa. Dev South Afr 39, 947–959.

BARRO, R.J., 1990. Government Spending in a Simple Model of Endogeneous Growth. Journal of Political Economy 98, 103–125.

BARROS, L., CASTRO, F.H., DA SILVEIRA, A., BERGMANN, D., 2020. Endogeneity in panel data regressions: methodological guidance for corporate finance researchers. Review of Business Management 22, 437–461.

BATUO, M., MLAMBO, K., ASONGU, S., 2018. Linkages between financial development, financial instability, financial liberalisation and economic growth in Africa. Res Int Bus Finance 45, 168–179.

BAYAR, Y., 2017. Financial development and poverty reduction in emerging market economies. Panoeconomicus 64, 593–606.

BECK, T., DEMİRGÜÇ-KUNT, A., LEVINE, R., 2007. Finance, inequality and the poor. Journal of Economic Growth 12, 27–49.

BECK, T., DEMİRGÜÇ-KUNT, A., MERROUCHE, O., 2013. Islamic vs. conventional banking: Business model, efficiency and stability. J Bank Financ 37, 433–447.

BECK, T., LEVINE, R., LOAYZA, N., 2000. Finance and the sources of growth. J financ econ 58, 261–300.

BEZEMER, D.J., 2011. The Credit Crisis and Recession as a Paradigm Test. J Econ Issues 45, 1–18.

BLANCHARD, O., SHEEN, J., 2013. Macroeconomics, 6th ed. Pearson Higher Education.

BLUMBERG, B., COOPER, D., SCHINDLER, P., 2014. Business research methods. McGraw Hill.

BORDALO, P., GENNAIOLI, N., SHLEIFER, A., 2018. Diagnostic Expectations and Credit Cycles. J Finance 73, 199–227.

BORENSZTEIN, E., DE GREGORIO, J., LEE, J.-W., 1998. How does foreign direct investment affect economic growth? J Int Econ 45, 115–135.

BOTTAZZI, G., SECCHI, A., TAMAGNI, F., 2014. Financial constraints and firm dynamics. Small Business Economics 42, 99–116.

BOUGATEF, K., NAKHLI, M.S., MNARI, O., 2020. The nexus between Islamic banking and industrial production. ISRA International Journal of Islamic Finance 12, 103–114.

BOUKHATEM, J., BEN MOUSSA, F., 2018. The effect of Islamic banks on GDP growth: Some evidence from selected MENA countries. Borsa Istanbul Review 18, 231–247.

BOURKHIS, K., NABI, M.S., 2013. Islamic and conventional banks' soundness during the 2007–2008 financial crisis. Review of Financial Economics 22, 68–77.

BREUSCH, T.S., GODFREY, L.G., 1981. A review of recent work on testing for autocorrelation in dynamic simultaneous models. Macroeconomic analysis, essays in macroeconomics and economics, 1, pp.63-100.

BREUSCH, T.S., and PAGAN, A.R., 1979. A simple test for heteroscedasticity and random coefficient variation. Econometrica: Journal of the econometric society 47(5), pp.1287-1294.

BROCK, W.A., DURLAUF, S.N., 2001. Interactions-Based Models. pp. 3297–3380.

BROWN, R.L., DURBIN, J., EVANS, J.M., 1975. Techniques for testing the constancy of regression relationships over time. Journal of the Royal Statistical Society Series B: Statistical Methodology, 37(2), pp.149-163.

BURRELL, G., MORGAN, G., 1979. Assumptions about the nature of social science. Sociological paradigms and organisational analysis 248, 1–9.

CAPORALE, G.M., HELMI, M.H., 2018. Islamic banking, credit, and economic growth: Some empirical evidence. International Journal of Finance & Economics 23, 456–477.

CARNEVALE, J.B., HATAK, I., 2020. Employee adjustment and well-being in the era of COVID-19: Implications for human resource management. J Bus Res 116, 183–187.

CEVIK, S., RAHMATI, M.H., 2020. Searching for the finance–growth nexus in Libya. Empir Econ 58, 567–581.

CHEN, S., RAVALLION, M., 2004. How Have the World's Poorest Fared since the Early 1980s? World Bank Res Obs 19, 141–169.

CHENG, S.-Y., HOU, H., 2022. Innovation, financial development, and growth: evidences from industrial and emerging countries. Economic Change and Restructuring 55, 1629–1653.

CHIANG, G., LIU, C.-C., LIU, H.-H., 2022. The Threshold Effect of Regulatory Quality on the Relationship between Financial Development and Economic Growth: Evidence from Asian Countries. Advances in Management and Applied Economics 103–119.

CHOUDHURY, A.H., DAS, A., RAHMAN, A., 2017. The Effectiveness of Micro-credit Programmes Focusing on Household Income, Expenditure and Savings: Evidence From Bangladesh. Journal of Competitiveness 9, 34–44.

CHOW, G.C., 1960. Tests of Equality Between Sets of Coefficients in Two Linear Regressions. Econometrica 28, 591.

CHOWDHURY, M.A.F., AKBAR, C.S., SHOYEB, M., 2018. Nexus between risk sharing vs non-risk sharing financing and economic growth of Bangladesh. Managerial Finance 44, 739–758.

ČIHÁK, M., HESSE, H., 2010. Islamic Banks and Financial Stability: An Empirical Analysis. Journal of Financial Services Research 38, 95–113.

ČIHÁK, M., SCHAECK, K., 2010. How well do aggregate prudential ratios identify banking system problems? Journal of Financial Stability 6, 130–144.

COHEN, L., MANION, L., MORRISON, K.R.B., 2007. Research Methods in Education, 6th ed. Routledge, Oxon.

CRAGG, J.G., DONALD, S.G., 1993. Testing Identifiability and Specification in Instrumental Variable Models. Econ Theory 9, 222–240.

CREEL, J., HUBERT, P., LABONDANCE, F., 2015. Financial stability and economic performance. Econ Model 48, 25–40.

CUCINELLI, D., BATTISTA, M.L. DI, MARCHESE, M., NIERI, L., 2018. Credit risk in European banks: The bright side of the internal ratings based approach. J Bank Financ 93, 213–229.

D O'GORMAN, K., MACINTOSH, R., 2015. Research methods for business and management: A guide to writing your dissertation. Goodfellow Publishers Ltd.

DAS, S.K., UPPAL, K., 2021. NPAs and profitability in Indian banks: an empirical analysis. Future Business Journal 7, 53.

DAWSON, P.J., 2010. Financial development and economic growth: a panel approach. Appl Econ Lett 17, 741–745.

DEININGER, K., SQUIRE, L., 1996. A New Data Set Measuring Income Inequality. World Bank Econ Rev 10, 565–591.

DONTHU, N., GUSTAFSSON, A., 2020. Effects of COVID-19 on business and research. J Bus Res 117, 284–289.

DUPREY, T., KLAUS, B., PELTONEN, T., 2017. Dating systemic financial stress episodes in the EU countries. Journal of Financial Stability 32, 30–56.

ERNST, YOUNG, 2016. World Islamic Banking Competitiveness Report 2016. Available online: https://ceif.iba.edu.pk/pdf/EY-WorldIslamicBankingCompetitivenessReport2016.pdf (access on 21 January 2021).

EASTERBY-SMITH, M., RICHARD THORPE, JACKSON, P.R., 2012. Management Research. Sage.

EASTERLY, W., LEVINE, R., 1997. Africa's Growth Tragedy: Policies and Ethnic Divisions. Q J Econ 112, 1203–1250.

EBRAHIM, M.S., SHEIKH, M., 2016. Debt Instruments in Islamic Finance: A Critique. Arab Law Quarterly 30, 185–198.

EL QORCHI, M., 2005. Islamic finance gears up. Finance Dev 42, 46.

EL-GALFY, A., KHIYAR, K.A., 2012. Islamic Banking And Economic Growth: A Review. Journal of Applied Business Research (JABR) 28, 943.

ELLAHI, N., 2011. How development of finance contributes to poverty alleviation and growth: A time series application for Pakistan. African Journal of Business Management 5, 12138–12143.

ELNAHASS, M., TRINH, V.Q., LI, T., 2021. Global banking stability in the shadow of Covid-19 outbreak. Journal of International Financial Markets, Institutions and Money 72, 101322.

ENGLE, R.F., 1984. Chapter 13 Wald, likelihood ratio, and Lagrange multiplier tests in econometrics. pp. 775–826.

ERLANDO, A., RIYANTO, F.D., MASAKAZU, S., 2020. Financial inclusion, economic growth, and poverty alleviation: evidence from eastern Indonesia. Heliyon, 6(10).

FARAHANI, G.Y., DASTAN, M., 2013. Analysis of Islamic banks' financing and economic growth: a panel cointegration approach. International Journal of Islamic and Middle Eastern Finance and Management 6, 156–172.

FARRAR, S., UDDIN, T., 2020. Building Islamic Ethics into Development: Exploring the Role and Limitations of "Islamic" Microfinance in Poverty Alleviation—An Indonesian Case Study. Law and Development Review 13, 371–406.

FATHAN, R., ARUNDINA, T., 2019. Finance-growth nexus: Islamic finance development in Indonesia. International Journal of Islamic and Middle Eastern Finance and Management 12 5, 698-711.

FOGLIA, M., ANGELINI, E., 2020. From me to you: Measuring connectedness between Eurozone financial institutions. Res Int Bus Finance 54, 101238.

FRY, M.J., 1982. Models of financially repressed developing economies. World Dev 10, 731–750.

FURQANI, H., MULYANY, R., 2009. Islamic banking and economic growth: Empirical evidence from Malaysia. Journal of Economic Cooperation & Development 30, 59–74.

GANI, I.M., BAHARI, Z., 2021. Islamic banking's contribution to the Malaysian real economy. ISRA International Journal of Islamic Finance 13, 6–25.

GHIRMAY, T., 2004. Financial Development and Economic Growth in Sub-Saharan African Countries: Evidence from Time Series Analysis. African Development Review 16, 415–432.

GINANJAR, A., KASSIM, S., 2020. Alleviating poverty through Islamic microfinance: factors and measures of financial performance and roles of Islamic values and financial policies. Enhancing Financial Inclusion through Islamic Finance, Volume II, pp.281-296.

GOLDSMITH, R.W., 1969. Financial structure and development. Yale University Press, New Haven.

GRAFF, M., 2003. Financial Development and Economic Growth in Corporatist and Liberal Market Economies. Emerging Markets Finance and Trade 39, 47–69.

GRASSA, R., 2013. Shariah supervisory system in Islamic financial institutions. Humanomics 29, 333–348.

GREENE, W.H., 2003. Econometric Analysis. Pearson Education India.

GREENWOOD, J., SMITH, B.D., 1997. Financial markets in development, and the development of financial markets. J Econ Dyn Control 21, 145–181.

GUIZANI, M., AJMI, A.N., 2021. The capital structure decision of Islamic and conventional banks: empirical evidence from Malaysia. Asia-Pacific Journal of Business Administration 13, 216–234.

GUJARATI, D.N., 2008. Basic Econometrics. Prentice Hall.

GURLEY, J.G., SHAW, E.S., 1955. Financial Aspects of Economic Development. Am Econ Rev 45, 515–538.

HA, N.M., LE, N.D., TRUNG-KIEN, P., 2019. The Impact of Urbanization on Income Inequality: A Study in Vietnam. Journal of Risk and Financial Management 12, 146.

HACHICHA, N., BEN AMAR, A., 2015. Does Islamic bank financing contribute to economic growth? The Malaysian case. International Journal of Islamic and Middle Eastern Finance and Management 8, 349–368.

HANESTI, E.M., HERIANINGRUM, S., SUKMANA, R., 2018. Islamic Financial Development as Efforts to Accelerate Economic Development and Poverty Alleviation. In: Proceedings of the 1st International Conference Postgraduate School Universitas Airlangga : "Implementation of Climate Change Agreement to Meet Sustainable Development Goals" (ICPSUAS 2017). Atlantis Press, Paris, France.

HANIF, M., 2014. Differences and Similarities in Islamic and Conventional Banking. International Journal of Business and Social Sciences 2, 25.

HANIF, M., TARIQ, M., TAHIR, A., MOMENEEN, W.U., 2012. Comparative Performance Study of Conventional and Islamic Banking in Pakistan. International Research Journal of Finance & Economics 83.

HASAN, M., DRIDI, J., 2010. Put to the Test Islamic banks were more resilient than conventional banks during the global financial crisis." 47, no. 4 (2010): 46. Finance Dev 47, 46.

HASSAN, A., 2014. The challenge in poverty alleviation: role of Islamic microfinance and social capital. Humanomics 30, 76–90.

HASSAN, M.K., HUSSEIN, K.A., 2003. Static and dynamic efficiency in the Sudanese banking system. Review of Islamic Economics 14, 5–48.

HASSAN, M.K., KAYED, R.N., 2009. The Global Financial Crisis, Risk Management and Social Justice in Islamic Finance. ISRA International Journal of Islamic Finance 1.

HASSAN, M.K., SANCHEZ, B., YU, J.-S., 2011. Financial development and economic growth: new evidence from panel data. The Quarterly Review of Economics and Finance 51, 88–104.

HAUSMAN, J.A., 1978. Specification Tests in Econometrics. Econometrica 46, 1251.

HAYAKAWA, K., 2007. Small sample bias properties of the system GMM estimator in dynamic panel data models. Econ Lett 95, 32–38.

HERMES, N., LENSINK, R., 2003. Foreign direct investment, financial development and economic growth. Journal of Development Studies 40, 142–163.

HITCHCOCK, E.R., CLOUGH, C.G., HUGHES, R.C., KENNY, B.G., 1989. Transplantation in Parkinson's Disease: Stereotactic Implantation of Adrenal Medulla and Foetal Mesencephalon. Routledge, London, pp. 48–50.

HOLDEN, M.T., LYNCH, P., 2004. Choosing the Appropriate Methodology: Understanding Research Philosophy. The Marketing Review 4, 397–409.

HSIAO, C., 2014. Analysis of Panel Data. Cambridge University Press.

HUNJRA, A.I., TAYACHI, T., CHANI, M.I., VERHOEVEN, P., MEHMOOD, A., 2020. The Moderating Effect of Institutional Quality on the Financial Development and Environmental Quality Nexus. Sustainability 12, 3805.

HUSSEIN, K., 2010. Bank-level stability factors and consumer confidence – A comparative study of Islamic and conventional banks' product mix. Journal of Financial Services Marketing 15, 259–270.

HYE ADNAN, Q.M., ISLAM, F., 2012. DOES FINANCIAL DEVELOPMENT HAMPER ECONOMIC GROWTH: EMPIRICAL EVIDENCE FROM BANGLADESH. Journal of Business Economics and Management 14, 558–582.

IFSB, 2022. Islamic Financial Services Industry Stability Report 2022.

IQBAL, M., MOLYNEUX, P., 2016. Thirty years of Islamic banking: History, performance and prospects. Springer.

IQBAL, Z., MIRAKHOR, A., 2011. An introduction to Islamic finance: Theory and practice. John Wiley & Sons.

ISLAM, J.U., RAHMAN, Z., 2017. Awareness and willingness towards Islamic banking among Muslims: An Indian perspective. International Journal of Islamic and Middle Eastern Finance and Management 10, 92–101.

IWASHYNA, T.J., KENNEDY, E.H., 2013. Instrumental Variable Analyses. Exploiting Natural Randomness to Understand Causal Mechanisms. Ann Am Thorac Soc 10, 255–260.

JARQUE, C.M., BERA, A.K., 1980. Efficient tests for normality, homoscedasticity and serial independence of regression residuals. Economics letters, 6(3), pp.255-259.

JOHANSEN, S., JUSELIUS, K., 1990. Maximum likelihood estimation and inference on cointegration—with application to the demand for money. Oxf Bull Econ Stat 52, 169–210.

JUNG, W.S., 1986. Financial Development and Economic Growth: International Evidence. Econ Dev Cult Change 34, 333–346.

KAPUR, B.K., 1976. Alternative Stabilization Policies for Less-developed Economies. https://doi.org/10.1086/260476 84, 777–795.

KEYNES, J.M., 1936. The Supply of Gold. The Economic Journal 46, 412.

KHAKI, A.R., SANGMI, M.-U.-D., 2011. Islamic Banking: Concept and Methodology. SSRN Electronic Journal.

KHALED, S.A., KHANDKER, W.A., 2015. Profit-Loss Sharing Contract Formation Under Zero Interest Financial System. Journal of King Abdulaziz University: Islamic Economics 28.

KHAN, H., KHAN, S., ZUOJUN, F., 2022. Institutional Quality and Financial Development: Evidence from Developing and Emerging Economies. Global Business Review 23, 971–983.

KHAN, M.S., SSNAHDJI, A.S., 2001. Threshold Effects in the Relationship between Inflation and Growth. IMF Staff Papers 48, 1–21.

KIM, S., MEHROTRA, A., 2017. Managing price and financial stability objectives in inflation targeting economies in Asia and the Pacific. Journal of Financial Stability 29, 106–116.

KING, R.G., LEVINE, R., 1993. Finance and Growth: Schumpeter Might Be Right. Q J Econ 108, 717–737.

LAGHARI, F., CHENGANG, Y., 2019. Investment in working capital and financial constraints. International Journal of Managerial Finance 15, 164–190.

LANCASTER, G., 2007. Research Methods in Management. Routledge.

LAW, S.H., SINGH, N., 2014. Does too much finance harm economic growth? J Bank Financ 41, 36–44.

LEBDAOUI, H., WILD, J., 2016. Islamic banking presence and economic growth in Southeast Asia. International Journal of Islamic and Middle Eastern Finance and Management 9, 551–569.

LECHNER, M., 2010. The Estimation of Causal Effects by Difference-in-Difference MethodsEstimation of Spatial Panels. Foundations and Trends® in Econometrics 4, 165–224.

LEDHEM, M.A., MEKIDICHE, M., 2022. Islamic finance and economic growth: the Turkish experiment. ISRA International Journal of Islamic Finance 14.

LEHNERT, T., 2019. Islamic Finance and Economic Growth: New Evidence. In: The 9th International Conference on Economics. University of Luxembourg.

LESZCZENSKY, L., WOLBRING, T., 2022. How to Deal With Reverse Causality Using Panel Data? Recommendations for Researchers Based on a Simulation Study. Sociol Methods Res 51, 837–865.

LEWIS, M.K., ALGAOUD, L.M., 2001. Islamic Banking. Edward Elgar Publishing.

LUCAS, R., 1988. On the mechanics of economic development . Journal of Monetary Economics 22, 3–42.

MAJID, M.S.ABD., DEWI, S., ALIASUDDIN, KASSIM, S.H., 2019. Does Financial Development Reduce Poverty? Empirical Evidence from Indonesia. Journal of the Knowledge Economy 10, 1019–1036.

MAJID, M.S.ABD., KASSIM, S.H., 2015. Assessing the contribution of Islamic finance to economic growth. Journal of Islamic Accounting and Business Research 6, 292–310.

MANU, L.P., ADJASI, C.K.D., ABOR, J., HARVEY, S.K., 2011. Financial stability and economic growth: a cross-country study. International Journal of Financial Services Management 5, 121.

MASOOD, O., ASHRAF, M., 2012. Bank-specific and macroeconomic profitability determinants of Islamic banks. Qualitative Research in Financial Markets 4, 255–268.

MASRIZAL, M., TRIANTO, B., 2022. THE ROLE OF PLS FINANCING ON ECONOMIC GROWTH: INDONESIAN CASE. Journal of Islamic Monetary Economics and Finance 8.

MATHIESON, D.J., 1980. Financial reform and stabilization policy in a developing economy. J Dev Econ 7, 359–395.

MCKENZIE, D., 2010. IFSL Research: Islamic Finance 2010. London.

MCKINNON, R.I., 1973. Money and Capital in economic development. Brookings Institution, Washington DC.

MENEGAKI, A.N., 2019. The ARDL Method in the Energy-Growth Nexus Field; Best Implementation Strategies. Economies 7, 105.

MENSI, W., HAMMOUDEH, S., TIWARI, A.K., AL-YAHYAEE, K.H., 2020. Impact of Islamic banking development and major macroeconomic variables on economic growth for Islamic countries: Evidence from panel smooth transition models. Economic Systems 44, 100739.

MIRZA, Z., MUNIR, D., 2023. Conflicting interests, institutional fragmentation and opportunity structures: an analysis of political institutions and the health taxes regime in Pakistan. BMJ Glob Health 8, e012045.

MISATI, R.N., NYAMONGO, E.M., 2012. Financial liberalization, financial fragility and economic growth in Sub-Saharan Africa. Journal of Financial Stability 8, 150–160.

MIZEN, P., 2008. The Credit Crunch of 2007-2008: A Discussion of the Background, Market Reactions, and Policy Responses.

MOHSENI-CHERAGHLOU, A., 2017. Financial Inclusion and Poverty Alleviation in Muslim-majority Countries: The Role of Islamic Finance and Qard Hassan. In: Financial Inclusion and Poverty Alleviation. Springer International Publishing, Cham, pp. 141–197.

MUSA, H., MUSOVA, Z., NATORIN, V., LAZAROIU, G., MARTIN BODA, M., 2021. Comparison of factors influencing liquidity of European Islamic and conventional banks. Oeconomia Copernicana 12, 375–398.

MUSAMALI, R.A., NYAMONGO, E.M., MOYI, E.D., 2014. The Relationship between Financial Development and Economic Growth in Africa. Research in Applied Economics 6, 190.

NARAYAN, P.K., 2005. The saving and investment nexus for China: evidence from cointegration tests. Appl Econ 37, 1979–1990.

NARAYAN, P.K., PHAN, D.H.B., 2019. A survey of Islamic banking and finance literature: Issues, challenges and future directions. Pacific-Basin Finance Journal 53, 484–496.

NAVEED, S., KHURSHID, M., AZEEM, M., 2020. A Gender based Analysis of Awareness Level and Willingness regarding Islamic Banking Products and Services: An Evidence from Pakistan. Journal of Islamic Thought and Civilization 10, 182–196.

NAZ, S.A., GULZAR, S., 2022. IMPACT OF ISLAMIC FINANCE ON ECONOMIC GROWTH: AN EMPIRICAL ANALYSIS OF MUSLIM COUNTRIES. The Singapore Economic Review 67, 245–265.

NEAIME, S., GAYSSET, I., 2018. Financial inclusion and stability in MENA: Evidence from poverty and inequality. Financ Res Lett 24, 230–237.

NOGUEIRA, M.C., MADALENO, M., 2021. Are International Indices Good Predictors of Economic Growth? Panel Data and Cluster Analysis for European Union Countries. Sustainability 13, 6003.

NOSHEEN, RASHID, A., 2021. Financial soundness of single versus dual banking system: explaining the role of Islamic banks. Portuguese Economic Journal 20, 99–127.

OBAIDULLAH, M., 2008. Role of Microfinance in Poverty Alleviation: Lessons from Experiences in Selected IDB Member Countries. Islamic Development Bank 92.

O'BRIEN, R.M., 2007. A Caution Regarding Rules of Thumb for Variance Inflation Factors. Qual Quant 41, 673–690.

ODHIAMBO, N.M., 2008. Financial depth, savings and economic growth in Kenya: A dynamic causal linkage. Econ Model 25, 704–713.

OMAR, A., ABDUH, M., SUKMANA, R., 2013. Fundamentals of Islamic money and capital markets. John Wiley & Sons.

OMOREGIE, O.K., IKPESU, F., 2017. Dynamic interaction between savings, investment and economic growth in Nigeria: A Vector autoregressive (VAR) approach. The Journal of Developing Areas 51, 267–280.

ONWUMERE, J.U.J., OKORE, O.A., IBE, I.G., 2012. The Impact of Interest Rate Liberalization on Savings and Investment: Evidence from Nigeria. Research Journal of Finance and Accounting www.iiste.org ISSN 3.

OUERGHI, F., 2014. Are Islamic Banks More Resilient To Global Financial Crisis Than Conventional Banks? Asian Economic and Financial Review 4, 941–955.

PAPPAS, V., ONGENA, S., IZZELDIN, M., FUERTES, A.-M., 2017. A Survival Analysis of Islamic and Conventional Banks. Journal of Financial Services Research 51, 221–256.

PAREWANGI, A.M.A., ISKANDAR, A., 2020. The nexus of Islamic finance and poverty. Hitotsubashi Journal of Economics 61, 111–139.

PARSA, M., 2022. Efficiency and stability of Islamic vs. conventional banking models: a meta frontier analysis. Journal of Sustainable Finance & Investment 12, 849–869.

PATRICK, H.T., 1966. Financial Development and Economic Growth in Underdeveloped Countries. Econ Dev Cult Change 14, 174–189.

PESARAN, M.H., SHIN, Y., SMITH, R.J., 2001. Bounds testing approaches to the analysis of level relationships. Journal of Applied Econometrics 16, 289–326.

POWER, M., 2007. Organized uncertainty: Designing a world of risk management. Oxford University Press, USA.

PRABAKARAN, PREMKUMAR, 2019. Islamic banking fundamentals and contemporary trends. International Journal of Research and Analytical Reviews 6.

PRATAMA, A.P., DISEMADI, H.S., PRANANINGTYAS, P., 2019. Existence And Position Of Islamic Economic Laws In Indonesia. Legality: Jurnal Ilmiah Hukum 27, 222–231.

RAFAY, A., FARID, S., 2017. Dynamic Relationship between Islamic Banking System and Real Economic Activity: Evidence from Pakistan. JKAU: Islamic Econ 30, 97–116.

RAHMAN, M.M., AHMAD, F., 2010. Impact of microfinance of IBBL on the rural poor's livelihood in Bangladesh: an empirical study. International Journal of Islamic and Middle Eastern Finance and Management 3, 168–190.

RAMADHAN, A.A., JIAN, Z.H., HENRY, K.K., PACIFIC, Y.K.T., 2016. Does Political Stability Accelerate Economic Growth in Tanzania? A Time Series Analysis. Global Business Review 17, 1026–1036.

RAMSEY, J.B., 1969. Tests for specification errors in classical linear least-squares regression analysis. Journal of the Royal Statistical Society Series B: Statistical Methodology, 31(2), pp.350-371.

REHMAN, A., SABA, I., KOUSAR, R., 2019. Does Financial & Social Development are Important for Economic Growth? An International Scenario. Journal of Business and Social Review in Emerging Economies 5, 315–322.

REWILAK, J., 2018. The Impact of Financial Crises on the Poor. J Int Dev 30, 3–19.

RIBAJ, A., MEXHUANI, F., 2021. The impact of savings on economic growth in a developing country (the case of Kosovo). J Innov Entrep 10, 1.

RİWAJANTİ, N.İ., 2013. Islamic Microfinance as an Alternative for Poverty Alleviation: A Survey. Afro Eurasian Studies 2 1, 254–271.

ROBINSON, J., 1952. The model of an expanding economy. The Economic Journal 62, 42–53.

SALEEM, A., SÁGI, J., BÁRCZI, J., 2021. Modes of Islamic financing and aggregate economic output: evidence from Islamic banking industry of Pakistan. Economic Annals-XXI 190, 109–118.

SALEEM, A., ASHAQUE, M., 2020. An Analysis of Profitability Determinants of Islamic Banks: Empirical Study of Malaysia Vs Pakistan. International Journal of Business Reflections 1 2, 142–163.

SALTARELLI, F., CIMINI, V., TACCHELLA, A., ZACCARIA, A., CRISTELLI, M., 2020. Is Export a Probe for Domestic Production? Front Phys 8.

SAMAD, A., 2013. Performance of interest-free Islamic banks vis-à-vis interest-based conventional banks of Bahrain. International Journal of Economics, Management and Accounting 12.

SAMAD, A., HASSAN, M.K., 2006. The Performance of Malaysian Islamic Bank During 1984–1997: An Exploratory Study. International Journal of Islamic Financial Services 1.

SAMARGANDI, N., FIDRMUC, J., GHOSH, S., 2014. Financial development and economic growth in an oil-rich economy: The case of Saudi Arabia. Econ Model 43, 267–278.

SANKARAN, A., KRISHNA, A., VADIVEL, A., 2021. How does manufacturing output affect export behaviors in emerging market economies? Evidence from a dynamic panel ARDL for ten biggest emerging market economies. Future Business Journal 7, 26.

SARGAN, J.D., 1958. The estimation of economic relationships using instrumental variables. Econometrica: Journal of the econometric society 26(3), pp.393-415.

SAUNDERS, M.N.K., LEWIS, P., THORNHILL, A., 2007. Research Methods for Business Students.

SCHUMPETER, J., 1912. Theorie der Wirtschaftlichen Entwicklung. The theory of economic development. Dunker & Humblot.

SCHUMPETER, J.A., 1934. The Theory of Economic Development: An Inquiry into Profits, Capital, Credit, Interest, and the Business Cycle. Translated by R Opie. ed. Harvard University Press, Cambridge.

SCOTT, C., 2021. Causal inference: The Mixtape. Yale University Press.

SEHRAWAT, M., GIRI, A.K., 2014. The relationship between financial development indicators and human development in India. Int J Soc Econ 41, 1194–1208.

SEKARAN, U., BOUGIE, R., 2016. Research methods for business: A skill building approach. John wiley & sons.

SHABAN, M., DUYGUN, M., ANWAR, M., AKBAR, B., 2014. Diversification and banks' willingness to lend to small businesses: Evidence from Islamic and conventional banks in Indonesia. J Econ Behav Organ 103, S39–S55.

SHAH, S.M.A.R., RAZA, K., SHAHERBANO, 2020. The Role of Islamic Finance in Achieving Economic Growth: An Econometric Analysis of Pakistan. Palgrave Macmillan, pp. 241–258.

SHAMSUDIN, M.Y., SALAMON, H., ABU-HUSSIN, M.F., MUHAMAD, N.H.N., 2015. Islamic Banking and Finance: Traders not Mere Financial Intermediary. Mediterr J Soc Sci 6.

SHAUKAT, B., ZHU, Q., 2021. Finance and growth: Particular role of Zakat to levitate development in transition economies. International Journal of Finance & Economics 26, 998–1017.

SHAW, E.S., 1973. Financial deepening in economic development. Oxford University Press, New York.

SHIRAZI, N.S., 2014. Integrating zakat and waqf into the poverty reduction strategy of the IDB member countries. Islamic Economic Studies 130, 1–30.

SHRESTHA, M.B., BHATTA, G.R., 2018. Selecting appropriate methodological framework for time series data analysis. The Journal of Finance and Data Science, 4(2), pp.71-89.

SIDDIQI, M.N., 2011. Islamization of knowledge: Reflections on priorities. American Journal of Islam and Society 28, 15–34.

SIDDIQUE, M.A., HAQ, M., RAHIM, M., 2020. The impact of the Islamic banking industry on economic growth and poverty reduction in Pakistan. Enhancing Financial Inclusion through Islamic Finance, Volume II, pp.259-279.

SKARE, M., PORADA-ROCHOŃ, M., 2019. Financial and economic development link in transitional economies: a spectral Granger causality analysis 1991?2017. Oeconomia Copernicana 10, 7–35.

SOEDARMONO, W., HASAN, I., ARSYAD, N., 2017. Non-linearity in the finance-growth nexus: Evidence from Indonesia. International Economics 150, 19–35.

SOLT, F., 2016. The Standardized World Income Inequality Database. Soc Sci Q 97, 1267–1281.

STIGLITZ, J.E., 1993. The role of the state in financial markets. The world bank economic review, 7, pp.19-52.

STOCK, J., YOGO, M., 2005. Asymptotic distributions of instrumental variables statistics with many instruments. In: Identification and Inference for Econometric Models: Essays in Honor of Thomas Rothenberg. pp. 109–120.

SURI, V., CHAPMAN, D., 1998. Economic growth, trade and energy: implications for the environmental Kuznets curve. Ecological Economics 25, 195–208.

SUYANTO, S., 2021. The Effect of Bad Credit and Liquidity on Bank Performance in Indonesia. The Journal of Asian Finance, Economics and Business 8, 451–458.

SWAMY, V., DHARANI, M., 2021. Thresholds in finance–growth nexus: Evidence from G-7 economies. Aust Econ Pap 60, 1–40.

TABASH, M.I., 2019. An empirical investigation on the relation between disclosure and financial performance of Islamic banks in the United Arab Emirates. Journal of Asian Finance, Economics and Business 6, 27–35.

TABASH, M.I., DHANKAR, R.S., 2014. Islamic finance and economic growth: An empirical evidence from United Arab Emirates (UAE). Journal of Emerging Issues in Economics, Finance and Banking 3, 1069–1085.

TANG, S., SELVANATHAN, E.A., SELVANATHAN, S., 2008. Foreign Direct Investment, Domestic Investment and Economic Growth in China: A Time Series Analysis. World Econ 31, 1292–1309.

THORNTON, J., DI TOMMASO, C., 2021. The effect of non-performing loans on credit expansion: Do capital and profitability matter? Evidence from European banks. International Journal of Finance & Economics 26, 4822–4839.

UDDIN, G.S., SHAHBAZ, M., AROURI, M., TEULON, F., 2014. Financial development and poverty reduction nexus: A cointegration and causality analysis in Bangladesh. Econ Model 36, 405–412.

USMANI, M.T., 1998. An introduction to Islamic finance. Maktab Ma'riful Quran., Karachi.

USMANI, M.T., 2007. Historic judgment on interest. Maktaba Ma'ariful Quran, Karachi.

UNDP., 2022. The 2022 human development report–"Uncertain times, unsettled lives Shaping our future in a transforming world".

VARGA, J., 2017. Az iszlám bankrendszer működése = The Functioning of the Islamic Banking System. POLGÁRI SZEMLE: GAZDASÁGI ÉS TÁRSADALMI FOLYÓIRAT, *13*(1-3), pp.295-306

VARGA, J. and CSEH, B., 2018. The operation of Islamic banks on the basis of an EU example= Az iszlám bankok működése egy EU-s példa alapján. Köztes-Európa, *10*(1), pp.125-133.

VARGA, J., TEMUULEN, E., BAREITH, T., 2019. An empirical analysis of the relationship between economic growth and credit volumes in Hungary. Public Finance Quarterly-Pénzügyi Szemle, 64(4), 455–470.

WHITEHEAD, A.N., 2006. The Concept of Nature. Courier Corporation.

WIERSMA, W., JURS, S., 2009. Research methods in education: An introduction, 9th ed. Financial Times Prentice Hall, London.

WILSON, R., 1983. Banking and Finance in the Arab Middle East. St. Martin's Press, New York.

YÜKSEL, S., CANÖZ, İ., 2017. Does Islamic Banking Contribute to Economic Growth and Industrial Development in Turkey? IKONOMIKA 2.

YUSOF, R.MOHD., BAHLOUS, M., 2013. Islamic banking and economic growth in GCC & East Asia countries. Journal of Islamic Accounting and Business Research 4, 151–172.

ZARROUK, H., EL GHAK, T., ABU AL HAIJA, E., 2017. Financial development, Islamic finance and economic growth: evidence of the UAE. Journal of Islamic Accounting and Business Research 8, 2–22.

ZHANG, P., ZHANG, M., ZHOU, Q., ZAIDI, S.A.H., 2022. The Relationship Among Financial Inclusion, Non-Performing Loans, and Economic Growth: Insights From OECD Countries. Front Psychol 13.

ZIKMUND, W.G., BABIN, B.J., CARR, J.C., GRIFFIN, M., 2013. Business research methods. Cengage Learning.

8.2 A2 - Further Appendix

8.2.1 Tables

Table A-1: Granger causality for Islamic financial depth

Pairwise Granger causality test

			F statistics	Prob	Direction		
IFD	→	GDP	17.025	0.000	IFD	→	GDP
GDP	→	IFD	2.379	0.102			
IFI	→	GDP	1.829	0.170	GDP	→	IFI
GDP	→	IFI	3.607	0.034			
NPA	→	GDP	3.260	0.046	NPA	→	GDP
GDP	→	NPA	0.208	0.813			
INF	→	GDP	5.970	0.004	INF	→	GDP
GDP	→	INF	7.768	0.001			
IR	→	GDP	1.599	0.212	IR	---	GDP
GDP	→	IR	0.240	0.787			
IFI	→	IFD	0.484	0.619	IFI	---	IFD
IFD	→	IFI	0.907	0.410			
NPA	→	IFD	0.778	0.464	NPA	---	IFD
IFD	→	NPA	0.307	0.737			
INF	→	IFD	2.076	0.136	IFD	→	INF
IFD	→	INF	10.759	0.000			
IR	→	IFD	6.461	0.003	IR	→	IFD
IFD	→	IR	0.629	0.537			
NPA	→	IFI	1.642	0.203	NPA	---	IFI
IFI	→	NPA	1.067	0.351			
INF	→	IFI	1.134	0.329	IFI	→	INF
IFI	→	INF	3.194	0.049			
IR	→	IFI	1.545	0.223	IR	---	INF
IFI	→	IR	0.403	0.671			
INF	→	NPA	1.071	0.349	INF	---	NPA
NPA	→	INF	1.046	0.359			
IR	→	NPA	8.709	0.001	IR	→	NPA
NPA	→	IR	0.188	0.829			
IR	→	INF	2.748	0.073	INF	→	IR
INF	→	IR	3.338	0.043			

Table A-2: Granger causality for Conventional financial depth

Pairwise Granger causality test

			F statistics	Prob			
CFD	→	GDP	4.052	0.023	CFD	→	GDP
GDP	→	CFD	2.733	0.074			
CFI	→	GDP	6.103	0.004	GDP	⇌	CFI
GDP	→	CFI	10.484	0.000			
NPL	→	GDP	1.516	0.229	NPL	---	GDP
GDP	→	NPL	1.582	0.215			

			Stat	p-value			
INF	→	GDP	5.970	0.005	INF	⇌	GDP
GDP	→	INF	7.768	0.001			
IR	→	GDP	1.599	0.212	IR	---	GDP
GDP	→	IR	0.240	0.787			
CFI	→	CFD	0.528	0.593	CFI	---	CFD
CFD	→	CFI	1.646	0.203			
NPL	→	CFD	3.586	0.035	NPL	→	CFD
CFD	→	NPL	2.592	0.084			
INF	→	CFD	0.161	0.852	INF	→	CFD
CFD	→	INF	8.239	0.001			
IR	→	CFD	3.640	0.033	IR	→	CFD
CFD	→	IR	0.433	0.651			
NPL	→	CFI	0.272	0.763	NPL	---	CFI
CFI	→	NPL	1.001	0.375			
INF	→	CFI	3.405	0.041	INF	→	CFI
CFI	→	INF	2.661	0.079			
IR	→	INF	0.648	0.527	IR	---	INF
INF	→	IR	1.026	0.366			
INF	→	NPL	1.537	0.225	INF	---	NPL
NPL	→	INF	0.381	0.685			
IR	→	NPL	7.256	0.001	IR	→	NPL
NPL	→	IR	1.758	0.182			
IR	→	INF	2.748	0.073	INF	→	IR
INF	→	IR	3.338	0.043			

Table A-3: Countries weights for synthetic – Pakistan (controlling Political instability and regulatory quality

Countries	Unit weight	Countries	Unit weight
Albania	0	Italy	0.211
Argentina	0	Jamaica	0.143
Armenia	0	Latvia	0
Austria	0	Lithuania	0
Barbados	0	Madagascar	0
Belarus	0.014	Mexico	0.105
Belgium	0	Moldova	0.052
Bhutan	0	Mongolia	0
Brazil	0	Myanmar	0.08
Bulgaria	0	Montenegro	0
Cameroon	0.011	Nepal	0
Colombia	0	Norway	0
Croatia	0	Panama	0
Czechia	0	Paraguay	0
Denmark	0	Peru	0
Dominica	0	Portugal	0
Ecuador	0	Philippines	0
Estonia	0	Romania	0
Finland	0	Slovak Republic	0.217
France	0	Slovenia	0
Ethiopia	0	Spain	0
Greece	0	Sweden	0

Hungary	0	Uruguay	0
Iceland	0	Vietnam	0
India	0.167	Zimbabwe	0
Israel	0	-	-
Total Weight	1.00	**RMSPE**	0.008735

Table A-4: Outcome variable balance

Predictors	Treated	Synthetic
gdp(1990)	25.32378	25.336
gdp(1991)	25.37315	25.3699
gdp(1992)	25.44739	25.43424
gdp(1994)	25.5015	25.50766
gdp(1995)	25.54994	25.542
gdp(1997)	25.60736	25.61611
gdp(1998)	25.63254	25.64309
gdp(1999)	25.66849	25.67045
gdp(2000)	25.71021	25.70507
gdp(2002)	25.76991	25.7721
cre_fi(1990)	24.15733	24.08859
cre_fi(1993)	24.39505	23.84918
cre_fi(1995)	24.20712	24.90751
cre_fi(1997)	24.64622	27.92427
cre_fi(1998)	25.11394	28.26009
cre_fi(1999)	25.47432	28.92008
cre_fi(2000)	20.13964	32.4828
cre_fi(2002)	19.61297	32.16625
Open*	35.78575	57.88868
GFCF*	18.77133	20.1645
GFCF(1993)	20.71728	19.41384
Inf*	8.722729	15.05161
FDI*	0.804176	1.926178
FDI(1991)	0.566384	1.584668
M3*	42.71529	48.49773
PS(1996(1)2002)	-1.19288	0.075894
RQ(1996(1)2002)	-0.64176	0.094418

*Represents the mean value of whole pre-adoption period i.e., 1990-2002

Table A-5: Post- and Pre- Root mean square prediction errors

Unit ID	Country name	Pre-RMSPE	Post-RMSPE	Post/Pre-Ratio
1	Albania	0.072985	0.386713	5.298537
2	Argentina	0.063186	0.053313	0.843747
3	Armenia	0.169916	0.171023	1.00652
4	Austria	0.025496	0.021408	0.839675
5	Barbados	0.027076	0.4977	18.38182

6	Belarus	0.097055	0.175396	1.807179
7	Belgium	0.004249	0.05527	13.00843
8	Bhutan	0.218139	0.612168	2.806324
9	Brazil	0.018211	0.114056	6.262924
10	Bulgaria	0.072056	0.16792	2.33042
11	Cameroon	0.025976	0.185513	7.141709
12	Colombia	0.009106	0.105153	11.54736
13	Croatia	0.033891	0.233503	6.889763
14	Czechia	0.016584	0.033093	1.995472
15	Denmark	0.005133	0.16619	32.37555
16	Dominica	0.349327	1.166244	3.338549
17	Ecuador	0.027741	0.05513	1.987303
18	Estonia	0.024072	0.193575	8.041406
19	Finland	0.03341	0.218108	6.528319
20	France	0.082132	0.240868	2.932676
21	Ethiopia	0.045047	0.49922	11.08227
22	Greece	0.024803	0.343944	13.86703
23	Hungary	0.021573	0.203921	9.452833
24	Iceland	0.029033	0.041247	1.420677
25	India	0.07848	0.554574	7.066392
26	Israel	0.01851	0.099282	5.363593
27	Italy	0.018007	0.172528	9.581328
28	Jamaica	0.049793	0.445028	8.93751
29	Latvia	0.062985	0.143553	2.279176
30	Lithuania	0.039556	0.075663	1.912799
31	Madagascar	0.046228	0.161036	3.483506
32	Mexico	0.036764	0.165	4.488036
33	Moldova	0.078788	0.077262	0.980626
34	Mongolia	0.020905	0.284936	13.6301
35	Myanmar	0.050034	0.497491	9.943094
36	Montenegro	0.093207	0.328459	3.523993
37	Nepal	0.01094	0.105662	9.657943
38	Norway	0.028967	0.071866	2.480938
39	**Pakistan**	0.007117	0.199386	28.0154
40	Panama	0.015174	0.265282	17.48303
41	Paraguay	0.027524	0.157654	5.727957
42	Peru	0.048727	0.117771	2.416954
43	Portugal	0.027934	0.266726	9.548366
44	Philippines	0.026053	0.129372	4.965708
45	Romania	0.031998	0.101027	3.157262
46	Slovak Republic	0.037363	0.021125	0.565396
47	Slovenia	0.022755	0.084614	3.718426
48	Spain	0.028194	0.0584	2.07132
49	Sweden	0.025339	0.025756	1.016486
50	Uruguay	0.023121	0.063787	2.75887
51	Vietnam	0.027109	0.147523	5.441785
52	Zimbabwe	0.033428	0.660182	19.74955

8.2.2 Figures
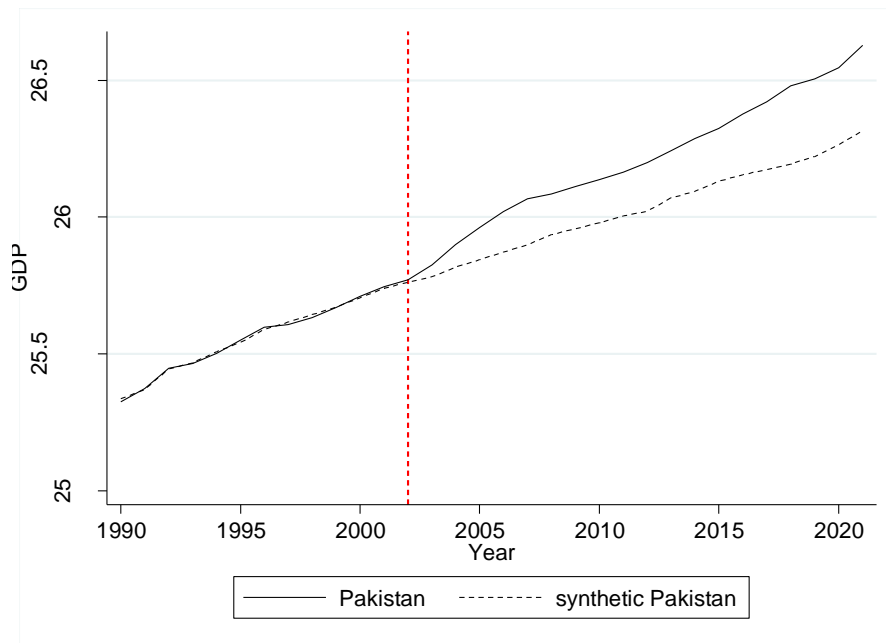
Figure A-1 – Synthetic control group results of economic growth (additional covariates)
Source: Authors' calculations using Stata 14.2
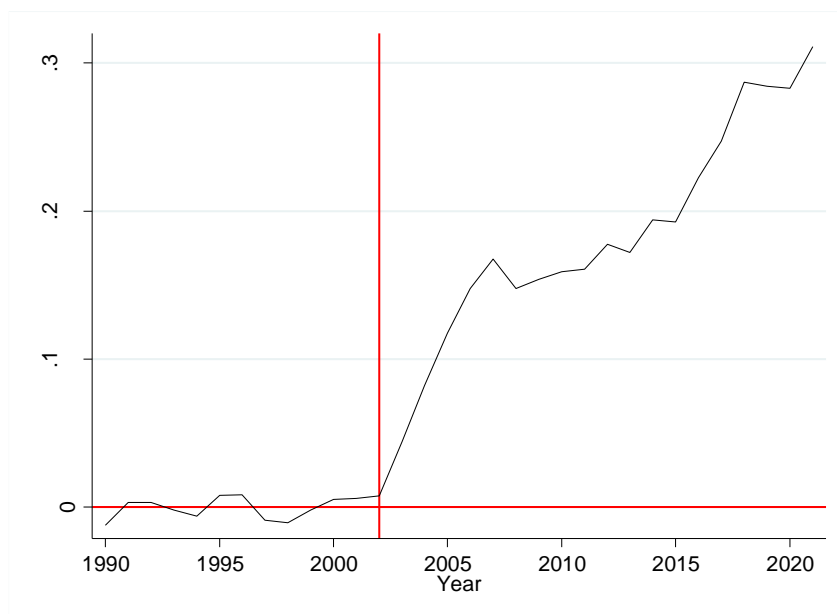
Figure A-2 – Gap between GDP of Pakistan and synthetic Pakistan (additional covariates)
Source: Authors' calculations using Stata 14.2
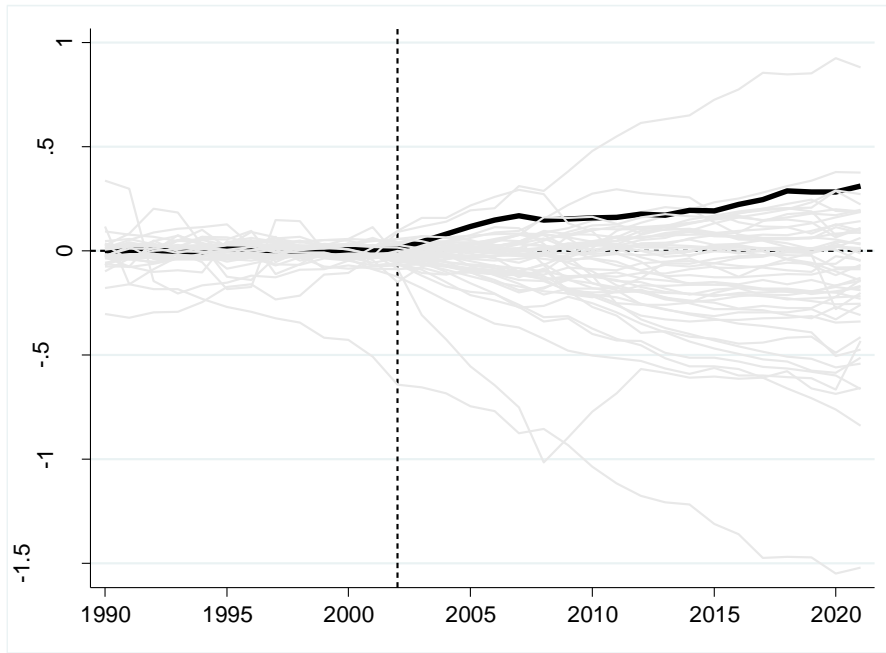
Figure A-3 – Placebo tests taking each country from the donor pool as treated unit (additional covariates)
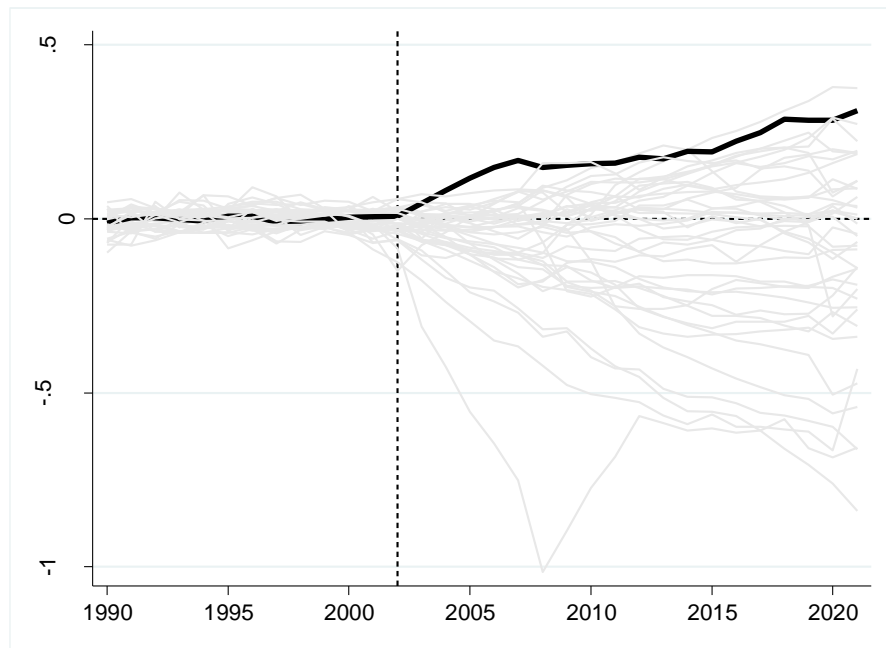Source: Authors' calculations using Stata 14.2

Figure A-4 – Placebo tests after removing the outliers (additional covariates)
Source: Authors' calculations using Stata 14.2
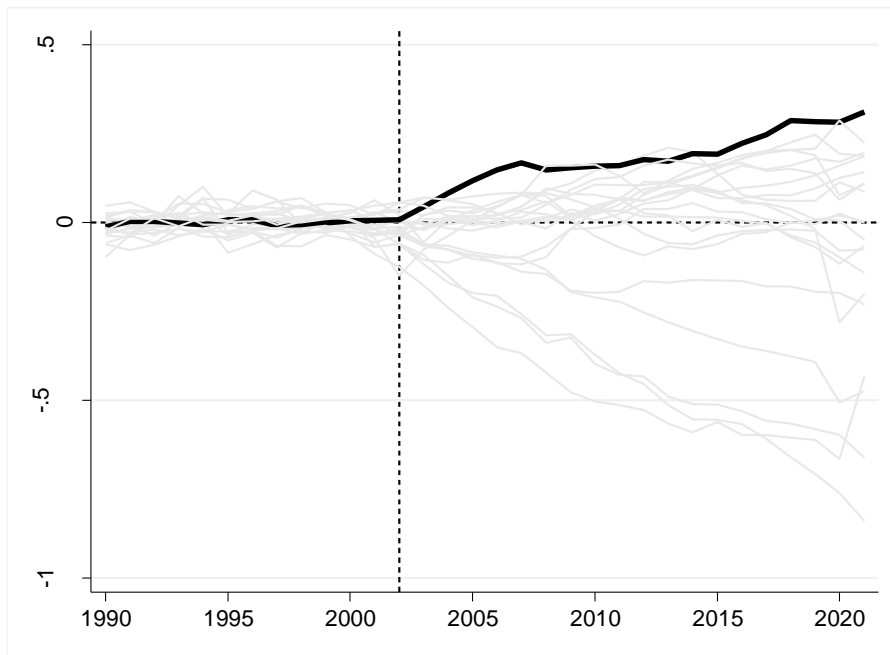
Figure A-5 – Placebo tests after removing the countries with lowest IFDI index (additional covariates)
Source: Authors' calculations using Stata 14.2
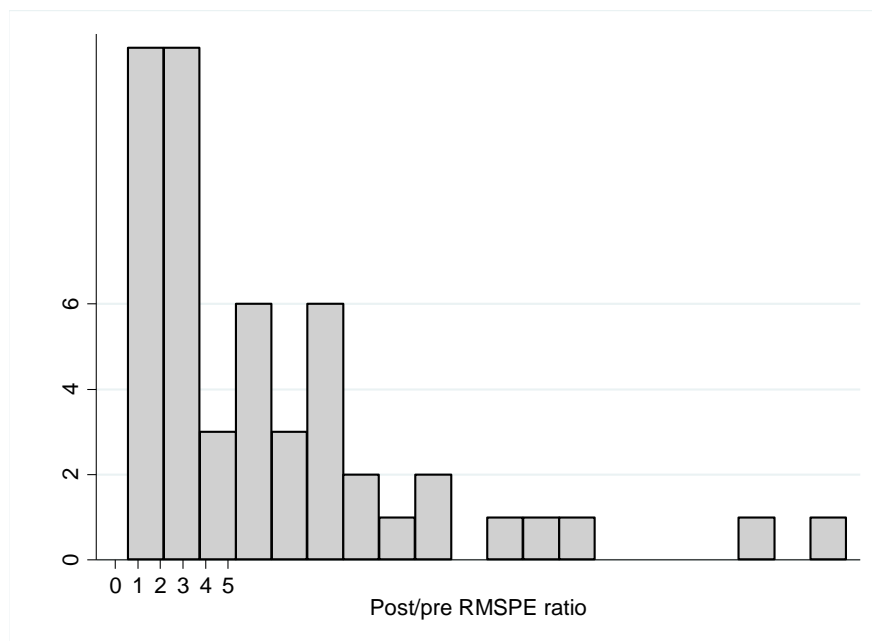
Figure A-6 – Frequency distribution of Post/Pre-RMSPE ratio
Source: Authors' calculations using Stata 14.2

ACKNOWLEDGEMENT