

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

DOI: 10.54598/005210

**Hungarian University of Agriculture and Life Sciences**

**Doctoral School of Economic and Regional Sciences**



**Thesis of the PhD 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 PhD School concerned.)***

## Table of Contents

1	INTRODUCTION .....	1
1.1	Introduction of Islamic financial system .....	2
1.2	Statement of the Problem and Research Objectives .....	4
1.3	Research hypotheses .....	5
1.4	Significance of the study .....	5
2	MATERIAL AND METHODOLOGY .....	6
2.1	Research methods .....	6
2.2	Materials and econometric methods .....	6
2.2.1	Section I: Islamic financial depth and economic growth .....	7
2.2.2	Section II: PLS vs non-PLS financings and real economic output .....	8
2.2.3	Section III & IV: Differential impact of adoption of Islamic banking on economic growth and poverty alleviation .....	11
3	RESULTS AND DISCUSSION .....	18
3.1	Section I - Islamic financial depth and economic growth .....	18
3.1.1	Model specification and Bounds testing .....	18
3.1.2	Robustness check (Section I) .....	24
3.2	Section II - Decomposed Islamic financings and its Impact on economic output.....	25
3.2.1	Regression results.....	25
3.2.2	Robustness check (Section II) .....	30
3.3	Section III - Differential impact of adoption of Islamic finance ....	31
3.3.1	Synthetic control results on economic growth .....	31
3.3.2	Robustness check (Section III).....	39
3.4	Section IV - Differential impact of Islamic finance on poverty alleviation .....	42
3.4.1	Synthetic control results for poverty alleviation .....	43
3.4.2	Robustness check (Section IV).....	48

3.5	Summary of hypothesis acceptance and rejection .....	49
4	CONCLUSION, POLICY IMPLICATION, AND LIMITATION .....	50
4.1	Key findings.....	50
4.2	Policy Implication.....	52
4.3	Limitation of the study.....	52
5	NEW SCIENTIFIC RESULTS.....	53
5.1	Influence of Islamic financial depth on economic growth .....	53
5.2	Role of PLS and non-PLS financing .....	54
5.3	Incremental impact on economic growth with Islamic banking:....	54
5.4	Living standards and Poverty alleviation: .....	54
6	REFERENCES.....	55
7	LIST OF PUBLICATIONS .....	61

## **1 INTRODUCTION**

The instigation of Islamic finance in late nineteenth century has opened a new paradigm in the financial world. The idea of Islamic banking system was first coined in late 1950s (WILSON, 1983). However, the experimental model was seen in 1963 in Egypt founded by Ahmed El Najjar. The operating model was based on investment bank working on profit and loss sharing (PLS) model (ARIFF, 1988). The second phase of Islamic banking development started in 1974 with the founding of global regulatory body Islamic development bank (IDB) by the Organisation of Islamic countries (OIC) (ABDEL-HAQ, 1989). The wave of Islamic finance was not limited to south East Asia, Middle East but also extended to developed economies including US, UK and Europe, starting its journey from one bank in 1970 to 300 banks in first decade of 21st century (EL QORCHI, 2005). The first landmark of Islamic finance in European region was witnessed in Luxembourg with the foundation of Islamic Finance House in 1978 (ARIFF, 1988). Although, the concept of Islamic financial system was initiated in South Asia and Arab countries in 20<sup>th</sup> century but the question on its stability and efficiency was of great importance. Therefore, it is worth noting that the overall progress of financial and economic progress of an economy is largely dependent on stability, soundness, and efficiency of 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 banking sector to withstand and endure the external shocks, crisis, or stress is reflected in financial system (HUSSEIN, 2010). In past two decades, the world experienced two major economic setbacks caused by credit crunch 2007-09 and COVID-19 in 2020 and the Islamic financial sector played exceptionally well in the time of stress.

After the global financial crisis, a new discussion of economic crisis was triggered by the pandemic. The effects of pandemic were not only limited to social and personal lives but it reached to every aspect of social settings. Hence, banking sector is no exception (CARNEVALE and HATAK, 2020; DONTHU and GUSTAFSSON, 2020). On global scale, the banking companies' performance were largely affected coupled with risks connected to financial stability of financial institutions (ELNAHASS et al., 2021). The destructive impact of pandemic has been witnessed over the global banking sector irrespective of geographic regions (Middle East, Greater Arabia, Europe, Africa), countries, level of income-generation, effect of bank type, and bank size (ELNAHASS et al., 2021). In recent pandemic context, both Islamic and conventional banks experienced low financial performance, higher risk of insolvency and financial instability (ABDELSSALAM et al., 2022). However, Islamic banks showed a marginally better financial performance and slightly lower operation risks during the time of COVID-19 crisis. This implicates the presence of significant difference in both counterparts in stability measures (ELNAHASS et al., 2021).

### **1.1 Introduction of Islamic financial system**

Islamic banking is a system that follows some rules of permissibility and some limitation as govern by Shari'a – the Islamic law. There are a few prohibitions in the eye of Shari'a, which largely infused in conventional banking system. The most important of it is dealing in interest-based debt transactions. In addition to non-permissibility of interest, the financial contracts with an increased uncertainty are forbidden, such as gambling or speculative activities. Moreover, the growing challenge in Islamic banking is the selection of 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 the option for investment as per Islamic law (ABASIMEL,

2023; USMANI, 1998). These limitation sets up the real challenge for interest-free banking system. The prime objective of Islamic banking revolves around the idea of socio-economic benefit and to bring justice within the society it operates. Therefore, despite being dependent on interest-based contracts, Islamic banks become handy in promoting socio-economic 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 key functions of a bank as per classical theory, where bank borrow funds in form of deposit and lend them to clients on interest. The spread between borrowing and lending interest rate is the lucrative proportion for banks. However, the real challenge is when Islamic banks perform the similar business without interest (KHAKI and SANGMI, 2011).

Literature has divided Islamic banking assets into two broad categories i.e., debt based and equity-based contract. The balance sheet of Islamic banks is conceptually different from conventional banks. The asset side contains financing to customers is broadly operated on sale/debt/non-participatory based contracts. Whereas liability side primarily consist of equity/participatory based contracts (AYUB, 2013). In other words, irrespective of asset or liability side, every contract is back by real asset or performed on risk-sharing basis. However, the contracts may be categorized in two broad types debt or sale-based contracts (Murabaha, Ijarah, Istisna, and Salam) and equity/participatory contracts (Musharakah, Diminishing Musharaka, Mudaraba)<sup>1</sup> (LEWIS and ALGAOUD, 2001).

---

<sup>1</sup> 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

## **1.2 Statement of the Problem and Research Objectives**

The world has experienced an exceptional growth in modern banking system from 1960s till now. 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, 2013). 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. However, the proposed research will try to fill the gap by analysing the differential effect of the adoption of Islamic banking on economic growth. Furthermore, keeping in view the entrepreneurial abilities of Islamic banking and social objective of Islamic finance, the study will also try to answer whether implementing Islamic banking truly contributes to achieve better living standard and poverty alleviation.

This study has 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.

---

property gradually. Istina and Salam are the sale transaction where delivery of the product is deferred, and payment is made in advance. Whereas Ijarah is an alternative to the lease contract.



### **1.3 Research hypotheses**

- H1: Islamic financial depth has positive effect on economic growth of Pakistan.
  - H1a: The positive effect of Islamic financial depth is greater than the conventional financial depth on economic growth Pakistan.
- H2: Risk-sharing financing positively affects real economic output.
- H3: Non-Risk sharing financing positively affects real economic output.
- H4: There is an incremental impact of financial development on economic growth after adoption of Islamic banking.
- H5: Better asset quality positively moderates the Islamic finance and aggregate economic output relationship.
- H6: Islamic financial development has a differential impact on poverty alleviation.

### **1.4 Significance of the study**

The study intends to contribute to the existing body of knowledge in four dimensions. First, this study aims to provide insights into the relative importance of Islamic financial depth in countries where a dual banking system is prevalent. Secondly, decomposing the financing side will offer a comprehensive view of the use of legitimate Islamic financing contracts, for instance, profit and loss contracts (Mudaraba and Musharaka) and will embody the spirit of Islamic financing by involving risk-sharing partners and encouraging entrepreneurs to engage in business. Thirdly, it will provide evidence of progress toward achieving Sustainable Development Goal 1, which focuses on Poverty reduction. Lastly, the findings concerning the incremental impact of adopting Islamic banking on economic growth are expected to offer guidance to countries with little or no presence of Islamic

banking. Moreover, it emphasizes Sustainable Development Goal 8, which is centered on achieving economic growth.

## **2 MATERIAL AND METHODOLOGY**

This section describes the detail of material and methods used in this study. The chapter proposes the data collection method and modelling of the variables. Furthermore, definition of research variables and measurement, data collection resources, and proposed econometric model will be explained as well.

### **2.1 Research methods**

There are two broad research methods in social sciences differentiated by the research objective and the adopted research philosophy i.e., quantitative and qualitative methods (BLUMBERG et al., 2014; SEKARAN and BOUGIE, 2016). The current study intends to dive into evaluation of finance-growth nexus in context of Islamic financial development that requires empirical testing of the phenomenon in real economic setting. The author chose the quantitative methods to reach the desired outcome.

### **2.2 Materials and econometric methods**

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, the decomposition of financing side and its relative impact on economic activity is analysed. Section III & IV, the differential impact of adoption of Islamic finance on economic growth and poverty alleviation is analysed in third & fourth section using quasi-experimental model.

## **2.2.1 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 is analysed in section I.

### **2.2.1.1 Data and variables**

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

The measure of economic progress is represented by real GDP (following (ABDUH and AZMI OMAR, 2012; ANWAR et al., 2020; FURQANI and MULYANY, 2009). Islamic financial depth is defined as the total Islamic banks’ financing in the percentage of GDP (ANWAR et al., 2020; BOUKHATEM and BEN MOUSSA, 2018; ZARROUK et al., 2017). The number of branches of each financial sector (Islamic and conventional) are considered as measures of financial intermediation (ANWAR et al., 2020). Moreover, this study uses the measure of non-performing assets to represent the asset quality (ALSAMARA et al., 2019; ČIHÁK and SCHAECK, 2010). Also, other control variables such as inflation (measured by consumer price index) and rate of interest are chosen.

### **2.2.1.2 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.

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

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

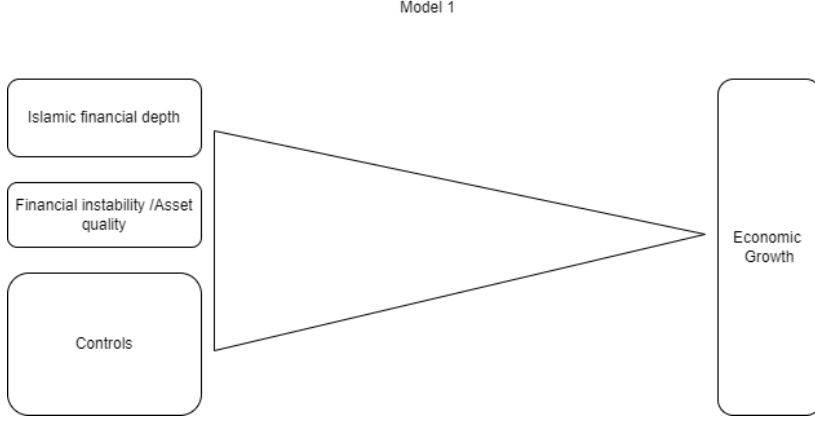


Figure 1: Islamic financial depth and economic growth (Model - 1)  
Source: Author own construction

Review of literature (ABDUH and AZMI OMAR, 2012; ANWAR et al., 2020; FARAHANI and DASTAN, 2013) and the nature of the data allow this study to use the Autoregressive Distributed Lag (ARDL) model for Section I. The general equation (iii) form for ARDL is given below:

$$\Delta(Y)_t = \delta_0 + \sum_{q=1}^{p_1} \sigma_{1r} \Delta(Y)_{t-r} + \sum_{q=0}^{p_2} \sigma_{2r} \Delta(X_2)_{t-r} + \sum_{q=0}^{p_3} \sigma_{3r} \Delta(X_3)_{t-r} + \alpha_1(Y)_{t-1} + \alpha_2(X_2)_{t-1} + \alpha_3(X_3)_{t-1} + \varepsilon_t \quad (\text{iii})$$

$Y$  represents the dependent variable at time  $t$ .  $p_i$  is the max lag length,  $\varepsilon_t$  is the error term in the model.  $X_2, X_3$  are the regressors.  $\omega_{1q}, \omega_{2q}, \omega_{3q}$ , and  $\omega_{nq}$  are the short run coefficient while  $\alpha_1, \alpha_2$ , and  $\alpha_3$  are the long-run estimates.

### 2.2.2 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 contributor in Islamic financial assets globally. For instance, as per IFSB (2022), 15 countries found to have indigenous double-digit growth in Islamic finance as well as top

contributor in global Islamic financial assets. In order to have a broader picture of Islamic financial sector and economic output, the second part of this study considers 15 countries. The countries include Pakistan, Egypt, Oman, Palestine, Jordan, UAE, Bangladesh, Djibouti, Qatar, Malaysia, Saudi Arabia, Kuwait, Brunei, Sudan, and Iran. Furthermore, 4 countries were excluded due data limitation.

#### **2.2.2.1 Data and variables**

Quarterly data from the year 2014 to 2022 have been sourced from several reliable sources. The bank related data have been collected from the latest database of Islamic Financial Service Board (IFSB), the macroeconomic indicators were collected from the World Development Indicators (WDI) and IMF's International Financial Statistics (IFS).

To represent the real economic output, total industrial output (IP) is taken as the dependent variable (BOUGATEF et al., 2020; MASRIZAL and TRIANTO, 2022). The independent variable is divided into two categories: participatory/risk-sharing/profit and loss (PLS) financing and non-participatory/non-risk-sharing/non-PLS financing (BOUGATEF et al., 2020; GUIZANI and AJMI 2021) and. The non-performing assets (NPAs) are considered proxies for asset quality, which have a significant impact on the profitability and stability of Islamic banks (Mensi et al., 2020). In addition to above, Inflation (Inf), conventional financing (CF), imports (Im), exports (Ex), and capital formation (GFCF) have been used as control variables (MENSI et al., 2020; PAPPAS et al., 2017; ZARROUK et al., 2017).

#### **2.2.2.2 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.

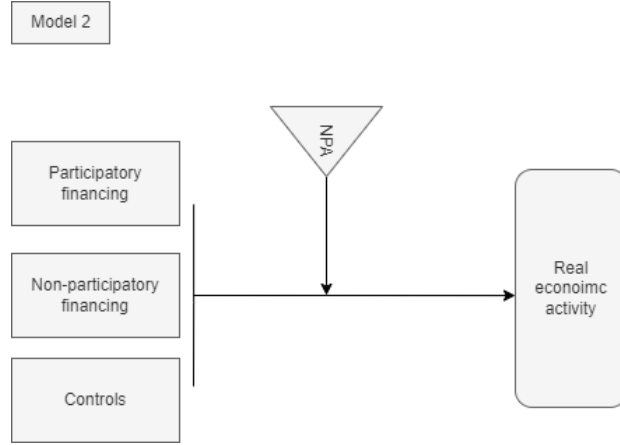


Figure 2: PLS vs non PLS financing and real economic output (Model - 2)

Source: Author own construction

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).

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

The equation (iv) represents the fixed effect model, where the cross-sectional characteristics are time-invariant and vary over cross-sections. The Chow test

is performed using an F-test of two equivalent regressions with restricted and unrestricted models (BALTAGI, 2013). The Hausman test (BALTAGI, 2013) 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.

$$y_{it} = \alpha_{0i} + \beta_1 X_{i,t} + \beta_2 W_{i,t} + \beta_3 X_{i,t} * Q_{i,t} + \varepsilon_{it} \dots\dots\dots (v)$$

The left-hand side of the equation (v) 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  $W_{i,t}$ .  $\beta_3$  measure the moderating role of asset quality i.e., non-performing assets.  $i$  and  $t$  are the country and period specific subscripts.

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

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 Islamic financial system was implemented in 2002 (SBP, 2020). In order to have comparison with untreated unit (countries where Islamic banking does not exist), Eikon-Refinitiv's Islamic banking development indicators (referred as IFDI rating Index) ranking (IFSB, 2022) is used to select the countries based on the degree of development of Islamic banking in each country.

#### **2.2.3.1 Data and variables**

Annual data is collected from 1990 to 2021 from several sources. Pakistan is chosen to estimate if the adoption of Islamic banking helped the country to

achieve 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 were selected to form a donor pool that will serve as an untreated/control group (Table 1).

Table 1: List of selected countries for controlled group

Sr. No.	Country name	Treated/Untreated	Ranking	Index	
1	Albania	Untreated unit	74	3.628	
		Untreated unit	Not in	No IFDI	
2	Argentina		ranking	Index	
		Untreated unit	Not in	No IFDI	
3	Armenia		ranking	Index	
4	Austria	Untreated unit	124	1.39	
		Untreated unit	Not in	No IFDI	
5	Barbados		ranking	Index	
		Untreated unit	Not in	No IFDI	
6	Belarus		ranking	Index	
7	Belgium	Untreated unit	120	1.771	
		Untreated unit	Not in	No IFDI	
8	Bhutan		ranking	Index	
9	Brazil	Untreated unit	134	0.504	
10	Bulgaria	Untreated unit	70	3.708	
11	Cameroon	Untreated unit	65	3.944	
		Untreated unit	Not in	No IFDI	
12	Colombia		ranking	Index	
13	Croatia	Untreated unit	95	3.105	



		Untreated unit	Not ranking	in	No Index	IFDI
14	Czechia					
15	Denmark	Untreated unit	121		1.657	
		Untreated unit	Not ranking	in	No Index	IFDI
16	Dominica					
		Untreated unit	Not ranking	in	No Index	IFDI
17	Ecuador					
		Untreated unit	Not ranking	in	No Index	IFDI
18	Estonia					
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	
		Untreated unit	Not ranking	in	No Index	IFDI
24	Iceland					
25	India	Untreated unit	41		9.108	
		Untreated unit	Not ranking	in	No Index	IFDI
26	Israel					
27	Italy	Untreated unit	122		1.569	
		Untreated unit	Not ranking	in	No Index	IFDI
28	Jamaica					
29	Latvia	Untreated unit	78		3.526	
		Untreated unit	Not ranking	in	No Index	IFDI
30	Lithuania					
		Untreated unit	Not ranking	in	No Index	IFDI
31	Madagascar					
32	Mexico	Untreated unit	132		0.903	
		Untreated unit	Not ranking	in	No Index	IFDI
33	Moldova					
		Untreated unit	Not ranking	in	No Index	IFDI
34	Mongolia					
35	Myanmar	Untreated unit	112		2.355	
		Untreated unit	Not ranking	in	No Index	IFDI
36	Montenegro					

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

Economic growth (GDP) is taken as the outcome variable, which represents the economic prosperity caused by well-functioning of Islamic financial sector. Human Development Index (HDI) has been used to measure poverty alleviation and the general standard of living in many studies (ALVAN, 2009; BAYAR, 2017; HANESTI et al., 2018; MOHSENI-CHERAGHLOU, 2017). GDP and HDI are two outcome variables for section III and IV. For the predictors, total private credit (Cre\_FI) represents the total financing made by financial sector, which also include the total financing by Islamic banks after the adoption of Shari'a banking system (ZARROUK et al., 2017). Furthermore, total deposit (Dep) as percentage of GDP is taken as the second

predictor of financial development. To control the model inflation (Inf), GFCF, and trade openness (Open), foreign investment (FDI), government expenditure (n\_exp), unemployment (UER), political stability (PS), and regulatory quality (RQ).

### 2.2.3.2 Econometric specification (Section III & IV)

For differential impact of adoption of Islamic banking on economic growth and poverty alleviation, Synthetic control method (SCM) model is used in this section. 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 uplifting the general standard of living and poverty alleviation.

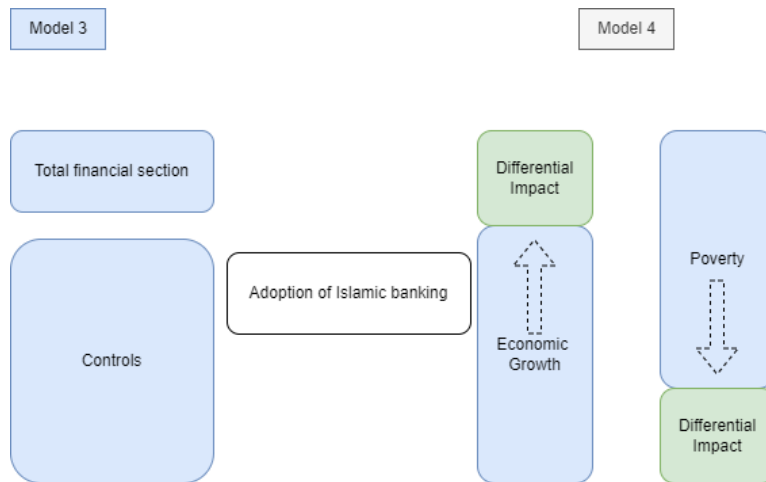


Figure 3: Differential impact on economic growth and poverty alleviation (Model – 3 & 4)

Source: Author own construction

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, 2021; ABADIE et al., 2015; ABADIE

and GARDEAZABAL, 2003). Table 1 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  $t = 1 \dots T$ . 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  $t$ .

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

$\tau_{it}$  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  $\tau_{it}$ . However, the counterfactual outcome variable  $Y_{it}^{NA}$  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.

$$Y_{it}^{NA} = \phi_t + \beta_t X_i + \lambda_t \mu_i + \varepsilon_{it} \dots (vii)$$

$\phi_t$  is the unknown constant factor common among donor countries.  $X_i$  is a vector of observed covariates of countries in SCM, with vector  $(r \times 1)$  with no connection to the intervention i.e., adoption of Islamic banking within donor

pool.  $\beta_t$  is time variable unobserved vector with dimension of  $(1 \times F)$ . Whereas,  $\lambda_t$  is the vector  $(F \times 1)$  of unobserved common factors and  $\mu_i$  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  $(K \times 1)$  vector of weights i.e.,  $W = (w_2, \dots, w_{k+1})$  in a way that  $w_k \geq 0$  for  $K = (2, \dots, K+1)$  provided that the total sum of all weights is unity i.e.,  $w_2 + \dots + w_{k+1} = 1$ . 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, 2021; ABADIE and GARDEAZABAL, 2003). The extension of linear factor modeling equation giving outcome of  $Y_{it}^{NA}$  with  $W$  synthetic group to compare with pre- and post-intervension.

$$\sum_{k=2}^{k+1} w_k Y_{it}^{NA} = \phi_t + \beta_t \sum_{k=2}^{k+1} w_k X_i + \lambda_t \sum_{k=2}^{k+1} w_k \mu_i + \sum_{k=2}^{k+1} w_k \varepsilon_{it} \dots (viii)$$

The graphical representation of SCM is given in Figure 4.

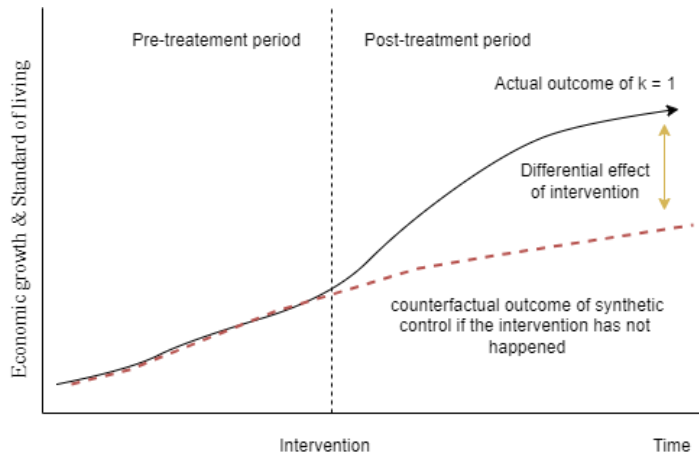


Figure 4: Synthetic control method graphical representation  
Source: Author own construction

### 3 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.

#### 3.1 Section I - Islamic financial depth and economic growth

This section provides the explanation and interpretation of the results got from the first statistical model i.e., Autoregressive distributed lag (ARDL).

##### 3.1.1 Model specification and Bounds testing

To examine the presence of cointegration among the variables, the degree of integration is first analysed. Augmented Dickey-fuller (ADF) and Phillip Perron (PP) unit root tests are performed, and the results found to be favourable for the application of the autoregressive distributed lag (ARDL) model. The unit root tests indicate the presence of a mixed order of integration at level  $I(0)$  and 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 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). 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. The long term cointegration between Islamic financial sector and economic growth is tested in two models as specified in 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 existence of long-run integration between Islamic financial depth and Islamic financial intermediation with the economic growth of the country.

Table 2: Cointegration test results

Model	IFD(a) <sup>1</sup>		IFD(b) <sup>2</sup>		CFD(a) <sup>3</sup>		CFD(b) <sup>4</sup>	
Bounds Tests								
F-Statistics	4.4647*		43.2523*		12.3147*		14.3109*	
Asymptotic	K		K		K		K	
Critical	3		5		3		5	
Values								
	<i>I(0)</i>	<i>I(1)</i>	<i>I(0)</i>	<i>I(1)</i>	<i>I(0)</i>	<i>I(1)</i>	<i>I(0)</i>	<i>I(1)</i>
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	0.751		0.402		0.761		1.096	
$\chi^2$	(0.415)		(0.533)		(0.410)		(0.243)	
RESET $\chi^2$	1.093		0.069		2.481		1.831	
	(0.301)		(0.793)		(0.122)		(0.183)	
Jarque	1.506		0.186		4.911		0.528	
Bera $\chi^2$	(0.471)		(0.911)		(0.085)		(0.768)	
LM BP $\chi^2$	3.046		1.355		1.941		0.932	
	(0.061)		(0.221)		(0.088)		(0.482)	

\*, \*\*, \*\*\* denotes significance at level 10%, 5%, 1% respectively

<sup>1</sup> F(GDP|IFD, IFI) ARDL [1,2,1] optimal lags are selected based on SIC criteria

<sup>2</sup> F(GDP|IFD, IFI, NPA, INF, IR) ARDL [4,3,0,0,2,4] optimal lags are selected based on SIC criteria

<sup>3</sup> F(GDP|CFD, CFI) ARDL [1,2,1] optimal lags are selected based on SIC criteria

<sup>4</sup> 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

For conventional banking models CFD(a) and CFD(b). The F-statistics obtained from the ARDL bounds test for both the models are 12.314 and 14.310, respectively. The findings indicate that the upper bound critical values for both models are 3.67 and 3.38, which significant at 5%.

### 3.1.1.1 Long-run impact of Islamic financial depth on economic growth

Once the cointegration is established, we proceed to estimate the long-term relationship using the ARDL long-run estimate presented in Table 3. 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 confirm the finding in the first model i.e., without controls. The coefficients for the IFD and IFI are 0.0213 and 0.0358, respectively. Both coefficients are statistically significant at the 1% level.

Table 3: Long run estimates

Model	IFD(a) <sup>1</sup>	IFD(b) <sup>2</sup>	CFD(a) <sup>3</sup>	CFD(b) <sup>4</sup>
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

<sup>1</sup> F(GDP|IFD, IFI) ARDL [1,2,1] optimal lags are selected based on SIC criteria



---

<sup>2</sup> F(GDP|IFD, IFI, NPA, INF, IR) ARDL [4,3,0,0,2,4] optimal lags selected based on SIC criteria

<sup>3</sup> F(GDP|CFD, CFI) ARDL [1,2,1] optimal lags are selected based on SIC criteria

<sup>4</sup> 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

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). The findings also confirm the first hypothesis (H1). 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 operates. 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. Moreover, there exists a negative relationship between non-performing assets (NPA) and interest rates (IR) with respect to gross domestic product (GDP) over the long-run period. This section further examined the long-run relationship between conventional financial depth (CFD) and economic growth. CFD has a positive and significant long-run association with economic growth. Interestingly, the coefficient is greater than the Islamic financial depth, and both of the relationships are significant at a 5% level, which rejects the sub-hypothesis H1a. The provision of financial intermediation either through Islamic or conventional banking channels make 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 long-term impact of both Islamic financial depth 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 in magnitude compared

to that of conventional financial depth (CFD). The results imply that conventional financial sector imparts greater impact on achieving the economic growth. The possible rationale of greater impact is characterised by the relative share of interest-based financing withing the economy. Though, the market share of Islamic banking is growing rapidly in Pakistan, still Islamic financing market covers almost 25% of the market share in banking sector (IFSB, 2022).

### 3.1.1.2 Short-run impacts using error correction method (ECM)

Error correction models provide insights into the short-term relationship between explanatory variables and the dependant variable. Table 4 provide the short-term coefficients of both models of Islamic (IFD(b)) and conventional (CFD(b)) financial depth. For the 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: Short Run results

Differenced Variables	IFD(b) <sup>1</sup>		CFD(b) <sup>2</sup>
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 <sup>2</sup>	0.8615		0.6800
Log likelihood	208.7563		184.8972
F-statistic (prob = 0.00)	23.8144		14.2236
AIC <sup>3</sup>	-6.8842		-6.1367
SIC <sup>3</sup>	-6.3055		-5.7783

\* denotes significance at level 5%

<sup>1</sup> F(GDP|IFD, IFI, NPA, INF, IR) ARDL [4,3,0,0,2,4] optimal lags are selected based on SIC criteria.

<sup>2</sup> F(GDP|CFD,CFI,NPL,INF, IR) ARDL [1,3,1,0,1,1] optimal lags are selected based on SIC criteria.

<sup>3</sup> Akaike Info criteria, Schwarz info criteria.

**Source:** Authors' calculations using Stata 14.2

In accordance with the concept of equilibrium, it can be observed that the Islamic banking sector had a somewhat faster rate of convergence towards equilibrium. Nevertheless, it has been observed that the rate at which conventional financial depth converges is 50% lower compared to 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 a 5%. This suggests that the involvement of Islamic financial operations has the potential to assist to the achievement of short-term economic growth. Nevertheless, the short-term GDP elasticity for conventional depth and intermediation exhibits a lack of magnitude and statistical significance. The findings of HACHICHA and AMAR (2015) indicate that there is inconsistency in the sensitivity of GDP elasticity. In contrast, our short-term estimates align with the prior economic research conducted by FURQANI and MULYANY (2009) 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. 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 with (ALSAMARA et al., 2019; CREEL et al., 2015).

### **3.1.2 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 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 in Table 2.

### **3.2 Section II - Decomposed Islamic financings and its Impact on economic output**

As per research objective 2 and hypotheses H2, H3, & H5, this section provides the detailed results and discussion on how different modes of Islamic financing facilitates in real economic productivity as measured by industrial production.

#### **3.2.1 Regression results**

Based on the Chow tests and Hausmann test, the clustered standard error (country level) with fixed effect panel regression model is applied. The results are presented in Table 5. The analysis is proceeded in two distinct models the first one covering the PLS financing and its impact over fostering real economic activity. While 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 third step the interaction term is added in both models to examine how asset quality affects the modes of financing – economic output nexus. The results of bivariate models without control variables PLS(a) and non-PLS(a) given in the column (1) and (5). PLS(b) and non-PLS(b) provides the results with control variables as shown in column (2) and (6). The addition of moderating effect of asset quality is present in column (3) for PLS(c) and column (7) for non-PLS(c). The robustness check is given in column (4) and (8). All 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.

The impact of PLS financing on industrial production in all of the estimated models are statistically significant and positive. 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 got greater compared to PLS(c). The results showed that profit and loss financing side of Islamic banks play a defining role in promoting the trading and real economic activities. However, the magnitude of PLS financing seemed to be weaker compared to the conventional financial depth i.e., 0.435 significant at 5%.

Table 5: Regression Results

VARIABLES	(1) PLS(a)	(2) PLS(b)	(3) PLS(c)	(4) PLS(d)	(5) non-PLS(a)	(6) non- PLS(b)	(7) non- PLS(c)	(8) 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)

Constant	22.91*** (126.7)	13.39*** (40.32)	22.62*** (30.11)	21.33*** (31.00)	22.53*** (60.48)	14.53*** (37.98)	21.04*** (32.66)	19.75*** (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. > $\chi^2$	-	-	0.216	-	-	0.114	-	-
Breusch-Pagan	-	-	18.647	-	-	23.088	-	-
Hausmann Test	-	-	(0.005)	-	-	(0.001)	-	-

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

Source: Authors' calculations using Stata 14.2



The results implied that the relative strength and growth of PLS financing in the selected countries is not higher than the conventional financial depth. Furthermore, the corporate sector prefers to rely on profit and loss sharing investment rather than bearing all the potential risk all alone. At the same time the popularity of PLS financing still could not reach to the level of conventional financing. The results concurred with the previous studies (BOUGATEF et al., 2020; SALEEM et al., 2021). It is important to note that previous research (such as (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, 2022)), 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 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 agreement, which not subject to change even though the rate of interest fluctuate. The reason being, Islamic banks do not give the loan but rather make contract 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, which showed significant positive impact over production. The results are consistent with the previous finding (GUIZANI and AJMI, 2021). Also, the results confirm the hypothesis H2 and H3, stating that both PLS and non-PLS finance facilitate the economic activities.

The negative coefficients of asset quality  $-13.94$  and  $-32.40$  in PLS(c) and non-PLS(c) shows that the ratio of non-performing loans is declining with the time and results concurred 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 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).

### **3.2.2 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. Moreover, the model is tested omitted variable bias and reverse causality (BARROS et al., 2020; GREENE, 2003; LESZCZENSKY and WOLBRING, 2022). For the robustness of the models, two separate econometric techniques

have been used to address the issues of endogeneity. The lagged independent variables have been applied to check the presence of reverse causality (following (LESZCZENSKY and WOLBRING, 2022)). On the other hands, the omitted variable biased is tests by applying the 2 stage least square regression (2SLS), by considering the deposits as instrumental variable (I.V.). The condition for the validity of Instrumental variable is justified with 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). Both the results showed no evidence of reverse causality was observed, secondly, 2SLS showed the consistent results with the main regression model.

### **3.3 Section III - Differential impact of adoption of Islamic finance**

This section answers the objective 3 and hypothesis H4, and provides a detailed analysis of the differential impact on economic growth resulting from the adoption of Islamic banking systems. The synthetic control method (SCM) is applied 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 country (Pakistan) before the time of adoption. Once the comparable unit is created, the pre- and post-adoption outcomes of Pakistan are compared with those of the synthetic unit to determine if there is evidence of a differential impact on the outcome.

#### **3.3.1 Synthetic control results on economic growth**

Table 6 shows the weights chosen for the construct of control group from the 51 selected donor countries. Two synthetic control groups are formulated, group A represents the weights chosen for the predictor private credits from

the financial institutions while group B is selected based on deposits selected as the key predictor. The pre-treatment trend constructed by weighted average synthetic control group A and B is produced copying the trend of 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 average of 0.24, 0.001, 0.223, 0.079, 0.084, 0.045, 0.108, 0.209, and 0.011, respectively. While all other countries are given the weight of 0. On the other hand, the construct of synthetic group is changed when 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 weight of 0.04 to produce a synthetic trend of pre-treatment that is similar to actual pre-treatment trend of Pakistan.

Table 6: 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	Madagasca	0	0
			r		
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	Montenegr	0	0
			o		

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	-	-	-
<b>RMSPE</b>	0.00621	0.01857	-	-	-

**Source:** Authors' calculations using Stata 14.2

The prediction error of both A and B is 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.

Based on the selected synthetic control groups the predictors and covariates pre-treatment means are shown in Table 7. Both the models A and B show that pre-intervention characteristic of synthetic Pakistan is similar to mean values of actual Pakistan in pre-intervention period i.e., 1990 – 2021. Compared to group A, the synthetic group B produces better and even closer mean characteristic of the pre-adoption leaving comparatively narrower gap between synthetic control and treated group. However, the combination of predictors is different from the group A, shown in Table 7. In sum, both the groups gave the robust pre-adoption matching results.

Table 7: Outcome predictors balance

Group A				Group B			
Predictors	Treated	SCM Unit	Avg. of 51	Predictors	Treated	SCM Unit	Avg. of 51

	countri es				countr ies		
GDP(1990)	25.32	25.33	24.36	GDP(1990)	25.32	25.34	24.36
GDP(1991)	25.37	25.37	24.37	GDP(1992)	25.44	25.42	24.37
GDP(1992)	25.44	25.44	24.37	GDP(1994)	25.50	25.50	24.43
GDP(1994)	25.50	25.50	24.43	GDP(1997)	25.60	25.60	24.56
GDP(1995)	25.54	25.54	24.48	GDP(1998)	25.63	25.64	24.59
GDP(1997)	25.60	25.61	24.56	GDP(1999)	25.66	25.66	24.65
GDP(1998)	25.63	25.64	24.59	GDP(2000)	25.71	25.71	24.65
GDP(1999)	25.66	25.67	24.61	GDP(2002)	25.76	25.76	24.70
GDP(2000)	25.71	25.70	24.65	Dep*	30.21	32.53	36.70
GDP(2002)	25.76	25.77	24.70	Dep(1993)	31.46	29.92	34.86
cre_fi(1990)	24.15	24.54	29.35	Dep(1994)	32.68	31.38	34.13
cre_fi(1995)	24.20	28.91	31.84	Dep(1996)	33.86	33.81	35.44
Open*	35.78	39.21	182.1	Dep(1997)	36.71	36.22	37.03
GFCF(1990)	20.13	15.86	32.12	Dep(1999)	32.99	34.35	39.00
GFCF(1991)	19.77	22.49	31.28	Open*	35.78	36.84	182.1
GFCF(1995)	19.65	21.29	40.30	Open(1991)	34.03	30.67	167.6
GFCF(1999)	16.25	20.47	55.22	Open(1993)	42.70	32.55	168.1
INF*	8.72	8.505	18.22	Open(1995)	37.24	36.46	167.5
UER*	1.31	16.95	17.38	Open(1997)	36.84	39.10	185.0
FDI(1992)	0.68	0.992	1.227	GFCF*	18.77	20.28	46.32
FDI(1995)	1.19	1.425	1.918	GFCF(1991)	19.77	19.75	31.28
N_exp*	111.0	99.89	247.6	GFCF(1993)	20.71	19.46	36.42
M3*	42.71	36.04	45.97	GFCF(1995)	19.65	18.54	40.30
				FDI*	0.804	2.19	2.599
				FDI(1993)	0.672	1.36	1.304
				FDI(1995)	1.19	1.93	1.918
				M3*	42.75	43.10	45.97

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

### 3.3.1.1 Synthetic group A

Figure 5 displays the trajectory of GDP of Pakistan and synthetic Pakistan in pre- and post-Islamic banking adoption period for the group A. The pre-adoption slop of Pakistan and synthetic-Pakistan is closely tracked together, which shows that pre-adoption characteristics of outcome variable of treated country closely resembles with the control group. This is the reason why the root mean square predication error is nearly zero for group A i.e., 0.006216.

The graph shows that both the curves diverge mutually at several points which shows the accurate and valid approximation of pre-treatment period. Since the time of adoption, the GDP of Pakistan significantly rises 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 climb 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 to this is the change of political regime in the country (MIRZA et al., 2023). The country faced several setbacks after the democracy took over the parliament after a long gap of 9 years of martial law (MIRZA et al., 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 synthetic-Pakistan trajectory. From 2013 onwards, the gap between treated and untreated units continue to rise. The results gave us the satisfactory outcomes on differential impact Islamic banking adoption on economic growth of Pakistan. Hence the results confirm the hypothesis H5, holding there is incremental impact of Islamic banking adoption on economic growth.

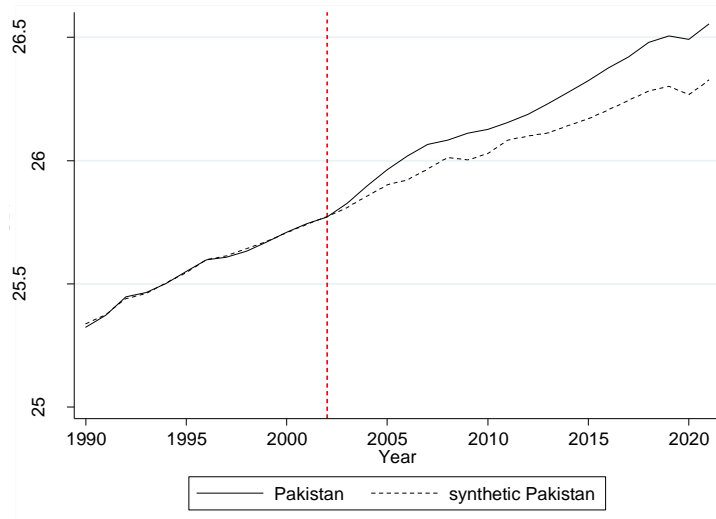


Figure 5 – Synthetic control group results of economic growth (group A)  
Source: Authors' calculations using Stata 14.2

Furthermore, Figure 6 shows the gap between the synthetic control group and Pakistan in pre- and post- adoption period i.e., 2002. The distance between the points of the curve and x-axis shows the GDP gap between Pakistan and synthetic-Pakistan. From the results, it is inferred that after adoption of Islamic banking system the GDP of Pakistan grew almost 23% more compared to those countries where asset-backed system is not implemented.



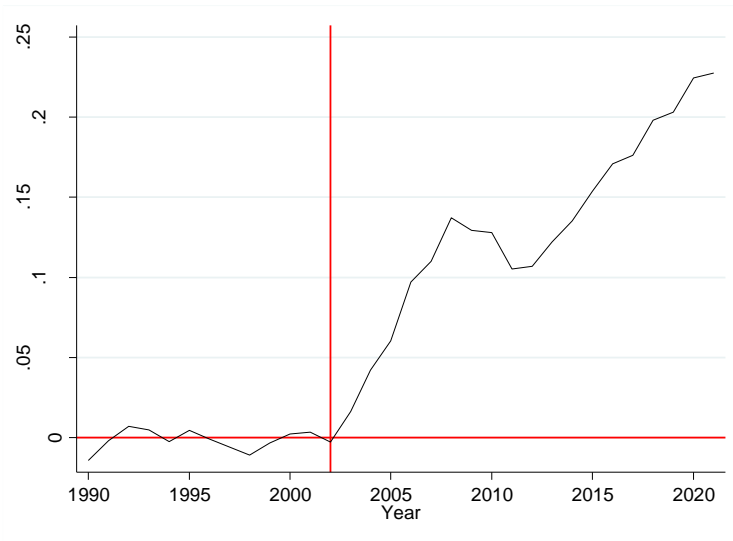


Figure 6 -Gap between GDP of Pakistan and synthetic Pakistan (group A)  
Source: Authors' calculations using Stata 14.2

### 3.3.1.2 Synthetic group B

The second model produced even better results compared to group A. Figure 7 and 8 shows the incremental impact of adoption of Islamic financial system on economic growth. Group B is modelled with additional covariates taking deposits measuring the financial development within the economy (as shown in Table 6). The overall findings are similar to the model A. However, the gap between outcome of Pakistan and synthetic-Pakistan in group B are wider compared to the previous group. The credibility of the synthetic control group is directly dependent on its ability to have close fit in pre-treatment trend (ABADIE, 2021; ABADIE et al., 2010). There are some fluctuations that can be observed starting from year 2008 till 2013 are similar to the previous findings in group A. Moreover, when the outcome is predicted with total deposits, GDP is predicted to have around 25% incremental impact compared to the group where Islamic banking system is not adopted.

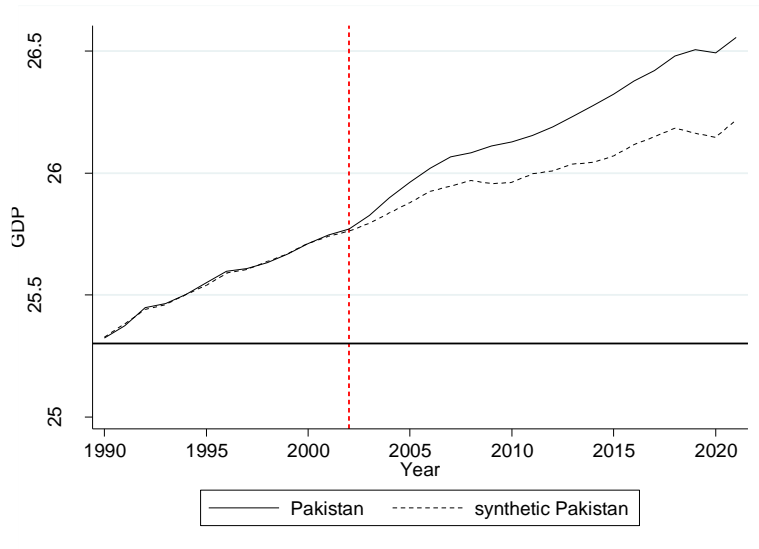


Figure 7 – Synthetic control group results of economic growth (group B)  
Source: Authors' calculations using Stata 14.2

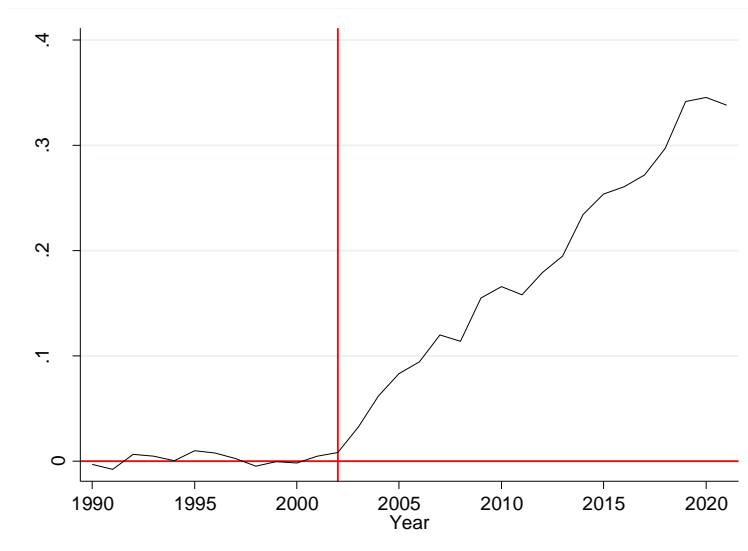


Figure 8 – Gap between GDP of Pakistan and synthetic Pakistan (group B)  
Source: Authors' calculations using Stata 14.2

Following the ABADIE (2021), the robustness of the results is checked by considering different set of predictors of outcome. However, synthetic control

group B is constructed with transformed set of countries choosing unique weighted average.

### **3.3.2 Robustness check (Section III)**

To evaluate the robustness of the results obtained in synthetic group A and B, placebo tests are used to see if the incremental impact on GDP occurred by the matter of chance. Following (ABADIE, 2021; ABADIE and GARDEAZABAL, 2003; SCOTT, 2021), each country (where 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., 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, then the results obtained in group A and B cannot be considered as a treatment effect as a result of adoption of Shari'a banking system. On the other hand, if the placebo tests provide the evidence of random positive or negative gaps with lower magnitude than that of Pakistan (mode A and B), then the results obtained in case of Pakistani economy are significant and evidence the incremental impact on GDP due to adoption of Islamic financial system.

#### **3.3.2.1 Group A**

The result of placebo tests is shown in the Figure 9. 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, black bold line shows the original results of Pakistan obtained from the first model where private credit by financial institution was taken as predictor. The results show that majority of countries in placebo tests appeared to be closely fit to the synthetic control unit, which shows the validity of the employed method. 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.

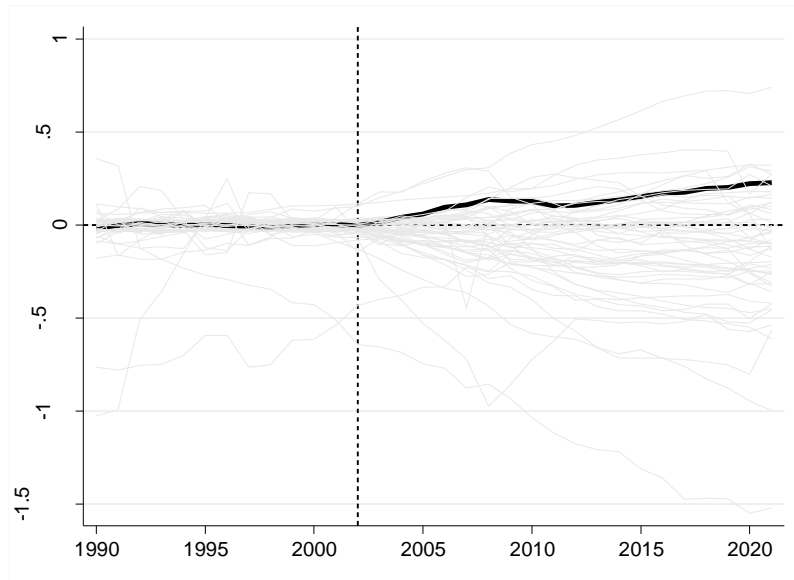


Figure 9 – Placebo tests taking each country from the donor pool as treated unit (group A)  
Source: Authors' calculations using Stata 14.2

Figure 10 show the placebo test results after removing the outliers. Countries with prediction error more than 0.070 are removed from the placebo as the synthetic control method is significantly dependent on how the data is trained and validated in pre-intervention period (ABADIE, 2021; SCOTT, 2021). Whereas, in the final version, the countries with negligible score in IFDI Index rating are excluded from the results and Figure 11 shows the final results, which confirms the primary results of existence of incremental impact on economic growth after adoption of Islamic banking in Pakistan.

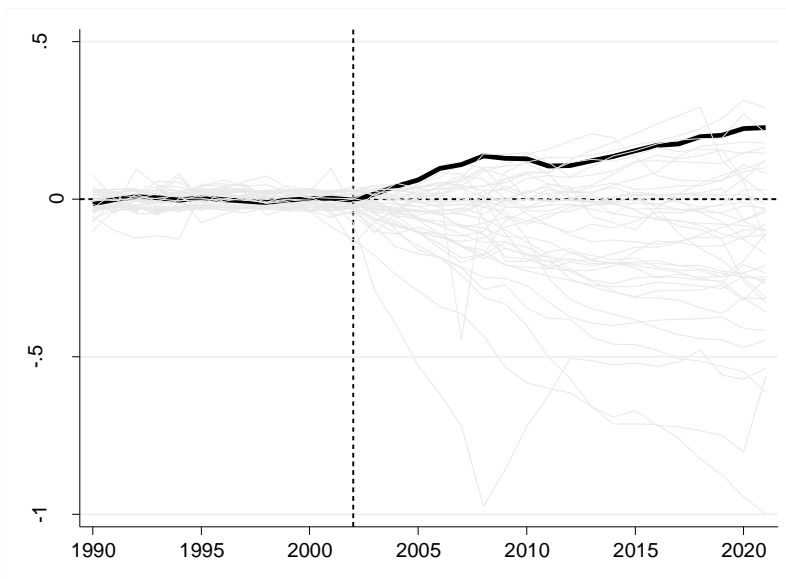


Figure 10 – Placebo tests after removing the outliers (group A)  
Source: Authors' calculations using Stata 14.2

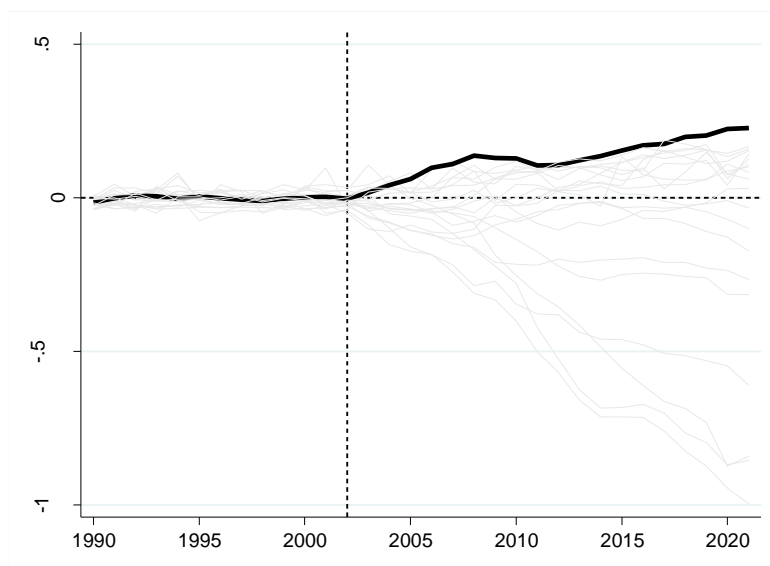


Figure 11 – Placebo tests after removing the countries with lowest IFDI index (group A)  
Source: Authors' calculations using Stata 14.2

### 3.3.2.2 Group B

Similar to the placebo tests for the group A, all of the 51 countries are taken as treated country assuming that if actual adoption happened there. At the first step the outliers are laid off with the highest RMSPE value. As a next step, removing outliers and following the removal of countries with IFDI rating below 10. The results show the consistent results with group A.

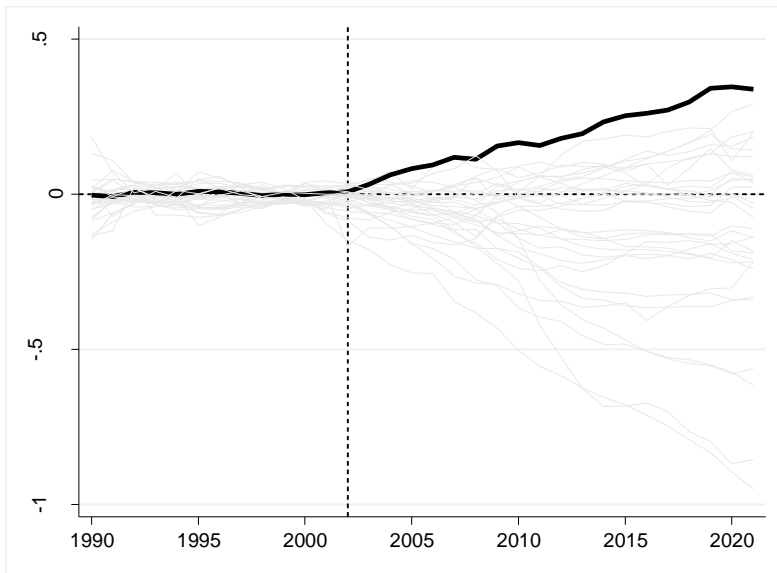


Figure 12 – Placebo tests after removing the countries with lowest IFDI index (group B)  
Source: Authors' calculations using Stata 14.2

## 3.4 Section IV - Differential impact of Islamic finance on poverty alleviation

This section explores the fourth objective of the study and test the final hypothesis (H6) i.e., Islamic financing helps in poverty alleviation. Utilizing the quasi-experimental approach detailed in the methodology section, 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 similar to section – III with donor pool of 51 countries where

Islamic banking has not introduced as of yet. The outcome variable for this section is HDI taken as proxy of poverty alleviation. To ensure result robustness, two alternative set of covariates are used to predict the outcome variable in pre-adoption period.

### 3.4.1 Synthetic control results for poverty alleviation

Two synthetic control groups are modelled in order to test the sensitivity of SCM. Group C shows the 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 8 for group C and D.

Table 8: 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			Madagasca		
	0	0	r	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			Montenegr		
	0	0	o	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	-	-	-
<b>RMSPE</b>	<b>0.003368</b>	<b>0.00819</b>	<b>-</b>	<b>-</b>	<b>-</b>

**Source:** Authors' calculations using Stata 14.2

Table 9 gives the predictors balance for synthetic group C and D, 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 perfectly close fit in pre-intervention period group, which further confirms the validity of better estimates in group D.

Table 9: Outcome predictors balance

Group C				Group D			
Predictors	Treated	SCM Unit	Avg. of 51 countries	Predictors	Treated	SCM Unit	Avg. of 51 countries
HDI-Pov*	0.30	0.304	0.65	HDI-Pov	0.304	0.305	0.653
GDP*	25.55	25.02	24.52	GDP*	25.55	23.86	24.52
Cre FI*	23.51	16.77	34.60	Cre FI*	23.51	22.02	34.60
Dep*	30.21	28.50	36.70	Cre FI(1999)	25.47	26.08	37.01
Open*	35.78	37.31	182.17	Cre FI(1997)	24.64	23.75	34.84
Inf*	8.722	6.935	18.22	Cre FI(1996)	24.69	22.84	32.54
N_exp*	111.0	97.16	247.60	Dep*	30.21	28.35	36.70
GFCF*	18.77	21.59	46.32	Open*	35.78	38.25	182.1
FDI*	0.804	0.927	2.59	Open(1991)	34.03	31.59	167.6
M3*	42.71	33.13	45.97	Open(1995)	37.24	42.17	167.5
				Inf*	8.722	6.441	18.22
				Inf(1993)	9.973	7.924	22.91
				Inf(1999)	4.142	4.046	13.10
				N_exp*	111.0	103.6	247.6
				N_exp(1991)	107.7	97.12	207.3
				N_exp(1993)	112.4	100.8	229.0
				N_exp(1995)	110.7	98.93	237.7
				GFCF*	18.77	16.50	46.32
				GFCF(1991)	19.77	20.46	31.28
				GFCF(1995)	19.65	21.00	40.30



---

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

**Source:** Authors' calculations using Stata 14.2

As per the setup data as stated above, synthetic control group results are discussed here. Figures 13 and 14 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 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 results. Therefore, even with the changed predictors, the untreated unit appeared to have the 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 standard and ultimately alleviating poverty. The gap between Pakistan and synthetic line is shown in Figure 15. Results came opposite to the postulated hypothesis H6: there is incremental impact of adoption of Islamic finance in poverty alleviation.

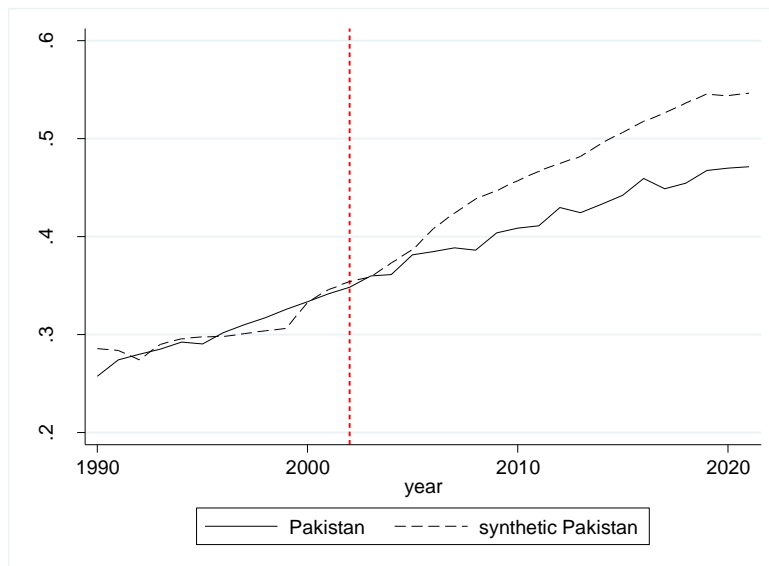


Figure 13 – Synthetic control group results of poverty alleviation (group C)  
Source: Authors' calculations using Stata 14.2

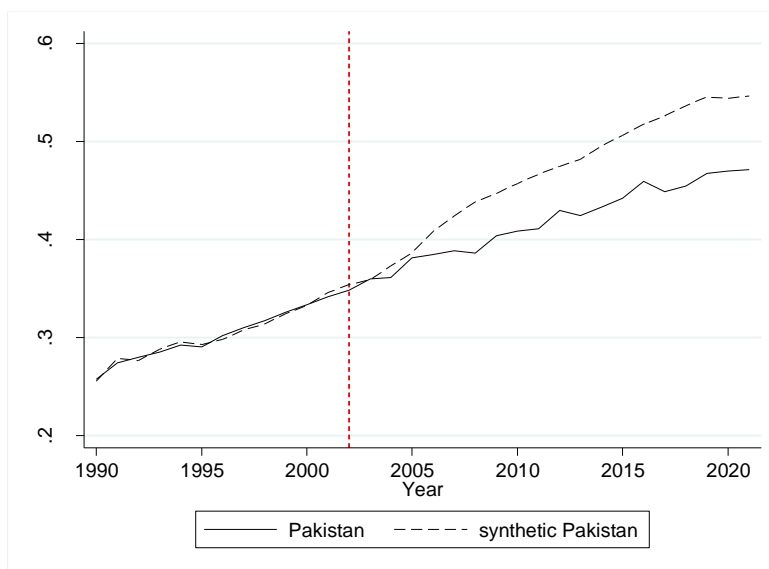


Figure 14 – Synthetic control group results of poverty alleviation (group D)  
Source: Authors' calculations using Stata 14.2

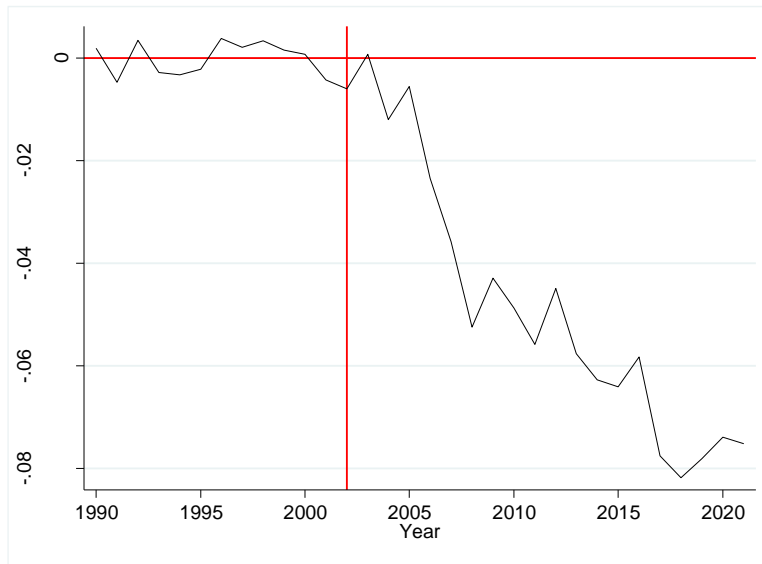


Figure 15 – Poverty alleviation gap of Pakistan and synthetic Pakistan (group D)  
Source: Authors' calculations using Stata 14.2

The results are inconsistent with the previous finding where 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 spurring the investing activities that gives rise to real sector to grow. Furthermore, the credit expansion plays a vital role in raising overall living standard in an economy. The larger access to credit enhances investments, create job opportunities, increase household consumption, and hence improve the quality of life. However, the results in previous studies are confined to specific countries. For instance, majority of work done in Indonesia (MAJID et al., 2019; PAREWANGI and ISKANDAR, 2020), where the role of small 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% people who borrowed money from financial institution in Indonesia and 13% of it was requested via mobile banking application (WDI Findex Index data based 2021). Whereas Pakistan

the ratio is 30% and only 4% of them was using mobile banking. The easy of credit access to poor should be the prime focus in order to have collective raise in poverty level. Moreover, the inconsistency of results to findings of SHAUKAT and ZHU (2021), is due to the fact, the author developed Zakat index by incorporating domestic investment, human capital, exchange rate, savings, and trade openness. The study provided an alternate solution by implementing 2.5% rate of Zakat on constructed zakat index and its potential impact on poverty alleviation.

### **3.4.2 Robustness check (Section IV)**

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 got in the first section are not valid. On the other hand, as the synthetic control group showed an incremental impact in post-adoption period, it is expected that majority of the gaps would be positive. Figure 16 shows the results of placebo results after excluding the outliers with highest pre-adoption prediction errors. The results show that with few exceptions, the trend in pre-adoption period is a closely fit and mimics the relative synthetic control group created for each country.

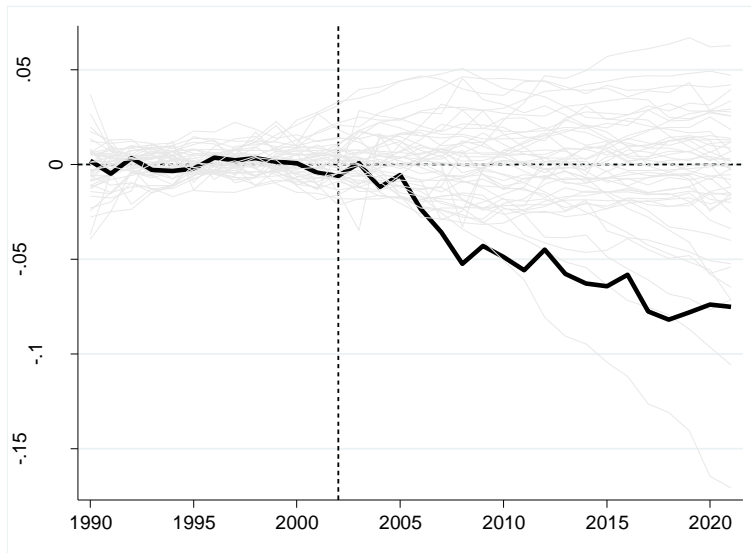


Figure 16 – Placebo tests after removing the outliers (group D)  
Source: Authors' calculations using Stata 14.2

### 3.5 Summary of hypothesis acceptance and rejection

Based on the results obtain in section I, II, III, and IV, Table 10 shows the final standings of all six hypothesis

Table 10: Summary of Hypothesis acceptance and rejection

Objectives	Postulated Hypothesis	Result
Objective 1	<b>H1:</b> Islamic financial depth has positive effect on economic growth of Pakistan	Accepted
	<b>H1a:</b> The positive effect of Islamic financial depth is more than the conventional financial depth on economic growth Pakistan	Rejected
Objective 2	<b>H2:</b> Risk-sharing financing positively affects real economic output	Accepted
	<b>H3:</b> Non-Risk sharing financing positively affects real economic output	Accepted

	<b>H5:</b> Better asset quality positively moderates the Islamic finance and aggregate economic output relationship	Accepted
Objective 3	<b>H4:</b> There is an incremental impact of financial development on economic growth by adopting Islamic banking.	Accepted
Objective 4	<b>H6:</b> Islamic financial development has a differential positive impact on poverty alleviation	Rejected

---

## 4 CONCLUSION, POLICY IMPLICATION, AND LIMITATION

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

### 4.1 Key findings

The results of the first section led to the conclusion that a healthy presence of Islamic financial assets within the economy positively influences economic growth. This finding confirms the first hypothesis (H1), which supports the idea that Islamic financial depth has a beneficial impact on economic growth. Interestingly, it is revealed that in a country with a dual banking system (combining Islamic and conventional banking), the traditional banking model is equally important. 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 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). Conventional financial intermediation is found to play a defining role in shaping the economy in a prosperous manner. The results imply that in Pakistan, there is strong evidence supporting the supply-leading theory. However, the impact originating from the conventional banking system is much stronger and more

impactful than that of Islamic banking. As a result, it is indicated that the presence of Shari'a-based banking is still in its early stages.

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 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 (such as (BOUGATEF et al., 2020; GUIZANI and AJMI, 2021)). Moreover, sale-based financing contract (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 greater impact on total economic output.

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. 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 trigger overall economic growth. Hence, there is a marginal impact on the country's economic growth in the post-adoption period.

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

## **4.2 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. Secondly, it is further implied that there is a dire need for innovation and the implementation of FinTech in the Islamic banking industry, particularly on the financing side. Thirdly, at a micro level, banks' management can shift their focus towards profit and loss financing modes rather than relying heavily on debt-based financing. 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.

## **4.3 Limitation of the study**

In line with the study's objectives, the use of 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 Sudan,



despite achieving a 100% Islamic banking system, 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. 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.

## **5 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. Below are the key new scientific results:

### **5.1 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.

## **5.2 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.

## **5.3 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.

## **5.4 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.

## 6 REFERENCES

- 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.
- 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.
- 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.
- 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.

- ARIFF, M., 1988. Islamic banking. *Asia Pac Econ Lit* 2, 48–64.
- AYUB, M., 2013. Understanding Islamic finance. Gramedia Pustaka Utama.
- BALTAGI, B.H., 2013. Panel Data Forecasting. pp. 995–1024.
- 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.
- BAYAR, Y., 2017. Financial development and poverty reduction in emerging market economies. *Panoeconomicus* 64, 593–606.
- BECK, T., DEMİRGÜÇ-KUNT, A., MERROUCHE, O., 2013. Islamic vs. conventional banking: Business model, efficiency and stability. *J Bank Financ* 37, 433–447.
- 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.
- 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.
- 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.

- 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.
- ČIHÁK, M., SCHAECK, K., 2010. How well do aggregate prudential ratios identify banking system problems? *Journal of Financial Stability* 6, 130–144.
- 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.
- DONTHU, N., GUSTAFSSON, A., 2020. Effects of COVID-19 on business and research. *J Bus Res* 117, 284–289.
- 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.
- 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.
- 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.
- FURQANI, H., MULYANY, R., 2009. Islamic banking and economic growth: Empirical evidence from Malaysia. *Journal of Economic Cooperation & Development* 30, 59–74.
- GREENE, W.H., 2003. *Econometric Analysis*. Pearson Education India.
- 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.

- 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.
- HASSAN, M.K., HUSSEIN, K.A., 2003. Static and dynamic efficiency in the Sudanese banking system. *Review of Islamic Economics* 14, 5–48.
- HAYAKAWA, K., 2007. Small sample bias properties of the system GMM estimator in dynamic panel data models. *Econ Lett* 95, 32–38.
- HSIAO, C., 2014. *Analysis of Panel Data*. Cambridge University Press.
- 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.
- IFSB, 2022. *Islamic Financial Services Industry Stability Report 2022*.
- 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.
- KHAKI, A.R., SANGMI, M.-U.-D., 2011. *Islamic Banking: Concept and Methodology*. SSRN Electronic Journal.
- KHAN, M.S., SSNAHDJI, A.S., 2001. Threshold Effects in the Relationship between Inflation and Growth. *IMF Staff Papers* 48, 1–21.
- 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.
- LEDHEM, M.A., MEKIDICHE, M., 2022. Islamic finance and economic growth: the Turkish experiment. *ISRA International Journal of Islamic Finance* 14.

- 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.
- 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.
- MASRIZAL, M., TRIANTO, B., 2022. THE ROLE OF PLS FINANCING ON ECONOMIC GROWTH: INDONESIAN CASE. *Journal of Islamic Monetary Economics and Finance* 8.
- MCKENZIE, D., 2010. *IFSL Research: Islamic Finance 2010*. London.
- MENSI, W., HAMMOUDEH, S., TIWARI, A.K., AL-YAHYAE, 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.
- 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.
- NARAYAN, P.K., 2005. The saving and investment nexus for China: evidence from cointegration tests. *Appl Econ* 37, 1979–1990.
- NOSHEEN, RASHID, A., 2021. Financial soundness of single versus dual banking system: explaining the role of Islamic banks. *Portuguese Economic Journal* 20, 99–127.
- 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.
- 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.

- 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.
- 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.
- SCOTT, C., 2021. *Causal inference: The Mixtape*. Yale University Press.
- 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.
- 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.
- 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.
- USMANI, M.T., 1998. *An introduction to Islamic finance*. Maktab Ma'riful Quran., Karachi.
- WILSON, R., 1983. *Banking and Finance in the Arab Middle East*. St. Martin's Press, New York.
- 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 HAJJA, E., 2017. Financial development, Islamic finance and economic growth: evidence of the UAE. *Journal of Islamic Accounting and Business Research* 8, 2–22.



## 7 LIST OF PUBLICATIONS

### Publications related to dissertation topic:

1. **Saleem, A.,** Sági, J., & Setiawan, B. (2021). Islamic financial depth, financial intermediation, and sustainable economic growth: ARDL approach. *Economies*, 9(2), 49. [**Scopus Q2**]
2. **Saleem, A.,** Setiawan, B., Bárczi, J., & Sági, J. (2021). Achieving Sustainable Economic Growth: Analysis of Islamic Debt and the Islamic Equity Market. *Sustainability*, 13(15), 8319. [**Scopus Q2**]
3. **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. [**Scopus Q3**]
4. **Saleem, A.,** Daragmeh, A., Zahid, R. A., & Sági, J. (2023). Financial intermediation through risk sharing vs non-risk sharing contracts, role of credit risk, and sustainable production: evidence from leading countries in Islamic finance. *Environment, Development and Sustainability*, 1-31.[ **Scopus Q1**]
5. **Saleem, A.,** Bárczi, J. Sági, J., (2021). The Microeconomic aspects of Islamic financial sector: An overview of literature. *Economics & Working Capital*, 3-4
6. **Saleem, A.,** Bárczi, J., & Sági, J. (2021). COVID-19 and Islamic stock index: Evidence of market behavior and volatility persistence. *Journal of Risk and Financial Management*, 14(8), 389. [**Scopus Q3**]
7. **Saleem, A.,** & Ashfaq, M. (2020). An analysis of profitability determinants of Islamic banks: empirical study of Malaysia vs Pakistan. *International Journal of Business Reflections*, 1(2).
8. Setiawan, B., **Saleem, A.\***, Nathan, R. J., Zeman, Z., Magda, R., & Barczi, J. (2021). Financial market development and economic growth: Evidence from ASEAN and CEE region. *Polish journal of management studies*, 23. [**Scopus Q2**]
9. Yunus, M., Setiawan, B., Bhagat, P. R., & **Saleem, A.** (2022). Financial Market Development on Economic Growth in Indonesia Using Principal Component Regression Analysis. *Jurnal Akuntansi dan Keuangan*, 10(1), 83-92.

## **Publications other than dissertation topic**

10. Mousa, M., **Saleem, A.**, & Sági, J. (2021). Are ESG shares a safe haven during COVID-19? Evidence from the arab region. *Sustainability*, 14(1), 208. [**Scopus Q2**]
11. Ali, K., Ashfaq, M., **Saleem, A.\***, Bárczi, J., & Sági, J. (2022). Did the Islamic stock index provide shelter for investors during the COVID-19 crisis? Evidence from an emerging stock market. *Risks*, 10(6), 109. [**Scopus Q2**]
12. Khan, M. K., Zahid, R. A., **Saleem, A.**, & Sági, J. (2021). Board composition and social & environmental accountability: a dynamic model analysis of Chinese firms. *Sustainability*, 13(19), 10662. [**Scopus Q2**]
13. Zahid, R. A., **Saleem, A.**, & Maqsood, U. S. (2023). ESG performance, capital financing decisions, and audit quality: empirical evidence from Chinese state-owned enterprises. *Environmental Science and Pollution Research*, 30(15), 44086-44099. [**Scopus Q1**]
14. Daragmeh, A., **Saleem, A.**, Bárczi, J., & Sági, J. (2022). Drivers of post-adoption of e-wallet among academics in Palestine: An extension of the expectation confirmation model. *Frontiers in Psychology*, 13, 984931. [**Scopus Q2**]
15. Taera, E. G., Setiawan, B., **Saleem, A.**, Wahyuni, A. S., Chang, D. K., Nathan, R. J., & Lakner, Z. (2023). The impact of Covid-19 and Russia–Ukraine war on the financial asset volatility: Evidence from equity, cryptocurrency and alternative assets. *Journal of Open Innovation: Technology, Market, and Complexity*, 9(3), 100116. [**Scopus Q1**]
16. Zahid, R.M.A., **Saleem, A.\***, Maqsood, U.S (2023). Moderating role of audit quality in ESG performance and capital financing dynamics: insights in China. *Environment Development and Sustainability* 1-30 [**Scopus Q1**]
17. Zahid, R. A., Ali, Q., **Saleem, A.**, & Sági, J. (2023). Impact of geographical, meteorological, demographic, and economic indicators on the trend of COVID-19: A global evidence from 202 affected countries. *Heliyon*, 9(9). [**Scopus Q1**]

## **Conference Papers**

18. **Saleem, A.,** & Bárczi, J. THE EFFECTS OF INDUSTRY 4.0 ON THE GLOBAL FINANCIAL SECTOR. A HISTORICAL VIEW. and alternative solutions in Central Eastern Europe, 125.
19. **Saleem, A.,** Sagi, J., 2020 Is Islamic Stock Index immune to COVID-19 Crisis? Evidence from Thomson Reuters Islamic global Indices. Conference Proceedings of the “CHALLENGES AND CHANGES UNDER THE SHADOW OF COVID-19” at 7th VUA YOUTH Scientific Session at Godollo.