

Determinants of Financial Development and their Role Towards Financial Integration

Dissertation zur Erlangung des akademischen Grades
Wirtschafts- und Sozialwissenschaften (Dr. rer. pol.)
Submitted in Faculty of Economics and Management of the
University of Kassel

Date of Submission: Oct 17. 2019

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Date of viva voce: February 4, 2020

Abstract

This thesis is composed of six chapters with four main chapters that encompasses three broad topics—Islamic financial development-growth, determinants of financial development and financial integration. The existing literature mainly focuses on their impact on economic growth or their role towards macroeconomic stability/instability. If financial sector is important, then why do countries have underdeveloped financial markets? In this thesis therefore, we explore a more fundamental question that, what determines financial development and the role of these determinants towards financial integration?

The second Chapter as a first step, establishes the link between financial development and economic growth. In that context we took two distinct sections of the financial market to see their impact on economic growth. These two sections include—the Islamic financial market and the conventional financial market. Therefore, in this chapter we, (i) explore the effect of Islamic finance on growth—which has not been explored as extensively as for conventional finance. (ii) investigate the role of Islamic finance on economic growth, that will enable policy makers to formulate policies towards the Islamic financial market and its regulation. Our results shows the supply-leading hypothesis to be valid between Islamic finance and economic growth. For the case of conventional finance, the majority of the results also validates the supply-leading hypothesis. The outcomes for Islamic finance do not change even in the presence of conventional finance. Similar results were found for the time series study on Pakistan which was included in Chapter 3. Being an important player among the countries undergoing transformation, growth and increased usage of Islamic banking, our choice for Pakistan was eminent.

After establishing the link between financial sector and growth, we then turn in Chapter 4 towards the determinants of financial development. We extract many possible factors from the theory and test the effect of these factors on improving financial sector development. We also test the Rajan & Zingales (2003) simultaneous hypothesis, which is then extended to include institutions. The panel data is divided into three groups—low income, middle-income and upper middle-income countries. Our results show that the determinants affect the financial sector development heterogeneously across income groups. For the lower middle income countries we do not find evidence for a positive effect of the determinants. Beginning from the middle income group, the determinants start to positively affect financial sector development. Rajan

and Zingales hypothesis is partially established for lower middle-income group in its strict version. A loose version of the hypothesis for the upper-middle income countries was also verified. The result indirectly points out to the threshold literature.

The determinants of financial development also suggested to improve financial integration. In Chapter 5, we explore the factors that may help to improve financial integration. We took a similar approach of dividing the countries into three groups and tested the effectiveness of the proposed determinants on the *de-jure* measure of financial integration. Our initial results verify that the effect is not homogeneous across income groups. Therefore in the next step we tested the same determinants in quantile regression environment. Our results, like Chapter 4, favor indirectly the threshold condition according to which the factors seem to improve financial integration only at higher levels.

Dedication

To my “Elders”.

Declaration

I herewith give assurance that I completed this dissertation independently without prohibited assistance of third parties or aids other than those identified in this dissertation. All passages that are drawn from published or unpublished writing, either word-for-word or in paraphrase, have been clearly identified as such. Third parties were not involved in the drafting of the content of this dissertation; most specifically, I did not employ the assistance of a dissertation advisor. No part of this thesis has been used in another doctoral or tenure process.

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Acknowledgment

I begin with the name of Allah SWT who gave me the ability and required strength to complete this difficult and challenging task. Not only He is the one who created the opportunity for me but also helped me in my bad and good times to take this work towards completion. Praise be to His Prophets especially on the last Prophet Muhammad (PBUH) who showed the mankind, righteous path.

I owe my humble gratitude to my supervisor, Prof. Dr. Georg von Wangenheim who gave me the opportunity to work in his research group. I still remember the time when I received a reply from him, after my email, that he is willing to supervise me. After working with him for over four and a half years, I found him to be very supportive and on top of all, a very nice human being. Without his continuous support this project would never have been completed. I am thankful to him for the encouragement, appreciation and valuable comments throughout my research work. I am also thankful for the scheduled (which was planned for thirty minutes but took 3 hours to conclude :-)) and unscheduled meetings which also enabled me to improve my work. I am indeed indebted to him for all the support whether for my research work or conference or lectures and for so many things that i cannot even count. I am very much inspired by his personality and tried adapting some of his habits.

I am also thankful for the support and appreciation by Prof. Dr. Christian Klein. I am especially grateful to him for his trust that he showed in giving me a teaching responsibility at the Department of Corporate Finance, University of Kassel. It was a unique experience for me. I also acknowledge his support during my research due to which I was able to write a paper with him as co-author published in Journal of Islamic Monetary Economics and Finance.

I would also like to thank Higher Education Commission (HEC) and Deutscher Akademischer Austauschdienst (DAAD) for providing me the required funding to undertake PhD studies in Germany. Towards the end of my studies, I am also grateful to University of Kassel (Abschlussstipendium) and DAAD-STIBET for providing me the needed funding to complete the PhD.

I also acknowledge the support of my university in Pakistan–International Islamic university (IIUI), in providing the platform to be able to study at the University of Kassel. Here I will never forget my teachers at IIUI and Quaid-i-Azam univerisy (QAU) Islamabad whose hard work resulted in shaping me and this research work. I would like to mention one particular name–Dr. Mazhar Iqbal–from QAU, with whom I did my Master thesis.

Here this acknowledgment would be incomplete without mentioning my sisters Huma, Hina and Mariam. Their continuous support and encouragement remained with me throughout my stay in Kassel. I missed you all. I also like to thank my friends in Kassel who remained supportive and lifted my spirits in low times. I would like to mention Muhammad Mohsin, Abdul Rafay, Muhammad Rizwan, Muhammad Khurram who supported me in every situation. I would like to mention Sania Zehraa for her support, time and care. I am also grateful for having a chance to meet a wonderful person–Aaye Noor who always believed in me to finish the thesis. Dr. Michael Dose is a special name in my list of friends I made in Kassel. He was (and still is) very supportive towards me for my affairs beyond the university. Whether it was an issue at bank or Ausländerbehörde he remained “on my side”. I enjoyed his German language lessons and the time we spent as office mates. I also like to mention Gabi Reichardt, Sylvia Rückebeil, Leo Reutter, Kevin Schumann and Gerrit Gräper for their support. Of course the list would be incomplete without mentioning Ms. Vesterling, Ms. Quanz and Ms. Wensch. These ladies took care of the administrative side for me at the University of Kassel.

In the end I would like to mention the role of my parents who played a crucial role throughout my life. I am not able to thank them as I feel their support and kindness is above and beyond words and thanks seems to be small word for them. May Allah SWT bless them.

Azeez, Jawad Ahmad
Ludwig Mohr Straße, Kassel.
Friday, October 11, 2019.

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Nomenclature

AAOFI	Accounting and Auditing Organization for Islamic Financial Institutions
ADF	Augmented Dickey-Fuller
AIC	Akaike Information Criteria
ARDL	Autoregressive Distributed lag
ASEAN	Association of the South East Asian Nations
CAGR	Compound Annual Growth Rate
CFD	Conventional Financial Development
CTFS	Committee for the Transformation of Financial System
DC	Domestic Credit Provided by Commercial Banks
DFE	Dynamic Fixed Effect
ECM	Error Correction Model
EU	European Union
FD	Financial Development
FDI	Foreign Direct Investment
FI	Financial Integration
FMOLS	Fully Modified Ordinary Least Square
GCC	Gulf Cooperation Council
GMM	Generalised Method of Moments

IB	Islamic Banking
IBD	Islamic Banking Development
IBGL	Ratio of Islamic Banking Gross Loans to Private and non-Private Sectors to GDP
IBTA	Ratio of Islamic Banking Total Assets to GDP
IBTCD	Ratio of Islamic Banking Total Customer Deposits to GDP
ICRG	International Country Risk Guide
IDB	Islamic Development Bank
IFM	Islamic Financial Market
IFSB	Islamic Financial Services Board
IIFM	International Islamic Financial Market
IILM	International Islamic Liquidity Management
IMF	International Monetary Fund
LL	Liquid Liabilities
LR	Likelihood Ratio
MENA	Middle East and North Africa
MG	Mean Group
NPFs	Non-Performing loans
OECD	The Organisation for Economic Co-operation and Development
OIC	Organization of Islamic Cooperation
PC	Private Credit Provided by Commercial Banks
PLS	Profit and Loss sharing
PMG	Pooled Mean Group
PRS	Political Risk Service

QR	Quantile Regression
RZ	Rajan and Zingales Hypothesis
SBP	State Bank of Pakistan
SIC	Schwarz Information Criteria
TFP	Total Factor Productivity
VAR	Vector Auto Regressive
VECM	Vector Error Correction Model
WDI	World Development Indicators

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Chapter 1

Introduction

1.1 Motivation

It is estimated that rich countries are about 30 times richer than the poor in general. Since the work of Smith (1776), the literature on growth has proposed different explanations as to why some countries grow faster and why some do not. However, to date, growth economists have not been able to develop a convincing theory to answer the question above. In the past, researchers proposed many possible answers as to why countries grow differently. A most notable explanation is through the application of typical production functions, particularly differences in resources and capital (Helpman 2004; Acemoglu 2009). Among them, capital is one of the important elements in growth, and classical literature considered it to be fixed in the short run and variable in the long run. The literature on growth has also indicated differences in investment in terms of physical and human capital, along with technology that has the potential of affecting the real per capital growth.

More recent studies related to growth have pointed out a key factor that may help to explain the growth difference across countries—the development of financial institutions and markets (Levine 1997; Ang 2008). The strand of the literature in which the argument for financial institutions emerged was related to the endogenous growth model, which itself started in the 1990s. The main point of the growth models above was that finance generate an external effect on aggregate investment efficiency. Growth theory suggests two ways through

which finance can influence growth. First, the capital accumulation channel, also known as the quantitative channel, was based on a hypothesis put forward by Gurley & Shaw (1955) according to which financial intermediaries mobilize savings that then are channeled toward high return projects. The allocation of capital to high-return projects influences growth. The second channel through which finance affects growth is the total factor productivity channel (TFP), or the qualitative channel, according to which financial intermediaries reduce the informational asymmetries, thereby increasing the efficient allocation of capital and monitoring these projects as they progress. This approach allows the use and ability to upgrade the technology used to carry out these tasks. Lateral studies have also confirmed the views above. For example, according to King & Levine (1993b) and Galetovic (1996), the financial system affects the rate of technology “A” by which society allocates funds to projects estimated to earn highest return. In the work of Aghion et al. (2005), it is the difference in financial development that determines the resources available to entrepreneurs who can then innovate. In the work of Bencivenga & Smith (1991) and Obstfeld (1994), finance influences the risk structure of projects, thus increasing the long-run growth. According to Greenwood & Jovanovic (1990), financial intermediaries have the responsibility to produce information about investment projects that will help investors to make better decisions that may, in turn, improve capital allocation.

This thesis has a three-fold objective. We want to test if financial development (FD) is good for growth. In this context, we tested the linkage for a new segment of financial market known as Islamic banking. The thesis then turns to identify what may be the factors that can increase FD if Islamic banking can indeed affect growth positively. The last purpose is to determine the role of FD and other economic factors for financial integration (FI). In the following section, we explain the emergence of financial markets and provide a summary of the background for each theme. After this section, we present a broad perspective related to each objective. After which we present the state of the art and summary of the results. The last section summarize the results for each of the four themes and the overall outcome of the thesis.

1.2 Relevance of Financial Markets

The availability of funds to people is not uniform. Some have more funds than others. People who have excess funds need to invest somewhere or to keep it safe (say the investor). On the other hand, there are individuals (say borrowers) who have some ideas, but they do not have enough funds to start them or to pursue them until they become profitable. If borrowers have access to investors to request their funds, they need to inform them of their intended project and what is in it for them. Similarly, investors would want their money to be safe and would not like to invest in a project that will expose them to excess and unusual risks. Besides risk consideration, it is difficult for investors to find the right borrowers and vice versa. If there is no systematic way of disseminating and collecting the required information, it will certainly raise the costs of funds for borrowers and investors. In addition, after the lending process, there will most likely be an agency cost involved. Borrowers have inside information about the projects that they do not want to disclose to investors. Since investors cannot distinguish between honest and dishonest borrowers, they incorporate a lemon premium¹ in their financing that will raise the cost for honest borrowers. Therefore, it all comes down to one single solution and problem—“information”—with which many future and current aspirations are tied up.

Thus, in a world where there are no frictions, such as the world described by Arrow (1973) and Debreu (1959) where there is no information and no transaction costs, there is no need to have a financial system and its peripheral functions (e.g., monitoring projects, auditing managers, or facilitating transactions). However, in reality, all of these frictions are present, and a solution is required. Financial markets and intermediaries can offer such a solution. Through economies of scale and scope, financial markets reduce the asymmetric information problem along with other frictions in the market, such as search costs. The reduction of such frictions allows the optimal allocation of capital and the reduction of transaction costs. The ability of financial systems

¹See Akerlof (1978). The lemon problem exist in investing through asymmetric information of the lender regarding creditworthiness of borrower. In that context, the higher yield demanded by lender as compared to market rate is called lemon premium.

can lead to long-term growth (see Diamond 1984; Williamson 1986; King & Levine 1993b). A typical financial system consists of banks, stock markets, and financial intermediaries, such as pension funds, insurance companies, and so forth. There is usually a regulator in the form of a central bank that monitors and supervises the operation of above functions and market as a whole.

The literature described above indicates an important role for the financial sector, and three roles can be broadly specified, including (i) to mobilize resources, (ii) to efficiently allocate them, and (iii) to monitor them. Levine (1997) pointed out five key functions of any financial system: (i) diversification of risk, (ii) allocation of capital, (iii) monitoring of financed ventures and capital governance of these borrowers, (iv) mobilizing and pooling of savings, and (v) facilitating the exchange of goods and services. Given the above functions and the important role of the financial system, it would be interesting to see a history of the financial system and why it emerged.

Thus, any financial system plays a crucial role in mobilizing and allocating savings to high-yield projects and an additional task to monitor them. A financial system that performs the above functions as mentioned by Levine (1997) efficiently is said to be more developed. In other words, the term FD refers to the improvement in producing information about possible investments and allocating capital, monitoring firms, exerting corporate governance, trading, diversifying, managing risks, mobilizing, pooling savings, and easing the exchange of goods. The World Bank has indicated that FD occurs “when financial instruments, markets, and intermediaries ease the effects of information, enforcement, and transactions costs and therefore do a correspondingly better job at providing the key functions of the financial sector in the economy”².

²See The World bank website <http://www.worldbank.org/en/publication/gfdr/gfdr-2016/background/financial-development>

1.3 Evolution of Thinking on Nexus between Finance and Growth

The proposed link between financial development and growth has always been a point of interest to researchers. The debate can be traced back to the work of Schumpeter (1934), who viewed banks as a catalyst in economic growth through their function as a provider of loans to entrepreneurs. After Schumpeter, there was much debate on the proposed link, and different authors have come up with their opinions and conclusions. They have used theoretical as well as empirical analyses to reach their conclusions. Theoretical studies can be divided into four main strands. First, the allocative role of financial development was explored in some studies (Bencivenga & Smith 1991; Greenwood & Jovanovic 1990; Pagano 1993; Wu et al. 2010). The second strand of the literature focuses on the risk diversification role of financial markets. Through risk reduction, firms diversify their portfolios and increase liquidity, which increases the prospect of growth (see Levine 1991; Saint-Paul 1992). The third strand provided evidence on the acquisition of new technologies and fostering specialization in entrepreneurship (Greenwood & Smith 1997). The fourth strand involves the corporate control aspect of financial development that will impact economic growth (Demirgüç-kunt & Levine 1996; Jensen & Murphy 1990).

As mentioned above, the link between FD and economic growth was a point of interest to many researchers, but the outcomes of their research vary. If we look at the literature, we can categorize the outcome into three distinct groups. The first group agrees that a well-developed financial system will affect long-term growth by enhancing the allocation of capital. Goldsmith (1969b)³, gave a huge push in directing research toward the topic by using a sample of 35 countries, establishing a positive correlation between FD and growth. Later researchers (Berthelemy & Varoudakis 1996; King & Levine 1993a; Andersen & Tarp 2003; Bencivenga et al. 2018; Cooray 2010) also held similar views based on their research. This view is also called supply-leading,

³the research by Goldsmith (1969b) and McKinnon (1973) is considered to be the second wave of research after Schumpeter (1934)

where FD provides the stimulus for economic growth. The second view favors the demand, where financial markets develop in response to a demand created in the market. A significant name favoring this view is Robinson (1952). When an economy grows, households and firms demand more financial services, which may be a reason why FD occurs. The third type of researcher, who viewed FD to be irrelevant in the growth process, include scholars such as Lucas (1988), who said that the role of finance is overemphasized. Modigliani & Miller (1958) developed their model, in which they showed that financial structure is irrelevant in decisions that firms make.

In the studies mentioned above, FD was measured by employing different indicators (proxies). The most relevant indicators belong to one of two types—namely, bank-based and stock market-based indicators. In most studies exploring the nexus, the conclusion was consistent with the view that financial markets are more important than the provider (i.e., stock markets or banks). It is viewed that financial markets and intermediaries are complements and not substitutes in promoting growth. However, a few studies have emphasized the role of banks in promoting growth as compared to stock markets (see Arestis et al. 2001).

1.4 Islamic Financial System

In this section, we will briefly describe the history of the Islamic financial system. Given its importance, it is pertinent to look at how the Islamic financial system evolved. We will also give a rationale for such a system especially in the context of religious prohibition of interest on Muslims.

1.4.1 History of the Islamic Financial System

If we look at the historical development of Islamic finance, it started with the creation of Mit-Ghamar (1963) (which was motivated by German savings banks) and then afterwards Naseer Social Bank in 1971 in Egypt. The creation of Islamic Development Bank (IDB) in 1975 provided a boost to Islamic finance, followed by the first true Islamic bank—Dubai Islamic

Bank in the United Arab Emirates. The creation of IDB was more focused on developing and propagating information about Islamic finance around the world, especially in Islamic countries (M. Iqbal & Molyneux (2005a)). Another objective of IDB was to form rules and regulations, as well as to impart technical training to individuals to better understand how Islamic banks works. Dubai Islamic bank was more focused on carrying out commercial functions. The success of Dubai Islamic Bank paved the way for the creation of other Islamic banks, such as Faisal Islamic Bank (Sudan) and Kuwait finance house (Kuwait) in 1977. Sudan and Pakistan were the first two countries that pledged to convert their financial system fully to Islamic banking. Pakistan led the process by legally amending the constitution to allow for the operation of *Sharia*-compliant profit-sharing financing companies in the 1980s (Rammal & Parker 2013; Khan & Mirakhor 1990a). Iran, in 1983, then enacted an interest-free banking system to replace conventional banking. Sudan also moved in the direction of making its financial system interest free from 1984. Since its creation, Islamic banking has seen the introduction of many standards specifically designed for this type of banking. A name worthwhile to mention here is the Accounting and Auditing Organization for Islamic Financial Institutions (AAOFI) in Bahrain, which issues accounting, auditing, and *Sharia* standards for Islamic financial institutions for financial reporting purposes. Another institution, the Islamic Financial Services Board (IFSB) created in 2002 in Malaysia, has the responsibility of issuing supervisory and regulatory standards plus guidelines⁴. Two other organizations—the International Islamic Financial Market (IIFM) (2001) and the International Islamic Liquidity Management Corporation (IILM) (2010)—issue guidelines for secondary markets trading and for new financial instruments (Rammal & Parker (2013)).

A major part of the Islamic financial market, Islamic Banking started nearly 35 years ago and, with the passage of time, has grown a notable size and volume. The first Islamic bank was established in 1975 and since

⁴Till April 2015, AAOFI has 88 standards issued in lieu of accounting and governance matters related to Islamic banks and IFSB has issued 17 prudential standards and 6 guidance notes.

then Islamic banking has grown to be the dominant sector in overall Islamic financial market. According to a report⁵ the total Islamic banking assets was measured at \$ 1.72 trillion at the end of 2017. At the end of same period, the total number of Islamic banks stood at 505 among which 402 are commercial banks. Relative to 2012, Islamic banks assets grew by a compound annual growth rate (CAGR) of 6%. Iran, Malaysia and Saudi Arabia are the three major markets-constituting 65% share in total assets. In particular the growth of Islamic banks assets was remarkable for Malaysia which stood at 16% for 2017. Currently there are 56 countries which have the presence of Islamic banks or Islamic finance assets. Among the non-Islamic countries, Australia and Cyprus have the fastest growth in Islamic finance assets in 2017.

1.4.2 Rationale for Islamic Banking

While Islamic banking performs almost similar functions as conventional banking does, it is fundamentally different. Many researchers have attempted to explain how Islamic Banking is fundamentally different from conventional banking, while some have argued that the two seem to have only slight differences (see Kettell 2011; Hanif et al. 2012; Hanif 2012; Ayub 2007).

According to Ariff (1988) and Z. Iqbal & Quibtia (2017), the basic difference between Islamic and conventional banking is the presence of “interest” or “*Riba*” The interest, or *Riba*, is defined as follows: “Any additional amount over the principal in the contract of loan or debt is the *Riba* prohibited by the Holy Quran in several verses” (Usmani 1999)⁶. The interest⁷ is prohibited for Muslims in general, and several teachings in Islam caution against it. Siddiqi (2004) concluded that any excess amount that a bank charges on a loan is interest or *Riba*, and Muslim scholars have an almost unanimous opinion about this subject. In this context, it is mandatory for Muslims not to engage in transactions that involve interest. In that context, Islamic bank-

⁵Islamic finance development report 2018 published by Thomson Reuters.

⁶Paragraph 22, SAB-SCP (Sharia Appellant Bench. Supreme court of Pakistan). https://www.albalagh.net/Islamic_economics/riba_judgement.shtml.

⁷We acknowledge the debate between Muslim scholars as to *Riba* is really the interest or not. But there is a general consensus that what a conventional bank offers and charge is essentially interest.

ing provides an alternative to conventional banking by offering interest-free banking services. Therefore, Islamic banking offers services designed in the light of *Sharia*⁸ principles. Due to this reason Beck et al. (2013) showed that under-banking is prominent among Muslims as they are not able to find a bank that offer them a product free from interest or in line with *Sharia* principles. Due to the same reason Muslims are no putting their savings into the banks nor they are actively borrowing. If in the shape of Islamic banking, a platform is provided to them, then their unused saving can be channelised towards a productive venture.

If one considers other reasons for Islamic Banking, the presence of Islamic banks in a financial market (in any place or region) can provide “consumers” (whether Muslims or non-Muslims) a range of financial products, which can certainly be considered as substitutes. The idea is that all users, irrespective of their beliefs, can take the advantage of both types of banking. In this background, Islamic banking can be seen as new product of, or for, financial markets. This type of banking can be beneficial in its own ways. For example, conventional banks mostly lend on the principal of the credit worthiness of the borrower. In Islamic banking, the products are of such a nature that there is less emphasis on credit worthiness, and more importance is attached to the productiveness of projects. Because of such emphasis, more borrowers (who may not have the capacity to provide collateral) will be able to receive required loans (or investments) from banks (Yousri 2016). Therefore, in a way, Islamic banking provides an alternative to conventional banking and provides individuals with different choices in the financial sector for both lending and borrowing. The alternative products from Islamic banking will deepen the financial markets further, thereby increasing overall financial development.

⁸*Sharia* is defined to be as Islamic Law which encompasses many different aspects of life and not only finance. The branch of *Sharia* that particularly deals with financial transactions is called Fiqh-al-Muamalat or Islamic rules of transactions.

1.5 Financial Integration

Financial integration (FI) refers to case where financial market participants across regions experience the three following characteristics: (i) They face rules and regulations that are the same across financial markets for all the instruments or services they are offering, (ii) a single participant has equal access to all the services and instruments offered and available to all participants, and (iii) they are treated equally in that banks do not discriminate against customers.

The definition of FI provided above lays down many characteristics and requires some elaboration. First, FI does not mean that there are no individual financial structures across regions. In other words, it does not necessarily imply one large financial structure across regions. Individual structures can exist even if the financial markets are fully integrated. Second, FI does not mean the absence of all frictions. Frictions in the financial market can persist even after integration. The definition only means that regions face frictions symmetrically. Third, from the supply and demand point of view, customers have equal access to banks and other intermediaries in a system that fulfills demand and provides supply. Alternatively, FI means equal and easy access to market for all participants. It essentially requires that no participant may be discriminated against based on location or national legal restrictions.

In the literature, there are many studies that favor FI based on its possible advantages. For example, Baele et al. (2004) stated at least three benefits. First, (i) FI provides more avenues for risk sharing, as Sebnem et al. (2016) also demonstrated empirically that sharing risk across regions brings production specialization. (ii) FI results in improved capital allocation, as investors will have more and freer choices to invest in funds, resulting in more chances that investments made will have the highest return opportunity. (iii) FI will improve the prospect of growth through optimal capital allocation and FD. So there is a strand of literature that favors the positive outcome for countries in FI. However still the researchers found mix evidence on the countries benefiting from FI⁹.

⁹see Section 1.7.4 and Chapter 5 for more details

1.6 Positioning of the thesis: The broad perspective

The four chapters that constitute the thesis are related to one another in a very systematic way. The following paragraphs contain an explanation of the hypothesis related to the four chapters and the underlying link between them.

As mentioned above, most of the studies looked at the banking sector and a few took stock market development to investigate the importance of the link between FD and economic growth. Currently, many developments are happening in financial markets, and if we look at it closely, we can observe a new sub-system emerging within these markets—namely, the Islamic Financial Market (IFM). This system was given the name “Islamic” because it follows (or at least tries to follow) specific principles laid down in the Islamic religion related to financial laws. Besides growing in size, research on IFM is limited. The current study contributes to the literature by exploring the link between Islamic banking—a major part of IFM—and growth. We do find some theoretical studies on the topic; however, empirical research to date is limited. The current study takes into account the diverse literature on the nexus between FD and growth, as given, and attempts to apply the same hypothesis on Islamic banking development (IBD). Besides trying to find some link between the two, the current study also aims to determine the direction of causality. The classical literature indicates supply-leading or demand-following views on the finance–growth nexus, and some scholars have found it to be irrelevant. However, if such a link exists, what is the direction of causality between IBD and growth? To address this question, we start by looking at IBD and analyze its role on economic growth for a panel of countries. Another contribution of the current study is that the link between IBD and growth is investigated in the presence of conventional financial banks, which can help to investigate the link for one system (Islamic or conventional banking) in the presence of the other. After establishing the link, the study turns to testing the existence of demand-following or supply-leading hypothesis for IBD and growth.

After establishing the link and direction of causality, the study then moves on to investigate the link for Pakistan as a case study to see if the link described above is established for time-series data. We took the case of Pakistan because of three reasons. First, it is the only country among the countries following the Islamic banking system for more than two decades for which there are not many studies available that can effectively analyze the IBD and growth relationship. It is important to note that, besides one of the first two countries that was determined to convert to Islamic banking fully and discard the conventional financial system based on interest, we found many studies for other countries, including Indonesia, Malaysia, and on Middle Eastern countries such as Qatar, Kuwait, and Bahrain. However, not many studies are available for Pakistan. Second, Pakistan's financial sector is growing, and there is a significant increase in IBD. Third, as Pakistan's Islamic finance sector is growing, it would be very relevant to see, for policy reasons, the contribution of IBD toward growth. For both panel and country analysis, the current study also contributes new IBD indicators for measuring Islamic banking development. These indicators were constructed in line with those used for conventional financial development.

The third chapter will try to find some potential determinants for FD. The finding of determinants will be very relevant in the sense that, if FD affects growth, then it becomes important to identify the factors that may affect FD. Determining the factors will help to understand what causes FD to improve. It is worthwhile to mention that, after extensive research on the finance–growth nexus, the determination of factors that could affect FD positively is an exciting area of interest. The literature on the underlying issue in the third chapter is still emerging, and to date, very few studies are available. Hence, there is a great deal of room and avenues present that can be explored in the context above. For example, the openness hypothesis put forward by Rajan & Zingales (2003) presents an interest group theory and postulates the simultaneous openness of current and trade accounts to boost FD. The current thesis contributes to and extends the literature by indicating determinants that actually promote the development of financial markets. It

includes economic and legal indicators, and it also tests the Rajan & Zingales (2003) hypothesis.

The determination of factors affecting FD take the thesis to the fourth chapter, where the same determinants are examined to learn how to improve FI, which is another topic associated with FD, and much has been said about its merits and demerits. There are many panel and times-series studies that indicate whether FI is beneficial or not. It is interesting to note that the determinants that have been identified for developing financial markets are more or less the same that have been pointed out for FI. Therefore it was tried to analyze the effect of those similar and other determinants for FI to determine not only the similarities between the determinants of FI but also to examine the contribution of FD to FI.

The discussion above essentially breaks down the thesis into three themes with four research chapters. The first theme is related to the nexus between FD and economic growth with a special reference to IFM. This theme is extended in the second chapter with a case study on Pakistan. The second theme and the third chapter are related to determinants of FD, where we try to find some of the determinants that may help to promote FD. The third theme and the fourth chapter deal with the role of different economic factors related to financial integration, including FD. In the next section, we provide a detailed overview and explain the state of the art for each theme, as well as the contribution of our thesis to the literature.

1.7 Positioning of the Thesis: The Narrow Perspective, State of the Art, and Objectives

In this section, we present the current state of research and details of our objectives for each topic. We follow the same scheme as above and in first two subsections discuss about the current state of research and objectives related to Islamic banking. The next subsection will elaborate on determinants of

financial development, whereas the last subsection will encompass the topic on financial integration.

1.7.1 Islamic Finance and Economic Growth

Given the importance of Islamic finance and as a system complementing and/or substituting the conventional financial system, it will be interesting to analyze whether it is capable of affecting growth. As already explained in the introduction regarding the link between finance and growth, it is important to analyze whether or not some link exists between IFM and growth in the context of Islamic banking because it is growing, and a positive link will be very relevant for policymakers to form policies and invest in this direction. We did not find many studies on this relationship as compared to the case for other non-Islamic financial markets. In the limited existing literature on Islamic banking, most of the studies address the core differences between Islamic and conventional modes of finance used in Islamic banking. Another set of studies address the idea of the superiority of one system over the other. The empirical literature addressing the link can be further categorized into two subsets: The first takes up the question on efficiency of Islamic banking and financial markets, and the second consists of an analysis of the link between IBD and growth. Therefore, given this picture, we can see that there is a limited amount of literature on the issue at hand.

One of the reasons that we did not find many empirical studies on the link between IBD and growth is the absence of time-series data, which limit a researcher's ability to analyze a subject objectively. Second is the fact that Islamic banking is relatively new; it started in 1970, but a significant number of Islamic banks began operating in the 1990s. Therefore, most of the empirical studies are available only after 2000. As Kassim (2016) noted, although Islamic banking and finance exist in 75 countries globally, studies on IBD's role in contributing to the real economy remain relatively few in number.

Among the studies available, it was stressed that, as compared to conventional finance, Islamic finance is more likely to affect economic growth.

Therefore, if a link with conventional finance is confirmed, it is more likely that the same link is valid (in some studies, it is expected to be even stronger) for Islamic finance. One theoretical study emphasizing this link was conducted by El-Galfy & Khiyar (2012). The authors discovered that Islamic banking does affect economic growth and provides a positive contribution to macroeconomic stability. The design of instruments and absence of interest helps stabilize the economy. Nagaoka (2010) and Khoutem & Nedra (2012) also emphasized this link due to the fact that the instruments used in Islamic banking have their roots in the real economy. They suggested that the instruments used in Islamic banking are based on the very principles that boost the real economy. These principles can be summarized in following three points, as suggested by Hussain et al. (2016). The first principle is equity, which protects the weak party in the contract by eliminating predetermined payments¹⁰. The payments mentioned are prohibited so that, in case a project suffers a loss, the parties in the contract can be protected from undue discrimination¹¹. The principle of equity also reduces excessive uncertainty from contracts (the *Sharia* equivalent of excessive uncertainty is *Gharar*). The second principle is the principle of participation, whereby participants are required to take some amount of risk and avoid returns that come just by the passage of time. This is in line with one of the *Sharia* principles: “Reward comes with risk taking”. The principle above asks people to indulge in some real activities and invest in economic assets. Third, the principle of ownership promotes the right of private property and to safeguard it. It prevents anyone from selling something that one does not own—for example, short selling.

Another reason why IBD is more likely to affect growth is the nature of instruments used in Islamic finance as explained by Islahi (2013). According to the author, they fall under one of the three general modes of financing—profit and loss sharing, non-profit and loss sharing, and fee-based products. This is in sharp contrast to financialization—the increasing importance of financial markets, financial motives, financial institutions, and financial elites in the

¹⁰The predetermined payments are categorized as *Riba* or interest in Islamic finance.

¹¹This discrimination can be safeguarding one party relative to other. However, it's easier to say than done as it requires due diligence on all parties and carries penalties if a party in a contract reports false information.

operation of the economy and its governing institutions, both at the national and international levels (i.e., a pattern in which profit making occurs through financial channels rather than through real production). This is in sharp contrast to the instruments used in Islamic banking.

On the empirical side, we did not find many studies addressing the IBD–growth nexus. As noted by Boukhatem & Ben-Moussa (2018), the first wave of studies focusing on the IBD–growth nexus appeared after 2009 (Abduh & Azmi 2012; Abduh et al. 2012; Majid & Kassim 2010; Furqani & Mulyany 2009; Abduh & Chowdhury 2012). From the available literature, we found two types of studies: country level and panel. Country-level studies mainly consist of selected countries, especially where Islamic banking has been functioning for many years. Some mentionable names include Malaysia, Indonesia, and one of the Middle East and North Africa (MENA) countries. The studies that found a positive impact of Islamic finance on growth include Furqani & Mulyany (2009) for Malaysia; Abduh et al. (2012) for Indonesia; Al-Oqool et al. (2014) for Jordan; Abduh & Chowdhury (2012) for Bangladesh; Jobarteh & Ergec (2017) for Turkey; and Abduh et al. (2012) for Bahrain. Panel studies that revealed a positive link include those by Yusof & Bahlous (2013) for selected Asian and Gulf Cooperation Council countries (GCC); Zirek et al. (2016) for the Organization of Islamic Cooperation Council (OIC); Tajgardoon et al. (2013) for 10 Asian and Gulf countries; Boukhatem & Ben-Moussa (2018) for MENA countries; and Imam & Kpodar (2016) for 52 developing countries, among which 29 were OIC countries. Gudarzi & Dastan (2013) for selected nine countries—which can be termed as highest performance economies (Malaysia, Indonesia, Bahrain, UAE, Saudi Arabia, Egypt, Kuwait, Qatar, and Yemen) where Islamic banking exist from many years.

The studies mentioned above mostly focus on OIC, Gulf, or MENA countries where most Islamic banking is concentrated. In our view, it is now time to analyze the IBD–growth nexus in other countries. By studying the literature, we came to conclude that these other countries were not included because of the absence of data. Unlike the case of conventional financial market, where we have an abundance of data to work with, we do not have this

freedom with Islamic banking. There is no dedicated database that collects data on a large scale for Islamic banking. Moreover, in many countries, conventional banks have also started Islamic banking windows, but they do not report the data related to Islamic branches separately. On the side of available databases, there are few, such as Bankscope, that collect data on different banks, including Islamic banks, but it depends on respective banks to disclose their information. Similarly, many banks stopped disclosing data to Bankscope, although they are still in operation and producing financial statements on a quarterly or yearly basis. In short, the data is limited, and for the time being, there is no unique database that collects such specific data. It is, however, encouraging to note that the World Bank now has plans to separately collect the data on Islamic banking. Similarly, the IMF has announced that it will include Islamic finance in its market surveillance from 2019, demonstrating the growing importance of Islamic finance in the financial market¹².

Given the importance of Islamic Banking, especially at the time when it is growing at a speedy pace, we analyze the link in our first chapter. The basic aim of the study includes,

1. assessing the impact of IBD on economic growth,
2. determining the long-run relationship between IBD and economic growth, and
3. determining the causal relation and the direction of causality between IBD and economic growth.

Given the objective above, this study advances the previous literature in many respects.

1. The chapter explains the use of conventional techniques that were not used before in analyzing the nexus between IBD and growth. For example, many different tests of unit root and co-integration tests were used to minimize, if not eliminate, the problem of low power associated with the traditional unit root and co-integration tests.

¹²<https://www.reuters.com/article/us-islamic-finance-imf/imf-to-add-islamic-finance-to-market-surveillance-in-2019-idUSKCN1IQ081>

2. The research makes use of a panel that permits higher degrees of freedom and reliable statistical tests. Pooling also allows for heterogeneity among the countries.
3. The panel set for 24 countries is used, unlike the case of taking only one country or only OIC countries. Therefore, this study did not distinguish on the basis of region or on the basis of highest concentration of Islamic banking, which was the main feature of previous studies.
4. This chapter focuses on the collection of data for measuring IB from financial statements, which was not carried out in case of earlier studies¹³. In earlier studies the data was taken usually from an electronic database which itself was un-balanced and has limited Islamic banks. By calculating the data from financial statements, the data will be more balanced and up to date. Also there will be inclusion of more banks which were missing in electronic database.
5. For this study, we estimated the direction of causality between IBD and growth. In previous studies, especially those dealing with panels, almost no effort was made to determine the direction of causality. Another distinguishing feature is that this study includes an analysis of the direction of causality with and without the presence of the conventional financial sector, which according to our knowledge, was never attempted before.

1.7.2 Islamic Finance and Economic Growth: Case Study of Pakistan

As previously mentioned, the literature on IBD and economic growth is limited. There are many time-series studies as compared to panel countries. Most of these time-series studies are based on selected countries that were the center of Islamic banking. However, there are many other countries with a

¹³Although, Bankscope was also used to obtain and calculate the data but it is highly limited by the number of years and banks.

fair number of Islamic banks, and the absence of data renders those countries to be ruled out for a similar analysis. One such country is Pakistan.

Pakistan was among the first two countries determined to operate its financial markets entirely on Islamic finance principles. As Ariff (1988) and Khan & Mirakhor (1990b) pointed out, the transformation was gradual. The process started in 1979, and the first phase was completed in around 1985, when domestic banks were asked to maintain both interest-based and interest-free windows. The idea was to introduce Islamic banking in stages so that the system would not collapse. Also, during the transformation, if any “new” situation arise that required policy recommendations or a different treatment, it could be addressed perpetually. In the second phase, the banking system was geared to operate transactions free of interest on all its accounts except for foreign currency deposits, foreign loans, and government debts. This approach was supposed to make the learning process and adaptation of the system easier. Profit and loss sharing (PLS) was introduced, which was based on a floating rate of return unlike conventional systems with promised rates.

Pakistan’s Islamic banking has recorded significant growth in recent years. According to Islamic Banking Bulletin Pakistan 2018, the total number of Islamic banking institutions at the end of December 2018 stood at twenty two. There are five full fledged Islamic banks and seventeen conventional banks having standalone Islamic banking branches. In 2018 alone, there were 270 new branches that were introduced throughout Pakistan. The asset growth in Islamic banking assets was recorded at 17% whereas the deposits were recorded at 16.9% for 2018. On the investment side, Islamic banking is mostly financing projects in the production and transmission of energy and textile industry and their share in the overall financing recorded at 17.7% and 13% respectively at the end of Dec 2018.

According to our knowledge, the present study is the first thorough study to test the supply-leading or demand-following hypothesis on growth for the case of Pakistan. This study is expected to be not only a worthy addition to the limited literature on IBD’s nexus with growth but also a worthwhile contribution as a time-series study in general and for the case of Pakistan in particular. A second contribution is that the data was collected on a

much larger scale, which provided more data points and a balanced data set. Third, more than one proxy was used to measure IBD, and a rigorous time series technique was applied to conduct the analysis. It may provide evidence that can be helpful in policy-relevant decisions regarding Islamic banking. Fourth, through the application of the autoregressive distributed lag (ARDL) model, we estimated both short- and long-run estimates. This approach helped us to understand the short- and long-term effects, given the fact that Islamic banking is relatively new and has not still captured a substantial share of the overall financial sector in Pakistan. The outcome of this study will be particularly important for policymakers who have the responsibility of designing IFM for Pakistan, as well as for other countries to learn lessons from the case of Pakistan.

1.7.3 Determinants of Financial Development

It is now widely accepted that FD has a long term impact on growth because it contributes towards economic efficiency by allocating funds to productive use (see Darrat et al. 2006; Roland et al. 2014). Since a financial system is integral to the long term growth, so designing a set of policy for uplifting economic development and ignoring improvements in financial system is a significant oversight. Levine & Zervos (1998a), showed that development in financial market (Bond and stock market) are strong predictor of growth. The important role of financial system requires more attention from researchers and policy makers as to what factors can improve it. It is essentially equal to determining factors that affect FD.

Most of the studies focusing on the determination of above factors, analyze the effect of one variable or at most trade or capital account openness on FD. For example Chinn & Ito (2006) found that capital account liberalization results in growth of equity markets only if the institutional level crosses a certain threshold. Svaleryd & Vlachos (2002) found a positive relationship between liberal trade policies and FD. Their result were robust to variety of specification and econometric techniques. They also found that FD cause volume of trade to improve. However for Sach-Warner index, their study

found that after the liberalization FD is even stronger. Levine (2001) showed that if capital flows are liberated, it will result in increasing the stock market liquidity. It will also allow more banks to come into the domestic market that will result in the efficiency of banking system. Klein & Olivei (2008) showed for industrialized countries a positive link between capital account liberalization and economic growth. An important factor indicated by Klein was the impact of capital account liberalization-which start to effect growth through financial system. In other words capital account liberalization deepens the financial market that will result in economic prosperity. However, the outcome was not validated when they used the data outside OECD countries. Y. Huang & Temple (2005) agreed that research on potential determinants of FD are outnumbered on a lower side when compared to the impact of FD on growth. So they grouped countries into two larger groups—the first group consist of low income and lower middle income countries. The Second group consisted of upper middle and higher income countries. Cross section and panel data were used and based on the outcome, it was concluded that trade openness does increase financial depth in higher income group but not in lower income group. Giavazzi & Tabellini (2004) linked trade liberalization with an increased demand in investment, that will more likely to promote FD. Aizenman (2008) also favored trade liberalization resulting in bringing financial reforms that will more likely to promote FD.

On the debate of institutional variables being a potential determinant of FD, we also found some studies, Like Mishkin (2009) suggested that globalization is a key factor in bringing reform to institutional environment in a country that will promote FD. At the same time reforming institution is a slow process and takes time before reforms can actually start to effect FD. On the other hand, poor countries will face more resistance to institutional reforms because it will result profits cuts to domestic entrepreneurs. Mishkin suggested to overcome this resistance is, to go global. La Porta et al. (1997) showed that legal origin—may it be German, Common or French—determine the financial environment of a country. The origin explains more effectively the difference in legal and regulatory environment across the countries and therefore explain the difference in level of FD. The differences in the legal environment directly

impact rights of investors against debtors and entrepreneurs. In this context, enforcement is also important and a part of legal environment. Cherif & Dreger (2016) showed for MENA region that institutional variables are important for FD. Another interesting finding of their study was that per capita income and inflation are less relevant for promoting FD, while trade openness is more relevant for its promotion.

Rajan & Zingales (2003) is one important research which diverted attention towards searching determinants for FD. The above study was not directly addressing the issue of determinants, however their argument provided researchers a stimulus towards a new direction in the openness literature. The argument in their study was related to “why some countries are more open than others?” and second was the relation between trade openness and FD. The study explained, there are political reasons why a country’s financial sector was underdeveloped. In this context, a theory of “interest groups” was presented. The interest groups are persons called incumbents, more specifically financial and industrial incumbents, who oppose opening up of financial and trade sector respectively to avoid competition. Rajan & Zingales (2003) argued that a combination of foreign competition through opening up financial sector and trade sector will weaken the approach of interest group towards FD and opening up external account (RZ hypothesis). They supplemented their argument by presenting facts related to condition of financial markets since 1913. They showed that in past, financial markets were more open as compared to present. The hypothesis put forward by Rajan & Zingales (2003) was an important development, but we did not find many studies testing the openness hypothesis. The third chapter will test above hypothesis for a panel of developing countries. According to RZ the phenomena of opposing the FD is more apparent in developing countries as compared to industrialized or high income countries. Baltagi et al. (2009) and Zhang et al. (2015) are two studies that also test RZ hypothesis. The focus of the first study by Baltagi et al. (2009) was to directly test the RZ hypothesis without taking into account other economic variables that may be potential determinants of FD. The study also did not distinguish among countries in sample as to their character (income or geographic) and selection

of countries was based on the availability of data. Therefore, their sample of countries includes developing and industrialized countries. The result showed that openness (financial and trade) can help in explaining the variation in the level of FD across countries. Using annual data and employing dynamic panel estimation techniques, the results showed openness to be a significant determinant of banking sector development. It was also found that relatively more close countries benefit more by opening up their financial and trade account. However opening up may not be essentially simultaneous, thereby validating RZ hypothesis partially.

A recent study testing RZ hypothesis was that of Zhang et al. (2015) which took the case of China. Their study was based on a panel set consisting of 30 provinces of China and using three set of indicators for FD. The finding showed that openness has a significant effect on financial efficiency and competition indicators (two out of three indicators used for measuring FD), but it did not find this effect to be significant for the depth indicator. Similarly the marginal effect of openness is positive for the efficiency and competition indicators for most open provinces in China and negative for most closed provinces. The study therefore provided, for at least two indicators, the validity of simultaneous opening hypothesis.

Our research in third chapter will also test the RZ hypothesis as in the last two studies mentioned above. However we advance the literature in at least five ways, (i) Unlike the other studies only focusing on capital, financial openness or both, the current study introduces other potential determinants of FD along with openness. In this framework, it is then analyzed, if openness matters for FD. (ii) Most of the studies used panel data sets which can be a disadvantage if we do not combine the cross sections in a meaningful manner. The study by Baltagi et al. (2009) combined developing countries with industrialized ones which may not give us a full scope of both income groups. Moreover literature documents the nexus between trade and financial openness on FD to vary across countries and empirical studies showed that it cannot fully take into account the historical occurrences, cultural norms and financial context prevailing in different countries. However, we can minimize this shortcoming by grouping the data in a way which is more relevant than

combining all countries or taking just one country like Zhang et al. (2015). Therefore, the current study groups the countries according to income and estimations are carried out for the individual income groups as well as for all the countries as a big group. We expect that results for the whole group and the income groups will vary based on the reason above. (iii) This study will extend the RZ hypothesis to include institutions. It is because for developing countries the level of FD is also influenced by legal environment. According to the available literature, the positive effect of institutions may come through the channel of trade or financial openness. (iv) This study will also use modern panel technique that will take full advantage of the time series variation and will take care of endogeneity problem at the same time. (v) Last but not the least, unlike taking different but not so common indicators, this study will use two indicators for FD that are mostly used in the literature. The indicators are related to banking sector mostly because in developing countries the banking sector is usually the strongest and dominant one as compared to stock market¹⁴.

1.7.4 Financial Integration

The link between FI, growth, FD was particularly interesting for researchers. Many who worked with FD has also looked on the possible link between FD and FI or FI and growth. Giannetti et al. (2002) argued that integration will improve FD by increasing competition among the financial market's participants. In another setting, Pagano (1993) observed that the same argument applies to the stock market as well. In financially integrated markets, firms from less developed economies can list their shares on foreign stock exchanges. They may do it for many reasons like reducing their cost of capital or because of more liquid markets.

However, there are some caveats to benefits arising out of FI. For example as Claessens & Schumukler (2007) noticed that if firms from less developed economies list their stock on foreign stock exchanges, it mostly serves the capitalization of those listed exchanges rather than of their own. Therefore,

¹⁴Another reason is that data on stock market development for most of developing countries is not available.

the improvement in FI may overestimate the benefits to financially less developed countries. In other words it may result in further development of already developed economies instead of improving the level of less financially developed economies. The crux of this debate is that in financially fully integrated markets, the domestic market is secondary and the whole market is of primary interest. So credit to GDP ratio might be declining in an individual market but for the overall integrated area it is rising.

Despite extensive research, till date there is no consensus on the role of FI towards economic growth. The studies that showed a positive link are unable to conclusively state the channel through which FI effects growth. It is worth mentioning that the same conflict is present for the FD-towards-growth case, but as compared to the literature relating to FI we have more studies validating the finance-growth link. Giannetti et al. (2002) showed for countries of the EU that financial integration can have potentially large effect on growth. The effect is estimated to lie between 0.75-0.94¹⁵ for the manufacturing industry. However the results did not show that less financially developed countries stand to lose more as compared to the gains earned by financially developed countries in terms of growth.

Epaulard & Pommeret (2016) showed for developing and emerging economies that FI does effect growth. They estimated that FI brings an 0.3 percentage point of growth per year for the countries in the sample. Similarly Osada & Saito (2010) using a panel of 83 countries for the time period 1974-2007 found mixed results for FI and economic growth. Their argument was that their result varied with the characteristics of a country and type of external asset and liabilities. For instance when external liabilities are broken down into foreign direct investment (FDI), equity and debt liabilities, FDI shows positive impact on growth. The debt has a negative impact on growth, especially whenever public debt was used. Another outcome of this study was that countries with better institution and FD tend to benefit more from FI compared to others. Masten et al. (2008) is another study that showed a positive impact of FI on growth for European countries particularly for financially developed markets.

¹⁵These are regression coefficients

Gourinchas & Jeanne (2006) concluded that developing economies do not benefit from FI. The study showed in a calibrated neoclassical model that conventional measures of welfare gains from income convergence appear relatively limited for developing countries. There is 1% increase in welfare gain from switching to financial autarky to perfect capital mobility, which, according to authors is negligible as compared to welfare gains observed in some of the countries in sample. Abraham & Schmukler (2017) showed that financial globalization has failed to fulfill its expectations. The movement of capital from rich to poor countries, as was expected, is limited. The same negative effect was also reported by (Mishkin 2007; Rodrik & Subramanian 2009; Mougani 2012; Moore 2014).

A recent strand of literature points out to the threshold effect of FI. According to this literature, countries are not uniformly affected by FI because there is a certain threshold level that needed to be attained before it starts to give indirect benefits. It had been generally perceived that industrial countries have better institutions, are macro-economically stable and have deeper financial markets, because of which they are the ones getting most of the benefits from financial globalization. In that context Rodrik & Subramanian (2009) argued that developing countries should first strengthen up their institutions and financial market before they proceed for FI. Mishkin (2006) also discussed that if a country allowed its financial sector to go global without first managing it, it is more likely to ignite a financial crisis associated with integration. So according to the threshold literature, the attaining of some minimums will ensure that countries will be less prone to negative fallout of FI. A study validating the above theory is Ayhan et al. (2011), which showed the presence of thresholds in financial depth, institutional quality, FD, trade openness, labor market rigidness and overall level of development. For 84 countries (excluding the transition economies of Eastern Europe), using parametric and semi-parametric approaches, the study found the cost-benefit trade off from financial openness to significantly improve once thresholds conditions are satisfied. J. Chen & Quang (2014) is another study favoring the threshold conditions. Their study found for 80 countries—consisting of developing and developed countries for the period 1984-2007 and using non-

linear and dynamic panel techniques, presence of thresholds for income level, institutional quality, private credit and government spending. An important result of their study was that countries can gain from FI if they improve on the quality of institutions and domestic FD.

FI has received interest from many financial economists. Earlier literature has addressed the measures of FI for benchmarking (Edison et al. 2002; Schindler 2009). To measure FI, there are two types of indicators that are used for benchmarking—*de-facto* and *de-jure* indicators. *De-jure* are used to proxy for the causes that resulted in FI and *de-facto* are used to measure the consequences resulting out of FI. Vo et al. (2005) offered other proxies that involves testing correlations between macroeconomic variables. The above indicators are used quite extensively in literature related to examining the link between FI and growth.

However on the question relating to determinants of FI, the literature is limited. The fourth chapter is an attempt to add to this limited literature by identifying some determinants for FI. In addition we would also like to test for developing countries that major economic indicators may not be ready or have not come at a level, which can bring positive results out of FI. This is essentially combining the threshold argument with determinants of FI literature. Earlier studies employ regression techniques for analyzing the effect of different economic variables on FI. One of the studies investigating the determinants, Garali & Othmani (2015) found trade openness, exchange rate and growth rate of GDP positively affect FI in the MENA region. A main drawback of their study is that they did not test other economic variables that could be potential determinants of FI. Another drawback of their study is that it used simple regression to reach at the conclusion which is not quite useful in panel settings. In another study on European countries the study, Lemmen & Eijffinger (1995) analyzed many different economic variables such as monetary, fiscal, political, institutional and structural to be potential determinants and indicated inflation rates, government instability and investment to be potential determinants of capital controls in EU. Their study used cross sectional and regression model to reach the above result. In our opinion, the use of above

technique is not suitable for countries as there may arise a problem of outliers, endogeneity and multicollinearity rendering the result biased.

Vo (2005) provides strong evidence through panel estimation on 79 countries for the period 1980-2003 that capital control, trade openness, growth and FD are important determinants for FI. However their study failed to take into account the regime change that came in 1990s. Also when countries are taken in a panel setting, there is no distinction between the countries as to their income or level of FI. Kaur & Singh (2014) analyzed three East Asian countries (China, Japan and South Korea) for a possible integration of their capital markets and indicated FD to be a major deciding factor. According to authors the difference in degree of FD among the three countries pose a challenge to be financially integrated. For FI, it was advised to look up and formalize the difference in regulatory policies, quality of institutions, corporate governance and trade openness.

Our strategy will be entirely different from the past literature. First we will use not one or two variables to assess their impact on FI but rather we look at a wide array of variables derived from the literature like Hubbard (2005). To achieve the above, the current study collected a large number of potential variables and then finally selected economic growth, capital account openness, level of education, trade openness, level of financial development—measured by domestic credit to private sector—and country political and investment environment—measured by the quality of institutions. Second, to use both the cross section and the time series dimension, and to avoid endogeneity problems, we will use Generalized method of moments (GMM) technique—which is advised in such kind of situation. Third, unlike other studies we will divide the countries into three income groups to exploit the diversity in data and to analyze whether the results are same across groups. The current study will also do it for all countries, which will provide a good reference point to compare individual groups' result with. Fourth, we will incorporate the threshold effect in a different setting by allowing the level of FI to vary using a Quantile regression (QR) framework. QR according to our knowledge has not been used for evaluating determinants for FI. We estimate a QR model for panel data with non additive fixed effects as was suggested

by Baker et al. (2016) and Powell (2014). The division of countries into groups will also allow to place countries with similar level of capital account openness. As Chanda (2005) noted, failure of capital control on growth that had been depicted by some studies is due to the failure of those to take into account the underlying difference in degree of capital controls across countries. Chanda (2005) concluded for a sample of 57 non-Organization for Economic Co-operation and Development (OECD) countries with capital controls for the period 1975-1995, 39 experiences reduction in growth rates. The use of quantile regression will also allow a nuanced view of the relationship between the dependent variable and the covariates, since it allows to examine the relationship between a set of covariates and the different parts of the distribution of the response variable (Benoit & Dirk 2009).

Chapter 2

Islamic Financial Development and Economic Growth: Does the Conventional Hypothesis Apply?

Abstract: Growth in Islamic banking has attracted a great deal of interest and attention during last few years. The debate is currently in a shift from a theoretical to an empirical framework. The growth in the empirical work has given rise to a new concept called “Islamic financial development” (IFD). It will be interesting to test the nexus between IFD and growth since the literature suggests a positive result for conventional finance and growth. We used a panel of 24 countries for a period of 11 years using annual data (2004–2014) to test the conventional hypothesis of supply-leading or demand-following between IFD and growth. In addition, we also investigated the direction of causality in a panel setting between the two. Our results suggest that IFD does affect growth positively. Comprehensive tests indicate the presence of a long-run relationship between IFD and growth. Moreover, the direction of causality seems to follow the supply-leading hypothesis; IFD affects economic growth, and evidence on a reverse causality was not found. This is true even when controlling for conventional financial development (CFD). Apart from the topic itself, this study distinguishes itself from the existing limited literature on the basis of the data set used and the estimation procedure to assess the nexus mentioned above.

2.1 Introduction

Financial markets, which include commercial banks, stock and bond markets, and so forth, play an important role in channeling funds from savers to users, who can utilize these funds productively. This productive allocation is then believed to effect economic growth (see Levine 2003; Demetriades & Andrianova 2004; Demetriades & Hussein 1996; Goodhart 2004). Levine (2003) pointed out five key functions of any financial system: (i) diversification of risk; (ii) allocation of capital; (iii) monitoring of financed ventures along with capital governance of borrowers; (iv) mobilization and pooling of savings; and (v) facilitating the exchange of goods and services. The aforementioned functions work better the more a financial system is developed. Therefore, the level of financial development measures how efficiently a system can perform the functions above.

The debate on the relation between financial markets and economic growth started in 1973, and since then, researchers have conducted many studies, both on a country and a panel level, to assess the relation between the two. Most of these studies suggest a positive relation, with the exception of few studies that found no relationship (Levine 1997; Levine et al. 2000). These studies dealt with what is called “conventional financial markets”, which include conventional banks and stock exchanges. However, there is another system emerging within financial markets, which is rapidly making its place in the literature and usage, known as the “Islamic financial market” (IFM). This system is given the name “Islamic” because of the notion that it is based on the financial teachings of Islam. Much debate has already appeared in the literature about its feasibility, as well as its differences and commonalities with the conventional financial system, but very little literature is available with regard to its contribution to economic growth.

As already mentioned, the literature examining the relation between Islamic finance and economic growth is far less developed than in the studies on conventional financial development (CFD)¹. The growing importance and

¹As this study will differentiate between Islamic financial development and mainstream financial development, so the later will be written as conventional financial development or CFD.

size of the Islamic financial market makes it highly relevant to assess its role on economic growth. Islamic banking, a major part of the Islamic financial market, has seen a great deal of development and is growing at a faster pace. The growth rate in Islamic banking between 2009 and 2013 was recorded to be around 17.6% (Ernst & Young 2014). It is estimated in the same report that Islamic banking industry is expected to pass USD 6.1 trillion by 2020. Among the countries where the presence of Islamic banking is recorded—Bahrain, Qatar, Saudi Arabia, the UAE, Kuwait, Pakistan, and Saudi Arabia—are the seven core markets that account for almost 90% of the total market. In the UAE and Malaysia, the Islamic banks' growth is converging to that of conventional banks, indicating their growing roles in the financial sector of these countries. Twenty-two international participating banks have more than USD 1 billion in shareholder equity, which puts them in a potential position to lead the markets in their regions. Saudi Arabia, Qatar, and Pakistan have double-digit growth in Islamic banking (15%, 15%, and 10%, respectively) (Ernst & Young 2015). The examining of the link between growth and Islamic banking will be interesting in the sense that, among the literature available, there are conflicting views, and the studies that do exist are often limited as to the selection of countries or data. Moreover, there are more theoretical studies than empirical ones².

The current chapter constitutes an attempt to add to this limited literature by assessing three questions and, at the same time, improving on previous studies on a similar topic. Among the three questions of interest, the first is to analyze if IFD has any impact on economic growth. For the current chapter, we used a panel data set and comprehensive panel tests to assess and to establish a relationship between the two. The above-mentioned tests were employed to investigate the link between CFD and growth; however, to our knowledge, these tests have never been used to assess the relation between IFD and growth. A positive answer will take the assessment to next question, which is whether or not a long-run relation between IFD and growth exists.

²The absence of abundant research may be due to the fact that data on Islamic banks is not available in contrast to that of conventional banks. Furthermore, expertise in this area is limited to few researchers, since not everyone has the insight knowledge of how Islamic financial market works.

For this purpose, we used more than one test for unit root and co-integration, which no researchers have done in studies related to IFD. The application of these tests permitted us to minimize, if not eliminate, the problems of low power associated with the traditional unit root and co-integration tests. On the other hand, pooling ensured reliable tests with a higher degree of freedom, as well as allowing for heterogeneity among countries. The third question requires us to determine the direction of causality between IFD and growth. This objective was accomplished by employing a causality test to determine whether IFD causes growth or vice versa. The assessment may prove interesting for those in the field and become unique when CFD is also taken along with IFD. This type of causality has never been analyzed before for a similar topic. The answer to the last question helps in establishing the supply-leading or demand-following hypothesis for Islamic banking.

The current chapter not only distinguishes itself from previous papers on the basis of the estimation procedure but also on the basis of data set used³. We took a panel of 24 countries and did not distinguish on the basis of region or of the highest concentration of Islamic banking, the main feature of previous studies. Pooling also allows for heterogeneity among the countries. In addition to that, 11 years of data were used, thus providing more concrete results and helping to explain the causality on a more general level. The study consists of five sections. Section 1 introduces the topic. Section 2 contains a literature review along with an overview of the need for Islamic banking. Section 3 explains the variables and methodology. The empirical results are discussed in section 4, followed by a conclusion in section 5.

2.2 Literature Review and Rationale for Islamic Banking

In this section, we will discuss the literature review along with rationale for Islamic banking—through which IFD is usually measured. The first subsection list the literature review whereas the second explain the rational for Islamic banking.

³for more information see section 2.1

2.2.1 Literature Review

The link between CFD and economic growth was first suggested by Schumpeter (1934), who argued that banks are responsible for allocating capital to those entrepreneurs who have the ability to come up with innovative ideas and a strategy to successfully implement them. The allocation will thus spur growth. If we summarize the literature on the nexus between CFD and growth, we come across at least three popular views. (i) The first holds that the causality runs from financial development to growth (see, for instance, Patrick 1966; Jung 1986; Arestis et al. 2001; King & Levine 1993b; Levine et al. 2000; Lebdaoui & Wild 2016). This view was also known as “supply-leading” because financial development supplies the stimulus for growth. (ii) The second view maintains that causality runs from growth to financial development (see, for example, Ang & McKibbin 2007; Robinson 1952; Masih & Masih 1996). This view was called “demand-following”, where the financial sector developed in response to an increase in demand for financial services. (iii) A final view involves is the existence of a bi-directional causality between financial development and growth (see, for instance, Demetriades & Hussein 1996; Hung & Victor 1998; Luintel & Khan 1999; Khalifa 2002).

While Islamic banking performs almost similar functions as those of conventional banking, many researchers have tried to explain how Islamic banking is fundamentally different from the latter. At the same time, some scholars have argued that the two seem to have only slight differences, and operationally, both are similar (see Kettell 2011; Hanif et al. 2012; Hanif 2012; Ayub 2007). Islamic banks are considered to be in demand where Muslim populations are concentrated or significant because Muslims in general are religiously prohibited from entering into contracts involving interest⁴. For Muslims then, this prohibition constitutes a natural ban on conventional banks, which normally deal in interest. It also forces Muslims not to acquire credit from banks or to put their deposits in savings account. Beck et al. (2013) found that, in a sample of 64 countries, only 24% of Muslims were

⁴There are many forms of “interest” but Interest here mean banking interest.

reported to have a bank account as compared to 44% of the non-Muslim population.

The literature on IFD and growth is limited. From this limited literature, there are many theoretical studies and a few empirical ones available. H. Ahmed (2005) contended that Islamic banks face certain operational problems related to the use of equity-based instruments to finance different projects, demonstrating that the limitations are causing inefficiencies in the Islamic financial system. If these inefficiencies are removed, then the Islamic financial system can play a meaningful role in the process of growth. His study concluded that there is a need to develop Islamic banks further before they can start to play a role in growth (H. Ahmed 2005). El-Galfy & Khiyar (2012) also theoretically explained that Islamic banking not only contributes to economic growth but also helps in macroeconomic stability. In their view, the design of the instruments and the absence of interest helps stabilize the economy. El-Galfy & Khiyar (2012) also suggested that researchers should conduct future empirical studies using panel data because it would be more relevant given the quantity of the data available. Beck et al. (2013) found that Islamic banks are better capitalized, have good asset quality, and are more stable even in a financial crisis situation as compared to conventional banks. These features of Islamic banks have helped them to cope with the financial crisis of 2008 in a better way as compared to conventional banks. Nagaoka (2010) conducted another theoretical study examining the link between Islamic banking and growth. The researcher concluded that Islamic finance does have the potential to affect growth because of its close relation with the real sector of the economy. Islamic finance has the ability to embed the two sectors (financial and real), which then have a greater capability for sustainable growth. Khoutem & Nedra (2012) theoretically established that, because of the absence of interest, uncertainty (*Gharar*), speculation, and the very nature of instruments used (which are based on profit and loss), Islamic banking helps in capital accumulation, which positively affects growth. The resulting growth is then characterized by more equitable distribution of resources and thereby reduces poverty. In addition, they also discussed

some policy reforms required in Islamic banking before it can start to produce positive results.

On the empirical side, Yusof & Bahlous (2013) used a panel co-integration analysis, variance decomposition, and impulse response functions to compare Gulf Cooperation Council (GCC) countries and selected Asian countries in order to identify a possible effect of Islamic finance on growth. Their results suggest the existence of a significant effect, both in long and short run. In addition, the short-run effect was stronger for Indonesia and Malaysia as compared to GCC countries. Tajgardoon et al. (2013) also found a positive role of Islamic banking in growth. Imam & Kpodar (2016) revealed a positive effect of IBD on economic growth. They used a pooled regression and a generalized method of moments (GMM) technique to demonstrate the positive effect of Islamic banking in a panel of 52 countries ranging from low to middle-income countries. Kassim (2016) uncovered a positive link between Islamic banking and growth for Malaysia using data from 1998 to 2004. His study used the autoregressive distributed lag model (ARDL) to illustrate that Islamic banking does not cause growth in the short run; however, it does cause growth in the long run. Kassim (2016) also suggested that Islamic banks should continue promoting *Sharia*-compliant products to attract more customers, which will make more funds available for investments. Zirek et al. (2016), using a panel set of 14 countries consisting of members of the Organization of Islamic Cooperation (OIC), demonstrated that an increase in the Islamic financial industry (in the form of deposits, assets, and loans) positively affects growth in the long run. They found capital stocks to be important indicators of growth. Their study also found that Islamic finance can be an important factor in attracting foreign investment into a country. In the case of Malaysia, Islamic finance effectively increases the intermediation process by transferring funds from surplus households/units to deficit households/units. Overall, they concluded that, both in the short term and the long run, Islamic finance seems to affect growth positively.

On the other hand, some researchers either did not find any relationship between Islamic banking and economic growth or, at best, did not uncover a long-term relation. For instance, using different estimating techniques

(e.g., ARDL, pooled mean group (PMG), mean group (MG), and dynamic fixed effects (DFE)) for selected South Asian countries, Lebdaoui & Wild (2016) discovered the presence of a long-run relationship between economic growth and Islamic banking. However, they were unable to find any short-run relationship between the two. Lebdaoui & Wild (2016) also asserted that the presence of a Muslim population was a major factor in the establishment of the positive link between Islamic banking and economic growth. Another justification for the positive role of Islamic banking on growth is the risk limitation imposed by the use of *Sharia*-compliant instruments and their role in mobilizing the savings, which increases the additional resources for the financial sector. On the basis of these results, they recommended that governments facilitate financial deepening by promoting Islamic banking products and operations.

Chowdhury & Shoyeb (2018) took the case of Islamic banks in Bangladesh and examined the linkage between Islamic financing principles and economic growth. The researchers used risk-sharing and non-risk-sharing modes of Islamic financing principles. They found a positive correlation between risk-sharing instruments and economic growth, while non-risk-sharing instruments had a negative correlation.

More recently, Boukhatem & Ben-Moussa (2018) analyzed the dynamic role of Islamic finance toward economic growth for selected MENA countries. They employed pooled fully modified ordinary least squares (FMOLS) for the 2000–2014 period and established a positive link between Islamic banking development (IBD) and economic growth. The researchers also found a positive role of overall financial deepening in growth. However, for Islamic financial development, Boukhatem & Ben-Moussa (2018) noted that the positive effect depends on institutional quality. An underdeveloped institutional framework can undermine the positive effect; hence, they suggested that developing Islamic banking should be reinforced with adequate legislation and regulations. El Mehdi & Mghaieth (2017), who studied the above relationship for 15 countries from the MENA region for the 2000–2009 period came to the same conclusion.

Maali & Atmeh (2015) examined the relation between Islamic finance and economic growth for eight selected countries for the 2000–2010 period. Their study also detected the presence of a positive effect of Islamic finance on growth. Abedifar et al. (2016) took the case of 22 Muslim countries and analyzed the role of Islamic and the conventional financial system on growth for the 1999–2011 period. The researchers noticed a positive link between the market share of Islamic banks and economic growth, especially in low-income countries and in those with predominantly Muslim populations (Abedifar et al. 2016). Lehnert & Kchouri (2019) investigated the relation between IBD and economic growth for 32 countries, ranging from developed to developing countries, and came to a similar conclusion.

On the direction of causality between Islamic banking and economic growth, Abduh & Chowdhury (2012) examined the causal relationship for Bangladesh. They employed quarterly data from 2004 to 2014 using the Granger causality test, noting the existence of bi-directional causality between the two. They also established a positive long-run link between Islamic banking and growth. On the other hand, Manap et al. (2012) discovered uni-directional causality running from Islamic finance to growth for Malaysia. They used quarterly data from 2008 to 2012 and employed Toda Yamamoto and bootstrap Granger non-causality tests to analyze the causal link. Abduh & Azmi (2012) found bi-directional causality for Indonesia. However, the researchers emphasized, on the issue of causality, the advantages of using a data set based on panel of countries to reach a more concrete result (Abduh & Azmi 2012). Similarly, Farahani & Sadr (2012) and Maali & Atmeh (2015) also took the view that bi-directional causality exists between Islamic banking and growth for selected countries. Furqani & Mulyany (2009) supported the demand-following hypothesis, according to which growth causes the Islamic bank financing to expand for the case of Malaysia.

2.2.2 Rationale and Overview of Islamic Banking

Islamic banking—a major part of the Islamic financial market—started nearly 35 years ago and, with the passage of time, has grown to a notable

size and volume. If we look at its historical development, it started with the creation of Mit-Ghamar (1963) (which was motivated by German savings banks) and then afterwards Naseer Social Bank in 1971. However, the first true Islamic bank started in the UAE in 1975, and since then, Islamic banking has grown from an almost negligible size to USD 1.6 trillion in 2012 (Mauro et al. 2013).

Figure 2.1: Trend of Islamic banking total customer deposits, Islamic bank total assets and Islamic banking total loans.

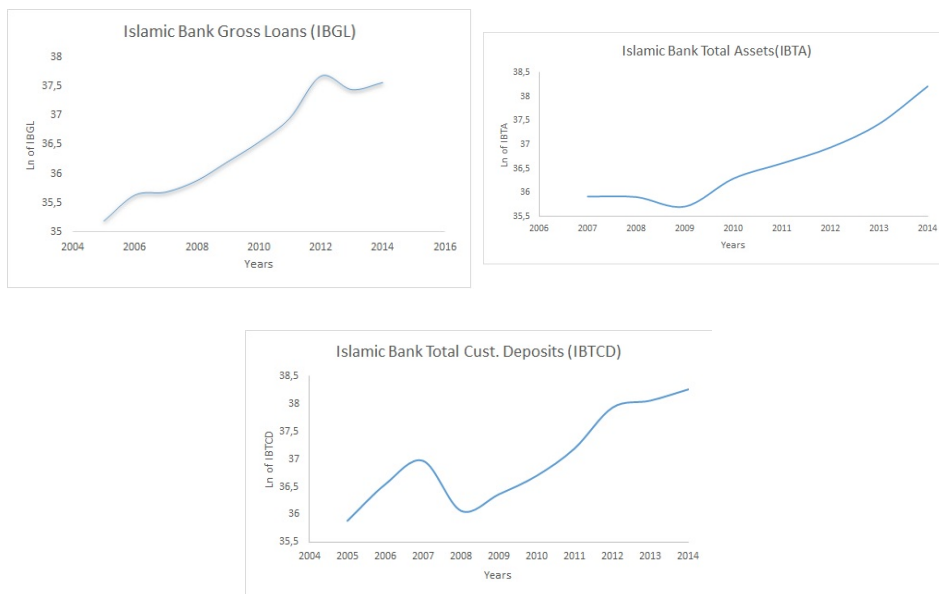


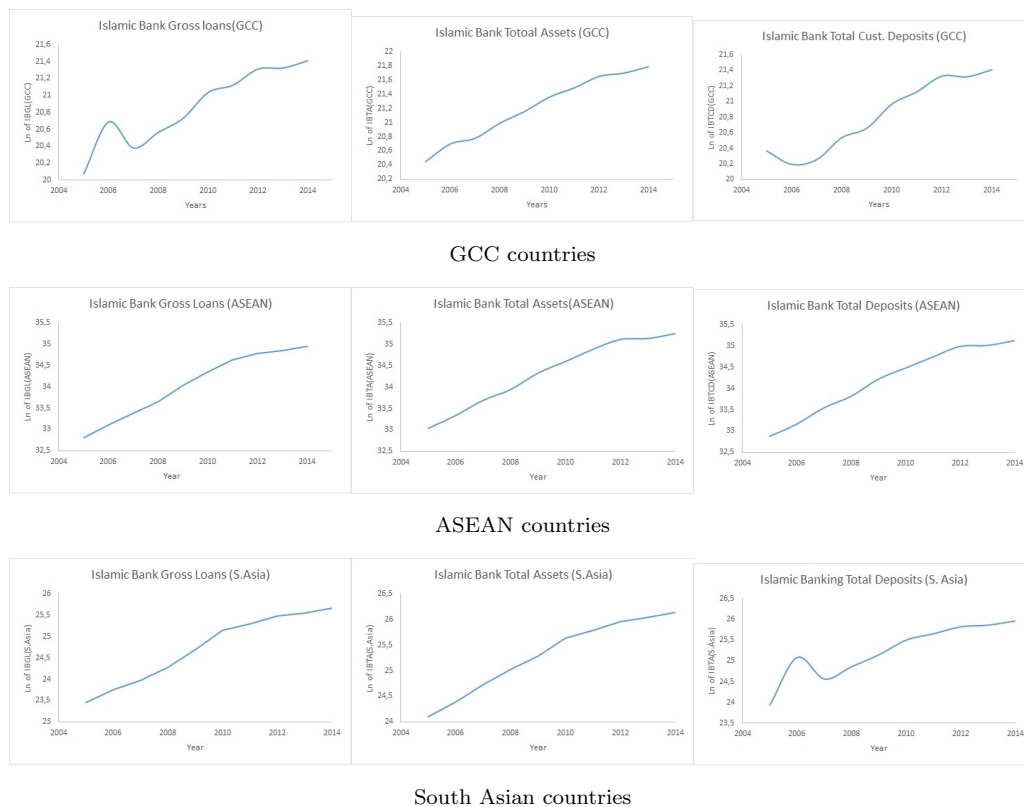
Figure 2.1 illustrates the trends in growth for three variables—namely, Islamic banking total assets, Islamic banking total customer deposits, and Islamic banking gross loans (IBGL)⁵. The trends of all these variables are increasing, demonstrating an improvement in Islamic banking for the 2004–2014 period. Figure 2.2 displays the same trends for different major regions across the world where Islamic banking is generally concentrated. These regions include the Gulf Cooperation Council (GCC)⁶, Association of South-East

⁵for more on their definition, see Section 3.

⁶GCC includes Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and UAE.

Asian Nations (ASEAN)⁷, and South Asian countries⁸. An important aspect from these graphs is that the financial crisis of 2007–2008 had not affected the growth in Islamic banking to an alarming degree. The graphs of all major indicators are upward; subsequently the market maintained this trend except in terms of total customer deposits, which took a sharp decrease after 2008 but then gradually recovered. This sharp decrease was more apparent in South Asian countries, while in case of GCC countries, it actually started increasing after 2008.

Figure 2.2: Trend of Islamic banking total customer deposits, Islamic bank total assets and Islamic banking total loans for different regions.



⁷ASEAN include, Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam.

⁸South Asian countries include Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka.

Islamic banking is not confined to Muslim countries, and many non-Muslim countries are now assisting Islamic banks in terms of startups. Many conventional banks have opened special branches and windows to specifically offer Islamic banking⁹. More recently, Islamic banking has gone beyond the traditional role as a saving institution and entered into investment banking, insurance, and finance companies. The Islamic bonds called *Sukuks* have also been in markets since 1990. Today, the *Sukuk* market stands at USD 270 billion. The important aspect of Islamic finance is that it has attracted debate from all over the world as a discipline separated from conventional finance in general, and people have also argued about its advantages and mechanisms in particular. Nowadays, Islamic banking's role is being understood in the context of its place in the overall financial sector of the economy and its contribution to growth.

As mentioned by Beck et al. (2013) and discussed above in literature review, the under-banking among Muslim customers may be because of the presence of interest in the Banking system. In this context, there exist a number of potential customers who demand a “right” product based on *Sharia* guidelines¹⁰; Islamic banks can tap into this customer base. The absence of Muslim customers at banks also means that savings are not channelled to productive use, which results in a loss of efficiency. In the form of Islamic banking, this group of customers will be provided a platform where they can gain more access to finance, as well as to keep their savings in accordance with their religious instructions. This “new” type of savings will increase the prospects of growth.

If one considers a reason other than demand from Muslims, the presence of Islamic banks in a financial market (in any place or region) can provide “consumers/customers” (whether Muslims or non-Muslims) a range of financial products that can certainly be considered as a substitute for conventional banking. The idea is that all users, irrespective of their beliefs, can take advantage of both types of banking. In this context, Islamic banks can be

⁹According to “the Banker”, many non-Islamic banks have Islamic bank windows like Citi, HSBC, Standard Chartered Bank etc.

¹⁰The term *Sharia* refer to the set of religious principles on which the laws are made. Here we are specifically referring to financial laws.

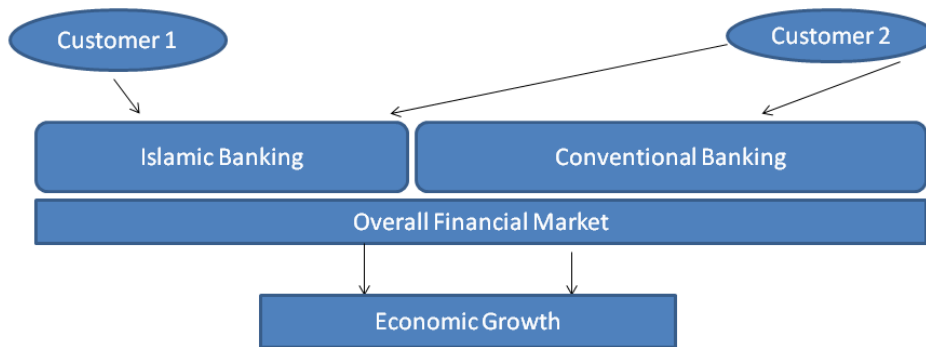
seen as new product of, or for, financial markets. It can be beneficial in its own ways; for example, conventional banks mostly lend on the principle of the credit worthiness of the borrower. In the case of Islamic banks, the products are of such a nature that there is less emphasis on credit worthiness, and more importance is attached to the productiveness of the project (Yousri 2016). Because of the emphasis on productiveness, more borrowers (who may not have the capacity to provide collateral) can qualify for the required loans (or investment) from the banks. Therefore, in a way, Islamic banks provide an alternative to conventional banking. The alternate/substitute products from Islamic banking will deepen financial markets further, thereby increasing overall financial development¹¹. Figure 2.3 illustrates this process more clearly. There are two groups of customers, customer 1 and 2, and financial markets have two sets of products, Islamic and conventional banking instruments. Customer group 1, say Muslims, will prefer to go to Islamic banks, while the other set of customers can have the option of going to both types of banks. In either situation, the financial market will be broadened as compared to the case where there is only conventional banking. This will help raise the level of savings and optimally allocate these savings in the form of capital. Furthermore, there is a moral dimension to every project in Islamic banking. If a project is harmful for society, no matter how profitable it is, Islamic banks are not allowed to finance it¹². Thus, there is a positive externality associated with the functioning of Islamic banks.

Given the advantages and functions of the Islamic banks described above, it would be interesting to see what contributions this “new” section of the financial market is contributing to the growth, besides meeting the demand and providing similar services as those of its counterparts.

¹¹It can be argued that in a Muslim country because of the prohibition of interest conventional banking is not allowed. But Islamic banks will take time to gradually move up to a level where they can replace the conventional banking. In the meantime both systems can facilitate the financial development process. In other non-Muslim countries where there is not a “natural demand” for Islamic banking, the presence can broaden the financial base.

¹²This moral dimension is defined in the Islamic teachings.

Figure 2.3: Customers, financial market and economic growth



Every customer have their preference. There will be customers, say Muslims who naturally want to go to Islamic banking and there will be other customers who want to deal with both types of banks. The presence of both types of banks will facilitate financial development.

2.3 Methodology

In this section we describe the methodology that is followed for the current study. This section also explain the variables that are employed for the regression analysis.

2.3.1 Variables and Data Sources

“A good measurement of financial development is very important to assess the development of financial sector and understand the impact of financial development on economic growth and poverty reduction” (World Bank¹³). This statement sheds light on the reason why several indicators used to measure CFD exist in the literature. In the case of IFD, this task is even more difficult because of data problems and almost non-existent standard measures as compared to the case of CFD. Mostly, in literature IFD is measured through Islamic banking development or IBD. However, the data on IBD is limited because of three main reasons. First, there is no “dedicated” database available that collects data specifically on Islamic

¹³<http://www.worldbank.org/en/publication/gfdr/background/financial-development>.

banking, as is the case for conventional banks. Second, many non-Islamic banks have Islamic bank operations and windows, but they do not present the data on Islamic banking separately. Third, the secondary market for Islamic banking is limited and not as big as compared to its counterpart in conventional financial secondary market. The problem of non-collection of data from the secondary market also exists as was the case for the banking market. For this reason, we calculated most of the data from the financial statements of Islamic banks. This approach is equal to creating a database consisting of Islamic banks and Islamic windows of non-Islamic banks. In other words, we measure IFD through Islamic banking development (IBD).

The database was built in three steps. In the first step, we established a definition of an Islamic bank. Only those banks whose operations and instruments are approved and monitored by a *Sharia* advisory board were included. If a commercial bank has an Islamic bank window or operations, only that specific window and operations are considered Islamic if it is also approved and monitored by a *Sharia* board. Furthermore, there are many financial institutions operating on the basis of Islamic finance principles, but all of them cannot be classified as “banking institutions”. While calculating the IBD measure, we only took those institutions that accept deposits from savers, who can be individuals or corporations. Second, the information was mainly collected from financial statements, central bank reports, and banking bulletins. However, there were some missing data, in which case the gap was filled by the data filling method. The data were collected both in dollar terms and local currency, the latter was converted to dollar. Third, IBD measures were calculated in terms of the ratio to gross domestic product. The exchange rates used belong to the same period during which the data were converted. The collection of the data, as mentioned above, made the panel more balanced, which would not have been the case if the data were gathered

from an existing database on Islamic banks¹⁴. It also increased the number of observations and banks reflected in the data.

Unlike other studies, more than one proxy to measure IBD was calculated for this research. The proxies to measure IBD include IBGL to GDP: This is the total amount of loans (finance) provided by Islamic banks to private and non-private sectors to GDP¹⁵. In this research, IBGL served as a means to try to capture the size of the Islamic banks and is closely related to domestic credit to private sector to GDP, as used to measure CFD. The second indicator is the ratio of Islamic banks' total customer deposits to GDP (IBTCD): Although IBGL measures the size of the Islamic banks, it does not indicate the size of total savings that individual put in these banks. For this reason, we calculated IBTCD over the sample years to ascertain the increase in savings due to of the presence of Islamic banks divided by GDP in order to measure the depth of Islamic banking. The use of IBTCD is in line with the work of Levine & Zervos (1998b). Third proxy is the ratio of Islamic banks' total assets to GDP (IBTA), which calculates the total assets of the Islamic banks as a ratio to GDP. This measure helped us capture the size of the Islamic banks. However, IBTA is a more general and comprehensive measure than IBGL because it includes both the asset and liability sides of the balance sheet.

The dependent variable in our regression is real GDP per capita growth (Growth). Although there is a disagreement regarding employing GDP as a measure of economic productivity, this remains a widely used variable¹⁶. We also used the CFD proxies alternatively along with the IFD proxy variable because almost all countries included in the sample have Islamic banking also in addition to a strong presence of conventional banking institutions.

¹⁴This study acknowledges the use of Bank-scope, but the data was limited and not balanced. Furthermore there is a limited number of banks and some banks had not been updated since long. To calculate the missing figures and update the data with new banks and more number of years, the financial statements were used. This attempt to balance the data and to update was not tried before according to our knowledge.

¹⁵Although Islamic banks do not provide loans as in conventional banks, the name is used to make it in line with the CFD proxies used in literature.

¹⁶Industrial production is also used in some studies like Kassim (2016), but in case of many countries in our data set, the above series was not available.

Therefore, to capture the effect of conventional banking on growth this study contains three variables: liquid liabilities (LL), private credit by banking sector (PC), and domestic credit by commercial banks (DC). These proxies are standard measures of CFD and have been used extensively in the literature (see Beck et al. 2000, 2010; Levine 2005; Beck et al. 2008). The use of the proxies above may help to isolate the effect of Islamic banking on growth and to analyze the effect of CFD on growth in the presence of Islamic banking (see Levine 1997; Levine et al. 2000).

Other variables added as control variables include government consumption as a percentage of GDP (GCons), inflation (Inf), trade openness (TO), foreign direct investment(FDI) and quality of institutions (INS). A study by Acemoglu et al. (2003) revealed that INS does matter for long-term economic growth. This study uses contract enforcement as a broad measure of the quality of institutions. It is more likely that, if contracts are enforced in a country, the quality of institutions would also become better, promoting growth in turn.

Annual data on 24 countries covering the 2004–2014 period were used for the current study. The choice of countries and time period is based on the availability of data, as well as the fact that data on Islamic banking were available for the period considered. Unlike other studies, this study is based on a balanced panel in order to reduce the number of unobserved observations or skipped values. The second reason is to increase the number of countries so that the quality of IBD indicators may increase, as well as the data points. The names of countries included in panel data and the sources of data are given in appendix to the chapter.

2.3.2 Empirical Methodology:

We divided the estimation procedure into three steps. The first step permitted us to assess the impact of Islamic banking on growth. In the second part, we attempted to detect the presence of a long-run relationship between IBD and growth. If a long-run relationship existed then, in the third and last step, we intended to check the direction of causality between the two.

Panel Fixed Effect

The basic equation for fixed effect can be written as,

$$Y_{it} = X_{it}\beta_{it} + \alpha_i + \mu_{it} \quad (2.1)$$

Where, α_i is the unknown intercept for each country in sample, Y_{it} is the dependent variable (Growth), μ_{it} refers to the error term and X_{it} denotes a vector of control variables, as follows:

$$X_{it} = (IBD, FDI, TO, INS, INF, GCons, CFD)$$

IBD is Islamic banking development and CFD is conventional financial development indicators. The subscript $i(= 1, \dots, n)$ represents the country and $t(= 1, \dots, T)$ denotes the period of time (years).

Panel Co-integration Test

Before estimating the causal relation through Vector Error Correction Model (VECM), panel unit root tests and panel co-integration tests were conducted to avoid spurious causation. The structure of a panel unit root test can be generally presented as ¹⁷

$$\Delta X_{it} = \gamma_i X_{it-1} + \sum_{i=1}^{p_i} \varphi_{il} \Delta Y_{it} + \alpha_i d_{it} + \epsilon_{it} \quad (2.2)$$

For panel unit root tests, there are many tests available, such as the Levin, Lin, and Chu test, the Pesaran and Shin W-test, the Fisher-ADF test, and the Fischer-PP chi-square test. All of the above-mentioned tests can be classified into two groups. First, where the tests assume a common unit root process (Levin, Lin, and Chu test and Beratung test), it means that γ_i in equation 2.2 is identical across cross-sections. The second group of tests (Pesaran and Shin W-test, the Fisher-ADF test, and the Fischer-PP Chi-square test) assumes an individual unit root process, so γ_i may vary across cross-sections. If γ_i is equal to 1 in absolute terms, then the series is said to have a unit root. We

¹⁷Not all tests mentioned in the literature above follow the same structure.

used all of the above-mentioned tests for unit root and reported the summary of these tests. The decision about the presence of a unit root was based on the basis of most outcome from these tests, which is a standard practice.

To assess the long-run relation, the method developed by Pedroni (1999) and Pedroni (2004), Johansen Fischer (Maddala & Wu 2003; Kao 1999) was used. The Pedroni and Kao tests are based on Engle & Granger (1987) approach, whereas the Fischer test is a combination of Johansen & Juselius (1990) tests.

Pedroni offered seven test statistics to measure the co-integration among the variables. An advantage of Pedroni's approach is that it allows heterogeneity across the cross-sectional units of a panel. Among the seven statistics, four panel statistic (panel ν , panel ρ , panel PP and panel ADF) are based on pooling the residuals of the regression within dimension of the panel, and the rest of them (group ρ , group PP and group ADF statistic) are based on pooling the residuals of the regression between the dimension of the panel. The basic idea is to estimate the integrating relationship for each member of the panel and then to pool the residuals of these estimations to conduct the panel tests¹⁸.

An empirical form of the Pedroni test can be depicted as,

$$Y_{it} = \alpha_{it} + \theta_{it}t + X_i\beta_i + \epsilon_{it} \quad (2.3)$$

where Y_{it} and X_{it} are the observable variables with orders $(Z \times K) \times 1$ and $(Z \times K) \times m$, respectively. In equation 2.3 above α_i denotes the intercept, and θ_i represents the time trend. The X_i are assumed to be I(1). All of the seven statistics were assumed to be distributed normally (asymptotically). The critical values were also calculated and supplied by Pedroni.

Kao (1999) followed the same approach as that of Pedroni. The only exception is that, in the first stage, this test specifies the cross-section's specific intercepts and homogeneous coefficients. Therefore, Kao assumed heterogeneity in intercept α_i , as well as homogeneity in β_i , and θ_i , which is the time trend, assumed to be 0.

¹⁸For more information see Pedroni (1999).

The third test used is the Johansen Fischer co-integration test. This test is the panel version of the individual Johansen co-integration test. As compared to other tests, this test has the advantage of being flexible, simple, and appealing for different economic variables. Hanck (2009) declared that the Johansen Fischer test performed well as compared to the Pedroni, Kao, and Larsen (1999) co-integration tests based on a simulation experiment analysis. The Johansen Fischer test sums the p values of individual co-integration tests for cross-section i . More simply, it can be presented as $-2 \sum_{i=1}^n \log(\theta_i)$ where θ_i is the p value of individual co-integration tests for the cross-section. The result is presented in the form of the chi-square statistic ($\chi^2_2 N$). The lag order is very important here to reach the correct conclusion and is also required so that the residuals are serially uncorrelated and normally distributed.

All of the co-integration tests described above were helpful in explaining the long-run relationship between the variables of interest. We decided to use many tests based on the fact that many studies dealing with panel data have conducted one or all of these tests to validate the co-integration among the variables.

Granger Causality

Co-integration tests establish the long-run relationship, but they do not indicate the direction of causality. Therefore, the Granger causality test, which is based on a two-step Engle & Granger (1987) procedure, augmented with error correction and derived from the long-run relationship was applied to determine the direction of causality. In the first step, the long-run model specified in equation 2.3 was estimated, and residuals were gathered. These residuals were then used to estimate Granger causality with the error correction term. To run Granger causality in this manner, a standard vector error

correction model VECM framework was used in the following form¹⁹

$$\begin{aligned} \Delta growth_{it} = & \alpha_{1k} + \sum_{l=1}^m \varphi_{11il} \Delta growth_{it-l} + \\ & \sum_{l=1}^m \varphi_{12il} \Delta IBD_{it-l} + \delta_{1i} ECT_{it-1} + \epsilon_{1it} \end{aligned} \quad (2.4)$$

and

$$\begin{aligned} \Delta IBD_{it} = & \alpha_{3k} + \sum_{l=1}^m \varphi_{31il} \Delta IBD_{it-l} + \\ & \sum_{l=1}^m \varphi_{32il} \Delta growth_{it-l} + \delta_{3i} ECT_{it-1} + \epsilon_{3it} \end{aligned} \quad (2.5)$$

When CFD is introduced in equations 2.4 and 2.5, the equations can be written as,

$$\begin{aligned} \Delta growth_{it} = & \alpha_{2k} + \sum_{l=1}^m \varphi_{21il} \Delta growth_{it-l} + \\ & \sum_{l=1}^m \varphi_{22il} \Delta IBD_{it-l} + \sum_{l=1}^m \varphi_{23il} \Delta CFD_{it-l} + \\ & \delta_{2i} ECT_{it-1} + \epsilon_{2it} \end{aligned} \quad (2.6)$$

$$\begin{aligned} \Delta IBD_{it} = & \alpha_{4k} + \sum_{l=1}^m \varphi_{41il} \Delta IBD_{it-l} + \\ & \sum_{l=1}^m \varphi_{42il} \Delta growth_{it-l} + \sum_{l=1}^m \varphi_{43il} \Delta CFD_{it-l} + \\ & \delta_{4i} ECT_{it-1} + \epsilon_{4it} \end{aligned} \quad (2.7)$$

and

$$\begin{aligned} \Delta CFD_{it} = & \alpha_{5k} + \sum_{l=1}^m \varphi_{51il} \Delta CFD_{it-l} + \\ & \sum_{l=1}^m \varphi_{52il} \Delta growth_{it-l} + \sum_{l=1}^m \varphi_{53il} \Delta IBD_{it-l} + \\ & \delta_{5i} ECT_{it-1} + \epsilon_{5it} \end{aligned} \quad (2.8)$$

¹⁹Toda & Yamamoto (1995) is another method to analyze the causal relation, which is also used in many papers. But this method is used when the variables are of different integrated levels. In our case, all variables are I(1), that's why the selection of VECM was a natural choice.

In the equations above, Δ shows the first difference, and m is the optimal lag length; l is determined by applying Schwarz Bayesian criteria. The model in the form above can determine the short- and long-run causality between the two variables. Long-run causality can be determined through the error correction term, ECT_{it-1} , which should be theoretically stationary. The error terms in the equations (ϵ_{1it} , ϵ_{2it} and so on) follow the usual properties (i.e., independent and identically distributed with 0 mean and constant variance). Error correction tells the rate of change of adjustment; hence, it is the feedback from long-to short-run changes in the dependent variable toward long-run equilibrium²⁰. To test short-run causality, the Wald test can be applied on the coefficient of IBD (φ_{12il}) in equation 2.4, as well as on *growth* (φ_{22il}) in equation 2.6.

The panel-based VECM mentioned above allows for two sources of causation (one through the lagged dynamic term or short-run causality, and error correction term or long-run causality); thus, three tests of causality tests can be performed: (i) a short-run Granger causality test, (ii) a weak exogeneity test, and (iii) a strong exogeneity test. The short-run Granger causality test evaluates the individual coefficient for a possible causal effect on the dependent variable. This causal effect can be determined by measuring the statistical significance of the F-statistics based on the null hypotheses $\varphi_{12} = 0$ and $\varphi_{32} = 0$ for equation (2.4) and (2.5), as well as similar null hypotheses for equations (2.6), (2.7) and (2.8). Masih & Masih (1996), and Asafu-Adjaye (2000) termed the short-run causality test as a weak causality test because the dependent variable responds to short-term shocks to the stochastic environment.

The weak exogeneity test, which is also called the long-run non-causality test, requires non-rejection of the null hypothesis $\delta_{1i} = 0$ in the case of equation 2.4. This is referred to as non-causality running from long-run equilibrium deviation in IBD, from the previous period to growth. Similarly, for equation 2.6, the weak exogeneity test refers to the satisfaction of the null hypotheses $\delta_{2i} = 0$ depicting deviations from long-run equilibrium to growth. The same procedure applies for other equations.

²⁰That is why it is called error correction term or adjustment factor.

For the strong causality test, joint significance of the lagged dynamic terms and ECT can be tested. It is equivalent to test the null hypothesis $\varphi_{22il} = \delta_{2i} = 0$ in the case of equation (2.6). This is the joint significance test of ECT/IBD. There is no Granger causality if this null hypothesis is not rejected. Along the same lines, growth does not Granger cause CFD if $\varphi_{52} = \delta_{5i} = 0$ (ECT/growth) cannot be rejected in equation 2.8. Similar reasoning can be applied for other equations. This is termed as the “strong Granger causality test”, as mentioned in several studies (Mahadevan & Asafu-Adjaye 2007; Yoo 2006; Mehrra 2007). This test helps to indicate the variables active to short-term adjustment and to re-establish long-run equilibrium after a shock to the system.

As this study contains three measures for IBD and CFD, a total of two models were estimated in the form of equations 2.4 and equation 2.5, as well as three models in the form of equations 2.6, 2.7 and 2.8 above. Therefore, for these five models, and for each IBD proxy, growth, and their direction of causality, there is a total of 33 equations estimated to reach some conclusion.

2.4 Empirical Results

This section presents the results in four steps. The first step first focuses on the results for panel fixed effects. The second one reports the stationarity of the variables through unit root tests. The third step consists of examining the co-integration among the variable. Finally, the long- and short-run causality tests are discussed in the fourth step.

2.4.1 Panel Fixed-Effects Regression

Table 2.1 presents the results for the panel fixed-effects regressions. In all of these regressions (1–12), the dependent variable is growth. In equations 1, 5, and 9, growth is regressed on a single IBD indicator to observe its effect. In equations 2–4, 6–8, and 10–12, growth is regressed on the IBD indicator, along with one CFD indicator. This process was repeated with other IBD indicators interchangeably, as well as with CFD proxies. The coefficient of IBD in all regressions is positive and significant at the 5% level

of significance. This finding confirms the well known supply-leading view, on the relationship between finance and growth for Islamic banking. The result is true even in the presence of CFD. More precisely, for a given level of financial development, Islamic banking seems to affect growth since the coefficients are positive and significant in all estimations. Apart from IBD, CFD also positively affects growth in all the equations, validating the classic link between CFD and growth. It can be concluded from the results that IBD, apart from conventional finance, has its own impact on growth. Because most countries in the data set are Muslim and have both Islamic and conventional financial institutions, for the time being, Islamic banking does not seem to crowd out conventional banks, perhaps strengthening the overall financial market in general by offering extended and substitute products. Similarly, a positive and significant IBD coefficient also means that Islamic banking is responding to and fulfilling the demand for those customers who do not wish to engage in transactions involving interest or who want substitute products along with conventional financial instruments. The coefficient of IBD in all estimation results is relatively small as compared to CFD, but significant. Our results for IBD closely match those of Zirek et al. (2016).

As for other variables in government consumption, expenditure positively and significantly affects growth. The same is true for trade openness. However, FDI is negative and significant, which is not a surprising result given the fact that developing countries have problems with weak policies, less well-trained human capital, and institutions, as shown by Haddad & Harrison (1993), Carkovic & Levine (2002) and Borensztein et al. (1998). Trade openness does seem to affect growth positively, which is contrary to recent studies in the literature that suggest a negative effect of liberalization on economic growth. Thus, our findings for trade openness confirm with the results of Karam & Zaki (2015), who discovered a positive effect of trade openness and growth for the MENA region.

In addition, most of the countries in the sample do not have well-developed financial systems (although they are in an evolving stage now), so investment is not fully utilized. The finding on FDI also indicates why the quality of institutions was not significant as well. Inflation has the usual negative

sign-usual in the sense that macroeconomic theories differ in their views about the inflation–growth nexus. Classical and neo-classical theories do not recognize the relationship in the short term but agree on a negative long-term relationship. On the other hand, Keynesians and neo-Keynesians believe both of them to be independent in the short run and positively dependent in the long run. Our result indicating a negative relationship can be explained by the high inflation that some of the panel countries may have experienced during the period under study.

Approximately similar results are true for all the regressions, where IBD and CFD affect growth positively, since the coefficients of both are positive in all regressions and significant. The coefficient of GCons is also positive and significant. On the other hand, FDI is negative all over and affects growth significantly. The quality of institutions is positive in all of these results, but it is insignificant. The diagnostic tests are within normal ranges, and R^2 suggests that almost 60%–68% of the variability in growth is explained by the explanatory variables. Our results relating to IBD and conventional finance to growth are in accordance with the findings of Imam & Kpodar (2016) and Boukhatem & Ben-Moussa (2018), who asserted that Islamic finance has a positive effect on growth even when controlling for conventional finance.

2.4.2 Results of Panel Unit Root

The results of unit root tests are presented in Table 2.2. For all three variables (growth, IBD, and CFD indicators) the null hypothesis of a unit root cannot be rejected at the first difference. At level, only the Levin, Lu, and Chu test shows the variables to be stationary. For all the other tests, the null hypothesis cannot be rejected. Furthermore, IBTCD and IBGL are only weakly stationary in ADF tests, whereas IBTCD, IBTA, DC, and PC are stationary at level according to the PP Fisher test. Since the Levin, Lu, and Chu test has lower power than the other tests²¹, it is reasonable to conclude that all variables are non-stationary at levels. In other words, it can be concluded that they are integrated in order one or $I(1)$, which means

²¹See Wang et al. (2011)

Table 2.1: The Islamic banking & economic growth: Panel fixed effect regression

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
C	2.6868*** (0.0000)	2.6452*** (0.0000)	2.6063*** (0.0000)	2.6445*** (0.0000)	2.6869*** (0.0000)	2.6452*** (0.0000)	2.6065*** (0.0000)	2.6445*** (0.0000)	2.6862*** (0.0000)	2.6452*** (0.0000)	26.452*** (0.0000)	2.6445*** (0.0000)
IBGL	0.0072** (0.0302)	0.0062** (0.0455)	0.0078*** (0.0156)	0.0080** (0.0561)								
IBTA					0.0051** (0.0372)	0.0044** (0.0529)	0.0054** (0.0206)	0.0062* (0.0659)				
IBTCD									0.0058** (0.0383)	0.0049** (0.0547)	0.0061** (0.0216)	0.0070* (0.0695)
FDI	-0.00686*** (0.0001)	-0.0072*** (0.0000)	-0.0069*** (0.0006)	-0.0076*** (0.0001)	-0.0068*** (0.0001)	-0.0073*** (0.0000)	-0.0069*** (0.0006)	-0.0076*** (0.0001)	-0.0069*** (0.0001)	-0.0073*** (0.0000)	-0.0069*** (0.0006)	-0.0077*** (0.0001)
G.Cons	0.0435*** (0.0064)	0.0624*** (0.0001)	0.0351* (0.0604)	0.0570*** (0.0028)	0.0435*** (0.0065)	0.0624*** (0.0001)	0.0350* (0.0610)	0.0571*** (0.0028)	0.0434*** (0.0066)	0.0623*** (0.0001)	0.0350* (0.0613)	0.0571*** (0.0028)
INS	0.2721 (0.1408)	0.2005 (0.2482)	0.1213 (0.5376)	-0.0045 (0.9819)	0.2729 (0.1401)	0.2006 (0.2488)	0.1228 (0.5334)	-0.0024 (0.9903)	0.27404 (0.1384)	0.2017 (0.2461)	0.1245 (0.5279)	-0.0008 (0.9966)
TO	0.0213*** (0.0015)	0.0210*** (0.0010)	0.0158** (0.0411)	0.0145** (0.0574)	0.0212*** (0.0015)	0.0210*** (0.0010)	0.0158** (0.0417)	0.0145** (0.0578)	0.0212*** (0.0015)	0.0210*** (0.0010)	0.0158** (0.0418)	0.0145** (0.0579)
INF	-0.0087** (0.0528)	-0.0089** (0.0346)	-0.0013 (0.8469)	-0.0024 (0.7248)	-0.0087** (0.0523)	-0.0090** (0.0343)	-0.0014 (0.8359)	-0.0023 (0.7198)	-0.0087** (0.0523)	-0.0090** (0.0343)	-0.0014 (0.8336)	-0.0023 (0.7166)
DC		0.0235*** (0.0000)				0.0336*** (0.0000)				0.0134*** (0.0000)		
LL			0.0202*** (0.0042)				0.0102*** (0.0043)				0.0102*** (0.0044)	
PC				0.0208*** (0.0000)				0.0109*** (0.0000)				0.0209*** (0.0000)

Notes: *, **, *** indicate significance at 10%, 5% and 1% level. Figures in brackets are the p-values

that, after taking the difference, all series become stationary. To summarize the results of the panel unit root tests, all the series have unit roots across countries. Based on these results, we can expect the series to be co-integrated, and thus we can proceed to the co-integration test.

2.4.3 Panel Co-Integration Tests

Having established $I(1)$ for all variables, the co-integration test was performed to determine the presence of a long-run relationship. The results are provided in Tables 2.3–2.6, which are in two steps. Tables 2.3 and table 2.4 present results for co-integration between growth and the IBD indicator, whereas Tables 2.5 and 2.6 display the same for growth and the IBD indicator, including the CFD indicators.

The Johansen Fisher test in 2.3 shows that the null hypothesis of no co-integration can be rejected at the 1% level of significance, which is a strong result for a long-run relationship. The same is true for the three-variable case, which is displayed in 2.6. The variables are significant at the 1% level of significance, indicating the presence of a long-run relationship among the three variables. In both Tables (2.3 and 2.6), the trace value and maximum eigenvalue suggest the presence of at least one co-integrated vector. Both tables also illustrate the long-run co-integration for the different indicators of IBD and CFD, respectively. In both tables, the CFD and IBD are used interchangeably, and every combination was tried in order to assess the long-run relationship. The result is that the Joahnsen Fischer test supports the existence of co-integration among the variables.

The results of the Pedroni test are presented in Table 2.4 for growth and IBD. The findings reveal that five out of seven test statistics reject the null hypothesis of no co-integration at the 1% and 5% levels of significance. Hence, the Pedroni test provides evidence of a long-run relationship among the variables. If we compare the results of the Pedroni test in Table 2.4 with results in Table 2.5—which contains the co-integration results among the growth and IBD proxies with the addition of a CFD proxy—it can be seen that four out of seven test statistics suggest the presence of co-integration among

Table 2.2: Results of panel unit root tests

Varb	Levin, Lin & Chu test		Breitung test		Im Pesaran & Shin Test		ADF Fischer test		PP Fisher test	
	Level	1st Diff	Level	1st Diff	Level	1st Diff	Level	1st Diff	Level	1st Diff
Growth	-5.8145*** (0.0000)	-12.4601*** (0.0000)	2.8687 (0.9979)	-6.5710*** (0.0000)	1.4186 (0.9979)	-1.9220** (0.0273)	37.4971 (0.8627)	86.0189*** (0.00060)	41.0530 (0.7510)	166.8701*** (0.0000)
IBTCD	-2.3122*** (0.0104)	-11.8304*** (0.0000)	8.9806 (0.9998)	-1.7963** (0.0362)	-0.3036 (0.3807)	-2.2859*** (0.0111)	61.8866 (0.1086)	101.3820*** (0.0000)	88.0019*** (0.0004)	206.3780*** (0.0000)
IBTA	-1.6374** (0.0508)	-12.9920*** (0.0000)	8.7953 (0.9953)	-3.0144*** (0.0013)	0.4921 (0.6887)	-2.2045*** (0.0137)	50.2025 (0.3839)	99.0370*** (0.0000)	80.4440*** (0.0023)	145.8501*** (0.0000)
IBGL	-4.3702*** (0.0000)	-13.5938*** (0.0000)	6.9694 (1.0000)	-4.7143*** (0.0000)	-0.3786 (0.3525)	-3.3868*** (0.0004)	61.7724* (0.0874)	116.4901*** (0.0000)	57.0926 (0.1730)	168.9303*** (0.0000)
DC	-6.0042*** (0.0000)	-10.2707*** (0.0000)	2.9772 (0.9985)	-1.9558** (0.0252)	-0.2541 (0.3997)	-1.7602** (0.0392)	52.1962 (0.3142)	86.2835*** (0.0006)	66.5072** (0.0396)	124.7644*** (0.0000)
PC	-9.3833*** (0.0000)	-9.0884*** (0.0000)	2.9039 (0.9982)	-1.1049** (0.0465)	0.4002 (0.6555)	-0.7258** (0.0234)	48.7683 (0.4420)	60.9755** (0.0486)	64.8112** (0.0532)	96.6082*** (0.0000)
LL	-5.6965*** (0.0000)	-11.5162*** (0.0000)	2.3598 (0.9996)	-0.8485** (0.0198)	0.0982 (0.5391)	-1.3532** (0.0329)	57.0078 (0.1750)	82.2348*** (0.0015)	45.0065 (0.5962)	126.0202*** (0.0000)

Notes: Lag length are selected on AIC criteria. *, **, *** indicate significance at 10%, 5% and 1% level. Figures in brackets are the p-values

Table 2.3: Panel co-integration tests:Johansen Fischer co-integration test-unrestricted co-integration rank test(trace & maximum eigen values)

Series	No of CE	Trace Value	Prob.	Max-Eigen Value	Prob.
Growth, IBGL	None	167.9***	0.0000	138.0***	0.0000
	At most 1	109.3***	0.0000	109.3***	0.0000
Growth, IBTA	None	215.6***	0.0000	170.1***	0.0000
	At most 1	133.3***	0.0000	133.3***	0.0000
Growth, IBTCD	None	266***	0.0000	233.4***	0.0000
	At most 1	119.5***	0.0000	119.5***	0.0000

Note: Probabilities are computed using the asymptotic Chi-square distribution. *, **, *** indicate significance at 10%, 5% and 1% level.

the three variables. The three tests that do not reject the null hypothesis (Panel v -statistic, Panel ρ -statistic and Group ρ -statistic) can have a very low power in the small time dimension, as noted by Pedroni, which may prevent them from detecting co-integration. Al-Iriani (2006) mentioned the same possibility. In summary, on the basis of the Pedroni test results, it can be concluded that there exists co-integration among the variables for both tables.

The results of the Kao test with intercepts and no trend are presented in Table 2.4. According to the table, the Kao test also rejects the null hypothesis of no co-integration at the 1% level of significance in all cases. However, only Table 2.5 suggests the presence of co-integration at the 5% level of significance for the first four columns. The acceptance of the alternative hypothesis according to the Kao-ADF test statistic also leads to the conclusion that there exists a long-run relation among growth-IBD and Growth, IBD, and CFD.

On the basis of all these tests, it can be concluded that there exists a long-run relationship between growth and IBD. This remains true if CFD is included in the model. The use of so many tests and their conclusions may also rule out the ideas that the estimated relationship among the variables is spurious.

Table 2.4: Pedroni & Kao panel co-integration tests results for Growth and IFD

	Growth, IBGI Statistic	Growth, IBTA Statistic	Growth, IBTCD Statistic
Pedroni test			
<u>Within Dimension</u>			
Panel v -statistic	0.7685	0.8376	1.5714
Panel ρ -statistic	-3.7361**	-3.6053**	-3.7999*
Panel PP-statistic	-13.1130***	-13.0190***	-12.9800***
Panel ADF-statistic	-14.0125***	-13.2871***	-13.5330***
<u>Between dimension</u>			
Group ρ -statistic	0.4940	0.6644	0.6993
Group PP-statistic	-10.0611***	-9.2812***	-8.8397***
Group ADF-statistic	-10.4663*	-9.1594*	-9.5516*
<u>Kao test</u>			
ADF	-3.2104***	-11.1277***	-3.1818***
Prob.	(0.0007)	(0.0000)	(0.0007)

*, **, *** indicate significance at 10%, 5% and 1% level.

Table 2.5: Pedroni & Kao panel co-integration tests results for Growth, IFD and CFD

	Growth,IBGL,DC	Growth,IBTA,DC	Growth,IBTCD,DC	Growth,IBGL,PC	Growth,IBTA,PC	Growth,IBTCD,PC	Growth,IBGL,LL	Growth,IBTA,LL	Growth,IBTCD,LL
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic
Pedroni test									
Within Dimension									
Panel v -statistic	-16.937	-15.438	-16.156	-22.968	-16.416	-19.461	-14.422	-11.676	-161.406
Panel ρ -statistic	22.082	18.898	19.038	29.911	23.735	24.856	183.627	17.498	17.118
Panel PP-statistic	-1.548**	-2.491**	-2.662*	0.389***	-0.334*	-0.747**	-2.201**	-2.113***	-2.763*
Panel ADF-statistic	-1.781***	-3.411***	-3.168***	0.003***	-1.421***	-1.364***	-2.815***	-2.965**	-3.601***
Between dimension									
Group ρ -statistic	40.075	38.762	39.051	42.129	36.109	40.252	42.193	416.070	41.598
Group PP-statistic	-1.975**	-3.932***	-4.125***	-3.885***	-2.882***	-2.844***	-2.298***	-2.138**	-2.709***
Group ADF-statistic	-2.761***	-5.573***	-4.088***	-5.038***	-5.678***	-4.705***	-3.815***	-2.976***	-3.884***
Kao test									
ADF	-1.856**	-1.882**	-1.819**	-2.409***	-2.402***	-2.403***	-3.010***	-3.076***	-3.031***
Prob	(0.0317)	(0.0299)	(0.0344)	(0.0080)	(0.0082)	(0.0081)	(0.0013)	(0.0010)	(0.0012)

Note: *, **, *** indicate significance at 10%, 5% and 1% level.

Table 2.6: Panel co-integration tests: Johansen Fischer co-integration test-unrestricted co-integration rank test(trace & maximum eigen values.)

Series	No of CE	Trace Value	Prob.	Max-Eigen Value	Prob.
Growth, IBGL,DC	None	202.2***	(0.0000)	202.2***	(0.0000)
	At most 1	296.2***	(0.0000)	236.3***	(0.0000)
	At most 2	158.6***	(0.0000)	158.6***	(0.0000)
Growth, IBTA,DC	None	270.4***	(0.0000)	270.4***	(0.0000)
	At most 1	282.5***	(0.0000)	238.4***	(0.0000)
	At most 2	136.1***	(0.0000)	136.1***	(0.0000)
Growth, IBTCD,DC	None	185.2***	(0.0000)	185.2***	(0.0000)
	At most 1	249.8***	(0.0000)	208.6***	(0.0000)
	At most 2	134.6***	(0.0000)	134.6***	(0.0000)
Growth,IBGL,PC	None	2.77	(0.5966)	2.77	(0.5966)
	At most 1	40.10***	(0.0000)	37.65***	(0.0000)
	At most 2	22.79***	(0.0001)	22.79***	(0.0001)
Growth, IBTA,PC	None	19.81***	(0.0005)	19.81***	(0.0005)
	At most 1	21.45***	(0.0003)	21.85***	(0.0002)
	At most 2	5.2**	(0.0267)	5.2**	(0.0267)
Growth, IBTCD,PC	None	19.81***	(0.0005)	19.81***	(0.0005)
	At most 1	29.31***	(0.0000)	27.29***	(0.0000)
	At most 2	9.18*	(0.0567)	9.18*	(0.0567)
Growth, IBGL,LL	None	101.8***	(0.0000)	101.8***	(0.0000)
	At most 1	180.8***	(0.0000)	157.7***	(0.0000)
	At most 2	83.71***	(0.0000)	83.71***	(0.0000)
Growth, IBTA,LL	None	135.9***	(0.0005)	135.9***	(0.0005)
	At most 1	198.5***	(0.0003)	176.2***	(0.0002)
	At most 2	71.31***	(0.0000)	71.31**	(0.0267)
Growth, IBTCD,LL	None	169.9***	(0.0005)	169.9***	(0.0005)
	At most 1	140.7***	(0.0000)	126.9***	(0.0005)
	At most 2	52.72***	(0.0006)	52.72***	(0.0006)

Note: Probabilities are computed using the asymptotic Chi-square distribution. *, **, *** indicate significance at 10%, 5% and 1% level.

2.4.4 Causality Results

Given the presence of a long-run relation between IBD and growth, as well as among IBD, CFD, and growth, the next step is to test the direction of causality using the Granger causality test. The results are displayed in Table 2.7 for IBD and growth, as well as in Table 2.8 for IBD, growth, and CFD.

Table 2.7 presents the results for the Granger causality test based on equations 2.4 and 2.5. The first Table 2.7(a) includes the first proxy of IBD, which is IBGL. Table 2.7(b) contains the second proxy IBTA, and 2.7(c) has the third proxy IBTCD. If we look at the short-run results for all the tables mentioned above, which are provided in the form of the Wald test for coefficient restriction, it suggests that there is a short-run causality running from IBD to growth in all cases. In Table 2.7(a), the coefficient is significant at the 1% level, while in Table 2.7(b) and 2.7(c), the coefficients are significant at the 5% level. When the same Tables 2.7(a) and 2.7(b) are looked at for reverse causality (i.e., from growth to IBD), we do not find any short-run causality between the two. However, in Table 2.7(c), growth does Granger cause IBD. This result is significant at the 10% level.

The coefficient of the ECT term paints a different picture. If we examine all the results, we can see that ECT term is significant in all cases where the dependent variable is growth. For all the other cases, where the dependent variable is IBD, we did not find a long-run causal relationship. The significance of the ECT term underscores the dynamic adjustment of the independent variable toward long-run equilibrium. In other words, IBD does cause economic growth in the long run. The coefficient of the ECT term also indicates the magnitude of correction in short-run equilibrium toward the long run. Therefore, for example, in Table 2.7(b), for the ECT term in the current period, the correction factor is 62%. These results support the work of Zirek et al. (2016); however, Zirek only found this relationship to be true for the long run and did not test the existence of reverse causality (i.e., causality from growth to IBD).

When the Granger causality is checked in the form of equations 2.6, 2.7 and 2.8, the results are even more interesting. The results are presented

Table 2.7: Panel Granger causality test

Table 2.7(a). Granger Causality test (GDP & IBGL)

F-Statistic (Prob)			
	Δ growth	Δ IBGL	ECT
Δ Growth	—	8.2934*** (0.0004)	-0.0687*** (0.0037)
Δ IBGL	2.5907 (0.7778)	—	0.6640 (0.000)

Table 2.7(b). Granger Causality test (GDP & IBTA)

F-Statistic (Prob)			
	Δ growth	Δ IBTA	ECT
Δ Growth	—	3.5270** (0.0314)	-0.6235*** (0.0000)
Δ IBTA	0.6132 (0.5427)	—	0.0045 (0.1620)

Table 2.7(c). Granger Causality test (GDP & IBTCD)

F-Statistic (Prob)			
	Δ growth	Δ IBTCD	ECT
Δ Growth	—	4.6205** (0.0110)	-0.5899*** (0.0000)
Δ IBTCD	6.6102* (0.0017)	—	0.0722 (0.0031)

Note: *, **, *** shows significance at 10%, 5% and 1% respectively. Figures in parentheses are the p-values.

in Table 2.8(a-i). In all of these tables, the short-run coefficient of IBD is significant. This means that our results clearly indicate that there is a causal relation running from IBD to growth. Interestingly, for all short-run results, we found this direction of causality to be uni-directional (i.e., running from IBD to growth). The long-run coefficient or ECT term for all tables—except for Table 2.8(d), where growth is the dependent variable—is negative and significant, demonstrating that, whenever there is a shock to the system, all variables interact dynamically to restore equilibrium in the long run. In other words, IBD and CFD do cause growth. If we analyze the short-run results for CFD causing growth, they also point out that, in most of the cases, CFD positively causes growth. In all of these results, there is a one-way causation running from CFD to growth. The above-mentioned short-run results confirm the supply-leading hypothesis. For the long-run effect, the results also indicate that CFD affects long-run growth. Here, as with the short-run results, the direction of causality follows the supply-leading hypothesis running from financial development to economic growth. However, in one case, Table 2.8(d), we did not find short- or long-run causality from either direction.

Looking at the joint wald F-test results, in seven out of the nine tables, there is a one-way causality between IBD and growth. In only two tables, 8(d) and 8(f), the results are supportive of bi-directional causality. So, the results of seven causality tests (strong exogeneity tests) validate the short-run results of one-way causality and also the direction—running from Islamic banking to economic growth. The results on the significance for the interactive terms of IBD and the ECT term on growth suggest that, both in the short run and the long run, IBD strongly Granger causes growth. It also indicates that, in the short run, if there is any shock to the system, then the Islamic banking variable and the conventional banking variable bear the adjustment to converge to long-run equilibrium. On the joint Wald F-test for the CFD and ECT terms, the results suggest that it is significant in six out of the nine tables, with direction of causality running from CFD to growth. Only in Tables 8(g) and 8(h) is there an indication of bi-directional causality. The occurrence of bi-directional causality in the case of CFD is not a new phenomenon, and many researchers are of the view that there bi-directional

causality may exist. On the direction of causality between IBD and CFD, our results indicate no meaningful relationship. Only in two cases, Tables 8(d) and 8(e), for the short run, our results are supportive of bi-directional causality.

In summary, based on the majority of the results for each case, there exists a long-run relationship between IBD and economic growth. In the short run, IBD significantly affects economic growth, and the direction of causality is from IBD to growth. For the long-run causality, we found evidence suggesting the causality to be uni-directional (i.e., from IBD to growth), and the reverse was not determined to be true. A strong causality is also present between IBD and growth, where the former causes the latter. The results unanimously seem to suggest causality from IBD to economic growth. A diagrammatic presentation of the results of Table 8 are shown in Figure 5. In terms of the direction of causality, our results confirm those of Abdul & Kassim (2015) for Malaysia, who also observed uni-directional causality running from Islamic finance to economic growth. However, our majority results do not support the existence of bi-directional causality, as was the case with Gudarzi & Dastan (2013) and Tajgardoon et al. (2013). Similarly, our results suggesting the existence of a long-run relationship partially agree with the work of Lebdaoui & Wild (2016), who found a long-run relationship between Islamic banking and economic growth. However, their study does not confirm the existence of a short-run relationship. Our study also mirrors the results of several other scholars (Gudarzi & Dastan 2013; Abedifar et al. 2016; Lehnert & Kchouri 2019).

Table 2.8: Panel Granger Causality test-(a-i)

Table 2.8(a). Granger Causality test (GDP, IBGL & LL)

F-Statistic (Prob)							
	Δ growth	Δ IBGL	Δ LL	ECT (t-statistic)	Δ growth/ECT	Δ IBGL/ECT	Δ LL/ECT
Δ Growth	–	3.9210** (0.0217)	2.5817* (0.0756)	-0.4767*** (0.0000)	–	12.1857*** (0.0000)	13.9890*** (0.0000)
Δ IBGL	1.0971 (0.3363)	–	0.2561 (0.7743)	0.0701 (0.1821)	18.6901 (0.1028)	–	1.2568 (0.2911)
Δ LL	0.6699 (0.5132)	0.1265 (0.8812)	–	0.0011 (0.0758)	1.0836 (0.3578)	2.0968 (0.1029)	–

Table 2.8(b). Granger Causality test (GDP, IBTA & LL)

F-Statistic (Prob)							
	Δ growth	Δ IBTA	Δ LL	ECT (t-statistic)	Δ growth/ECT	Δ IBTA/ECT	Δ LL/ECT
Δ Growth	–	4.8955*** (0.0011)	2.1613* (0.0781)	-0.3940*** (0.0000)	–	3.9242*** (0.0026)	5.5308*** (0.0001)
Δ IBTA	1.5150 (0.2229)	–	0.6388 (0.5292)	0.1212 (0.0001)	1.8498 (0.1129)	–	1.6033 (0.3825)
Δ LL	0.0454 (0.9556)	1.6098 (0.2032)	–	0.0001 (0.7252)	0.0692 (0.9762)	1.1461 (0.3324)	–

Table 2.8(c). Granger Causality test (GDP, IBTCD & LL)

F-Statistic (Prob)							
	Δ growth	Δ IBTCD	Δ LL	ECT (t-statistic)	Δ growth/ECT	Δ IBTCD/ECT	Δ LL/ECT
Δ Growth	–	3.2229** (0.0424)	2.6720* (0.0721)	-0.4726*** (0.0000)	–	11.9439*** (0.0000)	13.6780*** (0.0000)
Δ IBTCD	1.7146 (0.1832)	–	0.2532 (0.7766)	0.0165 (0.5847)	1.2058 (0.3094)	–	0.2897 (0.8327)
Δ LL	0.8633 (0.4238)	0.0678 (0.9345)	–	0.0012 (0.0428)	1.3934 (0.2469)	1.7657 (0.1560)	–

Notes: *, **, *** shows significant at 10%, 5% and 1% respectively. Figures in parentheses are the p-values.

Panel Granger Causality test

Table 2.8(d). Granger Causality test (GDP, IBGL & DC)

F-Statistic (Prob)							
	Δ growth	Δ IBGL	Δ DC	ECT (t-statistic)	Δ growth/ECT	Δ IBGL/ECT	Δ DC/ECT
Δ Growth	–	2.7079*	2.0598	0.0013	–	2.6210**	1.6429
	–	(0.0694)	(0.1304)	(0.6764)	–	(0.0522)	(0.1811)
Δ IBGL	0.1366	–	1.1539	0.7246	25.8367***	–	26.1381***
	(0.8724)	–	(0.3177)	(0.0000)	(0.0000)	–	(0.0000)
Δ DC	0.0709	0.9059	–	-0.0016	0.9522	1.4206	–
	(0.9316)	(0.4060)	–	(0.1130)	(0.4166)	(0.2383)	–

Table 2.8(e). Granger Causality test (GDP, IBTA & DC)

F-Statistic (Prob)							
	Δ growth	Δ IBTA	Δ DC	ECT (t-statistic)	Δ growth/ECT	Δ IBTA/ECT	Δ DC/ECT
Δ Growth	–	3.8166***	0.5087	-0.5913***	–	7.0677***	6.6279***
	–	(0.0058)	(0.7294)	(0.0000)	–	(0.0000)	(0.0000)
Δ IBTA	1.2891	–	2.0078*	-0.0296	1.0386	–	1.7023
	(0.2775)	–	(0.0972)	(0.5672)	(0.3979)	–	(0.1387)
Δ DC	1.5763	9.6962***	–	-0.0010	1.3905	8.9084***	–
	(0.1846)	(0.0000)	–	(0.9059)	(0.2322)	(0.0000)	–

Table 2.8(f). Granger Causality test (GDP, IBTCD & DC)

F-Statistic (Prob)							
	Δ growth	Δ IBTCD	Δ DC	ECT (t-statistic)	Δ growth/ECT	Δ IBTCD/ECT	Δ DC/ECT
Δ Growth	–	2.8384*	4.0558***	-0.4424***	–	16.3123***	15.2876***
	–	(0.0611)	(0.0189)	(0.0000)	–	(0.0000)	(0.0000)
Δ IBTCD	1.5143	–	0.5699	0.1294	5.6407***	–	6.2625
	(0.1123)	–	(0.5666)	(0.0001)	(0.0010)	–	(0.0005)
Δ DC	0.0849	0.9374	–	0.0006	0.0752	0.6555	–
	(0.9186)	(0.3935)	–	(0.7477)	(0.9733)	(0.5805)	–

Notes: *, **, *** shows significant at 10%, 5% and 1% respectively. Figures in parentheses are the p-values.

Panel Granger Causality test

Table 2.8(g). Granger Causality test (GDP, IBGL & PC)

F-Statistic (Prob)							
	Δ growth	Δ IBGL	Δ PC	ECT (t-statistic)	Δ growth/ECT	Δ IBGL/ECT	Δ PC/ECT
Δ Growth	–	4.3935**	1.9195	-0.5349***	–	16.5380***	15.0141***
	–	(0.0138)	(0.1499)	(0.0000)	–	(0.0000)	(0.0000)
Δ IBGL	0.0830	–	0.1401	-0.0164	0.5055	–	0.3663
	(0.9204)	–	(0.8694)	(0.3799)	(0.6790)	–	(0.7774)
Δ PC	0.1048	1.0215	–	0.0029	2.3138*	1.7509	–
	(0.9005)	(0.3626)	–	(0.0694)	(0.0784)	(0.1593)	–

Table 2.8(h). Granger Causality test (GDP, IBTA & PC)

F-Statistic (Prob)							
	Δ growth	Δ IBTA	Δ PC	ECT (t-statistic)	Δ growth/ECT	Δ IBTA/ECT	Δ PC/ECT
Δ Growth	–	2.6347**	0.9204	-0.5338***	–	9.3282***	7.4096***
	–	(0.0523)	(0.4328)	(0.0000)	–	(0.0000)	(0.0000)
Δ IBTA	1.9740	–	0.7037	-0.0009	1.4282	–	0.5473
	(0.1207)	–	(0.5514)	(0.9278)	(0.2108)	–	(0.7013)
Δ PC	1.4983	0.6347	–	0.0006	2.5928**	0.5901	–
	(0.2186)	(0.5940)	–	(0.4753)	(0.0400)	(0.6705)	–

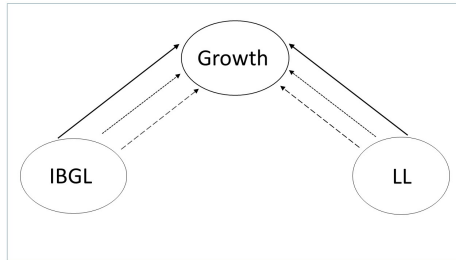
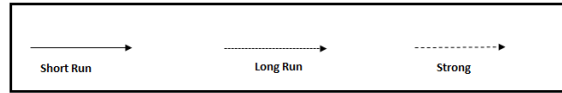
Table 2.8(i). Granger Causality test (GDP, IBTCD & PC)

F-Statistic (Prob)							
	Δ growth	Δ IBTCD	Δ PC	ECT (t-statistic)	Δ growth/ECT	Δ IBTCD/ECT	Δ PC/ECT
Δ Growth	–	6.0351***	1.5173	-0.5348***	–	16.7852***	15.288***
	–	(0.0029)	(0.2223)	(0.0000)	–	(0.0000)	(0.0000)
Δ IBTCD	0.0849	–	0.2091	-0.0003	0.0570	–	0.1399
	(0.9187)	–	(0.8115)	(0.9891)	(0.9821)	–	(0.9360)
Δ PC	0.1783	0.8489	–	0.0024	2.1768	1.4348	–
	(0.8369)	(0.4300)	–	(0.0935)	(0.1033)	(0.2351)	–

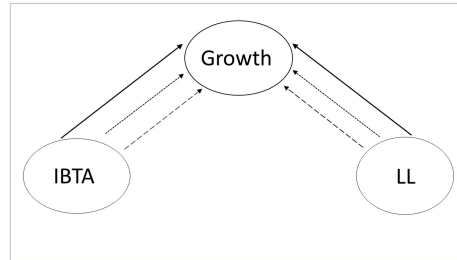
Notes: *, **, *** shows significant at 10%, 5% and 1% respectively. Figures in parentheses are the p-values.

Figure 2.4: Panel causality relation between growth, Islamic banking and conventional financial development (a-i).

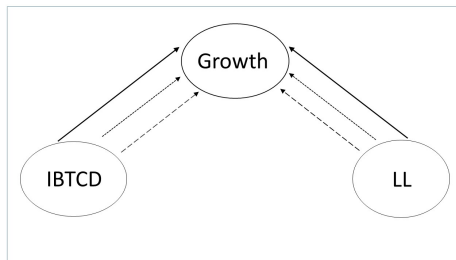
Legend of arrows used in sub-figures (a-i)



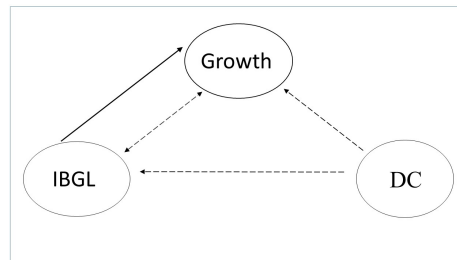
(a). Growth, IBGL & LL (Ref Table (2.8a))



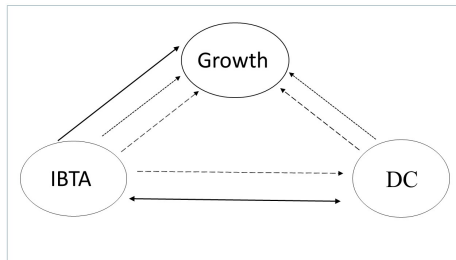
(b). Growth, IBTA & LL (Ref Table (2.8b))



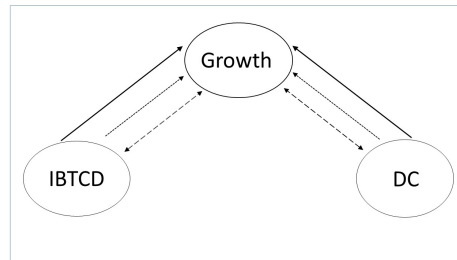
(c). Growth, IBTCD & LL (Ref Table (2.8c))



(d). Growth, IBGL & DC (Ref Table (2.8d))

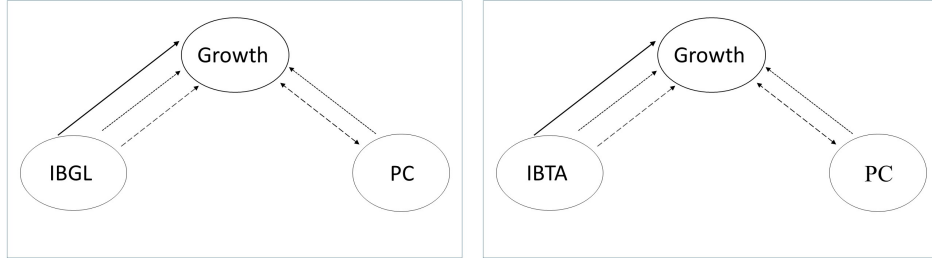


(e). Growth, IBTC & DC (Ref Table (2.8e))

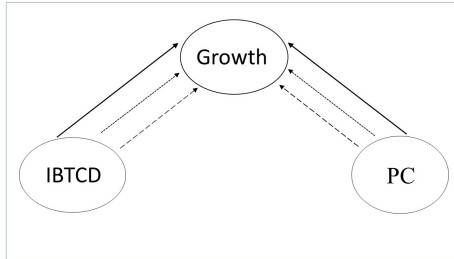


(f). Growth, IBTCD & DC (Ref Table (2.8f))

Panel causality relation between growth, Islamic banking and conventional financial development (a-i).



(g). Growth, IBGL & PC (Ref Table (2.8g)) (h). Growth, IBTA & PC (Ref Table (2.8h))



(i). Growth, IBTCD & PC (Ref Table (2.8i))

2.5 Conclusion

This chapter had three objectives. The first was to analyze the impact of IFD on economic growth, the second was to investigate the long-run relationship, and the third involved finding the causal relation between IFD and economic growth. We used a panel data on 24 countries for 11 years to assess the research questions. To see the impact, we employed a panel fixed-effects estimation regression to test the hypothesis. Panel co-integration tests were conducted to establish the long-run relationship between IFD and economic growth. After that, an error correction model was applied to examine the dynamic relation and causality among the variables. For accomplishing the above objectives, IFD was measured through IBD.

The panel fixed-effects estimation results reveal a positive effect of IFD on economic growth. This positive effect does not disappear even in the presence

of CFD. This result differs from other research on similar topics. We also tried pooling the data, but the results were not so different²².

Our results also indicate that a long-run relationship between IFD and economic growth exists. The long-run relationship holds for all the indicators used to measure IFD and CFD. An interesting outcome is that the results show a long-run relationship between IFD and growth, which did not diminish even when CFD was introduced.

On the direction of causality, this is the first research, to our knowledge, employing the standard tests and assessing the direction of causality between IFD and economic growth. Using the Granger causality test, we found that the direction of causality runs from IFD to economic growth. The result is, for most indicators, valid in the long run, as well as in the short run. Moreover, the direction of causality seems to be uni-directional (i.e., running from IFD to economic growth and not from economic growth to IFD). On the other hand, we also observed that CFD affects economic growth, and likewise, here, the direction also seems to follow the supply-leading hypothesis. Another conclusion that we can draw is that both systems (conventional and Islamic financial systems) contribute to economic growth. Our results support the Schumpeterian view or the supply-leading hypothesis. We did not find any relation between IFD and CFD, which also supports the view that Islamic finance in general and Islamic banking in particular, for the time being, is not crowding out conventional banking. This result is also unique in the sense that no other study has tested the relation between conventional and Islamic banking in such a causality framework. Thus, the introduction of another banking system (Islamic banking) with conventional banking has resulted in a deepening of the overall financial market, thereby promoting economic growth. Given these results and the fact that Islamic finance is still evolving and, for the time being, represents a small part of the overall economy, particularly of the financial sector, these results will be helpful in understanding the future role of the Islamic financial market and the resources to be allocated for its development. Islamic finance is still not believed to gain economies of scale and is still in expansion phase. Given Muslims' prohibition of engaging

²²The result from pooling are not reported.

in transaction involving interest, as well as the impact of Islamic financial markets on economic growth, it can help to raise savings and bring it to the formal sector.

2.6 Appendix

2.6.1 Name of Countries

Sr. No	Name of Country	Sr. No	Name of Country	Sr. No	Name of Country
1	Bahrain	9	Lebanon	17	Singapore
2	Bangladesh	10	Malaysia	18	South Africa
3	Egypt	11	Mauritania	19	Sudan
4	Indonesia	12	Morocco	20	Thailand
5	Iran	13	Pakistan	21	Tunisia
6	Jordan	14	Philippines	22	Turkey
7	Kenya	15	Qatar	23	United Arab Emirates
8	Kuwait	16	Saudi Arabia	24	Yemen

2.6.2 Data definition and Sources

Name of Series	Definition	Source
1. Islamic Bank Gross loans	Total loans by Islamic bank divided by GDP	Author Own calculations based on financial statements, bank bulletin and central bank reports
2. Islamic Bank Total Assets	Total assets of Islamic banks divided by GDP	Author Own calculations based on financial statements, bank bulletin and central bank reports
3. Islamic Bank Total Customer Deposits	Total deposits in Islamic banks divided by GDP	Author Own calculations based on financial statements, bank bulletin and central bank reports

4. Foreign Direct Investment	It is the sum of equity, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments.	World Development Indicators, World Bank
5. Government Consumption	Includes all government current expenditures for purchases of goods and services divided by GDP	World Development Indicators, World Bank
6. Institutions	Contract enforcement score	World Wide Governance Indicators.
7. Trade Openness	Trade openness is the sum of exports and imports of goods and services measured as a share of gross domestic product.	World Development Indicators, World Bank
8. Inflation	Measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services	World Development Indicators, World Bank
9. Domestic Credit by Conventional Banks	Financial resources provided to the private sector by financial corporations such as through loans, purchases of non-equity securities, and trade credits and other accounts receivable, that establish a claim for repayment divided by GDP	Global Financial Development, World Bank.
10. Liquid Liabilities	Liquid liabilities are also known as broad money, or M3	Global Financial Development, World Bank.

11. Private Credit Banking Sector	By	Private credit by deposit money banks and other financial institutions to GDP	Global Financial Development, World Bank
12. Real GDP per capita growth	per	Change in the ratio of real gross domestic product divided by population(mid year)	Global Financial Development, World Bank

Chapter 3

Islamic finance and Economic Growth: Application of Conventional Hypothesis for Islamic Banking. A case Study of Pakistan

Abstract: This chapter examines the link between Islamic financial development and economic growth for the case of Pakistan using quarterly data over the period spanning 2005-2015. Many studies have been conducted to assess the above-mentioned relationship for what is called conventional financial development. However, only a few studies have examined this relationship for Islamic financial development. With regards to the case of Pakistan—which is an important Islamic financial market—the literature is almost non-existent. The present study is an effort to fill this gap by examining the nexus between Islamic financial development and economic activity for Pakistan. It is the first time, perhaps, that data has been collected on a much larger scale and a thorough time series analysis has been conducted using the co-integration technique and ARDL methodology to examine the above link for Pakistan. The test results show that there exists a long-run relationship between Islamic financial development and economic growth, where the direction of causality seems to move from the former to the latter, and a reverse relationship does not exist. In other words, these results do support the finance-growth nexus and are supportive of the traditional supply-leading view.

3.1 Introduction

The link between financial development and economic growth was first suggested by Schumpeter (1934). According to him, the banks are responsible for allocating capital, which spurs growth. This view was later known as “supply-leading” or the “Schumpeterian” view. To test the above view, many studies have been conducted; these were based on both individual countries and on a group of countries (see Patrick 1966; Demetriades & Andrianova 2004; Qayyum et al. 2005; Bencivenga & Smith 1991; Liang & Reichert 2012). The later research pointed out two further views/hypotheses for the relation between financial development and economic growth, namely supply-leading and bi-directional. Demand-following advocates that financial systems develop in response to increases in economic activity, while the bi-directional view suggests that financial systems and growth cause each other, thus resulting in improvement of the financial system. A small section of literature also suggests that the role of the financial system is over-emphasized (see Robinson 1952).

With the passage of time, financial markets have gone through many phases; their functions have become diverse and more products have become available, all of which has contributed towards improvement in financial development. Today, the financial market is composed of two distinct sub-markets, namely the conventional financial market and the Islamic financial market. Most of the studies which assessed the role played by financial development in economic growth did not distinguish between conventional financial development (CFD) and Islamic financial development¹. Islamic banking—an important part of the Islamic financial market—has begun to gain more attention, especially after the financial crisis, as an alternative system which is viewed as more stable and sustainable because of its lower reliance on interest rates (Čihák & Hesse 2010; Farooq & Zaheer 2015). Today, Islamic banking is progressing in a dynamic manner, with its growth bypassing that of conventional banks. In more than 50 countries, Islamic banking exists

¹The name CFD and IFD were not used in literature, but to distinguish between financial development and Islamic financial development this paper is using the term CFD for the situation where the former was not the main focus.

in one way or another. According to Ernst & Young (2014), Bahrain and the QISMUT (Qatar, Indonesia, Saudi Arabia, Malaysia, The UAE and Turkey) constitute 80% of the total Islamic banking and their assets are increasing at a 19% compound annual growth rate (CAGR). With this rate, by 2019, their total assets are expected to reach US \$1.8 trillion. Indonesia is leading in asset growth, with 29% CAGR, while Pakistan is second with 27%. Saudi Arabia, Qatar and Pakistan are three countries which have double digit median banking growth (2010-2014). Many conventional banks have also started Islamic banking as a fully-fledged operation or in the form of a specialised branch network. Because of its importance Islamic banking development (IBD) is most of the time proxied for IFD.

Regarding the question of the relationship between Islamic financial or banking development (IBD) and economic growth, the literature is still developing and currently there are not too many studies available. Of these, few studies have focused on groups of countries (Goaied & Sassi 2010; Zirek et al. 2016), and again only limited studies have focused on country analysis (see Furqani & Mulyany 2009; Wahab et al. 2016; Kassim 2016). It is worthwhile to mention that there are theoretical studies available which have tried to establish the link between the Islamic financial market and economic growth, although the empirical studies are very few. The Islamic financial market has emerged as an important part of the overall financial market and a rapid increase in its volume has seen it qualify to be analysed for the same hypothesis as that which was researched extensively for the conventional financial market. In the case of Pakistan—an important market for Islamic finance—the literature is even more limited. This study is an attempt to fill the gap in the literature by testing the relationship between Islamic financial development and economic growth for the case of Pakistan². This analysis will be important in terms of establishing which of the three hypotheses is relevant for the Islamic financial market in Pakistan. The question will be relevant from a policy perspective, as Islamic banking is growing and a policy decision would make a difference to its growth. The outcome of the paper, on the one

²The three hypotheses are, supply-leading, demand-following and bi-directional relationship.

hand, may prove to be a guideline for policymakers in other countries wishing to promote Islamic finance, and could also make a significant contribution to the existing limited literature.

To accomplish the above, the present study will focus on two tasks—examining the impact of Islamic financial development on economic growth and finding the direction of causality between the two. We will proxy Islamic financial market through IBD—an important and significant part of Islamic financial market. The second task will be more directed towards establishing the causality relationship between IBD and economic growth, and therefore finding the supply-leading or demand-following relation. In this regard, an important question will always arise—how is it possible to measure IBD? Within the literature related to CFD there are “established” measures which help in measuring CFD, but unfortunately for IBD or even Islamic financial development, there are no such standard measures. Islamic banking—an important and significant part of Islamic finance—will be used to proxy for Islamic financial development. In this context, three banking sector indicators will be used to measure IBD—total financing (TF), total deposits (TD) and total assets (TA) of the Islamic banking. The way in which the above indicators for IBD are calculated is close to the way their counterpart in CFD is calculated, thus giving both measures a comparable outlook. Moreover, by taking variables from both the asset side and the liability side, it will be possible to obtain a good measure of the overall size of the Islamic financial sector.

To the best of our knowledge, this is the first thorough study to test the causal relationship for the case of IFD and growth in Pakistan. A second contribution is that the data was collected on a much larger scale, which provided more data points and a balanced data set. Third, more than one proxy was used to measure IBD and a rigorous time series technique was applied to conduct the analysis. This may provide evidence that can be helpful in policy-relevant decisions regarding the Islamic financial market in general and the case of Pakistan in particular. Furthermore, this study may

prove to be a worthy addition to the literature on IFD and economic growth, especially with reference to Pakistan³.

The paper is organised in five sections. Section 1 briefly introduces the topic, while Section 2 provides a theoretical background of the study and Pakistan's achievements in Islamic banking; Section 3 then presents the literature review, following which Section 4 discusses the variable and methodology along with empirical results, which will be followed by the conclusion in Section 5.

3.2 Theoretical Background and Pakistan Islamic Financial Sector

In this section we will discuss about the need for Islamic banking in general. In addition, we will also present some highlights of the Pakistan's Islamic financial sector.

3.2.1 Need for Islamic Banking

While Islamic banking performs almost similar functions as that of conventional banking, however it is fundamentally different from the latter. Muslims in general are prohibited religiously from transacting in any contract that involves an interest element⁴. As a result, a natural ban is put on products offered by conventional banks, which normally deal in interest. For Muslims, this prohibition forces them not to acquire credit from those banks or invest their savings, and therefore result in "under-banking". Beck et al. (2013) found that, among a sample of 64 countries, only 24% of Muslims were reported to have a bank account compared to 44% of the non-Muslim population. This is severe under-banking and the reason put forth for said situation was the presence of interest. The above indicates the existence of potential customers who demand the "right" product, which is compliant with *Sharia* law. When a group of potential customers are not using a bank,

³See more explanation in section 3.

⁴For Muslims this restriction can be understood from the fact that interest which is also called as "*Riba*" cannot be taken, given or recorded.

this means that the savings they hold are not channelled towards productive investments, which results in loss of efficiency. In the form of Islamic banking these customers will be provided a platform where they can get more access to finance as well as where they can keep their savings in accordance with their religious instructions. This “new” saving will increase the prospects for growth.

On the other hand, there are authors who stress that Islamic banking has its roots in the real sector of the economy. According to these authors, Islamic banking affects the real sector because of the very nature of the instruments it deals in. For example, Kahf et al. (1998) argued that Islamic banking conducts its operations according to the principles of transaction in the goods and services markets, carried out in the form of sharing profit or losses and sale/lease of contracts. Thus, Islamic banking promotes “actual transaction”. It makes the Islamic financial system directly linked to the real sector of the economy. El-Galfy & Khiyar (2012) also noted that, because of the important link between Islamic banking and the real sector of the economy, the former has a tendency to affect economic growth more convincingly.

3.2.2 Pakistan’s Islamic Financial Sector

Given the above reasons and since it is an Islamic country, Pakistan has started the Islamisation of the banking sector with the long-term goal of achieving a fully Islamic financial system. It was thought to be a gradual process, the starting point of which was the adaptation of Islamic principles for the banking sector and the eventual abandonment of the conventional system. However Pakistan’s approach was cautious and deliberate in its efforts, which started in 1979 (Z. Ahmad 1987). The elimination of interest from commercial banks proved to be the most difficult and complicated task, which resulted in an extension of the time initially set for achieving the above target (Khan & Mirakhor 1990b).

There was a re-surge in Islamic banking in 2001-2002 in Pakistan, when a transformation of financial system (CTFS) committee was established to

eliminate interest (*Riba*) and devise a legal framework for Islamic banks. The approach that was recommended by CTFS can be summarised as follows:

- Islamic banking branches of conventional banks
- Conventional banks' Islamic subsidiaries
- License to fully Islamic banks

As a result, the State Bank of Pakistan (SBP) formulated a policy in coordination with the Ministry of Finance, for Pakistan to set up Islamic banks in the country. This policy was important in the sense that it was formulated in consultation with Malaysia, Egypt and Saudi Arabia, which were (and still are) the “big” players in Islamic banking, and hence this policy set the rules, both for the promotion and regulation of Islamic banking (DFID-SBP 2014).

At the end of 2003, there was only one fully-fledged Islamic bank and only three conventional banks having few Islamic banking branches. Before 2001 and especially at the time of the inception of effort to eliminate *Riba*, it is alleged that serious effort was not put in by the government or the regulator, which is the State bank (the central bank), as was mentioned by Israrul Haque (2018). Today, there are 6 fully-fledged Islamic banks and 16 conventional banks with stand-alone Islamic bank branches. There were 2,146 branches of Islamic banking institutions at the end of June 2016⁵. Table 3.1 presents a classification of the Islamic banking branch network according to the regions. Region-wise, Punjab has the largest share, which amounts to 48% of the overall branch networks, while the Khyber Pakhtunkhwa and Sindh have a combined share of 41%. The assets of Islamic banks have grown from 6% in 2009 to 10% in 2013, and total deposits have recorded an increase from 6% to 11% for the same period. The market share of these banks has increased from 1.4% in 2004 to 13.2% in 2015. It is pertinent to note that the quality of Islamic bank assets, as shown by the various indicators, is better than that of the overall banking industry⁶. For example, non-performing loans to financing

⁵See Islamic banking Bulletin SBP Jun 2016 ext.

⁶Like ROA, ROE etc.

stand at 5.8% compared to the industry average of 11.1%, and net NPA to total capital is 0.9% compared to 8.9%. Total deposits of Islamic banking stood at Rs. 1461 billion in June 2016—an increase of 14.1% compared to the previous year. During 2003–2013, the net financing recorded an impressive growth from Rs.10 billion to Rs.709 billion. On the profitability side, various ratios, such as profitability, and return on equity ratios, are positive and growing steadily. The profit after tax of Islamic banking was recorded at Rs. 6 billion for the quarter ending June 2016 compared to Rs.4 billion for the previous year. Due to the expansionary phase, operating expense to gross income was recorded slightly higher when compared to the overall industry. Figure 3.2 and 3.3 gives an idea of the instrument mix used in the Islamic banking in Pakistan. According to both graphs, *Musharaka* is the most used product used followed by *Murabaha* and *Ijarah*.

Earlier, the presence of only conventional banks hindered a number of individuals, especially those who were Muslim, when they were attempting to put their savings in, or to borrow from the banks, as they were religiously barred from indulging themselves in *Riba*—modern-day interest. With the introduction of Islamic banking people gained access to an alternative location where they could put their money and at the same time borrow money based on Islamic principles. Another important aspect of Islamic banking is that it has also provided alternate financial products to the existing instruments in the market, thereby deepening the financial markets. The increase in deposits of Islamic banking has proved that there is a clear demand for this type of banking.

3.3 Literature Review

The relation between financial development and economic growth is one of the most well-researched topic in the literature. The debate gathered momentum in 1973 thanks to McKinnon (1973) and Shaw (1973) who, with the help of the financial repression hypothesis, theoretically proved the link between financial development and economic growth. Earlier, Cameron (1972) indirectly posited that capital, along with population, technology and social

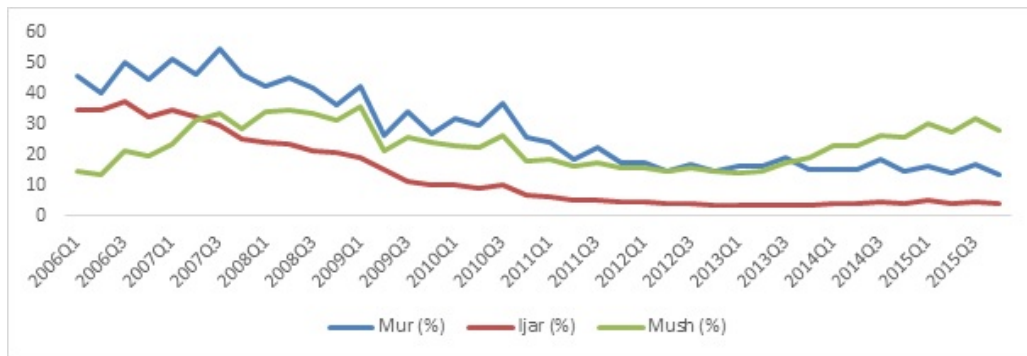
Table 3.1: Region wise branches (Jun 2016)

Region	Total Numbers	Share (Percent)
Punjab	1016	47.34%
Sindh	663	30.89%
KPK	226	10.53%
Balochistan	84	3.91%
Gilgit Baltistan	9	0.42%
FATA	7	0.33%
Federal Capital	110	5.13%
AJK	31	1.44%
Total	2146	100%

Figure 3.1: Percentage share (Region wise)



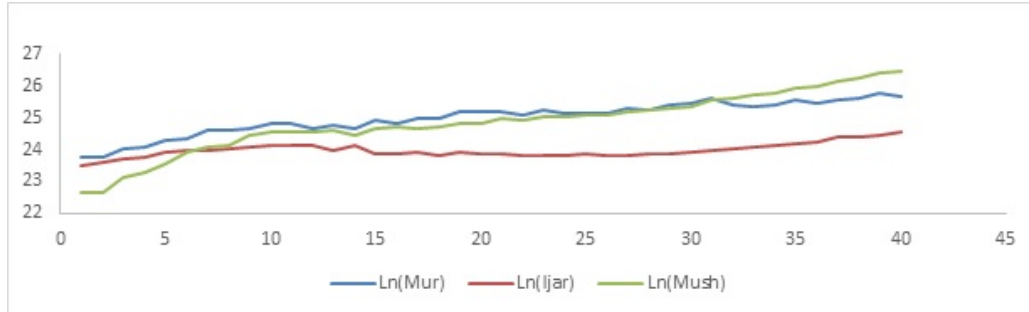
Figure 3.2: Trend of Islamic financing products (as a percentage of Total Financing)



Source: SBP Quarterly report on Islamic Banking in Pakistan. 2005-2016.

institutions, can affect the development of a country. Cameron did not explicitly mention financial development, but was of the opinion that banks, by providing the resource (capital) to business, can affect the development of a country. Later on, a number of studies were conducted to address this topic (King & Levine 1993c; Levine & Zervos 1998b; Rajan & Zingales 1996; King & Levine 1993a; Arestis et al. 2001; Levine 2003; Yu et al. 2012). Based on the literature and empirical findings, there are three causal links that were found between financial development and economic growth: 1) supply-leading,

Figure 3.3: Trend of Islamic financing products(Growth rates)



Source: SBP Quarterly report on Islamic Banking in Pakistan. 2005-2016.

where financial development is responsible for economic growth; 2) demand-following, where economic growth is responsible for financial development; and 3) bi-directional relation, where both affect each other.

As Muslims were forbidden from dealing in interest or *Riba*, there was a need felt in the Islamic world to establish Islamic banking which would be based on Islamic teaching and free from interest. As a first step, the Islamic development bank was established in 1975 with the motive of promoting and creating an environment conducive for Islamic banking. Soon after its inauguration, the first Islamic commercial bank was established⁷. Islamic banks are currently operating in more than 60 countries. They are not only seen as a replacement for conventional banks in Muslim countries, but also as an additional option along with conventional banks. Scharf (1983) was of the view that Islamic banking can contribute to economic growth positively, especially in the case of financial repression. This was also evident during the financial crisis of 2000, where Islamic banks proved themselves to be stable and relatively unaffected (Asadullah 2017). The same is true for their role in the case of declining or low levels of growth. Indeed, it is the inherent characteristic of Islamic banking that finance productive projects. Goaid & Sassi (2010) stated that products in Islamic banking which are based on profit sharing can influence economic growth more effectively than

⁷Dubai Islamic bank 1975.

those in conventional banking. The profit sharing will bring more equity in income distribution and social justice. They also argued that, since the financing will be provided on the basis of productivity, so there will be a more efficient allocation of resources and the possibility of more productive opportunities. The above is contrary to conventional banks, where credit approval depends on the financial strength of the borrower and less emphasis is on the productivity of the project itself. Moreover, due to Islamic banking's lower reliance on interest and debt financing, this type of banking is expected to be more stable. According to Kettell (2011) and M. Iqbal & Molyneux (2005b), because Islamic banking is based on the principle of profit and loss sharing, an ideal and fully-Islamic financial system will predominantly be based on the principle of equity.

Nagaoka (2011) conducted another theoretical study which examined the potential of Islamic finance to contribute to economic growth. His study postulated that, in an Islamic finance system, both financial and real sectors are embedded, and this can affect the growth positively. Zaher & Hassan (2001) predicted that the majority of savings in Islamic countries will be controlled by Islamic banks in the future. N. Ahmad & Haron (2002); Rammal & Zurbruegg (2007) and Kettell (2011) discussed different products offered by Islamic banks and how they vary from conventional banking products. Similarly, Khoutem & Nedra (2012) explained the Islamic finance affect growth through reduction in transaction costs and risk sharing. Their study also showed that once asymmetric information is resolved, Islamic finance has more capability to affect growth as compared to conventional finance.

Besides the above theoretical studies, which mainly emphasised the differentiation of Islamic finance from conventional finance, the empirical studies are limited (Abduh & Azmi 2012). The past empirical studies are mostly concerned with the measurement of the efficiency and stability of the Islamic banking system as compared to conventional banking. Specific studies on the role of Islamic finance towards growth are again very limited. One empirical study by Barajas et al. (2016) found that the level of financial deepening was not the same for oil and non-oil exporting countries. Thus, the level at which financial deepening affects economic growth was different for the two

sets of countries. However, their study did not isolate the effect of conventional finance to that of Islamic finance. Yusof & Bahlous (2013) took up the case of Malaysia, Indonesia and selected GCC countries to compare the possible impact of Islamic finance on economic growth for the two groups. The selection of the two groups was based on the fact that these were the countries which adapted Islamic banking practice at a very early stage. Their study used the panel co-integration and variance decomposition approach and found that, both in the short and long run, Islamic banking did contribute to economic growth. An interesting result was that Islamic banking, in the short run, affects the growth process more in Malaysia and Indonesia compared to in GCC countries.

Abduh et al. (2012) also examined the relation between Islamic finance and economic growth. A feature which distinguished their study from former studies was that it examined separately the effect of Islamic finance and conventional financial development on growth. Their study was focused on Bahrain, and used time series data to test the claim about the relationship between finance and growth. It used 11 years of quarterly data from 2000-2010 and employed co-integration and the Vector Error Correction model (VECM) approach. The finding of their study was that both conventional and Islamic finance were correlated with economic growth in the long run. They also suggested, based on the results, that conventional finance is correlated with growth only in the short run, whereas Islamic finance does not have a short-run effect on growth. In addition, Islamic finance and economic growth were found to be bi-directional. Abduh & Azmi (2012) used quarterly data from 2003-2010 for Indonesia and showed that there existed a strong relationship between Islamic finance and economic growth, both in the short and long run. They employed the bound testing approach of co-integration and the Error Correction Model (ECM) to reach this result. However, the study found the above relationship to be bi-directional. In other words, it was suggested that Islamic banking affects economic growth and economic growth also affects Islamic finance.

Malaysia is an important player in Islamic banking and is among the leading countries dealing in Islamic finance. Furqani & Mulyany (2009)

examined the relationship between Islamic finance and growth for Malaysia, employing the VECM approach using quarterly data. In their paper, they used Islamic banking financing and analysed its effect on real gross domestic product and Real Gross Fixed Capital Formation (GFCF). They concluded that Islamic bank financing did not have a short-run relation with growth and vice versa. However, they also found that, in the long run, there was a bi-directional relation between Islamic finance and growth. They further discovered that Islamic bank financing affected the overall GFCF in Malaysia positively, both in the short and long run. Manap et al. (2012) also examined the Islamic finance and growth nexus for Malaysia. By using Toda & Yamamoto (1995) bootstrap Granger non-causality, and improving the number of observations, they showed that Islamic finance did Granger cause economic growth, but that the reverse was not true. They concluded that, in the case of Malaysia, the results agreed with the view of Schumpeter or supply-leading. They concluded that further development of Islamic finance will improve economic growth in the future.

On the other side of the picture, Hachicha & Ben-Amar (2015) attempted to ascertain the relation between Islamic finance and growth. Their study used three indicators for measuring Islamic financial development in Malaysia, and employed a neoclassical production function augmented by Islamic bank finance for Malaysia for the period 2001(quarter 1)–2011(quarter 4); they concluded that there was no long-run relationship between Islamic banking and economic growth. They justified their findings on the basis of Islamic banks' non-participatory modes of activities, whose impact, according to the authors, is generally short run. Thus, they looked for a short run relationship between the two and concluded it to be valid. Lebdaoui & Wild (2016) conducted another study which found that only a long-run relationship held for Islamic banking and growth. Their study was based on selected South Asian countries, and used different estimating techniques such as Auto Regressive Distributed Lag (ARDL), Pooled Mean Group (PMG), Mean Group (MG) and Dynamic Fixed Effect (DFE); they showed that a long-run relationship held between the two. However, their study was unable to find any short-run relationship. The outcome of their study strongly indicated the presence of a Muslim population

as a decisive factor for the above long-run relationship. Another reason was the risk limitation inherent in the use of *Sharia*-compliant instruments. The above type of financial instrument also increases the number of resources for the financial sector by mobilising the savings. On the basis of the above results, they recommended that governments facilitate financial deepening by way of promoting Islamic banking products and operation.

Chowdhury & Shoyeb (2018) examined the linkage between Islamic financing principles and economic growth for Bangladesh. Their study assessed risk sharing and non-risk sharing modes employed by Islamic banks as financing principles. They found a negative correlation between non-risk sharing instruments compared to a positive correlation for risk sharing instruments in relation with growth. More recently, Boukhatem & Ben-Moussa (2018) analysed the dynamic role of Islamic finance in economic growth for selected Middle East and North Africa (MENA) countries. They employed pooled Fully Modified Ordinary Least Square (FMOLS) for the period 2000-2014 and concluded that there was a positive link between Islamic financial development and economic growth. Their study also found that overall financial deepening had a positive effect on growth. However, for Islamic financial development, they noted that the positive effect depended on institutional quality. An underdeveloped institutional framework can undermine the positive effect, and hence they suggested that the developing of Islamic banking should be reinforced with adequate legislation and regulation. The same conclusion was also drawn by El Mehdi & Mghaieth (2017), who studied the above relationship for 15 selected countries from the MENA region for the period 2000–2009.

Maali & Atmeh (2015) examined the relation between Islamic finance and economic growth for eight selected countries for the period 2000–2010. Their study also concluded the presence of a positive effect from Islamic finance on growth. Abedifar et al. (2016) looked at 22 Muslim countries and analysed the effect of the Islamic as well as the conventional financial system on growth, for the period 1999-2011. Their study concluded that there was a positive link between the market share of Islamic banks and economic growth, especially in low-income countries and countries with predominantly Muslim populations.

A similar conclusion was also drawn in a recent study by Lehnert & Kchouri (2019) for the relation between Islamic banking development and economic growth for 32 countries ranging from developed to developing.

To determine the direction of causality between Islamic banking and economic growth, Abduh & Chowdhury (2012) examined the causal relationship for Bangladesh. They employed quarterly data from 2004–2014 using the Granger causality test, and concluded the existence of bi-directional causality between the two. They also showed that there was a positive long-run link between Islamic banking and growth. On the other hand, Manap et al. (2012) showed uni-directional causality running from Islamic finance to growth for Malaysia. They used quarterly data from 2008–2012 and employed Toda Yamamoto and the Bootstrap Granger non-causality test to analyse the causal link. Abduh & Azmi (2012) concluded a bi-directional causality result for Indonesia. However, Abduh and Omar emphasised, regarding the issue of causality, using a data set based on a panel of countries to reach a more concrete result. Similarly, Gudarzi & Dastan (2013) were also of the view that bi-directional causality exists between Islamic banking and growth for selected countries.

The above literature showed that, on the topic of IFD and growth nexus, the literature is limited. Most of the studies have used a set of panel data to examine the relationship. Country-specific studies mostly focused on Indonesia or Malaysia or, at best, one of the GCC countries.

3.4 Econometric Methodology and Results

This paper used quarterly time series data for the period 2005I–2016IV for IBD, where IBD was measured by three indicators—total deposits in Islamic financial system (TD), total financing by Islamic financial system (TF), and total assets of the Islamic financial system (TA). It was emphasised that, unlike the case for CFD, there are no “standard” proxies to measure IBD. Thus, we calculated and used the above mentioned proxies, keeping in line with how the proxies for CFD are calculated. More specifically, the above proxies

will only measure the financial depth of Islamic banking⁸. These proxies cover the asset as well as the liability side of the Islamic banks' balance sheet, which can encompass almost the whole banking system and its depth. Total financing and total deposit signify the ability of Islamic banks to mobilise and allocate funds based on *Sharia* principles/permissible mode of financing. In order to look at the Islamic-finance-growth nexus the proxies were used interchangeably but not together in one equation. To capture economic activity, real gross domestic product (GDP) was used. GDP represents the real economic side of the economy, which Islamic banking is believed to affect more convincingly as compared to conventional banking. GDP is typical of many studies on such topics related to conventional financial development (see Levine 1997, 2003). Although there is disagreement as to the use of GDP to measure economic productivity, it is still a widely-employed variable⁹. All of the estimations were carried out by converting the series into log form. The data on TD, TF and TA was taken from an Islamic Banking Bulletin published by the State Bank of Pakistan (SBP)¹⁰, and GDP was taken from World Development Indicators (WDI) and economic survey of Pakistan¹¹.

To test the long-run relationship between IBD and GDP, the current study was conducted in two steps. In the first step, the Granger causality and a Vector Auto Regressive (VAR) framework were used to assess the direction of causality. From the Granger causality outcome, it can be assessed whether the evidence suggests that the effect is supply-leading, demand-following or bi-directional. In the second step we used the ARDL model framework to obtain the long-run and short-run estimates of Islamic banking development on economic growth. However, before undertaking the above two steps, it was necessary to know the order of integration for the variables used. Unit root is particularly useful in assessing this type of ordering.

⁸There can be further improvement in calculation of these proxies for IBD. we hope that it may prove to be a starting point to bring in line the two sets of proxies used in CFD and IBD, and to standardize the proxies for future use.

⁹Industrial production is also used in some studies like Kassim (2016), but in case of Pakistan, this data series was not available.

¹⁰<http://www.sbp.org.pk/ibd/bulletin/bulletin.asp>.

¹¹<http://www.finance.gov.pk>.

3.4.1 Unit Root

In time series modelling, the unit root tests must be performed to identify the stationary properties of the variables used. Also Ouattara (2004) argued that if one of the variables in the ARDL framework is integrated of order 2 or $I(2)$, then the F-Statistics calculated by Pesaran et al. (2001) cannot be consulted. To avoid this problem, the unit root test should be conducted to establish whether there is any $I(2)$ variable. In order to test the stationarity of the variables, the Augmented Dickey Fuller (ADF) unit root test from Dickey & Fuller (1979) and Phillips & Perron (1988) was used.

For ADF test, the basic equation is of the form,

$$\Delta IBD_t = \beta_0 + \beta_1 t + \beta_2 IBD_{t-1} + \sum_{i=1}^n \varphi \Delta IBD_{t-i} + \varepsilon_t \quad (3.1)$$

The above ADF regression tests for the existence of unit root in IBD_t for time period t . ΔIBD_{t-i} is the first difference of the variable IBD_t with i being the number of lags. The last term (ε_t) adjusts for errors of autocorrelation. β_2 is the variable of interest that will indicate the presence of a unit root. The null hypothesis is $\beta_2 = 0$ against the alternative $\beta_2 < 0$.

In case of Phillips Perron (PP) test, the basic equation takes the form,

$$\Delta IBD_t = \beta_0 + \beta_1 t + \beta_2 IBD_{t-1} + \varepsilon_t \quad (3.2)$$

The PP test has the same hypothesis for testing the unit root as that of the ADF test, but the lags of the variables are excluded. According to Enders (2004), the PP test corrects for serial correlation and the problem of heteroscedasticity in the error terms without including the lags.

Table 3.2 summarises the result of the unit root test. GDP and Islamic total financing are not stationary at levels, but become stationary at first difference. On the other hand, TA and TD have no unit root at levels and we can thus reject the null hypothesis, i.e. the presence of unit root for the above variables. In summary $[GDP, TF]$ are each integrated at first difference or $I(1)$ and $[TA, TD]$ are integrated in their level or $I(0)$. This also implies the possible presence of a co-integrating relationship. The presence of different

ordered variables also compels the use of the ARDL approach, which is suited for such kinds of situations. In addition, because none of the variables have an order of integration greater than one, the ARDL bound tests can also be applied.

Table 3.2: Unit root tests results

Variables	ADF		PP		
	Level	First Difference	Level	First Difference	Status
GDP	-0.4459 (0.8905)	-10.1464*** (0.0000)	0.0284 (0.9556)	-10.3670*** (0.0000)	First Difference
TA	-4.6284*** (0.0037)	-2.8774*** (0.0053)	-3.9803*** (0.0038)	-7.9985*** (0.0000)	Level
TD	-3.0438** (0.0403)	-1.9307** (0.0522)	-6.2034*** (0.0000)	-8.1366*** (0.0000)	Level
TF	-1.8158 (0.3676)	-7.4582*** (0.0000)	-4.7894*** (0.0000)	-7.3739*** (0.0000)	First Difference

Notes: *, **, *** shows significance at 10%, 5% and 1% respectively. Figures in parentheses are the p-values.

3.4.2 Autoregressive Distributed Lag Model (ARDL)

The present study used the ARDL approach presented by Pesaran et al. (2001). This approach adopts the bounds testing approach to co-integration. One advantage of the ARDL bound testing approach is that it does not impose the same level of integration for the variables. According to Pesaran et al. (2001), ARDL can be applied to variables with different orders of integration. Another advantage of using ARDL is that it takes into account the problems of autocorrelation and omitted variables. Narayan (2004) and Odhiambo (2010) were of the opinion that ARDL provides unbiased and efficient estimates even in the presence of endogeneity. ARDL can be applied to a small sample size and has the ability to estimate both long-run and short-run dynamic relationships among dependent and independent variables (see Dritsakis 2011). All of the above-mentioned advantages add to the reason why the ARDL methodology was selected for the current study.

Our study also applied the bound testing approach to examine the causality between IBD and GDP. To test using the ARDL methodology, choosing the right lag length is very important. Schwartz information criteria (SIC) and Akaike information criteria (AIC) are helpful in choosing the lag length. To apply these criteria, the likelihood ratio (LR) test technique was used, as proposed by Johansen (1995).

A basic ARDL model can be written as,

$$\ln(GDP)_t = \alpha_0 + \lambda_1 \ln(IBD)_{t-1} + \lambda_2 \ln(GDP)_{t-1} + \sum_{i=1}^p \theta_{1i} \Delta \ln(GDP)_{t-i} + \sum_{i=0}^p \theta_{2i} \Delta \ln(IBD)_{t-1} + \vartheta_{1t}. \quad (3.3)$$

where p is the optimal lag length, determined from AIC and SIC criteria. In the above Equation 3.3, IBD is the Islamic banking development indicator and GDP is the growth rate of gross domestic product. The above equation will be tested for all the three indicators of IBD. As three equations are to be formulated, so α_0 is the constant in the first equation and α_1, α_2 represents the constants in the other two equations.

3.4.3 Results of the Co-integration Test: Bound F-Test

According to Pesaran et al. (2001), the ARDL co-integration test assumes one long run relationship between dependent and independent variables. The F-test is then used to investigate the co-integration among variables, i.e. long-run relationship. The bound test approach is usually applied to test the long-run relationship, for which the null and alternative hypotheses are $H_0 = (\lambda_1 = \lambda_2 = 0)$ against the alternative $H_1 = (\lambda_1 \neq 0, \lambda_2 \neq 0)$ for the above Equation 3.3. The F-test is compared with the bound values calculated and supplied by Pesaran et al. (2001). If the calculated-F value is less than the lower critical bound, this means there is no long-run relationship. A long-run relation will exist only when the F-value is above the upper bound value. However, if the value lies in between the lower and upper critical bound, then the results will be inconclusive. Table 3.3 depicts the results of

co-integration for variables using the F-test and their critical values. It also includes critical values from Narayan (2004) for a small sample¹².

Table 3.3: Results of bound F- tests for long run relationship.

Results of Bound test for long run Relationships				
Null Hyp: No long run relationships exist				
Computed F-Statistic				
EST EQ 1	GDP = f(TA)	F =	4.5573	
EST EQ 2	GDP = f(TD)	F =	5.9220	
EST EQ 3	GDP = f(TF)	F =	5.1604	

Level of Significance	Pesaran et al		Narayan 2005	
	Lower Bound	Upper Bound	Lower Bound	Upper Bound
1%	4.94	5.58	5.593	6.333
5%	3.62	4.16	3.937	4.523
10%	3.02	3.51	3.21	3.73

Notes: *, **, *** shows significance at 10%, 5% and 1% respectively. Figures in parentheses are the p-values.

The above table shows that, for the three indicators, the calculated F-statistic is higher than the upper critical bound at the 5% level of significance. This is true with reference to both critical values supplied by Pesaran et al. (2001) and Narayan (2004) for large and small samples. Thus, it can be concluded that there is a co-integrating relationship between GDP–TA, GDP–TD, and GDP–TF. Hence, it indicates the presence of a long-term relationship between GDP and IFD.

3.4.4 Long Run and Short Run Estimates

Once the long-run relationship was established, the long-run coefficient could be estimated from the model:

$$\ln(GDP)_t = \alpha_0 + \sum_{i=1}^p \theta_{1i} \ln(GDP)_{t-i} + \sum_{i=0}^p \theta_{2i} \ln(IBD)_{t-i} + \mu_t. \quad (3.4)$$

¹²Narayan (2005) argued that critical values as calculated by Pesaran et al (2001) are based on large sample size and thus not appropriate for small sample. Narayan re-calculated these critical values for small sample size. The values were calculated for sample size range between 30 to 80 data values. For more information see Narayan (2004).

For the short-run coefficient, an error correction model (ECM) is estimated, for which the ARDL specification is:

$$\Delta \ln(GDP)_t = \alpha_0 + \sum_{i=1}^p \theta_{1i} \Delta \ln(GDP)_{t-i} + \sum_{i=0}^p \theta_{2i} \Delta \ln(IBD)_{t-1} + \varphi ECT_{t-1} + \eta_t. \quad (3.5)$$

where in the equation above 3.5, φ is the speed of adjustment and ECT is the error correction term. Again, the equation above is repeated for TA, TD and TF. According to Engle & Granger (1987), the presence of co-integration among variables does not show the direction of causality, and as such should be determined within a dynamic error correction model, as in equation 3.6. The short-run effects are investigated with the specific coefficients lagged terms, and ECT will record the long-term relationship. In other words, a negative and statistically-significant ECT term will show the long-term relation and significant lagged independent variables will represent the short-run impact.

Table 3.4 (a) shows that TA is significant at the 1% level of significance. The sign of the variable is positive, thus indicating that it affects GDP positively in the long run. A 1% change in the TA of Islamic banks will lead to a 0.32% increase in GDP. In Table 3.4(b), the long-run result for TD is presented, which also shows TD to be significant at the 1% level of significance. A 1% change in TD in Islamic banks will increase the GDP by 0.27%. Our result is also significant in the context of a recent study by Kassim (2016), which found that TD had a weak impact on growth in Malaysia.

In Table 3.4 (c) the results for TF are presented, which also depict a positive and significant long-run relationship between TF and GDP. At the 1% level of significance, a 1% change in TF will lead to a 0.24% increase in GDP for Pakistan. The result above is contrary to that found by Kalim et al. (2016). Their study showed no long-run impact of gross fixed capital formation by Islamic banks on growth for Malaysia. However, their overall findings support the notion that IBD affects economic growth.

Comparing Table 3.4 (a) and Table 3.4 (c), it is clear that the coefficient of TD and the coefficient of TF are close to each other. It is obvious because what come in as deposits are converted into financing. The closeness indicates

Table 3.4: ARDL estimate of long run relationship

(a) ARDL long run coefficients: Model with TA

	Variable	Coefficient	t-Stat	Prob
Model 1(with TA)	TA	0.3208***	9.0503	(0.0000)
	Intercept	15.8742***	14.8250	(0.0000)
R-Squared	0.9727		SE-Regression	0.0361
Adj R-Squared	0.9645		Resd. Sum of Square	0.0353
DW-Stat	1.8245			

(b) ARDL long run coefficients: Model with TD

	Variable	Coefficient	t-Stat	Prob
Model 2(with TD)	TD	0.2660***	8.3937	(0.0000)
	Intercept	17.4892***	19.6691	(0.0000)
R-Squared	0.9656		SE-Regression	0.0403
Adj R-Squared	0.9587		Resd. Sum of Square	0.0486
DW-Stat	1.8360			

(c) ARDL long run coefficients: Model with TF

	Variable	Coefficient	t-Stat	Prob
Model 2(with TF)	TF	0.2472***	6.3256	(0.0000)
	Intercept	18.1083***	17.423	(0.0000)
R-Squared	0.9640		SE-Regression	0.0412
Adj R-Squared	0.9568		Resd. Sum of Square	0.0509
DW-Stat	1.9036			

Notes: *, **, *** shows significance at 10%, 5% and 1% respectively. Figures in parentheses are the p-values.

that Islamic banks are able to convert most of their deposit into financing effectively, which in turn can be reflective of the demand for Islamic financing. However, it must be noted that, in the context of Islamic banking, not all deposits can be utilised for financing purposes. Some deposits are to be kept as “*Wadia*”, which means funds are kept and protected on behalf of the depositor and as such cannot be used for investment.

In summary, for all cases above, the IFD indicator seems to impact GDP in the long run positively and significantly. There are not too many studies which have estimated a long-run impact of IBD on growth for the case of Pakistan, because of which we are unable to compare our results with those of similar studies. Our results are contrary to those produced by Wahab et al. (2016), who did not find any long-run relationship between IBD and growth. If we compare our results with studies on countries other than Pakistan, our results are in line with Farahani & Sadr (2012) for the case of Indonesia, Abduh et al. (2012) for Bahrain, Abduh & Azmi (2012) for Indonesia and Yusof & Bahlous (2013) for Malaysia.

The short-run effect of IBD on GDP is presented in Table 3.5 (a-c). The three tables show that IBD indicators do not strongly affect the GDP in the short run. In the first table (3.5 (a)), TA is significant at the 10% level of significance, thus indicating that TA has a weak impact on GDP. In Table 3.5 (b), TD is also weakly impacts GDP at the 10% level of significance, which shows that, in the short run, there is a lag between the receiving of deposits in the Islamic financial system, and converting them to financing or channelling them for economic activity. This may indicate that Islamic banks require some time to assess the effectiveness of the project in question to be financed. In Table 3.5 (c), TF is insignificant and does not affect GDP even at the 10% level of significance.

The insignificance of TF is perhaps due to the fact that not all deposits are transformed into financing, as well as the lag in converting the investable deposits into financing, as described above. In Table 3.5 (a), the error correction term (ECT) is negative and significant, which shows the convergence towards long-run equilibrium. In other words, 44% of deviations from the

equilibrium path are adjusted in one quarter, thus suggesting the presence of long-run causality between TA and GDP.

In Table 3.5 (b), ECT is negative and significant at the 1% level of significance, indicating that 42% of deviations are adjusted in one quarter towards long-run equilibrium. With regard to the case of TF, in Table 3.5 (c) ECT is also negative and significant at the 5% level of significance. However, the first two ECTs are significant at the 1% level, whereas ECT in the third table is significant at the 5% level of significance. The short-run results are in partial agreement with the findings of Kalim et al. (2016) for Pakistan. Kalim also found that TF affects the economic growth in the short run, while all other variables are insignificant¹³. Our results are also in partial agreement with those of Kassim (2016), who found that TD had no effect on economic growth but found financing to be significant in the short run. In contrast with the short-run results discovered by Furqani & Mulyany (2009) for Malaysia, who found that financing had no short-run effect on economic growth, our results do not support this result for Pakistan. Abduh & Azmi (2012) found similar short-run results for Islamic banking in Indonesia.

The diagnostic tests for serial correlation, heteroscedasticity and stability were also conducted, and show the overall stability of the estimated model 3.5. For the first two models, it can be said that the error term is normally distributed with no serial correlation. The models are well specified. However, in model 3, in Table 3.5 (c), there is some problem of heteroscedasticity, as the test statistic is significant at the 5% level of significance. However, all of the other diagnostic tests are well inside their basic criteria of 5% level of significance. We also tested for deviations from the expected value (cumulative sum or CUSUM test). This test will hint at parameter stability. Hansen (1992) proposed that, in time series analysis, the parameters that are estimated may vary over time and thus can cause results to be biased. For this reason, parameters should be estimated for stability. The CUSUM plots for three models are given in Figure 3.4. In all of these figures for the CUSUM test, the basic hypothesis is that regressions coefficients are constant over

¹³Other variable in their study included Net investment and financing, *Murabaha*, Diminishing *Musharaka*, *Ijarah* and lag value of growth.

Table 3.5: Results of ARDL short run estimates and ECM

(a) ARDL short run estimates and ECM: Model with TA

Variable	Coefficient	t-Stat	Prob
$\Delta\text{GDP}(-1)$	0.2975***	2.5720	(0.0159)
ΔTA	0.3818**	1.9826	(0.0577)
ECM(-1)	-0.4438***	-2.8706	(0.0079)
ECM(-1) = LN(GDP) - (0.3208*LN(TA) + 15.8742)			
Test	Test Stats		Prob Value.
Serial Corrl.	1.5787		(0.2136)
Normality Test	1.5143		(0.386)
Hetero.	0.6749		(0.7091)
F-ARCH Test.	0.4374		(0.7804)

(b) ARDL short run estimates and ECM: Model with TD

Variable	Coefficient	t-Stat	Prob
$\Delta\text{GDP}(-1)$	0.2973**	2.3640	(0.0248)
ΔTD	0.1499*	1.7913	(0.0833)
ECM(-1)	-0.4260***	-2.8590	(0.0077)
ECM(-1) = LN(GDP) - (0.2660*LNTD + 17.4892)			
Test	Test Stats		Prob Value.
Serial Corrl.	0.8313		(0.4884)
Normality Test	2.2784		(0.3201)
Hetero.	2.1206		(0.0801)
F-ARCH Test.	0.3708		(0.7746)

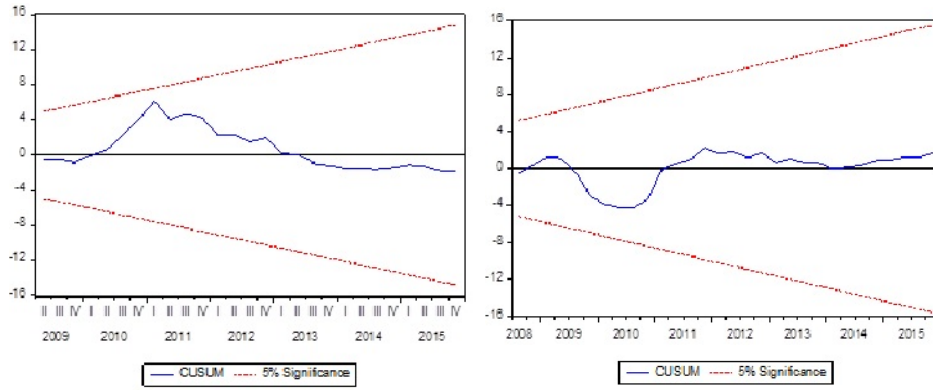
(c) ARDL short run estimates and ECM: Model with TF

Variable	Coefficient	t-Stat	Prob
$\Delta\text{GDP}(-1)$	0.1998*	1.6995	(0.0996)
ΔTF	0.0596	1.0662	(0.2949)
ECM(-1)	-0.2505**	-2.0082	(0.0437)
ECM(-1) = LN(GDP) - (0.2660*LNTF + 17.4892)			
Test	Test Stats		Prob Value.
Serial Corrl.	0.7356		(0.5399)
Normality Test	1.7400		(0.2297)
Hetero.	4.5921		(0.0225)
F-ARCH Test.	0.0449		(0.7746)

Notes: *, **, *** shows significance at 10%, 5% and 1% respectively. Figures in parentheses are the p-values.

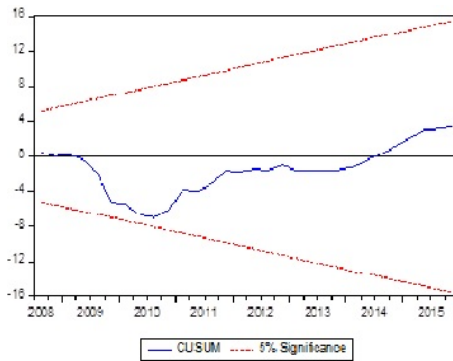
time against the alternative that these coefficients are not constant over time. In all of the diagram models (1-3), the CUSUM plot is within the critical bound, which implies that coefficients in the ECM model are stable.

Figure 3.4: Plot of Cumulative sum of recursive residual for TA, TD and TF



(a) CUSUM Model 1

(b) CUSUM Model 2



(c) CUSUM Model 3

3.4.5 Granger Causality

The long-run relation between GDP and IBD variables leads to the investigation of the direction of causality between the two. This is carried out with help from the Granger causality in a VAR(k) framework. To know the direction of causality, this study will use the following model:

$$\ln GDP_t = \theta_0 + \sum_{i=1}^h \theta_{1i} \ln GDP_{t-i} + \sum_{j=1}^l \theta_{2ji} \ln IBD_{t-j} + \varepsilon_{it} \quad (3.6)$$

and

$$\ln IBD_t = \alpha_0 + \sum_{i=1}^h \alpha_{1i} \ln IBD_{t-i} + \sum_{j=1}^l \alpha_{2ji} \ln GDP_{t-j} + \varepsilon_{2t} \quad (3.7)$$

where GDP_t , and IBD_t are GDP growth and one of the Islamic financial development indicators. h and l are optimal lag lengths of the GDP and IBD. ε_{it} and ε_{2t} are two error terms which are assumed to be white noise and follow usual properties. The null hypothesis for Equation 3.6 is $H_0 = IBD$ does not Granger cause GDP, if $\sum_{j=1}^l \theta_{2j} = 0$, against the alternative that $H_1 = IBD$ does Granger cause GDP, if $\sum_{j=1}^l \theta_{2j} \neq 0$. A similar hypothesis applies for other equations.

The results of the Granger tests are given in Table 3.6(a-c). In the first table (3.6 (a)), TA does Granger cause GDP, as the calculated value of 11.3 is greater than the tabulated value. However, GDP does not Granger cause TA, as the calculated value of 1.14 is less than the tabulated value. Table 3.6 (b) shows the Granger causality results between TD and GDP. Here, the direction of causality runs from TD to GDP, but the opposite is not true. For the same table, it can be seen that the calculated value of 10.44 is greater than the tabulated value, and thereby the null hypothesis can be rejected. For the case of reverse causality, the calculated value of 6.34 is less than the critical value, and thus the null can be accepted; this means that GDP does not Granger cause TD. In Table 3.6 (c), which shows the direction of causality between GDP and TF, the results also indicate that the direction of causality runs from TF to GDP, and there is no evidence for causality from GDP to TF. These results are important in the sense that, based on said results, the supply-leading hypothesis seems to be established for IFD and GDP, for the case of Pakistan.

3.5 Conclusion

There are many studies which have been conducted to assess the relationship between financial development and economic growth. There are three relationships that were found to exist between the two: (i) supply-leading, (ii)

Table 3.6: Granger Causality Test

(a) Granger causality test (GDP & TA)

Null: TA (lag1-3) does not Granger cause GDP			
Dep Variable	F-Stat	Prob	Status
TA	11.3241	(0.0101)	Rejected
Null: GDP (lag1-3) does not Granger cause TA			
Dep Variable	F-Stat	Prob	Status
GDP	1.1461	(0.7660)	Accepted

(b) Granger causality test (GDP & TD)

Null: TD (lag1-3) does not Granger cause GDP			
Dep Variable	F-Stat	Prob	Status
TD	10.4445	(0.0336)	Rejected
Null: GDP (lag1-3) does not Granger cause TD			
Dep Variable	F-Stat	Prob	Status
GDP	6.3490	(0.1746)	Accepted

(c) Granger causality test (GDP & TF)

Null: TF (lag1-3) does not Granger cause GDP			
Dep Variable	F-Stat	Prob	Status
TF	8.4655	(0.0373)	Rejected
Null: GDP (lag1-3) does not Granger cause TF			
Dep Variable	F-Stat	Prob	Status
GDP	1.4044	(0.7045)	Accepted

Notes: *, **, *** shows significance at 10%, 5% and 1% respectively. Figures in parentheses are the p-values.

demand-following, and (iii) bi-direction causality. Despite this extensive literature, only a few studies have investigated the relationship between Islamic financial development and economic growth. Islamic banking—a major part of Islamic finance—was originally motivated by the demand for *Sharia*-compliant ways to save and borrow the funds from the market, and currently the industry has started to make its presence felt.

Islamic banking has grown over time, not only in Pakistan but also in other parts of the world. Islamic banking is also seen as a substitute provider of financial products, along with conventional banks. IBD is used as a measure of IFD in literature constituting approximately 80% of Islamic financial market, to assess the nexus between IFD and growth. Particularly, we were interested in analysing the direction of causality between IFD and growth so as to know which hypothesis—supply-leading, demand-following or neutral role—is true for the case of Pakistan. To answer said question, our study, in a first step, analysed the co-integration to establish the long-run relationship. In the second step, the ARDL model was used to estimate the long-run and short-run estimates; the Granger causality test was also used to analyse the direction of causality in the third step.

The results revealed that a long-run relationship exists between IBD and economic growth. The direction of causality runs from IBD to economic growth, whereas evidence of a reverse causality was not found. This proved the supply-leading hypothesis between IBD and economic growth in the case of Pakistan. Thus, it can be said that Islamic banks have the potential to affect economic growth and to raise the level of savings in Pakistan's economy. However, the time lag when it comes to converting deposits into investment should be decreased, as was evident from the weak short-run relationship. The major instruments that are used, such as *Murabaha* and *Musharika*—two important financing modes in Islamic banking, are long term in nature, and Islamic banks should also focus on short-term instruments. To summarise, the Islamic financial market is making a significant long-term contribution to economic growth, and hence Islamic banks are carrying out, effectively, the intermediation role through *Sharia*-compliant instruments¹⁴.

¹⁴Same result was found by KAP study (SBP & DFID) 2014 conducted for Pakistan.

In view of the above findings, more efforts should be made to further expand the Islamic financial market in general and Islamic banking in particular. In addition effort should be put in designing future *Sharia* compliant instruments, especially for the short term. This would further increase the scope of Islamic banks and result in expansion of the deposit base and lending opportunities. However, in the long run, it must be supplemented with a regulatory framework¹⁵ and disclosure requirements—something we have learned from other studies on conventional banks. Over the period, given the experience with conventional banking, and especially in the context of financial crisis, a regulatory framework¹⁶ is deemed necessary for its governance.

Currently, the SBP has a special department which deals with Islamic banks, namely the “Islamic Banking Department”, which is also performing the regulatory role. In addition, the International Monetary Fund (IMF) has setup a separate section to address the collection of data and research on Islamic banking. Beside these findings, still there is a big scope of research in Islamic banking in general, and Islamic finance and growth in particular, for Pakistan.

¹⁵Although this result does not directly came up from our results but was mentioned here as to the need for separate regulatory framework for Islamic banking sector because of its “interest” free character and other dissimilarities with conventional banking. Further research is also possible in this area as well.

¹⁶See Baltensperger & Behrends (1994) Baltensperger (1989), and Cristina Ungureanu (2008).

Chapter 4

Determinants of Financial Development: An Analysis Across Different Income Groups

Abstract: There is a divergent view on the relation between financial development and economic growth. Apart from the extensive literature on the topic above, there is not much research available looking into the more fundamental question of what factors determine financial development. This chapter attempts to fill this gap by identifying some of the determinants that promote the development of financial markets. In this context, the openness hypothesis laid down by Rajan and Zingales will also be tested. Using time-series data on 93 countries and employing a dynamic panel-estimation technique, our results provide evidence that the determinants do not affect financial development uniformly across income groups. Our results also suggest that most of the proposed determinants affect the level of financial development for upper middle-income countries. Openness positively influences financial development for lower-middle and upper middle-income countries. Similarly, the marginal effects of financial (trade) openness are positively related to the level of financial development only for the level of financial development for lower middle-and upper middle-income countries that are more open countries in the above mentioned groups. In particular, our findings do not support the openness hypothesis for low-income countries but partially support it for lower middle-and upper middle-income countries.

4.1 Introduction

Researchers have come up with many possible answers as to why countries grow differently. One of the notable explanations concerns capital allocation. The lateral discussion not only addresses its impact on growth but also takes into account the system that allocates capital to different ventures. The system that perform such function is termed as “financial system” and a developed system is able to efficiently perform various functions (Levine 1997).

The literature contains many studies examining the relation between financial development and economic growth. In the first wave of research, Schumpeter (1934) conducted pioneering work and emphasized the positive influence of the financial sector’s development on economic growth. The second era is attributed to the work of Goldsmith (1969a), who documented the evolution of financial systems and financial intermediaries. In the same era, McKinnon (1973) and Shaw (1973) investigated the role of government restrictions in hampering financial development and growth. To date, the discussion continues with improved methodology and data.

Various authors had also tried to indentify the channel through which financial market affect economic growth. In the middle of the first and second waves, Wicksell, Knut and Claseen 1935 highlighted the role of financial development in promoting growth via the credit channel. Demetriades & Andrianova (2004) explored the idea that financial intermediaries help to attain economies of information that reduce the problem of asymmetric information. Wachtel & Paul (1998) found no evidence of a feedback effect from output to financial intermediation. Luintel & Khan (1999) concluded that the levels of per capita real income and real interest rates contribute positively to financial depth. Similarly, bank-based financial systems contribute more to long-term growth than ones based on capital markets, as suggested by Arestis et al. (2001).

The opinions on the finance-growth nexus can be summarized into three views. The first view (i.e., supply-leading) holds financial development has a positive effect on growth (Patrick 1966; Jung 1986; Arestis et al. 2001; King & Levine 1993a; Levine et al. 2000; Lebdaoui & Wild 2016). The second view

(i.e., demand-following) goes against the first, arguing that growth affects financial development (Robinson 1952; Masih & Masih 1996). The third view tries to establish a bi-directional effect between the two (Demetriades & Hussein 1996; Hung & Victor 1998; Luintel & Khan 1999; Khalifa 2002).

Given the importance of financial systems, every country would like to have a developed one. Nevertheless, upon close examination, it becomes apparent that many countries do not even have a good financial system. This situation raises the question of what factors may contribute to the development of a financial system. While a considerable number of researchers have investigated the finance-growth relationship, only a few have looked deeply into the more fundamental question about what promotes financial development or its main determinants. The current study is an attempt to fill this gap and add to the existing literature by examining the following question: What are the potential determinants of financial development? Researchers have identified some factors that had been suggested in the literature to be potential determinants. At the same time some scholars have even formulated hypotheses that have not been rigorously tested yet. Rajan & Zingales (2003) put forward one such hypothesis (referred to as the “RZ” hypothesis in the rest of this text), suggesting a new idea in the sequence of the liberalization literature¹. We made use of the RZ hypothesis in our study along with other variables of interest. The authors of the above hypothesis argued that interest groups—industrial and financial incumbents—frequently stand to lose from financial development because it creates opportunities for new firms to establish themselves, increasing competition and decreasing incumbents’ rents. In addition, incumbents’ opposition to financial development may become weaker when an economy is open to both trade and capital flows; it may also create incentives for incumbents to adopt a different view toward developing financial markets (Rajan & Zingales 2003).

In case of financial repression or an environment where there is no desire to open financially, the large industrial incumbents can obtain cheap funds

¹The idea of RZ is in sharp contrast to existing sequencing literature which suggest that trade liberalization should be introduced first relative to financial liberalization and in some cases financial liberalization may be the last stage McKinnon (1991).

from the markets that can help them face competition. In the case of financial openness, industrial incumbents have the possibility of acquiring cheap funds from international financial markets, which they may not need. At the same time, industrial incumbents tend not to allow small firms to acquire funds from international markets. Domestic financial incumbents' rents will be threatened, as their major customers have access to international markets, thereby reducing their profits if they have only small firms to finance. Financial incumbents may push for liberalization but will face swift resistance from industrial incumbents, who tend to oppose such actions in order to avoid competition. Therefore, financial openness alone cannot help develop financial markets. Hence, Rajan & Zingales (2003) suggested opening capital and trade accounts simultaneously to allow all parties to back the development process. However, to date, empirical evidence regarding the RZ hypothesis, along with the general determinants of financial development, remains thin². Rajan & Zingales (2003) study was limited to 24 countries, mostly industrialized, for which data were available. Therefore, their study was limited by data; thus, they could not use the time-series variation available in the more recent sample. Zhang et al. (2015) conducted a recent study testing the openness hypothesis but only in relation to China. Earlier, Baltagi et al. (2009) tested the openness hypothesis for a panel of countries, but they also failed to incorporate the difference in income across countries, and they based their within-group estimations on coefficients obtained from pooled data.

The present study is, if not first, among the few studies to subject this hypothesis to empirical testing. This study also stands out in the literature related to determinants of financial development, which has not been examined as extensively as its counterpart in finance growth literature. More precisely, this research aims to test, individually, the effects of traditional variables on financial development, such as capital account (CAO) and trade openness (TOP)—considered important for developing financial markets. Our empirical approach will consider regressing two important indicators of financial

²Rajan & Zingales (2003)'s own study stressed that financial markets were more developed before 1980 and just recently they have crossed that barrier. So their study was not directly addressing the openness hypothesis.

development–private credit and domestic credit–on variables suggested by the literature, including trade and capital account openness. Secondly, this chapter explores the importance of simultaneously opening both trade and capital accounts considered necessary for financial development. To test the openness hypothesis, we examined two openness terms to determine if one type of openness is enough without the second one or how much one depends on the other. We went one step further and introduced institutions in the hypothesis, and then we analyzed it as a determinant of financial development. We used the annual data on 93 countries as a group and divided the sample into three groups based on level of income. The current study improves on Rajan and Zingales’ work and subsequent papers on a similar topic by increasing the number of years and improving on methodology for the results’ robustness. Unlike previous researchers, we did not take data on one country or group of countries as a single group but instead used different groups for countries and then carried out the analysis. This approach helped us gain insights into the relationship at different levels of income and openness. It is expected that the output of current study will be helpful for policy makers related to financial development, trade reforms, and monetary policy.

This chapter consists of five sections. The first section introduces the topic, the second consists of a literature review, and the third section presents the data and methodology. The fourth section explains the results, followed by a conclusion in the last section.

4.2 Literature Review

The debate about the role of financial systems on economic growth started with Schumpeter (1934), who advocated the role of the banking system on growth because of its function in mobilizing savings and allocating this capital for productive use. The debate on this topic gathered momentum in 1973 when McKinnon (1973) and Shaw (1973) asserted that financial repression does not help improve investment in the economy. Repressed interest rates, for example, would not motivate the households to put their savings in banks. This lack of motivation, in turn, decreases the funds at the disposal of banks,

which thus means that funds are not allocated optimally. After this resurgence in the academic discussion, some scholars (Townsend 1979; Diamond 1984; Williamson 1986; Greenwood & Jovanovic 1990; Bernanke et al. 1999) used endogenous growth models to explain the importance of finance on growth. The debate still continues, and many researchers have revealed a positive impact of finance on economic growth (e.g., Duarte et al. 2017; Akça et al. 2017; Liu & Zhang 1979).

Given the broad consensus on the role of finance on economic growth, it would be important to know the factors that determine financial development. In the literature, at least three hypotheses directly or indirectly hint at some determinants of financial development. The first was suggested by La Porta et al. (1997) which was given the name law-and-finance hypothesis. They divided the legal codes observed in countries around the world in different categories (e.g., common law countries influenced under British law and civil law countries mostly originating from French law). La Porta et al. (1997) demonstrated that common law countries are more conducive to development of financial markets as compared to civil law countries because the former were evolved to protect private property from the state as opposed to the latter, which mainly developed to increase the power of state. Thus, under common law, small investors are better protected, which increases their confidence, thereby increasing financial development.

The second hypothesis—the endowment hypothesis—states that strong institutions are vital for financial development. The creators of the hypothesis, Daron et al. (2011), argued that the quality of institutions varies across countries because of their initial endowments. More simply, the shape of institutions in a country depend on the type of colonizers they had in the past. If colonizers settled because they found the environment suitable, they stayed there for a long time and built institutions to protect the property laws and check the powers of the state within a legal framework. Therefore, the United States, New Zealand, and Australia are few examples of such a setup. On the other hand, in regions—where colonizers did not settled because the environment was not conducive to them, they did not settle but created institutions intended to extract resources. Examples include the Congo, Ivory

Coast, and Latin American states. Hence, the conditions became initial endowments that played a major role in the type of institutions that emerged after the colonizers left. The settled areas ended up with more democratic rules and property rights, and institutions developed—unlike the case where the colonizers did not settle and only extracted resources.

Beck et al. (2003) empirically tested both the endowment and law and finance hypotheses and suggested that both of the hypotheses were helpful in explaining some of the cross-country variations in financial markets. They argued that, where colonizers' policy was not to settle, small elite groups mostly benefited instead of private investors; on the other hand, where colonizers settled, private investors were protected through legal processes (Beck et al. 2003). While comparing both the endowment and the law-and-finance hypotheses, they concluded that the former theory is more profoundly able to explain the cross-country variation in financial markets because the latter is more concerned with the channel through which settlers affected the level of financial development.

Rajan & Zingales (2003) proposed the third hypothesis, shedding light on different actors in finance and overall industry. They were of the view that there exist interest groups in the economy that stand to lose from financial development. These actors are related to one another in the sense that a decrease in one's profits lowers those of other party as well. Two of these actors are industrial and financial incumbents. Industrial incumbents can finance new projects from earnings without accessing external capital markets, using the collateral from existing projects or their prior reputations to borrow. Industrial incumbents, in a way, enjoy positional rents. Anyone else who starts a new business has to sell it to the incumbents or force them to fund it through financial incumbents. Therefore, the incumbents enjoy some rents in the markets they operate in, but they also end up appropriating most of the returns from new ventures. Financial incumbents capitalize on their informational advantage, which arises due to their relation-based financing and overtime. Furthermore, financial incumbents become monopolists in providing loans to firms when problems of poor disclosure and weak contract enforcement raise fixed costs for new financial entrants.

Thus, Rajan and Zingales suggested that, if financial and trade sectors are opened simultaneously, only then do incumbents have the incentive to back financial development. Trade liberalization accompanied by freeing of capital flows forces incumbents to make the best use of liberalized capital markets in order to cope with the competitive pressure from foreign and domestic entrants. Lower profits resulting from trade openness and the greater need for external finance now free them to explore possibilities from international capital markets. The government role in directing credit to incumbents and its ability to provide subsidized loans to favored firms will decrease as the free flow of capital forces governments to maintain macroeconomic prudence. Therefore, in terms of sequencing, the RZ hypothesis differs substantially from contemporary theories, where capital account should be the last step, and trade openness must precede financial openness (see McKinnon 1991). Rajan & Zingales (2003) favored the opening of both simultaneously.

The empirical evidence on the determinants of financial development remains limited. Most of the studies that we found focused on more narrow approaches looking for the relation between financial openness (or foreign direct investment) and financial development. Guiso et al. (2004) used the data on households and firms in Italy and demonstrated that social capital does play an important role in promoting financial development. Social capital refers to the trust of a society in institutions, which reduces the investment in cash holdings, which ultimately increases investment or demand for financial services. Galindo & Calderon (2001) produced almost the same results for a sample of 48 countries. Their research also revealed that trust in a society does affect financial development positively. Chinn & Ito (2006) observed 108 countries in the period 1980–2000 in their study and concluded that higher financial openness is associated with higher levels of financial development. But their findings were preconditioned on the level of institutional and legal development in a country, and they indicated that emerging economies are more conducive to such a relationship as compared to developing countries.

Klein & Olivei (2008) found that financial liberalization improved financial development for 87 countries and also played an important role in economic growth. However, the result was only valid for developed countries, and they

did not find the same for small economies. An interesting result of their study was that liberal capital accounts over some length of period affected a country's financial development more positively as compared to countries that continued with capital account restrictions. According to Svaleryd & Vlachos (2002), trade openness positively affects financial development. In addition, the degree of financial integration has a separate effect on trade openness. W. Huang et al. (2006) concluded that financial openness can explain cross-country differences in financial development. W. Huang et al. (2006) employed a panel containing 35 countries for the period 1976-2003 and demonstrated that financial openness was the key factor that explain cross-country differences in financial development in the sample group. An important aspect of Huang's study was the use of different types of indicators for financial development and capital account openness—such as the banking sector, stock market, and national capital account-based measures. However, the researcher concluded that financial openness is more effective when using stock market-based indicators as compared to banking-based ones (W. Huang et al. 2006). Kim et al. (2010) employed data on 88 countries and demonstrated, on the basis of a pooled mean group approach, that there is a long-term relationship between trade openness and financial development. However, their results were not uniform across the group of countries. They concluded that a positive relationship between trade openness and financial development holds for low-income and high-inflation countries only.

A book by Y. Huang (2011) encompasses many factors that have the potential of improving financial development in different chapters. In every chapter, the author looked at individual factors, such as the level of development, the origin of the legal system, the quality of institutions, private investment, government reforms, and geographic endowments. On the levels of economic development, legal origins, and institutional quality, using Bayesian model averaging and a general-to-specific approach, Huang concluded that the above variables do affect the level of financial development. Similarly, Huang's research used the generalized method of moments (GMM) approach for 43 countries, revealing the presence of bi-directional causality between private investment and financial development. For institutional improvements

affecting financial development, Huang identified a positive effect in the short run for a sample on 90 countries, but it is important to note that a positive effect was apparent for low-income countries and countries with French legal origins (Y. Huang 2011).

Some country-wise studies have also investigated the above relationship. Acikgoz & Saracoglu (2012) conducted one such study by using quarterly data on Turkey for the period 1980–2007 and concluded that openness indicators have a predictive power in terms of financial development. Another study by Cakan (2017), also on Turkey but based on time-series data from 1974 to 2014, also concluded that financial openness and foreign direct investment played an effective role in promoting financial development. Based on the bound-test approach, the researcher suggested using financial openness and foreign direct investment as policy tools to promote financial development. Another country analysis by Zhang et al. (2015) on the Chinese financial market indicated that both trade and financial openness are positive determinants of financial efficiency—one of the three indicators of proxy financial development. However, simultaneous opening had a negative impact on financial development. Zhang tested the RZ hypothesis for various provinces of China and concluded that, for most open provinces, the marginal effects of openness on efficiency and competition measures of financial development were positive for more open provinces and negative for the least open regions. However, an important conclusion of their study was that the marginal effects of simultaneous openness on financial development was negative for most provinces in sample.

4.3 Methodology and Data

In this section, we present the proposed model and empirical methodology to test the hypothesis of interest. We divide the current section into two subsections—where the first subsection describes the model along with the empirical technique to estimate it. The second subsection explains the calculation of marginal effect to test the RZ hypothesis.

4.3.1 Dynamic Empirical Model and GMM

Our specification is aimed at utilising an empirical model that explain the level and pace in financial development across countries. So our empirical strategy should allow to make maximum use of both time and cross-section dimensions of the data that was used. Using only time series data may not represent long run equilibrium values in any given year, because of slow adjustment to changes in other variables. Financial development indicators especially, asset based are likely to be persistent. Similarly, credit based measures also may likely display persistence from year to year. To allow for the partial adjustment, we specify a log-linear model, which also include a lagged dependent variable.

A general form of the model can be written as follows:

$$\begin{aligned} \ln FD_{it} = & \alpha_0 + \alpha_1 \ln CAO_{it} + \alpha_2 \ln GDP_{it} + \alpha_3 \ln EDU_{it} + \alpha_4 \ln SAV_{it} \\ & + \alpha_5 \ln TOP_{it} + \gamma_1 \ln FD_{it-1} + \mu_{it}. \end{aligned} \quad (4.1)$$

The equation above is a simple economy with TOP & CAO , where TOP is trade openness, and CAO is capital account openness. Due to our interest in testing the RZ hypothesis, we included an interaction term for financial openness and trade openness in the form of $TOP \times CAO$. The equation above can be extended as

$$\begin{aligned} \ln FD_{it} = & \alpha_0 + \alpha_1 \ln CAO_{it} + \alpha_2 \ln GDP_{it} + \alpha_3 \ln EDU_{it} + \alpha_4 \ln SAV_{it} \\ & + \alpha_5 \ln TOP_{it} + \alpha_6 (\ln TOP_{it} \times \ln CAO_{it}) \\ & + \gamma_1 \ln FD_{it-1} + \mu_{it}. \end{aligned} \quad (4.2)$$

where the interaction term $TOP \times CAO$ indicates the simultaneous opening of capital and trade account openness. The introduction of the interaction term helped us test both strict and loose versions of the RZ hypothesis.

Following research by Demetriades & Philip (1997) and Demetriades & Andrianova (2004), who emphasized the role of institutions on the development of financial markets and economic growth, we extended the model above to

include the institution (INS) hypothesis put forward by Acemoglu et al. (2003) and introduce INS in the model. It is worthwhile to note that Rajan & Zingales (2003) also recognized the importance of INS, which represents the quality of property rights, standards for accounting disclosures, enforcement of contracts, and regulation of policies. However, according to the authors, institutions are shaped by the political economy factors that themselves are determined by financial and trade openness. Thus, we included institutions separately, as well as with the opening hypothesis, in order to know more about the channel above. Eq.4.1 then takes the following form:

$$\begin{aligned} \ln FD_{it} = & \alpha_0 + \alpha_1 \ln CAO_{it} + \alpha_2 \ln GDP_{it} + \alpha_3 \ln EDU_{it} + \alpha_4 \ln SAV_{it} \\ & + \alpha_5 \ln TOP_{it} + \alpha_6 \ln INS_{it} + \gamma_1 \ln FD_{it-1} + \mu_{it}. \end{aligned} \quad (4.3)$$

The variable *INS* captures the quality of institutions across countries in our panel. The equation above takes into account the effect of institutions only along with other potential determinants. After establishing this part of the equation, we included institutions alongside simultaneous openness. The model along with interaction term can be written as,

$$\begin{aligned} \ln FD_{it} = & \alpha_0 + \alpha_1 \ln CAO_{it} + \alpha_2 \ln GDP_{it} + \alpha_3 \ln EDU_{it} + \alpha_4 \ln SAV_{it} \\ & + \alpha_5 \ln TOP_{it} + \alpha_6 \ln INS_{it} + \alpha_7 (\ln TOP_{it} \times \ln CAO_{it}) \\ & + \gamma_1 \ln FD_{it-1} + \mu_{it} \end{aligned} \quad (4.4)$$

This chapter introduces a modified version of the RZ hypothesis to test that not only trade and capital account openness are required but that we need strong institutions along with simultaneous opening of *CAO* and *TOP*. The interaction term $TOP \times CAO \times INS$ was used to test the form of hypothesis presented above. The modified version can be written as following,

$$\begin{aligned} \ln FD_{it} = & \alpha_0 + \alpha_1 \ln CAO_{it} + \alpha_2 \ln GDP_{it} + \alpha_3 \ln EDU_{it} + \alpha_4 \ln SAV_{it} + \\ & \alpha_5 \ln TOP_{it} + \alpha_6 \ln INS_{it} + \alpha_7 (\ln TOP_{it} \times \ln CAO_{it}) + \\ & \alpha_8 (\ln TOP_{it} \times \ln INS_{it}) + \alpha_9 (\ln CAO_{it} \times \ln INS_{it}) + \\ & \alpha_{10} (\ln TOP_{it} \times \ln INS_{it} \times \ln CAO_{it}) + \gamma_1 \ln FD_{it-1} + \mu_{it}. \end{aligned} \quad (4.5)$$

In all the equations above, $\ln FD$ is the financial development proxy. We employed two indicators for financial development—liquid liabilities (LL) and private credit (PC). $\ln GDP$ represents the log of real gross domestic product per capita, $\ln SAV$ denotes the growth rate of savings, and $\ln EDU$ refers to the total budget spent on education, which can capture the level of education. The term μ is an error term that can be written as $\mu_{it} = \mu_i + \varepsilon_t + \nu_{it}$, which means that it contains both country and time-specific effects, and is assumed to be *iid*. All of the potential determinants above were drawn from theory and were expected to affect FD positively³.

To test the hypothesis above, we tried to employ an empirical strategy that would make maximum use of the time and cross-country dimensions of data. Some past studies on panel data averaged out data over five years (some used averages of three or 10 years) to get a steady-state relationship and to flush out any seasonal variation in data. However, our study differs from these studies, as we did not average the data because doing so does not always result in a stable relationship. Moreover, smoothing of the data by taking the averages also removes useful variations from the data that can be crucial for final results.

In all the models, a lagged dependent variable was also included to capture the dynamic nature of FD along with the fact that it depends on its level in the previous period. The lagged dependent variable also implies the existence of a correlation between regressors and the error term. In other words $\ln FD_{-1}$ depends on μ_{it-1} , which itself is a function of μ_i . This correlation makes the equations suffer from Nickell (1981) bias. This issue can be corrected if t tends to infinity. To overcome this difficulty, the literature recommends using the GMM approach developed by Hansen (1992); GMM can be estimated using the difference approach developed by Arellano & Bond (1991) or system approach developed by Arellano & Bover (1995) and Blundell & Bond (1998). In the case of the former, the model is usually differenced to remove any country-specific effects. The method also removes any endogeneity that may arise when country-specific effects are correlated

³In the case of GDP, there are many studies indicating that the relationship is not conclusive. However, theoretically, it is still viewed as affecting FD positively.

with the independent variables. Differencing also ensures that the variables are stationary. The latter approach combines the regression in the first difference and in levels, which takes care of heterogeneity, omitted variable bias, and time-invariant components. The system approach is also, similar to the difference approach, corrects for endogeneity through the use of instruments for explanatory variables. Instruments are used for differenced equations by taking two times the lagged values of explanatory variables and lagged difference for level equations. Thus, system GMM estimates two equations, one in difference form and another in level, thus reducing the potential bias and imprecision that arise when only the first difference GMM is used (Arellano & Bover 1995; Blundell & Bond 1998; Blundell et al. 2001). The authors of system approach also suggested testing GMM for Sargan/Hansen for the over-identifying restriction, which tests the overall performance of the instruments and the second-order serial correlation test. The process above allowed for the examination of whether or not the error term μ_{it} is serially correlated. The Hansen test was helpful to test the over-identifying restriction, for which the null hypothesis consist of instrumental variables that are not correlated with residual. For endogenous variables, only the first relevant lag was used, permitting us to check the issue of reverse causality and omitted variables bias. According to Blundell et al. (2001), system GMM is preferred over differenced GMM because of the former's ability to handle heterogeneity, omitted variables bias, and endogeneity as compared to the latter. Furthermore, as Blundell & Bond (1998) noted, system GMM estimators are more likely to result in consistent and efficient parameters, as well as better asymptotic and finite sample properties compared to the first difference GMM. For the current study, we used a one-step GMM estimator for the proposed methodology.

The current study aims to test the RZ hypothesis across different levels of income, as well as a whole group, and not just a pool analysis. We divided the countries as to capture an important aspect of RZ hypothesis which was not captured in earlier studies i.e. in the words of RZ "...In essence our theory suggests that why financial development can differ so much between countries at similar levels of economic and industrial development". To achieve the

same level of economic development, the current study divides the countries into different income groups. This approach allowed us not only to carry out an overall analysis but also examine the differences across various groups of countries based on their income, permitting us to know more about the dynamics related to potential determinants and their effects on the level of financial development.

4.3.2 Marginal Effects and Testing of Hypothesis

To test the RZ hypothesis, we included the interaction term ($TOP \times CAO$) alongside other economic variables in equations 4.2 and 4.4. The interaction term was expected to inform us about the simultaneous opening of capital and financial accounts. According to Rajan & Zingales (2003), an examination based on two variables—capital account (or trade account) and financial development—is not helpful in explaining the relationship. Therefore, they suggested an important three-variable relationship—trade, capital account, and financial development—in the form of the RZ simultaneous openness hypothesis. Rajan & Zingales (2003) based their theory on the basis of interest groups present in the society.

Therefore, the interaction term in the equations above can test for the simultaneous hypothesis, which is the core of the RZ hypothesis. The marginal effects can be calculated by taking the partial derivatives of equations above with respect to both trade and financial openness. We tested such a hypothesis for two equations (i.e., equations 4.2 and 4.4), the first without institutions and the latter with institutions. Therefore, we calculated four derivatives in total for a single type of openness. More precisely, for equation 4.2,

$$\frac{\partial \ln FD_{it}}{\partial \ln CAO_{it}} = \alpha_1 + \alpha_6 \ln TOP_{it} \quad (4.6)$$

and

$$\frac{\partial \ln FD_{it}}{\partial \ln TOP_{it}} = \alpha_5 + \alpha_6 \ln CAO_{it} \quad (4.7)$$

The derivatives were calculated for both the equations mentioned above and for both proxies of financial development.

As discussed in the work of Baltagi et al. (2009), the RZ hypothesis can be tested in the form of strict and loose versions. The strict version implies that one type of openness cannot promote financial development without other one (i.e., trade openness cannot promote financial development without financial openness and vice versa). The loose version of same hypothesis means that more of either type of openness can be helpful in promoting financial development. In other words, a small increase in trade (financial) openness would lead to more financial development. The former version requires the marginal effects of financial openness to be non-positive when an economy is closed to trade; it also implies that the marginal effects of trade openness should be non-positive when an economy is financially closed. Rajan & Zingales (2003) suggested that, when an economy opens up financially, assuming that trade openness is low or relatively closed, there is no need for domestic financial institutions because industrial incumbents can reach out for cheaper funds in international financial markets. Likewise, the domestic financial sector cannot provide credit to new industrial units because of previously existing industrial incumbents' competitiveness. Therefore, there is no motivation for developing the financial market further. On the other hand, for cases where trade account is relatively open but the financial sector remains relatively closed, there tends to be demand for a repressed financial sector to facilitate industrial incumbents. The loose version of the RZ hypothesis requires both derivatives to be positive, meaning that a small increase in either trade or financial openness would lead to greater financial development.

The openness hypothesis is straightforward to assess after obtaining the underlying coefficient estimates because we can then calculate the marginal effects of financial development with respect to openness. However, to test the strict and loose versions of the RZ hypothesis, we can calculate the marginal effects of trade and financial openness at their minimum levels. For instance, if we find both derivatives to be positive for a country that is financially (trade-wise) more closed, we can conclude that the RZ hypothesis is not

validated in its strictest form. On the other hand, if the marginal effects are non-positive at minimum levels, it indicates that there is some evidence in favor of the RZ hypothesis. A more interesting analysis would be to look at dynamic changes in the sign and magnitude of the partial derivatives along with the change in the degree of openness across countries within groups. Similarly, if one or more α_i is negative but the others are positive, it would make more sense to look for signs of marginal effects within the sample. The next section contains more discussion regarding this issue.

4.3.3 Data Measurement

This section provides a short description of the variables used in this study. Starting from the dependent variable—financial development—we used two indicators to measure it (i.e., private credit and liquid liabilities). It is worth mentioning that scholars have suggested many different indicators for measuring financial development. The indicators may be efficiency based, banking based, or stock market based (Levine et al. 2000; Baltagi et al. 2009). To provide a comprehensive measure that can encompass the full aspects of a financial system and that is available for our data set, we resorted to the two proxies mentioned above⁴. Both indicators allowed us to measure the “size and efficiency” of the financial system and therefore provided us more comprehensive indicators.

The first proxy—private credit (PC)—is the total credit provided by the banking sector to various private sector organizations as a share of GDP. The banks included in the definition are commercial banks and other financial institutions that accept transferable deposits. This proxy measures the degree of financial intermediation and thus the efficiency of the financial system, particularly banks. The second proxy is liquid liabilities (LL), which measures the liquid liabilities of the financial system. It measures the currency plus demand and interest-bearing liabilities of the financial system. It includes all financial intermediaries and non-bank financial intermediaries as a percentage of GDP. This is the broadest indicator of financial development because it

⁴We are aware that stock market-based indicators are also important, but the data were not available for most of the countries; therefore, we had to drop such proxies.

includes all three financial sectors—central banks, commercial banks, and other financial institutions. Finally, LL is a typical measure of financial depth and indicates the overall size of the financial sector.

Two other important variables are trade and financial openness. Trade openness (TOP) is defined as the ratio of total trade (export, import, and services) as a share of GDP. This is a well-known measure of trade openness. Capital account openness (CAO) measures the financial openness in our data set. Theoretically, capital account openness is less straightforward to measure compared to TOP, as indicated by the literature. Broadly, there are two types of measures—*de-jure* and *de-facto*. The *de-facto* measure was developed by Lane & Milesi-Ferretti (2007) and defined as the volume of a country's foreign assets and liabilities as a percentage of GDP. The *de-jure* measure was developed by Chinn & Ito (2006) and can be constructed by dummy variables that codify restrictions on cross-border financial restriction. Both types of measure have their own strengths and weaknesses, and it is difficult to decide which is superior. For the current study, we used the *de-jure* measure of financial openness. In this regard we will resort to index constructed by Chinn & Ito (2006).

Institution (INS) is another variable of interest that captures the quality of institutions. Following Knack & Keefer (1995), we used four indicators (i.e. corruption, government stability, law and order, and bureaucratic quality) to represent the quality of institution. Higher values of the indicators above reflect institutions of better quality. All the indicators have their own scores that assume a range respective to each indicator. As the range of scores for most variables do not vary considerably, for practical purposes we bundled them into a single summary measure by adding them up, as Baltagi et al. (2009) did. Therefore, the range in our data set is 0-25. All of the indicators mentioned above were taken from the International Country Risk Guide (ICRG), which is published by the Political Risk Service (PRS).

Other variables include real GDP per capita (GDP), government expenditure on education (EDU), and gross savings as a percentage of GDP (SAV). The variables above are potential determinants of financial development, as suggested by the literature. Some of the variables were drawn from the finance

and growth literature. For instance, real economic performance is related to financial development. Improvement in education can enhance economic development, which in turn, boosts financial development (Barro & Xavier 2005; Dollar 1992). Grohmann et al. (2017) found higher financial literacy to be associated with increasing financial depth. Odhiambo (2008), for the case of Kenya, pointed out that saving drives the shape and development of financial markets.

Except for financial openness and institutional quality data, the rest of the data were collected from World Development Indicators (WDI). As already mentioned above, data on financial openness were gathered from Chinn & Ito (2006), and quality of institution data was taken from the ICRG. The data set is summarized in Table 4.1–4.4. These tables also include their units of measurement, means, standard deviation, and minimum and maximum values.

A quick overview of basic data reveals some insights. Low-income countries are the least open (financially) with a score of -0.69 followed by lower middle ones. The most open countries are upper middle income countries with a score of 0.01. Among the upper middle-income countries, the highest value of openness is 2.38, which is associated with 13 countries (i.e. Jordan, Mauritius, Panama, Peru, Romania, Botswana, China, Costa Rica, Ecuador, Georgia, Guyana, Jamaica, and Venezuela). The countries above are the most open economies in our sample for upper middle-income countries. In this context, the sample average is far below the highest value, reflecting the sharp divide among the upper middle-income countries in terms of openness. In this regard, it is worthwhile to note the average value of upper middle-income countries is 1.61. Similar is the story regarding trade openness. Upper middle-income countries score the highest (4.35) compared to lower-income countries (4.02). The quality of institutions is highest in lower middle-income countries (10.95) compared to the low-income group (9.78). However, there are more countries in upper middle-income group with a high score compared to the lower middle-income group.

Table 4.1: Summary statistics: For overall group

Variable	Source	Unit of Measurement	Mean	Overall Std. Dev	Between Std. Dev	Within Std. Dev	Min	Max
PC	WDI	% of GDP	31.8242	28.6775	26.9814	10.0684	0.5514	165.8603
LL	WDI	% of GDP	42.6857	32.3578	31.0105	9.6226	4.1292	252.7191
TOP	WDI	% of GDP	77.4792	34.4470	31.7214	13.8151	15.6355	220.4074
CAO	Chin & Ito.	Capital Account Openness Index	-0.1681	1.3862	1.2842	0.5372	-1.8948	2.3892
GDP	WDI	US Dollar (current)	2725.302	2689.456	2229.401	1525.559	100.6932	13890.86
EDU	WDI	% of GDP	4.1137	1.6331	1.5721	0.8192	1.0122	10.6786
SAV	WDI	% of GDP	15.5391	14.5835	13.0226	6.9203	-40.8147	67.2772
INS	ICRG	Sum of Corruption, Law & Order, Govt. Stab., Bure. Quality	10.5234	7.7870	5.6241	5.4158	0	23.5597
Countries	N = 93	Panama, Gambia The, Peru, Guyana, Nicaragua, Yemen, Armenia, Zambia, Jordan, Uganda, Guatemala, Mauritius, Botswana, Egypt, Costa-Rica, Lebanon, Mongolia, Kenya, Georgia, Mexico, Romania, Indonesia, Bolivia, Paraguay, Ecuador, Dominican Republic, Cambodia, Sri Lanka, Malaysia, Philippines, Venezuela, Argentina, Madagascar, Macedonia, Honduras, Albania, Brazil, St. Lucia, Tonga, Dominica, Colombia, Thailand, Iran, Azerbaijan, Turkey, Sudan, Nigeria, Vietnam, Comoros, Tajikistan, Congo, Grenade, Niger, Moldova, Guinea Bissau, Congo Rep., Swaziland, Fiji, Namibia, Tunisia, Bhutan, Togo, St. Vincent, Gabon, Cote-d-Ivoire, Kazakhstan, Chad, Mozambique, Senegal, Morocco, Algeria, Benin, South Africa, Mali, Nepal, China, Tanzania, Cameroon, Burkina Faso, India, Bangladesh, Pakistan, Belize, Ghana, Belarus, Malawi, Ukraine, Burundi, Suriname.						

Table 4.2: Summary statistics: For lower-income group

Variable	Source	Unit of Measurement	Mean	Overall Std. Dev	Between Std. Dev	Within Std. Dev	Min	Max
PC	WDI	% of GDP	12.7128	8.7158	7.5247	4.7726	0.5513	56.4594
LL	WDI	% of GDP	25.0998	12.3373	10.5675	6.9180	4.1290	80.8461
TOP	WDI	% of GDP	58.4704	17.7970	13.2017	12.2780	20.9641	126.3508
CAO	Chin & Ito.	Capital Account Openness Index	-0.6908	1.2261	1.2212	0.2879	-1.8948	2.3892
GDP	WDI	US Dollar (current)	451.2023	219.2967	144.2425	168.1543	100.6932	1093.716
EDU	WDI	% of GDP	3.5765	1.2305	0.9709	0.9025	1.0345	7.7942
SAV	WDI	% of GDP	13.0359	9.1162	7.1360	5.5065	-22.1091	46.5861
INS	ICRG	Sum of Corruption, Law & Order, Govt. Stab., Bure. Quality	9.7813	7.7196	6.0332	4.9925	0	23.5597
Countries	N = 20	Togo, Chad, Mozambique, Senegal, Madagascar, Guinea, Gambia The, Malawi, Comoros, Benin, Mali, Haiti, Congo, Guinea Bissau, Nepal, Tanzania, Burkina Faso, Burundi, Niger						

Table 4.3: Summary statistics: For lower middle-income group

Variable	Source	Unit of Measurement	Mean	Overall. Std. Dev	Between Std. Dev	Within Std. Dev	Min	Max
PC	WDI	% of GDP	28.4103	20.9735	18.1142	11.0247	1.2592	109.9762
LL	WDI	% of GDP	38.8004	22.0694	20.2962	9.3795	6.0601	117.5339
TOP	WDI	% of GDP	78.8631	33.7270	30.8417	14.7218	17.8586	199.675
CAO	Chin & Ito.	Capital Account Openness Index	-0.0616	1.3894	1.3338	0.4531	-1.8948	2.3892
GDP	WDI	US Dollar (current)	1541.65	1064.63	742.8934	772.9541	139.1091	4509.362
EDU	WDI	% of GDP	4.1568	1.9174	1.8018	0.7983	1.0122	9.8966
SAV	WDI	% of GDP	20.4991	9.9068	8.2334	5.9709	-21.8182	60.7819
INS	ICRG	Sum of Corruption, Law & Order, Govt. Stab., Bure. Quality	10.9598	7.4691	5.1108	5.5155	0	22.0764
Countries	N = 33	Congo Rep., Swaziland, Vietnam, Moldova, Honduras, Cambodia, Mongolia, Tajikistan, Ukraine, Tunisia, Bhutan, Ghana, Philippines, Cote-d-Ivoire, Nicaragua, Armenia, Tongo, Yemen, El-Salvadore, Morocco, Zambia, Sri lanka, Bolivia, Guatemala, Indonesia, Kenya, Nigeria, Egypt, Cameron, India, Bangladesh, Pakistan, Sudan.						

Table 4.4: Summary statistics: For upper middle-income group

Variable	Source	Unit of Measurement	Mean	Overall. Std. Dev	Between Std. Dev	Within Std. Dev	Min	Max
PC	WDI	% of GDP	44.0138	34.1496	32.6740	11.1214	1.1491	165.8603
LL	WDI	% of GDP	54.5358	40.5545	39.4540	10.8914	5.9411	195.3681
TOP	WDI	% of GDP	85.9280	37.5955	35.3370	13.7857	15.6356	220.4074
CAO	Chin & Ito.	Capital Account Openness Index	0.0199	1.3965	1.2322	0.6827	-1.8948	2.3819
GDP	WDI	US Dollar (current)	4846.669	2763.555	1670.24	2217.597	409.2167	13890.86
EDU	WDI	% of GDP	4.3575	1.5024	1.5604	0.7919	1.1509	10.6786
SAV	WDI	% of GDP	21.4246	11.8514	11.3562	5.9482	-16.9367	63.3247
INS	ICRG	Sum of Corruption, Law & Order, Govt. Stab., Bure. Quality	10.5343	8.0547	5.9166	5.5412	0	23.2083
Countries	N = 40	Panama, Peru, Guyana, Jordan, Jamaica, Mauritius, Botswana, Costa Rica, Lebanon, Georgia, Mexico, Romania, Paraguay, Ecuador, Dominican Republic, Malaysia, Venezuela, Argentina, Macedonia, Albania, Brazil, St. Lucia, Dominica, Colombia, Thailand, Iran, Azerbaijan, Turkey, Grenada, Fiji, Namibia, St. Vincent, Gabon, Kazakhstan, Algeria, South Africa, China, Belize, Belarus, Suriname.						

4.4 Empirical Analysis

This section is divided into two subsections—the first reports the estimation results based on the data set explained above using GMM estimation and outlines the implications for our hypothesis. In second subsection, the openness hypothesis is discussed along with policy implications.

4.4.1 Estimation Results

The estimation results for equations 4.2–4.5 are presented in Tables 4.5–4.9. These are the main results of the chapter, which were estimated using GMM, as mentioned in the section above. There are four groups for which the estimation was carried out—the overall group, low-income group, lower middle-income group, and upper middle-income group. There are six models in each group, which are indicated as model 1, model 2, model 3 and so on. In each group for tables 4.5–4.8, first three models/columns represent results where the dependent variable is PC and the last three models/columns for LL. Table 4.9 depict the results where RZ is extended to include INS. For the above table–4.9, the estimations results are represented in columns indicated as model 25–32, which represent overall countries and group of countries. First column in every group is for first proxy of FD–PC and the second column is for LL. These tables also report the results of a variety of robustness checks that determine the stability of models.

Before turning straight to the hypothesis of interest, this section looks at the general outcomes of all variables from our estimation. The results indicate that variables did not affect FD uniformly across groups. In Table 4.5 (related to overall countries), we can see that growth was significant in all cases and for both indicators. This fact suggests that growth is a strong determinant of FD. However, when we break the countries into three groups—low-income, lower middle-income, and upper middle-income countries—we can observe that growth was not significant in all cases for all groups. In low-income countries, growth was insignificant in all models for both indicators. It is only from middle-income countries that growth became significant in Tables 4.7, 4.8 and 4.9 thereby, indicating the start of positive impact of growth on FD.

Table 4.5: GMM estimation results for overall countries

Dependent Variable:	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	PC	PC	PC	LL	LL	LL
CAO	0.046*** (0.015)	0.023*** (0.004)	0.035*** (0.013)	0.035 (0.052)	0.066 (0.038)	0.013*** (0.001)
GDP	0.074*** (0.038)	0.044*** (0.009)	0.058*** (0.021)	0.032*** (0.012)	0.028*** (0.014)	0.048*** (0.008)
EDU	-0.051*** (0.015)	0.016*** (0.003)	0.036*** (0.014)	-0.068 (0.056)	-0.017 (0.008)	0.025*** (0.004)
SAV	-0.009 (0.007)	-0.037*** (0.014)	-0.008 (0.007)	-0.018 (0.011)	0.038 (0.027)	-0.009 (0.005)
TOP	0.081 (0.056)	-0.069** (0.026)	0.007 (0.016)	0.019 (0.014)	-0.056 (0.052)	0.014 (0.001)
INS	-	-0.062*** (0.012)	-0.033*** (0.016)	-	-0.069 (0.054)	-0.012*** (0.006)
$TOP \times CAO$.	-0.057 (0.038)	-	-0.021 (0.016)	-0.033 (0.028)	-	-0.025*** (0.002)
Dep. Var.(-1)	0.858 *** (0.008)	0.019*** (0.003)	0.852*** (0.007)	0.885*** (0.007)	0.054*** (0.001)	0.465*** (0.004)
Constant	0.144 (0.134)	0.596*** (0.017)	0.262*** (0.119)	-0.329 (0.151)	0.469*** (0.025)	0.644*** (0.036)
Sargan test	80.26	67.33	47.57	89.56	89.91	49.54
(p-values)	(0.833)	(0.290)	(0.326)	(0.638)	(0.542)	(0.102)
First Order	-2.49	3.99	-2.64	-7.55	-3.28	1.54
(p-value)	(0.013)	(0.000)	(0.008)	(0.000)	(0.001)	(0.012)
Second Order	-0.33	1.05	-0.2	0.021	-1.97	-0.94
(p-value)	(0.744)	(0.294)	(0.839)	(0.986)	(0.495)	(0.347)

Notes: All regressions are estimated using the system GMM estimator. *, **, *** indicate significance at 10%, 5% and 1% level. Figures in brackets are the standard errors except stated otherwise.

Table 4.6: GMM estimation results for lower-income countries

Dependent Variable:	Model 7 PC	Model 8 PC	Model 9 PC	Model 10 LL	Model 11 LL	Model 12 LL
CAO	-0.016 (0.041)	0.024 (0.026)	0.017 (0.012)	-0.043** (0.022)	0.035 (0.021)	0.042* (0.022)
GDP	0.036 (0.027)	0.083 (0.049)	0.034 (0.026)	0.013 (0.012)	0.023 (0.026)	0.077 (0.049)
EDU	0.020 (0.017)	0.024 (0.033)	0.021 (0.026)	-0.028 (0.016)	-0.017 (0.013)	-0.028 (0.038)
SAV	-0.054 (0.037)	-0.012 (0.014)	-0.044 (0.032)	0.014 (0.011)	-0.089 (0.068)	0.019 (0.014)
TOP	-0.026 (0.013)	-0.014** (0.007)	-0.032 (0.019)	-0.043 (0.035)	-0.018 (0.016)	-0.050 (0.033)
INS	—	-0.067 (0.059)	0.005 (0.003)	—	-0.035 (0.026)	0.001 (0.002)
$TOP \times CAO$	-0.013 (0.014)	—	-0.014* (0.008)	-0.007** (0.004)	—	-0.021* (0.011)
Dep. Var.(-1)	0.062 *** (0.014)	0.016*** (0.002)	0.074 *** (0.011)	0.087*** (0.021)	0.035*** (0.010)	0.097 *** (0.022)
Constant	-0.039 (0.033)	0.507* (0.302)	-0.046 (0.039)	-0.057* (0.031)	-0.741 (0.449)	-0.073* (0.041)
Sargan test	75.21 (0.743)	67.27 (0.190)	78.39 (0.301)	21.39 (0.557)	90.16 (0.416)	21.22 (0.68)
(p-value)	-2.93 (0.003)	-1.76 (0.078)	-2.55 (0.011)	-1.81 (0.070)	-3.42 (0.001)	-1.57 (0.117)
First Order	-1.19 (0.235)	-0.51 (0.610)	-1.12 (0.261)	0.25 (0.804)	-0.68 (0.495)	0.23 (0.402)
(p-value)						

Notes: All regressions are estimated using the system GMM estimator. *, **, *** indicate significance at 10%, 5% and 1% level. Figures in brackets are the standard errors except stated otherwise.

Table 4.7: GMM estimation results for lower middle-income countries

Dependent Variable:	Model 13	Model 14	Model 15	Model 16	Model 17	Model 18
	PC	PC	PC	LL	LL	LL
CAO	-0.054 (0.046)	0.015 (0.077)	-0.065 (0.051)	-0.066*** (0.047)	0.091 (0.079)	-0.071 (0.045)
GDP	0.028** (0.013)	0.083** (0.032)	0.026*** (0.012)	0.055*** (0.019)	0.051*** (0.018)	0.052*** (0.019)
EDU	0.119*** (0.023)	0.025 (0.018)	0.123*** (0.028)	0.030*** (0.006)	0.011*** (0.003)	0.130*** (0.026)
SAV	0.003 (0.003)	-0.084 (0.059)	0.005 (0.013)	0.003*** (0.001)	0.017 (0.020)	0.021 (0.013)
TOP	-0.006 (0.004)	-0.022*** (0.011)	0.008 (0.004)	-0.003 (0.003)	0.093** (0.003)	0.004*** (0.002)
INS	-	-0.009 (0.006)	0.033 (0.015)	-	0.034 (0.023)	0.031*** (0.016)
$TOP \times CAO$.	0.004*** (0.002)	-	0.019** (0.010)	0.013** (0.004)	-	0.027* (0.014)
Dep. Var.(-1)	0.861*** (0.143)	0.320*** (0.102)	0.882*** (0.125)	0.868*** (0.114)	0.474*** (0.104)	0.864*** (0.134)
Constant	-0.486 (0.286)	0.732*** (0.177)	-0.443 (0.226)	0.071 (0.061)	0.870*** (0.328)	0.706*** (0.584)
Sargan test	67.94	49.40	72.86	58.96	49.65	63.57
(p-value)	(0.253)	(0.369)	(0.106)	(0.440)	(0.827)	(0.319)
First Order	-1.37	2.21	-1.92	-1.42	-2.69	-1.95
(p-value)	(0.003)	(0.027)	(0.055)	(0.070)	(0.007)	(0.031)
Second Order	-1.15	1.19	-1.16	-0.98	0.70	-1.22
(p-value)	(0.250)	(0.043)	(0.246)	(0.326)	(0.484)	(0.224)

Notes: All regressions are estimated using the system GMM estimator. *, **, *** indicate significance at 10%, 5% and 1% level. Figures in brackets are the standard errors except stated otherwise.

Table 4.8: GMM estimation results for upper middle-income countries

Dependent Variable:	Model 19	Model 20	Model 21	Model 22	Model 23	Model 24
	PC	PC	PC	LL	LL	LL
CAO	0.012*** (0.003)	0.018*** (0.004)	0.011*** (0.003)	0.067*** (0.023)	0.019*** (0.043)	0.059*** (0.023)
GDP	0.019*** (0.006)	0.041*** (0.009)	0.023*** (0.011)	0.012** (0.006)	0.029*** (0.008)	0.019*** (0.008)
EDU	0.062 (0.061)	0.076*** (0.024)	0.097 (0.181)	0.042** (0.021)	0.082*** (0.025)	0.047 (0.035)
SAV	0.026*** (0.011)	-0.012 (0.014)	0.031** (0.011)	0.024 (0.014)	0.025* (0.014)	0.018** (0.009)
TOP	0.019*** (0.005)	-0.013*** (0.003)	0.002** (0.001)	0.061*** (0.022)	0.021*** (0.007)	0.006*** (0.002)
INS	-	0.043*** (0.009)	0.029** (0.009)	-	0.046*** (0.011)	0.024** (0.009)
$TOP \times CAO$.	0.088*** (0.017)	-	0.042** (0.018)	0.049** (0.023)	-	0.071 (0.056)
Dep. Var.(-1)	0.844 *** (0.011)	0.018*** (0.000)	0.834*** (0.021)	0.825*** (0.009)	0.018*** (0.000)	0.825*** (0.009)
Constant	0.428*** (0.014)	0.515*** (0.027)	0.373*** (0.133)	0.490** (0.041)	0.582*** (0.034)	0.321*** (0.126)
Sargan test	79.13	58.39	77.95	64.38	51.89	63.55
(p-value)	(0.129)	(0.791)	(0.989)	(0.640)	(0.791)	(0.751)
First Order	-1.77	2.29	-0.44	-1.69	1.67	-1.17
(p-value)	(0.043)	(0.022)	(0.065)	(0.050)	(0.095)	(0.024)
Second Order	-1.38	-1.19	-1.13	-1.31	-0.94	-0.42
(p-value)	(0.166)	(0.233)	(0.257)	(0.171)	(0.348)	(0.676)

Notes: All regressions are estimated using the system GMM estimator. *, **, *** indicate significance at 10%, 5% and 1% level. Figures in brackets are the standard errors except stated otherwise.

Table 4.9: GMM estimation results including institution for overall and across income groups

Dependent Variable	Overall countries		lower income countries		Middle income countries		Upper middle countries	
	Model 25	Model 26	Model 27	Model 28	Model 29	Model 30	Model 31	Model 32
	(PC)	(LL)	(PC)	(LL)	(PC)	(LL)	(PC)	(LL)
CAO	-0.014*** (0.006)	0.011 (0.011)	0.004 (0.003)	0.064 (0.052)	0.014 (0.013)	0.018*** (0.007)	0.085*** (0.008)	0.056*** (0.008)
GDP	0.042*** (0.014)	0.095*** (0.016)	0.032 (0.022)	0.018 (0.013)	0.092*** (0.021)	0.099** (0.038)	0.067*** (0.016)	0.089*** (0.015)
EDU	0.124*** (0.038)	0.149*** (0.051)	-0.125 (0.108)	0.045 (0.038)	0.058*** (0.010)	0.105*** (0.034)	0.087*** (0.034)	0.016*** (0.003)
SAV	0.015*** (0.023)	0.014*** (0.003)	-0.007 (0.007)	-0.045** (0.002)	0.017*** (0.007)	0.013 (0.008)	0.039* (0.022)	-0.023 (0.021)
TOP	-0.078* (0.042)	-0.083 (0.062)	0.014 (0.011)	0.054 (0.079)	0.068 (0.068)	0.077*** (0.013)	0.011*** (0.003)	0.066*** (0.025)
INS	-0.043 (0.026)	-0.023 (0.023)	0.015 (0.048)	0.015 (0.032)	0.036 (0.039)	0.052*** (0.010)	0.028** (0.014)	0.024 (0.021)
$TOP \times CAO$	-0.013 (0.009)	-0.031*** (0.011)	-0.003 (0.002)	0.002*** (0.000)	0.051*** (0.014)	0.019 (0.012)	0.058** (0.015)	0.096 (0.056)
$TOP \times INS$	0.032 (0.037)	0.052 (0.023)	-0.002 (0.002)	-0.007* (0.004)	-0.005 (0.003)	0.001*** (0.000)	0.026** (0.012)	0.026** (0.011)
$CAO \times INS$	-0.031** (0.014)	-0.011*** (0.004)	0.017 (0.031)	-0.016 (0.016)	0.025*** (0.011)	0.013*** (0.003)	0.065*** (0.006)	0.048*** (0.005)
$CAO \times TOP \times INS$	0.044 (0.024)	-0.013 (0.011)	-0.004 (0.004)	0.021 (0.023)	0.004 (0.002)	0.017*** (0.007)	0.084*** (0.008)	0.054*** (0.008)
Dep. Var(-1)	0.036*** (0.009)	0.018*** (0.000)	0.083*** (0.027)	0.099*** (0.021)	0.031*** (0.004)	0.036*** (0.001)	0.019*** (0.001)	0.021*** (0.000)
Const	0.798 (0.728)	0.510** (0.023)	0.219 (0.121)	0.194* (0.169)	-0.725*** (0.267)	0.808*** (0.020)	0.242*** (0.020)	0.182*** (0.016)
Sargan test	39.79 (0.347)	57.04 (0.17)	10.02 (0.614)	57.25 (0.540)	65.32 (0.735)	67.60 (0.260)	31.47 (0.989)	34.99 (0.966)
First Order	1.53 (0.059)	2.05 (0.041)	-1.52 (0.061)	-1.86 (0.069)	-1.39 (0.053)	-2.32 (0.031)	1.37 (0.063)	1.84 (0.026)
Second Order	0.73 (0.466)	1.02 (0.309)	-0.36 (0.720)	-0.75 (0.453)	-0.31 (0.758)	-0.35 (0.725)	-0.47 (0.875)	0.22 (0.826)

Notes: All regressions are estimated using the system GMM estimator. *, **, *** indicate significance at 10%, 5% and 1% level. Figures in brackets are the standard errors except stated otherwise.

One of the two openness variables—CAO—was significant in the overall country group only for one indicator (i.e., private credit). For the other one—liquid liabilities—CAO was insignificant. If we look in the tables related to the three income groups, we can observe that the impact of CAO on FD was insignificant in all cases except for a significant case in upper middle-income countries. In the case of the lower middle-income group, CAO was significant only for model 16, where the dependent variable is liquid liabilities, and in models 10 and 12 for the low-income group. The other openness variable, TOP, also rendered mostly insignificant results. For overall countries in model 2—TOP was negative and significant, which does not explain much of its effects. Therefore, we can look across the three groups, which indicates that, in low-income countries, the coefficient was still negative but mostly insignificant except for the case in model 8. The negative sign for these two groups is in contrast to the previous studies (see Beck 2002; Aizenman 2008; Kim et al. 2010; Mishkin 2009). This finding may be due to the fact that, in these two groups of countries, the trade and financial sectors had unbalanced growth. This unbalanced growth may have caused financial markets to be more repressed or pressured by interest groups (industrial incumbent). The insignificant impact of CAO for most cases also hints in this direction, and the basic data also suggest that the first two income groups are the least financially open groups.

The average financial openness for the overall group stood at -0.1681 and -0.6908 for the low-income group. Even for the lower middle-income group, the average financial openness was still negative. The verification of this logic can be explained by calculating the marginal effects, as presented in the next subsection (see Section 4.4.2). In the lower middle-income group, we found three values to be significant—one in model 14 with a negative sign and the other in models 17 and 18 with a positive sign. In the last income group, the result indicates mostly positive and significant values except for model 20. For TOP, we observed mixed results overall. In the overall group, we recorded mostly insignificant but positive values. The only significant effect was negative in model 8. For the low-income group, we observed the same situation as that of the overall group where the only significant value was in

model 2 with a negative sign. In the lower middle-income group, the coefficient of TOP started to improve, and we found two positive and significant values (in models 17 and 18) where LL is the dependent variable. In model 14 of the same group, the coefficient was still negative and significant.

On the legal side, INS also rendered an interesting outcome. It was expected that better institutions would exert a positive impact on FD. In our results for overall countries as well as for the low-income group, we did not observe such a behavior from institutions. For models 2, 3, and 6, in the overall countries case, INS exerted a negative impact on FD, which is surprising. In addition, for all cases, in the overall group, the coefficient of INS was negative and significant except for model 5. In the case of low-income countries, the coefficient of INS was negative in models 8 and 11 but insignificant. For the same group of countries, models 9 and 12 exhibited positive but statistically insignificant coefficients. The same is the case with lower middle-income countries where, in the two models, it was positive but insignificant. Only in one case—model 18 it was positive as well as significant. For upper middle-income countries, INS did exert a positive and significant impact on FD in all models. Therefore, for INS, we do not have convincing evidence—except for upper middle-income countries—that this coefficient affected FD. In addition, for INS, where it was included with and without interaction terms, it yielded almost identical results as far as its sign and significance are concerned. For example, in the overall country group, for both cases, it negatively affected FD. For the case of low-income countries, it was insignificant for all cases, whereas in lower middle-income group except for model 18, it was again insignificant. For the upper middle-income group, it became positive and significant for all regressions. Even when observing TOP and CAO along with INS, we did not find convincing evidence of the latter variable having an overlap with openness even if we saw its effect with or without the interaction term. In other words, our results indicate that INS has its own independent effect on the level of FD.

The coefficient of EDU also yielded an interesting result. In the overall group for the first indicator, education is positive and significant except in model 1 with a negative sign. For the second measure, we observed an

insignificant coefficient except for model 6. In the low-income group, EDU was insignificant for all models. Starting from middle-income countries this coefficient became positive for most of the models and was significant.

The coefficient SAV had a similar story where—not only for overall countries but for low-income and lower middle-income group—it was mostly insignificant. However, the coefficient of saving started to improve as soon as we began to observe the results from the lower middle-income group, and in the case of model 16, we found one significant value for savings. In the upper middle-income group, it became significant and positive mostly, indicating that savings may be a potential determinant of financial development for upper middle-income countries.

The diagnostic tests displayed in all the tables were satisfactory, as the values indicate. For instance, the Sargan test did not reject the over-identification restrictions for instruments. AR(1) rejected the first-order serial correlation, while AR(2) did not reject the absence of the second-order serial correlation. The lagged dependent variable was significant in most cases and was below unity, thus precluding explosive behavior. Moreover, the significance of the lagged dependent variable at the 1% level of significance shows the considerable persistence of FD, which indicates that the banking system is highly history dependent.

With reference to RZ, we checked for the interaction terms for TOP and CAO. For overall countries, we do not find interaction terms to be significant for models 1, 3, and 4. In all models, the coefficient was negative, and only in one case—model 6—it was significant. In the case of low-income countries, we observed a similar situation as that of the overall group: In all models, the coefficient was negative. Unlike for the overall group, in models 9, 10, and 12, the coefficients were significant. The interaction term was negative for the groups with the dependent variable “liquid liabilities”, which measures the size of the financial sector. The negative result thus indicates that the marginal effects of financial (trade) openness on size indicators were negatively related to the degree of trade (financial) openness for the two groups mentioned above. The interaction term improved as we moved from the low- to lower middle-income group where for all models the interaction

term became positive and significant. The positive interaction term suggests that the marginal effects of financial (trade) openness on efficiency and size indicators were positively related to the degree of trade (financial) openness for both the lower middle- and upper middle-income groups, suggesting that RZ should be validated. In short, for the two income groups, we have clear evidence as to the validity of hypothesis mentioned above. The separation of negative and positive marginal effects on the size and efficiency indicators of FD may help us to understand and possibly modify the interest group theory. More on this is discussed in next subsection.

We also extend the RZ hypothesis to include INS with TOP and CAO to examine its impact on FD. In Table 4.9, we present the results for this proposal. For the overall countries, we observed that, for both indicators, the financial and trade interaction terms had a negative effect, which is the same as the result for model 1. However, in model 26, the terms exerted a negative significant effect on FD. The CAO and INS interaction terms had negative effects on the level of FD and were significant for both indicators. The TOP and INS interaction terms positively affected FD but were insignificant for both models. The interaction terms for TOP, CAO and INS in both models were insignificant. Therefore, for the overall country group, we cannot establish any convincing relationship between any of the interaction terms with the level of FD except for $CAO \times INS$.

If we look across income groups, for low-income countries, the TOP and CAO interaction terms for the first measure of FD were negative but insignificant (model 27), and for the second measure, they were positive and significant (model 28). The TOP and INS interaction terms for both models were negative but only significant for model 28. The CAO and INS interaction terms were insignificant for both models, as was the case with the three variable interaction terms. Thus, again, we observed inconclusive results from the low-income group. Most of the other variables in both models did not contribute much to a meaningful interpretation, as all of them were insignificant except for SAV, which influenced FD positively for one model.

Starting from the lower middle-income group, our results started to improve, and different interaction terms also began to exert a positive influence

on FD. For the lower middle-income group, the TOP and CAO interaction terms were positive for both models (29-30) but only significant for model 29. The CAO and INS interaction terms were positive and significant for both columns, as well as for TOP and INS for both models. For the three variable interaction terms, we observed mixed results; in models 29 and 30, the coefficient was insignificant and significant, respectively. It is pertinent to note that both models yielded a positive sign, indicating that we have some evidence of a combined effect of these variables on the level of FD. For the last income group—upper middle-income countries, we found positive results for most interaction terms. In fact, except in model 32 for CAO and TOP, the interaction terms exerted a positive effect on the level of FD.

For other variables, CAO had a positive influence on the level of FD starting from the lower middle-income group in model 30. In addition, GDP, EDU, and TOP also exhibited same behavior and started to affect the level of FD starting from the lower middle-income group. For SAV and EDU, we observed mixed results; SAV was only positively significant in models 29 and 31, and INS was only significant in models 30 and 31.

In short, we have evidence for the lower middle- and upper middle-income group that TOP, CAO, and INS seem to have affected the level of FD. For all models where the three variable interaction terms were positive, financial and trade openness were also positive. This finding provides an indication that, for these income groups, institutions, trade, and capital account openness variables reinforce each other. We can also conclude that different variables exert different effects on FD. The difference in impact is not only present for the size and efficiency measures of FD but also related to differences in income across countries. A variable that is insignificant for one income group may become significant for a group with higher incomes. Furthermore, TOP appears to mostly influence the efficiency measure of FD positively. Finally, CAO seems to impact the size measure of FD mostly, whereas their joint effect in the form of interaction terms is mostly significant when FD is measured through a size indicator.

4.4.2 Assessment of Openness Hypothesis

In this section, we provide the marginal effects of openness on FD. In addition, we examine how the marginal effects of openness on FD change along the minimum and maximum values. We then link this discussion with the RZ hypothesis. In particular, this section contains an examination of the loose and strict versions of the RZ hypothesis.

To check the strict and loose versions of RZ, we calculated the marginal effects of CAO and TOP. To accomplish this, we calculated the partial derivatives for each FD indicator with respect to both types of openness for equations 4.2 and 4.4. The partial derivatives were calculated at different levels: mean, minimum, and maximum values of financial and trade openness, alternatively. The results are reported in Table 4.10, where panel (a) presents the marginal effects of TOP and (b) of CAO. The derivative at the minimum level in both tables allow for the discussion of the strict version of RZ. During the calculation, we observed that, within groups, partial derivatives varied depending on the level of financial or trade openness in an individual country. Therefore, we calculated the value of the derivatives above for all years across groups using the estimated coefficients for individual groups. We calculated the partial derivatives not only for both indicators but also taking into account both regressions (i.e., with and without institutions).

Table 4.10: Calculation of marginal effects of openness on financial development

(a) Marginal effect of trade openness

	Mean Financial Openness	Minimum Financial Openness	Maximum Financial Openness
For over all countries			
<i>Without Inst.</i>			
Private Credit(Model 1)	0.0904	0.1899	-0.0570
Liquid Liab.(Model 3)	0.0245	0.0814	-0.0597
<i>With Inst.</i>			
Private Credit(Model 4)	0.0101	0.0451	-0.0418
Liquid Liab.(Model 6)	0.0183*	0.0617*	-0.0459*
For lower-income countries			
<i>Without Inst.</i>			
Private Credit(Model 7)	-0.0167	-0.0011	-0.0566
Liquid Liab.(Model 9)	-0.0178*	-0.0094*	-0.0394*
<i>With Inst.</i>			
Private Credit(Model 10)	-0.0222*	-0.0057*	-0.0644*
Liquid Liab.(Model 12)	-0.0277*	-0.0034*	-0.0900*
For lower middle-income countries			
<i>Without Inst.</i>			
Private Credit(Model 13)	-0.0058*	-0.0123*	0.0030*
Liquid Liab.(Model 15)	-0.0034*	-0.0273*	0.0286*
<i>With Inst.</i>			
Private Credit(Model 16)	0.0066*	-0.0284*	0.0534*
Liquid Liab.(Model 18)	0.0020*	-0.0472*	0.0676*
For upper middle-income countries			
<i>Without Inst.</i>			
Private Credit(Model 19)	0.0212*	-0.1480*	0.2307*
Liquid Liab.(Model 21)	0.0623*	-0.0326*	0.1797*
<i>With Inst.</i>			
Private Credit(Model 22)	0.0031*	-0.0775*	0.1029*
Liquid Liab.(Model 24)	0.0078	-0.1286	0.1797

(b) Marginal effect of capital account openness

	Mean trade Openness	Minimum trade Openness	Maximum trade Openness
For over all countries			
<i>Without Inst.</i>			
Private Credit(Model 1)	-0.1989	-0.1123	-0.2647
Liquid Liab.(Model 3)	-0.1045	-0.0551	-0.1422
<i>With Inst.</i>			
Private Credit(Model 4)	-0.0512	-0.0207	-0.0744
Liquid Liab.(Model 6)	-0.0935*	-0.0558*	-0.1222*
For lower-income countries			
<i>Without Inst.</i>			
Private Credit(Model 7)	-0.0677	-0.0550	-0.0783
Liquid Liab.(Model 9)	-0.0508*	-0.0439*	-0.0565*
<i>With Inst.</i>			
Private Credit(Model 10)	-0.0382*	-0.0248*	-0.0494*
Liquid Liab.(Model 12)	-0.0396*	-0.0198*	-0.0561*
For lower middle-income countries			
<i>Without Inst.</i>			
Private Credit(Model 13)	-0.0390*	-0.0439*	-0.0354*
Liquid Liab.(Model 15)	-0.0099*	-0.0281*	0.0035*
<i>With Inst.</i>			
Private Credit(Model 16)	0.0162*	-0.0103*	0.0358*
Liquid Liab.(Model 18)	0.0237*	-0.0135*	0.0512*
For upper middle-income countries			
<i>Without Inst.</i>			
Private Credit(Model 19)	0.3964*	0.2548*	0.4887*
Liquid Liab.(Model 21)	0.2827*	0.2034*	0.3345*
<i>With Inst.</i>			
Private Credit(Model 22)	0.1937*	0.1263*	0.2377*
Liquid Liab.(Model 24)	0.3701	0.2559	0.4446

According to Rajan & Zingales (2003), government interventions in financial markets are minimized when an economy is open to trade and capital flows. This minimum intervention puts industrial incumbents directly in the face of competition to obtain external finance. This situation forces industrial incumbents to search for cheaper funds; naturally, they tend to look toward international financial markets. The long-term relationship between industrial and domestic financial incumbents does not help finding new sources of finance, as financial incumbents usually push for more transparency and disclosures from industrial incumbents. On the other side, if domestic

financial incumbents lose their existing customers (industrial incumbents), they have to look for new customers, such as private enterprises. However, these private enterprises do not enjoy healthy credit scores and, ultimately, financial incumbents have to ask them to be more transparent and obtain their risk profiles. For this reason, both industrial and financial incumbents tend to push for financial development.

In the first panel of Table 4.10 (a), for example, for the overall income group, the values [0.1898–0.0569] mean that the marginal effects of trade openness on the PC (size indicator) at the minimum and maximum levels of financial openness range from 0.1898 to -0.0569, respectively, in all the years for our sample. Similarly, the first panel of Table 5(b) [-0.1123–0.2647] indicates the range for the marginal effects of financial openness at the minimum and maximum levels of trade openness. At the mean level of CAO, the derivatives of our two proxies' indicators are positive for the overall countries in all models. The same is also true for the models having INS along with openness (models 4 and 6). In fact, for both cases (i.e., with and without institutions), the effects of the derivatives exhibit same behavior in terms of their signs at the mean level. The same is true for the marginal effects evaluated at the minimum level of financial openness. Only when observing them at the maximum level did the derivative become negative. The marginal effects of CAO at the mean, minimum, and maximum levels of TOP are reported in upper panel of Table 4.10(b). The marginal effects in all models assume negative values for both indicators at the mean, minimum, and maximum levels of trade openness. The results at the minimum and average levels were exactly opposite to what we observed in the case of financial openness in terms of the signs of the derivatives. This mean that, for the overall countries, our results do not approve the strict or the loose version of the RZ hypothesis. The findings do not offer much explanation as to why such an outcome was possible. It is worth mentioning that, except for model 6 in this group, other interaction terms were insignificant⁵. The next section focuses on the three income groups for a possible meaningful result.

⁵The asterisk with the values show if the interaction term was significant in the regression and does not show the level of significance associated.

When observing countries by income groups, the results became more interesting. At mean CAO, for low-income group, the derivatives of FD indicators with respect to TOP were negative, as well as for the minimum and maximum levels of CAO. The signs of derivatives were the same for both types of indicators with and without INS. It should be noted that the results at the average and minimum levels in low-income countries were opposite to those found in the case of the overall country group for the marginal effects of TOP. On the other side, for both indicators and models—with or without INS—the derivatives of the financial indicators with respect to CAO were all negative at the average, mean, and maximum levels of TOP. The signs of the marginal derivatives for TOP exactly matched, as was the case for the overall group. This is a very strong result for low-income countries and completely rejects the RZ hypothesis. In other words, not only the simultaneous opening of trade and financial openness but also even a single type of TOP or CAO does not improve the level of FD.

For the third group—lower middle-income—we observed mixed results. At mean level of CAO, for the first proxy (models 13 and 15), the marginal derivatives of FD with respect to TOP were negative. At the minimum level, the derivatives were still negative and became positive at the maximum level of CAO, which means that there was some level of CAO where the marginal derivative changed sign. For the second model with institutions—with 16 and 18 in the same group—financial indicators had a positive derivative at the average level of CAO, whereas at the minimum level, the marginal effects were negative, as was the case for the first proxy for the same minimum level of CAO. On the other side, the marginal effects were positive at the maximum level of CAO for both indicators where INS was included. Looking at the marginal effects of CAO for the lower middle-income group, we observed mixed results as well. At the mean level, for models 16 and 18, the signs of the marginal derivatives of the financial indicator were positive, but the signs were negative only for models 13 and 15. At the minimum level, for all models, the signs were negative. Similarly, at the maximum level of TOP, all the marginal effects exhibited positive signs and values except for model 1. The results indicate the existence of the strict version of the RZ hypothesis

only for models 15, 16 and 18. For model 13, we have some evidence in favor of the loose version of the RZ hypothesis.

For the last income group, we observed clearer results, as the marginal derivatives of FD with respect to CAO for all models were positive at the mean, minimum, and maximum levels of TOP. However, the same situation do not exist for marginal derivative with respect to trade openness. The healthy outcome is that at minimum level of financial openness marginal derivative is negative and as we move to average and maximum level it becomes positive—a result that was desirable to validate the strict version of RZ. Translating both marginal derivatives, the finding means that opening up may benefit these countries in promoting financial market development further. Therefore, for this group, we can conclude that the loose version of the RZ hypothesis may be more relevant.

A point of interest in the results relates to the negative values at the maximum level of openness for the overall and low-income countries. Similarly interesting is the case when one of the coefficients for the marginal effects is negative and the other is positive. As mentioned earlier, it would make sense to evaluate the derivatives within the group for the sample countries to look for a case where sign of the derivative varies with the degree of openness. Reviewing the results, it becomes apparent that, for the overall group, the marginal effects of financial openness on either size or efficiency measure of FD was negative for all levels of TOP for all countries. In other words, as the degree of trade openness increased, the marginal effects of financial openness remained negative by and large. Only one country showed some positive years, such as the case where institutions were not included and the size measure of the financial indicator (i.e., Nigeria in 2000).

Furthermore, examining the within-sample variation for the marginal effects of trade openness at different levels of financial openness revealed interesting result. For all countries in the sample group, we observed a change of sign from positive to negative as level of CAO increased. This phenomenon means that countries such as Suriname, Guinea, Malawi, and so forth, which are financially closed, can benefit from more open financial markets. However, for more financially open countries in the same group,

such as Panama, Gambia, Peru, and Guyana, additional financial openness can clearly hinder the financial efficiency and size measure of FD. There is only one country—Nigeria—for which the loose version of the RZ hypothesis was valid for only one year (2000).

In the low-income group, we did not observe a change of sign. For both types of openness, the marginal effects were all negative for both size and efficiency measures. This finding may mean that these countries do not benefit by opening either financially or in terms of trade. However, in another context, one could conclude that these countries' trade and capital account openness is not up to a level that can provide them with the required benefits. In such contexts, low-income countries can benefit if they open financially or trade-wise. However, a strict reading of the results of the current research does not validate either the loose or the strict version of the RZ hypothesis.

In the case of the lower middle-income countries, the marginal effects of financial openness were positive for models 15, 16, and 18 at the maximum level of TOP. At the average level of trade openness, the marginal effects were positive for models 16 and 18 only. For the same level, the marginal effects were negative for models 13 and 15. At the minimum level, we observed a negative sign for the marginal effects. On the other hand, the signs of the marginal effects of trade openness were positive for the maximum level of CAO and negative for the minimum level of CAO. At the average level, we observed mixed results, as the corresponding values were negative for models 1 and 3 and positive for the remaining two. From models 15, 16, and 18, we can conclude that more openness can benefit financial market development. Looking at the within-sample variation, for efficiency measure, we have some evidence for the RZ hypothesis in countries such as Nicaragua, Yemen, Armenia, Zambia, Guatemala, El Salvador, Egypt, Mongolia, Kenya, Indonesia, Bolivia, Cambodia, Sri Lanka, the Philippines, and Honduras. The results for the countries above hold when we include INS.

For the last group—the upper middle-income group, we also uncovered interesting results. The marginal effects of financial openness were positive for the varying degree of trade openness for both the size and efficiency indicators—both with and without institutions—at the maximum, minimum,

and average levels. However, the marginal effects of trade openness changed sign for both indicators of FD. For all these estimations, the marginal effects of trade openness on the size and efficiency indicators steadily increased, and the signs of the derivatives changed from negative to positive as a result of increased financial openness across the countries. At the minimum level, the signs for all models exhibited negative signs, which changed to positive values at the maximum level of CAO. The results clearly indicate the validity of the loose version of the RZ hypothesis for this group of countries.

Four important results can be drawn from above results. First, the marginal effect of financial (trade) openness on different indicators of FD were not much different in their impact. In other words, the marginal effects of trade (financial) openness on the size indicator were nearly same as their effects on the efficiency indicator as a result of increased financial (trade) openness. The same was true for most of the other variables with an impact on FD. Second, the variables, including openness, did not affect the countries alike. Alternatively, across different income groups, our results suggest a varying impact of the variables discussed above. This is a very strong result, as it indicates that countries should be assessed for openness individually or that they should be combined in groups more wisely. Another important outcome to indicate is that our results are strikingly different across income groups as compared to the overall group. This fact questions the results reported in other studies that employed a panel of countries, especially the studies by Baltagi et al. (2009) and Law & Demetriades (2006). These studies above also assessed the RZ hypothesis in a panel framework but without taking into account differences in income or openness across countries. Third, the marginal effects of openness on financial development differed substantially across various income groups for our sample. Except for the low-income group, openness had marginal positive effects on the size and efficiency indicators of FD on average across the countries, which is even more true for more open countries in the sample groups. For low-income countries, we did not observe this outcome. For this particular group, even more open countries did not experience any positive effects in terms of the FD indicator. The positive result for the high-income group and more open countries can find

its explanation from interest group theory, according to which the attitude of incumbents changes when a country reaches certain levels in terms of CAO and TOP. In our results, the fact that marginal effects of openness on size and efficiency indicator changed sign from negative to positive reflect this change in the attitude of incumbents. With the rise in openness, the original monopoly positions of the financial and industrial incumbents start to weaken, along with the opposition. Therefore, the impact of interest groups on FD is subject to the degree of openness.

Fourth, although openness has positive marginal effects on FD for the lower middle- and upper middle-income groups in the most open countries, there are also a number of closed countries within these groups that may be suffering from “incumbent opposition”. Similarly, for lower middle-income countries, the marginal effect of financial openness on FD is different when INS is included or not included. In the case when INS is not included, we did not observe changes of sign the efficiency indicator, which means that the marginal effects of financial openness decline as a result of increasing trade openness. For the other cases where INS was included, we had a clear change of sign from negative to positive for both the size and the efficiency indicator. The result for this setting indicates that, for countries with a low level of trade openness (e.g., India, Bangladesh, Pakistan, and Sudan), a rise in CAO improves FD, and this effect grows as TOP rises. If we observe the marginal effect of TOP for both the size and the efficiency indicator in the presence or absence of INS, we can see that the signs of derivatives change from negative to positive as a result of increasing CAO. Therefore, in countries such as Ukraine, Ghana, Pakistan, Bangladesh, India, Cameroon, Morocco, Ivory Coast, Bhutan, Tunisia, Swaziland, Congo Rep., Moldova, Tajikistan, Vietnam, Nigeria, and Sudan, which suffer from low levels of capital account openness, can benefit in the form of FD by increasing TOP. A similar pattern was observed for upper middle-income countries when we observed the marginal effects of TOP at varying levels of CAO. For upper middle-income group countries such as Suriname, Belarus, Belize, China, South Africa, Algeria, Kazakhstan, Gabon, Fiji, Grenada, Turkey, Azerbaijan,

Thailand, Colombia, and Macedonia can benefit in terms of FD by increasing TOP.

It can be reasoned that countries with a lower level of TOP and relatively more CAO may experience more financial repression, thus reducing the finances for the private sector and resulting in loan subsidies to government-preferred sectors (i.e., industrial incumbents). The negative values for the marginal effects of TOP on FD suggest an uneven distribution of financial resources among trading firms (industrial incumbents). Overall, for lower middle- and upper middle-income countries, the sign changed from negative to positive for both the size and the efficiency indicator, with or without INS, which indicates that FD can be improved by opening trade accounts further.

However, the results above clearly demonstrate that, because of the variation in financial and trade openness, we cannot draw a definitive conclusion regarding the RZ hypothesis for a single group. Across the groups, we uncovered different results, so it is also difficult to declare one group to be a representative group. Therefore, we tested the RZ hypothesis group by group. With the exception of the low-income group—where our results led to a clear rejection of the RZ hypothesis—our results support the loose version of the RZ hypothesis for upper middle income countries and partially strict version for lower middle-income countries.

Our results also partially explain those of Baltagi et al. (2009), who found that relatively closed economies can benefit from liberalizing their trade and financial sectors. Our varying results across groups of countries are also in line with a study by Kim et al. (2010), who were of the view that the effects of TOP are not unique across low income and high-inflation countries. For the case of CAO, our findings indicate that, starting from the lower middle-income group, CAO did affect FD. Our results indirectly point toward the outcome of a study by Chinn & Ito (2006), who analyzed a data set of 108 countries and discovered that CAO does cause FD to improve once a certain level (threshold) is crossed. In our case, the group of countries had different average levels of capital and trade account openness. For low-income countries, the average level is the minimum in all groups. Our results thus

indicate that CAO only affects FD if the average level crosses a minimum point (for instance starting from a lower middle-income group average score).

Our results for different income categories are also partially in line with the findings of Law & Demetriades (2006). Using the data from 43 developing countries and applying panel and pooled techniques, their study revealed that openness (in terms of trade and capital accounts), as well as institutions, does play a role in promoting FD. The study used both bank- and stock market-based FD indicators, and their findings remain valid for both types of indicators (Law & Demetriades 2006). Another finding of their paper also matches with ours regarding how INS and TOP affect developing countries differently, and they also found that, in low-income countries, the variables above affect FD significantly less than was the case in middle-income countries. Finally, on the relationship between INS and FD, our results also support the views put forward by Fergusson (2006), who conducted a comprehensive literature review—both theoretical and empirical—to conclude that the institutional characteristics of a country do influence the level of FD. However, this effect heavily depends on how the INS shapes up overtime. Therefore, if for a specific country or group of countries INS does not seem to affect FD, then one should study the historical and political characteristics that have resulted in the formation of such institutions.

Our results are also closely related to those of Zhang et al. (2015), who tested the RZ hypothesis for the case of China. Their study was based on a panel consisting of 30 provinces of China. The researchers tested the RZ hypothesis by calculating the marginal effects and testing for both the strict and loose versions. Using the dynamic panel-estimation technique, they concluded that both financial and trade openness are significant determinants of FD. However, their results are only applicable for two measures of FD, namely efficiency and competition indicators. For the size indicator, they discovered a negative effect of financial and trade openness. In addition, for China, local incumbents' opposition was found to be hindering the development of financial markets (Zhang et al. 2015). However, our findings differ from their study because their results suggest a different impact of the marginal effects on different indicators for FD: The openness hypothesis is unsupported for the

size indicator but receives empirical support for the efficiency and competition indicators.

In summary, our results seem to indicate that the potential determinants affect the level of FD differently for each income group. The least open countries (in our case, low-income countries) do not benefit from simultaneous opening of TOP and CAO. However, for upper middle- and lower middle-income countries, our result suggest that simultaneous opening can benefit FD, and in this context, the loose and strict version of the RZ hypothesis seems to be valid.

4.5 Conclusion

Several researchers have examined the link between financial development and economic growth. Despite the extensive literature on the topic, there is not much research available looking into the more fundamental question of what determines financial development. This chapter is an attempt to add to the literature by identifying some potential determinants of financial development. In this regard, the RZ hypothesis was tested in a framework that had not been tried before. We categorized the countries into different income groups and tried to identify the plausibility of the hypothesis mentioned above. Other variables, apart from the Rajan and Zingales argument, were collected from literature. Our study also estimated the potential determinants for all countries as an overall group. Within each group, we created a simple model based on the RZ hypothesis and then tested it with and without institutions. To accomplish this, we gathered data on 93 countries for the period 1996-2015 on an annual basis.

Our results indicate that, for each income group, the outcomes varied, and determinants affected financial development differently. For the overall countries, we found mixed evidence for openness. Financial openness seemed to affect financial development for this group. However, growth was the only variable that had a positive effect on financial development. Across different income groups, our results indicate that, for lower middle- and upper middle-income groups, openness did affect the level of financial development

positively. For the same two groups, we found simultaneous opening to be beneficial. The results suggest that the other variables started to have positive effects as soon as the average exceeded the low-income group; starting from lower middle-income group, they mostly affected FD positively. For the upper middle-income group, most of the economic variables influenced financial development positively.

We found mixed evidence for the RZ hypothesis across groups. While simultaneous opening may have a larger effect on the level of financial development of countries that are relatively more open and have higher incomes, it does not appear to be a necessary condition for other income groups. Overall, in most groups, we found a loose version of the RZ hypothesis to hold. This could be good news for policy makers who face domestic political pressure not to open up to the world, especially both accounts at a single time. Moreover, our results indicate that institutions seem to have independent impacts. The empirical evidence also supports the contribution of political economy factors in improving FD; however, the results presented above are only valid for the overall and lower middle-income groups.

Chapter 5

Determinants of Financial Integration: A Panel Quantile Regression Analysis.

Abstract: Many scholars have argued that the degree of financial integration has increased, especially in last two decades, making this subject an important area of research. Many theories associated with this topic look into the advantages, disadvantages, sequence, and conduct of monetary policy in a financially integrated area. This study represents an effort to discuss financial integration in a manner different than what is mostly discussed in literature—namely, to identify the determinants of financial integration. Different economic, legal, and financial variables were gathered. Finally, capital account openness, growth, level of education, trade openness, financial market development, and level of institutional quality were selected as variables. Overall, the results provide support that the above-mentioned variables are potential determinants of financial integration. However, these results are valid only if these variables have crossed some minimum values. The results indirectly favor the threshold argument for financial integration.

5.1 Introduction

The literature on financial integration (FI) provides conflicting views on its role toward different economic variables, such as economic growth, poverty, the quality of institutions, and especially improving financial development. The theory on FI suggests improving capital allocation, economic growth, and production specialization (Obstfeld 1994; Daron Acemoglu and Fabrizio

Zilibotti 1997). On the other side of the theoretical literature, FI tends to increase the capital flows and allow risk sharing at an international level, but at the same time, it exposes an economy to financial risks, especially financial crises. When these theories are put to the test, there is mixed evidence. Boyd & Smith (1992) asserted that countries with low institutional quality cannot reap the benefits of FI. For these countries, they argued that FI can result in an outflow of capital. Bekaert et al. (2005) and De Nicoló & Tieman (2006) documented the positive effects of FI on growth, whereas Edison et al. (2002) and Kelesego & Abdullahi (2015) discovered the same effect for some individual countries.

Today, many economists believe that countries have become more financially integrated as compared to thirty years ago. This development has happened because countries, since the end of the 20th century and the beginning of the 21st century, have been in the process of bringing reforms to the financial sector, thereby reducing restrictions on the cross-border movement of capital. Agénor (2001) and Lane & Milesi-ferretti (2003) found the same for transition economies in East Asia, Latin America, and Eastern Europe. These countries have not only removed or reduced the barriers but also reformed their financial systems. The reduction in capital controls are also at the lowest point in 50 years for OECD countries (Epstein & Schor 1992), while Prasad et al. (2003) argued that financial linkages between developing countries and the rest of the world have also increased in recent years. This has resulted in greater capital flows to developing countries (Pierre-Richard Agénor 2004). In that context, FI is viewed as access to world capital markets, which increases the opportunities for investors and provides them with better and less risky returns. A major argument in favor of FI is consumption smoothing (Obstfeld 1994) in times of shocks, resulting in growth and welfare gains. On the other side of the spectrum, there are studies that debate the measurement issues related to FI. In this context, earlier studies have addressed the measures of FI for benchmarking (Edison et al. 2002; Vo et al. 2005), while recent studies have focused more on its impact on economic growth and other variables.

Given its importance, FI has attracted the interest of many financial economists. The literature indicates mixed results of FI and its possible impact on economic variables. The objective of this chapter is to empirically investigate the determinants of FI. We hope to show that, as FI is not advantageous for less developed countries as suggested by some authors, the same argument can be made from the other side of the picture—that major economic indicators may not be ready or have not arrived at a level that can yield positive results from FI. In other words we want to test the hypothesis that there is a level associated with potential determinants that will affect FI. To accomplish the objective described above, the current study uses data from 93 countries for the 1996-2015 period using the generalized method of moments (GMM) and quantile regression (QR) to confirm or reject the hypothesis above. In this chapter, we will take a different course of action as compared to previous studies by first testing through GMM the impact of different economic variables on financial integration. This is to be carried out on all countries as a group as well as in subgroups made according to income level. By making the above groups we are taking the view that the degree of financial integration changes with economic conditions¹. Unlike the threshold literature, where one or two variables are assessed for a possible critical value, the current study examines numerous economic variables, similar to Von-Furstenberg (1998). By using numerous variables, we also recognize that successful FI is the end result of an organized process that requires both formal and practical elements of policy that allow financial markets to perform securely and competitively. Also, Kearney & Lucey (2004) pointed out that FI is the result of increased trade and the exchange of services among countries. Therefore, naturally, there are other economic variables involved than just lifting legal barriers. Hence, we will take trade openness, capital account openness, the level of education, the quality of institutions, and financial market development as some of the potential determinants of FI.

The results of this study may be of use for policy formation, especially for countries with varying levels of economic conditions. This research should

¹Overall economic conditions are measured through the income levels on the basis of which the subgroups are formed.

also provide insights for policymakers regarding when countries go global or what variable or group of variables they should be focusing on to reap the benefits arising from FI. It is also applicable for countries wanting to make a monetary union or want to begin a partnership with other countries. This study will contribute to the existing literature with an improvement regarding to the number of countries used and the methodology. The use of quantile regression on a group of countries divided on the basis of income level may provide more insights into the theory of FI and identify the group of countries most likely to benefit from FI, those who do not benefit, and what measures they can take to start benefiting from it. The use of GMM along with QR on panel data for FI will reduce bias caused by data and specification issues, resulting in better and reliable results. The remainder of this chapter is outlined as follows. Section 2 contains a literature review. Section 3 presents a definition of the estimation technique along with the potential determinants used. Section 4 outlines the results, followed by conclusion in section 5.

5.2 Literature Review

The literature on FI can be divided into four major strands. The first strand of the literature attempts to define FI and its measurement issues. The second strand of the literature discusses the question of how much countries are integrated, as well as whether the level of this integration is higher or lower as compared to the past (the degree of FI). The third strand of literature focuses on assessing the effect of FI on different economic variables (e.g., growth, financial market development, investments, portfolio risk, and trade). The fourth strand concerns FI's impact, if any, and what the determinants of FI might be. It is relevant to note that, while considerable literature is available on the first three strands, the fourth one has received the least amount of interest from researchers, possibly due to measurement issues or lack of an appropriate methodology to assess this type of question.

The literature on FI suggests many definitions for the term. The most relevant and quoted is that of Baele et al. (2015), who assumed that following two characters, a group of two or more markets can be said to be integrated

if (i) all markets face a single set of rules when they have to decide about a certain financial product or service, (ii) equal access is applicable for all the countries in a group, and (iii) all countries are treated equally and none of them have an edge over others. The characteristics above indicate that FI is not dependent on the financial structures of the individual countries. How the cash flow between institutions, governments, and individuals is also irrelevant. The important point is that they face equality in terms of rules and regulations. Furthermore, the definition of FI does not rule out the presence of frictions in financial markets.

What FI shows is that the above restrictions may be faced by every country and institution. In the presence of asymmetric frictions, FI cannot complete its natural course and will remain under-integrated. Similarly, FI also requires that investors and borrowers can access any market and institution having no edge or discrimination on the basis of location or any other factor. Based on this argument, a region can range from fully to partially financially integrated.

Oxelheim (1990) and Puja et al. (2004) identified FI to be of different types. Total integration refers to the case where interest rates (real) become equal for all the markets. Direct integration, also known as capital market integration, is usually defined in terms of deviations in price of the securities with reference to the law of one price. If the returns (risk-adjusted) on a security are not uniform across different markets but differ less than or equal to the transaction cost, the markets are said to be efficient but not integrated. Segmented financial markets consist of cases where FI is almost 0 (a case of perfect disintegration), which can occur due to the high costs of doing arbitrage, or it can be due to some other market inefficiency (Puja et al. 2004).

Baltzer et al. (2008) demonstrated that FI closely resembles the idea of the law of one price². Brouwer (2005) stated that FI is the process through which the financial markets of an economy become closer (in terms of rules and regulation) to the markets of other countries or those in the rest of the

²Law of one price states that any asset with same returns and risk profile shall trade at identical price on two different locations. If the law does not hold then there is always arbitrage opportunities available.

world. In a report by United Nations Commission for Africa (2008)³, viewed FI as a process of removing all or some restrictions on foreign institutions engaged in financial transactions, allowing free movement of capital to and from the countries having these institutions. Ho (2009) also believed that FI is necessarily a process through which two or more than two countries harmonize their regulations on financial transactions and also form a joint action in case of a financial disturbance or crisis. According to Ho, both of these measures are necessary to achieve full-scale FI.

Baele et al. (2015) identified three main benefits of FI. First, it increases the opportunities for risk sharing. Second, better allocation of capital, and third, it raises the quality of financial institutions in terms of the services FI offer by introducing competition and new techniques. Jappelli & Pagano (2008) also viewed FI as improving risk sharing through more opportunities available across regions. In this way, country-specific risk can be diversified away.

Kalemli-Ozcan et al. (2008) analyzed the Euro area banking system integration and concluded that banking integration does increase consumption risk sharing, thereby reducing risk significantly. Levine (2001) stated that FI allows a better allocation of capital since more opportunities become available for the freed-up capital. The resulting allocation improves the growth process. Giannetti et al. (2002) also expressed a similar view regarding the relationship between FI and economic growth. Lane & R.Lane (2000) found that, for a sample of 19 countries, more open countries hold higher numbers of foreign assets and liabilities.

Kaur & Singh (2014) analyzed three East Asian countries (China, Japan, and South Korea) for possible FI and indicated financial development to be a major deciding factor. According to the authors, the difference in degree of financial development among the three countries posed a challenge to FI. For integration, it was advised that the three countries look up and formalize the difference in regulatory policies, the quality of institutions, corporate governance, and trade openness.

³see Union & African (2008).

On the question related to FI and economic growth, there are many studies available, and to date, researchers have looked for an answer to this question. There were conflicting outcomes as to its answer; however Obstfeld (2009) and Mody & Murshid (2005) discovered that better macroeconomic policies and economic management are vital for a positive impact of FI on growth and investment. Arteta et al. (2003) regressed financial depth measured by the ratio of liquid liabilities to GDP and the strength of institutions captured by a law and order index calculated by the International Country Risk Guide (ICRG) on FI and concluded that strength of institutions does have a positive impact on FI. Edison et al. (2002) extended the work of Arteta et al. (2003) and used many proxies for financial depth, as well as a *de-facto* measure of FI and reached at the same conclusion. J. Chen & Quang (2014), using panel threshold models on 80 countries, concluded that FI can affect growth if certain threshold conditions are satisfied. These conditions were related to the level of income, financial development, institutions' quality, and government spending. A. D. Ahmed & Mmolainyane (2014) in a study on Botswana using the vector error correction model (VECM), concluded that FI did not affect growth. However, they managed to find a positive relation between FI and financial development. The study also pointed out that the level of government spending, institutional quality, and a stable macroeconomic environment are conducive for FI. A similar study by Ahuja et al. (2007) came to the same conclusion.

The literature on determinants of FI is not very old, and only recently has a renewed interest re-emerged. The first significant contribution can be attributed to Von-Furstenberg (1998), who, in his essay on "capital mobility and international financial integration", argued that there are pre-requisites to FI. He pointed out that institutional and mutual confidence reinforced with reputation are needed as prerequisites for FI. Levine et al. (2000) reported a strong relationship between economic growth and financial institutions, concluding that financial development has the ability to encourage foreign direct and indirect investment that can help in fostering the relationship between domestic and foreign financial markets. In turn, it increases the prospect of FI and thus helps in growth. Portes & Rey (2005) identified

GDP, market capitalization, financial market development as positive determinants, whereas Information asymmetries and higher transaction costs have a negative relation with bilateral equity flows. Martin & Rey (2006), for trade flows, found the size of economies and transaction costs to be positively related. Lane & Milesi-ferretti (2003) examined the determinants related to a *de-facto* measure of FI for organizations for countries related to the Organization for Economic Co-operation and Development (OECD). They identified restrictions on financial markets, its depth, and openness to trade, to name among few, as important determinants.

Vo & Daly (2004) provided strong evidence, through a panel estimation of 79 countries for the period 1980-2003, that capital control, trade openness, growth, and financial market development are important determinants for FI. However, their research failed to take into account the regime change in financial markets that happened in the 1990s. Also, when the countries are taken into a panel, there is no distinction between the countries as to their income or level of FI. Garali & Othmani (2015) also demonstrated that, for the Middle East and North Africa (MENA) region, trade openness, exchange rates, and economic growth positively explain the degree of FI. Their findings indicate that financial instability, inflation, taxes, and the level of education do not affect FI. On the other hand, the study mentioned above has methodological problems, such as the application of OLS on a panel of countries, which is not appropriate because of country heterogeneity. Moreover, out of the 21 MENA countries, they only took a sample of eight countries, which greatly reduces scope of the study. For the same MENA region, Neaime (2002) demonstrated that MENA markets had weak integration with the rest of the world markets. The study used the co-integration technique to reach at their conclusion. De-Gregorio et al. (1998) took a sample of developed and emerging economies for the 1960-1993 period to study the relationship between FI, the level of financial development, and economic growth. Their study concluded the existing of a positive relationship between the above-mentioned variables. Their study indicated the financial development channel through which FI was positively affecting growth.

Some authors explored the firm-level characteristics to act as a potential determinants in promoting FI. Wiwattanakantang (2001) postulated that FI is affected by factors of the firm, such as leverage, corporate governance, and industry. Lucey & Zhang (2011) concluded that corporate leverage has a negative effect on FI. On the other hand, Yeyati et al. (2009) concluded that large firms tend to be integrated to a high degree with international financial markets. The above and many other studies have pointed out size of the firms (Hong et al. 2007), growth in sales of an industry (Roosenboom & van Dijk 2009; Chan & Lakonishok 2004), firm performance in an industry (Jegadeesh & Livnat 2006; Lee et al. 1991), and leverage (Lucey & Zhang 2011) to be important determinants of FI. Others (Jian et al. 2011; La Porta et al. 1999; Faias & Ferreira 2017; Gillan & Starks 2003) have indicated corporate governance and its elements to be important determinants. The elements of corporate governance include the presence of large shareholders, earning management, and the level of institutional shareholders in a market. M.-P. Chen et al. (2018) also explored the firm-specific characteristics, such as corporate governance and American depository receipts, using data on 33 Japanese firms, and concluded that the above characteristics do have a positive relationship with FI.

According to Levine (1997) the financial system facilitates financial transactions occurring within and across countries⁴. Financial development can play its role in allocating capital optimally. Therefore, in a sense, FI and financial development are related. Brezigar-Masten et al. (2011) assessed the role of financial development and FI on growth for European countries and found both of the variables to affect growth positively. They concluded, on the basis of their results, that a high degree of financial openness tends to reduce the negative effects of financial crises by providing liquidity. Another result they formulated was about the view that countries that rely on international flows become more vulnerable to financial crises is not necessarily true (see also Fetai 2015). A. D. Ahmed (2016) looked at the financial development–FI growth nexus for 30 Sub-Saharan African countries. The study used a

⁴Many authors have pointed out that there is a positive relationship between financial development and economic growth.

dynamic panel technique (GMM) and showed a positive relation between financial development and economic growth. However, on the association between FI and growth, the study found a negative relationship. At the same time, A. D. Ahmed (2016) found a positive relation between FI and financial development. On the basis of these results, these author claimed to have observed an indirect effect of FI on growth through the financial development channel. Portes & Rey (2005) provided evidence that cross-border capital flows are affected by financial market size and frictions in acquiring information. Henry (2000a) and Henry (2000b) also found a strong relation between development of financial markets and FI.

Capital account liberalization is the process of relaxing the cross-border flow of money. Its degree can vary from 0 to a high, where high degree refers to the free mobility of capital. As many authors have indicated, FI is influenced by the degree of liberalization of capital accounts. For example Lane & Milesi-ferretti (2003) suggested that the flow of cross-border capital should increase if capital account is liberalized. Others (Prasad et al. 2003; Vo 2005) have also suggested that liberalization of capital accounts is a prerequisite for FI. Some authors have also looked into whether FI with or without trade openness is beneficial or not. Cavallo et al. (2008) and Martin & Rey (2006) suggested that FI without trade openness can lead to financial crises.

The level of economic growth has also been suggested as a determinant of FI. The Institute of Finance (Finance. 2003) listed economic growth as a determinant of FI. Vo & Daly (2004), in an interesting study, identified an inverse relationship between capital flows and economic growth. According to these authors, it is growth that affects the flow of capital and not the other way around. Similarly, Edison et al. (2002) and Prasad et al. (2003) indicated that countries with a high per capita income and a substantially high level of education are more likely to be highly integrated.

Von-Furstenberg (1998) stated that mutual trust among countries plays an important role for the cross movement of capital. FI will build trust among investors engaged in some venture, especially outside their own region or country. This mutual trust and credibility can be judged from the political and legal environment of a country. La Porta et al. (1997) also declared

that creditor and shareholder rights, as well as the level of enforcement, determine the structure of finance. Capital markets of those countries with better quality of creditor and shareholder right and quality of enforcement are more likely to have broad financial markets as compared to countries scoring less on the above rules. Some scholars (Acemoglu et al. 2003; Blackburn & Forgues-Puccio 2010; Mishkin 2006; Ju & Wei 2010) have asserted that it is the level of enforcement, security of private property, and an overall effective legal system that determine the efficient allocation of resources.

According to Lane & Milesi-ferretti (2003), trade openness may potentially promote FI because, the exchange of goods directly involves financial transactions (e.g. letters of credit, insurance, etc.). The openness in goods markets, in turn, increases the willingness to engage in cross-border financial transactions.

5.3 Empirical Analysis

For the empirical analysis, the first difficulty is to appropriately measure FI. In this context, there are two types of indicators used for benchmarking: *de-facto* and *de-jure* indicators. The latter are used as a proxy for the causes of FI and the former are used to measure the consequences resulting out of FI. Vo (2005) offered other proxies that involve testing correlations between macroeconomic variables.

To measure FI, we proxied FI with aggregate stock of foreign direct investment (FDI) and portfolio investment (PI) as a share of gross domestic product (GDP). The use of this proxy categorizes it as a *de-facto* measure. Previous research studies, such as that of Alesina et al. (1993), as well as Epstein & Schor (1992) have used proxies for measuring FI, which are not good measures because they used dummies that do not reflect the actual flow of capital that resulted because of the opening process. With the use of *de-facto* indicators, it is also recognized that FI is a result of an organized process through which several measures, both at the institutional level and the economic level, are taken to allow the financial markets to be competitive and secure at the local and international levels. Kearney & Lucey (2004)

also contended that increasing international trade, services, and financial assets among the countries has made them more integrated both in terms of commodities and finance.

To look at potential determinants of FI, we looked at a wide array of variables derived from the literature, such as those proposed by Hubbard (2005). Following Hubbard (2005) work, we collected a large number of variables and then finally selected GDP per capita (GDP), capital account openness (FAO), level of education (EDU), trade openness (TOPEN), and the level of financial development measured by domestic credit to the private sector. Among the above, TOPEN is considered as a potential determinant of FI by many authors, such as Lane & Milesi-ferretti (2003). We measured TOPEN as an index–ratio of trade to GDP. Moreover, FD was considered as a factor that can determine FI, as in the work of Portes & Rey (2005) and Henry (2000b). In current study, we also explored financial development(FD) as a potential determinant by measuring it through the ratio of domestic credit to GDP. The measurement of FD by the above ratio is a standard practice in the literature (for more information see Levine 1997; Čihák et al. 2012; Beck et al. 2000). Similarly, following the work of Acemoglu et al. (2003), Blackburn & Forgues-Puccio (2010), Mishkin (2006) and Ju & Wei (2010), who demonstrated that an overall effective legal system has the ability to determine the efficient allocation of resources, we measured the legal environment by taking the quality of institutions (INST) into account. We measured this variable by combining the corruption, government enforcement, rule of law, effectiveness of government, and political stability scores as calculated by world governance indicators. These figures were summed up and averaged because these estimates are in the form of an index, and the values they assumed have little variability. Another reason was that individual series across countries are so close that there is no variation for these series. The variables were taken for the log to eliminate heteroscedasticity. The main source of the variables above is World Development Indicators (WDI).

We took a panel of 93 countries and adapted a dynamic panel GMM method to assess the impact of determinants of FI. To scrutinize the countries further, we divided them based on the income into three groups and estimated

the individual and full group with QR. Therefore, we used both panel GMM as well as panel QR to reach some conclusion.

5.3.1 Estimation Methodology

We tried to assess the various economic indicators for possible determinants of FI. For this purpose, we used both cross-sectional and time-series characteristics of the data. This is equivalent of using panel data that allow for the control of heterogeneity (individual). In order to do so, GMM was used initially to make most use of both time-series and cross-sectional dimensions of data⁵. Specifically, we employed GMM as developed by Blundell & Bond (1998) and can be formulated by,

$$\begin{aligned} \ln FI_{it} = & \alpha \ln FI_{it-1} + \beta_1 \ln GDP_{it} + \beta_2 \ln FAO_{it} + \beta_3 \ln EDU_{it} + \\ & \beta_4 \ln TOPEN_{it} + \beta_5 \ln FD_{it} + \beta_6 \ln INST_{it} + v_i + \varepsilon_{it} \end{aligned} \quad (5.1)$$

We ran the above equation for three groups and for the overall sample of countries. The above form of system GMM is considered better than the previous version developed by Arellano & Bover (1995). Blundell & Bond (1998) termed this method to correct for unobserved country heterogeneity, bias arising from omitted variables, and endogeneity issues. The basic idea of the technique above is to combine the first difference regressions in a system and in levels. First, the difference takes care of unobserved heterogeneity and omitted variable bias, as well as for endogeneity, through instrumenting the right-hand side of the equation. The instrument for differenced equations is obtained from values of explanatory variables lagged at least twice, and for level equations, the lagged difference of the variables. The consistency of the GMM estimators depends on the validity of the above-mentioned instrument variables. To test the validity, Arellano & Bond (1991) and Blundell & Bond (1998) suggested two specification tests: the Sargan/Hansen test and the

⁵Unlike other studies we will not average out the data, which is normally carried out to capture the steady state relationship between dependent and independent variable. This on one side may not be able to capture the steady state relationship, but also will loose variation from the data that may result in not so accurate estimates.

AR(2) test. The null hypothesis in the case of the Hansen test states that the set of instruments used are valid for all the cases or they are exogenous. For the second test, the null hypothesis states the absence of a serial correlation. The null in both types of test should not be rejected to prove the validity.

One of the difficulties that researchers face in cross-country analyses is the problem of outliers, which are the result of heterogeneity among cross-sectional units. In simple regressions, it is easy to detect the problem of outliers with the help of a scatter plot. It becomes difficult in the case of multivariate regressions. Under outliers, OLS usually tilts toward outliers, resulting in biased results. The tilt is due to the fact that OLS assigns equal weights to all observations in the data set. There are at least two solutions proposed to deal with this kind of situation. One is to use robust estimation estimators that are not affected by outliers, such as QR, least median squares (LMS) and maximum likelihood estimators (ML estimators) (see Zuo 2005; Rawlings et al. 1998; Peter J. Rousseeuw and Annick M. Leroy 1987). In addition, QR provides a more comprehensive picture of the relationship at different conditional distributions of Y ⁶ (also see Rao & Rekha 2011). The quantile q , which has values $q \in (0, 1)$, is defined as the value of Y , which splits or divides the data into proportion q below and $(1-q)$ above it. Thus, QR provides more space to study the impact of independent variables on both scale and location parameters of the model. It also avoids the assumption about parametric distribution of errors. In other words, QR assumes that error terms may not be *iid* at all points of the conditional distribution, and slope parameters vary at different quantiles of the distribution. A simple form of the QR model can be written as in the work of Koenker & Bassett (1978).

$$y_{it} = x_{it}Z_{\theta} + \mu_{\theta it} \quad (5.2)$$

with $Quant_{\theta}(y_{it}/x_{it}) = x_{it}\beta_{\theta}$ and $0 < \theta < 1$

and y denotes the dependent variable, x is the vector containing independent variables, β represents the vector of parameters to be estimated, and μ

⁶where Y is the dependent variable and given the independent variables as Z with a mean function $E(Y/Z)$.

are residuals, whereas $Quant_{\theta}(y_{it}/x_{it})$ defines the θ^{th} conditional quantile of y given x .

Therefore, we can estimate a quantile regression model for panel data with non-additive fixed effects, as suggested by Powell (2014) and Baker et al. (2016). In our framework explained above, our QR will take the form,

$$\begin{aligned}
 Q_{\tau}(\ln FI_{it}) = & \alpha \ln FI_{it-1} + \beta_{1\tau} \ln GDP_{it} + \beta_{2\tau} \ln FAO_{it} + \\
 & \beta_{3\tau} \ln EDU_{it} + \beta_{4\tau} \ln TOPEN_{it} + \beta_{5\tau} \ln FD_{it} + \\
 & \beta_{6\tau} \ln INST_{it} + \varepsilon_{it}
 \end{aligned} \tag{5.3}$$

In above equation 5.3 is the regression parameter of τ^{th} quantile in FI. $\beta_{1\tau} \dots \beta_{6\tau}$ indicate the regression parameter of τ^{th} quantile⁷.

5.3.2 Empirical Results

In this section, we present the empirical results based on equations 5.1 and 5.3. For both equations, we also report the results of a variety of robustness checks used to test the sensitivity of results. We made groups of countries based on the level of income and for the overall group. The countries in each group are listed in Table 5.2.

5.3.3 GMM Estimation Result

In Table 5.1 we report the results from system GMM that control for possible endogeneity. The table has four columns; the first three present the results of individual groups, and the fourth one displays the overall countries. The validity of instruments was tested with a standard Hansen test, confirming the validity of the instruments. To use the right lag length of the instruments, we adopted the procedure proposed by Andrews & Lu (2001). Coefficient standard errors are robust to heteroscedasticity. AR(1) and AR(2) tests were also used, indicating the correct specification of the models.

⁷For more information on QR see Roger Koenker and Kevin F. Hallock (2001) and Cantner & Kruger (2004).

If we look at the overall country column, we can observe that capital account openness negatively affects FI, which in turn, means that capital account is not helpful in promoting FI. This result is somewhat similar to that of Arfaoui & Abaoub (2010). It is also partially in accordance with the findings of Vo & Daly (2007), where financial liberalization does not have a significant effect on FI. Vo & Daly (2007) demonstrated that capital controls do not have significant effect on FI, as its coefficient was insignificant. Our results indicate that GDP has a positive and significant effect on FI, which is in accordance with the theory that higher growth rates boost FI. Vo & Daly (2007) arrived at the same conclusion. In the literature, the level of education was viewed to play a significant role in cross-country integration, as suggested by Edison et al. (2002), and Kose et al. (2006). Our estimate for education demonstrates a significant inverse relationship between the two. The same is the case with trade openness, which suggests a negative significant effect at the 1% level of significance. The quality of institutions exerts a positive and significant effect on FI at the 1% level. It is generally argued that strong institutions are a prerequisite for FI. The level of financial development is positive but highly insignificant; financial development does not affect FI for the overall group of countries.

If we divide the overall sample into different groups according to the level of income, the results become very interesting. The first column shows the GMM estimation results for the countries that are not only low-income countries but also score low in FI based on our measure⁸. The results indicate that almost all the coefficients are insignificant with the exception of the initial level of FI, and none is even weakly significant. The lag term of FI is also significant not only in the first column but in all the three columns related to individual groups, as well as in the column related to the overall group of countries. The positive effect mainly supports the convergent theory that low-income countries tend to grow more quickly. The coefficient for the first column is 0.72, and subsequent values in remaining groups appears to be close to the above value. In the second column, only the capital account openness

⁸An analysis of the data shows that these countries also scored low on trade openness, institutional quality, education level and financial development as well.

and trade openness positively affect FI. In the same column, education exert a negative influence on FI. The results can be justified given the fact that these are the countries receiving substantial amounts of investment and trade. However, the quality of institutions has not reached a level that can influence FI. Similarly, growth is not sufficient for FI, as its coefficient is negative but insignificant. The financial sector is still not ready to contribute significantly to FI. There is a range of research that demonstrates that, for developing countries, FI can help boost financial sector development (see, for instance, Levine, 1997b). The result in the third column improves significantly for the group of countries with higher levels of FI and income levels. Capital account openness, growth, and trade openness are highly significant and affect FI positively. The quality of institutions and the level of financial development are also significant but only weakly at the 10% level of significance. Overall, the estimation suggests that all variables have the potential to determine FI.

5.3.4 Quantile Estimation Results

Each quantile can fully depict the distributional characteristics of FI. Besides, QR can reveal the marginal effects of the independent (or explanatory variables) on different quantiles of FI. The results are tabulated in Table 5.4–5.7. This chapter includes six representative quantiles according to the level of income (and so does for FI) for each income group (i.e. 10th, 20th, 40th, 60th, 80th, and 90th) to estimate with QR. The names of countries in subgroups, according to the quantiles, are listed in Table 5.2. Summary statistics related to three income groups are presented in table 5.3 (a-c).

In Table 5.4, which depicts the result for the overall countries, any reference to income group reveals mixed results for various variables on the level of FI. The coefficient FAO is significant in three quantiles (20th, 60th, and 80th), among which the positive influence was only found in two quantiles (60th and 80th). The biggest influence is in the 60th quantile (0.0752). The effect of GDP is also mixed on the level of FI, whereas in four quantiles (20th, 40th, 60th, and 80th), it is significant. The highest influence of GDP is in the 20th quantile (0.0215). A similar situation can be seen with the level of education,

Table 5.1: GMM estimation results

coeff	lower-income	lower middle-income	upper middle-income	overall
FAO	-0.3398 (0.1857)	0.1076** (0.0459)	0.0975*** (0.0288)	-0.0524** (0.0245)
GDP	0.0118 (0.0124)	-0.0058 (0.02087)	0.0228** (0.0105)	0.0864*** (0.0103)
EDU	0.0264 (0.0284)	-0.5894*** (0.1559)	0.1093** (0.0558)	-0.1933** (0.1012)
TOPEN	-0.3917 (0.2646)	0.0110*** (0.0034)	0.0025*** (0.0011)	-0.0254*** (0.0088)
FI(-1)	0.7209*** (0.2019)	0.1951*** (0.0266)	0.1431*** (0.0187)	0.2031** (0.0953)
INST	0.0234 (0.0299)	0.0344 (0.0236)	0.4041* (0.2233)	0.0482*** (0.0055)
PC	0.5702 (0.3727)	0.0283 (0.0975)	0.0388* (0.0201)	0.9689 (0.8651)
Cons	0.3756** (0.1118)	-0.4569 (0.5077)	0.0684** (0.0326)	0.2972*** (0.0378)
J-Stat	9.51 (0.218)	42.15 (0.631)	73.87 (0.58)	44.73 (0.712)
AR(1)	-1.19 (0.0233)	-3.11 (0.002)	-3.14 (0.002)	-3.58 (0.000)
AR(2)	0.3 (0.762)	-0.37 (0.712)	-0.84 (0.4)	-0.34 (0.733)
Countries	20	33	40	93
Years	20	20	20	20
Period	1996-2015	1996-2015	1996-2015	1996-2015

Notes: *, **, *** shows significance at 10%, 5% and 1% respectively. Figures in parentheses are the p-values.

where in four quantiles (20th, 40th, 60th, and 90th), it affects the level of FI significantly. In two quantiles (20th and 40th), it has a negative effect, and in the rest (60th and 90th), it has a positive effect on FI. The biggest influence is located in the 60th quantile (0.5236). The result of trade openness is also mixed, and it positively and significantly affects FI in two quantiles (40th and 90th), and in one quantile (60th), it has a negative and significant effect. The biggest effect is in the 90th quantile (0.0513). The quality of institutions is only significant in three quantiles (20th, 40th and 60th), among which the largest influence is in the 20th quantile (0.4969). In only one quantile (40th), the quality of institutions affects FI negatively. The level of financial development in most of the quantiles has a negative effect on FI (10th, 20th, 40th, and 80th), whereas in only one quantile group (90th), it has a positive and significant effect (0.5703).

To go into further detail on the determinants of FI, the individual groups were estimated using QR. In Table 5.5, it can be seen that QR yields the influence coefficient of each factor on the FI level in different quantiles for the low-income group. The coefficient of capital account openness on FI in the 60th quantile is the largest (0.5164). According to the data, the FAO index is highest in the 40 to the 60th quantiles, where its value is positive at 0.713. For all the other countries in different quantiles, the value of FAO is negative, that explains the high level of influence of FAO in the 40th to the 60th quantiles. The more the capital account is open, the more it positively affects FI. Therefore, because the 40th to the 60th quantile countries enjoy more openness as compared to other quantile countries, that is why FAO affects FI positively. Low-income countries are assumed to be more open since they have more opportunities for FDI. In this context, the results for FAO seem surprising. As a matter of fact, we can notice some hints from GDP growth, as the lower value of growth 2.64 lies in the low-income group. Even the second lowest value of 2.82 among all groups also lies in the low-income group, which suggests that FDI cannot provide benefits properly in the presence of low growth rates. Moreover, the low-income countries also experience capital flight, turning their capital accounts negative. Furthermore, GDP tells a similar story, where all the significant values negatively affect FI and lie in the

10th and 90th quantiles. The highest significant value is in the 10th quantile (-0.0631). The level of education has only two significant values (i.e., in the 10th and 90th quantiles). From the two, highest value is in the 90th quantile (0.5301). The highest level of education is also in this quantile of countries (1.38). As for trade openness, most of the values negatively affect FI in most quantiles, but in two quantiles (10th and 60th), these negative values are significant. The highest value is located in the 20th quantile (0.0263). This quantile of countries is also more open to the outside according to the data (4.13). As the results illustrate for low-income countries, more trade openness does affect the level of FI. Financial development significantly affects FI in four out of six quantiles, three negatively (10th, 20th, and 90th) and one positively (80th). The highest quantile group where FD influences the level of FI is in the 80th quantile, which is also the one with the second highest level of financial development (2.67). The quality of institutions is negative in four quantiles (10th, 20th, 60th, and 90th). The second highest value of INST is located in the group of countries belonging to 20th to the 40th quantiles. As a result, the highest impact of institutions in QR is in the 40th quantile. The score of INST for this quantile of countries is 2.73. The lag of FI is significant in all quantiles and positively affects FI. In short, for the low-income group, the variables do not significantly explain the determinants of FI.

In Table 5.6, which represents lower middle-income countries, the overall results seem to improve with reference to low-income countries. In addition, FAO is significant in four quantiles (10th, 20th, 40th, and 60th). However, as compared to FAO in Table 5.4, most of the values are positive, and the coefficients have improved as well. The influence of FAO on FI is greatest in the 60th quantile (0.0723), which is the same quantile of countries where the index of FAO is the highest (0.658). Also, GDP has improved and significantly affects FI in four out of six quantiles (10th, 20th, 40th, and 80th), whereas the highest influence of growth is in the 10th quantile (0.0649). The level of education is not much different from the results in the previous table and mostly negatively affects the level of FI. The value is negative in four quantiles (10th, 20th, 60th, and 80th). In only one quantile, where the EDU is significant—the 90th quantile (0.2358)—and affects FI positively. Again, this

is the same quantile where the EDU is highest (1.64). Trade openness is still negative in most quantiles (10th, 20th, 60th, and 80th), but the coefficients have decreased in magnitude. The highest significant value of TOPEN lies in the 40th quantile (0.0039), which is interestingly the same quantile of countries with highest value of TOPEN (4.49). Financial development is significant in three quantiles (10th, 80th, and 90th), among which two (80th and 90th) influence FI positively. There is a considerable improvement in the INST in terms of FI. Three out of five quantiles have a significant effect on FI, and in one (90th), it is positive. The highest influence is in the 90th quantile (0.0404). This is, again, the same quantile of countries with the highest value of INST (2.89).

The results in Table 5.7, which belong to the upper middle-income countries, paint a more interesting picture. In all the quantiles, most of the values become positive and significant. If we look at the FAO, in three out of six quantiles (10th, 40th, and 90th), it is significant. In two quantiles (40th and 90th), FAO exerts a positive influence on the level of FI, with the highest value being in 90th quantile (0.1079). Moreover, GDP exerts a positive influence on the level of FI in all quantiles; however, not all are significant. The influence of GDP on the level of FI is highest in the 10th quantile (0.051). The highest level of GDP is also in the 10th quantile (8.73). The level of education is significant in four quantiles (10th, 40th, 80th, and 90th). Only in two quantiles (80th and 90th) is the level of education is positive and significant. In the 80th quantile, EDU influences the level of FI the most (0.0577). Again, it is the same quantile of countries with the highest score in education (1.61). The coefficient of TOPEN has also improved in most quantiles in size and significance in two quantile groups (80th and 90th), and the greatest influence is in the 90th quantile (0.0051). The quantile above also has highest score in this income group (4.66), as well as across groups. FD is significant in four quantiles (10th, 20th, 80th, and 90th). The positive values are in last two quantiles (80th and 90th), and the greatest influence is in the 90th quantile (0.0741), which is in line with highest level of FD (4.30). For the INST, we again have mixed results, with significant values in four

quantiles (20th, 40th, 80th, and 90th), and the highest influence is in 90th quantile (0.0652).

Table 5.2: Countries distribution in terms of level of financial integration.

(a) Distribution of lower-income countries

Quantiles	Countries
The Lower 10th Quantile group	Burundi, Comoros
The 10th-20th Quantile group	Guinea Bissau, Nepal
The 20th-40th Quantile group	Burkina Faso, Togo, Gambia, The, Haiti
The 40th-60th Quantile group	Guinea, Niger, Benin, Malawi
The 60th-80th Quantile group	Congo, Madagascar, Mali, Senegal
The Upper 80th group	Chad, Mozambique, Tanzania, Uganda

(b) Distribution of lower middle-income countries

Quantiles	Countries
The Lower 10th Quantile group	Congo Rep., Sudan, Yemen
The 10th-20th Quantile group	Cambodia, Cameroon, Ghana, Zambia
The 20th-40th Quantile group	Armenia, Bhutan, Cote de Ivor, Moldova, Nigeria, Swaziland, Tajikistan.
The 40th-60th Quantile group	Guatemala, Kenya, Mongolia, Nicaragua, Pakistan, Ukraine.
The 60th-80th Quantile group	Bangladesh, Egypt, Honduras, India, Indonesia, Philippines, Srilanka, Tonga.
The upper 80th group	Bolivia, El-Salvadore, Morocco, Tunisia, Vietnam.

(c) Distribution of upper middle-income countries

Quantiles	Countries
The Lower 10th Quantile group	Belize, Dominca, Greneda, St. Vincent, Suriname
The 10th-20th Quantile group	Fiji, Guyana, St. Lucia,
The 20th-40th Quantile group	Albania, Gabon, Jamaica, Namibia, Botswana, Macedonia, Mauritius, Paraguay
The 40th-60th Quantile group	Costa Rica, Dominican Republic, Iran, Algeria, Belarus, Ecuador, Georgia, Jordan
The 60th-80th Quantile group	Kazakhstan, Malaysia, Peru, Romania, Azerbaijan, Lebanon, Panama, South Africa, Venezuela
The upper 80th group	Argentina, Brazil, China, Colombia, Mexico, Thailand, Turkey

Notes: According to income level, this study divides all countries into three groups and in six quantiles within individual income groups.

To summarize, countries with high scores on capital account openness, financial development, growth, education, and quality of institutions do affect the level of FI positively. The interesting fact is that the effect is more

Table 5.3: Summary statistics for individual quantile groups

(a) Summary statistics for lower-income countries

Quantile group/Series	lnGDP	lnFAO	lnEDU	lnTOPEN	lnFD	lnINS
Lower 10th Quantile group	6.015	-1.773	0.805	4.073	1.065	2.62
10th-20th Quantile group	5.859	-1.803	0.956	4.131	1.375	2.682
20th-40th Quantile group	6.189	-1.32	1.325	3.875	2.023	2.730
40th-60th Quantile group	5.841	-0.702	0.955	4.091	2.401	2.72
60th-80th Quantile group	6.112	-1.803	1.321	4.012	2.679	2.7283
Upper 80th group	5.915	-1.803	1.384	4.041	3.077	2.751

(b) Summary statistics for lower middle-income countries

Quantile group/Series	lnGDP	lnFAO	lnEDU	lnTOPEN	lnFD	lnINS
Lower 10th Quantile group	6.912	0.470	1.028	4.177	1.6031	2.56
10th-20th Quantile group	6.569	0.442	1.085	4.286	2.317	2.768
20th-40th Quantile group	6.975	0.437	1.465	4.501	2.743	2.660
40th-60th Quantile group	7.110	0.468	1.365	4.194	3.127	2.630
60th-80th Quantile group	7.220	-1.788	1.076	4.081	3.513	2.741
Upper 80th group	7.530	-0.086	1.643	4.390	4.043	2.892

(c) Summary statistics for upper middle-income countries

Quantile group/Series	lnGDP	lnFAO	lnEDU	lnTOPEN	lnFD	lnINS
Lower 10th Quantile group	8.730	-1.97	1.155	4.320	2.240	2.72
10th-20th Quantile group	8.270	0.219	1.344	4.138	2.590	2.766
20th-40th Quantile group	8.31	0.186	1.331	4.294	2.998	2.750
40th-60th Quantile group	8.380	-1.729	1.420	3.904	3.398	2.762
60th-80th Quantile group	8.290	-0.160	1.608	4.636	4.251	2.725
Upper 80th group	8.037	0.452	1.085	4.662	4.305	2.725

Notes: According to income level, this study divides all countries into three groups and in six quantiles within individual income groups.

Table 5.4: Estimation results: Quantile regression model for the period 1996-2015 for over all countries.

Quantile	0.1	0.2	0.4	0.6	0.8	0.9
FAO	0.0105 (0.0100)	-0.0538* (0.0288)	-0.0491 (0.0343)	0.0752*** (0.0204)	0.0176* (0.0097)	-0.0827 (0.0738)
GDP	-0.0519 (0.0448)	0.0215** (0.01024)	0.0120*** (0.0137)	-0.0444*** (0.0124)	-0.0571** (0.0256)	-0.0383 (0.1664)
EDU	-0.8604 (0.5411)	-0.4578*** (0.6980)	-0.4012** (0.1729)	0.5236*** (0.0551)	0.3851 (0.4012)	0.4116** (0.1449)
TOPEN	0.0083 (0.0061)	-0.0032 (0.0019)	0.0027** (0.0022)	-0.0063*** (0.0012)	-0.0018 (0.0037)	0.0513*** (0.0096)
PC	-0.3857** (0.2096)	-0.1905*** (0.0739)	-0.3713** (0.1608)	0.1511 (0.1496)	-0.6613** (0.0919)	0.5703*** (0.1567)
INST	0.1201 (0.1009)	0.4969*** (0.1708)	-0.4108** (0.3452)	0.3114*** (0.0695)	0.3058 (0.1757)	-0.9650 (0.6893)
FI(-1)	-0.4258* (0.2379)	0.7873*** (0.2392)	0.4613*** (0.1781)	-0.0854 (0.0142)	-0.8132*** (0.1555)	-0.4499*** (0.0930)

Notes: *, **, *** shows significant at 10%, 5% and 1% respectively. Figures in parentheses are the standard errors.

Table 5.5: Estimation results: Quantile regression model for the period 1996-2015 for lower-income countries.

Quantile	0.1	0.2	0.4	0.6	0.8	0.9
FAO	-0.0322*** (0.1675)	-0.5741*** (0.1649)	-0.2561*** (0.1274)	0.5164*** (0.1396)	-0.4890 (0.4748)	0.0731 (0.4571)
GDP	-0.0631*** (0.0309)	-0.0673 (0.0548)	0.0120 (0.0177)	-0.0223 (0.0211)	0.0448 (0.0467)	-0.1650*** (0.0606)
EDU	-0.3224** (0.1641)	-0.1693 (0.6510)	0.0114 (0.0083)	-0.0867 (0.0574)	-0.0804 (0.1962)	0.5301*** (0.1380)
TOPEN	-0.0199*** (0.0061)	0.0263** (0.0132)	0.0168 (0.0136)	-0.0534*** (0.0210)	-0.0028 (0.0069)	-0.0152 (0.0095)
PC	-0.6642** (0.2237)	-0.2874** (0.1469)	-0.1472 (0.1350)	0.0868 (0.0620)	0.3768** (0.1952)	-0.0953*** (0.0287)
INST	-0.0241** (0.0212)	-0.1146** (0.0514)	0.1454** (0.1253)	-0.0346** (0.0262)	0.0160 (0.0137)	-0.3623*** (0.1347)
FI(-1)	0.9487*** (0.3579)	0.4634*** (0.0931)	0.4627*** (0.1096)	0.1807*** (0.0717)	0.3697*** (0.1384)	0.1014*** (0.0192)

Notes: *, **, *** shows significant at 10%, 5% and 1% respectively. Figures in parentheses are the standard errors.

Table 5.6: Estimation results: Quantile regression model for the period 1996-2015 for lower middle-income countries.

Quantile Coff	0.1	0.2	0.4	0.6	0.8	0.9
FAO	0.0331** (0.0173)	0.0122*** (0.0047)	-0.1168** (0.0569)	0.0723** (0.0321)	-0.0562 (0.0365)	0.0943 (0.2858)
GDP	0.0649* (0.0347)	0.0218** (0.0114)	0.0207** (0.0106)	0.0420 (0.0298)	0.0648* (0.0387)	0.0148 (0.0154)
EDU	-0.1076** (0.0530)	-0.3211*** (0.1574)	0.7011 (0.3559)	-0.4797 (0.3135)	-0.0980** (0.0491)	0.2358*** (0.0967)
TOPEN	-0.0028 (0.0044)	-0.0010 (0.0016)	0.0039** (0.0017)	-0.0091*** (0.0036)	-0.0098*** (0.0032)	0.0009** (0.0005)
PC	-0.1332** (0.0672)	-0.0896 (0.1337)	0.1422 (0.1381)	0.3768 (0.3014)	0.4805* (0.2555)	0.4417*** (0.0550)
INST	0.0689 (0.0594)	0.0374 (0.0200)	0.0191 (0.0194)	-0.0341** (0.0139)	-0.0513** (0.0259)	0.0404*** (0.0068)
FI(-1)	0.4551*** (0.1459)	0.3567*** (0.0688)	0.2284 (0.1104)	0.3889*** (0.1562)	0.3002*** (0.0944)	0.7437*** (0.0897)

Notes: *, **, *** shows significant at 10%, 5% and 1% respectively. Figures in parentheses are the standard errors.

Table 5.7: Estimation results: Quantile regression model for the period 1996-2015 for upper middle-income countries.

Quantile	0.1	0.2	0.4	0.6	0.8	0.9
FAO	-0.1929*** (0.0745)	-0.0711 (0.0567)	0.0286* (0.0156)	0.0193 (0.0921)	-0.0805 (0.0544)	0.1079** (0.0191)
GDP	0.0507*** (0.0135)	0.0296*** (0.0035)	0.0242 (0.0163)	0.0375 (0.0344)	0.0458 (0.0164)	0.0253*** (0.0086)
EDU	-0.2828*** (0.0469)	-0.0236 (0.0061)	-0.2676*** (0.0704)	0.0157 (0.0091)	0.0577** (0.0279)	0.0338** (0.0164)
TOPEN	-0.0035 (0.0025)	-0.0019*** (0.0005)	-0.0072*** (0.0014)	-0.0056 (0.0062)	0.0045** (0.0028)	0.0051*** (0.0018)
PC	-0.2006*** (0.0857)	-0.0478*** (0.0132)	-0.1303 (0.0732)	0.0649 (0.0499)	0.0729*** (0.0111)	0.0741*** (0.1950)
INST	0.0182 (0.0158)	-0.0540** (0.0166)	0.0211*** (0.0031)	-0.0788 (0.1109)	-0.1696*** (0.0389)	0.0652*** (0.0258)
FI(-1)	0.8969*** (0.1034)	0.8298*** (0.1049)	0.8655*** (0.1086)	0.1063 (0.1131)	0.2452* (0.1258)	0.3937*** (0.0465)

Notes: *, **, *** shows significant at 10%, 5% and 1% respectively. Figures in parentheses are the standard errors.

prominent in the quantile with higher income groups, possibly because of the fact that low-income countries are usually less developed, and accordingly, they score lower on other economic variables. They cannot absorb the full benefits of FI; thus, the determinants mentioned above do not affect FI. For example, Ju & Wei (2010) demonstrated that countries with low income levels do not have good quality of institutions, so the profit opportunities in these countries are reduced. The reduction in profits results in decreasing capital flows. For the quality of institutions, our results are mixed and are not in line with most of the literature, such as the findings of Bhattacharya & Daouk (2002), Jin & Myers (2006) Stulz (2005). Only where the score of the quality of institutions is high did we find a significant relationship. It can be seen from results that, in less developed countries, the entries with high scores are significant, and those with low scores are either insignificant or affect FI negatively. Even in the case of upper middle-income countries, we have some negative significant values because of a few quantiles group scoring less than the highest quantile in the low-income group. For instance, the quality of institutions score is highest in middle-income countries with a score of 2.89, followed by the upper middle-income country group. This is surprising, as high-income countries are theorized to have better scores on the quality of institutions. However, when we compare the total average of both groups, the picture is turned in favor of upper middle-income countries, followed by the middle group. The coefficients, when compared, have the same ordering: It is higher for middle-income countries and slightly lower for upper middle-income countries.

For the case of trade openness, our results are mixed, therefore indicating a limited power of explanation. However, we found that higher values of trade openness mostly tend to positively affect the level of FI. As with the quality of institutions, the highest score is in the upper middle-income group with a score of 4.66, followed by the low middle-income group (4.49) and the low-income group (4.13). The score of trade openness improves as we move from the low-income group to upper middle-income one. A compelling finding is that, whereas the low-income group has the highest score (4.13), the next group starts nearly from the same value (4.08), reflecting how the

countries become more open as we move upwards across groups. Interestingly, the coefficient size for TOPEN estimated with QR is in the same order. Thus, in a way, our results also partially support the findings of Carrieri et al. (2004) and Bhattacharya & Daouk (2002) and Vo & Daly (2007). Similarly, financial development is seen to positively (in most cases) affect FI for lower middle-income and upper middle-income countries, indicating a positive role of financial development in promoting FI. The highest score of financial development lies in the upper middle-income group with a score of 4.30, followed by the middle-income group with 4.04. In both of these quantile groups, where the score is highest, the coefficient has a positive and significant effect on level of FI. The result above is also in conformity with the findings of Dorrucchi & Meyer-Cirkel (2009) and Hartmann et al. (2007). Arfaoui & Abaoub (2010) also found mixed results for the relationship between FI and the level of financial development. From the statistics, it also seems that high-income countries have higher financial development.

A similar strand of studies related to FI and economic growth also discovered that different income groups experience different effects of FI on economic growth (see Ibrahim et al. 2016; Rahman et al. 2015). If we look at the GDP per capita statistics, we come across interesting findings. The highest GDP is located in the low-income group, which validates the catching up hypothesis that low-income countries tend to grow more quickly. This group is followed by the middle-income group (5.90) and then upper middle-income group experiencing the lowest level of growth (5.09). The highest value across groups is 6.07, which is located in the 80th quantile in the low-income group. It is the same group where growth affects the level of FI positively. The same is true for other highest value of GDP in the other two income groups. Our results partially validate those found by Edison et al. (2002), who found a negative relation between FI and economic growth. Arfaoui & Abaoub (2010) rendered a similar result and observed a negative relation between FI and economic growth. According to these researchers, less developed countries experience high economic growth that exceeds the growth of FI because of which the negative relation holds (Arfaoui & Abaoub 2010). At the same time, we did discover a relationship between FI and economic growth to be

positive for the cases where growth exceeds some minimum level. In other words, we did find that a positive relationship holds for all quantiles where the growth rates are at their highest. It is also worth mentioning that, the upper middle-income group, we did not find any negative value (significant or insignificant) for the GDP coefficient.

An interesting case was found for capital account openness. Contrary to expectations, low-income countries are more open capital wise as compared to middle-income countries. Upper middle-income countries scored the highest with a score of 1.81, followed by low-income countries (0.71) and lower middle-income ones (0.65). The minimum score of FAO across all the groups also lies in low-income group which is -1.61. An intriguing observation is that the highest score of FAO is in the middle-income group, which is close to the highest score in the low-income group, which suggests that the transition of countries—being more open as we move from one group to another. Across the groups, capital account openness improves as we move from the low-income group to upper middle-income one. In all of the high-scoring quantiles, the FAO was found to affect the level of FI positively and significantly. The level of education is also significant where it scores the highest in all quantiles. The highest score lies in the middle-income group—1.64, followed by the upper middle-income group (1.61), with the low-income group lagging behind with a score of just 1.38, possibly due to the fact that middle-income countries are spending a greater share of their GDP on education. Low-income countries are already low in income, so they do not have the financial ability to spend more on education. Based on this notion, our results partially support other in the literature (Ibrahim et al. 2016; Glaeser & Saiz 2003; Vo & Daly 2007; Edison et al. 2002; Prasad et al. 2003). Our results, therefore, partially do not support the results suggested by Garali & Othmani (2015).

In short, our results provide evidence in favor of some minimum scores or thresholds that countries may/should reach to influence FI. This is more apparent when we see the results across quantile groups and how they improve when they score better as compared to the other two groups. J. Chen & Quang (2014) and Ayhan et al. (2011) stipulated that there are threshold conditions that, if met, can produce the benefits of FI toward economic

growth. The same is established through GMM estimation, where most of the variables affect the level of FI for upper middle-income countries, which is an improvement on lower middle-income countries. Furthermore, QR estimation shows an even clearer picture of the argument above.

5.4 Conclusion

The degree of FI has believed to be increased, especially in last two decades and become an important area of research. Researchers have asserted that the degree of FI has increased, especially in last two decades, and become an important area of research. There are many theories associated with this subject that will look into the advantages, disadvantages, and sequence of FI. The current study represents an attempt to look into the more fundamental question of what determines or improves FI. The potential determinants were identified from the literature, including capital account openness, GDP per capita, the level of education, trade openness, the level of financial development, and the legal environment captured through the quality of institutions. The literature overview does not only include the effect of the above-mentioned variables on FI; we also carefully looked into studies examining the effect of FI on economic variables mentioned above. We used the *de-facto* measure to proxy FI, to better understand effects of the potential determinants described above and to improve the robustness of investigation. To accomplish this, we employed a GMM panel estimation technique for an initial investigation and then ran a panel quantile regression to see the within-group dynamics. The use of panel on 93 countries helped to remove potential biases and produce more reliable results.

Overall, the results favor a threshold argument, where most of the variables are significant and affect the level of FI positively at higher levels. The results are mixed for the overall group for both panel GMM and QR. However, if the results are looked at across the groups—low income, middle income, and upper middle income—then the picture becomes clearer. Almost all the variables exert positive influence in the quantiles where there is a maximum value for each variable. For most of the variables in low-income countries, the results

are not robust enough, but as we move from low-income countries to upper middle-income ones, the size of the coefficient not only improve, but also, in most of the quantiles, the variables affect FI positively. Therefore, indirectly, the results point out some minimum levels after which a variable has the potential to become a determinant for FI. The results strongly support the work of other researchers, especially that of Ayhan et al. (2011) and Alaabed & Masih (2016). The outcome of the current chapter strongly suggests conducting further research in this area, especially to look into the causality analysis and to combine it with the threshold proposition. A country analysis or a small group of countries experiencing the same characteristics in the above-mentioned variables could become a good proposal for future research.

Chapter 6

Conclusion and Future Directions

This chapter summarize the outcome of the thesis based on the empirical results. In addition, it will also identify some directions in which the future research can be directed. The chapter can also be interesting for policy makers and other researchers who are or wish to pursue research in this field.

6.1 Conclusion

This thesis addressed some important issues related to financial development and growth, specifically we looked into finance-growth analysis and factors that are important in promoting financial markets. We also looked into the contribution of factors important for financial integration. The above tasks were accomplish in four chapters addressing different but interrelated issues. The main themes were financial development, growth and financial integration.

In chapter 2, we analyzed the link between IBD and economic growth. We followed three steps to analyze the above link. In the first step, we looked into IBD's impact on economic growth along with other potential variables. In the second step, through many co-integration tests we establish the long run relationship among IBD and growth, while in third step we tried to find out the direction of causality. In the same time we advance the previous studies in many aspects like, more countries, comprehensive data collection, systematic and modern estimation technique and recognition of conventional financial market as well. Our results showed positive effects of

Islamic banking on economic growth and existence of a long run relationship. The long run relationship did not disappear even if we included conventional banking. On the direction of causality, our result indicated the classical view of supply-leading to be validated for our sample countries. Another interesting result is the direction of causality in case of conventional banking. Our result validate the same supply-leading result. Hence, our results confirm and reinforce previous studies that advocate supply-leading view for conventional finance, like (Arestis et al. (2001), King & Levine (1993a), Levine et al. (2000), Lebdaoui & Wild (2016)). As far our results for Islamic banking and growth is concerned our results support the outcome by Yusof & Bahlous (2013), Tajgardoon et al. (2013), Abduh & Azmi (2012) and Zirek et al. (2016).

To further analyze the above link and causality, for Islamic finance and growth, we took the case of Pakistan in Chapter 3. Pakistan being an important and growing market, we do not find even a single comprehensive study. Pakistan's Islamic financial market is currently among the two countries that are growing with a double digit growth rate. We took three indicators for Islamic banking which according to our knowledge was never tried before. Our results are suggestive of a positive link between Islamic banking and economic growth. There exist a long run relation between various indicators of Islamic banking and growth. On the direction of causality our results establishes the supply-leading hypothesis for Pakistan. Our outcome support other studies partially like, (Kassim 2016; Kalim et al. 2016; Abduh et al. 2012) for Bahrian, Abduh & Azmi (2012) for Indonesia and Yusof & Bahlous (2013) for Malaysia, in terms of positive influence of Islamic banking on economic growth and direction of causality.

In Chapter 4, we identify important determinants that can improve financial development. We extended the work of Baltagi et al. (2009) and Zhang et al. (2015) to test the openness hypothesis by introducing different variables, unlike taking just one or two variables as was in previous studies, but also test it across different income groups. We also tried not to mix countries with varying degree of income as it may render the results to become biased and dubious. Unlike Baltagi et al. (2009) we did not mix industrialized and underdeveloped countries, rather we took the case of developing countries

and further divided them into different groups according to the income, so as to place similar income countries in one group. In this context we tested openness hypothesis put forward by Rajan & Zingales (2003) and later we extended it to include institutions. Regression results showed that different economic variables effect financial development differently across groups. Our results for the full sample shows mix results of economic variables on financial development. The results for different income groups shows that, for lower income countries, the variables do not effect financial development at all. Starting from lower middle income group the same economic variables start to effect financial development positively. For upper middle income group most of the variables show positive effect, which proves that the effect of these economic variables are not uniform across groups. Another interesting outcome of our results is that trade and capital account openness exert positive effect on financial development for upper middle income countries. Through marginal effect, our result suggest a loose version of RZ hypothesis to hold only for some countries in lower middle income and for most countries in upper middle income group. Another important outcome is that institutional factors have their independent effect on financial development and thus do not confirm the idea that more openness effect financial development by effecting institutional factors that will enhance growth and improve financial environment.

A closely related topic to financial markets is financial integration (FI). In Chapter 5 we investigated the determinants that may help to facilitate FI process. We used the *de-facto* measure to proxy FI. The use of such proxy helps to understand effects of the above potential determinants and to improve the robustness of investigation. The use of panel, consisting of a 93 countries helped to remove potential biases and produce more reliable results. We did an analysis through different income groups and our results show that in order to be financially integrated, there are certain minimum levels that must be reached before the economic variables can start to effect financial integration. More precisely, results favor a threshold argument indirectly, where most of the variables are significant and effecting the level of FI positively at higher levels. The results are mix for overall group for both panel GMM and QR.

However, if the results are looked across groups—low income, middle income and upper middle income then the picture is more clear. Almost all variables exert positive influence in the quantiles where there is a maximum value for each variable. For most of the variables in low income countries the results are not robust enough but as we move from low income to upper middle countries, the size of the coefficient not only improve but also in most of the quantiles the variables are effecting FI positively. This result seems to favor threshold argument as was also advocated by Ayhan et al. (2011) and Alaabed & Masih (2016). The variables that do not exert positive influence on FI starts to effect positively once we are in the higher income group. It suggest that in early phase of development, financial markets are not strong enough to compete in international markets, whereas in later stage of development, when some minimum level of income is attained, the variables emerges as strong predictors of FI.

6.2 Future Research

We suggest the research to extend in the area of Islamic finance and growth, to include more countries and to especially carry out further time series analysis. We also suggest that a dedicated database be maintained to collect the data precisely for Islamic banks. Islamic banks have unique products and some special type of financing due to which their balance sheet include many new products and concepts. The development and use of standardized indicator(s) will be another very important suggestion for future research, which can be achieved only through rigorous data collection. We also suggest to include monetary policy framework and *halal* industry¹ initiatives and the role of Islamic finance towards its growth. In other words the time has probably come to analyze the micro impact of Islamic finance on firms and industry.

On determinants of financial development we suggest that, more time series studies be carried out as our result suggest that effect of variables are different

¹There is no definition of *halal* industry in literature. However it refers to the industry which is operating on the basis of Islamic *Sharia* principles/guidelines

as the income varies. The findings of proposed time series may enhance our understanding of the interactive effects of variables on financial development. Second, we can extend the threshold literature on financial development from view point of different income groups. However, the threshold conditions should be found out not only for one variable but for group of variables. This kind of analysis in a threshold framework will help us to know the level of variables beyond which further increase in them may be detrimental for financial development. The threshold can also be helpful to analyze for a financial market to cope with financial crises. A similar set of suggestions is also applicable for FI as well.

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