Decomposition of Market Concentration in Islamic and Conventional Banks of Pakistan

Mahnoor Jadoon

Reg No. 88-SE/MS IBF/F14

Supervisor: Professor Dr. Eatzaz Ahmed

Professor, University of Peshawar

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International Institute of Islamic Economics (IIIE),

International Islamic University (IIU), Islamabad, Pakistan

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By

Mahnoor Jadoon

88-SE/MS-IBF/F14

Accepted by the International Institute of Islamic Economics, International Islamic University, Islamabad, as partial fulfillment of the requirements for the award of degree of MS in Islamic Banking & Finance.

Supervisor:

Prof Dr. Eatzaz Ahmed
Professor, (UOP)
University of Peshawar

Internal Examiner:

Dr. Faiz ur Raheem
Assistant Professor, IIIE
International Islamic University, Islamabad

External Examiner:

Dr. Muhammad Mazhar Iqbal
Professor, Management and Science
Capital University of Science and Technology, Islamabad

Acting Chairperson
Department of Economics, Female campus
International Islamic University, Islamabad

Director
International Institute of Islamic Economics
International Islamic University, Islamabad

Date of Viva Voce: 18-12-2017

Certificate

The thesis entitled **"Decomposition of Market Concentration in Islamic and Conventional Banks of Pakistan"** in partial fulfillment of MS degree in Islamic Banking & Finance has been completed under my guidance and Supervision. It is certified that the student has incorporated the necessary changes suggested by the Examiners during viva voce exam on December 18, 2017. Now the thesis is ready for further process.

Signature: 

Prof Dr. Eatzaz Ahmed

Professor UOP

(Supervisor)

Dedication

To My Beloved Mother Mehr-un-Nisa

&

Father Abdul Malik

Declaration

I hereby solemnly declare that all the literature presented in following dissertation is entirely based on research work carried out in defense of my thesis topic. This publication is pioneer in its context and has neither similarity to any previously submitted thesis nor any copied material in its contents from any source except where due reference is clearly mentioned. All of the published data is result of my own efforts, research and analysis with support of those mentioned in acknowledgement, in specific my supervisor. If at some later stage plagiarism is detected in the submitted research based literature, I will be fully responsible for all the consequences as per the prevailing rules and law of approval committee.

Mahnoor Jadoon

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Abstract

This study measures and decomposes the market concentration in dual banking system of Pakistan using the k-bank concentration ratio for k = 3,4, ...10, Herfindahl- Herchman index and Theil's First and Second entropy indices. The study finds the increased level of competition in the banking market of Pakistan. There is greater level of concentration within Islamic banks but the contribution of Islamic banks towards the overall level of concentration has been quite small. Conventional banks of Pakistan show low level of concentration, but in overall level of concentration the contribution of conventional banks is higher. The study finds that the contribution of banks within conventional and Islamic banking system has been substantially smaller than the contribution of banks between Islamic and conventional banks.

Chapter 1

Introduction

1.1 Background

The market concentration of an industry measures the degree to which production of an industry is concentrated in a few firms, alternatively, concentration may also be defined based on the degree of concentration of assets in a few firms. Concentration ratios are usually used to show the level of market control of the larger firms in an industry. The changes in the market structure of firms could be examined through several measures. Market concentration is one of the most important determinant of competitiveness (Tushaj 2010)(Nathan and Neavel, 1989). To analyze the market structure of banking industry, we may focus on banking concentration. There are numerous ways of measuring banking concentration. Rose (1999:687) states: the degree of concentration in a market is measured by proportion of assets or deposits controlled by the largest banks serving the market. Measures of concentration therefore provide useful information to understand why certain banks are in better position to lead an industry as compared to other banks.

Structure conduct performance hypothesis assumes a one-way relationship between concentration and competition. It shows high concentration may slow competition in the sector, while equal sized banks can result in competitive price setting behavior. High concentration banks mostly use new era technology that changes the scope of operations with updated technology. Hence, each bank needs to advance in term of technology in order to compete in the market.

Various studies have proposed concentration theories in the literature. These theories could be classified into pro-concentration and cons-concentration theories where concentration refers to the degree of control of economic activity by large firms (Sathye, 2002). The increase in concentration levels could be due to considerable size enlargement of dominant firm(s) and/or considerable size reduction of the non-dominant firm(s). conversely, reduction in concentration levels could be due to considerable size reduction of the dominant firm(s) and/or considerable size enlargement of the non-dominant firm(s) (Athanasoglou et al. 2005).

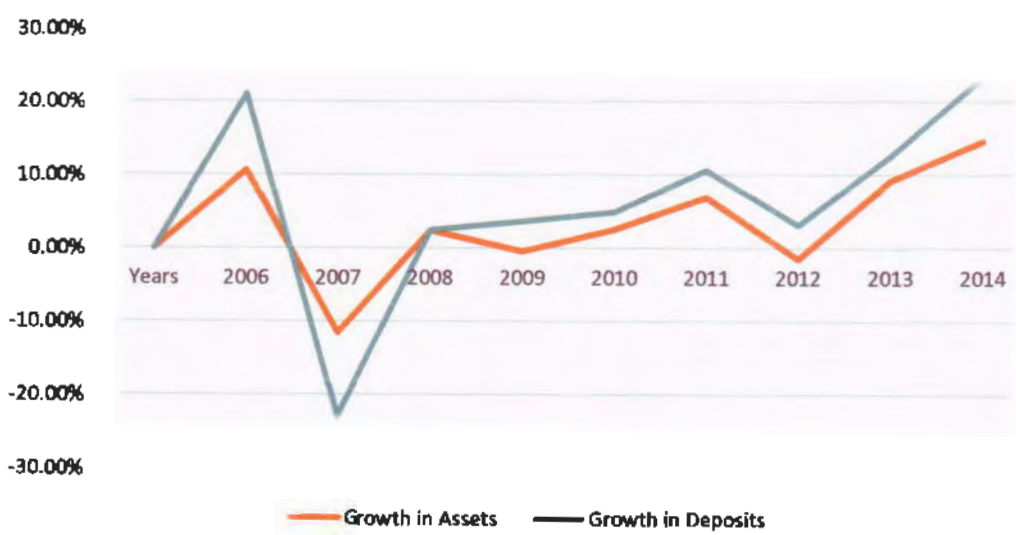
The banking sector in Pakistan has witnessed many changes over the period of 70 years since country's independence in 1947. Initially banking sector faces shortage of resources because of political and socioeconomic conditions. The State Bank of Pakistan (SBP) was established as the Central Bank on July 1, 1948 to control the financial sector. With the passage of time different amendments were also made to extend the control and functions of State Bank of Pakistan. The State Bank of Pakistan encouraged private sector to establish banks and financial institutions in the country but this encouragement resulted into unlawful practices and unhealthy competition due to corruption during 1950's and 1960's. In 1974 all the existing banks were nationalized by the government. The performance of nationalized banks was not good and resulted into the provision of inferior products and poor services. This poor performance of nationalized banks caused the privatization of banking sector in the early 1990.

Banking sector is important for the development as well as smooth running of economy of any nation. Till 20th century the whole financial sector of the world was operational on interest basis due to which a large segment of population (Muslims) could

not properly avail banking services, which led to the development of interest free (Shariah compliant) banking. In Pakistan efforts for Islamization of the economy was started in the 1980's but resulted in failure in practicing. From beginning of 21st century central bank of Pakistan implemented different approaches other than conventional of 1980s and 1990s approach and started parallel working of Islamic and conventional banking.

Today the banking sector of Pakistan is playing vital role in economic growth of Pakistan. In accordance with the State Bank of Pakistan Act, the banking system of Pakistan is a two-tier system including the State Bank of Pakistan on one hand and commercial banks, specialized banks, development finance institutions, Microfinance banks and Islamic banks on the other hand.

[1]Figure 1- growth pattern in assets and deposits of the banking sector of Pakistan from 2006 to 2015.



[1] **Source**: Data from State Bank of Pakistan Bulletin

1.2 Gap in the literature

Some empirical studies have been conducted in Pakistan related to market concentration. These studies include Khan (2009). He took the data of conventional banks and find the market concentration of only those banks but he does not discuss decomposition of market concentration in both banking streams of Pakistan. Whereas at international level there are several authors who have discussed about market concentration in dual banking streams. The main contribution has come from Nafisah Mohammad et al., (2015). They took data from conventional and Islamic banks of Malaysia and concluded that different concentration ratios show a decreasing trend, which increase the degree of competition in the Malaysian dual banking system.

Furthermore, the preexisting literature like Tushaj et al., (2010) only focused on market concentration of banking systems but none of the previous studies has research on decomposition of market concentration in dual banking streams. The focus of this study is not only to find market concentration in dual banking system but it will also focus on decomposition of market concentration in three parts; within Islamic banks, within conventional banks and between Islamic and conventional banks.

1.3 Research Objectives

There are mainly two objectives of the study, which are as follows:

1. To measure market concentration in the banking sector of Pakistan
2. To decompose the concentration in three parts,

   Concentration within Islamic banks of Pakistan

   Concentration within conventional banks of Pakistan

Concentration between Islamic and conventional banks of Pakistan.

1.4 Research Questions

The research questions of our study are:

1. To what extent banking sector is concentrated?
2. Is the extent of concentration greater in conventional banks or Islamic banks?
3. How concentrated are banks towards conventional or Islamic category?
4. Is concentration in banking sector increasing or decreasing with the passage of time?

1.5 Significance of the study

To evaluate the impact of various changes specifically on decomposition of market concentration in banking sector it is important to examine the trend of different concentration measures. Since market concentration or more specifically, the degree of seller's concentration is an important element of market structure Ferguson et al., (1994), which plays a dominant role in determining the behavior of firm in the market Hart et al., (1973). This study will help bank management in understanding the banking market structure and enable it to use and implement suitable policies that help in the development of strong and healthy banking market. It will help the policy makers to increase the competition level in the Pakistans' banking sector with the sufficient number of banking firms with appropriate size.

The study will also make significant contribution to existing literature by filling gaps and exploring new dimensions for the banking of Pakistan. The generalization of the

present study would be a great contribution to the broad knowledge of research students as it will provide them opportunities to explore further dimensions in this area of study.

1.6 Organization of the Study

Chapter 1 includes background, gap in literature, research objectives, research questions and significance of the study. The remainder of thesis is planned as follows. Chapter 2 reviews the important literature and theories related to market concentration. Chapter 3 presents an overview of Banking Sector of Pakistan. Chapter 4 disclose the methodology, chapter 5 presents the empirical result and their analysis. Finally, Chapter 6 presents some conclusions and future directions of research on the study.

Chapter 2

Literature Review

2.1 Introduction

In this chapter, we will discuss market concentration theory and concept, measures of concentration used in financial literature, pros and cons of concentration and empirical literature.

The changes in the market structure of firms could be examined through various measures. To analyze the market structure in banking industry, sometime we focus on banking concentrations. Market concentration is one of the most important determinants of competitiveness (Nathan and Neavel, 1989). Demirguc-Kunt and Levine (2000) measure banking system concentration via the fraction of bank loans controlled by three largest banks in the industry. The increase in concentration levels could be due to considerable size enlargement of the dominant firm(s) and/or considerable size reduction of the non-dominant firm(s). Conversely, reduction in concentration levels could be due to considerable size reduction of the dominant firm(s) and/or considerable size enlargement of the non-dominant firm(s) (Athanasoglou et al., 2005:25).

2.2 Measures of Concentration Used in Financial Literature

In economic literature, industrial concentration has great importance and has been regularly discussed. Despite the many different approaches to its measurement, general agreement prevails about the constituting elements of concentration measures the number of banks and the distribution of bank size in each market. This section considers seven concentration measures which are the *k*- bank concentration ratio (CR_k), the Herfindahl-

Hirschman Index (HHI), the Hall-Tideman Index (HTI), the Rosenbluth Index (RI), the Comprehensive Industrial Concentration Index (CCI), the Hannah and Kay Index (HKI), the U index (U), and the Entropy measure (E). This section also discusses the weighting scheme and structure of each scheme in the measurement of concentration.

2.2.1 Classification by Weighting Scheme and Structure

All ten concentration measures can be classified per their weighting schemes and structures. Marfels (1971a) and Dikson (1981) discuss the weighting schemes of several concentration ratios. Marfels differentiates between four groups of weights.

a) Weights of unity are attached to the shares of an arbitrarily determined number of largest banks that are ranked in descending order ($w_i = 1, \forall i \leq k$), and zero weights are attached to the remaining banks.

b) Bank's market shares are used as their own weights ($w_i = s_i$, V), so that greater weights are attached to larger banks. These indices take into account all banks in the industry, for example, Herfindahl -Herchman Index.

c) The rankings of the individual banks are used as weights ($w_i = s_i, \forall_i$), where banks can be ranked in ascending or descending order. All banks are included in computing this index. For example, Rosenbluth index and the Hall-Tideman index

d) Each market share is weighted by the negative of its logarithm ($w_i = -\log s_i, \forall_i$). A smaller absolute weight is thus attached to larger market shares. An example is the Entropy index.

Dicksons (1981) found only seven indices under investigation consistent with theoretical market models: the CR_k, the HHI, the CCI, the HTI & RI, the HKI, the U and the E.

2.2.2 Concentration Ratios

2.2.2.1 The k Bank Concentration Ratio (CR_k)

The k bank concentration ratio is one of the most frequently used measures of concentration because of its simplicity and limited data requirement in the empirical literature. Summing only over the market shares of the k largest banks in the market, it takes the form:

$$CR_k = \sum_{j=1}^{k} S_i \qquad 2.1$$

It assigns equal weights to the k leading banks, but neglecting the remaining smaller banks in the market. The index approaches zero for an infinite number of equally sized banks and it equals unity if the banks included in the calculation of concentration ratio make up the entire industry (White, 1982).

2.2.2.2 Herfindahl-Hirchman Index (HHI)

The index is equal to the sum of the squares of banks' relative sizes measured as market shares. This index assigns greater weights to larger banks as compared to smaller banks, and it incorporate each bank individually so that arbitrary cut-off is avoided. Davies (1979) analyzes the sensitivity of HHI to its constituent parts, that is, the number of banks in the market and the inequality in the market shares among the different banks and finds that the index become less sensitive to changes in the number of banks the larger the number of banks in the industry. The HHI takes the form:

$$HHI = \sum_{j=1}^{k} S_j^2 \qquad 2.2$$

One of the most widely used measure of concentration is Herfindahl-Hirchman index. The HHI plays a significant role in the enforcement process of antitrust laws in banking,

an application of the merger of two banks will be approved without more examination if the basic guidelines for the evaluation of the concentration in deposit markets are fulfilled. Those guidelines indicate that the post- merger market HHI does not exceed 0.18, and that the increase of the index from the pre-merger situation is less than 0.02 (Cetorelli,1999).

2.2.2.3 The Hall-Tideman Index (HTI) and the Rosenbluth Index (RI)

The concentration indices developed by Hall and Tideman (1967) and Rosenbluth resemble one another both in form and in character (Niehans, 1961). Hall and Tideman bring forward several properties which concentration measures should satisfy and they accept the HHI based on those properties. They emphasis the need to include the number of banks in the calculation of a concentration index, because it reflects to some level the conditions of entry into industry. Their index takes the form:

$$HTI = 1/(2\sum_{i=1}^{n} is_i - 1) \qquad 2.3$$

The market share of each bank is weighted by its ranking in descending order to ensure that the emphasis is on the absolute number of banks, and that the largest bank receives weight equal to one. The HTI ranges between zero and unity, being close to zero for an unlimited number of equally sized banks, and reaching unity in the case of high concentration.

The Rosenbluth Index (RI) resembles the Hall-Tideman Index since the same formula is used but the market share of each bank is weighted by its ranking in ascending order. This index is therefore sensitive to change in the size distribution of the smaller banks, with small values of HTI indicating high concentration.

2.2.2.4 The Comprehensive Industrial Concentration Index (CCI)

This index reflects both relative sizes of the largest banks as well as dispersion in bank sizes. As with the Hall-Tideman Index, the CCI requires the market share of each bank s_i to be sorted in descending order.

$$CCI = s_1 + \sum_{i=2}^{n} s_i^2(1 + (1 - s_i)) \qquad 2.4$$

This index also produces a value of unity in the case of high concentration.

2.2.2.5 The Hannah and Kay Index (HKI)

Hannah and Kay (1977) recommend a summary index of concentration of the form:

$$HKI = (\sum_{i=1}^{n} s_i^{\alpha})^{1/(1-\alpha)} \qquad \alpha > 0 \text{ and } \alpha \neq 1 \qquad 2.5$$

Where market shares are raised by a power α, which is a parameter that reflects changes in concentration arising from the entry of new banks or ceasing of the existing banks. The fact the choice of α is left to the investigator (Hannah and Kay suggest a value in the range 0.6 to 2.5 points) allows for alternative views on what is the appropriate weighting scheme. The value for the HKI gives an approximation of the number of large market shares of a bank. Consequently, a small number indicates high concentration.

2.2.2.6 The U Index (U)

Daves (1979) defines his U index in terms of inequality and the number of banks in the industry reflecting his observation that most of the concentration indices established earlier attach too much weight to either inequality or number of banks in the market. It takes the form:

$$U = I^{a}\, n^{-1} \qquad 2.6$$

where a $\geq$ 0 and I is generally accepted measures of inequality. This index allows flexibility; in the measurement of concentration. The weight assigned to the concentration measure I and the number of banks (n) can be changed by varying a. This is an innovation compared to the concentration measures presented earlier.

The α parameter decreases inversely to the degree of collusion, and for $\alpha \rightarrow \infty$ the index approaches the HHI.

2.2.2.7 Entropy Measure (E)

The E measure has its theoretical foundations in information theory and measures the ex-anti expected information content of a distribution. It takes the form:

$$E = -\sum_{i=1}^{n} s_i log\, s_i \qquad 2..7$$

The index ranges between 0 and $\log_2$ n, and is therefore not restricted to [0,1], as most of the other measures of concentration. The value of the Entropy varies inversely to the degree of concentration.

2.3 Pros and Cons of Concentration

Literature on the measurement of competition which measures the competitive behavior of the banking firms in the banking market can be divided into two main streams; structural and non-structural approaches (Bikker and Haaf, 2002a; and Arises, 2009). The structural approach to measure competition is based on the structure conduct-performance (SCP) paradigm and the efficient structure (ES) hypothesis. Theoretically, the SCP paradigm assumes that concentration will weaken competition by collusive behavior

among the firms in the market, hence also known as collusion hypothesis. Thus, the SCP paradigm expects a negative relationship between concentration and competition. The SCP paradigm is also known as 'Structural Model' because the arguments in this paradigm are based on the market structure of the banking firms (Al-Muharrami, et al. 2006). Many studies in the banking sector had found a negative relationship between market concentration and competition where high concentration tends to decrease competitiveness in this sector (Gilbert, 1984).

Several previous studies on banking market concentration have resulted in the existence of two well-known bank concentration theories namely pro-concentration and cons-concentration theories (Tushaj, 2010; and Sharma and Bal, 2010). The supporters of banking concentration underlined on the welfares of highly concentrated banking market are as follows:

First, the increasing concentration in the banking market may help the banking firms to improve their efficiency level (Demergick-Kunt and Levine, 2000).

Second, less concentrated banking market with many small banks is more disposed to banking crises compared to the concentrated banking sector with few large banks (Allen and Gale, 2004).

Third, the banking system with fewer large banks is less fragile compared to the banking system with many small banks because large banks are able to spread better compared to small banks. Beck (Demirguck-Kunt & Levine 2003).

Fourth, banking firms in highly concentrated market are able to gain higher profits, therefore lower bank fragility (Beck et al., 2003).

Fifth, it is easy to monitor a few large banks compared to many smaller banks; therefore, the chance of bank failure is less in more concentrated banking system (Beck et al. 2003).

In contrast, the opponents of banking concentration have also listed disadvantages of banking sector concentration as follows; First, increase in banking concentration will decrease the credit supply in the banking market" (Berger, 1995). Second, higher market concentration is related with lower social economic wellbeing due to pricing performance of the banking firms that charge higher prices for their services. Third, the banking firms in the more concentrated banking market are more "fragile" (Boyd and Runkle, 1993). Finally, the degree of competition in highly concentrated market is less, therefore it will adversely affect economic development (Smith 1998).

Some studies presented an important relationship between banking market structure and market structure of industrial sectors. The empirical evidence based on 35 manufacturing sectors in 17 OECD countries produced conclusion constant with theoretical views suggesting that banks with market power may concentrate lending to small number of firms with whom they have already established long-term relationships, what can cause increasing concentration in industrial sectors (Cetorelli, 2001).

2.4 Empirical literature

Some empirical studies have been conducted in Pakistan related to market concentration in banking system but in that study, only conventional banking stream was included. Khan (2009), analyses market concentration in banking sector of Pakistan, using M-concentration ratio and Panzor and Rosse statistic. He concluded that degree of

competition exists in banking industry of Pakistan. The time which he used for his study is 1997-2007.

By using eight type of concentration ratios on total assets, Sharma and Bal (2010) concluded that market concentration in many banking industries of India had decreased due to liberalization process which was reflected in the increasing degree of competition in those sectors.

Deltuvaite, et al., (2007), analyses Lithuania's banking sector using concentration index HHI and CR and find a decrease in the level of concentration. Studies conducted by (Gajurel 2010; Abdul Majid and Sufian 2007a) concluded that the decreasing trend in concentration ratio reflects the change in the market structure of the banking industry; these studies also suggests the increasing trend in the level of competition in those markets.

Staikouras and Fillipaki (1998-2002) used Panzor and Rosse model based on a non-structural estimation of market competition in European Union (EU) banking environment. According to their result European Banks were working under conditions of monopolistic condition and that bank interest in the ten new EU member's states was earned under condition of higher competition that the one that existed in the old EU banking industries. In less competitive environment smaller bank earn more interest income than larger banks.

Arises (2010) evaluated the competitive conditions prevailing in Islamic and conventional universal banking markets and considered the possible differences in profitability between these markets, using a sample of banks across 13 countries during 2000-2006. According to the findings of this study Islamic banks assign a greater share of their assets to financing activities compared to conventional banks.

Prasad and Ghosh (2005), used the Panzar and Rosse model to evaluate the competition in the Indian banking system. Their method is to break down the study into various sub-periods to see the effects of operation of financial reforms in India. They found out increasing monopolistic competition in India.

In the United States, Berger et al (1995) find evidence that the increase in the proportion of banking industry assets controlled by the largest banking organizations in the 1990s, due to the liberalization of geographic restrictions on banking in the United States, may have been responsible for part of the credit crunch observed in 1989-92. It has also been argued that the higher the concentration in the local bank market; the higher prices are for financial services, and consequently the higher the banks' profits. This is because banks in less competitive environments charge higher interest rates to firms. If concentration is positively associated with banks having market power, then concentration will increase both the expected rate of return on bank assets and the standard deviation of those returns (Beck, Demirgüç-Kunt and Levine, 2004: 2). The policy implication is that higher market concentration is associated with lower socio-economic welfare and, therefore, higher concentration is undesirable.

The development in the market structure of banking sector can be termed impressive we can conclude that competition in banking sector has also increased as empirical literature on concentration provides mixed results. Highly concentrated market can be competitive if large numbers of participants exist in market. It is important to note that most of the studies only focus on conventional banking sector. The study in Pakistan done by Mahmood ul Hasan Khan (2009) also focus on concentration in conventional banking. However, one study done by Turk-Ariss (2010) looks at market concentration for

both streams. Thus, this study attempts to fill in the gap by examining market concentration in Islamic and conventional banking system of Pakistan. Further this study will investigate on decomposition of market concentration in both streams.

Chapter 3

An overview of Banking Sector of Pakistan

3.1 Introduction

Bank is an institution transacting the business of accepting, for purpose of lending, of deposits of money from the public. Banks are the financial intermediaries. Pakistan banking sector has witnessed extreme changes over a period of 70 years since country's independence in 1947. Initially it suffered from serious shortage of resources. Deficiency of trained human resource and professionals resulted into poor quality of products and services. State bank of Pakistan was established as the central bank on July 1, 1948 to control the financial sector. Successive amendments were made to extend the control and functions of central bank through State bank of Pakistan act 1956. State Bank of Pakistan encouraged the private sector to create banks and financial institution in the country.

In 1974, all the existing banks were nationalized by the Government. Government starts giving protection to employees" which results into the provision of inferior goods and poor services because of this the performance of nationalized banks deteriorated. The poor performance of nationalized banks caused the privatization of banking sector in early 1990s.

Today, the Banking sector of Pakistan is playing vital role in the growth of the economy. In accordance with the State Bank of Pakistan Act, Pakistan's banking system is a two-tier system including the State Bank of Pakistan (SBP), commercial banks, specialized banks, Development Finance Institutions (DFIs)' Microfinance banks and Islamic banks. As of June 2010, the banking sector comprised 36 commercial banks

(including 25 local private banks, 4 public sector commercial banks and 7 foreign banks) and 4 specialized banks with a total number of 9,087 branches throughout the country. Among the banks, there are 6 fully fledged Islamic banks as at end of June 2010.

Following is the detailed history of banks in Pakistan.

3.2 History of Banking Sector in Pakistan

1940-1959

Before the Indian partition in 1947, British banks and banking system prevailed and dominated the system of local banks all over the India. The independent banking system was started locally for the first time after independence from Britain. The banks included were the ABL (Allied Bank Limited formerly Australasia Bank), the Habib Bank Limited, the Muslim Commercial Bank Limited, and the National Bank of Pakistan. The prominent trading families started and operated these banks except the National Bank of Pakistan. The first government of Pakistan in 1948 established a central bank with name of State Bank of Pakistan. An ordinance was issued in 1955 clarifying the key role of State Bank of Pakistan. The United Bank Limited was another bank which was established in 1959.

1960-1974

During the second five-year plan (1960-1965), the State Bank of Pakistan opened six new offices. The number of other bank branches increased from 430 to 1591 over this period. Total deposits increased from Rs. 2943 million to Rs. 6883 million while total advances increased to Rs. 5759 million from Rs. 1458 million. During this period, wide-range of banking laws were also formulated. In the third five-year plan (1965-1970), the

total number of bank branches increased to 3133 with a 91% increase in deposits and a 64% growth in advances.

The new introduced banks were regulated direct by State bank of Pakistan such as IDBP (Industrial Development Bank of Pakistan) and ADBP (Agriculture Development Bank). All the domestic commercial banks were nationalized by the first government of Zulfiqar Ali Bhutto by 1974. This step of nationalization opened a new banking economy. The branches of the state-owned banks were opened throughout country without knowing the business capability of the area where the branch was opened.

3.3 History of Islamic Banking in Pakistan

Pakistan acquired freedom in 1947 as an Islamic Republic. Quaid-e-Azam Muhammad Ali Jinnah, in his dialogue on the event of inauguration of State Bank of Pakistan on 1st July 1948, aimed to fabricate the economic and financial system of Pakistan in line with verdicts of Islamic. He said,

I shall watch with keenness the work of your Research Organization in evolving banking compatible with Islamic ideas of social and economic life. The adoption of Western economic theory and practice will not help us in achieving our goal of creating a happy and contented people. We must work our destiny in our own way and present to the world and economic system based on true Islamic concept of equality of manhood and social justice.

At the beginning, renowned Shariah scholars both from Pakistan and abroad, take on the responsibility to research on Islamic finance. In 1950, the Research Department of State Bank of Pakistan launched an Islamic Economic Division, and the task of conducting

research on Islamic economic system was hand over to that division. In 1970, efforts were made to remove Riba and several remarkable and practical steps were taken in 1980s. In November 1991, the Federal Shariat Court (FSC) stated the financing system based on mark-up as un-Islamic. After that, an appeal was made to the Shariat Appellate bench of Supreme court and the 1991 Federal Shariat Court declaration was postponed till court orders.

In the interim, the government of Pakistan planned to endorse Islamic banking as an equivalent and suitable system. After the license for Islamic commercial banking, issued by State Bank of Pakistan, Meezan Bank started its operations in 2002 as a full fledge premier Islamic bank. In Pakistan, Islamic banking emanated as a reaction to both religious and economic needs.

3.3.1 Islamization of Banks 1979-1992

In Egypt, the first modern Islamic bank was established in 1963 according to the principles of Islamic finance. The Organization of Islamic Conference (OIC) also supported the Islamic financial system in 1973 at Jeddah, Saudi Arabia. Similarly, a number of Islamic banks were established as Philippine Amanah Bank on 1973; Dubai Islamic Bank in 1975; the Faisal Islamic Bank of Sudan in 1977; the Faisal Islamic Bank of Egypt in 1977; the Bahrain Islamic Bank in 1979, and Meezan Islamic Bank of Pakistan in 2002.

3.3.2 Privatization of Banks 1992-2000

During 1990s financial liberalization and deregulation encouraged local investors and motivated foreign banks to start their operations in Pakistan. It inspired the competition among banks due to development of the banking industry. A large number of banks

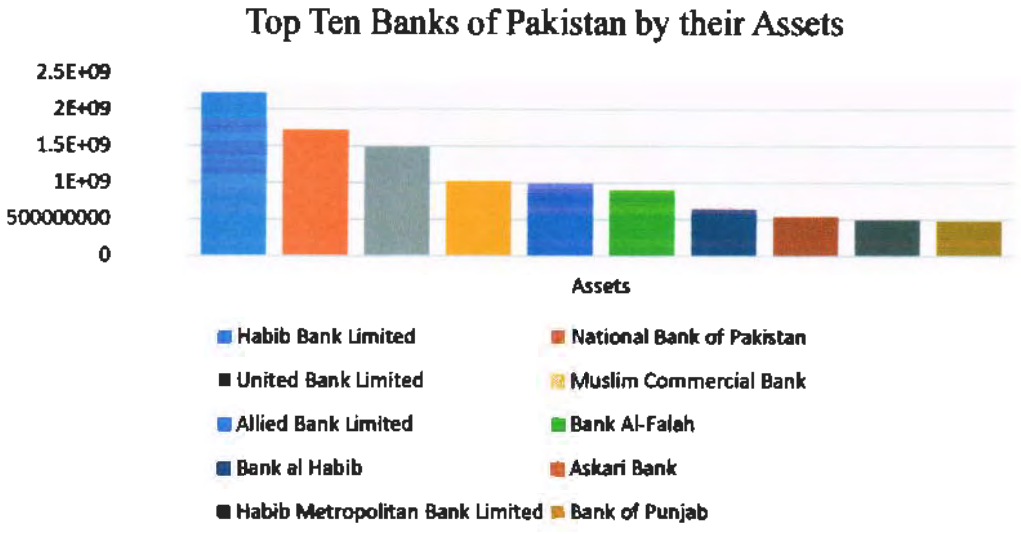
initiated their operations in Pakistan and try to attract the maximum number of customers. It is reported that government ownership of banks could be discouraged due to slower financial development, low productivity and slow economic progress (La Porta et al. 2002). Similarly, State Owned banks are unable to monitor their progress due to absence of clear objectives and responsibility (Clark et al. 2003). It is found that there is smaller improvement in the financial health of banks as a result of financial liberalization and privatization in Pakistan (Khalid, 2006).

3.4 Size, Structure and Growth of Pakistan Banking Sector

Pakistani banking sector is continuously improving with diversified pattern of ownership due to an active participation of foreign and local stakeholder. It resulted into an increased competition among banks to attract a greater number of customers by the provision of quality services for long-term benefits. Now there are 5 full-fledged Islamic banks offering products and services according to principles of Shariah in different parts of the country. All banks are competing in a highly competitive environment for the provision of quality services according to customer's expectations.

In Pakistan, Islamic banking industry has shown significant progress since its re-launch in 2002. At present, the Islamic banking industry has acquired 11.4 percent share in assets and 13.2 percent share in deposits of overall banking industry. To increase financial presence and promote financing to important sectors, the banking industry has been financing targets for SMEs and agriculture.

Figure- 3.1 Top Ten Banks of Pakistan by their Assets

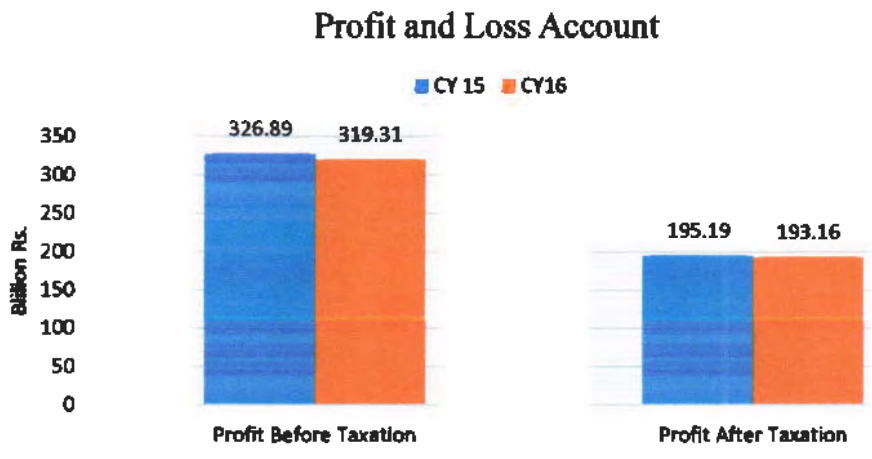


Total assets of the banking sector increased from RS. 14.27 trillion in CY15 to RS. 15.98 trillion in CY16 registering an increase of 12.02 percent. Investment and gross advances grew by 8.42 percent and 12.10 percent in 2016 as compared to previous year. The analysis of components of total assets reveals that lending to financial institution witnessed an increase of 73.38 percent in 2016. Increase in total assets of the banking sector was mainly attributed to local banks which comprised 97.55 percent of banking sector's assets. Local banks assets increased by Rs. 1.59 trillion or 11.32 percent during 2016 over 2015.

Gross advances of banking sector increased from Rs. 5.42 trillion in 2015 to Rs. 6.08 trillion in 2016. The analysis of advances reveals that Non- Performing Loans (NPL) decreased by 6.01 percent in 2016 whereas, provision against NPL also decreased by 0.60 percent as compared to 2015.

In terms of profitability of banking sector, CY 2016 witnessed a decline both in profits before taxation and profit after taxation. Profit before taxation decreased from Rs. 326.89 billion in 2015 to Rs. 319.31 billion in 2016. Profit after taxation decreased to Rs. 193.19 billion in 2016 from Rs. 195.16 billion in 2015. Decrease in profitability of banking sector is attributed to local and foreign banks as both documented downfall in their profit in 2016 as compared to 2015.

Figure- 3.2 Profit and Loss Account of 2015 and 2016



Islamic banking industry observed growth of 7.4 percent during the time of April to June 2016 as its assets reached to Rs. 1,745 billion. Deposits of Islamic Banking Institution also increased by 9.3 percent during the reviewed time. Market share of Islamic banking assets and deposits in overall banking industry raised at 11.4 percent and 13.2 percent respectively by end of June 2016. (Table 3.1).

Profit after tax of Islamic Banking Institutions was recorded at Rs. 6 billion by the end of June 2016 as compared to Rs. 4 billion by the end of June 2015. Among other profitability indicators, Return on Equity (ROE) and Return on Assets (ROA) were noted at 11.3

percent and 0.7 percent respectively during the review quarter that is, June 2015 and June 2016.

Table 3.1: Industry Progress and Market Share

	Industry Progress (Amount in Billions)			Growth (YoY Percent)		
	June 2015	March 2016	June 2016	June 2015	March 2016	June 2016
Total Assets	1,495	1,625	1,745	37.3	24.8	16.8
Deposits	1,281	1,336	1,461	3,7.4	19.0	14.1
Total Islamic Banking Institutions	22	22	22	22	22	22
No. of Islamic Banking Windows	1,006	1,064	1,062	1,006	1,064	1,062
Source: Data from the banks under Reporting Chart of Accounts.						

3.5 Islamic Banking Industry's Branch Network

The network of Islamic Banking Institutions consists of 22 Islamic Banking Institutions (IBIs); 5 full- fledged Islamic banks and 16 conventional banks having standalone islamic banking branches. Branch network of Islamic Banking Institutions was recorded as 2,146 branches spread across 98 districts by end of June 2016. Province wise division of branches shows that Punjab and Sindh jointly have 78 percent share in overall Islamic banking Institutions' branch network. The number of Islamic banking branches functioned by conventional banks having Islamic banking branches stood at 1,062 by the end of June 2016.

Table 3.2: Region Wise Branches (April- June 2016)

Province/ Region	Total Number	Share (Percent)
Punjab	1,016	47.3
Sindh	663	30.9
KPK	226	10.5
Baluchistan	84	3.9
Gilgit Baltistan	9	0.4
FATA	7	0.3
Federal Capital	110	5.1
AJK	31	1.4
Total	**2,146**	**100**

3.6 Assets and Liability Structure of Islamic Banking Institutions

Assets

Assets base of Islamic Banking Institutions witnessed growth of Rs. 120 billion (7.4 percent) during the quarter 2016 to June 2016 to reach Rs. 1,745 billion compared to Rs. 1.625 billion in the earlier quarter" that is, March 2016 to April 2016. Market share of Islamic banking Institutions in overall banking industry documented at 11.4 percent by the end of June 2016. The share of net financing and investments in total of Islamic Banking Institutions stood at 39.8 percent and 36.8 percent respectively at the end of the quarter April to June 2016.

Analysis of assets by breakup among Islamic banking and Islamic Banking Branches shows that assets of both increased by Rs. 57 billion (5.7 percent) and Rs. 63 billion (10.3 percent) respectively during the quarter April to June 2016. However, the share of Islamic Banking (60.9 percent) continued higher than that of Islamic Banking Branches (39.1 percent) in overall assets of Islamic Banking Institution.

Investments of Islamic Banking Institutions were recorded at Rs. 642 billion by the end of June 2016 compared to Rs. 587 billion in the previous quarter. Break up of investments between Islamic Banking and Islamic Banking Branches reveal that investment of Islamic Banking increased by Rs. 19 billion (6.1 percent) during the April to June 2016 compared to increase of Rs. 36 billion (13.1 percent) in investment of Islamic Banking Branches.

Financing and Related Assets

Financing and related assets of Islamic Banking Institution witnessed growth of Rs. 47 billion during the quarter April to June 2016 and reached Rs. 659 billion. Financing to deposits ratio of Islamic Banking Institution was at 47.6 percent by the end of June 2016. A further analysis of Financing to Deposit ratio shows that Financing to Deposit ratio of Islamic Banks remained higher (54.7 percent) compared to Financing to Deposit ratio of Islamic Banking Branches (IBBs) (36.5 percent). Among the various modes of financing (gross), Diminishing Musharaka remined the most preferred mode for financing as its share in overall financing of Islamic Banking Institution was recorded at 35.8 percent by the end

of June 2016. Muraabaha and Musharaka remained other main modes in overall financing of Islamic Banking Institution.

Table 3.3: Modes of Financing (Percent Shares)

	June 2015	March 2016	June 2016
Murabaha	24.8	22.1	20.1
Ijara	7.7	7.2	7.2
Musharaka	10.2	14.5	12.9
Diminishing Musharaka	34.7	32.4	35.8
Salam	5.6	5.3	3.3
Istisna	10.2	8.0	7.3
Others	6.7	10.6	13.4
Total	100.0	100.0	100.0

Liabilities

Deposits of Islamic Banking Institution depict a growth of Rs. 125 billion (9.3 percent) during the quarter April 2016 to June 2016 and reached to Rs. 1,461 billion compared Rs. 1,336 billion in the previous quarter." Thus, the market share of islamic Banking Institutions deposits in overall banking industry's deposits increased from 12.9 percent by the end of March 2016 to 13.2 percent by the end of June 2016. Both customers' deposits as well as financial institutions' deposits witnessed growth and grew by Rs. 106 billion (8.4 percent) and Rs. 19 billion (23.2 percent) respectively during April 2016 to June 2016.

The breakup of deposits shows that current and saving deposits increased by Rs. 71 billion and Rs. 33 billion respectively during April to June 2016. Deposits among Islamic Banking and Islamic Banking Branches reveals that deposits of Islamic Banking witnessed increase of Rs. 52 billion (6.2 percent) and Islamic Banking Branches witnessed increase of Rs. 73 billion (14.6 percent) respectively.

Liquidity Ratios

Liquid Assets of Islamic Banking Institution increased by Rs. 78 billion during April 2016 to June 2016 and recorded at Rs. 674 billion by the end of June 2016. Liquid Assets to Total Assets and liquid Assets to Deposits ratio depicted growth during the April 2016 to June 2016 as compared to previous quarter.

Table 3.4: Liquidity Ratios (in percent)

	June- 2015	March -2016	June- 2016	Industry
Liquid Assets to Total Assets	34.4	36.7	38.6	55.2
Liquid Assets to Deposits	40.1	44.6	46.2	77.0

Profitability

Profit after tax (PAT) of Islamic Banking Institution was recorded at Rs. 6 billion by the end of June 2016 compared to Rs. 4 billion by the end of June 2015. Return on Equity (ROE) of Islamic Banking Institution were recorded at 11.3 percent by the end of June 2016. Return on Assets (ROA) of Islamic Banking Institution were recorded at 0.7 percent during June 2016. Operating Expense to Gross Income of Islamic Banking Institution remained higher than that of overall banking industry.

Table 3.5: Profitability and Earnings of Islamic Banking Institution. (in percent)

	June- 2015	March- 2016	June- 2016	Industry
Return on Assets (ROA)	0.6	0.7	0.7	1.3
Return on Equity (ROE)	9.8	10.8	11.3	14.4
Operating Expense to Gross Income	66.0	77.6	75.6	51.0

Chapter 4

Methodology

4.1 Introduction

The importance of concentration ratios comes from its ability to capture structural features of the market. Concentration ratios are also able to reflect changes in concentration because of bank's entry into the market or bank's exits from the market. The main principles of concentration are number of banks and distribution of bank size in the market. There are many concentration ratios but in this chapter, we will focus on those concentration ratios which we used in our study.

We consider four concentration measures for finding market concentration in the banking sector of Pakistan and to decompose the concentration with respect to Islamic banks and conventional banks of Pakistan. The four concentration measures are the k bank concentration ratio, the Herfindahl-Herchman index, Theil's index 1 and Theil's index 2. All the four indices are calculated for each year, the indices in this study calculates using total assets and deposits of both banking stream since these two variables represents the size of banking market.

4.2 Theoretical Background

In general terms, there are four classical model of market structure and individual markets are classified into four categories a) perfect competition, b) monopolistic competition, c) oligopoly and d) monopoly. How these categories hold in the market depends upon market power assumed by one or more firms and according to definition market concentration (market concentration (in a particular market) refers to the degree to

which a small number of firms/banks provide a major portion of total production). If we refer banks to our classical model of market structure, banking sector which is close to monopoly is considered as (highly) concentrated and on the opposite, side a banking sector which is close to perfect competition is considered as low concentrated. Some measures have been constructed for quantifying concentration of markets. If a concentration measures indicates low concentration, then the market is competitive. On the other hand, if the concentration measure shows high concentration then the market is considered as close to monopolistic or oligopoly.

4.3 The Concentration Ratios

For finding market concentration we use the k bank concentration ratio, the Herfindahl-Hirchman index and Theil's indices (Theil's index 1 and Theil's index 2). Before discussion on each of these concentration measures, we describe their formulas and key features. Table 4.1 provides all the detail in this context.

Table 4.1: Comparative Analysis of used Concentration Measures

Name of Concentration Measures	Focus of the Measure	Mathematical Form	Range
The k Bank Concentration Ratio Jacob A. Bikker and Katharina Haaf (2002)	The market share of k bank concentration ratio takes only large banks into account.	$CR_k = \sum_{j=1}^{k} S_j$ Where S_j is defined as share of j bank in the market and k denotes the number of largest banks in the banking sector.	Zero and 1
The Herfindahl-Herchman Index Kwoka, J. (1985)	It considers all the banks in measuring concentration ratio.	$HHI = \sum_{j}^{k} S_j^2$	1/n and 1
Theil's Index I Theil, H. (1979)	Both the measures are primarily used to measure economic inequality.	$T_1 = \frac{1}{n}\sum_{i=1}^{n}\left(\frac{Y_i}{\bar{Y}}\right) ln\left(\frac{Y_i}{\bar{Y}}\right)$	Zero and $\log_n$
Theil's Index 2 Theil, H. (1996)		$T_2 = \frac{1}{n}\sum_{i=1}^{n}\left[ln\left(\frac{\bar{Y}}{Y_i}\right)\right]$	Zero and log (1/n)/n

Source: Constructed by the Authors based on Bikker and Haaf (2002)

We now discuss each measure one by one in simple words in the following sub-section.

4.3.1 The *k* Bank Concentration Ratio

The k bank concentration ratio is the most frequently used measure of concentration in the empirical literature because of its simplicity and limited data requirements. The main emphasizing of the k banks concentration ratio is on largest banks and give equal weight to all selected large banks, but neglects many small banks in the market. There is no rule of determination of the value of k, so that the number of banks included in the concentration index is a rather arbitrary decision. In practice setting the value of k equal to 3,4 and 5 is very common.

4.3.2 The Herfindahl-Herchman Index

From all the concentration measures one of the most widely used measure of concentration in theoretical literature is The Herfindahl-Herchman Index (HHI). It often serves as the bench mark for the evaluation of other concentration indices, In the United States, The HHI is used for antitrust laws in banking. The HHI is often called the full-information index because it captures the entire distribution of the bank sizes (Haaf, 2002). It incorporates each bank individually, so the arbitrary cut-offs and insensitivity to share distribution are avoided. However larger banks are given more weightage to smaller banks according to their shares. HHI can be interpreted as a generalization of k-bank concentration index by setting k=n and multiplying (assigning weight positive) each bank's by the share itself.

4.3.3 Theil's Measures

There are different measures of inequalities and among the most widely used are the Theil indexes. In our work, we are providing the application of Theil's indexes to measure concentration, which will suggest a different interpretation. We will use banks instead of households because we are interested in the decomposition of market concentration within banks or between banks.

Theil's index 1 {E (1)} is called the Theil Index by the name of author who first proposed it in 1967. Theil's index 2 is also known as Theil's L, and sometimes referred to as the mean log deviation measure. Both indexes, however, share an undesirable feature, that is, not being defined if there are zero value in data. It only can be calculated by replacing zeros with very small values. However, this problem will not arise when the measures are applied for market concentration. The reason is that no existing firm will have size zero.

4.4 Decomposition of Concentration Measures

The present study decomposes market concentration in banking system of Pakistan (both conventional and Islamic banks) to observe the relative amount of concentration within and between all banks of Pakistan.

4.4.1 Decomposition of the k Bank Concentration Ratio

For the decomposition of the k bank concentration ratio within Islamic and conventional banks we use the following equation.

$$CR = S^I CR^I + S^C CR^C$$

Where; CR represents the concentration ratio, CR^I is the concentration within Islamic banks, CR^C is the concentration ratio within conventional banks and S^I and S^C represents the shares of all Islamic and all conventional banks.

4.4.2 Decomposition of The Herfindahl-Herchman Index

$$HHI = (S^I)^2 HHI^I + (S^C)^2 HHI^C$$

HHI^I and HHI^C represent the Herfindahl-Herchman Index within Islamic banks and within conventional banks and $(S^I)^2$ is the square of shares of Islamic banks, $(S^C)^2$ is the square of shares of conventional banks. The first term represents market concentration within Islamic banks and second term represent market concentration within conventional banks.

4.4.3 Decomposition of Theil's Index 1 and Theil's Index 2

$$T_1 = S_I T_1^I + S_C T_1^C + S_1 ln\left(\frac{\bar{Y}^I}{\bar{Y}}\right) + S_C ln\left(\frac{\bar{Y}^C}{\bar{Y}}\right)$$

$$T_2 = P_I T_2^I + P_2 T_2^C + P_I ln\left(\frac{\bar{Y}}{\bar{Y}^I}\right) + P_C ln\left(\frac{\bar{Y}}{\bar{Y}^C}\right)$$

S_I and S_C are the shares of sales of all Islamic and all conventional banks respectively, while P_I and P_C are the proportion of Islamic and Conventional banks respectively. The first term in each case measures decomposition within the Islamic banks and second term in each case measures the decomposition within conventional banks and the third term measures of market concentration between Islamic and conventional banks.

4.5 Data

In order to measure concentration of firms in any industry, the first question is how to measure the size of firms in the industry. Size of a firm means the magnitude of its activities and is normally measured by its total tangible assets or total labor force. However, in the banking sector a bank's size is conventionally measure either by the size of its assets or the size of its deposits (liabilities) and obviously the two measures are very closely related. We also follow the same convention in our study and measure a bank's size alternatively by its assets and its liabilities. Data of assets and deposits of a bank are available from the bank's annual balance sheets.

Our study is based on annual data for the period 2006 to 2015. The reason for choosing this period for the analysis are that 2006 is the year when full independent Islamic banks were introduced in Pakistan, while 2015 is the latest year for which the required data could made available. The data on assets and deposits of banks are measured in million Pakistani rupees and is unconsolidated data. All the data are collected from annual reports of 5 Islamic banks and 23 conventional banks. The names of these banks are given in Table A1 of Appendix.

Chapter 5

Empirical Results

5.1 Introduction

In this chapter, we present the empirical results regarding concentration in the entire banking sector of Pakistan and within the categories of Islamic banks. Using number of measures as explained in Chapter 4, banking sector's concentration is measured on the basis of assets as well as deposits. Various indices of concentration are also decomposed to quantify the contributions of Islamic and conventional banks to the overall level of concentration in the banking industry.

The analysis is started in section 5.2 with k-bank concentration ratio, setting k=3,4,…..,10. This ratio, being a crude measure of concentration, is calculated for the entire banking system with no distinction between Islamic and conventional banks. In the next section (5.3) we present the results of Herfindahl- Herchman Index for the overall banking sector and its decomposition into Islamic and conventional banks. In section 5.4 we present the results of Theil's index 1 for the entire banking sector along with its decomposition with respect to Islamic and conventional banks. The same analysis is repeated in section 5.5 for Theil's index 2. Finally, the chapter is completed with some concluding remarks.

5.2 The k-Bank Concentration Ratios (K= 3, 4,..., 10)

Concentration ratios calculated on the basis of banks' assets for the largest number of banks k= 3, 4,…, 10 are presented in Table 5.1, while the corresponding concentration ratios calculated on the basis of bank's deposits are presented in Table 5.2

The degree of concentration in a market is measured by the proportion of assets or deposits controlled by the largest banks serving that market. Sum of the market share of three largest banks is 0.418 percent in 2006 and it decreased to 0.268 percent in 2015. Similar trend can be observed for the market share of five largest banks. All the estimated concentration ratios from CR_3 to CR_{10} show moderate competition from the year 2006 to 2014. The estimates show a declining trend of all the concentration ratio based on total assets which means that there is growing competition in the banking industry. This points towards increase in assets diversification over time. In 2015, the concentration level has decreased by greater margin as compared to the previous examined which indicates substantial increase in the level of competition in the banking industry. The reason for this change is that banks with small assets size in previous years (2006-2014) improved their assets and came in competition with the major banks of Pakistan. For instance, Meezan bank which was at ninth position in 2014 make its place at sixth position in 2015.

Table 5.1: The k Bank Concentration Ratio of Assets (All Banks)

Measures /Years	CR3	CR4	CR5	CR6	CR7	CR8	CR9	CR10
2006	0.418	0.506	0.577	0.642	0.705	0.748	0.790	0.829
2007	0.405	0.490	0.559	0.625	0.678	0.727	0.765	0.802
2008	0.411	0.497	0.567	0.634	0.685	0.725	0.761	0.796
2009	0.394	0.478	0.547	0.611	0.663	0.705	0.746	0.785
2010	0.388	0.472	0.539	0.600	0.647	0.694	0.739	0.778
2011	0.382	0.466	0.532	0.591	0.640	0.686	0.730	0.767
2012	0.400	0.482	0.550	0.608	0.656	0.698	0.736	0.772

2013	0.400	0.482	0.555	0.616	0.662	0.702	0.742	0.777
2014	0.388	0.470	0.544	0.609	0.660	0.699	0.737	0.774
2015	0.268	0.315	0.354	0.394	0.430	0.465	0.481	0.495

The k bank concentration ratios based on deposits are shown in Table 5.2. In terms of value of deposits, sum of market share of three largest banks was 0.429 percent in 2006 which is just 0.275 percent in 2015. Similarly, the sum of market share of ten largest banks was 0.843 percent in 2006 which reaches to 0.520 percent in 2015. It clearly advocates from this table, the declining trend of all the concentration ratios in the market and shows evidence of moderate concentration in the banking market. The value of all the concentration ratios in all the examined years except in 2015 show that both Islamic and conventional banking markets could be in the monopolistic competitive market structure. On the other hand, all concentration ratios in 2015 shows low concentration, which implies improvement in the level of competition. The reason for low concentration in 2015 is that bank with less deposits improved their deposits and come in competition with major banks like National Bank, Muslim Commercial Bank, etc. For example, to find sum of the market share of five largest banks Meezan Bank was not included in five largest banks as it was at ninth position but in 2015 Meezan Bank came in the list of five largest banks and compete with the banks with higher deposits. In conclusion, the market share of largest banks has been gradually decreasing over the study period. It shows that the largest banks have been losing the monopoly power in the Pakistani banking industry.

Table 5.2: The k bank Concentration Ratio of Deposits (All Banks)

Measures /Year	CR3	CR4	CR5	CR6	CR7	CR8	CR9	CR10
2006	0.429	0.516	0.596	0.665	0.718	0.764	0.809	0.843
2007	0.411	0.491	0.565	0.637	0.690	0.738	0.777	0.811
2008	0.420	0.503	0.578	0.653	0.696	0.738	0.779	0.816
2009	0.411	0.492	0.564	0.636	0.681	0.726	0.768	0.810
2010	0.373	0.449	0.517	0.583	0.646	0.691	0.735	0.774
2011	0.396	0.477	0.542	0.608	0.657	0.705	0.744	0.783
2012	0.403	0.479	0.551	0.615	0.662	0.705	0.742	0.780
2013	0.402	0.480	0.556	0.621	0.669	0.710	0.748	0.785
2014	0.398	0.475	0.550	0.617	0.667	0.710	0.752	0.791
2015	0.275	0.326	0.372	0.415	0.455	0.492	0.506	0.520

There are number of reasons for this improved completion in the banking sector of Pakistan. Following the gradual denationalization of banks in 1990s, the initial response in the banking sector was cautious because the process of reforms had just started and new banks were reluctant to make entry in the system. however, as time passed, it become easier to start a new bank. As a result, not only quite a few successful entries were made, but the new banks were also gradually able to create a space for their businesses. Reforms process in the banking sector started in the 1990s continued during the 2000s and the larger banks had to face increased competition from the new banks, which had modern outlook both in term of banking products and services and displayed much more customer friendly

atmosphere. Although larger banks also adopted to the modern trends, yet the new smaller banks benefitted more because of the 'first-mover's advantage' and were able to capture additional space in the business. All this resulted in increased competition in the banking market and declining values of the concentration indices as shown in the two tables.

5.3 Herfindahl-Herchman Indices

The Herfindahl -Herchman Index accounts for the number of firms in a market, as well as concentration, by incorporating the relative size (that is, market share) of all firms in a market. Herfindahl -Herchman Index has been determined in each year by considering all banks that in operation to measure the level of bank's concentration in entire banking industry.

The Herfindahl -Herchman Index of total assets are presented in Table 5.3 for the overall banking system. The results show moderate concentration in overall banking system that consists of both conventional and Islamic banks. We have also done a separate analysis for conventional and Islamic banks for Herfindahl -Herchman Index of total assets. The Herfindahl-Herchman Index ranges between 1/n and 1. However, based on Herfindahl-Herchman Index within conventional banks we conclude that the values lie more towards 1 which means from 2006 to 2015, the concentration level has been high within conventional banks. The estimated Herfindahl-Herchman index indicate towards monopolistic competition prevalent in the banking industry of Pakistan.

In 2006, the Islamic banks showed higher Herfindahl -Herchman Index, Meezan bank was at higher level according to assets. The Herfindahl -Herchman Index for Islamic

banks from 2006 to 2015 showed low concentration, which means that competition level in Islamic banking sector has been increased.

In Herfindahl-Herchman Index greater weights are attached to large banks. As the number of conventional banks are more in Pakistan so, greater weights are assigned to conventional banks. For example, in 2013 and 2014 about 93% weight was assigned to conventional banks and remaining 7% to Islamic banks. We assign weights to extract shares from both conventional and Islamic banks. We can observe from our results that contribution of conventional banks decreases as compared to Islamic banks. In 2006 conventional banks contribution was 99% and remaining 1% was of Islamic banks and by 2015 percentage contribution of conventional banks was 98% and 2% contribution was of Islamic banks.

Table 5.3: Herfindahl-Herchman Index of Assets (All Banks)

	Herfindahl-Herchman Index				Percentage Contribution to Index	
Years	Overall	Within Conventional banks	Within Islamic Banks	Weights of Conventional Banks	Conventional banks $(S^C)^2HHI^C$	Islamic banks $(S^I)^2HHI^I$
2006	0.089	0.092	0.593	0.984	99.83	0.17
2007	0.084	0.088	0.376	0.975	99.73	0.27
2008	0.085	0.090	0.342	0.969	99.61	0.39
2009	0.081	0.087	0.358	0.963	99.38	0.62
2010	0.079	0.087	0.312	0.953	99.13	0.87
2011	0.077	0.085	0.313	0.948	98.91	1.09

2012	0.082	0.091	0.325	0.943	98.7	1.3
2013	0.082	0.092	0.327	0.936	98.37	1.63
2014	0.080	0.091	0.375	0.933	97.88	2.12
2015	0.082	0.093	0.353	0.927	97.68	2.32

In table 5.4 the overall banking sector (both Islamic and conventional banks) shows moderate concentration. In other words, there is monopolistic competition in deposit market. The Herfindahl -Herchman Index for conventional banks of deposit market is more towards its upper tail which indicates that banks are competing. In case of Islamic banks the Herfindahl-Herchman Index in 2006 was 0.735, which was higher than other years, showing more concentration in this year that is, 2006. The reason is that in this year the number of Islamic banks was only three. However, after 2006 as the number of banks increased, our result show less concentration, which means increased competition in Islamic banks.

The Herfindahl -Herchman Index assign greater weights to the banks with higher market share. The number of conventional banks are more in Pakistan as compared to Islamic banks. It is obvious that conventional banks have greater market share so, greater weights are assigned to conventional banks and remaining are given to Islamic banks.

After assigning weights the last two columns in Table 5.4 show percentage contribution of conventional banks and Islamic banks to the overall level of concentration. The contribution of conventional banks to market share was more than Islamic banks. Our results show that percentage share of conventional banks has been decreasing after 2009

and Islamic banks contribution has been increasing but it remained much less than the contribution of conventional banks.

Table 5.4: Herfindahl-Herchman Index of Deposits (All Banks)

	Herfindahl-Herchman Index				Percentage contribution to index	
Years	Overall	Within Conventional Banks	Within Islamic Banks	Weights of Conventional Banks	Conventional banks $(S^C)^2HHI^C$	Islamic banks $(S^I)^2HHI^I$
2006	0.093	0.095	0.735	0.986	99.85	0.15
2007	0.086	0.090	0.434	0.976	99.71	0.29
2008	0.088	0.093	0.382	0.969	99.58	0.42
2009	0.086	0.092	0.375	0.961	99.33	0.67
2010	0.082	0.090	0.322	0.950	99.03	0.97
2011	0.081	0.090	0.320	0.944	98.77	1.23
2012	0.082	0.092	0.327	0.938	98.45	1.55
2013	0.083	0.094	0.335	0.932	98.12	1.88
2014	0.083	0.094	0.383	0.926	97.5	2.5
2015	0.083	0.096	0.365	0.916	96.88	3.12

5.4 Theil's Index 1

Table 5.5 presents the results of Theil's first index of concentration. The first block shows the results for the overall banking system. As in the previous tables here again we find that market concentration of banks has been moderately decreasing overtime, which indicates increase in competition in Pakistani banking market. Conventional banks are also

indicating moderate concentration overtime but in 2015 the concentration level was lower as compared to previous years because in this year the number of larger banks were less than the previous year. In other words, in 2015 competition level was relatively higher. The results of concentration within Islamic banks show that concentration level has been decreasing overtime, which indicates that the level of competition has been increased in Islamic banking market.

While calculating Theil's indices that is, Theil's index one and Theil's index two one new classification emerges that includes the contribution of concentration between conventional and Islamic banks besides the contribution of concentration within conventional and within Islamic banks.

We have decomposed the overall concentration in three categories that is, within conventional banks, within Islamic banks and between conventional and Islamic banks. The number of conventional banks are more than Islamic banks in Pakistan, the assets concentration is more towards conventional banks. Greater weight is assign to conventional banks as compared to Islamic banks. For example, in 2006 98% weights is assigned to conventional banks and remaining 2% to Islamic banks.

The results of within conventional banks concentration indicate moderate contribution of conventional banks to overall market share. Within Islamic banks concentration show that contribution of Islamic banks is increasing. The result shows that the contribution of assets disparity between Islamic and conventional banking system is larger than contribution of Islamic banks but is less than the contribution of conventional banks. Another notable observation is that, as expected, concentration of assets within conventional banks has been the main contributor to the market concentration.

Table 5.5: Theil's Index (T1) of Assets (All Banks)

	Theil's First Index (T1)				Contribution to Overall Ratio		
Years	Overall	Within Conventional Banks	Within Islamic Banks	Weights of Conventional Banks	Within Conventional Banks	Within Islamic Banks	Between Conventional and Islamic Banks
2006	0.618	0.510	0.586	0.984	81.23	1.46	17.31
2007	0.590	0.474	0.363	0.975	78.34	1.52	20.14
2008	0.588	0.488	0.301	0.969	80.58	1.53	17.89
2009	0.552	0.463	0.327	0.963	80.76	2.18	17.06
2010	0.524	0.455	0.245	0.953	82.67	2.29	15.05
2011	0.501	0.439	0.239	0.948	83.20	2.40	14.40
2012	0.524	0.472	0.251	0.943	84.92	2.67	12.40
2013	0.510	0.461	0.256	0.936	84.71	3.14	12.16
2014	0.476	0.417	0.358	0.933	81.72	5.04	13.24
2015	0.416	0.348	0.337	0.927	77.40	6.01	16.59

In Table 5.6 the scores generated by Thiel's first index in case of deposits in overall banking system are shown. The tables show that the concentration has been moderately decreasing but in 2015 Theil's First Index is 0.431 which is much lower. The results of within conventional banks show moderate concentration which means that there is

monopolistic competition. Within Islamic bank column showed mix result that is, year to year fluctuation with no secular trend.

The contribution of within conventional banks is now smaller as compared to k - bank concentration ratios and Herfindahl -Herchman Index because some of the concentration is now also explained by the third category, that is, concentration between conventional and Islamic banks. After assigning weights the concentration of deposits within Islamic banks is increasing. The market share of Islamic banks has been higher than its number of banks in market. The last column is increasing steadily but its contribution is more than Islamic banks but less than conventional banks.

Table 5.6: Theil's Index (T1) of Deposits (All Banks)

	Theil's First Index (T1)				Contribution to Overall Ratio		
Years	Overall	Within Conventional Banks	Within Islamic Banks	Weights of Conventional Banks	Within Conventional Banks	Within Islamic Banks	Between Conventional and Islamic Banks
2006	0.627	0.548	0.584	0.986	86.26	1.28	12.46
2007	0.62	0.5	0.491	0.976	78.71	1.94	19.35
2008	0.624	0.522	0.387	0.969	81.09	1.92	16.99
2009	0.594	0.509	0.371	0.961	82.18	2.52	15.29
2010	0.553	0.489	0.268	0.95	84.69	2.35	13.56
2011	0.534	0.48	0.256	0.944	85.02	2.62	12.36
2012	0.538	0.494	0.257	0.938	86.22	2.98	10.8

2013	0.528	0.485	0.271	0.932	85.61	3.6	10.8
2014	0.506	0.455	0.375	0.926	83.4	5.53	11.07
2015	0.431	0.375	0.362	0.916	79.77	6.98	13.26

5.5 Theil's Index 2

Table 5.7 show the results obtained by measuring Theil's second measure. The first column overall banking system show a decreasing trend but this decrease is slow indicating moderate concentration throughout period of analysis. Within conventional banks also indicates moderate concentration hence showing monopolistic competition.

Islamic banks in third column show mix results which also indicate moderate concentration. Coming now to the last blocks it is noticeable that Theil's second measure produces large contribution within conventional banks and Islamic banks than Theil's first measure. The reason is that Theil's second measure assigns largest weight (based on number of banks).

Second column within Islamic banks indicates that contribution of banks is slightly increasing each year. The results show that the contribution of banks within conventional and Islamic banking system has been substantially smaller than the contribution of banks between Islamic and conventional banks.

Table 5.7: Theil's Index (T2) of Assets (All Banks)

	Theil's Second Index (T2)				Contribution to Overall Ratio		
Years	Overall	Within Conventional Banks	Within Islamic Banks	Weights of Conventional Banks	Within Conventional Banks	Within Islamic Banks	Between Conventional and Islamic Banks
2006	0.932	0.738	0.646	0.852	67.38	10.3	22.32
2007	0.81	0.65	0.357	0.821	65.93	7.9	26.17
2008	0.786	0.678	0.297	0.821	70.87	6.74	22.39
2009	0.729	0.636	0.319	0.821	71.74	7.82	20.44
2010	0.667	0.616	0.25	0.821	75.86	6.75	17.39
2011	0.627	0.588	0.23	0.821	77.16	6.55	16.29
2012	0.633	0.612	0.224	0.821	79.46	6.32	14.22
2013	0.631	0.62	0.229	0.815	80.03	6.66	13.31
2014	0.626	0.584	0.356	0.808	75.52	10.88	13.6
2015	0.525	0.446	0.38	0.792	67.24	15.05	17.71

Table 5.8 The Theil's second index statistics for all the year under consideration indicates decreasing trend for all the first three block in the Table, that is, overall, within conventional banks and within Islamic banks. This decreasing trend shows that for all these columns concentration is decreasing showing competition is increasing each year except

in 2015 in Islamic banks where Theil's second measure increases to 0.41 in 2015 from 0.382 in 2014.

After assigning weights the contribution of conventional and Islamic banks shows both increasing and decreasing trend but in 2015 share of conventional bank to overall ratio has been decreased from 79% (2014) to 72% and share of Islamic banks to overall ratio has been increased from 10% to 14%. In last column, the degree of share between Islamic and conventional banks has been decreasing almost steadily over the year.

Table 5.8: Theil's Index (T2) of Deposits (All Banks)

	Theil's Second Index (T2)				Contribution to overall ratio		
Years	Overall	Within Conventional Banks	Within Islamic Banks	Weights of Conventional Banks	Within Conventional Banks	Within Islamic Banks	Between Islamic and Conventional Banks
2006	1.014	0.879	0.744	0.885	76.73	8.48	14.79
2007	0.936	0.759	0.538	0.821	66.67	10.26	23.08
2008	0.899	0.791	0.407	0.821	72.22	8.11	19.67
2009	0.832	0.754	0.393	0.821	74.52	8.41	17.07
2010	0.74	0.707	0.281	0.821	78.51	6.76	14.73
2011	0.711	0.697	0.254	0.821	80.56	6.34	13.1
2012	0.697	0.702	0.232	0.821	82.76	5.89	11.35

2013	0.712	0.725	0.246	0.815	83.01	6.32	10.67
2014	0.714	0.701	0.382	0.808	79.38	10.24	10.38
2015	0.586	0.54	0.41	0.792	72.99	14.53	12.48

We conclude from the above results that the degree of concentration has been much higher within Islamic banks as compared to conventional banks. The reason is that while in the conventional category there are quite a few large banks like Habib Bank Ltd, United Bank Ltd, Muslim Commercial Bank Ltd, etc., only one Islamic bank, The Meezan Bank can be regarded as large within the category of Islamic banks. This makes the concentration ratio smaller in conventional banks as compared to Islamic banks. It can also be observed from various tables that despite high degree of concentration in Islamic banks, the overall degree of concentration of the entire banking sector remains relatively low. This is because despite having reasonably good progress, Islamic banks still occupy a small share in the banking market. When concentration indices of the two categories of banks are combined according to their respective weights, more weight is assigned to conventional banks (having smaller concentration indices) that as a group occupy a very large share in the banking sector.

Chapter 6

Summary and Conclusion

This study has been an attempt to analyze the degree of market concentration in the banking sector of Pakistan. For this purpose, four measures of concentration are applied. These are k-banks concentration ratio for k = 3, 4 ,..., 10; Herfindahl- Herchman index and the two entropy measured proposed by Theil. The k- bank concentration ratio considers the market share of a fixed number of largest banks. Herfindahl- Herchman index, on the hand, is based on market share of all the banks but it assigns larger weight to larger banks and smaller weight to smaller banks according to their market share. The index is decomposable into concentration indices in two or more sub- categories of banks. The two measures of Theil are more comprehensive as compared to the k-banks concentration and Herfindahl- Herchman index and are neatly decomposable into concentration indices in two or more sub- categories of banks plus the concentration ratio between the categories.

Thus, the study has employed all the above measures not only to quantify the degree of concentration in the banking sector of Pakistan but also to observe its robustness or sensitivity with respect to the measure of concentration. The study also decomposes the overall degree of concentration indices into two categories, namely Islamic and conventional banks. All the concentration ratios are measured on the basis of banks' assets as well as banks' deposits. The study uses annual data for the period 2006 to 2015, which are collected from the balance sheets of the respective banks from their annual reports.

Empirical results on various measures of concentration employed in the study show evidence that the degree of concentration in the banking sector of Pakistan has improved

over the period of analysis and the same trend holds for both the streams of the banking market, that is, Islamic and conventional banks. This observation reflects increased level of competition in the banking market of Pakistan. The study also finds that the level of competition is greater among conventional banks as compared to Islamic banks. There are five Islamic banks in Pakistan and one of them, namely Meezan Bank ltd occupies a lion's share in the market. This accounts for the relatively high values of various concentration indices within the category of Islamic banks.

The study further finds that despite greater level of concentration within the category of Islamic banks, the contribution of Islamic banks towards the overall level of concentration has been quite small. This result holds because conventional banks are still occupying a lion's share of the banking market and Islamic banks need more time and efforts to gain any sizable share in the market.

The above results are robust with respect to the variable used to quantify banks' size (that is, assets or deposits) and the measures of concentration employed (particularly Herfindahl- Herchman index and Theil's indices 1 and 2).

Based on above findings, the study arrives at the conclusion that banking sector of Pakistan is quite competitive and the level of competition has been increasing over the years. Intensity of competition is also reflected in the pace at which new banking products are introduced in the market and the way banks are engaged in vigorous advertising campaigns.

Islamic banks started with an appeal to religion but these banks need to do much more if they want to gain substantial inroads in the market. In particularly, they need to

ensure and convince the potential customers that their products are Islamic in letter and spirit. Secondly, they also need to make their products economically attractive for the potential customers.

6.1 Limitations of the Study

The research in this study is subject to certain limitations. Observing attractive business prospects in Islamic banking, some of the conventional banks have also opened windows for Islamic banking. As such the way, a concentration index is decomposed into two categories becomes questionable. As the inclinations towards Islamic banking picks up, it will become more and more questionable to make a sharp distinction between Islamic and conventional banks. At the same time, in their efforts to benefit from the appeal of religion, the banking sector has the tendency to create new products that are Islamic more in cosmetics than in true spirit, which will further create doubts about the distinction between Islamic and conventional banks. However, this trend needs to be checked by the regulatory agencies, particularly the State bank of Pakistan.

6.2 Policy Implications

The finding gives several important policy implications; firstly, we need to implement the policy that promotes enough degree of concentration and competition in the banking. Hence, banks in Pakistan banking industry need a contestable market environment to make them earn higher profit and operate efficiently. Secondly, intensifying the level of competition that is, the level of competition in the Pakistani banking market need to be intensified with the sufficient number of banking firms with appropriate sizes. The existence of larger banks is still needed in our banking market in

order to remain their operation in an increasing competitive edge. Thirdly, the banking market with ideal level of concentration and competition should be promoted to maintain the stability in the dual banking system of Pakistan and at the mean time may enable the banking firms to compete with their peers.

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Appendix A1

List of Banks

Conventional banks

1. National Bank
2. Habib Bank Limited
3. United Bank Limited
4. Muslim Commercial Bank
5. Bank Al Falah
6. Allied Bank Limited
7. Standard Chartered Bank
8. Askari Bank
9. Bank of Punjab
10. Habib Metropolitan Bank Ltd.
11. Faysal bank
12. Bank Al Habib
13. Citi Bank
14. Soneri Bank
15. Silk Bank
16. NIB
17. The Bank of Khyber
18. KASB
19. PPCB
20. JS bank
21. First Women Bank

22. Samba Bank

23. Summit Bank

Islamic Banks

1. Meezan Bank
2. Dubai Islamic Bank
3. Bank Islami Pakistan
4. ALBARKA Bank
5. Burj Bank

Appendix A2

Table 1. The *k* Bank Concentration Ratio of Assets in Conventional Banks

Measures /Year	CR3	CR4	CR5	CR6	CR7	CR8	CR9	CR10
2006	0.424	0.514	0.586	0.652	0.716	0.760	0.803	0.842
2007	0.415	0.503	0.573	0.641	0.696	0.746	0.784	0.822
2008	0.425	0.513	0.585	0.655	0.707	0.748	0.785	0.821
2009	0.409	0.496	0.568	0.635	0.688	0.732	0.775	0.815
2010	0.407	0.496	0.565	0.629	0.679	0.728	0.775	0.817
2011	0.403	0.491	0.561	0.624	0.676	0.724	0.770	0.809
2012	0.424	0.512	0.583	0.645	0.696	0.740	0.781	0.818
2013	0.427	0.514	0.593	0.658	0.707	0.750	0.792	0.830
2014	0.416	0.504	0.583	0.653	0.707	0.749	0.749	0.789
2015	0.289	0.340	0.383	0.383	0.422	0.459	0.477	0.492

Table 2. The *k* Bank Concentration Ratio of Assets in Islamic Banks

Measures /Year	CR3	CR4	CR5	CR6	CR7	CR8	CR9	CR10
2006	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2007	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2010	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2011	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2012	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2013	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2014	0.000	0.000	0.000	0.000	0.000	0.000	0.569	0.569
2015	0.000	0.000	0.000	0.534	0.534	0.534	0.534	0.534

Table 3. Decomposition of The *k* Bank concentration of Assets in Conventional banks

Years	$S^{C}CR3$	$S^{C}CR4$	$S^{C}CR5$	$S^{C}CR6$	$S^{C}CR7$	$S^{C}CR8$	$S^{C}CR9$	$S^{C}CR10$
2003	0.418	0.506	0.577	0.642	0.705	0.748	0.79	0.829
2004	0.405	0.49	0.559	0.625	0.678	0.727	0.765	0.802
2005	0.411	0.497	0.567	0.634	0.685	0.725	0.761	0.796
2006	0.394	0.478	0.547	0.611	0.663	0.705	0.746	0.785
2007	0.388	0.472	0.539	0.6	0.647	0.694	0.739	0.778
2008	0.382	0.466	0.532	0.591	0.64	0.686	0.73	0.767
2009	0.4	0.482	0.55	0.608	0.656	0.698	0.736	0.772
2010	0.4	0.482	0.555	0.616	0.662	0.702	0.742	0.777
2011	0.388	0.47	0.544	0.609	0.66	0.699	0.699	0.736
2012	0.268	0.315	0.354	0.354	0.391	0.425	0.442	0.455

Table 4. Decomposition of The *k* Bank concentration of Assets in Islamic

Years	$S^{I}CR3$	$S^{I}CR4$	$S^{I}CR5$	$S^{I}CR6$	$S^{I}CR7$	$S^{I}CR8$	$S^{C}CR9$	$S^{I}CR10$
2006	0	0	0	0	0	0	0	0
2007	0	0	0	0	0	0	0	0
2008	0	0	0	0	0	0	0	0
2009	0	0	0	0	0	0	0	0
20010	0	0	0	0	0	0	0	0
20011	0	0	0	0	0	0	0	0
20012	0	0	0	0	0	0	0	0
2013	0	0	0	0	0	0	0	0
2014	0	0	0	0	0	0	0.038	0.038
2015	0	0	0	0.039	0.039	0.039	0.039	0.039

Table 5. The *k* bank Concentration Ratio of Deposits in Conventional Banks

Measures /Year	CR3	CR4	CR5	CR6	CR7	CR8	CR9	CR10
2006	0.435	0.523	0.604	0.675	0.728	0.775	0.820	0.855
2007	0.421	0.503	0.579	0.653	0.707	0.757	0.797	0.831
2008	0.434	0.519	0.597	0.674	0.719	0.762	0.804	0.842
2009	0.428	0.512	0.587	0.662	0.709	0.756	0.800	0.843
2010	0.418	0.503	0.503	0.577	0.647	0.698	0.748	0.792
2011	0.420	0.505	0.575	0.644	0.696	0.747	0.788	0.829
2012	0.429	0.511	0.587	0.656	0.706	0.752	0.792	0.832
2013	0.432	0.516	0.597	0.666	0.718	0.762	0.803	0.843
2014	0.430	0.513	0.593	0.666	0.720	0.766	0.766	0.808
2015	0.300	0.356	0.356	0.403	0.446	0.487	0.502	0.502

Table 6. The *k* bank Concentration Ratio of Deposits in Islamic Banks

Measures /year	CR3	CR4	CR5	CR6	CR7	CR8	CR9	CR10
2003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2006	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2007	0.000	0.000	0.145	0.145	0.145	0.145	0.145	0.145
2008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2010	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2011	0.000	0.000	0.000	0.000	0.000	0.000	0.576	0.576
2012	0.000	0.000	0.550	0.550	0.550	0.550	0.550	0.715

Table 7. Decomposition of The k Bank Concentration of Deposits in Conventional banks

Years	$S^{C}CR3$	$S^{C}CR4$	$S^{C}CR5$	$S^{C}CR6$	$S^{C}CR7$	$S^{C}CR8$	$S^{C}CR9$	$S^{C}CR10$
2006	0.429	0.516	0.596	0.665	0.718	0.764	0.809	0.843
2007	0.411	0.491	0.565	0.637	0.69	0.738	0.777	0.811
2008	0.42	0.503	0.578	0.653	0.696	0.738	0.779	0.816
2009	0.411	0.492	0.564	0.636	0.681	0.726	0.768	0.81
2010	0.397	0.478	0.478	0.549	0.615	0.664	0.711	0.752
2011	0.396	0.477	0.542	0.608	0.657	0.705	0.744	0.783
2012	0.403	0.479	0.551	0.615	0.662	0.705	0.742	0.78
2013	0.402	0.48	0.556	0.621	0.669	0.71	0.748	0.785
2014	0.398	0.475	0.55	0.617	0.667	0.71	0.71	0.748
2015	0.275	0.326	0.326	0.369	0.408	0.445	0.459	0.459

Table 8. Decomposition of The k Bank Concentration of Deposits in Islamic

Years	$S^{I}CR3$	$S^{I}CR4$	$S^{I}CR5$	$S^{I}CR6$	$S^{I}CR7$	$S^{I}CR8$	$S^{I}CR9$	$S^{I}CR10$
2006	0	0	0	0	0	0	0	0
2007	0	0	0	0	0	0	0	0
2008	0	0	0	0	0	0	0	0
2009	0	0	0	0	0	0	0	0
2010	0	0	0.007	0.007	0.007	0.007	0.007	0.007
2011	0	0	0	0	0	0	0	0
2012	0	0	0	0	0	0	0	0
2013	0	0	0	0	0	0	0	0
2014	0	0	0	0	0	0	0.042	0.042
2015	0	0	0.047	0.047	0.047	0.047	0.047	0.061