VOLITILITY IN STOCK MARKET AND PERFORMANCE OF BANKING INDUSTRY IN PAKISTAN

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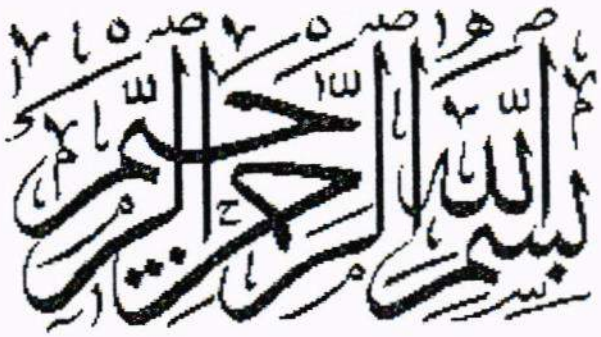

In the name of Allah, the most merciful and beneficent

DEDICATION

I dedicate this thesis to my parents, my teachers and my supervisor whose support and guidance enabled me to complete this research study successfully.

(Acceptance by the Viva Voice Committee)

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APPRECIATION AND GRATITUDE

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Mr. Saif-ul-Rahman

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CHAPTER 1

Introduction

1.1 Background

Banking sector plays a very important role in the economic development of a country. The economic health of a nation is affected by the soundness of banking system prevailing in the country. Although banks do not create wealth directly, indirectly they make the trading process easy, so businesses flourish in the country and it is beneficial for the economy as a whole. In the modern world. banks became the essential part of the trading system. They facilitate buying and selling process within and outside the country. All the cross country transection accomplished with the help of banks. So the progress of banking system is as necessary as the progress of country itself. Iimi (2004) argued that generally, in developing countries, allocation of funds by banks has a great impact on the economic growth of the country.

Similarly, Chatzoglou et al. (2010) claimed that it is necessary for the financial improvement of banks to make and apply efficient strategies that lead towards high profitability. Development of banking system will translate into the economic progress of country. And likewise economic progress of country encourages the growth of its financial sector (Hondroyiannis et al. (2005). Liang (2005) described that development in financial sector have played important role in the economic development in China. So it can be concluded that development of banking industry and economic development of country go side by side with each other.

Banking system in Pakistan was established over a period of time. Ali et al. (2011) claimed that due to lack of capital and political conditions of the country, banking system has been undergone a state of rapid changings. From the time of independence policies of government have influenced the financial structure of country. As mentioned in Iimi (2004), in the mid of 1970s, government of Pakistan took steps in nationalizing its domestic banks. As a result, state owned banks have leading impact on decisions of financial side of the country. However, in the late 1980s, government again took decision to privatize state owned banks to strengthen financial industry so that it can compete with financial sector of developing countries (Iimi, 2004). In past years, interest rates of banks were policy administered, and sometimes too low that gives negative real returns due to high inflation in the country. Low interest rate adversely affects economic growth in the country as well (Khan et al., 2005). Arif and Anees (2012) argue that in 1997, State Bank of Pakistan (SBP) came to be an independent organization for administration of banking industry in Pakistan. From then, the SBP observes every bank to make it sure that each of them is following predefined rules and regulation.

Development of banking contributes in development of country. There are many factors which are affecting the performance of banking industry and a lot of research is done on this topic. For example, Ali et al. (2011) found the effect of macroeconomic and bank-specific indicators on the profitability of banks. Their results show that profitability of conventional banks is affected by efficient asset management, credit risk, capitalization, operating efficiency, and economic growth in Pakistan. Al-Tamimi and Charif (2011) documented that bank size matters to the

performance of banks. Their study concluded that generally banks of large size perform better than small size banks.

There are some other factors/variables on which no empirical work has been done in Pakistan, such as the stock market volatility. The stock market volatility is basically the variation that comes in the prices of stocks. Sometimes price goes up and sometimes it suddenly decreases due to market crash or other reasons. These unexpected variations affect every player of stock exchange either they are individual or institutional investors. Tan and Floros (2012) concluded that price variations in stock market create a risk and every rationale investor tries to save himself from that risk. In this case, mostly investors have two options. First one is to withdraw all investment and buy the securities of financial intermediaries to transfer the risk. Second option is to withdraw the money, deposit into bank, and wait until the situation of stock market becomes normal. In both the cases, the investor goes towards banks or financial institutions.

These deposits definitely affect the profitability of banks. Garcia-Herrero et al. (2009) argued that these deposits affect positively the profitability of banks, when they explained the causes of low profitability of Chinese banks for the period 1997-2004. These deposits also help banks to provide liquidity to its customers. Akhtar et al. (2011) claimed that deposits assit banks to provide liquidity and fulfill loan requests by customers. So they play an important role in the working of banking system.

In this situation, banks are in the direct link with these price fluctuations of stock market. Of course, this volatility affects the performance of banks either in

positive or negative way. So the increased deposits from the investors also have an impact on the profitability of banks. Indeed, there is some empirical evidence on the existence of the relationship between volatility in stock market and banking sector performance in some developed countries. For example, Tan and Floros (2012) proclaimed that the stock market volatility positively affects the banking performance in China if banking performance in measured in term of return on equity (ROE) and excess return on equity (EROE). However, they show that the volatility has not a significant impact on banking performance if the performance is measured in terms of net interest margin (NIM) or economic value added (EVA).

The present study has contributed into the literature by examining the relationship between stock market volatility and banks' performance in Pakistan over the period of eight years from 2006 to 2013. The study also aims to calculate the marginal effect of bank size on the volatility-performance relation.

1.2 Research Gap

Many studies have been conducted worldwide that show the positive relationship between risk and returns. The example of these studies are Armour and Teece (1978), Neumann et al. (1979), Bowman (1980), Treacy (1980), Conrad and Plotkin (1968), Cootner and Holland (1970) and Hurdle (1974). However, there are many others who are in point of view that in the presence of high risk, it is very difficult to get high returns. Specifically, Bowman (1980) found a negative relationship between risk and return known as Bowman's paradox. So according to this, if risk rises in a market, return will start to decrease. According to certainty effect discussed in prospect theory, if there is large risk prevailing in the market then people give less importance to the outcome that is merely probable as compared to the

outcome that is more certain (Kahneman and Tversky, 1979). So investor would prefer to invest where they get a certain return rather than risky market. Volatility in stock market is viewed as the risk prevailing in stock exchange. So in the presence of high volatility, investors would hesitate to invest in stock exchange. Rather, they try to find other investment opportunities with certain return e.g. term deposits and fixed deposits. Hence, riskiness of stock exchange affects the banking performance through increased deposits. However, when we review the literature, we did not find any empirical evidence on how the volatility of stock market affects banking sector's performance in Pakistan.

Bank size is another important factor that also affects the performance of banks. Many empirical studies revealed that banks with larger size perform better than small size banks. Examples of these studies are Al-Tamimi and Charif (2011), Fadzlan and Kahazanah (2009), and Koasmidou (2008). The rationale behind this nexus is "too big to fail" thinking of depositors as described by Santoos (2014). That is, the depositors have more trust on the banks with large size as compared to small size banks due to their size. Thus, they are likely to deposit their holdings in large banks. These deposits may affect the performance of banks. When there is high volatility in stock market, according to prospect theory, investors would deposit their money in banks, and due to "too big to fail" thinking of investors, they would prefer to deposit their holding in large banks. Janjua et al. (2014) concluded that in Pakistan, monetary tightening puts more burdens on smaller banks. Given all this, banks size may act as a moderator for the relationship between stock market volatility and banking performance. As per best of our knowledge, no one has investigated this relationship in Pakistan. Therefore, in this study, the role of bank size as a moderator

between stock market volatility and banking performance relationship is also examined empirically.

1.3 Problem Statement

In today's financial world, investors have lots of information through different sources like news channels, internet, business magazines, and many other ways. They take different steps to earn maximum gains with facing minimum risk. Different financial markets have emerged with the time to fulfill the needs of the investors e.g. stock markets, future exchanges and option markets. Allen and Santomero (1997) suggested that emerging market of derivatives like forwards, futures and options, are basically designed for institutions rather than individual investors.

When we talk in conventional terms normally individual investors have two main types of investment opportunities. First one is to go in stock market, invest directly in stocks of company, take risk and earn money accordance to the amount of risk they had taken. Secondly, investors can invest in term deposits and fixed deposits offered by different banks and earn a fixed amount of return without taking any risk. First option is relatively risker but more attractive in terms of gains but in second option risk is nearly equals to zero and return is also minute. So if conditions are better and favorable then investor would prefer to invest in stocks and earn money according to amount of risk they had taken but if investors are not earning adequate return based on the level of risk in stock market, it means stock market became risker or more volatile, then they would prefer to invest in term deposits and fixed deposits.

In this scenario, riskiness of stock market (volatility) will affect the performance of banks. In fact, Tan and Floros (2012) conducted a study to check the relationship

between stock market volatility and banking performance in China, and concluded that at the time of high volatility individual investors hesitate to invest in the stock market and mostly deposit their money into banks. So these increased deposits due to high volatility will affect the profitability of banks. Another study conducted by Angbazo (1997) concluded that the stock market volatility has more strong relationship with lending rate of banks than deposit rate. As per our knowledge, no empirical investigation has been done to check the presence of relationship between the stock market volatility and banking sector's profitability in Pakistan. So the present study investigates the relationship between stock market risk and banking performance. The study also explores the effect of bank size on the relationship between stock market risk and banking performance.

1.4 Research Objectives

Main objectives of this study are as follows:

- To measure the volatility in Karachi Stock Exchange using KSE-100 index data for the period of eight years (2006-2013) using the GARCH model.
- To investigate the impact of stock market volatility on performance of banks working in Pakistan.
- To investigate the impact of size of bank on the volatility-banking performance relationship.

1.5 Research Questions

This study attempts to answer the following research questions.

- How one can capture the unpredictable variations in share prices at Karachi Stock Exchange?

- Does there exist any relationship between the stock market volatility and performance of banks in Pakistan?
- What is the marginal effect of volatility in stock market on banking performance for different size of banks in Pakistan?

1.6 Purpose and Scope of Study

This research work focuses on the linkage between the financial institutions and financial markets of Pakistan. For the representation of financial institutions. data from public and private sector conventional banks are used. To measure the volatility in stock market data from Karachi Stock Exchange (KSE) are utilized. The KSE is the biggest stock exchange in Pakistan and it contributes more than 70 percent of stock transactions in Pakistan (Mohammad et al, 2009). There are two main purposes of this study, first one is to investigate the relationship between the stock market volatility and banking performance in Pakistan, and second is to gauge the impact of bank size on the relationship between volatility in Karachi Stock Exchange and performance of banks working in Pakistan.

The scope of this research is limited to Pakistan due to two main reasons. First, banking regulations are not same all over the world. There exists many differences in banking sector regulation across different countries. Hence, the results obtained from a single country cannot be generalized in all other countries. And secondly, Karachi Stock Exchange is not as efficient as other well-structured stock exchanges of the world. Hameed et al. (2006) concluded that Karachi Stock Exchange is weak form inefficient market which implies that information on historical prices of stocks are helpful in predicting future prices. Similarly, Riaz et al. (2013) used different measures to check the efficiency of Karachi Stock Market and found that the KSE is

weak form efficient when autoregressive model and run test were applied, but when variance ratio test is applied, they showed that KSE is not weak form efficient. They also argued that variance ratio test is more powerful tool so its results are more reliable.

Due to these differences the results obtain from Pakistani market cannot be generalized to all other countries.

1.7 Limitation of Study

Main limitation regarding this study is due to unavailability of long-term data. For this study we mainly relay on secondary data. But the problem is data of different banks are not available on their websites. Only limited data are present. Due to unavailability of long term data, we cannot enhance the generalizability of our research.

1.8 Research Contribution

This study is very important especially in the context of Pakistan where the stock market remains uncertain most of the time. According to Mohammad et al. (2009), Karachi Stock Exchange was the leading stock exchange and it was called "Best Performing Stock Market of the World for the year 2002". But there came a huge variation in the value of KSE-100 index in the last decade. In start of 2003, the index value was 2,701.41 while at the end of 2013, the value was 25,261.14[1]. While total listed capital and market capitalization also vary from time to time. A complete summary of progress report of Karachi Stock Exchange is shown in Table A.1 in the appendix. The study of this area would explore many implications for both

[1] From website of Karachi Stock Exchange

researchers and practitioners. The research findings would be valuable for the banks working in Pakistan.

To the best of our knowledge there is no previous study conducted in Pakistan that can explain the relationship between the stock market volatility and banks' performance. Logically, they both interlink with each other. Volatility in stock market affects every player of stock exchange including banks. This study covers the gap in the literature and presents the empirical evidence on the existence of relationship between the stock market volatility and banks' performance in Pakistan. This study also explains the marginal effect of stock market volatility on performance of banks with different size. And practically, this study also has significant implication for management of banks, as it gives support to the theory of optimal bank size. Conclusion of study shows a negative and statistically significant relation of volatility with banking performance. It also shows that in the time of high volatility management of the bank should not go to increase the size of bank.

CHAPTER 2

Theoretical Background

The empirical model that we estimated in this study is based on two well-known economic theories. Below, we discuss each one briefly.

A. Theory of Optimal Bank Size

The theory of optimal bank size basically describes the importance of bank size in determining the profitability of banks in the presence of non-diversifiable aggregate risk. This theory was given by Stefan Krasa and Anne Villamil in 1992. This theory has implication for size distribution of banks. As the size of a bank's portfolio increases its default probability will start to decline and also lender's cost of monitoring the bank will start to increase so bank has to choose the optimal portfolio size where the gains from decreased bank default probability are more than additional cost of monitoring. In theory of optimal bank size, it has been shown that both risk and cost considerations are important determinants of bank size.

Banks in general faces two main types risk, first one is related to their portfolio that is diversifiable and second is non-diversifiable macro risk. Both types of risk are important in determining the size of banks. As the size of bank starts to increase bank specific diversifiable risk starts to decline. So the bank-specific risk is negatively related to the size of bank. Second type of risk is non-diversifiable macro risk which is not related to banks' portfolio but it is risk present in the environment in general and uncontrollable for the management of the bank. Stock market volatility is also refers to such type of risk, which is not specific to any organization but it is

present in the economy. The theory of optimal bank size describes that bank size is also related to bank exposure of macro level risk (Krasa and Villamil, 1992).

The theory states that even when banks' portfolio is subjected to non-diversifiable macro risk, up to certain level as bank size rises it will improve the default probability of bank. However, bank size, after some critical point, is not optimal because it leads to increase monitoring costs. Krasa and Villamil (1992) also stated that a bank's exposure to macroeconomic risk is inversely related to the size of the bank. In the presence of macroeconomic risk, banks tend to decrease their size so that they can save themself from drastic impacts of risk (Krasa and Villamil, 1992).

B. "Too big to fail"

The term "too big to fail" is normally used to show the importance of size for an organization. Santoos (2014) described that the idea that some firms may be too big to fail appears to go back as far as 1975 in connection with Lockheed Corporation and the financial difficulties that firm experienced at the time.[2] The phrase too big to fail means that certain organizations specially financial institutions grow too large and so interconnected that their failure becomes very harmful for economy, so government or central bank must support them when they face difficulties. Santoos (2014) argued that larger banks have two main advantages over smaller banks. First is cost advantage due to their size and second, depositors' belief of too big to fail about large banks. This theory also links with the second hypothesis of our study, which asserts that riskiness of stock market affects large banks and small banks differently.

[2] In 2008, in his *New York Times* column on language, William Safire explained the origins of the phrase in "Too Big to Fail or to Bail Out?," which cited a 1975 *Business Week* article about Lockheed Corporation with the headline "When Companies Get Too Big to Fail." Sited in Santoos (2014).

When investors feel the presence of more risk in stock market, then they would prefer to deposit their money in large banks due to their believe of too big to fail.

CHAPTER 3

Literature Review

Financial crises are always the part of economy from the start of financial markets. These crises may vary in the severity of conditions. Most of the times, these are calculated according to the magnitude of companying economic contractions. The effect of these crises distributed to all the sectors of economy but financial sector has to bear the maximum effect (Al-Rjoub and Azzam, 2012). The stock market volatility is not a new concept. Rather, investors are facing it for the years. After the crash of New York Stock Exchange (NYSE) in October 1987 (also known as *black Monday* in history) and October 1989, this concept became popular (Schwert, 1990). Different authors define volatility differently. Schwert (1990) defines that the stock market volatility is basically dispersion of returns that is measured through standard deviation. So the volatility refers to variation. Hamilton and Lin (1996) said that due to these variations in stock prices, sometimes it becomes more riskier to invest in stocks rather than other investment oppertunities.

During the period of crises, the volatility of stock market reaches at peak level and the prices of stocks decreases in both types of markets i.e. developed and emerging. In newly emerged markets, these effects are quick, abrupt as well as long lasting (Patel and Sarkar, 1998). The stock market volatility affects banks' profitability is another important aspect. As mentioned earlier, banks use public deposits to invest further. So in this sense, banks play like investors and they have only concern with the rate of return that they earn in the volatile market. There exists

a positive but insignificant relationship between expected volatility and expected stock returns in the stock market of UK (Poon and Taylor, 1992).

French et al. (1987) also investigated the relationship between the volatility and expected stock returns by using different statistical techniques. They concluded that there exists a direct relationship between expected risk premiums and expected stock return volatility, and an inverse relation between unexpected volatility and unexpected stock returns. Baillie and DeGennaro (1990) proclaimed the presence of a weak relationship between volatility and returns on a stock portfolio. As referred earlier stock market volatility is basically the fluctuation that comes in the return of stocks. This will affect the behavior of investors. According to Ahmad and Zaman (1999) increased volatility in stock market is considered as higher risk in individual sector. So this increased risk will affect individual investment decision. Because of that, investment decisions of banks are also very likely to be effected by stock market volatility. According to Tan and Floros (2012), stock market volatility affects positively the performance of banks in China. This result holds regardless the performance is measured in terms of return on equity (ROE) or excess return on equity (EROE).

Albertazzi and Gambacorta (2009) utilized about five indicators of performance of banks to find the effect of stock market volatility on the performance of banks for major developed countries (Belgium, Austria, France, Italy, Germany, the Netherlands, the UK, Spain, and the USA) for the time period of 1981 to 2003. The indicators used in the research are non-interest income, net interest income, provisions, operating cost, profit before tax, and return on equity. They concluded that three out of five indicators are positively related to stock market volatility. These

indicators are non-interest income, net interest income, and return on equity. While one indicator is negatively related to stock market volatility, that is profit before tax. However, they show that there is significant relationship between provisions and stock market volatility. Albertazzi and Gambacorta (2010) conducted another research in which the taxation is considered as independent variable and profit after tax is used instead of return on equity. The findings reveal that non-interest income, profit after taxes and provisions are directly related to stock market volatility. And, net interest income is inversely related to stock market volatility.

Several bank-specific, industry-specific, and macroeconomic indicators also have significant impacts on the profitability of banks. For example, a strong positive relationship was observed between bank size and the profitability of banks (Pilloff and Rhoades, 2002). Ramlall (2009) and Sufian (2009) also found similar results. In particular, they found that bank size has a significant and positive impact on the profitability of banks. While there are many other studies suggesting a negative relationship between bank size and the profitability of banks like Koasmidou (2008) and Spathis et al. (2002).

Several studies reveal the importance of bank-specific variables in measuring the profitability of banks. For example, Wu et al. (2009) conducted a study to find the impact of financial development and bank characteristics on banking performance and concluded that non-traditional activities have a negative impact on the profitability of banks in China. Similarly, Garcia-Herrero et al. (2009) documented that bank capitalization is positively and significantly related to the banking profitability. They used five bank-specific variables as control variables in their empirical analysis. These variables are credit risk, capitalization, taxation, liquidity and non-traditional

activity. Some industry-specific factors also contribute towards the profitability of banks. For instance, Bourke (1989), Molyneux and Thornton (1992) used industry specific variables in their study. Athanasoglou et al. (2008) used ownership and concentration as industry specific variable in their model while studying the profitability of Greek banks. Albertazzi and Gambacorta (2009) reported that banking sector development and size of banking industry both affect positively and significantly the profitability of banks. Macroeconomic variables also have impacts on the performance of banks. Alexiou and Sofoklis (2009) claimed that inflation rate and economic growth of country have strong positive relation with the profitability of banks. Kunt and Detragiache (1998) suggested that both high inflation rate and little economic growth cause diseconomies of scale and lower the business of banks. There are some other studies that reported different relationships between these variables. For example, Ali et al. (2011) enlist two main indicators that play important role in determining the profitability of banks, namely GDP growth and inflation rate.

As we mentioned earlier, several studies in the literature have been examined the impact of stock market volatility in the profitability of banks. These studies including some others are Albertazzi and Gambacorta (2009), Albertazzi and Gambacorta (2010), and Angbazu (1997). A common finding emerging from these studies is that the volatility of stock market is significantly related to the profitability of banks. However, when reviewing the literature in Pakistan, we did not find any empirical evidence on the relationship between stock market volatility and banks profitability. Furthermore, we also do not know, how small and large banks respond to the volatility of stock market. Yet, understanding of the differential response of large and small banks to stock market volatility would enhance our knowledge

regarding the relationship between stock market volatility and banks' profitability. Therefore, this study aims to examine not only the impact of stock market volatility on banks' performance but also the role of bank size in formulating the volatility-performance relationship.

CHAPTER 4

Theoretical Framework and Model

As discussed earlier, there are many factors that can affect the financial performance of banks. This study attempts to incorporate the effect of most of these variables. In particular, for the purpose of analysis, we divided these variables in four different categories. The categories of variables are dependent, independent, moderator, and control variable. Banking performance is used as dependent variable in the study. Stock market volatility is our main independent variable. Other important variables, which are used to measure the performance of banks, are used as control variables. These control variables, according to their nature, are further divided into three groups. These groups of control variables are bank-specific variables, industry-specific variables, and macroeconomic variables. Bank-specific control variables consist of credit risk, liquidity, capitalization, and non-traditional activity. Industry-specific control variables are size of banking industry, landing to GDP ratio, and banking sector development. Macroeconomic variables are money market rate, GDP growth, and inflation rate. Bank size is used as moderator in the relationship between stock market volatility and banking performance. Theoretical framework of the study is shown in the following diagram.

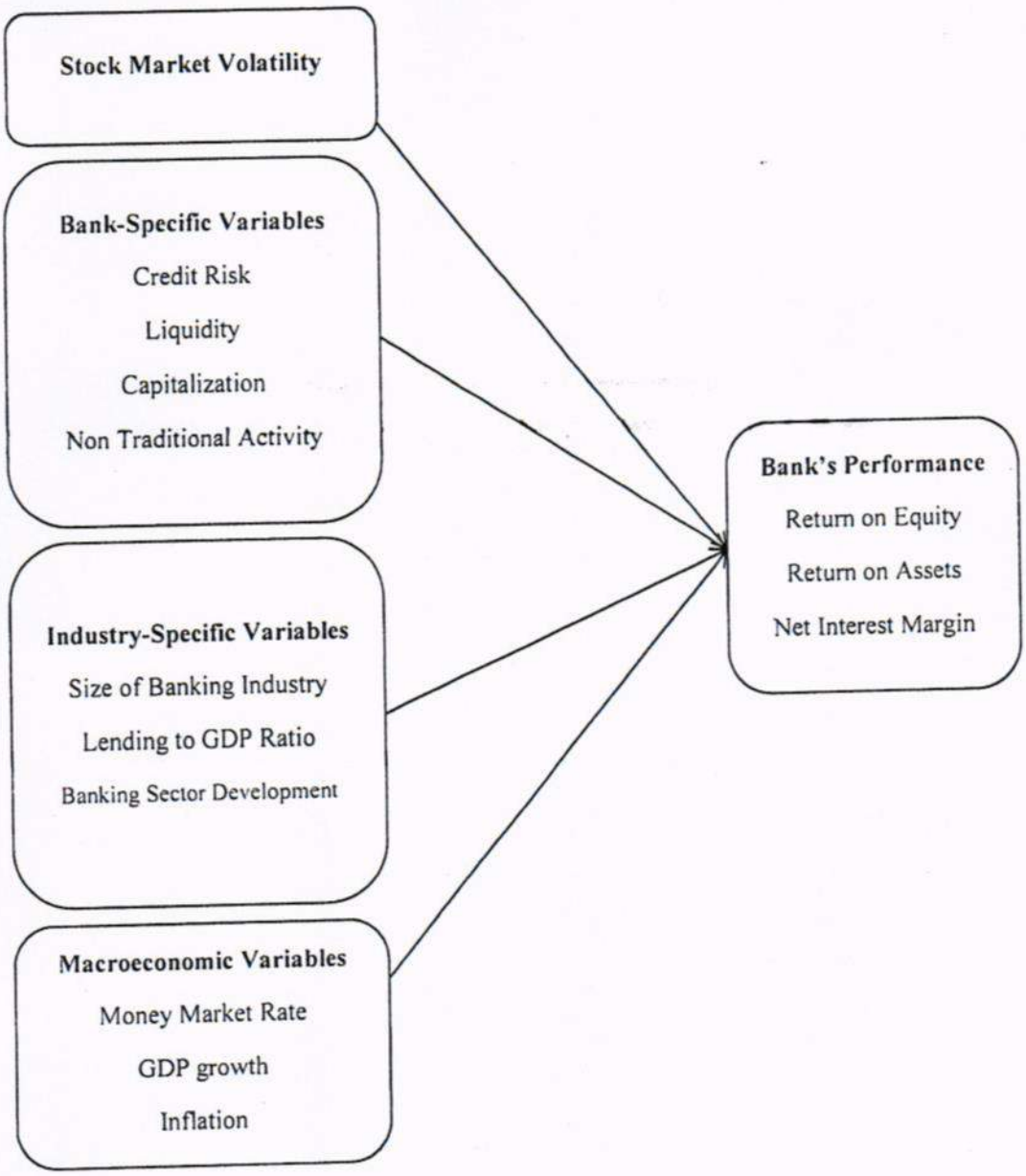

Figure 4.1: Schematic diagram of Model 1 of the study

To study the impact of bank size on the volatility-performance relationship, another econometric model is developed. In the model, all three types of control variables are used, namely, bank-specific, industry-specific and macroeconomic variables. Additionally, bank size is used as moderating variable in this model. Schematic diagram of our second model is shown in figure 4.2.

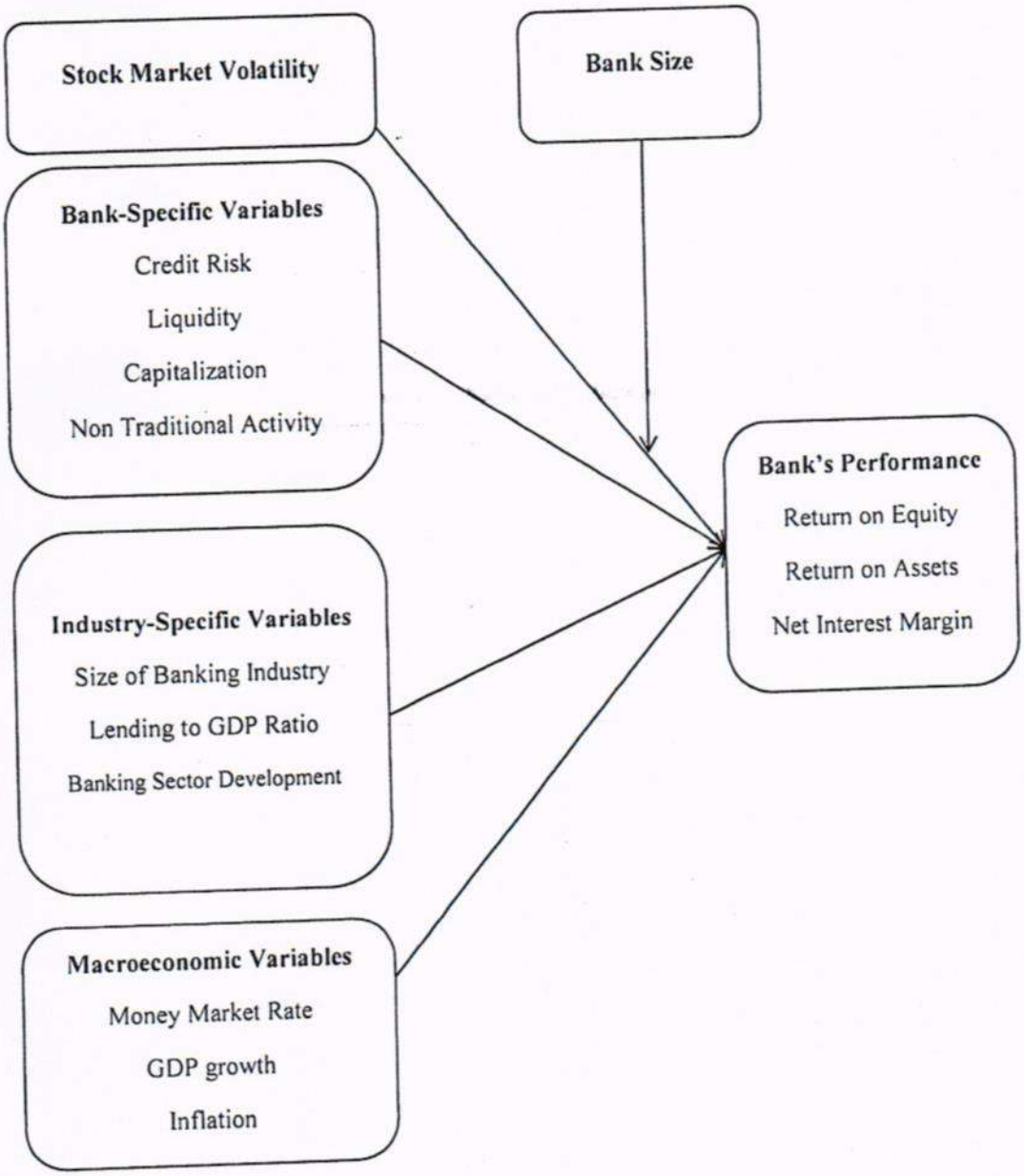

Figure 4.2: Schematic diagram of Model 2 of the study

4.1 Operational Definitions of Variables

This study examines the impact of stock market volatility on the performance of banking sector of Pakistan. The sample includes both public and private sector banks working in Pakistan. Most of the related data are collected from the annual

financial statements of the banks. In the study, four main type variables are used i.e. dependent, independent, moderator and control variable. The independent variable used in this study is the stock market volatility. And our objective is to find the impact of stock market volatility on banks' performance. So banks' performance is our dependent variable, which is measured by three alternative proxies. The second objective of research is to check the impact of bank size on volatility performance relationship. So bank size is used as moderator in the study.

4.1.1 Dependent Variable

Banking Performance

It is main dependent variable, used in this research. There are some indicators which are used to find a bank's performance. Different studies used different proxies for measuring banks' performance previously. For example, Al-Tamimi and Charif (2011), Wu et al. (2007), Sufian and Parman (2009), Stiroh and Rumble (2006), all of these researchers used different proxies of banking performance. In this research following indicators are used as proxy of banking performance.

A. Return on Equity (ROE)

Return on equity is the basic indicator of bank performance. It was used in different researches in the past to find the profitability of banks, like Ahmed and Khababa (1999), Sinkey (2002) Gilbert and Wheelock (2007), and Al-Tamimi and Charif (2011). Return on equity basically shows "the ratio of net income after tax to shareholders equity". Specifically, it is defined as

Return on Equity = Net income after tax / shareholders' equity

An increase in return on equity means that banks performance is good or vice versa. This variable was used by Heffernan and Fu (2010) to find the banking performance. Athanasoglou et al. (2008) also used return on equity to measure banking profitability. Normally data regarding this variable can be found from the financial statements and annual reports of different banks.

B. Return on Assets (ROA)

Return on assets is also used as proxy for measuring our dependent variable. It is used by many researchers to measure profitability of banking industry such as Wasiuzzaman and Gunasegavan (2013). According to them, it shows that how efficiently the firm is using its assets to earn high level of profits. It is basically the ratio between Net income after tax with total assets. As banking activity relates to borrowing and lending so due to this variable we can adjust the profitability coming from the lending and other assets. Simply we can calculate the return on assets by using formula given below.

Return on Assets (RoA) = Net income after tax / Total assets

The data required to calculate this equation can be easily found from balance sheets of banks.

C. Net Interest Margin (NIM)

Net interest margin is also a very well-known indicator of a bank's performance and it is used historically by different researchers. For example, Heffernan and Fu (2010) claimed that net interest margin is relatively a good indicator of banks' performance than other conventional indicators. Net interest margin (NIM)

is a measure of the difference between the interest income generated by banks or other financial institutions and the amount of interest paid to their lenders (for example deposits), relative to the amount of their (interest-earning) assets. We define net interest margin as follows:

NIM = (Interest income earned – Interest expense paid) / Banks loans to consumers

4.1.2. Independent Variable

Stock Market Volatility

We simply define stock market volatility as a measure of fluctuation in stock prices in the stock market. Sometimes these prices are high and sometimes these are low. These variations in stock market are measured through stock market volatility. The volatility shows unexpected changes in price level of stocks over the time. So it is a method of calculating the risk prevailing in stock market. When the stock prices rise, it is beneficial for investor. But it can also give losses due to instant decrease in prices of their stocks.

Stock market volatility affects each and every player of the economy. It affects the banks as well, because most of the banks also invest in stock markets additionally to their conventional borrowing and lending activities. In another aspect, if risk averse investors will deposits their money in banks in high volatile environment, then this increased deposits will also affect banks' performance. Normally, the volatility of stock prices can be measured through standard deviation of returns across the time. Lau et al. (2013) used standard deviation of monthly return to find stock market volatility and to find month return they used difference in log of stock market index. Hameed and Ashraf (2006) claimed that standard deviation has became a

unsophisticated measure to calculte volatility so they used a generalised GARCH model to measure stock market volatility. They claimed that it is most suitable measure of capturing the effects of volatility in stock return. Husain and Uppal (1999) measured stock market volatility in stock market of Pakistan through ARCH and GARCH models and found that the GARCH model is appropriate for measuring conditional variance. Following previous literature, we estimante the GARCH model to gauge the stock market volatility over the sample period.

4.1.3. Moderator

Bank Size

Bank size is used as the moderator in our study. Fadzlan and Kahazanah (2009) found a positive relationship between bank size and profit efficiency of banks. Similarly, Koasmidou (2008) argued that bank size is an important variable in determining profitability of banking sector because it helps banks to capture more market shares. Normally, bank size is measured through the quantity of assets held by a bank. Ameur and Mhiri (2013) used the log of total assets of a bank as a proxy for bank size. Similarly, Ali et al. (2011) also used natural log of total assets to find bank size and found a strong positive relationship between banking performance and size of banks, when they studied bank-specific and micro economic determinants of profitability in Pakistan.

4.1.4. Control Variables

There are some other important variables which also affect the profitability of banks. So it is important to take their effects into consideration while examining the

impact of stock market volatility on banks' performance. In this study, the following three main categories of variables are used as control variables.

A. Bank-Specific Variables

Fadzlan and Kahazanah (2009) conducted a research to find the empirical determinants of profitability for commercial banks for the period of seven years ranging from 2000 to 2007. Their findings suggest that bank-specific variables, namely, like bank size, capitalization, and credit risk, are positively related to the profitability of banks, while overhead cost and liquidity have negative and statistical significant impacts on banks' profitability. Similarly, Garcia-Herrero et al. (2009) explained that capitalization is positively related to the banking sectors' profitability. In our study, four bank-specific control variables are considered. These variables are credit risk, capitalization, liquidity, and non-traditional activity. These variables were commonly used in previous studies as well e.g. Adesina and Olurotimi (2013); Ahmad and Bashir (2013); and Ongore and Kusa (2013). List and proxies of measuring these variables are given in Table A.3 of the appendix.

B. Industry-Specific Variables

Another category of variables which may affect the profitability of banks is related to whole industry of banking sector. Banking sector development, stock market development, and size of banking industry are some of the main industry-specific variables that are expected to be significantly related to banks' performance. Extensive empirical works in literature were found on these variables. For example, Bourke (1989), Molyneux and Thornton (1992), and Athanasoglou et al. (2008) incorporated industry specific variables in their study. Athanasoglou et al. (2008) found insignificant impact of ownership and industry concentration on the banking

profitability. List of all industry-specific variables and their proxies used in this study are given in Table A.3 of the appendix.

C. Macroeconomic Variables

Macroeconomic indicators, which have significant impacts on the profitability of banking industry, are also used as control variables. Many authors used macroeconomic variables in their research while studying banking sector. For example, Ali et al. (2011), Ghazouani (2004) and Liu and Wilson (2009) incorporated macroeconomic variables in their model, to gauge the performance of banking sector. Ali et al. (2011) mentioned two main indicators who play important role in determining profitability of banks. These two variables are GDP growth and inflation rate. So in this study all of three variables will be used to capturing effect of macroeconomic variables in performance of conventional banks in Pakistan.

CHAPTER 5

Research Design

In this section, the type and nature of the study is described. Population, sampling strategy, and technique of data process are briefly explained in this chapter.

5.1 Study Type

Different researchers study a phenomenon in different ways. So that, all the aspects, regarding that phenomenon, can be analyzed. Here, we studied the relation between stock market volatility and banking sector performance through hypothesis testing. The data for the research have collected from secondary sources. Secondary data is used in the study because it is merely impossible to measure the profitability from the data of each bank and also data regarding sales from each branch of bank is very confidential for a company. It is very difficult to access such data so secondary data of banks is used and collected by different websites. The data that is used in this study is available on the website of SBP and yahoo finance.

5.2 The Population

The present study is conducted to investigate the impact of the stock market volatility on banks' performance in Pakistan. So the population for the study comprises of public and private banks working in Pakistan. The selection of an appropriate sample from the population makes easy to conduct the empirical research.

5.3 Sample and Sampling Strategy

In this study, the main focus is on both public and private sector banks for the purpose of data collection. The sample of conventional banks of Pakistan is selected and their annual data are used to measure bank performance for the period of 2006 to 2013. The data of all banks are easily available for the selected period. Annual data for eight years of 27 conventional banks in Pakistan are collected so total number of observation is 216.

5.4 Econometric Model

As discussed earlier, four main categories of variables are used in this study i.e. independent, moderator, control and dependent variable. These different types of variables are used in same model because these all variable have significant impact on the profitability of banks. In literature different researchers used similar variables in a same model like Iannotta et al. (2007), Ali et al. (2011), and Alexiou and Sofoklis (2009). They all conducted research on banking sector and used macroeconomic variables with bank specific variables in same model. Because both types of variables (bank specific and macroeconomic) are important in measuring profitability of banks so both of them are used in model. To examine the relationship between these variables, three step approach is used in this study. In first step volatility of stock market is measured through the GARCH model. In second step effect of stock market volatility on banking performance is measured via regression analysis. And in last step effect of bank size is measured in volatility-banking performance relationship. To examine the relationship generalized methods of moments (GMM) is used. This method is developed by Arellano and Bond (1991), and used by many researchers like Athanasoglou et al. (2008), and Sharma and Gounder (2012). Main advantage behind

adaptation of this method is its ability to saves the model from endogeneity problem.

So econometric model used in second step is as follows.

$$BF_{it} = \beta BF_{it-1} + \sum_{m=1}^{m} \alpha_m X_{it}^m + \sum_{n=1}^{n} \gamma_n Y_{kt}^n + \sum_{j=1}^{j} \rho_j Z_t^j + \delta Vol_t + f_i + U_{it} \ldots\ldots 5.1$$

Representations of symbols used in equation (i) are as follows,

BF_{it}	Performance of individual bank i in year t measured in terms of ROE, ROA, and NIM.
BF_{it-1}	Performance of bank i in year t-1
X_{it}^m	Bank-Specific variables which determine profitability of banks i.e. credit risk, liquidity, capitalization, and non-traditional activity of bank.
Y_{kt}^n	Industry-specific variables which affect profitability of banks i.e. size of banking industry, and banking sector development,
Z_t^j	Macroeconomic determinants of banking profitability i.e. money market rate, GDP growth, and inflation rate
Vol_t	Volatility in KSE-100 index in year t
f_i	Time invariant firm-specific fixed effect.
U_{it}	Error term

For the purpose of examining the impact of bank size in formulating the volatility-performance relationship, we made another econometric model. To capture the effect of bank size on the volatility-performance relationship, we used same variable as equation 5.1. Additionally, interaction term of stock market volatility and bank size is introduced to gauge the moderating role of bank size.

$$BF_{it} = \beta BF_{it-1} + \sum_{m=1}^{m} \alpha_m X_{it}^m + \sum_{n=1}^{n} \gamma_n Y_{kt}^n + \sum_{j=1}^{j} \rho_j Z_t^j + \delta Vol_t + \tau Vol_t \times Size_{it} + f_i + U_{it}$$

.....5.2

All symbols in equation (5.2) are same as in equation (5.1), with just an additional variable of $Vol_t \times Size_{it}$ that is used to take the effect of moderator i.e. bank size in the volatility-performance relationship.

5.5 The Data

Financial sector of Pakistan comprises of ten different segments and 181 companies. Banks, leasing companies, modaraba companies and mutual funds have main contribution in formulation of this sector. Among all others, banks contribute the highest in establishing the financial sector of Pakistan. Total number of banks used to vary in the past. However, from previous eight years, there are approximately 27 public and private sector banks working in Pakistan. So, we used eight years annual data of these banks in our research. The total numbers of observations are 216. Volatility of stock market is measured through the GARCH model while Generalized Methods of Moments method is used to find the impact of stock market volatility on Banks` performance.

5.6 The GARCH

There are several methods used to compute volatility in stock market. Standard deviation and GARCH are most common among them. Generalized Auto Regressive Conditional Heteroskedasticity (GARCH) process was introduced by Robert F. Engle in 1982, while studying the inflation of the United Kingdom. This process is used to estimate the volatility in financial market. GARCH model can be used in stock market of Pakistan. Husain and Uppal (1999) measured stock market volatility in stock

market of Pakistan through ARCH and GARCH models and found that the GARCH model is appropriate for measuring conditional variance. The data of stock prices is changing very frequently. We have to considered these short period changings while calculating volatility. This is the main motivation behind the selection of the GARCH model for volatility. In this study, we have applied the GARCH model to gauge the volatility in in daily stocks dat of KSE-100 index. Results of the GARCH model are given below.

Table 5.1: Results of the GARCH model

Dependent Variable: R
GARCH = C(3) + C(4)*RESID(-1)^2 + C(5)*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.001295	0.000256	5.066518	0.0000
AR(1)	0.099415	0.024248	4.099875	0.0000
Variance Equation				
C	7.01E-06	5.76E-07	12.17296	0.0000
RESID(-1)^2	0.155428	0.014593	10.65119	0.0000
GARCH(-1)	0.804581	0.013579	59.25115	0.0000

Table 5.1. shows the results of the GARCH model applied to calculate the volatility in stock prices. In the return equation, P-value of AR(1) is significant and coefficient of AR(1) is positive which shows that the current period return is based on and is 9.94% higher than last period return. In the variance equation, P-value of GARCH(-1) is significant which shows that current volatility is influenced by previous day's volatility and coefficient of GARCH(-1) is positive, it reflects that 80% of last day volatility is transferred in current volatility. Diagnostic tests including PAC, Q and Q^2 correlogram are telling us that there is no further hetroskedestisity or autocorrelation in standardized residual we obtained so the model we have applied is

valid. The results of these diagnostics are shown in appendix A.5 and A.6. The results of these diagnostic tests Through the GARCH model, we calculated the variance of KSE-100 index for each day. This day to day variance in KSE-100 index, by using the GARCH model is shown in Figure 5.1.

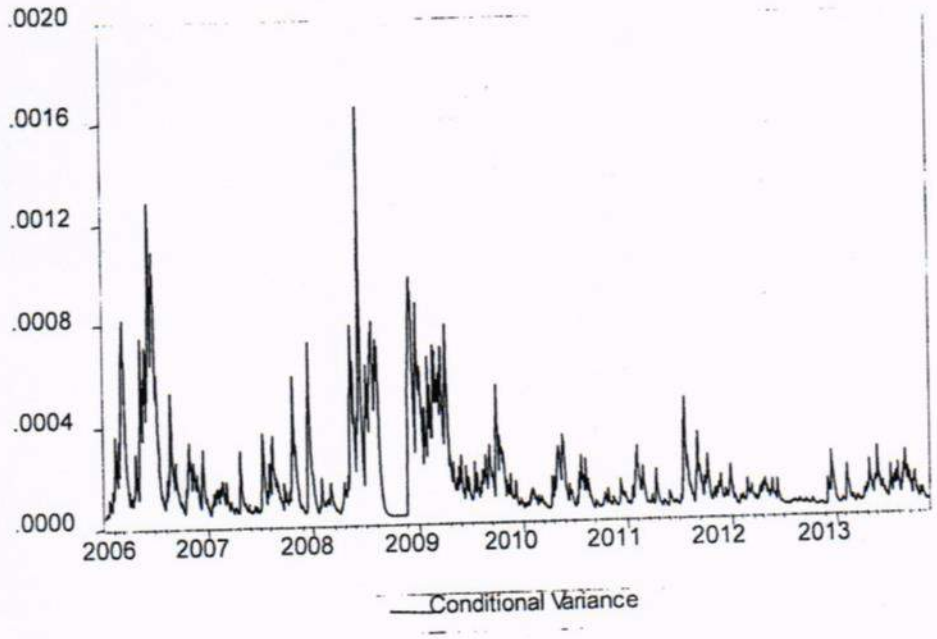

Figure 5.1: Volatility in stock prices by using GARCH Model

Volatility in KSE-100 index, using daily data of the stock returns, is presented in Figure 5.1. However, in this study we need the annualized volatility in the Karachi Stock Exchange to make the data of volatility coherent with the data of banking sectors' performance. For that purpose, daily volatility in stock exchange has to be converted into annual volatility. According to Smithson and Minton (1996) risk for longer time period can be measured by multiplying the risk for shorter time with the square root of time[3]. Therefore, we have converted average daily volatility into annual

[3] $\sigma_T = \sigma_1 \times \sqrt{T}$

volatility by applying same method. The annual volatility in KSE-100 for the period of 2006 to 2013 is shown in the Figure 5.2.

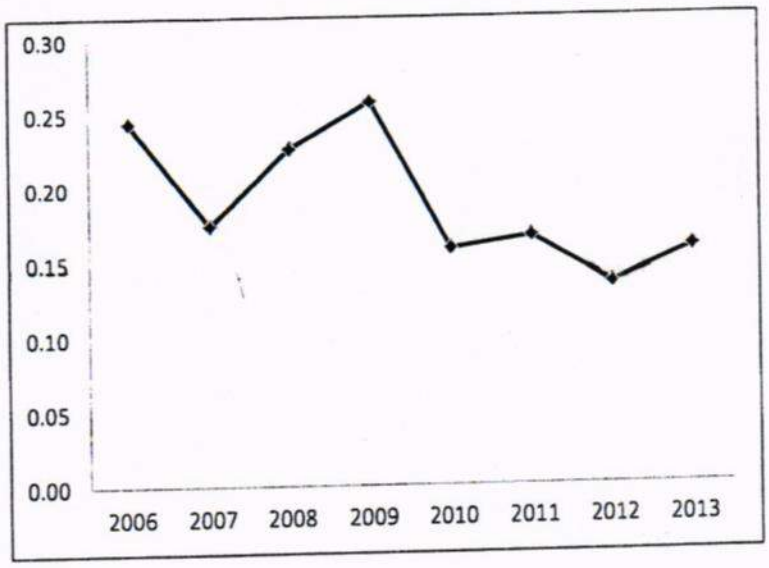

Figure 5.2: Annualized Volatility in KSE-100 index

Karachi Stock Exchange remains uncertain most of the time. Annual volatility prevailing in the Karachi Stock Exchange, during the period of study, is shown in Figure 5.2. The results indicate a higher volatility in stock return before 2010, and show all the time high value of 0.26 in 2009, during the period of study. There are certain reasons behind the higher volatility in stock returns from the period of 2006 to 2009. Haroon and Shah (2013) described the period till 2007 consists of great political uncertainties. Prime minister of country kept on changing. In 2007, Stock market faced biggest one day crash because of emergency rule imposed by president. Finance crisis is another cause of the high volatility in the KSE. Ali and Afzal (2012) revealed that financial crisis of 2008 is largest financial recession after 1930s, and affect adversely to the stock market of Pakistan. High volatility in 2008 and after is also one of the consequences of this financial crisis.

CHAPTER 6

Results and Discussion

Before finding the impact of independent variable i.e. Stock Market Volatility on dependent variable bank performance through Generalized Method of Moments, some preliminary tests are applied on the data to check the multicollinearity. Results of these tests are discussed below. Summary statistics is also produced to get some information about the distribution of the variables included in the analysis.

6.1 Descriptive Statistics

The most important and most initial task before going in the detail analysis is to describe the nature of data. The nature of data deals with it's characteristics like number of observations, mean, median and standard deviation etc. etc. By looking on the summary statistics, one can easily know the normality of data. If raw data collected from different sources fulfill its assumption of normality only then different statistical techniques can be applied on it. If the data is not normally distributed it will also generate results but these results are just only numbers not having any significant value. So descriptive statistics of all variables used in the study is given below.

Table 6.1: Descriptive Statistics

Variable Name	Mean	Standard Deviation
ROE	0.065	1.105
ROA	0.002	0.020
NIM	0.070	0.049

Volatility	0.189	0.042
Bsize	25.522	1.368
CR	0.116	0.104
Liq	0.493	0.115
Cap	0.118	0.093
NTA	0.097	6.500
SBI	29.531	0.312
Lending/GDP	0.259	0.048
BSD	0.494	0.040
Inflation	0.116	0.049
MMR	0.116	0.020
GDPG	0.039	0.013

Note: Variable descriptions are given in Table 3 of Appendix.

Table 6.1 shows average value and standard deviation of each variable used in the study. Mean value of return on equity is 0.065, while the value of standard deviation is 1.105. It shows that there is a large deviation across the mean value, because of difference in performance of different banks for the period. Return on equity of some banks is high while others have low return on equity. Similarly, the mean value of return on assets is 0.002 while its' standard deviation is 0.020. Higher value of standard deviation with respect to the mean value shows diversity in return on assets of banks. The mean value of net interest margin is 0.07 and its' standard deviation is 0.049. Standard deviation of net interest margin is also high because of different

banks. As, different banks have different values of net interest margin. And this value also varies with time. Mean value of stock market volatility is 0.189 and its' standard deviation is 0.042. It shows that volatility in stock market remains high with the mean value of 18.9% during the selected period and it has a low value of standard deviation (4.2%). During the period of study, the average value of bank size was 25.522 and its' standard deviation is 1.368, which shows the persistence in the variable. Credit risk has average value of 0.116 and standard deviation is 0.104. Due to differences among various banks, value of standard deviation is high. Banks have average liquidity of 49.30%. High level of liquidity shows that banks have issued more loans to short term projects. Mean value of capitalization is 0.118 and its' standard deviation is 0.093. It refers that banks in Pakistan have almost similar debt equity structure. Banking sector development shows that banking industry in Pakistan is developing rapidly, as it has the mean value 0.494 and its' standard deviation is 0.040. Similarly, average inflation rate for the period is 0.116 and its' standard deviation is 0.049. It demonstrates that inflation rate remains consistent with minor changes during the period. Mean value of money market rate is 0.116. It is very close to the mean value of inflation, that exhibits the chances of strong correlation among these two variables. The mean value of GDP growth is 0.039 that describes a very low growth rate of 3.9% averagely. The value of standard deviation for GDP growth is 0.013. It reveals that GDP growth remains consistent during the period with the minor changings of 1.3%.

6.2 Correlation Analysis

Correlation analysis describes how the variables are linked with each other. The value of correlation coefficient shows the association between two variables. Correlation coefficients and their significance values are given in Table 6.2.

Table 6.2: Correlation Matrix with p-value

	VOL	BSIZE	BSD	CAP	CR	GDPG	INF	L/G	LIQ	MMR	NTA
BSIZE	-0.22*										
	0.03										
BSD	-0.72*	-0.24									
	0.00	0.13									
CAP	0.11	-0.55*	0.18*								
	0.12	0.00	0.01								
CR	-0.16*	0.03	-0.29*	-0.07							
	0.02	0.70	0.00	0.33							
GDPG	0.02	-0.13	0.38*	0.05	-0.14*						
	0.76	0.07	0.00	0.49	0.03						
INF	0.28*	-0.07	0.18*	0.05	-0.03	-0.67*					
	0.00	0.33	0.00	0.43	0.66	0.00					
L/G	0.67*	-0.28*	0.89*	0.18*	-0.26*	0.18*	0.46*				
	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
LIQ	0.21*	0.27*	0.19*	-0.27*	0.18*	-0.14*	0.32*	0.28*			
	0.00	0.00	0.00	0.00	0.01	0.04	0.00	0.00			
MMR	0.40*	-0.06	0.03	0.04	0.02	-0.76*	0.92*	0.38	0.30		
	0.00	0.37	0.71	0.55	0.76	0.00	0.00	0.18	0.15		
NTA	0.06	0.03	0.06	0.05	-0.08	0.02	-0.06	0.02	-0.04	-0.07	
	0.41	0.63	0.42	0.50	0.24	0.75	0.42	0.77	0.58	0.31	
SBI	-0.71*	0.31*	0.82*	-0.18*	0.24*	-0.39*	-0.24*	-0.92*	-0.22*	-0.24*	-0.01
	0.00	0.00	0.02	0.01	0.00	0.00	0.01	0.00	0.00	0.15	0.89

Note: * indicates significant correlation between variables.

It is not possible that all variable have zero correlation with one another, there is always some value of correlation coefficient which may be positive or negative, lies between -1 to +1. But if the variables are strongly correlated either on positive or negative side then there are strong chances of multicollinearity in data. Table 6.2 shows correlation among variables with their significance value. In this table, p-value is added with every correlation coefficient to see whether that correlation coefficient is significant or not. Most of correlation coefficients have normal value. However, some of the variables exhibited very high correlation coefficients values. Those may have chances of multicollinearity among them. So we will apply the tests of multicollinearity later to see whether it exists or not. Here, we only describe the

significant vales of correlation coefficients. Stock market volatility relates negatively with size of Bank with a correlation coefficient of -0.22, it refers that as volatility rise in stock market banks decrease their size. Banking sector development and stock market volatility have significant correlation with the value of -0.72 and p-value of 0.00, which describes that these two variables have linkage of 72%, their values move together but in opposite direction. Banking sector development linked positively with lending to GDP ratio with the value of 89%. GDP growth showed a strong negative linear relationship with money market rate with the value of 76%, it means that when GDP growth rises money market rates fall. Money market has a strong linear positive relationship with inflation, with the value of 92%. It describes that when inflation increases money market rate also rises. Size of banking industry is positively linked with banking sector development with the value of 82%, and negatively linked with lending to GDP ratio with the value of 92%. It shows that when banking industry increases in size, it brings development in banking industry, and start to lend more money than before. These all values of correlation coefficient are significant at the level of 5%. Due to the high significant correlation coefficients, these variables cannot be used together in the model.

6.3 Multicollinearity Analysis

When using a multiple regression model, there are some explanatory variables which have significant causal relation. So when the amount of one variable changes it affects the other variable and hence their coefficients in regression model do not depicts their original value. Normally there are chances of existence of multicollinearity in data because similar types of explanatory variables are used. One can try to minimize the multicollinearity but it cannot be eliminated completely.

In table 6.2, the correlation coefficient are shown, multicollinearity among variables are checked with the higher correlation coefficients. As shown in correlation matrix correlation coefficients of lending/GDP with banking sector development and size of banking industry are very high. Additionally VIF Test (Variance Inflationary Factor Test) is applied whose value (6.008) is greater than tolerable limit. Similarly, the correlation coefficient of money market rate and inflation rate is also very high that is 0.92, so Variance Inflationary Factor is calculated for these two variables value of which is also above the acceptable limit that is 6.79. So money market rate is omitted from the model. Similarly, VIF value calculated for stock market development and GDP growth was 5.812, and for banking sector development and size of banking industry was 5.014.Variance Inflationary Factor can be calculated by using following formula.

$$\text{VIF}=\frac{1}{1-Adj\ R^2}$$

For that reason, we omit money market rate, lending to GDP ratio and banking sector development from the model and keep other variables like stock market volatility, inflation, GDP growth, and capitalization in the model.

6.4 GMM Test

Numerous methods are used to determine the performance of banking industry. Some researchers use fixed effect model like Kousmidou et. al. (2003) used this model while finding the determinants of banks profitability. Similarly another most common model to determine banking profitability is GLS model. Hassan and Bshir (2003) used GLS when conducting their research on banks. Wu et. al. (2007) used

fixed and random effect model to check the impact of financial development and bank characteristics on the performance of banks in China during the period of 1996 to 2004. In the same way Sufian and Parman (2009) used fixed effect, random effect and ordinary least square model to examine the profitability of noncommercial financial institutes and banks in Malaysia during the period of 2000 to 2004. These methods are widely used but in this study Generalized Method of Moments is applied due to several reasons.

Main reason behind the selection of Generalized Method of Moment is the presence of endogenity in model. Endoginity occurs when error term is correlated with one of the independent variable. This make the result biased and true results cannot be obtained. Secondly sometimes dependent variable is depending upon its lagged value. In econometric terms this phenomenon is known as autocorrelation. Results become biased due to presence of autocorrelation in model. In the case of performance determination, there are evidences that performance of a year is depending upon the performance of previous year like Athanasoglou et al. (2008) concluded that performance of banks depend of it previous year performance if it is measured in terms of return on assets (ROA).

Due to these basic problems Generalized Methods of Moments is applied to check the impact of stock market volatility on banking performance in Pakistan. This model was initially developed by Arellano and Bond (1991). The main characteristic of this model is that it uses lagged value of dependent and lagged value of independent variables as instrument in the model. This model was known as GMM difference. After that this was critiqued by Arellano and Bover (1995). Those were in point of view that if instruments are weak than this model became inefficient. So they

developed a new model known as GMM system in which lagged values of dependent and independent variables at level and their differences are used as instrument.

Many researchers have applied these models and argued in favor of these like Roodman (2009) describes the properties of generalized methods of moments and explains that GMM can solve many problems in data like endogeneity problem, problem of autocorrelation and profit persistence, so this is relatively a good method then ordinary least square. These are the main reason of popularity of generalized method of moments.

So in this study generalized methods of moment system estimator is applied. As discussed earlier that in this study performance of banking industry will be examined through three different indicators net interest margin (NIM), return on equity (ROE) and return on assets (ROA). So this model is applied while taking each of these indicators as dependent variable. After that same model is used to check the moderating role of bank size in volatility and performance relationships in banking industry of Pakistan.

6.5 ROE as dependent variable

Performance of a company can be measured from different indicators like return on equity (ROE) and return on assets (ROA) etc. etc. As this study deals with banking sector so in addition to these performance indicator another indicator net interest margin is used because main business of bank is related to borrowing and lending of money. When generalized method of moments is applied by taking return on equity as a dependent variable it gave following results.

Table 6.3: GMM System results: ROE as dependent variable

Independent Variable	Coefficient	Z-statistics	P-Value
Return on Equity (-1)	0.004	0.05	0.963
Volatility	-7.099	-1.98	0.047
Bank Size	0.211	2.60	0.009
Credit Risk	-3.151	-3.25	0.001
Liquidity	-0.785	-0.76	0.446
Capitalization	3.322	2.58	0.010
Non Traditional Activity	-0.012	-0.98	0.325
Size of banking industry	-0.392	-0.52	0.604
GDP growth	-15.46	-0.77	0.442
Inflation	-1.324	-0.29	0.774
Constant	8.534	0.36	0.721
AR(2)	0.62	P-value	0.536
J-statistics	158.99	P-value	0.375

The value of j-statistic confirms the validity of instrument and the value of AR(2) indicates that residuals are free from second order correlation. Independent and control variables used in the study are mentioned in the first column of Table 6.3. Result indicates highly negative impact of independent variable on the dependent variable. P-vale 0.047 and z-statistic -1.98 shows stock market volatility is significantly and negatively affect the performance of banking system. Coefficient of -7.099 states that one unit increases in stock market volatility causes 7.099 units decrease in performance of banks. Rationale behind this is that when uncertainty in market increases financial intermediary demands higher lending rate while firms try

to decrease portion of debt (Levy and Hennessy, 2007). Banks cannot utilize their deposits effectively to get high returns.

Bank size and capitalization of banks have significant positive impacts on bank performance. Size of bank refers to the total assets held by a bank. As bank size rises, the bank has more to lend and of course more to earn. Fadzlan and Kahazanah (2009) have also found positive effect of bank size on performance of a bank. Coefficient for bank size is 0.21 that shows if bank size rises by one unit performance of the bank will rise by 0.21 units. Capitalization shows also progressive relationship with banking sector returns. A well-capitalized bank will be more profitable than its rivals. A well-capitalized bank refers to the bank that has more portion of shareholder's equity in its total assets. As portion of shareholder's equity rises depositors gain more confidence and give deposit to such institute. And bank has more to invest in profitable projects that will positively affect its financial performance. Coefficient of capitalization is 3.32 which show great importance of this variable in determining performance. Coefficient's value tells that 100% rise in capitalization will enhance 337% of banking performance. In banking sector, Clementina and Isu (2013) also concluded similar results for capitalization of banks while studying the performance of banking sector in Nigeria for period 1970 to 2010. Similarly, Berger (1995) also claimed the positive relation between capitalization and banking performance.

Credit risk is another important factor that has significant negative relationship with banking performance. Credit risk refers to portion of non-performing loans in total loans. As the level of non-performing loans rises, it becomes dangerous for banks. In this research similar conclusion has drawn. As results suggests, 1% rise in

AR(2)	-0.70	P-value	0.485
J-statistics	19.01	P-value	0.754

Return on assets is another commonly used indicator of financial performance. Wasiuzzaman and Gunasegavan (2013) used this indicator while studying comparative performance of Islamic and conventional banks in Malaysia. Return on asset is also used in this research as a dependent variable. In this model, the value of j-statistic confirms the validity of instrument and the value of AR(2) indicates that residuals are free from second order correlation.

One of the important factor that affects the performance of banks in Pakistan is volatility in stock market. As uncertainty increases in stock market performance of banks comes down. Rationale behind this relationship can be explained by uncertainty and leverage relationship. Rashid (2013) explained macroeconomic uncertainty have negative impact on firms leverage decision. In another study, Rashid (2014) revealed that when macroeconomic risk rises firms are less likely to do external financing. So when volatility in stock exchange rises, banks demands higher lending rate as level of risk increased in economy and organizations do not go for debt financing and do not agree to give such higher rates. So banks cannot utilize their deposits effectively to get high returns. Results statistics indicate that one unit rise in stock market volatility will cause to decrease in banking performance with 0.13 units. Next factor that significantly affects banking performance is size of a bank. Coefficient of bank size is 0.022. Although this is very low but there is positive change in performance of banks if size increase. As banks have more opportunities to invest. These results are very similar to Fadzlan and Kahazanah (2009).

Credit risk has significant inverse impact on the performance of banking industry. Credit risk measures the percentage of nonperforming loans among the total loans issued by the bank. Results describing the impact of credit risk on return on equity are very similar as to earlier when return on assets is used as performance indicator. Negative sign of coefficient tells about the inverse relationship. Magnitudes of coefficient is 0.126 that shows 100% rise in credit risk can affect performance by making ROA less with 12.6%. Capitalization is considerably directly related with performance of banking industry in Pakistan. Well capitalized banks are higher performer in terms of return on assets as compared to others. Inferences can be drawn that 100% increase in capitalization will affect return on assets by increasing it 14.90%. Size of banking industry has negative impact on performance of banks, as industry grows it becomes difficult for banks to earn more profit because now they have to face more competition. According to results a unit rise in size of banking industry will affect banking performance to decrease with 0.022 units. According to the results, GDP growth and inflation inversely affects the performance of banks. The value of t-statistic shows that negative impact of these variables on banking performance is insignificant.

6.7 NIM as dependent variable

Net interest margin refers to the differential interest amount earned by a financial institute or a bank relative to the amount of loans issued to its customers. As banks deals with borrowing and lending of loans so the marginal amount of interest earned by the bank can also act as a good financial performance indicator of that bank. GMM model applied while taking (Net Interest Margin) NIM as a dependent variable that shows results as follows.

Table 6.5: GMM System results: NIM as dependent variable

Independent Variable	Coefficient	Z-statistics	P-Value
Net Interest Margin (-1)	0.226	5.92	0.000
Volatility	-0.015	-0.24	0.810
Bank Size	0.006	3.99	0.000
Credit Risk	-0.081	-4.53	0.000
Liquidity	-0.126	-6.60	0.000
Capitalization	0.029	1.28	0.200
Non Traditional Activity	0.008	0.40	0.690
Size of Banking Industry	-0.010	-0.78	0.434
GDP Growth	-0.820	-2.32	0.020
Inflation	-0.079	-0.97	0.331
Constant	0.327	0.78	0.435
AR(2)	1.01	P-value	0.310
J-statistics	165.89	P-value	0.183

Main business of banking sector is to deal with borrowing and lending of money. This borrowing and lending is not free of cost, the amount of interest is involved in it. For this reason net interest margin can act as good financial performance indicator of bank. The value of j-statistic in the model confirms the validity of instrument and the value of AR(2) indicates that residuals are free from second order correlation. Results of this indicator describe that among the independent and control variables only five variable significantly affect the financial performance of banks. Previous year's financial performance significantly affects financial performance of current year. NIM is determined 22.6% by lag of its own. Independent variable of this study is stock

market volatility but in this equation it does not affect significantly to banking performance. Other control variables that have significant impact on net interest margin are bank size, credit risk, liquidity and GDP growth.

Bank size have significant positive impact on banking performance, value of z-statistics shows significance of bank size while value of coefficient shows how much bank performance is affected due to changing in bank size. Net interest margin changes 0.6% due to change in bank size. Credit risk and liquidity have significantly negative relation with banking performance; test suggests 100% increase in credit risk causes 8.1% decline in net interest margin and in case of liquidity 100% increase in liquidity causes 12.60% decrease in performance. GDP growth of economy is also negative relation with net interest margin like other two performance indicators, 8.20% decrease in performance can be seen if GDP growth rises with a unit.

6.8 Bank size as Moderator

Size of any firm has a significant effect on its performance. If the situations are favorable the firms of large size have more opportunities to capture more customers and earn more profits as compare to firms of small size. There are number of advantages that a firm can gain due to its size. But at the same time if situations are not good, lots of volatility in environment, uncertainty is high then firms of large size have more to loss then firm of small size. According to the theory of optimal bank size moderating role of bank size in volatility and performance relationship can be viewed. The results of the while taking bank size as moderator are as follows.

Table 6.5: GMM Sytem results: Bank Size as moderating variable

Dependent Variable: ROA

Independent Variable	Coefficient	Z-statistics	P-Value
Return on Assets (-1)	-0.119	-0.33	0.743
Volatility	-1.209	-2.73	0.006
Bank Size × Volatility	-0.005	-3.88	0.000
Bank Size	0.023	2.97	0.003
Credit Risk	-0.128	-2.72	0.006
Liquidity	-0.001	-0.04	0.967
Capitalization	0.147	2.17	0.030
Non Traditional Activity	-0.008	-0.07	0.947
Size of banking industry	-0.022	-3.10	0.002
GDP Growth	-0.401	-1.59	0.111
Inflation	-0.096	-1.42	0.155
Constant	0.113	0.35	0.725
AR(2)	0.64	P-value	0.520
J-statistics	19.0	P-value	0.755

In second step of research approach, when impact of stock market volatility was measured on banking performance, only two among three indicators gave significant results. Those indicators are return on equity and return on assets. So to check the moderating role of bank size in volatility and performance relationship only those two performance indicator were used as dependent variable. Results of GMM system model, taking return on assets as dependent variable and bank size as moderating variable, are shown in Table 6.5. In this model, the value of AR(2) indicates that residuals are free from second order correlation and the value of j-statistic confirms the validity of instrument.

Bank size and capitalization of bank is significantly positive related to return on assets of bank, while volatility in stock return, credit risk and size of banking industry are negatively related to return on assets. The only difference here in this model, moderating role of bank size is analyzed. Results suggest that bank size is negatively related to volatility-performance relationship, when return on assets is used as dependent variable. Krasa and Villamil (1992) gave theory of optimal bank size. They described the size distribution of banks. Results are very similar to the theory. Theory of optimal bank size has an implication that "*Bank size is determinate and inversely related to bank exposure to macroeconomic risk*". Results of our hypothesis are very similar to this testable implication of theory of optimal bank size. Study suggests that in the presence of high macroeconomic risk in economy, increase in bank size is not optimal. Instead it adversely affects financial performance of banks in Pakistan. Results of the model when return on equity is used as dependent can be seen in Table 4 of Appendix. In this case, it shows significant effect of only two variables. The negative impact of credit risk and positive impact of capitalization on bank banking performance can be seen in Table 4 of Appendix.

CHAPTER 7

Conclusion

Banks are the main source of funds for different organizations working in an economy. Most frequently lending and borrowing from organizations, make banks able to run their business. The main chunk of profit of these banks comes from the interest difference between lending and borrowing. There are many factors that affect the profit of banks. Some of them are bank specific, some are industry specific and others are macroeconomic. These variables are used in the model and results are obtained. These results suggest that lagged value of NIM significantly and positively contributes towards the current performance of banks, while lagged value of ROE and ROA do not contribute significantly in performance determination. Stock market volatility relates negatively with return on equity and return on assets, while no relationship was observed between stock market volatility and net interest margin. Bank size has significant positive relation with all the performance indicators i.e. ROE, ROA and NIM. Similarly credit risk of individual bank significantly negatively related to these three performance indicators.

Capitalization of a bank also contributes positively for the performance of banking system. ROE and ROA showed a significant positive relation with capitalization. While, in the case of NIM this relationship is not significant. Generally, well capitalized banks are more profitable than others. Liquidity is another factor that contributes in the profitability determination of the banks. As liquidity of a bank rises, its performance decreases in terms of net interest margin, while other two

performance indicators have insignificant relationship with liquidity. So more liquid banks have a fewer opportunities to invest in long term and more profitable projects. Liquidity is as important for banks as it should be able to manage cash as quickly as depositors demand from it. So that depositors have more confidence on the institute. In the situation a bank has to decide an optimal level to gain the advantages of both liquidity and profitability. Size of banking industry is as essential factor as other described earlier in determining profitability of banks. It has negative significant relationship with return on assets. As the size of banking industry rises it is viewed as increased competition that a bank has to face. That's why as competition rises in industry it becomes rather difficult for banks to earn same amount of profit that it was earning before. Macroeconomic variable, GDP growth contributes negatively to the performance of banking sector in Pakistan.

At the time of high uncertainty in market profitability of banks decreases, as discussed earlier. But at that time one important factor, which acts as moderator between volatility and profitability, is the size of that bank. When the impact of bank size was examined as moderator, the results revealed a negative relation in this nexus. This explains that in the time of high volatility banks profitability starts to decline, but this profitability decline is not same for all size of banks. In other words negative impact of volatility on the bank with larger size is high. So if banks or similar institutes want to be less effective in the bad times (characterized as high volatility) they must have to make their size compatible. In good times i.e. economies are stabilizing, businesses are growing, banks should increase their size but if risk start to rise in economy, more fluctuation comes in stock market then it is not advisable for banks to increase their size and rather it became more harmful for them.

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Appendix

A.1 Summary of statistic of Karachi Stock Exchange:[4]

Indicators\ Years	2006	2007	2008	2009	2010	2011	2012	2013
No. of Listed Companies	651	654	653	651	644	638	573	560
Listed Capital (In Millions)	515,029.54	671,269.47	750,477.55	814,478.74	919161.26	1048443.87	1094367.4	1129787.32
Market Capitalization (In Millions)	2,766,583.84	4,329,909.79	1,858,698.90	2,705,879.83	3268948.59	2945784.51	4242278.04	6056506.03
KSE 100 INDEX	10,040.50	14,075.83	5,865.01	9,386.92	12022.46	11347.66	16905.33	25261.14

[4] From KSE website

A.2. Sample of banks used in Study:

Public Sector	
Symbol	**Name**
FWBL.	First Women Bank Limited
NBP	National Bank of Pakistan
SDBL.	Sindh Bank Ltd.
BOK	The Bank of Khyber
BOP	The Bank of Punjab
Private Sector	
Symbol	**Name**
ABPL.	Albaraka Bank (Pakistan) Limited
ABL	Allied Bank Ltd.
AKBL.	Askari Bank Ltd.
BAHL	Bank Al-Habib Ltd.
BAFL	Bank Alfalah Ltd.
BIPL	Bankislami Pakistan Ltd.
BBL.	Burj Bank Limited
DIBPL.	Dubai Islami Bank Pakistan Ltd.
FABL	Faysal Bank Ltd.
HBL	Habib Bank Ltd.
HMB	Habib Metropolitan Bank Ltd.
JSBL	JS Bank Ltd.
KASBB	KASB Bank Ltd.
MCB	MCB Bank Ltd.
MEBL	Meezan Bank Ltd.
NIB	NIB Bank Ltd.
SBL.	Samba Bank Limited
SILK	Silkbank Limited
SNBL	Soneri Bank Ltd.
SCBPL	Standard Chartered Bank (Pakistan) Ltd.
SMBL	Summit Bank Limited
UBL.	United Bank Ltd.

A.3. Summary of variables with definition:

Category of Variable	Name of Variable	Definition
Dependent	ROE	Return on Equity
	NIM	Net Interest Margin
	ROA	Return on Assets
Independent	Stock Market Volatility	Monthly share Return of Stock exchange
Moderator	Bank Size	Log of total Asset of specific bank
Control Variable		
i) Bank Specific	Credit Risk	Ratio of Non-performing loans to Total loans
	Liquidity	Ratio of Loans to Assets
	Capitalization	Ratio of Shareholders Equity with Total Assets
	Non Traditional Activity	Ratio of Non-interest income to Gross Income of Bank
ii) Industry Specific	Size of banking industry	Log of Total asset of banking industry
	Lending to GDP Ratio	Total Lending of Industry /GDP
	Banking Sector Development	Total Assets of banking industry / GDP
iii) Macro Economic	Money Market Rate	Three Month inter-bank rate
	Inflation	Growth in Money supply
	GDP growth	Growth rate in gross domestic product

A.4. GMM System results: ROE as dependent and Bank Size as moderating variable

Independent Variable	Coefficient	Z-statistics	P-Value
Return on equity (-1)	0.005	0.07	0.944
Volatility	-4.814	-1.03	0.305
Bank Size × Volatility	1.481	0.87	0.387
Bank Size	-0.060	-0.19	0.851
Credit Risk	-3.070	-3.15	0.002
Liquidity	-0.936	-0.90	0.370
Capitalization	3.416	2.65	0.008
Non Traditional Activity	-0.012	-0.95	0.341
Size of Banking Industry	-0.344	-0.46	0.649
GDP Growth	-1.831	-0.74	0.460
Inflation	-1.016	-0.22	0.826
Constant	14.043	0.57	0.570
AR(2)	0.63	P-value	0.530
J-statistics	158.64	P-value	0.361

A.5. Correlogram of Standardized Residuals

Q-statistic probabilities adjusted for 1 dynamic regressor

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob*
		1	0.027	0.027	1.4079	0.235
		2	0.053	0.053	7.0097	0.030
		3	0.015	0.013	7.4740	0.058
		4	0.031	0.028	9.3814	0.052
		5	0.013	0.010	9.7286	0.083
		6	0.023	0.019	10.761	0.096
		7	0.025	0.022	11.970	0.102
		8	0.015	0.011	12.416	0.134
		9	0.033	0.029	14.566	0.104
		10	0.067	0.063	23.564	0.009
		11	-0.005	-0.013	23.620	0.014
		12	0.001	-0.008	23.622	0.023