COMPARATIVE FINANCIAL SYSTEMS DURING FINANCIAL CRISIS PERIOD: A COUNTRY-LEVEL AND FIRM-LEVEL ANALYSIS

(A DOCTORAL DISSERTATION)

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ISLAMABAD

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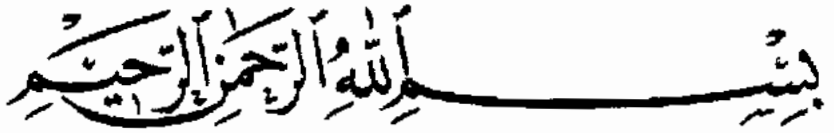
Ghulam Mujtaba Chaudhary
REG # 38-FMS/PHDFIN/F11

Submitted in partial fulfillment of the requirements for the
PhD degree in Management Sciences with specialization in Finance
at the faculty of Management Sciences,
International Islamic University,
Islamabad.

Dr. Zaheer Abbas **March, 2018**



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Title of Thesis: "Comparative Financial Systems during Financial Crisis Period: A Country-Level and Firm-Level Analysis".

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Ghulam Mujtaba Chaudhary

PhD Management Sciences (Finance)

Faculty of Management Sciences

DEDICATION

Dedicated

To

My beloved family members

&

Teachers

Whose continuous prayers, love, and sincerity always paved the way of my success . . . . . .

(Acceptance by the Viva Voce Committee)

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ABSTRACT

This study is aimed at investigating the relative performance and behavior of financial systems in backdrop of global financial crisis. It covers both country level and firm level aspects. Country level analysis intends to grasp the relative effect of crisis on economic growth and stock markets volatility of diverse financial structure countries. For this purpose top fifty countries of the world, excluding members of organization of the petroleum exporting countries, are selected as sample. Sample countries are initially categorized on the basis of financial structure and economic development level. For empirical analysis, panel regression and exponential generalized autoregressive conditional heteroskedasticity models, are applied. Appropriate dummy variables and interaction terms are added to capture the overall and relative effect of crisis. Analysis is then extended to firm level and is progressed with both macro and micro aspects.

Financial performance of firms, selected from diverse category countries, is relatively examined in the context of crisis under macro part of firm level analysis. A sample of 1440 firms, selected from countries of diverse financial structure and economic development, is being utilized for this purpose. Micro portion, on the other side, concentrates on non-financial firms in the domestic economy of Pakistan. For this domain, 263 non-financial firms are selected from different sectors. Earlier stated techniques of country level analysis are applied to examine the financial performance and stocks volatility of sample firms. This study utilizes the data of 2005-2012, collected from different sources. Entire study period covers three major phases, out of which crisis phase covers the years of 2008 and 2009.

The study finds a significant decline in economic growth and increase in stock markets volatility for majority of sample countries, during crisis period. Effect at global firms' level and differential effect across countries of diverse financial structure, however, remains insignificant. In Pakistan, significant decline in performance of non-financial firms during crisis period is observed and this trend remains more pronounced in firms of higher bank financing level. Similar evidence for stocks volatility is, however, not found. The overall results of this study suggests that structure of financial system is not a much relevant phenomenon in modern, interconnected, and integrated globalized economies. It is better for firms and countries to adopt a moderate, balanced, and vibrant financing strategy.

Key Words: Financial Systems, Global Financial Crisis, Economic Growth, Stocks Volatility, Financial Performance

ACKNOWLEDGEMENTS

All praises are attributed to ALLAH ALMIGHTY Who is the source of knowledge and wisdom for mankind. He gave me the courage, ability, and resources to accomplish this challenging task. After ALLAH ALMIGHTY, I am thankful to His Prophet Muhammad (PBUH) who enlightened our lives by the teachings of ALLAH. He is the messenger of ALLAH and source of inspiration and guidance for human beings. I am extremely grateful to my family especially wife and kids for continuous support, prayers, patience, and sacrifices during this whole period. I also want to express cordial gratitude to my thesis supervisor Dr. Zaheer Abbas, Assistant Professor FMS, for his invaluable insight, thoughtful guidance, constant encouragement and all the time availability, right from start till completion of this dissertation. Without his support, it would have been impossible for me to accomplish this task.

I am grateful to Dr. Syed Zulfiqar Ali Shah, Associate Professor & Deputy Dean, FMS for his kind cooperation, valuable suggestions, and continuous support. I owe special thanks to Dr. Mazhar Hussain Chaudhry, Assistant Professor & Coordinators HS&R, and the team of program office HS&R at FMS; especially Mr. Hamid Mahmood, LDC and Mr. Amjad Mehmood, LDC. They extended full cooperation during entire study period and facilitated in all administrative proceedings. I am also highly indebted to Dr. Ghulam Ghous, Professor Emeritus and other colleagues at University of Kotli for their inspiring guidance and continuous encouragement. Special thanks to the faculty members of FMS at IIUI and other friends for their cooperation and encouragement.

(Ghulam Mujtaba Chaudhary)

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LIST OF ABBREVIATIONS

AIC	Akaike Information Criteria
ARCH	Autoregressive Conditional Heteroskedasticity
ARMA	Autoregressive Moving Average
ASEAN	Association of Southeast Asian Nations
BRIC	Brazil, Russia, India, and China
BRICS	Brazil, Russia, India, China, and South Africa
CEE	Central and Eastern Europe
ECOWAS	Economic Community of West African States
EGARCH	Exponential GARCH
GARCH	Generalized Autoregressive Conditional Heteroskedasticity
GDP	Gross Domestic Product
MENA	Middle East and North Africa
OECD	Organization for Economic Cooperation and Development
OPEC	Organization of the Petroleum Exporting Countries
PSE	Pakistan Stock Exchange
U.K.	United Kingdom
U.S.	United States

FORWARDING SHEET

The thesis entitled "**COMPARATIVE FINANCIAL SYSTEMS DURING FINANCIAL CRISIS PERIOD: A COUNTRY-LEVEL AND FIRM-LEVEL ANALYSIS",** submitted by Mr. Ghulam Mujtaba Chaudhary (38-FMS/PHDFIN/F11) in partial fulfillment of PhD degree in Management Sciences with specialization in Finance has been completed under my guidance and supervision. I am satisfied with the quality of student's research work and allow him to submit this thesis for further process as per IIU rules & regulations.

Date: March 21, 2018

Signature: _____

Name: **Dr. Zaheer Abbas**
Supervisor

CHAPTER 1

INTRODUCTION

1.1 Chapter Summary

First chapter offers a brief introduction of the research thesis. This chapter initially provides background of the study. Brief description of financial systems and global financial crisis is covered in this section. After description of background, the chapter provides theoretical framework of the study. It further elaborates research problem, summarizes research objectives, and specifies research questions to be addressed in this study. It also highlights significance and contributions of the research. An overall roadmap of study is presented at the end of chapter.

1.2 Background of the Study

Existence of established financial system gets significant importance in modern globalized world. Nations are being integrated through their financial institutions and markets. In a well-designed financial system, allocation of resources is usually more systematic and efficient (Boot & Thakor, 1997). Mobility of capital facilitates efficient utilization of available economic resources and promotes overall well-being (Mishkin & Eakins, 2011). An efficient financial system is necessary for a well-performing economy and is a key contributing factor to financial stability in any country. It facilitates economic transactions, ensures efficient allocation of capital, and creates an environment that is supportive for investors (M.A. Khan & S. Khan, 2007; Klemkosky, 2013). Higher growth and productivity can be achieved in developed financial systems (Thakor, 1996). The pace

of firms' growth in countries with better developed financial system usually outperforms those having absence of such system. Significant growth of financial systems has been noted across globe in recent decades (Beck, Degryse, & Kneer, 2014). Within a financial system, banks and/or markets facilitate economic transactions.

Design of financial system may have an influence on real decisions. In economic reforms, the developing countries have always considered financial systems' choice as a main critical issue (Limpaphayom & Polwitoon, 2004). There are two popular views about financial systems, i.e. traditional and modern view. Traditional view, most common in 19th century, favors dominant role of banks. It is believed that banks run countries and in absence of banks, managers protect their own interests instead of shareholders. The modern view, however, contradicts and proposes that actions of managers can be regulated and such mechanism exists through which the managers who do not take care of shareholders' interests can be replaced (Stiglitz, 1985). Banks dominated the financial systems till mid of 1970s but after that gradual change occurred with more involvement of markets. Financial intermediaries and markets, indeed now, work closely and complementarily to each other (Allen & Santomero, 2001).

Firms generally have borrowing and depository relationships with banks. To finance investment projects, firms either deploy debt or equity financing or a combination of both (McLaney, 2009). In case of debt financing, it is not necessary to rely on banks only. Capital markets may also be approached for this purpose. Non-availability of financing sources other than banks can affect the capital investment as well as economic growth in situation of banks' credit rationing (Thakor, 1996). There are certain countries where firms mainly rely on bank financing while in other countries, markets are preferred

to fulfil the financing requirements (Ergungor, 2008). Traditionally, among the developed nations, Japan and Germany have been considered as bank based while United States and United Kingdom as market based economies (Levine, 2002). German model assigns more weightage to financial intermediaries with limited role of markets. On the other side, U.S. model advocates dominance of financial markets without having any role of intermediaries (Allen & Gale, 1995).

Relative advantages of each financial system have been discussed by different economists and researchers. Earlier discussion regarding role of financial systems in economic growth dates back to the study of Bagehot (1873). This discussion got momentum after the work of Gerschenkorn (1962) and Goldsmith (1969). Further contribution in this area has been made by Stiglitz (1985), King and Levine (1993), Levine and Zervos (1998), Ram (1999), Allen and Gale (2000), Levine (2002), Beck and Levine (2004), Solo (2013), Apergis, Artikis, and Kyriazis (2015). It has, however, also been observed that countries can gain similar economic growth rates with different financial systems (Chakraborty & Ray, 2006). This debate on comparative financial systems is yet inconclusive from each theoretical and empirical aspect. In existing studies, it is primarily attempted to examine the relative contribution of market based and bank based financial systems in economic growth across different countries. This study is a unique attempt to relatively examine financial systems in the context of financial crisis.

The term 'financial crisis' refers to a situation where majority of assets and institutions lose their value. Allen and Gale (2004) elaborated it as an intense decline in worth of asset prices, thereby affecting solvency and ability of larger number of banks in meeting their commitments with depositors. It disturbs normal functioning of a financial

system and refers to episodes during which functioning of both financial institutions and markets disrupted severely (Terrones, Scott, & Kannan, 2009). Financial crisis may take different forms such as banking panic, currency crisis, stock market crash, sovereign debt crisis, etc. (Claessens & Kose, 2013). History of financial crises is as old as capitalism itself is and *Dutch tulip bulb bubble* of 1636 is considered as a major bubble of 17th century. Number of other shocks, including *south sea bubble* of 1720, occurred in 18th and 19th century (Kindleberger & Aliber, 2005). In 20th century, devastating economic events included *great depression* started in 1929, *oil crisis & stock market crash* of 1973-74, and *Asian financial crisis* of 1997. Besides these, number of other crises occurred during 20th century.

Series of crises continued till 21st century during which highly significant shock of economic history happened and is termed as *global financial crisis*. Crisis started with the burst of housing bubbles and failure of major U.S. financial institutions in 2007 (Dabrowski, 2010; Chaudhury, 2011; Verma & Mahajan, 2012). Failure of financial institutions and crash of stock markets resulted in spread of crisis to the real economy during 2008 (Silipo, 2011). Default of borrowers created a situation of bank failure and condition of credit crunch emerged in rich nations by the start of 2008. Credit crunch started from U.S. rapidly converted to global financial crisis which affected almost all countries across the world irrespective of their level of integration (Bahiti, Shkurti, & Babasuli, 2011). According to Kalemli-Ozcan, Papaioannou, and Perri (2013), distress in global banks played a leading role in spread of sub-prime crisis across the globe. The global stock markets also experienced biggest fall since September, 2001 (Usman, 2010).

The crisis started increasing and soon it grasped over European financial markets and rest of emerging and developed economies across the globe (Dabrowski, 2010). It spread out to different countries of the world through direct and indirect channels. Effect of crisis has felt at individual level and everywhere across the globe (Edey, 2009). Major stock exchanges around the world borne consequences of this shock and it remained the most terrible event of economic history since *great depression* (Moroianu & Belingher, 2011). Crisis expanded sharply across all countries of the world as U.S. has been serving as a hub for majority of world economies by interconnecting their financial systems (Frenkel & Rapetti, 2009). European countries are heavily affected by the crisis that transmitted across countries mainly through real and financial channels. This effect, however, differed across countries as well as between emerging and advanced economies (Fraga & Rocha, 2014).

Advanced countries were highly affected by the crisis as compared to emerging economies (Bhattarai, 2015). Countries having higher level of economic freedom and more dependence on financial sector remained more susceptible to financial crisis (Shostya, 2014). Integration of global financial system facilitated in spread of crisis from one economy to other; thereby affecting at the global level (Chava & Purnanandam, 2011; Raz, Indra, Artikasih, & Citra, 2012). Financial integration has created an impact on the economies through domestic liquidity decline, fall of stock prices, and reduction in access of companies to overseas finance during the period of global financial crisis (Siddiqui, 2009). Attractiveness of large financial system has been revisited after the global financial crisis and it has been argued that the oversized financial sector may result in economic instability and improper allocation of resources (Beck et al., 2014).

Global financial crisis is the only crisis after great depression that covered the whole world. Stock markets from developed, developing, and emerging market economies were affected negatively due to U.S. economic shocks (Kudrin, 2009). Equity level across all sectors, industries, and countries went down during the crisis period and equity investors remained unable to identify any place to hide from consequences (Bartram & Bodnar, 2009). The unique feature of global financial crisis is its economic consequences for the whole world, although, effect varied across countries and regions while the immediate effect of crisis remained in advanced economies (Claessens, Kose, & Terrones, 2010). No country of the world has completely escaped from its harmful effects. Developing countries suffered more because of their lesser ability to absorb external shocks while oil producing countries were affected least (Shahrokhi, 2011). This crisis has also highlighted the leading role of U.S. in world economy. Crisis originated from U.S. and then spread sharply to emerging and developed economies (Francis, Owyang, & Soques, 2015).

Economic activities were badly affected during period of crisis and afterwards. Average world GDP, output, trade volume, and employment declined significantly during crisis period (International Monetary Fund, 2013). Stock prices also fell sharply and investors faced huge losses (Angabini & Wasiuzzaman, 2011; Hwang, 2014). The crisis did not appear at the same time in all countries, however, there is a general consensus that it started appearing in September, 2007. Collapse of banks and capital markets was witnessed across developed countries soon after the start of crisis from U.S. (te Velde, 2011). This effect got severity by the start of 2008 and remained till 1st quarter of 2009; after which recovery process started (Usman, 2010; Chaudhury, 2011; Ali & Afzal, 2012; Frankel & Saravelos, 2012). The pace of recovery, like effect, varied across countries

(Long, Li, Wang, & Cheng, 2012). This crisis is regarded as largest crisis after the great depression (Llanto & Badiola, 2009; Ali & Afzal, 2012). The crisis resembles with tsunami which affected majority of the world countries (Ioan & Maria, 2009).

The comparative trend of GDP growth rate and average stock index values of sample economies for four consecutive years are summarized in Appendix A and Appendix B, respectively. As evident from appendices, the years 2008 and 2009 witnessed a sharp decline in GDP growth and stock index values in most of sample countries which somehow recovered in 2010 and afterwards. In Pakistan, banking sector is not much effected by the crisis due to its low level of integration with global banks. Loan loss provisions and cost ratio, however, remarkably increased during crisis period. The central bank has tightened monetary policy and initiated other remedial measures to safeguard banking sector of the country (State Bank of Pakistan, 2009). Discount rate gradually increased from 10.50% in 1st month of January, 2008 to 15% at end of the year. Similar trend is noted in lending rates offered by commercial banks that increased from 10.80% in January, 2008 to 14.30% in December, 2008 (Government of Pakistan, 2009). Increased lending rates may especially be problematic for highly bank dependent firms as they lack access to alternative financing sources. Empirical investigation of this phenomenon is also a part of this study.

1.3 Theoretical Framework

Theory of financial intermediation describes the role of intermediaries in an economy (Andrieş, 2009). It explains, why financial intermediaries exist? According to Bencivenga and Smith (1991), financial intermediation helps the economies to reduce proportion of such savings which are in shape of unproductive assets. Financial intermediaries facilitate in transfer of funds from saving surplus to saving deficient units

and thereby ensure efficient utilization of national resources (Allen & Santomero, 2001). Intermediaries can be able to gain comparative advantage through economies of scale, acquisition of relevant information at low cost, and reduction of transaction costs (Benston & Smith, 1976). Their presence is not only beneficial for lenders and borrowers but these institutions also perform a vital role in overall economy. Financial intermediation related theories are based on model of resource allocation. It is proposed that presence of frictions such as asymmetric information and transaction costs are pivotal to understand the intermediation process (Allen & Santomero, 1998).

Leland and Pyle (1977) described informational advantages of financial intermediation. *Information asymmetry models* are based upon assumption that one party in transaction is better informed than other(s) and therefore dominate decisions. Borrowers and entrepreneurs in majority of cases do not present their true characteristics and its verification by external parties may either be costly or not possible. This asymmetry of information may lead to problems of moral hazard and adverse selection and generate imperfection in markets. Information asymmetry issue can be avoided with the help of financial intermediaries. Intermediaries usually help to overcome this issue by acting as delegated monitors (Diamond, 1984). In the presence of asymmetric information, debt is usually advantageous to outside equity because it compels loss-making firms out of market and thereby improves average quality of firms. Markets generally react negatively to issuance of new equity and resultantly stock prices go down (Narayanan, 1988).

Traditional focus of financial intermediation related theories changed with the passage of time (Allen & Santomero, 1998). Role of financial institutions in allocation of capital and financial innovation is also addressed in *contemporary banking theory*

(Bhattacharya & Thakor, 1993). It is argued that intermediaries render valuable services to customers and provide a range of services that are beneficial for overall economy. Financial intermediation activities particularly help in reducing volatility and promoting economic stability of low income countries (Beck et al., 2014). History of financial intermediaries is very old and banks exist since ancient times. According to Siddiqui (2003), it dates back to times when importance of money to serve as the medium of exchange was felt. Financial intermediaries have historically played a key role in mobilization of savings from individuals to the corporate sector for investment. Financial markets, on the other side, have acquired importance recently and in few countries only (Allen & Santomero, 1998).

Focus of earlier banks remained to the extent of attracting deposits and extending loans. With the passage of time and growth in economies, finance became rare. It was felt that financing through banks is not sufficient to fulfill the requirements of growing businesses. Additionally, individuals and businesses having good reputation can only secure finances from banks. At this stage, people have been involved in the process of generating finances and it has resulted in creation of markets. Involvement of large number of small investors also ensure that the reputational issue of borrowers does not matter much (Thakor, 1996). According to Blackburn, Bose, and Capasso (2005), the debt financing is more common in initial stages of development while at higher level it includes both debt and equity. Progression in stage of development, therefore, describes the phenomenon of stock markets emergence having constructive effect on growth. Financial intermediaries and markets became stronger with the passage of time and are significantly contributing in best possible allocation of resources within an economy (Andrieş, 2009). Economies are

now heavily relying on these and in such a situation, if anything emerges in the financial system, its consequences usually appear in overall economy.

The dramatic transformation in financial systems has been observed in last few decades with tremendous growth of financial markets (Allen & Santomero, 1998). Increased role of capital markets forced banks to review their traditional role of accepting deposits and extending loans only. Role of financial intermediaries is, however, still very important and in fact it has facilitated the entire process of financial market development. There are, however, some economists who claimed for irrelevance of intermediaries in perfect financial markets on the basis of Arrow- *Debreu model*. It is argued that in such a market, banks earn zero profit and banking actions do not influence to other economic agents. Financial intermediaries, in this model, can only be considered as a mean of reducing transaction costs (Allen & Gale, 1995). These are treated as superfluous institutions in this framework.

Firms are not only concerned with composition of capital structure but also with the source from which they acquire finances. According to Diamond (1991), firms initially use bank financing to ascertain credibility and subsequently enters into capital markets. Boot and Thakor (1997) stated that choice of optimal financial system is generally associated with credit reputation of borrowers. Systems having borrowers of comparatively poor credit reputation tilts to bank financing while in case of good reputation borrowers, it skews towards capital markets. Similarly, borrowers with relatively high moral hazard favor bank financing while those having lesser issue prefer capital market financing. Financial system design may also influence the future contest for control and difference exists between banks and capital markets to determine its outcomes. Role of banks and

markets, in this context, considerably differs (Thakor, 1996). These differences formed a basis for initiation of debate on financial structure to economic growth association.

Theoretical discussion of financial structure has been progressed with reference to four different financial structure views. *Bank based view* is backed up primarily by the theory of financial intermediation. It emphasizes positive role of banks in economies. *Market based view* advocates positive role of markets to promote economic growth. It also criticizes bank based view for its deficiencies. *Financial service view* highlights the role of overall provision of financial services while *law and finance view* supports for role of legal system in promoting economic growth. Debate relating to comparative financial systems is yet unresolved and inconclusive. It needs further contribution from different aspects. One such aspect is the comparison of financial systems in distress situation. Major distress after great depression is the global financial crisis that has originated from U.S. and spread globally. In modern era, banks have developed linkages for facilitation of liquidity and risk sharing. In parallel to interlinkages of banking sector, world economies are also interdependent and integrated through markets. Linkages of banking sector and market interdependencies have also contributed in rapid transfer of shocks from one country to another and thereby at global level during episodes of global financial crisis. The current study is intended to contribute in discussion of comparative financial system in context of this devastating crisis of economic history which is termed as global financial crisis.

1.4 Statement of the Research Problem

The decision regarding selection and preference of financing sources is a critical and ever-challenging issue for firms and economies. There is an ongoing debate among economists, academicians, and financial practitioners relating to this issue as well. Initially,

two main schools of thoughts emerged from this discussion. One group of economists has been supporting financial intermediaries for their superior role and other group to the stock markets. With the passage of time, a third group came forward to support the provision of financial services and role of overall financial system in economic growth, without having any distinction of bank or market orientation. In debate of comparative financial systems, number of economists and researchers have presented their views. These include Allen and Gale (2000), Tadesse (2002), Levine (2002), Chakraborty and Ray (2006), Pinno and Serletis (2007), Song and Thakor (2010), Lee (2012), Sahoo (2014), Kim, Lin, and Chen (2016). The discussion in this domain has been mainly proceeded by considering different financial structure views.

According to *bank-based view*, bank financing is the key to economic progress of nations (Schumpeter, 1911/1934; Bencivenga & Smith, 1991). It also criticizes capital market financing for being costly, disruptive, and uneconomical as compared to banks. Contrary to it, advocates of *market based view* have been highlighting positive role of capital markets in economy and criticizes banks for their deficiencies (Rajan, 1992; Greenwood & Smith, 1997). Additionally, financial *service view* and *law and finance view* do not consider the market and bank based classification as a useful way of comparing financial systems (Merton & Bodie, 1995; La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 1998, 2000). In existing studies, relative association of financial structure to economic growth in normal periods is largely emphasized. An important question over here is, "Whether categorization of financial systems matter in distress period and how countries and firms with different financial structure pattern behaved in episodes of financial crisis?"

In order to facilitate decision makers, the empirical evidence regarding comparison of financial systems, in special context of global financial crisis, is needed.

1.5 Objectives of the Study

This study is intended to:

1. examine the overall and relative effect of global financial crisis on economic growth of diverse financial structure countries;
2. observe the volatility pattern of stock indices around the financial crisis period and then compare it across different category countries;
3. analyse overall and relative effect of crisis on performance of non-financial firms in comparative financial systems;
4. explore overall and then relative effect of crisis on performance of non-financial firms, having different level of bank dependence, in Pakistan;
5. observe stocks volatility pattern of non-financial firms in Pakistan, around the crisis period, and then its comparison across firms of different bank dependence level.

1.6 Research Questions of the Study

1. Did global financial crisis effect the economic growth of sample countries and whether effect differ across countries of diverse financial structure?
2. Did global financial crisis effect the volatility of stock indices in sample countries and whether volatility pattern differ across countries of different categories?
3. Did global financial crisis effect the performance of sample non-financial firms and whether effect differ across comparative financial systems?
4. Did global financial crisis effect the performance of non-financial firms in Pakistan and whether effect of crisis differ across firms of different bank dependence level?

5. Did global financial crisis effect the stocks volatility of non-financial firms in Pakistan and whether volatility pattern differ across firms of different bank dependence level?

1.7 Significance and Contributions of the Study

Discussion regarding role of financial system and financial development in economic growth dates back to 19th century. It formally initiated with the study of Bagehot (1873). This area has been significantly emphasized in 20th century with large number of theoretical and empirical contributions. The discussion not only concentrated on overall contribution of financial system to economic growth but also of its different components, separately. On one side of debate, constructive role of intermediaries in efficient allocation of resources and economic growth has been extensively emphasized (Schumpeter, 1911/1934; Gerschenkorn, 1962; Benston & Smith, 1976; Leland & Pyle, 1977; Diamond, 1984; James, 1987). The other side, however, has been supported the positivity of markets and criticized the role of banks in economy (Fisher, 1930; Fama, 1970; Rajan, 1992; Allen, 1993; Greenwood & Smith, 1997). In addition to these extremes, another view for joint involvement and co-existence of banks and markets has also been presented and supported (Diamond, 1991; Boot & Thakor, 1997; Allen & Santomero, 2001).

The critical analysis of these and similar other studies form a theoretical base for new discussion in this domain. Indeed, the existing discussion has comprehensively covered and elaborated the role of financial intermediaries and markets in economic progression of countries alongwith benefits for dominance of either system. In debate of comparative financial systems, Allen and Gale (2000) made a significant contribution. It is, however, realized that the behaviour and resilience of each system in situation of

economic crisis should be probed. To some extent, this issue has earlier been addressed by Mavrotas and Vinogradov (2007) but its scope is restricted to a crisis having limited effect. The current study is intended to cover this aspect from a broader spectrum. Comparison of financial systems in background of global financial crisis is the scope of current study. This crisis has widespread effect on majority of world countries. The study is, therefore, expected to be a valuable addition in debate of comparative financial systems.

In initial empirical studies of financial structure to economic growth association, four developed countries of world have only been emphasized. Demirguç-Kunt and Levine (1999) initiated a broader cross country analysis in this domain. Further contribution and expansion is made by Levine (2002). These studies have induced other researchers to examine the phenomenon from different aspects. Relevance of financial structure, with relatively superior role of either banks or markets, has been observed by many researchers (Tadesse, 2002; Caporale, Howells, & Soliman, 2004; Pinno & Serletis, 2007; Yeh, Huang, & Lin, 2013; Mishra & Narayan, 2015; Luintel, Khan, Leon-Gonzalez, & Li, 2016; Rapp & Udoieva, 2018). On the other side, irrelevance of financial structure and development of banks and markets in parallel has been suggested by some researchers (Levine, 2002; Beck & Levine, 2002; Song & Thakor, 2010; Lee, 2012; Dima, Dinca, & Spulbar, 2014; Apergis et al., 2015). The conclusive view in this domain is not yet emerged. Existing studies mainly focussed to explore the effect of financial structure views on economic growth. There are very few studies addressing the issue of crisis in this discussion (Bahiti et al., 2011; Allen, Gu, & Kowalewski, 2012; Mirzaei & Kutan, 2016; Ahmad, Etudaiye-Muhtar, Matemilola, & Bany-Ariffin, 2016).

Bahiti et al. (2011), however, only considered a single bank based economy in analysis. In the study of Allen et al. (2012), different banking crises and market crashes have been taken into consideration due to which results cannot be generalized. Mirzaei and Kutan (2016) focused on element of bank diversification and industry growth. In the study of Ahmad et al. (2016), concentration remained limited to overall financial development and a specific region. Considering these issues, this study is aimed to examine a broader set of financial systems in the context of global financial crisis. The study covers both cross-country and cross-firm aspects to uncover the phenomenon more comprehensively. In this way, the study is expected to be a valuable addition in the literature of comparative financial systems. This study can be significant for financial practitioners, researchers, and others who are interested to observe the behaviour of financial systems in crises situation. Earlier, Chakraborty and Ray (2006) pointed out that the focus of large number developing countries started diverting towards market based system without having a conclusive evidence regarding superiority of any one system. Results of this study are expected to facilitate in making a better and systematic choice of financial systems rather than the random one. It also sets a direction for future research in this area.

Micro level focus of study is the domestic economy of Pakistan from non-financial firms' perspective. Finance is considered as lifeblood of any business and is crucial for proper functioning of business firms. It facilitates start-up, expansion, and smooth-functioning of business activities and enable the firm(s) to achieve strategic objectives. Firms usually have different level and nature of relationship with banks. Through closer ties with banks, firms can be able to reduce credit constraints, secure more financing, and improve performance (Chakraborty & Ray, 2006; Castelli, Dwyer, & Hasan, 2012;

Davydov, 2016; Diallo, 2018). The banking relationship can, however, be problematic for bank dependent firms in banking and financial distress periods (Chava & Purnanandam, 2011; Iacoviello, 2015). Considering the importance of banking relationship, this study also relatively examines the performance of firms in Pakistan, having different levels of bank dependence, in backdrop of financial crisis. In different countries, studies have shown a significant effect of crisis on bank financing and consequently on investment and performance of bank-dependent firms (Wu, 2012; Akbar, Shafiq ur Rehman, & Ormord, 2013; Diana & Carmen, 2014; Buca & Vermeulen, 2017).

In Pakistan, studies relevant to this domain are observed to be limited in scope and are mostly concentrating on one sector (Channar & Ram, 2011; Shahzad, P. Ali, Ahmad, & S. Ali, 2015). The current study is attempting to fill this gap in existing literature as well and is expected to be a valuable addition in literature related to effect of global financial crisis in Pakistan. In parallel to investigating overall effect of crisis on performance of firms, the study compares firms with different level of bank dependence. Firms in Pakistan generally prefer bank financing over other available resources. Micro component of firm level analysis highlights the consequences of excessive bank financing for non-financial enterprises. This domain has not been addressed in the country earlier. Findings of the study are expected to be helpful for officials in formulating better, systematic, and vibrant financing policies to ensure smooth functioning of firms during crisis situation. The study also opens a room of discussion for future research in the country.

1.8 Organization of the Study

First chapter offers background and theoretical framework of the study. Statement of problem and research objectives followed by research questions and significance of

study are also explained in this chapter. Second chapter summarizes the existing theoretical and empirical literature relevant to the study. Gap analysis and hypotheses of the study are also described in this chapter. Brief explanation of methodological framework alongwith description of population and sample, econometric specification, and data sources are given in third chapter. Results of data analysis are in fourth chapter whereas fifth chapter summarizes the discussion made in earlier chapters and offers key conclusion, recommendations, and implications of the study. Limitations of the study and future research areas are also highlighted in fifth chapter.

CHAPTER 2

LITERATURE REVIEW

2.1 Chapter Summary

This chapter is relevant to the survey of existing theoretical and empirical studies and their critical analysis for identification of research gap. It initially summarizes the theories of financial structure and financial crisis. This chapter also reviews the existing studies relevant to relationship of each financial development and financial structure to economic growth. It further elaborates literature regarding origin, transmission, and effect of financial crisis on economic growth and stock markets volatility of different countries. Review of studies related to bank-firm relationship and effect of global financial crisis on performance of firms both globally and locally is also provided in this chapter. From analysis of existing studies, research gap is identified and hypotheses of the study are constructed.

2.2 Review of Existing Theoretical Discussion

This study is about the analysis of financial systems in backdrop of global financial crisis. Following section briefly elaborates the theories relevant to both financial structure and financial crisis.

2.2.1 Theoretical Discussion on Financial Structure

Existing theoretical discussion on financial structure to economic growth association has been evolved from four different financial structure views. Brief description of each view is in following section.

2.2.1.1 Bank Based View

This view claims that bank financing is pivotal to economic progression of countries. According to Schumpeter (1911/1934), presence of banks in an economy facilitates the operations that may not be executed in absence of bank money. Gerschenkorn (1962) has also supported for superiority of banks over markets in financing industrial expansion, especially in under-developed countries. It was argued that problems of economic backwardness can be solved by establishing a closer relationship between banks and industrial firms. In such a system, banks and financial intermediaries are usually being entrusted with greater responsibility to develop overall economic system (Bertocco, 2008). Banks are not only involved in funding a business firm but also in number of activities including project selection, identifying talented entrepreneurs, and monitoring. Closer bank-firm relationship can considerably help to minimize the monitoring costs. It can also help to overcome the issue of free riding (Diamond, 1984). A closer relationship usually enhances the ability of firms to access credit, minimizes issue of information asymmetries, and results in an overall financial performance improvement (Castelli et al., 2012). Agency problem can be reduced through established banking relationship and it facilitates the firm(s) to borrow relatively more than what is secured from market financing (Chakraborty & Ray, 2006). Additionally, banks monitor to ensure that managers of their client firm(s) take efficient business actions.

Stiglitz (1985) advocated bank financing for better mechanism of corporate control while the role of banks in financing innovative activities was highlighted by Stulz (2000). The contribution of stock markets in overcoming issues of informational asymmetries has also been criticized. Rapid adjustment of prices in response to new information may create

free-rider problem and resultantly incentives for investors to carryout costly research may be diminished. Modigliani and Perotti (2000) supported the viability and reliability of bank lending because of greater bargaining and monitoring power of financial intermediaries. Comparatively long term relationships of borrower and banks in bank based economies can help to lessen moral hazard problem (Thakor, 1996). The market financing, on other side, have little or no involvement in firm's investment decision and is only an arm's length contract (Chakraborty & Ray, 2006). Positive role of banks in risk management, investment efficiency, proper capital allocation and mobilization, effective monitoring, achieving economies of scale, and promotion of economic growth has also been highlighted by Diamond (1984), Bencivenga and Smith (1991). Role of banks is critical in an economy as it provides intermediation service among the savers and users of funds (Tabb, 2010).

Role of banks as liquidity providers is highlighted in the model proposed by Diamond and Dybvig (1983). *Diamond-Dybvig model* describes banks as association of depositors that provide insurance to individuals against shocks that may affect their liquidity position adversely. Banks are also involved in maturity transformation of funds. These institutions pool resources of depositors having short term claims and extend long term business and personal loans. Banks do it by virtue of *law of large numbers* and gets compensation in the form of net interest margin. Bank financing can also serve as a mechanism of generating positive signals for borrowing firm (s). Public announcement of a firm regarding new bank credit or extension in existing one usually positively effects its share prices (James, 1987). It is, however, generally difficult for a bank, in presence of adverse selection, to attract good customers of one bank while leaving others with lesser desirability (Sharpe, 1990). Similarly, a borrower cannot be able to secure credit from any

bank after being rationed by some other bank (Stiglitz & Weiss, 1983). The reason can be the bad signals generated through refusal of former bank. Banks generally have an access to company accounts and announcement of bank credit is considered as a vote of confidence by the informed party.

2.2.1.2 Market Based View

This view highlights and supports the leading role of capital markets in economies and criticizes bank financing for being expensive. Bargaining power of banks over profits of firms is yet another limitation of bank based systems that influences owners to exert fewer efforts (Rajan, 1992). On the other side, checking on operations of firms occur more frequently in stock markets as compared to banks and is therefore advantageous for investors in dynamic industries (Allen, 1993). Countries having less developed capital markets could be more vulnerable to banking shocks because they have no substitute of financing during banking distress period. Shen and Huang (2003) suggested that in such situation a distress in banks can affect more negatively to bank oriented economies.

This view is backed up primarily by the theory of *savings and investment in perfect capital markets.* The theory is supporting for a positive role of capital markets in facilitating investment and financing decisions of individuals and firms. Capital markets can increase the utility of parties having surplus wealth and those with profitable investment projects by providing each party a low cost mean of achieving its goals. Presence of capital markets usually boosts the level of savings and investment in economies and thereby economic growth (Fisher, 1930). A well-developed market can increase and mobilize savings, efficiently allocate capital to productive investment, and thereby promotes economic growth. The financing for larger projects can be facilitated by stock markets. Arrangement

of huge amount for such projects may otherwise be difficult. Stock markets can mobilize savings of large number individuals and thereby stimulates the investment and growth rate (Greenwood & Smith, 1997). In absence of equity markets, it might be excessively costly for outside investors to raise capital in the presence of informational asymmetries (Demirguç-Kunt & Maksimovic, 1996).

Integration of stock markets across the globe is facilitating in risk sharing, improving allocation of resources, and speeding up the growth rate of economies. Savings and efficient allocation of capital for productive investments can be encouraged in highly developed stock markets which in turn can strengthen the growth momentum. The *efficient market hypothesis* by Fama (1970) has also provided a theoretical support for shift in global economic policies towards market-oriented systems and capital market financing. It is proposed that capital markets are beneficial for investors, firms, and government policy-makers. After establishment of markets, banks have also stopped the improper allocation of funds to investment projects prone to the loss (Rajan & Zingales, 1998). Bank based system is further criticized on grounds that it is more suitable for financing of existing firms only but not for innovations.

2.2.1.3 Financial Service View

This view highlights the role of overall provision of financial services, without having any distinction of banks and markets (Merton & Bodie, 1995). It is concentrating on creation of an environment where both banks and markets can provide valuable financial services. Banks and markets can play a complementary role in provision of services and the role of financial system in economic growth depends upon effectiveness of services provided to customers. The issuance of debt can become prohibitively expensive if equity

markets are nonexistent (Boyd & Smith, 1998). Financial service view is conceptually consistent with both market and bank supported views (Levine, 2002). This view suggests that financial systems should be examined in functional instead of institutional perspective. The former is based on services provided by financial system while later upon institutions that provide the services (Allen & Santomero, 1998).

2.2.1.4 Law and Finance View

It emphasizes the role of legal system in promoting economic growth. Functioning of both banks and markets can be improved in presence of a well-performing legal system. This view favours for distinction of countries on the basis of effectiveness of legal system instead of financial structure basis (La Porta et al., 1998, 2000).

2.2.2 Theoretical Discussion on Global Financial Crisis

Global financial crisis originated from U.S. with collapse of some major financial institutions in 2007. In modern economies, banks are interlinked and interconnected. In this situation, failure of a bank in response to any minor liquidity shock may result in weakening or shutting down of all other banks in that economy (Lagunoff & Schreft, 2001). Due to economic globalization, linkages among banks are not limited locally but are spread to a global level. These linkages of banking sector can facilitate in spillover of shocks and contagion effect. Similar situation became a root cause of global financial crisis. As proposed in *world systems theory*, production and exchange activities are necessities of market participants (Wallerstein, 1974; Goldfrank, 2000). These market interdependencies have also contributed in rapid transfer of shocks from one country to another and thereby at global level during episodes of global financial crisis. Theories regarding origination, transmission, and effects of global financial crisis are presented in following sections.

2.2.2.1 Financial Instability Hypothesis

Frenkel and Rapetti (2009) argued that global financial crisis is representing to effects described in the Minsky's theory of financial crisis. Crisis has both the features of large banking failure and spillover effects, as described by Minsky. Silipo (2011) claimed that the crisis can be explained by *financial instability hypothesis* which underlines the willingness of investors to take excessive risk and banks to extend finance in economic growth periods. This theory has also been termed as *financial fragility hypothesis* and can be applied to describe transmission of banking panic to bank-dependent firms. Debt and risk taking activities usually raise in expansionary periods and debt can even exceed income necessary to payoff obligations (Fisher, 1933; Minsky, 1977). Borrowing bubbles could end up with the imposition of credit restrictions by banks, even if firms can afford it. This credit contraction can deteriorate the performance of bank-dependent firms and economic activities. Friedman and Schwartz (1963) raised the similar argument. Wolfson (2002) proposed certain amendments in the *Minsky's theory* to extend its scope from domestic economy to global context. Shocks originated from one region or sector can gradually gather momentum and affect economies on a larger scale (Allen & Gale, 2000). Same situation happened in U.S. that resulted in global meltdown of economic activities during 2008-09.

2.2.2.2 Disaster Myopia Hypothesis

According to Cornand and Gimet (2012), global financial crisis is better explained through *disaster myopia hypothesis*, initiated by Guttentag and Herring (1986). Risky behavior of investors in optimistic conditions can result in creation of bubbles and bursting to crisis. It is referring to a situation in which the possibility of adverse outcomes be

underestimated by agents. Almost similar event happened in banking sector of U.S. during 2007 that resulted in origination and spread of crisis. Rakshit (2012), however, argued that the phenomenon of global financial crisis is closely related to the Keynes analysis of booms and busts in share market that is explained in the *general theory*. Reasons behind global financial crisis are similar to those described in the Keynes theory except duration of recession which is comparatively short and shallow. Slowdown of economic activities during crisis period and then an impressive recovery in 2010 is noted across the globe.

2.2.2.3 Bank Run Theory

Global financial crisis started from U.S. and resulted in failure of renowned banks across the globe. Banking failure in U.S. started after sudden withdrawals by fearful investors. Massive runs from some major U.S. banks resulted in historical bank failure and start of crisis (Goedde-Menke, Langer, & Pfingsten, 2014). Situation of liquidity and credit crunch emerged which has negatively affected the banking performance. The confidence regarding stability of world economic and financial system shaken during the period of crisis (Spence, 2009). Effect of the crisis can be explained better through *bank run theory* that explains pessimistic expectations of depositors about future state of economy. A perception of depositors regarding downfall of banking activities and failure of banks can result in immediate cash withdrawals and initiation of liquidity problems for banks. In such a situation, banks can be enforced to sell their assets at loss for meeting liquidity requirements (Diamond & Dybvig, 1983). Shortage of funds can create a situation of insolvency, bankruptcy, and end up with economic recession. Similar phenomenon has been earlier expressed in the *debt-deflation theory* of Fisher (1933). It is argued that debt issue can play a dominant role in creation of booms and depression in an economy.

It is deposit financing that makes banks more susceptible to runs and panic in banking sector actually describe the contagion mechanism of runs (Bhattacharya & Thakor, 1993). An expectation of recession in near future can induce bank customers to withdraw their deposits immediately as they want to avoid losses associated with bank failure. Bank runs form a basis of real economic issues and is commonly considered as a characteristic of extreme crises. Bank runs and banking panic also created economic problems during the *great depression* (Diamond & Dybvig, 1983; Gorton, 1988). The behavior of depositors is, therefore, an important determinant of banking stability and overall economic system. Immediate withdrawal of deposits from a distress bank may also generate a negative signal regarding other banks. Tightening of interbank lending in situation of a bank failure and interconnections among banks can result in failure of overall banking system. Crises of 1929 and 2008 happened because of banking system failure (Iusim, 2009).

2.2.2.4 Efficient Capital Market Theory

Kindleberger and Aliber (2005) elaborated financial crisis as a broader term than that presented by monetarists. It involves failure of large financial and nonfinancial firms, sharp decline in asset prices, disruptions in foreign exchange markets, deflation or disinflation, or some combination of all these. Traditional economic theories, including *efficient capital market theory* of Fama (1970), are based on assumption of perfect capital markets in which every participant have costless and instantaneous access to same type of information. Akerlof (1970), however, argued that *informational asymmetry* exists in markets where buyers and sellers hold different levels of information, thereby creating market imperfection. These information asymmetries can create problems of adverse selection and/or moral hazard. Some economists and market specialists criticized the

efficient market hypothesis and blamed it for latest financial crisis. It is argued that belief upon this hypothesis has induced many financial managers to underestimate dangers of asset bubbles breaking. Unjustified faith on market efficiencies is also as a prime reason of global financial crisis (Volcker, 2011).

Economists also argued that markets can turn out to be inefficient in the presence of asymmetric information. In this situation, financial markets could be unable to channelize funds for productive investment opportunities and such market failure can cause a downturn of overall economy (Mishkin, 1991). Imperfection in capital markets occur because of asymmetric information (Blackburn et al., 2005). In the presence of asymmetric information, individual investors can place different valuations to a similar project, depending upon the nature of information they have (Bertocco, 2008). Another argument in this context is based upon view that information asymmetry creates herd behavior. Small and medium level investors face higher cost of getting relevant information in comparison to large banks and investment companies. Uninformed investors in such a situation follow actions of big players and this behavior results in occurrence of bubbles, crisis, and poor connection of markets to economic fundamentals. This phenomenon also provides a justification for co-movements in stock markets and crash of markets across globe during the period of economic downturn.

2.2.2.5 Agency Theory

Jensen and Meckling (1976) presented the agency cost model of firm. This model highlighted the issues relevant to interests and claims of different parties in a firm. It is argued that each party wants to protect its own interests and expecting for a similar approach of other involved parties (Megginson, 1997). Prior to this theory, firm has been

considered as an isolated entity owned and operated by the party having personal and business interests aligned. In agency theory, consequences of ownership and management separation are highlighted. This separation creates agency problem or principal-agent problem in firms. Managers are actually agents of shareholders in firms and it is expected that their efforts should be intended to maximize the wealth of shareholders. In situation of ownership-management separation, however, each party assumes that other one is protecting its self-interest at their cost. This clash of interest among two parties can negatively affect the financial performance of firms. In agency theory, mechanism of minimizing the agency problem is also proposed.

Agency problem is also a cause of crisis originated in U.S. during 2007 that rapidly grasped the global economies. In U.S. it was not much easy to secure residential mortgages prior to 2000 and highly credit worthy borrowers were only in position to secure such loan. Advancement in technology, however, made it easier to assess the default probabilities of loan seekers. The transaction costs reduced and it helped in initiation of securitization process. Banks started offering subprime mortgages to even average quality borrowers (Mishkin & Eakins, 2011). In pre-crisis period, collateralized debt obligations became very much popular. Mortgage brokers were playing the role of agents for investors (principals). Interest of brokers was limited to earning of the brokerage fee. They were interested to maximize the volume of transactions for charging maximum fee. Self-interested brokers did not put much effort to evaluate the repayment ability of borrowers as loans were immediately sold to investors in shape of securities (Smith, 2010; Mishkin & Eakins, 2011).

Brokers encouraged households for mortgage loans without giving due consideration to their affordability. Even loan applications were processed and approved through falsified information. Incentives for banks remained higher to underwrite mortgage-backed securities while weaker to evaluate and ensure the repayment possibilities. Insurance companies also charged huge amounts by writing financial insurance contracts for risky deals. Entire process, however, raised the complexity of structured products and increased problems of adverse selection and moral hazard in financial systems (Mishkin & Eakins, 2011). With the passage of time and increase in demand, prices of houses increased. This has continued for some time but after that declining phase started due to mismatch of housing prices with economic fundamentals. In peak time, the amount of mortgage also exceeded actual value of house. Once decline started, borrowers realized that value of house owned by them is lower than the value of mortgage and they started defaulting (Lavoie, 2016). This has negatively affected lending by banks. In order to meet liquidity requirements, banks sold their assets even below cost and also imposed constraints on fresh lending to both individual and corporate borrowers. Decline in lending has negatively affected the performance of corporate enterprises and overall economic activity.

2.3 Review of Existing Empirical Studies

The discussion regarding role of financial development in economic growth is very old. Bagehot (1873), Schumpeter (1911/1934), Gerschenkorn (1962), and Goldsmith (1969) initially contributed in this discussion. In parallel to examining the role of overall financial system in economic growth, relative contribution of its different components also remained under discussion. In debate of comparative financial systems, Levine (2002)

significantly contributed by making a comprehensive cross-country comparison. Number of other researchers also attempted to explore this area from different aspects; however, discussion is yet inconclusive. This study is aimed to relatively analyse the financial systems in wake of global financial crisis. It covers both country level and firm level aspects. Following sections briefly summarize existing empirical evidences relating to the association of financial development and financial structure to economic growth as well as origin, transmission, and effects of global financial crisis both globally and locally.

2.3.1 Financial Development and Economic Growth

The term 'economic growth' refers to the comparative increase in an economy's capacity for producing goods and services and increase in welfare of a nation over time (Fase & Abma, 2003). Financial system facilitates transfer of funds from saving surplus to deficit units and thereby contributes to overall economic growth. Role of financial system in promoting economic growth has been extensively discussed in literature. Discussion in this area started with the study of Schumpeter (1911/1934) who highlighted the importance of banking system in technological innovation and economic growth. Robinson (1952), on the other side, argued that expansion of economy actually results in financial development. Growth of economy generates demand for different kinds of financial services that the financial system can provide. This discussion on financial development to economic growth association got momentum by the work of Goldsmith (1969), after which number of researchers including King and Levine (1993), Levine and Zervos (1998), and Ram (1999) attempted to extend this work.

King and Levine (1993) found a positive association of financial development to economic growth across a sample of over 80 countries. Levine and Zervos (1998) stated

that both stock markets and banks contribute positively in economic growth, despite the fact that services offered by each differ in nature. In another study, Arestis, Demetriades, and Luintel (2001) pointed out a significant contribution of both banks and stock markets in economic growth of France, Germany, and Japan while weak relationship between financial and economic development has been found in U.S. and U.K. The researchers advocated for stronger role of banking system in promoting growth than market based system. Rabiul (2010) also found both stock markets and banks to be contributing positively and significantly in the long-run economic growth of developing countries. In order to achieve economic benefits, the proper development of both is suggested. On the other side, Ram (1999) studied the relationship between financial and economic development across a sample of 95 countries. A very weak negative association between financial development and economic growth in majority of sample economies has been noted.

Beck and Levine (2004) found banks and stock markets to be positively influencing the economic growth in a sample of 40 countries. On the other side, no significant association of stock market and banking development to economic growth has been noted by Naceur and Ghazouani (2007) in a sample of eleven MENA countries. Again, Deidda and Fattouh (2008) found a positive effect of each stock market and banking development upon economic growth of sample economies. Nowbutsing and Odit (2009) also observed a positive short-run as well as long-run effect of stock market development on economic growth of Mauritius. Similarly, Boubakari and Jin (2010) identified a positive association between stock market development and economic growth of countries from Europe having liquid and active stock markets. A significant contribution of financial development to

economic growth of bank-based Vietnam's economy has also been noted by Anwar and Nguyen (2011). The researchers suggested for deployment of resources in development of financial markets. Another study by Jalil and Feridun (2011) demonstrated a significant positive association among financial development and economic growth in Pakistan over the period of 1975-2008.

By selecting a sample of 36 countries from Africa, Ngare, Nyamongo, and Misati (2014) found a positive effect of stock market development on economic growth. Menyah, Nazlioglu, and Wolde-Rufael (2014), on the other side, did not find a significant impact of financial development upon economic growth of 21 countries from Africa. Law and Singh (2014), again, observed a positive role of financial development in economic growth of sample countries but the benefits emanate only till a certain level. The study has highlighted the importance of optimal financial development level for economic growth. Arac and Ozcan (2014) also observed the existence of long-run relationship between financial development and economic growth of Turkey. Existence of long run association among financial development, international trade, and economic growth in Pakistan has been noted by Gokmenoglu, Amin, and Taspinar (2015). It is suggested to develop financial system for accelerating and stabilizing economic development in the country. Similarly, Sehrawat and Giri (2015) found the presence of a long run association among financial development and economic growth of India. In a sample of forty countries, Durusu-Ciftci, Ispir, and Yetkiner (2017) also observed a positive contribution of financial development on economic growth. Role of credit market development found to be more substantial in majority of sample economies.

Direction of causality among financial development and economic growth also remained an important area of research and discussion. Existing studies in this domain reported a variation in results. Fase and Abma (2003) found the presence of significant uni-directional causality from financial development to economic growth in emerging Southeast Asian economies. Similar results for Korea have been established by Yang and Yi (2008). A reverse unidirectional causality, from economic to financial development in China has, however, been noted by Liang and Teng (2006). Colombage (2009) observed a leading role of financial market development to stimulate economic growth in Japan, U.S., U.K., and Switzerland. The reverse causality has, however, been noted for Canada. Hsueh, Hu, and Tu (2013) also found the presence of association among financial development and economic growth in some of Asian countries selected as sample. Naik and Padhi (2015) too found the existence of uni-directional causality, from development of stock market to economic growth, across a sample of 27 emerging economies. Similarly, Coşkun, Seven, Ertuğrul, and Ulussever (2017) supported the presence of uni-directional causality from development of capital market to economic progression in Turkey. There are, however, some studies showing the presence of bi-directional causality among both variables. In one such study, Abu-Bader and Abu-Qarn (2008) employed trivariate VAR technique over the data of 1960-2001 and demonstrated the existence of bi-directional causality between economic and financial development in Egypt. Similarly, Shahbaz, Ahmed, and Ali (2008) found a strong association of stock market development to economic growth in Pakistan. Presence of bi-directional causality has been observed in long run, however, for short-run it remained uni-directional from stock market development to economic growth. Pradhan, Arvin, Hall, and Bahmani (2014) also found the existence of uni-directional as well as bi-

directional causality among development of stock market, banking system development, economic growth, and other selected macroeconomic variable in countries from ASEAN region.

It is noted by different researchers that direction of causality among financial development and economic growth depends upon structure of financial system. Mishal (2011) observed a long-run bi-directional relation between banking development and economic growth while uni-directional causality from economic to stock market growth in Jordan. Conversely, L.M. Marques, Fuinhas, and A.C. Marques (2013) found the presence of bi-directional causality between development of stock market and economic growth in Portugal. The similar effect, in case of bank financing, has however not noted. Thumrongvit, Kim, and Pyun (2013) found a positive association of stock market and banking development to economic growth across a sample of 38 developing and developed countries. Development of domestic bond market, however, diminished the role of bank credit and transformed the association of banking to economic growth from positive to negative. According to Peia and Roszbach (2015), development of stock markets causes economic growth whereas reverse causality exist between development of banking sector and economic growth. The study deployed a sample of 22 advanced economies for examining co-integration and causality among finance and economic growth.

It is also noted in different studies that financial development to economic growth association influences by the stage of financial development. Odedokun (1996) observed a positive impact of financial intermediation upon real GDP that remained more pronounced in low income as compared to high income countries of the sample. Similarly, Hassan, Sanchez, and Yu (2011) found the existence of positive association among financial

development and economic growth in developing countries only. The researchers proposed for necessity of financial development but not considered it enough to achieve sustainable economic growth in developing countries. On the other side, Herwartz and Walle (2014) noted a stronger effect of finance upon economic development of high-income in comparison to low-income countries. The study utilized annual data of 73 countries over the period of 1975-2011. Another study by Seven and Yetkiner (2016) demonstrated a positive effect of banking development upon economic growth in low and middle income countries while in case of high income countries, it remained negative. On the other side, association of stock market development to economic growth, found positive in middle as well as high income countries. The study concluded that effective financial system functioning is crucial to economic growth of developing countries.

The importance of financial development to economic growth association is evident from the survey of literature. In majority of existing studies, the presence of association among these two variables has been documented. Direction of causality among variables, however, varied across countries and in different studies. In some countries, it remained uni-directional while bi-directional in others. Researchers further observed that stage of development may also be relevant to determine the contribution of financial development in growth rate of economies. Its behavior may differ in high, low, and middle income countries. From entire discussion of this section, it can be established that financial development ever played and is playing a leading role in economic advancement of nations. The studies in this area can, however, be broadly classified to two groups. One describing overall association among variables while other explaining the role of either banking or stock market development in economic progression. This second aspect is addressed in

next section which is summarizing the literature relevant to financial structure and economic growth relationship.

2.3.2 Relationship between Financial Structure and Economic Growth

The phenomenon of comparative financial systems has been earlier addressed by different researchers. Levine (2002) made a significant contribution in this area, after which the debate got momentum. The study considered four competing financial structure views and utilized the data of 48 countries. An overall link of financial development to economic growth has been noted without having a distinction of bank or market based structure. According to Beck and Levine (2002), classification of countries on the basis of its orientation to markets or banks is not useful, however, classification on the basis of overall financial development and efficiency of legal system can enable to draw some meaningful results. Tadesse (2002), on the other side, supported for superior role of bank-based system in countries having less developed financial sector while stronger role of market-based system in countries with developed financial sector. Uzunkaya (2012) demonstrated the similar evidence and argued that legal system can be a key determinant in relative merits of two systems.

Rajan and Zingales (1998) observed that industrial sector which depends comparatively more on external finance grow excessively in countries having developed financial markets and such markets, therefore, serve as a source of competitive advantage. Fisman and Love (2007), however, reexamined this work and suggested for dominance of growth opportunities over financial dependence. It has been proposed that financial development can facilitate firms in seeking advantage of growth opportunities. Earlier, Caporale et al. (2004) documented a positive and relatively stronger role of well-

functioning stock markets in long run economic growth of majority of sample economies. Conversely, Hondroyiannis, Lolos, and Papapetrou (2005) found a stronger role of bank financing in economic growth of Greece. Similarly, Hao (2006) documented a positive effect of financial intermediation development on economic growth of China and recommended for further financial sector reforms to reap full benefits of intermediation in real economy. Chakraborty and Ray (2006) also advocated for relatively superior role of bank-based system during transition process of traditional economy into industrialized one.

By extending work of Levine (2002) and incorporating the role of heterogeneity, Pinno and Serletis (2007) found the existence of association among financial structure and economic growth. Researchers observed a dominant role of bank based (market based) financial system in economic growth of developing countries (developed countries). According to Ergungor (2008), structure of financial system is not irrelevant for economic growth. The countries having nonflexible judicial structure can develop faster with high orientation of financial system toward banks. Another study by Salami and Ujunwa (2009) concluded that both market and bank based systems promoted economic growth in Nigeria. Role of bank-based system found to be comparatively dominant in promoting economic growth. Arestis, A.D. Luintel, and K.B. Luintel (2010) too found a significant effect of financial structure upon economic growth in majority of sample economies from low and middle income group. Existence of bi-directional causality between financial development and economic growth with dominant role of banking sector has also been observed by Demirhan, Aydemir, and Inkaya (2011) in Turkey.

Ujunwa, Salami, Nawakoby, and Umar (2012) found a positive effect of bank and legal based theories while negative of market and financial service based theories to

promote growth in Nigeria. The significant role of financial structure in both economic growth and its volatility across a sample of 40 countries has also been observed by Yeh et al. (2013). The study noted a faster pace of growth in market driven economies but such countries expose more to economic fluctuations. Similarly, Oima and Ojwang (2013) supported for relevance of financial structure in economic growth of selected ECOWAS countries. Deltuvaite and Sineviciene (2014a) also observed a higher level of economic development in market-oriented financial systems. Sahoo (2014), however, observed the economic growth to be positively and strongly influencing by bank based financial intermediation in India. Similarly, Duican (Moisescu) and Pop (2015) found a significant influence of banking credit on economic growth of Romania. Researchers suggested to carry on credit extension activities by banks for betterment of country's economy.

Nyasha and Odhiambo (2015) comprehensively surveyed the literature related to association among development of market-dominated financial system and economic growth across both developing and developed countries. Broader evidence regarding leading role of market driven financial system to real sector development has been noted. Mishra and Narayan (2015) also found a significant negative effect of banking sector while positive of stock market indicators upon economic growth in majority of sample countries. Kim, Lin, and Chen (2016), however, noted a faster growth pace of small firms' dominant industries in countries having relatively more bank oriented financial system. The researchers suggested for strengthening and promotion of bank based system to speed up the growth process of developing countries. Nyasha and Odhiambo (2017) also found a positive effect of market oriented financial development on economic progression of Kenya. The growth pace, however, observed to be unaffected by the bank centered

financial development. The researchers suggested for development of stock markets in Kenya to get better economic outcomes. Similarly, according to Rapp and Udoieva (2018), structure of financial system is relevant for determining the economic progression of advanced economies. The study found a significant contribution of stock markets in stimulating economic progression and reducing risk of OECD countries. The similar effect for private credit and bond markets has not been observed.

In opposite to relevance school of thought, some researchers highlighted the complementary role of banks and markets and suggested coexistence of both in the economy. In one such study, Song and Thakor (2010) observed that development of financial system positively influences the economic growth. There is, however, not a consensus regarding source of this effect, i.e. market or banking development. The co-existence of both is actually beneficial for eachother as well as for overall economy. Same complementary role of banks and markets has been earlier described by Sylla (1998), Wang and Ma (2009). Similarly, Lee (2012) noted a complementary role of banks and markets in promoting economic growth of sample developed countries except U.S. The banking system played a pivotal role in early stages of development while markets became more important as time passes. Solo (2013) too noted irrelevance of financial structure but importance of structure efficiency, to promote economic growth in majority of sample economies from Africa.

Dima et al. (2014) argued that banking sector efficiency and capital market development together make a financial nexus. The supportive role of capital market development in progression of sound banking sector across a sample of developing and developed countries has been noted. A very weak positive effect of shift in financial system

upon economic growth of some sample economies has been noted by Deltuvaite and Sineviciene (2014b). The overall results of study are supporting the dominant role of financial services delivery instead of its form. Apergis et al. (2015) compared the economies of Germany and U.K. to document the presence of strong association among liquidity of stock markets and macroeconomic variables without having any differentiation on the basis of economy's orientation towards market based or bank based system. Luintel et al. (2016) documented the relevance of financial structure for economic growth of high income countries with more significant and dominant contribution of market based system. Similar evidence for middle and low income countries has, however, not observed. Researchers suggested the development of markets in high income while of both banks and markets in middle and low income countries. In discussion of financial structure to economic growth association, the conclusive view has not yet emerged.

2.3.3 Origin and Transmission of Global Financial Crisis

Global financial crisis started form U.S. in 2007 and spread rapidly across global economies. According to Chava and Purnanandam (2011), Raz et al. (2012); globalization, advancement in technology, and financial system integration across the globe remained key sources of financial panic's rapid transmission from one economy to the other; thereby affecting at global level. The crisis is considered as worst one after the *great depression* that affected almost all sectors of economy and all world countries. The effect of crisis was felt everywhere, though its magnitude remained different. Moriyama (2010) noted its spillover from advanced to emerging MENA countries. Christopoulos, Mylonakis, and Koromilas (2011) too reported a negative impact of crisis on all five international capital

markets taken as sample. The crisis transmitted through banking, stock markets, foreign trade linkages, foreign exchange markets, and other channels.

Cardarelli, Elekdag, and Lall (2011) pointed out that a relatively longer and deeper economic recession is associated with financial disorder created by banking distress in advanced economies than that of foreign exchange or securities markets stress. The crisis effected almost all sectors of financial system and main regions of the world. Similarly, Bracke and Fidora (2012) argued that monetary shocks contributed more in building up of imbalances in global economy, during global financial meltdown period. Chudik and Fratzscher (2011) too observed that main transmission channel of global financial crisis remained financial conditions tightening in the advanced economies. The transmission in emerging market economies occurred primarily through real side of economy. Balakrishnan, Danninger, Elekdag, and Tytell (2011), however, noted the transmission of financial stress to emerging market economies mainly through their financial linkages with developed countries. Fry-McKibbin, Hsiao, and Tang (2014) also found a stronger role of financial linkages compared to trade linkages in transmission of crisis across countries. Similarly, Yamamoto (2014) argued that crisis transmitted from U.S. to Asian economies through trade and financial linkages while impact of later channel remained stronger than the former. Fink and Schüler (2015) too demonstrated a stronger role of financial linkages than trade linkages in transmission of systematic shocks from U.S. to emerging market economies.

Apostolakis and Papadopoulos (2014) observed the co-movement and spillover of financial stress among G-7 countries which transmitted mainly through interplay of security markets. Similarly, Apostolakis and Papadopoulos (2015) argued that security

markets played a comparatively stronger role in transmission of stress to other markets as compared to banking and foreign exchange indices. Pang and Siklos (2016), however, attributed the spillover of crisis to China through both financial and real sectors of U.S. economy. Popp and Zhang (2016) too found an adverse effect of uncertainty shocks on both financial markets and real economy. The shocks noted to be larger in recessionary periods and mainly transmitted through financial channel. In another study, Yan, Phylaktis, and Fuertes (2016) observed the transmission of crisis from U.S. to emerging and developed markets of 36 countries through bank credit. The contribution of international trade and portfolio flow in this process did not remain considerable.

The integration and interdependence of economies has also been considered as a mechanism for rapid transmission of shocks across the globe through spillover and contagion effects. Neaime (2012) attributed the global financial crisis as most stern economic crisis after *great depression* that exerted pressure on all economies including those from emerging markets and MENA region. Effect varied across countries, depending upon their level of financial integration with mature financial markets. Morales and Andreosso-O'Callaghan (2012) attributed the volatility of Asian stock markets to inter-linkages among economies without having any contagious effect from stock markets of U.S. The short and long term dynamics for both bond and stock markets during global financial crisis have been observed by Kenourgios and Padhi (2012) in financial markets of U.S., selected emerging economies, and two global indices. Results confirmed the presence of contagion effect that effected economies and markets without having any distinction of economic integration or isolation.

Kotkatvuori-Örnberg, Nikkinen, and Äijö (2013) found a significant effect of Lehman Brothers' collapse and resulting financial crisis on stock markets of almost all 50 equity markets selected from different regions. Singh, Nejadmalayeri, and Lucey (2013), on the other side, did not find a satisfactory evidence regarding significant and consistent effect of U.S. macroeconomic shocks on returns and volatilities of stock markets among 10 major developed and 02 emerging economies selected as sample. In another study, Dimitriou, Kenourgios, and Simos (2013) examined the contagion effect of global financial crisis on BRICS economies. Effect has not been observed in early stages of crisis, however, it started appearing afterwards. Mensi, Hammoudeh, Nguyen, and Kang (2016) again found a strong spillover of crisis from U.S. to emerging stock markets of BRICS countries, excluding Russia. Similarly, Bhuyan, Robbani, Talukdar, and Jain (2016) observed a significant return and volatility spillover from stock market of U.S. to that of emerging markets in BRICS countries.

Lee, Tucker, Wang, and Pao (2014) argued that major markets across the globe are interrelated and therefore, reaction of U.S. crisis felt in most of the world economies. Morales and Andreosso-O'Callaghan (2014), however, found different world economies to be affected differently in global financial meltdown duration without having any regional or global contagion effect. The transmission of shocks has been attributed to spillover effects. In four Latin American stock markets, Hwang (2014) reported a contagion effect of global financial crisis. Stock markets of sample economies found to be heavily affected by the crisis. Effect, however, differed across countries. It remained stronger in stock markets of Brazil, Argentina, and Mexico while relatively less severe in Chile. Balli, Hajhoj, Basher, and Ghassan (2015) also observed a significant return and volatility

spillover effect from developed financial markets to those of emerging market economies in Asia and MENA region. B.-H. Kim, H. Kim, and Lee (2015) too noticed a non-negligible spillover effect of global financial crisis on financial markets of selected emerging Asian countries. The effect, however, lasted for a relatively shorter period of time.

According to Boubaker, Jouini, and Lahiani (2016), stock market movements of U.S. generated instability in both developed and emerging market economies, following the period of sub-prime crisis. Similarly, Apostolakis (2016) attributed the integration and interdependence of markets as a source of stress transmission and destabilizing financial systems in selected Asian economies, during excessive financial instability periods. The presence of interdependence and volatility transmission among selected developed and emerging stock markets has also been observed by Rejeb and Arfaoui (2016). Mollah, Quoreshi, and Zafirov (2016) too found the spread of equity market contagion from U.S. to other emerging and developed markets of world during both sub-prime and sovereign debt crises. Transfer of bank risk among U.S. and other countries has been attributed as a key transmission channel. In the period of global financial crisis, Akca and Ozturk (2016) noted an increase in volatility spillover between stock markets of six major developed countries. This situation has minimized the benefits of diversification for investors. Jebran and Iqbal (2016) also found an evidence of volatility spillover in selected Asian stock markets. It remained bidirectional in some markets but unidirectional for majority of cases.

It is evident from survey of literature that majority of the world countries were affected during global financial crisis period. The crisis originated from U.S. and then transmitted to other countries through different channels. Its transmission across countries remained mainly through banking institutions, stock markets, and foreign trade. The

globalization, interlinkages, and interdependencies among financial markets facilitated its rapid transmission across economies. For financial markets of Asian, European, and American regions, Zhang, Zheng, and Zeng (2017) noted strong interlinkages and interdependencies. Fluctuation in interdependencies has, however, observed during the period of financial crisis. The researchers further observed that U.S. indices played a strong and influential role for those of other different continents. The global financial crisis remained so severe that its effect has been felt everywhere in the globe. The magnitude of effect, however, varied across countries and regions. It has negatively affected the functioning and performance of economies, markets, and firms at global level. In following section, the existing literature regarding effect of financial crisis on economic growth, stock markets volatility, and financial performance of firms is summarized.

2.3.4 Effect of Financial Crisis on Economic Growth of Countries

The global financial crisis started from U.S. and transmitted across globe with a rapid pace in both developed and developing countries. The initial significant impact of crisis appeared in U.S. during August, 2007 that got momentum in September, 2008. The crisis effected both financial markets and real economic activities, making it the largest downturn since the *great depression* (Firtescu, 2012). According to Edey (2009), the growth rate of credit declined sharply in a series of countries at the end of 2008 or start of 2009. Starting from credit markets of developed countries, the crisis effected economic activities of almost every country and every region. Credit conditions remained tighten during the crisis period. Even in countries which continuously expanded during crisis period, the growth rate declined significantly. Industrial production and GDP growth

reduced considerably in majority of key economies and harmful effects of crisis transmitted sharply around the globe.

It has been attempted in different studies to examine the effect of global financial crisis on economic growth across different countries. In one such study, Siddiqui (2009) documented a negative impact of crisis on different sectors of economy and overall economic growth of two emerging market economies namely India and China. Similarly, Tabata (2009) noted a significant decline in production and economic growth of Russia during last quarter of 2008 and 1st half of 2009. In a similar study, Zaman and Georgescu (2009) observed a negative impact of crisis on economic growth of Romania. The sharp decline in different sectors including industrial production and exports has been noted during 1st half of 2009. Yuan, Liu, and Xie (2010) too found a decrease in economic growth of China during the period of financial crisis. The researchers attributed this decline to fall of exports in crisis duration. The significant effect of financial stress on economic growth of South Asian region has also been observed by Malik and Janjua (2011).

Raz et al. (2012) found an adverse impact of both Asian and global financial crisis on East Asian economies. The effect of Asian crisis remained sever in comparison to global financial crisis. Furceri and Mourougane (2012) also reported a permanent and negative effect of financial crisis on potential output of OECD countries. Effect, however, varied across countries on the basis of structural features and enormity of crisis raised with its sternness. In another study, Long et al. (2012) examined the comparative effect of global financial crisis on economic growth of five different category countries. Decline in economic growth rate of almost all categories because of crisis has been found, though timing and severity remained somewhat different. Major developed economies and

emerging European economies were affected relatively earlier and deeper than the emerging Asian economies. Economic growth recovered more sharply in emerging as compared to developed economies.

Cevik, Dibooglu, and Kutan (2013) noted a significant association of financial stress to economic activities across a sample of five transition economies. Similarly, Ksantini and Boujelbène (2014) found a significant negative effect of financial crisis on economic growth and investment level of respective country. The researchers employed dynamic panel model over a sample of 25 countries. Significant impact of global financial crisis upon economic growth of some sample countries has also been observed by Poshakwale and Ganguly (2015). The study utilized a sample of 75 emerging market economies. Average effect of crisis on growth of sample economies, however, remained negligible. Cevik, Dibooglu, and Kenc (2016) also found a significant negative effect of financial stress on economic activities of selected Southeast Asian economies. Fukuda (2016) too observed a negative effect of global financial crisis on financial development and economic growth of South Korea. Economic growth of South Africa also found to be significantly affected by the tighter financial conditions of U.S. but it prevailed for a shorter time period (Sithole, Simo-Kengne, & Some, 2017). Transmission of effect from other major sample trading partners, however, remained negligible.

Shocks in financial sector usually have significant effect on real economic activities. A similar dissemination of banking shocks to real economy across a sample of 18 OECD countries has been noted by Levintal (2013). Jokipii and Monnin (2013) also found a positive association of banking sector stability to growth of real output across a sample of OECD countries. Similarly, Halvorsen and Jacobsen (2014) reported an output

contraction in Norway and U.K. due to unfavorable bank lending shocks. It has been observed that financial intermediation remained a significant source of shocks for real economic activities. In another study, Creel, Hubert, and Labondance (2015) found a negative effect of financial instability on economic growth of sample economies from European Union. The stronger contribution of financial shocks in credit and real economic activities during crisis period has also been observed by Silvestrini and Zaghini (2015). Caldara, Fuentes-Albero, Gilchrist, and Zakrajšek (2016) also noted the adverse effect of financial shocks on economic outcomes. The uncertainty shocks found to be a vital cause of macroeconomic disturbances having stronger economic impact in the conditions of financial tightening. The researchers supported for a significant contribution of both category shocks in creation of cyclical fluctuations during last few decades.

It has also been observed that countries at different stages of development were effected differently by the crisis and highly external finance dependent industries responded more strongly to shocks of financial sector. In one such study, Lartey and Farka (2011) demonstrated a stronger negative effect of financial crises on economic growth of sample countries. This remained more pronounced in countries of better developed than those of lesser developed financial systems. Similarly, Ashraf, Kayani, and Rafiq (2012) noted financially developed countries to be affected more during financial crisis period. There is, however, not a complete survival for any category and harmful effects of crisis have transmitted globally. There are few studies relating to comparative effect of financial crises on economies having different financial system structure. In one such study, Mavrotas and Vinogradov (2007) compared market driven and bank dominant economies in context of a macroeconomic shock and recovery mechanism in each type. The quick

recovery in market-driven economy has been found but the burden of crisis in such a situation would be for one generation only. The similar burden in bank-based economy can, however, disperse across numerous generations of population. This smoothing of shocks by the banking system can be advantageous for reduction of poverty.

According to Bahiti et al. (2011), countries from CEE region, which are mostly bank based, affected deeply by the crisis despite their low level of integration with developed countries. Baum, Schäfer, and Talavera (2011), however, observed the firms in market-oriented system to be relatively more constrained than their counterparts from bank-dominated financial system. Banking system provides a relatively easier access of external financing to constrained firms but it may increase the leverage to a dangerous level in stress periods. Equity markets, on the other side, can manage the financial pressures more successfully and therefore market-oriented systems could be more beneficial in severe financial panic periods. Cardarelli et al. (2011) pointed out that heavy reliance of non-financial firms on external financing and countries upon arm's-length financial structure is associated more with contraction of economic activities, following banking distress. M. Kilinç, Z. Kilinç, and Turhan (2012), on other side, observed the resilience of market-based Turkish economy to global financial crisis, because this recession is neither deep nor long-lived as it remained in previous crises. This resilience has been attributed to strong fundamentals and financial factors in country prior to the crisis.

Fornari and Stracca (2012) stated that economic and financial structure of countries and level of financial development did not matter much in transmission of financial shocks across countries. In another study, Allen et al. (2012) examined the association among financial system structure and financial crisis across a sample of 69 developing and

developed countries. The selected sample comprised of different market crashes and banking crises incurred from 1970 to 2009. Short term significant reversal in financial system structure has been found during the occurrence of each type of event. The researchers suggested for balanced structure of financial system as it can facilitate in quicker recovery from crises situation. By utilizing the data of 28 industries from a sample of 66 countries, Mirzaei and Kutan (2016) found a negative effect of global financial crisis in both market and bank based countries. Diversification of banking activities, however, strengthened the resilience of countries to crisis which remained more pronounced in bank based countries. The researchers suggested for diversification and development of banking sector in financially underdeveloped countries. Fernández, González, and Suárez (2016) again found a positive role of banking stability to reduce output volatility of industries that depends heavily on external finance. Effect remained relatively pronounced in countries having lesser bank market competition. Levine, Lin, and Xie (2016), on other side, highlighted the role of stock markets as alternative source of external financing during banking crises episodes. In presence of proper shareholder protection laws, stock markets can help to minimize the consequences of banking crises on real economy.

2.3.5 Effect of Financial Crisis on Volatility of Stock Markets

The stock markets are considered as barometer of economy and performance of any country can be gauged though this indicator. Importance of stock markets cannot be undermined, even in the presence of developed banking sector (Demirguç-Kunt & Maksimovic, 1996; Nafis & Chain, 2012). Considering its importance, different researchers have attempted to examine the effect of global financial crisis from stock returns and volatility perspective. Anbarasu and Srinivasan (2009) found an increase in

volatility of Indian stock market during the period of financial crisis. The researchers advocated for presence of decoupling effect in this crisis, as none of the world market survived from its harmful effects. Ayodeji (2009) documented the presence of persistence volatility, clustering, and asymmetry, without having an impact upon stock returns of Nigerian stock exchange. Similar effect in Indian stock market has been observed by Sah (2011). Dufrénot and Keddad (2014) also observed the presence of persistent volatility across all sectors of equity markets in India, during the period of global financial meltdown. Todea (2016) too noted a stronger volatility and its persistence in highly integrated emerging stock markets. Angabini and Wasiuzzaman (2011), on the other side, documented an increase in volatility but decrease in volatility persistence during crisis period in Malaysia.

Verma and Mahajan (2012) observed a significant impact of global financial crisis on volatility of stock returns in India. Rejeb and Salha (2013) too noted a strong increase in volatility of selected emerging stock markets as a result of financial crises. The level of stock market development and integration has, however, reduced the harmful effects of crises. In BRIC countries, Bianconi, Yoshino, and de Sousa (2013) observed an increase in volatility of financial markets after global financial crisis. This volatility increase has been attributed to mutual interdependence of financial markets and contagion effect. Dakhlaoui and Aloui (2016) too observed the volatility of BRIC markets to be significantly influenced by the economic policy uncertainty of U.S. Similar evidence regarding presence of a significant contagion effect from U.S. to stock markets of BRICS countries has also noted by Jin and An (2016). Earlier, Sekmen and Hatipoglu (2015) examined the return and volatility behavior of stock exchange in Turkey during crisis episodes. The researchers

employed GARCH, EGARCH, and GARCH-M models and observed an increase in volatility of stock returns during crisis period. A significant positive relationship between risk and expected stock returns has been found. During episodes of global financial crisis, Banchit, Abidin, and Wu (2016) observed an overall increase of stock markets volatility in New Zealand. Similarly, Christou, Cunado, Gupta, and Hassapis (2017) found a negative effect of uncertainty in economic policies on stock returns of six countries selected from Pacific-Rim region. The researchers observed a spillover of U.S. economic uncertainty in majority of sample countries. Chuliá, Gupta, Uribe, and Wohar (2017) also observed a reduction in stock returns of both mature and emerging markets due to uncertainties in U.S. equity market.

It has also been attempted in some earlier studies to compare the effect of global financial crisis with other crises. Karunanayake, Valadkhani, and O'Brien (2010) studied the impact of Asian and global financial crisis on stock returns and volatility of stock exchanges in U.S., U.K., Singapore, and Australia. By employing MGARCH technique, the researchers found a significant impact of both crises on stock volatilities of sample markets whereas no such effect on stock returns has been noted. Cho and Yoo (2011) too compared the volatility of stock market in Korea during 1997-98 currency crisis and 2008-09 credit crisis. A lesser irrational sentiments' driven fluctuation in stock prices during later crisis as compared to former has been noted. In another study, Singhania and Anchalia (2013) investigated the effect of global financial crisis and sovereign debt crisis on volatility of returns in stock markets of selected Asian economies. The researchers found a positive effect of global financial crisis upon volatility of returns in China, Japan, and India while returns of Hong Kong stock market remained unaffected. Sovereign debt crisis,

on other side, only affected the volatility of returns in China and India whereas other sample economies remained unaffected. In bond and equity markets of developing countries, Aizenman, Jinjarak, Lee, and Park (2016) made a similar comparison. Equity and bond markets returns found to be consistently and negatively affected by the global financial crisis. The impact of Eurozone crisis on developing countries, however, remained mixed and limited.

The comparative analysis of financial crisis on stock returns and volatility of stock markets in countries of some similar characteristics have also been investigated by some researchers. Ali and Afzal (2012) studied the comparative effect of global financial crisis on stock markets of Pakistan and India. The study employed EGARCH methodology and documented a negative effect of crisis on stock returns with increase in volatility of both stock markets. The impact on Indian market found to be greater than that of Pakistan. Earlier, a similar study by Sed'a (2009) noted the significant jump risk in Polish and Czech stock markets during crisis period. The occurrence of jump risk has been found more frequent in Polish market. Dua and Tuteja (2016) too demonstrated a significant intensification in volatility of both U.S. and Indian financial markets during global financial crisis episodes. Effect of volatility in U.S. market has been noticed in India without having a reverse impact.

2.3.6 Financial Constraints, Bank Lending, and Firm Performance

Firms generally have borrowing and depository relationships with banks. It is, however, not mandatory for every firm to maintain both relations. Firms usually finance the investment projects through either debt or equity financing, however, even in case of debt, firms do not necessarily rely on bank financing only. Capital markets may also be

approached for this purpose. Again, in the case of bank financing; firms may have an option of maintaining relationship with single or multiple banks. According to Thakor (1996), non-availability of financing sources other than banks can affect the capital investment as well as economic growth in situation of banks' credit rationing. A closer association with banks enhances the ability of firms to access capital but banks get more benefit from this relationship through high interest receipts (Weinstein & Yafeh, 1998). Bolton and Freixas (2000) stated that firms prefer bank financing because of banks' potential to facilitate during financial distress periods. The preference of firms in equilibrium, however, depends upon their level of risk, where extremely risky firms prefer bank loans while safer ones prefer bond markets. Higher intermediation cost has remained a major disadvantage of bank financing for borrowing firms.

Effect of banking crisis on bank-dependent firms show that banking relationship matters. There are different studies showing the effect of banking panic on performance of bank-dependent firms. Slovin, Sushka, and Polonchek (1993) declared client firms as stakeholders of lending banks. Share prices of client firms found to be negatively affected by expectations regarding insolvency of banks while positively by the rescue activities. The most significant loss was observed in firms which have an access to only banks for external funding. Kang and Stulz (2000) examined the effect of banking shocks on borrowing firms in Japan. The study demonstrated a better performance of bank-dependent firms' stocks during period of banking rise and relatively poor performance during the period of fall in 1990s. Ongena, Smith, and Michalsen (2003), however, noted a temporary

and minor effect of banking panic on stock price performance of bank-dependent firms in Norway.

Brewer III, Genay, Hunter, and Kaufman (2003) analysed the impact of banking relations by comparing market value of client firms of distressed and non-distressed banks in Japan during the failure event of three largest banks. The researchers demonstrated an adverse effect of failure announcement on market value of distressed banks' client firms on the event date. This pattern, however, remained same for all firms in the economy, irrespective of the fact that they have relationship with either failed or survived banks. Firms with alternative financing sources or relationship with more profitable, well capitalized banks, however, affected less by the failure announcement. Another study by Limpaphayom and Polwitoon (2004) found a positive association of overall banking relationship to capital investment of client companies in Thailand. Additionally, negative association of bank lending and positive of equity ownership to market performance has been noted. The researchers concluded that too much use of bank financing may result in unfavourable investment decisions.

According to Fok, Chang, and Lee (2004), reputation of lending bank matters much in performance of client firms during financial distress period. Ashcraft (2005) documented a significant and permanent effect of major banks' failure on economic activities of real sector. Customers of such banks may not be able to develop relations elsewhere immediately and on equal terms. The productivity of firms in manufacturing industry of Japan over Asian financial crisis period has been examined by Akiyoshi and Kobayashi (2010). Declining financial performance of banks has negatively affected the productivity of firms borrowing from such distressed banks. Chava and Purnanandam (2011) also

observed a negative effect of crisis on performance of firms, which largely depends on borrowing from infected banks. In study, the impact of banking panic on bank-dependent firms of U.S., during Russian financial crisis has examined. Cao, Chen, and Chi (2010), however, found an inverse relationship between bank-firm relationship and market performance of listed firms in China. The researchers concluded that the bank-firm relationship is not beneficial for either party because of strong ownership association among listed companies, banks, and government.

In Taiwan, Wang and Shen (2012) found stock prices of banks to be severely affected in distress period of their client firms. Although all lending banks affected in response to the announcement of distress by client firms, it remained comparatively more severe in three largest lending banks. Similarly, the client firms relying more on bank financing during distress episodes troubled relatively more than those with lesser reliance on such financing. Tsuruta (2014) also found a significant improvement in performance of client firms, after switching their major borrowing relationship from distressed to non-distressed banks in Japan. The significant effect of variation in supply of loan on output fluctuation of euro area countries has been noted by Rondorf (2012). The researcher supported for supremacy of bank loans in financing of non-financial firms and economic recovery from recessionary phase.

Fernández, González, and Suárez (2013) concluded that panic in banking sector can affect the economic growth in many ways, including reduction in funds, supply of credit, and allocation of investment. In study, the effect of banking distress is observed to be pronounced in heavily external dependent sectors and countries with more institutional and financial development. Liu and Minford (2014) too have attributed the major cause of

variation in production gap during crisis period to credit shocks. Similarly, Iacoviello (2015) credited the contraction of bank credit during credit crunch periods to strengthening and spread of crisis in real economy through bank dependent firms. In BRIC countries, Davydov (2016) observed a positive effect of higher bank financing on profitability and market valuation of firms. Diallo (2018) also found a positive contribution of banking efficiency in reducing credit constraints and improving growth rate of external finance dependent industries. The study has conducted in background of global financial crisis by utilizing data of 38 countries.

2.3.7 Effect of Financial Crisis on Performance of Non-Financial Firms

It is evident from the discussion of previous section that banking relationship matters in performance of non-financial firms and for real economy. It is further established that contraction of bank lending and financial crisis can affect the non-financial firms. Evidence regarding substantial decline of new bank lending to corporate sector, during global financial crunch period has been observed by Ivashina and Scharfstein (2010). During crisis period, Cotugno, Monferrà, and Sampagnaro (2013) noted an overall reduction of banking loan supply to firms in Italy. Firms having established banking relations, however, faced lesser problems of credit rationing by banks. Similarly, Diana and Carmen (2014) observed a significant effect of global financial crisis on bank loans to non-financial enterprises in emerging economies of Central and Eastern Europe. The researchers also noted a considerable change in choice of financing sources. Meriläinen (2016) too observed a negative effect of global financial crisis as well as sovereign debt crisis on lending growth rate of banks in Western Europe. Similarly, Zeitun, Temimi, and Mimouni (2017) found a negative and significant effect of global financial crisis on

leverage ratios of firms selected from GCC countries. Effect, however, differed across industries and countries. In pre-crisis years, the demand of debt remained a major driver of leverage while in post-crisis years it included both demand and supply.

The shrinkage of bank financing in financial crisis episodes became problematic for client firms. This remained more pronounced in financially constrained and exclusively bank dependent firms. Campello, Graham, and Harvey (2010) noted a similar situation during survey of Chief Financial Officers from Asia, U.S., and Europe. The researchers observed a significantly larger decline in investment, employment, technology, and marketing of financially constrained firms during era of global financial crisis. Financially constrained firms have been enforced to cut and even withdraw many profitable investment opportunities due to non-availability of external finances. Adachi-Sato and Vithessonthi (2017) also found corporate investment of U.S. firms to be influenced by the systematic risk of banks and strengthened by firms' leverage. Effect of risk on investment observed to be relatively pronounced in firms that remained more constrained financially.

The contraction of bank lending and non-availability of finances negatively affected sales, investment, and performance of non-financial firms. Wu (2012) found a stronger negative effect of financial crisis on publicly listed firms of Chile, largely relying on external financing. Coulibaly, Sapriza, and Zlate (2013) examined the impact of credit crunch, during crisis of 2008-09, on sales performance of firms in emerging South Asian economies. The researchers found a lesser decline in sales of firms having better pre-crisis financial conditions, ability to replace external finance with trade credit during crisis, and not involving in export activities. Akbar et al. (2013) also observed an adverse impact of credit contraction during financial crisis period on financing and investment policies of

private companies in U.K. Firms failing to identify alternative financing sources suffered more than those who managed it properly. Earlier, Chor and Manova (2012) stated that unfavorable credit conditions played a leading role in diffusion of crisis to flow of foreign trade. In global financial crisis period, the researchers observed a decline of exports to U.S. from the countries having tighter credit conditions. This effect remained more prominent in sectors requiring higher level of external financing, lesser access to trade credit, and limited assets for collateral purposes.

Gaiotti (2013) observed that investment by firms became significantly elastic to accessibility of bank loans during economic downturn periods. Similar trend has not been noted in normal periods. The study found a significant impact of credit restraints on investment of Italian firms during global financial crisis period. Nguyen and Qian (2014), however, reported the declining demand for products and services as a key factor that effected the performance of firms during financial crisis period. The contributions of credit availability remained minor. Similarly, Hosono, Takizawa, and Tsuru (2016) demonstrated a dominant role of trade channel in propagation of global financial shocks to Japanese firms. Liquidity channel also considerably contributed in lessening the performance of firms during crisis period but role of credit channel remained very weak. Bandyopadhyay and Barua (2016), again, observed a significant influence of macroeconomic cycle on financing decisions and performance of firms in India. Buca and Vermeulen (2017) also found an adverse effect of credit tightening during global financial crisis on investment of firms. Fall in investment remained more substantial in highly bank-dependent industries.

There are, however, certain studies showing a supportive and dominant role of bank financing in global financial crisis episodes. In one such study, Uchino (2013) highlighted

a positive role of bank loans to substitute bond financing for firms in Japan. Banking sector effectively covered the shocks of bond market and enabled firms to maintain appropriate level of investment expenditures. Davydov and Vähämaa (2013) also found a significant and superior performance of exclusively bank-dependent Russian firms than those having access to public debt markets during financial crisis period. The researchers advocated for leading role of bank loans in crisis duration. Dewally and Shao (2014) too noted a lesser change in leverage of firms relying on bank financing than those having access to public debt markets around the crisis period. Firms having established lending association with banks better managed the crisis and remained comparatively more profitable. Similarly, Belaid, Boussaada, and Belguith (2017) observed a reduction in probability of default risk for Tunisian firms through development of strong financing relationships with banks. The similar effect for duration of relationship has, however, not been found.

2.4 Gap Analysis and Hypotheses of the Study

From debate of financial structure to economic growth association, two different and broader views are emerged. One view supports the relevance of financial structure with superior role of either banks or markets for economic growth. In past, different researchers have observed a superior role of banks in financing, industrial, and economic expansion (Schumpeter, 1911/1934; Gerschenkorn, 1962; Hondroyiannis et al., 2005; Chakraborty & Ray, 2006; Salami & Ujunwa, 2009; Sahoo, 2014; Duican (Moisescu) & Pop, 2015). In the meantime, certain studies have documented a relatively stronger and leading character of financial markets in promoting economic well-being of nations (Rajan & Zingales, 1998; Caporale et al., 2004; Yeh et al., 2013; Deltuvaite & Sineviciene, 2014a; Mishra & Narayan, 2015; Nyasha & Odhiambo, 2017; Rapp & Udoieva, 2018). In opposite, the

second view points out the irrelevance of financial structure and supports the role of overall financial development and efficiency of legal system in economic progression of countries. This has been suggested in some earlier studies (Levine, 2002; Beck & Levine, 2002; Solo, 2013; Deltuvaite & Sineviciene, 2014b; Apergis et al., 2015). It has also been proposed by some researchers that coexistence and proper functioning of both banks and markets is more beneficial and necessary in modern globalized economy (Song & Thakor, 2010; Lee, 2012; Dima et al., 2014). The leading role of markets in developed financial system countries while that of banks or both in countries of developing system has also suggested in some studies (Tadesse, 2002; Pinno & Serletis, 2007; Luintel et al., 2016; Kim, Lin, & Chen, 2016).

The conclusive evidence regarding relevance or irrelevance of financial structure has not been emerged from existing literature. It requires further investigation from different aspects. One such domain that needs investigation is the relative behavior of financial systems in episodes of financial distress. A recent distress is the global financial crisis which is most significant distress of economic history after the *great depression*. Its effect has earlier been examined by researchers in different countries and from different dimensions. From economic growth perspective, the significant negative effect of crisis has been demonstrated in many studies (Siddiqui, 2009; Tabata, 2009; Zaman & Georgescu, 2009; Yuan et al., 2010; Malik & Janjua, 2011; Furceri & Mourougane, 2012; Ksantini & Boujelbène, 2014; Poshakwale & Ganguly, 2015; Cevik, Dibooglu, & Kenc, 2016; Fukuda, 2016; Sithole et al., 2017). These studies have either examined the impact of crisis on individual countries or some specific regions.

In parallel to examining the effect of crisis on economic growth, it has also been attempted to explore the volatility behavior of stock markets during financial turmoil period. It has been observed in majority of studies that volatility of markets significantly increased during the episodes of global financial crisis (Anbarasu & Srinivasan, 2009; Sah, 2011; Verma & Mahajan, 2012; Rejeb & Salha, 2013; Bianconi et al., 2013; Dufrénot & Keddad, 2014; Sekmen & Hatipoglu, 2015; Banchit et al., 2016). These studies again are limited to either individual markets or some specified regions or groups. In addition to growth and volatility pattern of stocks, it has also been observed by researchers that global financial crisis has negatively affected the financing, investment, and performance of corporate enterprises (Campello et al., 2010; Wu, 2012; Gaiotti, 2013; Akbar et al., 2013; Nguyen & Qian, 2014; Hosono e al., 2016; Buca & Vermeulen, 2017). In parity with earlier described perspectives, studies to examine the effect of crisis on performance of firms are also limited to firms selected from an individual or some specific countries only.

In addition to individual country studies, cross-country studies have also been conducted by few researchers. For comparative effect of crisis on stock markets of India and Pakistan, Ali and Afzal (2012) conducted a study while Sed'a (2009) did the same for Polish and Czech markets. The volatility pattern of financial markets in U.S. and India has also been examined by Dua and Tuteja (2016). Regarding comparative effect of financial crisis across countries of divergent financial structure, only few studies with limited scope have been identified from literature. In one such study, Baum et al. (2011) pointed out that firms in market based system remained financially more constrained during crisis period than those belonging to bank based system. This study is covering the time span prior to initiation of global financial crisis. Another study in this domain is of Allen et al. (2012)

but is based on different banking crises and market crashes across different countries. It is, therefore, difficult to generalize the results of this study. Mirzaei and Kutan (2016) made a valuable contribution in this domain but the study is based on selected industries only. From the findings of these studies and other literature summarized in previous sections, it is realized that a widespread study to analyze the effect of global financial crisis on divergent category countries is missing in literature. The current study is attempting to bridge these missing links in literature. Before observing cross country variations, overall effect of global financial crisis on different components of financial system needs to be examined in each sample country. Following hypotheses are constructed to examine the effect of crisis on economic growth, stock markets volatility, and financial performance of firms in sample countries.

H_1: There exists a significant effect of global financial crisis on economic growth of sample countries.

H_2: There exists a significant effect of global financial crisis on stock markets volatility of sample countries.

H_3: There exists a significant effect of global financial crisis on financial performance of non-financial firms in sample countries.

The unique aspect of this study is to relatively examine the effect of crisis across countries of diverse financial structure pattern. Following hypotheses are formulated for this purpose.

H_4: Effect of crisis on economic growth significantly differs across market based and bank based countries.

H_5: Volatility pattern of stock markets during crisis period differs across market based and bank based countries.

H_6: Effect of crisis on performance of non-financial firms significantly differs across countries of dissimilar financial structure pattern.

In addition to its macro aspect, micro domain of study covers the aspect of bank dependence and performance of firms in Pakistan. Banking sector indicators across globe reported a significant decline of bank lending during global financial crisis period. It is also evident from survey of existing studies that majority of world economies affected severely by the crisis. The crisis has also negatively affected the performance of non-financial sector in many countries. Pakistan, like other developing countries, faced tough situation during the crisis although banking sector has largely absorbed the shocks (Usman, 2010). Studies regarding impact of crisis on performance of firms in Pakistan are, however, few and limited in scope. One such study by Channar and Ram (2011) reported a decline in overall performance and availability of loans for textile industry of Pakistan in response to global financial crisis. Earning capacity of this sector has also worsened during the crisis period. In another study, Shahzad et al. (2015) examined the association of leverage to performance of firms from textile sector of Pakistan, in context of global financial crisis. Results showed a negative effect of crisis on performance of firms, however, no conclusive evidence regarding nature of relationship between leverage and performance of firms has been noted. Existing studies regarding effect of crisis on non-financial firms of Pakistan are limited to textile sector only. A comprehensive study covering all major sectors and broader aspects is not found during survey of literature. The current study is an attempt to

fill this gap. Following hypotheses are formulated to examine the effect of crisis on financial performance and stocks volatility of non-financial firms in Pakistan.

H_7: There exists a significant effect of global financial crisis on financial performance of non-financial firms in Pakistan.

H_8: There exists a significant effect of global financial crisis on stocks volatility of non-financial firms in Pakistan.

The study further compares the firms with different level of bank dependence in backdrop of financial crisis. To the best of knowledge and study, this aspect has not been earlier addressed in the country. Following hypotheses are formulated to examine the relative effect of crisis upon financial performance and stocks volatility of non-financial firms in Pakistan.

H_9: The greater the dependence of firms upon bank financing in Pakistan, the larger is the effect of crisis on their financial performance.

H_{10}: The greater the dependence of firms upon bank financing in Pakistan, the larger is the volatility of stocks during global financial crisis period.

Hypotheses formulated in this chapter are empirically testified by applying different econometric techniques. Detailed methodological framework including description of population, sample, and econometric model is explained in the following chapter.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Chapter Summary

This chapter is concerned with identification and specification of tools and techniques for empirical investigation of formulated hypotheses. It is initiated with specification of population and sample of the study for each country and firm level. After defining population and sample, the categorization mechanism is chalked out. Econometric techniques are then specified for data analysis and hypotheses testing. It is attempted to study the phenomenon comprehensively from multiple dimensions so several different models are applied. The description of each model with justification of variables is also a component of this chapter. This chapter is concluded with description of data collection tools and sources.

3.2 Population and Sample of the Study

At country level, population of the study is comprised of total world countries. Sample of top 50 countries, on the basis of gross domestic product, is selected. Complete list of sample countries is placed at Appendix C. Member countries of OPEC are excluded from sample in order to overcome potential biases and to ensure fair representation. The sample countries hold over 90% of global economy on the basis of GDP and therefore are expected to fairly represent the whole population. In macro perspective of firm level analysis, non-financial firms of sample countries constitutes population of the study. A sample of 1440 firms, on the basis of total assets, is selected from countries of diverse

financial structure and economic development level. Sample selection is based on equal representation of countries from different categories and availability of consistent data. This study is primarily intended to examine the consequences of panic in financial sector for real sector of economy. Considering the scope of study, financial firms are excluded from analysis. Appendix D presents the list of countries from which selection of firms is made. In parity of macro aspect, the micro domain of firm level analysis covers non-financial sector of Pakistan. Firms listed at PSE, constitutes population of the study. The study intends to relatively analyse the performance of non-financial firms with different levels of bank dependencies for their financing requirements. Banks, financial service firms, insurance firms, mutual funds, equity investments, modarba, future contracts, and leasing companies are, therefore, excluded for this analysis. Firms listed after 2005, delisted during the period of 2005-2012, or suspended trading during same period are also excluded to ensure the fair comparison across firms. The selected sample thereby comprises 263 non-financial firms from different sectors and list is placed at Appendix E.

3.3 Categorization of Countries

To overcome potential biases associated with classification mechanism, sample countries are initially categorized on the basis of their economic development level. This categorization is adopted from an official publication named *world economic outlook* (International Monetary Fund, 2013). The categorization scheme enables to get more consistent results because countries within each group usually share more common characteristics. List of economically developed and underdeveloped sample countries is summarized in Appendix F. In order to classify the countries as market based and bank based, a structure index, following studies of Demirguç-Kunt and Levine (1999), Levine

(2002), Ujunwa et al. (2012) is constructed. The structure index is formulated by using indicators of size, activity and efficiency. Analysis of each indicator is made with the help of different ratios that have been used by researchers earlier. Indicators of size, activity, and efficiency are calculated for market with respect to banking side and larger time span are utilized to check the historical trend. A brief description of indicators used to calculate structure index is summarized in Table 1.

Table 1. Description of Variables Used for Determination of Structure Index

Size Indicators	{Stock market capitalization to GDP (%)+Outstanding domestic private debt securities to GDP (%)+Outstanding domestic public debt securities to GDP (%)}/ Deposit money banks' assets to GDP (%)
Activity Indicators	Stock market total value traded to GDP (%)/Private credit by deposit money banks to GDP (%)
Efficiency Indicators	Stock market total value traded to GDP (%)/Bank deposits to GDP (%)
Index	Average of above three Indicators, i.e. size, activity, and efficiency.
Categorization	The countries with above mean values are treated as market based. The countries with below mean values are treated as bank based.

The description of ratios used in classification scheme is summarized in Appendix G. Data of all indicators is initially averaged for each sample country and then for developed and underdeveloped categories, separately. Countries having above mean value in each category are treated as market based while those with below average value are referred as bank based. Robustness of results is checked and verified by using some alternative ratios of size, activity, and efficiency indicators. For further confirmation of structure index and categorization of countries, the principal component analysis (PCA) is also used. These alternative ratios and techniques are applied to ensure the validity of categorization.

3.4 Categorization of Firms

At micro level, this study is aimed at relatively examining the non-financial firms of Pakistan, with different financing patterns, in background of global financial crisis. For this purpose, firms are classified into two categories on the basis of their bank dependence level. To analyse the level of bank-dependence, the value of bank financing as percentage of total liabilities is calculated for individual firms and then aggregated for all firms in the sample. Ratio of bank financing for individual firm(s) is then compared to sample average. Firms with above average value are treated as *high bank dependent* and those with below mean value as *low bank dependent*. To explore the phenomenon further, firms are classified into four categories on the basis of their bank financing ratios. Firms with bank financing to liabilities ratio of 75% and above falls in *category A* while those with average of above 50% but less than 75% belongs to *category B*. Similarly, firms with bank financing average of above 25% but less than 50% are placed in *category C* while firms in *Category D* have least level of bank financing with an average of below 25%. After categorization of firms, analysis is processed from financial performance as well as stocks volatility perspective.

3.5 Econometric Models for Country and Firm Level Analysis

This study is intended to examine the effect of global financial crisis from different perspectives and multiple econometric models are applied for analytical purpose. A brief overview of each model is presented in the following section.

3.5.1 Panel Data Regression Model

Panel data technique is useful for analysis of a sample having 'N' cross-sectional units to be examined over 'T' time periods. The simple panel data model can be expressed mathematically as (Asteriou & Hall, 2007):

$$Y_{it} = \alpha+\beta X_{it}+\mu_{it} \text{ ----------(1)}$$

In above model, "Y_{it}" is representing the dependent variable while "X_{it}" is for the set of control variables or regressors. "α" is intercept, "β" is slope coefficients while "μ_{it}" is random error term of the model. The use of panel data is advantageous over separate analysis through time-series or cross-sectional data because of its ability to handle complex problems and wider range of issues. It further helps to overcome the problems of multicollinearity, certain forms of omitted variables, and enhances the power of test (Brooks, 2008). Estimation in panel data may be made by using common, fixed, or random effect model. The choice of model is based on likelihood ratio test and test developed by Hausman (1978). Panel regression model is applied in both country level and firm level analysis. Suitability and fitness of model in each case is initially ensured with the help of different diagnostic tests. Application of panel regression model in current study is briefly summarized in the following section.

3.5.1.1 Country Level Analysis

Following regression model is used to examine the impact of global financial crisis upon economic growth of sample countries:

$$GDPG_{it}=\alpha_0+ \alpha_1FD_{it}+\alpha_2FDI_{it}+\alpha_3GC_{it}+\alpha_4GFCF_{it}+\alpha_5GDS_{it}+\alpha_6OPEN_{it}+\alpha_7IR_{it}+\alpha_8PG_{it}$$
$$+\alpha_9GFC+\varepsilon_{it} \text{ ----------(2)}$$

Gross domestic product per capita growth rate (GDPG) is the dependent variable and proxy of economic growth while variables that can affect the economic growth are used as regressors. These are selected by following the studies of Beck and Levine (2004), Naceur and Ghazouani (2007), Raz et al. (2012), Ujunwa et al. (2012), Yeh et al. (2013), Thumrongvit et al. (2013), Ksantini and Boujelbène (2014), Pradhan et al. (2014). The description of variables is summarized in next section. Dummy variable "GFC" is used to

capture the effect of global financial crisis on economic growth. It takes value of '1' during crisis years of 2008-2009 and '0' otherwise. Coefficient of dummy variable is expected to be negative and significant indicating a negative effect of crisis on economic growth. Majority of crisis related theories proposes negative consequences of crisis for economic growth.

To analyze relative effect of crisis upon economic growth of countries with different financial structure pattern, the following panel regression model is used:

$$GDPG_{it}=\alpha_0+\alpha_1FD_{it}+\alpha_2FDI_{it}+\alpha_3GC_{it}+\alpha_4GFCF_{it}+\alpha_5GDS_{it}+\alpha_6OPEN_{it}+\alpha_7IR_{it}+\alpha_8PG_{it}$$
$$+\alpha_9GFC+\alpha_{10}\,GFC*BB+\varepsilon_{it} \quad \text{---------- (3)}$$

For further investigation and confirmation, a comparison is made across developed and underdeveloped categories, for which following regression model is used:

$$GDPG_{it}=\alpha_0+\alpha_1FD_{it}+\alpha_2FDI_{it}+\alpha_3GC_{it}+\alpha_4GFCF_{it}+\alpha_5GDS_{it}+\alpha_6OPEN_{it}+\alpha_7IR_{it}+\alpha_8PG_{it}$$
$$+\alpha_9GFC+\alpha_{10}GFC*D+\varepsilon_{it} \quad \text{---------- (4)}$$

In model (3) "BB" is a dummy variable which is assigned the value of "1" for bank based while "0" for market based countries. Similarly, in model (4), "D" is a dummy variable which takes the value of "1" for developed while "0" for underdeveloped category countries. Interaction terms "GFC*BB" and "GFC*D" are used to capture the relative effect of crisis upon economic growth of countries with diverse financial structure pattern and economic development level, respectively. Analysis is then further extended to relatively check the effect of crisis upon association of each variable to economic growth. Following regression model is used for this purpose:

$$GDPG_{it}=\alpha_0+\alpha_1FD_{it}+\alpha_2FDI_{it}+\alpha_3GC_{it}+\alpha_4GFCF_{it}+\alpha_5GDS_{it}+\alpha_6OPEN_{it}+\alpha_7IR_{it}+\alpha_8PG_{it}+\alpha_9GFC$$
$$+\alpha_{10}FD_{it}*GFC+\alpha_{11}FDI_{it}*GFC+\alpha_{12}GC_{it}*GFC+\alpha_{13}GFCF_{it}*GFC+\alpha_{14}GDS_{it}*GFC+$$
$$\alpha_{15}OPEN_{it}*GFC+\alpha_{16}IR_{it}*GFC+\alpha_{17}PG_{it}*GFC+\varepsilon_{it} \quad \text{---------- (5)}$$

3.5.1.1.1 Description and Economic Rationale of Variables

Gross domestic product per capita growth rate (GDPG) is used as the proxy of economic growth. This indicator represents that all the citizens are getting benefits from increased level of economic production. In past, the variable has been used by researchers including Naceur and Ghazouani (2007), Pinno and Serletis (2007), Hassan et al. (2011), Raz et al. (2012), Ngare et al. (2014) to examine the economic growth across different countries. Financial development variable is the average of indicators selected from each banking and market side. A positive effect of financial development upon economic growth is expected, as supported by theories of Bagehot (1873), Schumpeter (1911/1934), and Shaw (1973). Foreign direct investment (FDI) usually play a pivotal role in the economic growth of any country. FDI can cause an increase in capital stock and resultantly production as well as growth and output raises. The positive impact of FDI through technological transfer and innovation has been highlighted in technological spillover view (Borensztein, DeGregorio, & Lee, 1998). Overdependence upon FDI is, however, not beneficial and it can make an economy susceptible to external shocks. Fluctuations in FDI during panic period can make a country more vulnerable to shocks.

Excessive government spending can sometime result in reallocation of resources from productive to non-productive enterprises and thus negatively affect the economic activities. Negative effect of government consumption (GC) on economic growth is supported by both *pro-free market view* and *income accounting perspective* (Landau, 1983). These views suggested that rise in government expenditure hurts the economic growth except some situations where effect may be positive. Keynes (1936) suggested the supportive role of government spending in stimulating demand and economic recovery

from recessionary phase. The association of government consumption to economic growth is, therefore, ambiguous in existing literature. Gross fixed capital formation (GFCF), on the other side, is expected to positively contribute in economic growth. It represents net addition in fixed assets. Capital accumulation could expand the productive capacity of different sectors by increasing number of firms and resource efficiency thus be achieved through economies of scale. This indicator is used to capture country specific productivity levels. Gross domestic savings (GDS) is also expected to positively associate with economic growth. Higher savings and investments in an economy can facilitate in achieving the higher level of national income. A positive association of gross fixed capital formation and gross domestic savings to economic growth is backed up by the growth model of Harrod (1939) and Domar (1946), jointly called Harrod-Domar growth model. This model has highlighted the importance of propensity to save and capital output ratio in determining economic growth rate. Similar positive role of savings and investment in accelerating economic growth has been underlined in growth model of Solow (1956).

Role of inflation (IR) in economic growth is ambiguous. There are different views about it. On one side, inflation can induce individuals to acquire more capital assets than holding money, resulting in increase of investment and growth (Mundell, 1965; Tobin, 1965). On the other side, increase in inflation can cause an increase in price variability thereby leading to uncertainty about the future profitability of investment projects. The conservative investment decisions then generate a negative impact upon economic growth (Fischer, 1993; Allen & Ndikumana, 2000). Inflation rate is used as an indicator of macroeconomic instability. Trade openness (OPEN) is measured as ratio of exports plus imports to GDP. This variable may have positive or negative effect upon economic growth.

Trade openness positively affect economic growth in case of import of capital goods (Allen & Ndikumana, 2000). A decrease in demand of domestic products due to import substitutions can, however, negatively affect the economic growth. Countries having open trade with limited restrictions are usually more vulnerable to economic shocks because of having contagion and transmission effect. Regarding association of population and economic growth, there are contradictory evidences in existing literature (Mushtaq, 2006; S. Ali, A. Ali, & Amin, 2013). This phenomenon is also subject to empirical investigation. It has been argued that rapid growth of population is harmful for economic growth as it causes an increase in ratio of dependents, reduces saving, and creates burden for government subsidized services. There are, however, some economists who advocated for positive role of population growth in the economic development of a country on grounds that it may ensure availability of cheap workforce, more demand of consumer goods, and facilitates in achieving benefits from economies of scale.

3.5.1.2 Firm Level Analysis

Panel data methodology is also used to examine the effect of financial crisis upon performance of sample non-financial firms. Following regression model is used in macro aspect of firm level analysis:

$$ROA_{it} = \gamma_0+\gamma_1 QUICK_{it}+\gamma_2 TURNOVER_{it}+\gamma_3 LEVERAGE_{it}+\gamma_4 TANGIBILITY_{it}+\gamma_5 SIZE_{it}+ \gamma_6 GDPG_{it}+\gamma_7 IR_{it}+\gamma_8 GFC+\varepsilon_{it} \quad (6)$$

The dependent variable in regression model is the return on assets (ROA); while number of variables/ratios, following studies of Fok et al. (2004), Castelli et al. (2012), Thanh and Ha (2013), Ameer (2014), Serrasqueiro, Nunes, and da Silva (2016) are used as regressors. Quick ratio (QUICK) represents the liquidity position of a firm. Its effect on

profitability is ambiguous and subject to empirical investigation. On one side, it portrays the firm's ability to meet timely obligations and thereby enable to maintain good relations with supplier of inputs. On other side, return on highly liquid assets is usually too low that retards the firms' profitability. Inventory turnover ratio (TURNOVER) usually positively affect the profitability of a firm. This ratio is applied to check the efficiency level of a business enterprise in its inventory management. Excessive inventory level, in some cases, represents poor sales of firm and it also creates a danger of loss due to falling prices in future. The situation of shortages, however, may not be beneficial for long run performance of any firm. Total liability to equity ratio (LEVERAGE) represents the extent to which a company is applying mix of debt and equity to finance its assets and operations. Its effect on profitability is again ambiguous.

Operating fixed assets to total assets ratio (TANGIBILITY) generally have positive effect on profitability of firms. Firms having more tangible assets are considered less vulnerable to financial distress. Fixed assets however, if not properly utilized, can negatively affect the firms' financial performance. SIZE, measured as natural log of total assets, has an ambiguous relation with profitability and is subject to empirical investigation. It positively effects the performance through economies of scale that may also effect in reverse direction. External factors include GDP per capita growth rate (GDPG) and inflation rate (IR). The effect of former is expected to be positive while for later it may be positive or negative and is subject to empirical investigation. "GFC" is a dummy variable used in regression model to capture the effect of crisis upon performance of non-financial firms of sample economies. It takes the value of '1' for crisis years of 2008-2009, and '0' otherwise. Coefficient of "GFC" is expected to be negative and

significant indicating a negative impact of crisis upon performance of sample non-financial firms.

In order to analyze the relative effect of crisis on performance of firms in bank and market based as well as developed and underdeveloped economies, interactive dummies are added. Following panel regression models are used for this purpose:

$$ROA_{it} = \gamma_0+\gamma_1 QUICK_{it}+\gamma_2 TURNOVER_{it}+\gamma_3 LEVERAGE_{it}+\gamma_4 TANGIBILITY_{it}+\gamma_5 SIZE_{it}+ \gamma_6 GDPG_{it}+\gamma_7 IR_{it}+\gamma_8 GFC+\gamma_9 GFC*BB+ \varepsilon_{it} \quad (7)$$

$$ROA_{it} = \gamma_0+\gamma_1 QUICK_{it}+\gamma_2 TURNOVER_{it}+\gamma_3 LEVERAGE_{it}+\gamma_4 TANGIBILITY_{it}+\gamma_5 SIZE_{it}+ \gamma_6 GDPG_{it}+\gamma_7 IR_{it}+\gamma_8 GFC+\gamma_9 GFC*D+ \varepsilon_{it} \quad (8)$$

The purpose of interaction terms "GFC*BB" and "GFC*D" is to capture the relative effect of crisis across countries of dissimilar financial structure and economic development level, respectively. Negative and significant interaction terms can indicate a differential effect of crisis upon performance of firms in different category countries.

Micro domain of firm level analysis is relevant to non-financial sector of domestic economy. To empirically examine the effect of financial crisis upon performance of non-financial firms in Pakistan, following panel regression model is used:

$$ROA_{it} = \gamma_0+\gamma_1 QUICK_{it}+\gamma_2 TURNOVER_{it}+\gamma_3 LEVERAGE_{it}+\gamma_4 TANGIBILITY_{it}+\gamma_5 SIZE_{it}+ \gamma_6 AGE_{it}+\gamma_7 FINANCING_{it}+\gamma_8 GDPG+\gamma_9 IR+\gamma_{10} GFC+\varepsilon_{it} \quad (9)$$

A brief description of variables has earlier been given in macro perspective of firm level analysis. Variables AGE and FINANCING are used additionally in domestic firm level analysis. AGE is measured as natural log of total period of firms' operations and it has an ambiguous relation with profitability that is subject to empirical investigation. The performance of firm is likely to improve as it matures, however, that may not be a case if it is passing through a later stage of life cycle. FINANCING represents the proportion of

bank financing in total external liabilities of each sample firm. Its effect on profitability of firms is again ambiguous. Banking relationship can facilitate firms in securing finances during crisis periods but costly financing and restrictive covenants by banks may negatively affect the profitability of firms. Following panel regression models are used to capture the relative effect of crisis upon firms of different bank dependence level:

$$ROA_{it} = \gamma_0+\gamma_1 QUICK_{it}+\gamma_2 TURNOVER_{it}+\gamma_3 LEVERAGE_{it}+\gamma_4 TANGIBILITY_{it}+\gamma_5 SIZE_{it}+ \gamma_6 AGE_{it}+\gamma_7 FINANCING_{it}+\gamma_8 GDPG+\gamma_9 IR+\gamma_{10} GFC+\gamma_{11} GFC*LOW+ \varepsilon_{it} \quad (10)$$

$$ROA_{it} = \gamma_0+\gamma_1 QUICK_{it}+\gamma_2 TURNOVER_{it}+\gamma_3 LEVERAGE_{it}+\gamma_4 TANGIBILITY_{it}+\gamma_5 SIZE_{it}+ \gamma_6 AGE_{it}+\gamma_7 FINANCING_{it}+\gamma_8 GDPG +\gamma_9 IR+\gamma_{10} GFC+\gamma_{11} GFC*B+ \gamma_{12} GFC*C+ \gamma_{13} GFC*D+ \varepsilon_{it} \quad (11)$$

Interaction terms are used to differentiate the effect of crisis across firms of different bank dependence level. Categories "HIGH" and "A" are excluded from the analysis to avoid dummy variable trap and are used as reference categories. Coefficients of interaction terms and their significance level are used to describe the relative position of each category in comparison to that of reference category.

3.5.2 ARCH Family Models

Autoregressive Conditional Heteroskedasticity (ARCH) models of measuring volatility have been widely used by researchers. Engle (1982) developed basic ARCH model by showing the dependence of variance of residuals on past periods' squared error terms. ARCH family models proposes for simultaneous modeling of mean as well as variance of series. Basic ARCH model can be expressed as (Asteriou & Hall, 2007):

$$Y_t = \alpha+\beta' X_t+\mu_t \quad (12)$$

$$\sigma_t^2 = \gamma_0+ \gamma_1 \mu^2_{t-1} \quad (13)$$

Equations (12) and (13) are mean and variance equations, respectively. Numerous extensions in ARCH models have been later introduced. ARCH family models are commonly preferred because of providing superior volatility forecasts (Brailsford & Faff, 1996). These models also have the ability of incorporating dummy variables in both mean and variance equations. EGARCH methodology, developed by Nelson (1991) is popular among researchers and has been preferred over other ARCH family models. This model can be used to capture both the size and sign effect. It has certain advantages over simple GARCH type models. These include its ability to respond asymmetrically to both negative and positive lagged values. This model also does not ask for imposition of non-negativity constraints, as in case of GARCH. It further allows for leverage effect that cannot be done by simple GARCH model (Rachev, Mittnik, Fabozzi, Focardi, & Jasic, 2007; Brooks, 2008). Haniff and Pok (2010) found EGARCH model to be producing superior results over other GARCH specifications. Nor and Shamiri (2007) documented better estimation performance of AR (1)-EGARCH model for stock market of Singapore. This model has been used by researchers in past including; Leon (2007), Ayodeji (2009), Ali and Afzal (2012), Abbas, Khan, and Shah (2013), Singhania and Anchalia (2013).

3.5.2.1 Country Level Analysis

To examine the volatility of stock indices in sample countries, EGARCH methodology developed by Nelson (1991), is applied. The variance equation of basic EGARCH model can be mathematically expressed as:

$$\text{Log } \sigma_t^2 = \alpha_0 + \sum_{i=1}^{m} \beta_i \left| \mu_{t-i}/\sqrt{\sigma^2_{t-i}} \right| + \sum_{i=1}^{m} \beta_i \, \mu_{t-i}/\sqrt{\sigma^2_{t-i}} + \sum_{j=1}^{m} \gamma_j \text{Log}\sigma^2_{t-j} \quad \text{----------(14)}$$

The log of variance series on left hand side of above model assures non-negativity of the estimates of conditional variance (Asteriou & Hall, 2007). The purpose of absolute

term in above model is to capture the size effect. Significant and positive coefficient value of "β_i" thus indicates that big shocks generate more volatility than small shocks. The presence of similar term, in non-absolute form, is to check the differential effect of bad and good news. Its negative and significant value would demonstrate a relatively more pronounced effect of bad news on volatility of series. This is termed to as the leverage effect (Rachev et al., 2007). "γ_j" describes the density of volatility. Significant and positive coefficient of "γ_j" would be an indication of persistence volatility clustering. The main aim of this analysis, as discussed earlier, is to check the effect of global financial crisis on volatility of stock indices in sample countries. In order of capturing this effect, the dummy variable "GFC" is added in variance equation. Robustness of model is checked by using different techniques while ARMA specification is decided by applying AIC and related diagnostic tests. The equation, after inclusion of dummy variable, takes following form:

$$\text{Log } \sigma_t^2 = \alpha_0 + \sum_{i=1}^{m} \beta_i \left| \mu_{t-i}/\sqrt{\sigma^2_{t-i}} \right| + \sum_{i=1}^{m} \beta_i \, \mu_{t-i}/\sqrt{\sigma^2_{t-i}} + \sum_{j=1}^{m} \gamma_j \text{Log}\sigma^2_{t-j} + \lambda \text{GFC} \quad \text{----------(15)}$$

Dummy variable takes value of '1' during the crisis period and '0' otherwise. As discussed earlier, the effect of crisis did not appear at same time across all global economies; however, it is widely quoted that it started appearing in September, 2007. The crisis got severity by start of 2008 and remained till 1st quarter of 2009; after which recovery process started. The dummy variable "GFC" covers the severe period of crisis, from 01/01/2008 to 31/03/2009. In variance equation, coefficient "λ" is expected to be positive and significant; indicating an increase in volatility of stock markets during crisis period. Recent empirical studies also observed an increase in volatility of stock exchanges during financial crisis episodes (Angabini & Wasiuzzaman, 2011; Ali & Afzal, 2012; Verma & Mahajan, 2012; Chaudhury, 2014; Sekmen & Hatipoglu, 2015).

The timeline of crisis, proposed by (Bank for International Settlements, 2009) is also used. This approach of identifying crisis regimes has earlier been endorsed by some researchers including; Dimitriou et al. (2013), Luchtenberg and Vu (2015), Bhimjee, Ramos, and Dias (2016). In this scheme, four different phases of crisis have been identified. First phase covered the period of 01/08/2007 to 15/09/2008 and is referred as *initial financial turmoil*. Second phase is termed as *sharp financial market deterioration* and ranges from 16/09/2008 to 31/12/2008, after which third phase started and lasted till 31/03/2009. This phase is expressed as *macroeconomic deterioration*. The recovery process started afterwards and this fourth phase is considered as period of *stabilization and tentative signs of recovery*.

3.5.2.2 Firm Level Analysis

EGARCH methodology is also used to relatively analyse the volatility pattern of stocks around financial crisis period in non-financial firms listed at PSE. The presence of ARCH effect is initially checked and then dummy of "GFC" is added in variance equation to capture the effect of global financial crisis upon volatility of stocks in sample firms. Following model is applied for empirical analysis:

$$\text{Log } \sigma_t^2 = \alpha_0 + \sum_{i=1}^{m} \beta_i \left| \mu_{t-i}/\sqrt{\sigma^2_{t-i}} \right| + \sum_{i=1}^{m} \beta_i \, \mu_{t-i}/\sqrt{\sigma^2_{t-i}} + \sum_{j=1}^{m} \gamma_j \text{Log}\sigma^2_{t-j} + \lambda \text{GFC} \quad \text{----------(16)}$$

The dummy variable takes value of '1' during crisis period and '0' otherwise. Significant and positive value of dummy variable means that stocks volatility increased during the crisis period. Coefficients and significance level are then simply compared across firms of different categories to examine the relative effect of crisis.

3.6 Data Collection Sources

This study is based on secondary data of 2005-2012. The data set covers crisis years of 2008-2009 with three pre-crisis years (2005-2007) and three post-crisis years (2010-2012). To capture the effect of global financial crisis upon economic growth, data of macroeconomic variables is extracted from *world databank*, *international financial statistics*, and related sources. On the other side, data of daily closing stock prices to observe the volatility pattern of indices in each sample country is extracted from *stock exchanges* of respective countries, *yahoo finance*, and related sources. Similarly, for probing the effect of crisis on performance of firms in market and bank based countries, the data of firm level variables is extracted from *annual reports* and *datastream.* For examining the relative effect of crisis on different category firms in Pakistan, the data of firm specific variables is extracted from *annual audited reports*, *balance sheet analysis of joint stock companies* published by State Bank of Pakistan, and other related sources. Additionally, the data on closing prices of firms stocks is extracted from *PSE*, *zhv securities*, and related sources to check the effect of crisis on stocks volatility of sample firms.

CHAPTER 4

RESULTS AND DISCUSSION

4.1 Chapter Summary

This chapter is presenting the results of empirical analysis. In the start of chapter, results regarding placement of financial systems to different categories are presented. After classification, the relative effect of crisis on economic growth and stock markets volatility across diverse categories is analysed and presented. This chapter also summarizes results of firm level analysis for both macro and micro domains. It elaborates the effect of crisis on performance of non-financial firms across financial systems in its macro perspective. In micro aspect, outcomes of crisis for non-financial firms of Pakistan are presented. The chapter concludes by summarizing and linking results with objectives and hypotheses of the study.

4.2 Empirical Results

The focus of whole study is around the performance and behaviour of comparative financial systems with special background of global financial crisis that affected global economies like a tsunami. Analysis is progressed alongwith country level and firm level perspectives. The comparative analysis of different category countries from each economic growth and stocks volatility aspect is explained at country level while at firm level the same is elaborated from global and domestic economy contexts. Following sections briefly summarizes and elaborates the results regarding placement of countries to different categories and impact of global financial crisis at both country and firm levels.

4.2.1 Classification of Countries

After placing the countries into developed and underdeveloped/emerging categories, the sample countries are further classified on the basis of a conglomerate index of financial structure. An index is formulated by using indicators of size, activity, and efficiency from each market and banking side. The market to bank related indicators are initially averaged for each sample country individually and then aggregated separately for economically developed and underdeveloped/emerging categories. Average for each category is calculated and countries having above mean value are treated as market based while those with below mean value as bank based. The calculated index values are summarized in Appendix H. This classification scheme relatively places the countries into market and bank based categories. List of classified sample countries in each category is presented in Appendix I. For further confirmation, certain other ratios and principal component analysis are also applied. The pattern of categorization in all cases remains the same. United States is excluded from classification scheme because of its extreme index value in economically advanced category of market oriented countries. Similarly, India and Pakistan have traditionally been considered as bank based economies and banks have been playing a dominant role in financing the enterprises. The dramatic growth of stock markets has been noted in recent years but role of banks is still crucial and firms usually prefer bank financing over other sources. These three countries are excluded from classification scheme to avoid abnormalities and traditional structure pattern is followed in the study.

4.2.2 Global Financial Crisis, Economic Growth, and Stocks Volatility

Global financial crisis effected the economic growth of many countries. The crisis spread through multiple channels out of which financial channel remained more prominent.

First part of country level analysis is intended to examine the effect of crisis on economic growth of overall sample countries initially. It further examines the relative effect of crisis across countries of diverse financial structure and different level of economic development. Panel regression model is applied in this case. GDP per capita growth rate is the dependent variable while other variables including financial development are used as regressors. Descriptive statistics of variables used in panel regression model are summarized in Table 2.

Table 2. Descriptive Statistics of Variables Applied in Panel Regression Model of Country Level Analysis

	Mean	Median	Maximum	Minimum	Std. Dev.	Observations
GDPG	2.2911	2.1819	13.6001	-14.4209	3.6106	400
FD	112.3937	113.0946	232.0052	30.7115	59.2467	400
FDI	5.0530	3.0891	23.0626	0.2422	5.8047	400
GC	16.4449	17.7428	24.2190	8.4235	4.9191	400
GFCF	22.9528	22.3429	31.3997	17.3719	3.9386	400
GDS	25.6902	24.7732	43.8169	13.8197	8.0544	400
OPEN	81.7261	67.8961	190.3407	30.8766	43.7198	400
IR	4.1444	3.3092	10.9193	0.2242	3.0148	400
PG	0.8503	0.8812	2.0515	-0.3289	0.6613	400

Descriptive statistics depicts mean, median, maximum, minimum, and standard values of variables used in regression model. Among variables, highest mean and standard deviation values are of financial development. There are two possible reasons for larger dispersion in the value of this variable. First is relevant to the sample of study which comprises of both financially developed and underdeveloped category countries while

second is about time period of the study. The above summary statistics are for whole sample countries and covers entire study period of 2005-2012. This includes the crisis period of 2008-2009 during which indicators of banking and stock markets development sharply and substantially declined. Same is the case of trade openness with highest mean and standard deviation values after the indicator of financial development. For all other variables, the dispersion in values is not much wider and it remains lowest in population growth. In order of making a choice from amongst common and fixed effect models, redundant fixed effects- likelihood test ratio is applied. The test developed by Hausman (1978) is then applied for making a selection from amongst fixed and random effect models. Results of both tests are presented in Table 3.

Table 3. Selection of Appropriate Model in Country Level Analysis

Redundant Fixed Effects Tests			
Effects Test	**Statistic**	**d.f.**	**Prob.**
Cross-section F	2.99	(49,342)	0.0000
Cross-section Chi-square	142.49	49	0.0000
Correlated Random Effects - Hausman Test			
Test Summary	**Chi-Sq. Statistic**	**Chi-Sq. d.f.**	**Prob.**
Cross-section random	54.69	8	0.0000

The significant value of both tests implies that fixed effect is more appropriate model for this data set. Fitness of model is also assured through various diagnostic tests. Panel regression model is then applied to examine the overall and relative effect of crisis on economic growth of sample countries. Results of panel regression models are summarized in Table 4.

Table 4. Comparative Effect of Crisis on Economic Growth of Sample Countries

	Dependent Variable: GDPG			
	(1)	(2)	(3)	(4)
Intercept	1.1668 (4.9080)	1.0775 (4.8960)	1.2182 (4.9179)	1.3484 (4.8594)
FD	0.0210** (0.0081)	0.0199** (0.0082)	0.0209** (0.0082)	0.0185** (0.0080)
FDI	0.1127*** (0.0392)	0.1090*** (0.0392)	0.1137*** (0.0394)	0.0965** (0.0412)
GC	-0.7171*** (0.1830)	-0.7130*** (0.1826)	-0.7185*** (0.1834)	-0.6461*** (0.1808)
GFCF	0.3928*** (0.0715)	0.3920*** (0.0713)	0.3945*** (0.0719)	0.3488*** (0.0714)
GDS	0.1067 (0.0814)	0.1102 (0.0812)	0.1056 (0.0816)	0.1488* (0.0807)
OPEN	0.0005 (0.0172)	0.0014 (0.0172)	0.0003 (0.0173)	-0.0101 (0.0171)
IR	0.0825 (0.0836)	0.0864 (0.0835)	0.0854 (0.0843)	0.0743 (0.0920)
PG	-1.4695** (0.5953)	-1.4591** (0.5938)	-1.4992** (0.6051)	-1.6527*** (0.6030)
GFC	-3.6287*** (0.2696)	-4.1025*** (0.3937)	-3.7065*** (0.3844)	-8.6596*** (2.5401)
GFC*BB		0.8428 (0.5113)		
GFC*D			0.1482 (0.5209)	
FD*GFC				0.0114* (0.0059)
FDI*GFC				0.0536 (0.0596)
GC*GFC				-0.0611 (0.0670)
GFCF*GFC				0.3226*** (0.0815)
GDS* GFC				-0.0912** (0.0449)
OPEN*GFC				-0.0167* (0.0087)
IR*GFC				0.0438 (0.1098)
PG*GFC				0.4924 (0.4427)
*, **, *** indicates significance at 10%, 5% and 1% levels, respectively and the values in parenthesis shows standard errors				
Adjusted R-squared	0.63	0.63	0.63	0.65
Durbin-Watson stat	1.96	1.95	1.96	1.94

Model 1: $GDPG_{it}=\alpha_0+\alpha_1FD_{it}+\alpha_2FDI_{it}+\alpha_3GC_{it}+\alpha_4GFCF_{it}+\alpha_5GDS_{it}+\alpha_6OPEN_{it}+\alpha_7IR_{it}+\alpha_8PG_{it}+\alpha_9GFC+\varepsilon_{it}$

Model 2: $GDPG_{it}=\alpha_0+\alpha_1FD_{it}+\alpha_2FDI_{it}+\alpha_3GC_{it}+\alpha_4GFCF_{it}+\alpha_5GDS_{it}+\alpha_6OPEN_{it}+\alpha_7IR_{it}+\alpha_8PG_{it}+\alpha_9GFC+\alpha_{10}GFC*BB+\varepsilon_{it}$

Model 3: $GDPG_{it}=\alpha_0+\alpha_1FD_{it}+\alpha_2FDI_{it}+\alpha_3GC_{it}+\alpha_4GFCF_{it}+\alpha_5GDS_{it}+\alpha_6OPEN_{it}+\alpha_7IR_{it}+\alpha_8PG_{it}+\alpha_9GFC+\alpha_{10}GFC*D+\varepsilon_{it}$

Model 4: $GDPG_{it}=\alpha_0+\alpha_1FD_{it}+\alpha_2FDI_{it}+\alpha_3GC_{it}+\alpha_4GFCF_{it}+\alpha_5GDS_{it}+\alpha_6OPEN_{it}+\alpha_7IR_{it}+\alpha_8PG_{it}+\alpha_9GFC+\alpha_{10}FD_{it}*GFC+\alpha_{11}FDI_{it}*GFC+\alpha_{12}GC_{it}*GFC+\alpha_{13}GFCF_{it}*GFC+\alpha_{14}GDS_{it}*GFC+\alpha_{15}OPEN_{it}*GFC+\alpha_{16}IR_{it}*GFC+\alpha_{17}PG_{it}*GFC+\varepsilon_{it}$

Model 1 is used to check the effect of global financial crisis upon economic growth of overall sample economies while relative effect on the basis of financial structure and economic development level is analyzed in model 2 and 3, respectively. Model 4 examines the effect of each regressor on economic growth of countries during crisis period. The positive effect of financial development upon economic growth is found in the sample economies. This result is supported by the theories of Bagehot (1873), and Schumpeter (1911/1934). Similar effect in different economies has earlier been noted by King and Levine (1993), Levine and Zervos (1998), Beck and Levine (2004), Deidda and Fattouh (2008), Rabiul (2010), Law and Singh (2014), Sehrawat and Giri (2015). Foreign direct investment is also found to be significantly and positively associated with economic growth in sample economies. This result is consistent with the technological spillover view of Borensztein et al. (1998). Existing empirical studies of Katircioglu and Naraliyeva (2006), Raz et al. (2012) also demonstrated similar evidence.

Negative and significant effect of government consumption on economic growth indicates that higher proportion of government expenditure retards the growth rate of countries. This is backed up by *pro-free market view* and *income accounting perspective* (Landau, 1983). Expenditures of government on certain projects may have positive effect but usually such benefits appear after a relatively longer period of time. Similar negative effect of government consumption on economic growth has earlier noted by Hassan et al. (2011), Thumrongvit et al. (2013), Ngare et al. (2014). As expected, gross fixed capital formation and gross domestic savings are contributing positively in economic development of sample economies. This is consistent with Harrod-Domar growth model of Harrod (1939) and Domar (1946). The impact of gross domestic savings, however, is insignificant.

Positive association indicates that a higher level of domestic savings and investment in productive resources enable a country to achieve higher rate of growth. Positive effect of these variables upon economic growth is consistent with existing empirical studies of Hassan et al. (2011), Ali, Chaudhry, and Farooq (2012), Raz et al. (2012), Uneze (2013). Effect of trade openness and inflation rate on economic growth is found to be insignificant. The coefficient of openness is positive which implies that reduction of trade restrictions facilitated the countries in achieving higher economic growth rates. Earlier, researchers including Hassan et al. (2011), Thumrongvit et al. (2013), Narayan and Narayan (2013) noted a positive effect of trade openness on economic growth. Negative effect of population growth upon economic development is consistent with *Malthusian theory of population*, and growth model jointly presented by Coale and Hoover (1958). Existing empirical studies of Hao (2006), Ksantini and Boujelbène (2014) also documented same results.

The main aim of this study, as described earlier, is to examine the effect of financial crisis and then compare it across different financial systems. This objective is achieved by creating a dummy variable that takes value of '1' during crisis period of 2008-2009, and '0' otherwise. Coefficient of dummy variable "D1" is significant and negative which implies that global financial crisis has negatively affected the economic growth of sample economies. This result is backed up by many crisis related theories including *bank run theory*, *debt deflation theory*, and *financial fragility hypothesis;* explaining that economic and financial crises retards economic growth in different ways (Fisher, 1933; Minsky, 1977; Diamond & Dybvig, 1983; Wolfson, 2002). Researchers including Raz et al. (2012), Long et al. (2012), Ksantini and Boujelbène (2014), Poshakwale and Ganguly (2015) also

observed a negative effect of global financial crisis on economic growth of different countries and regions. Interaction terms "D1*BB" and "D1*D" are used to check the relative effect of crisis upon economic growth of countries with different financial structure pattern and development level, respectively. Coefficients of both interaction terms are positive and insignificant. This implies that countries do not significantly differ in terms of bearing consequences of crisis, on the basis of financial structure or economic development level. The financial crisis has negatively affected the economic growth of world countries without any exception.

For further investigation, the effect of each component on economic growth is separately determined in context of global financial crisis. The interaction of individual variables with crisis dummy shows a change in sign and significance of some variables. Coefficient of interaction term "FD*D1" indicates that effect of financial development on economic growth weakened during financial crisis period, although it still remained positive and significant. Earlier, Ahmad, et al. (2016) made a similar observation. Researchers found a positive role of banking and stock market development in economic growth of selected African countries. The crisis has, however, reduced this positive contribution. Effect of some other variables including foreign direct investment, government consumption, and population growth became insignificant during crisis period. Gross domestic savings and trade openness are turned out to be negative and significant. This implies that preference for savings over investment during crisis period has negatively affected the economic growth. Similarly, the countries that are open to trade remained more vulnerable to transmission of crisis. This may be due to contagion effect. The contribution of gross fixed capital formation, however, remained positive and

significant in both normal and crisis periods. Contrary to this, the effect of inflation rate on economic growth remained insignificant in both periods.

It is clear from results described in previous section that global financial crisis has negatively affected the economic growth of sample countries. The significant variation across different category countries is, however, not found. After examining the effect of crisis on economic growth, next step is to check the stocks volatility pattern of sample countries and then its comparison across countries of dissimilar financial structure. Purpose of this analysis is to check the vulnerability of sample countries during crisis period. EGARCH methodology is used to examine the effect of crisis on volatility of each stock market and dummy variable "GFC" is inserted in variance equation to grab this effect. Coefficients and significance level of dummy variable are simply compared to examine the volatility pattern of stocks across individual market dominant or bank oriented economies. The results are summarized in Table 5.

Table 5: Comparative Effect of Crisis on Stocks Volatility of Sample Countries

Country	Index	GFC	Country	Index	GFC
Bank Based Countries			**Market Based Countries**		
Economically Developed Category					
Austria	ATX	0.0256*** (0.0102)	Australia	AORD	0.0334*** (0.0121)
Belgium	Bel20	0.0250*** (0.0096)	Canada	SPTSX	0.0378*** (0.0090)
France	CAC40	0.0141* (0.0077)	Finland	HEX	0.0157** (0.0066)
Germany	DAX	0.0179** (0.0083)	United States	NASDAQ100	0.0565*** (0.0122)
Japan	NIKKEI225	0.0639*** (0.0150)	United Kingdom	FTSE100	0.0267*** (0.0075)
Ireland	ISEQ	0.0330*** (0.0095)	Korea, Rep.	KOSPI	0.0468*** (0.0114)
Israel	TA25	0.0348*** (0.0099)	Singapore	STI	0.0388*** (0.0095)

Norway	OSEAX	0.0342*** (0.0124)	Denmark	OMXCOPEN	0.0341*** (0.0107)
Czech Republic	PX	0.0471*** (0.0142)	Hong Kong	HANG SANG	0.0228** (0.0093)
New Zealand	NZ50	0.0577*** (0.0148)	Netherlands	AEX	0.0200** (0.0080)
Portugal	PSI20	0.8170*** (0.0487)	Switzerland	SPI	0.0316*** (0.0093)
Spain	IBEX35	0.0096 (0.0064)	Sweden	OMX NORDIC40	0.0109 (0.0070)
Greece	ASE	0.0027 (0.0062)			
Italy	ITLMS	0.0092 (0.0069)			
Economically Underdeveloped & Emerging Category					
Argentina	BURCAP	0.0385*** (0.0128)	Brazil	IBOVESPA	0.0480*** (0.0124)
Colombia	IGPC	0.0234 (0.0158)	China	CSI300	0.0218*** (0.0067)
Egypt, Arab Rep.	EGX30	0.0710*** (0.0114)	Chile	IGPA	0.0919*** (0.0201)
India	BSESENSEX	0.0532*** (0.0126)	Turkey	XU100	0.0570*** (0.0151)
Indonesia	JKSE	0.0853*** (0.0140)	Malaysia	KLSE	0.0031 (0.0049)
Pakistan	KSE100	0.0362*** (0.0100)	Peru	IGBVL	0.0555*** (0.0149)
Poland	WARSAW MIG40	0.0152* (0.0091)	Mexico	IPC	0.0186** (0.0086)
Romania	BET	0.1146*** (0.0162)	South Africa	FTSEJSE TOP40	0.0180* (0.0092)
Thailand	SET	0.0530*** (0.0140)	Russia	RTSI	0.0400*** (0.0076)
Ukraine	UX	0.0564*** (0.0086)	Philippines	PSEI	-0.5725*** (0.1237)
Bangladesh	CASPI	-0.0103 (0.0100)			
Hungary	BUX	0.0130 (0.0092)			
Kazakhstan	KASE	-0.0060 (0.0045)			
Vietnam	VN	0.0136 (0.0156)			

*, **, *** indicates significance at 10%, 5% and 1% levels, respectively and the values in parenthesis shows standard errors

The coefficient of dummy variable is positive and significant in majority of sample countries excluding Bangladesh, Colombia, Greece, Hungary, Italy, Kazakhstan, Malaysia, Spain, Sweden, and Vietnam. This is indicating the increase in stocks volatility during crisis period. This result is consistent with the studies of Anbarasu and Srinivasan (2009), Karunanayake et al. (2010), Ali and Afzal (2012), Singhania and Anchalia (2013), Sekmen and Hatipoglu (2015). The comparison of bank based and market based countries shows that the volatility pattern is not much different across two categories. This results is consistent with the view that crisis has affected stock markets in majority of global economies. There is no exception for any country and investors remained unable to get proper benefits of diversification in crisis period (Bartram & Bodnar, 2009). Earlier, Mobarek and Li (2014) made a similar observation. Researchers attributed the volatility of stocks to presence of common instead of country specific factors across stock markets of selected countries and regions.

Overall analysis is then decomposed to phases for checking response mechanism of countries to the crisis signals. First phase covers the period of initial financial disorder while second phase comprises of period during which financial markets deteriorates sharply. Third phase encompasses time span of macroeconomic deterioration. Description of these phases has already been given in methodological section. This analysis also helps to empirically examine the response pattern of stock markets to crisis signals and identification of earlier crisis symptoms in different category countries. Difference in volatility pattern across different categories is not noted again. Results of comparative analysis are presented in Appendix J. Overall results of country level analysis suggest that economic growth and stock markets in majority of countries are significantly affected by

the global financial crisis, however, considerable difference across countries of dissimilar financial structure and economic development level does not exist. The analysis is further expanded to firm level and its results are summarized in next sections.

4.2.3 Global Financial Crisis and Performance of Non-Financial Firms in Comparative Financial Systems

Relative effect of global financial on economic growth and stock markets volatility of market and bank based economies has been discussed in earlier sections. This section is intended to examine the effect of crisis on performance of overall sample non-financial firms initially and then its relative effect across firms belonging to countries of diverse financial structure pattern and economic development level. Non-financial firms from different economies, as per Appendix D, are selected for analysis. Selection of firms from each sample economy is subject to availability of consistent data and on the basis of total assets. Descriptive statistics of variables used in analysis are summarized in Table 6.

Table 6. Descriptive Statistics of Variables used in Performance Analysis of Non-Financial Firms from Selected Sample Countries

	Mean	Median	Maximum	Minimum	Std. Dev.	Observations
ROA	0.0577	0.0485	0.8589	-0.9652	0.0800	11520
QUICK	1.0794	0.9357	2.6266	0.3350	0.5868	11520
TURNOVER	12.1289	6.3034	57.4359	1.5163	14.3959	11520
LEVERAGE	1.8330	1.4080	5.5835	0.2942	1.4023	11520
TANGIBILITY	0.3799	0.3598	0.7914	0.0539	0.2209	11520
SIZE	16.5771	16.2357	22.6947	12.4636	2.7633	11520
GROWTH	0.0221	0.0209	0.1360	-0.0900	0.0366	11520
INFR	0.0407	0.0318	0.2029	-0.0135	0.0348	11520

In above table, summary statistics of variables used in macro aspect of firm level analysis are presented. Data is initially winsorized to remove the effect of outliers. Results of descriptive statistics shows highest mean value of size but dispersion in this case is not much wider. The possible reason of this lesser dispersion can be the sample of study. For this aspect, firms are selected from different countries on the basis of total assets. Sample from each country, therefore, comprises of firms with largest amount of assets. After this, the mean value of inventory turnover is found higher in comparison to other regressors. The greatest dispersion is also noted in the value of inventory turnover. This dispersion is due to the selection of firms from different industries and countries. Inventory management policies largely differ across firms, industries, and countries. Among firm level variables, smallest mean value and lowest dispersion is found for return on assets. After examining data, panel regression is applied for analysis and appropriate model is selected by using likelihood ratio and Hausman tests. Results of these tests are summarized in Table 7.

Table 7. Selection of Appropriate Model in Macro Aspect of Firm Level Analysis

Redundant Fixed Effects Tests			
Effects Test	**Statistic**	**d.f.**	**Prob.**
Cross-section F	6.63	(1439,10073)	0.0000
Cross-section Chi-square	7678.43	1439	0.0000
Correlated Random Effects - Hausman Test			
Test Summary	**Chi-Sq. Statistic**	**Chi-Sq. d.f.**	**Prob.**
Cross-section random	75.79	7	0.0000

These significant test values suggests for suitability of fixed effect model for this data set. Diagnostic tests are also applied to establish the validity and fitness of model.

Dummy variable and interaction terms are then added to capture the overall and relative effect of crisis on performance of sample non-financial firms. Results of panel regression are summarized in Table 8.

Table 8. Effect of Crisis on Performance of Non-Financial Firms Selected from Comparative Financial Systems

	Dependent Variable: ROA		
	(1)	**(2)**	**(3)**
Intercept	0.1272*** (0.0197)	0.1262*** (0.0198)	0.1277*** (0.0198)
QUICK	0.0242*** (0.0017)	0.0243*** (0.0017)	0.0242*** (0.0017)
TURNOVER	0.0006*** (0.0001)	0.0006*** (0.0001)	0.0006*** (0.0001)
LEVERAGE	-0.0134*** (0.0008)	-0.0134*** (0.0008)	-0.0134*** (0.0008)
TANGIBILITY	-0.0393*** (0.0079)	-0.0393*** (0.0079)	-0.0395*** (0.0079)
SIZE	-0.0041*** (0.0011)	-0.0041*** (0.0012)	-0.0041*** (0.0012)
GROWTH	0.3509*** (0.0236)	0.3557*** (0.0241)	0.3498*** (0.0237)
INFR	-0.0808*** (0.0308)	-0.0813*** (0.0308)	-0.0859*** (0.0313)
GFC	-0.0003 (0.0015)	0.0011 (0.0021)	0.0011 (0.0021)
GFC*BB		-0.0024 (0.0025)	
GFC*D			-0.0024 (0.0025)
*, **, *** indicates significance at 10%, 5% and 1% levels, respectively and the values in parenthesis shows standard errors			
Adjusted R-squared	0.51	0.51	0.51
Durbin-Watson stat	1.79	1.79	1.79

Model 1: $ROA_{it} = \gamma_0+\gamma_1 QUICK_{it}+\gamma_2 TURNOVER_{it}+\gamma_3 LEVERAGE_{it}+\gamma_4 TANGIBILITY_{it}+\gamma_5 SIZE_{it}+\gamma_6 GDPG_{it}+\gamma_7 IR_{it}+\gamma_8 GFC+ \varepsilon_{it}$

Model 2: $ROA_{it} = \gamma_0+\gamma_1 QUICK_{it}+\gamma_2 TURNOVER_{it}+\gamma_3 LEVERAGE_{it}+\gamma_4 TANGIBILITY_{it}+\gamma_5 SIZE_{it}+\gamma_6 GDPG_{it}+\gamma_7 IR_{it}+ \gamma_8 GFC+ \gamma_9 GFC*BB+ \varepsilon_{it}$

Model 3: $ROA_{it} = \gamma_0+\gamma_1 QUICK_{it}+\gamma_2 TURNOVER_{it}+\gamma_3 LEVERAGE_{it}+\gamma_4 TANGIBILITY_{it}+\gamma_5 SIZE_{it}+\gamma_6 GDPG_{it}+\gamma_7 IR_{it}+\gamma_8 GFC+ \gamma_9 GFC*D+ \varepsilon_{it}$

The results of panel regression show a positive and significant effect of QUICK and TURNOVER ratio on profitability of firms. There are contradictory views about this phenomenon in existing literature. On one side, the negative relationship between liquidity and profitability has been proposed in existing theoretical and empirical literature based on fact that the return on highly liquid assets is very low. Cash which is highest liquid asset is considered as an idle and unproductive resource of business enterprises in terms of return (Butt, 2006). On the other side, positive relationship among the two has been examined by many researchers. Sufficient liquidity means that companies can be able to meet obligations timely and thereby maintain good reputation and relations with input suppliers. It can further be able to take advantage of speculative events. As proposed in *pecking order theory* of Myers and Majluf (1984), firms prefer internally generated funds to finance investments over external of any kind. The presence of sufficient liquidity can facilitate the firm(s) in seeking such investment opportunities. Liquidity especially benefices companies in credit crunch situations. The positive association among liquidity and profitability has earlier noted by Zainudin (2006), Ajanthan (2013), and Ismail (2016). Same is the case of inventory turnover which is positively affecting the profitability of non-financial firms. This means that effective inventory management of sample firms has facilitated for achieving higher profitability levels. This result is consistent with findings of Thanh and Ha (2013).

Effect of LEVERAGE, TANGIBILITY, and SIZE, on the other side, is negative and significant. Higher proportion of debt financing means that companies need more interest payments and restrictive covenants associated with debt may force such companies to forego profitable opportunities. This is consistent with the *pecking order theory* of Myers

and Majluf (1984) that profitable firms usually have least preference to external financing. Negative association of leverage to financial performance of firms has earlier demonstrated by some researchers including, Enqvist, Graham, and Nikkinen (2014), Vithessonthi and Tongurai (2015), Yazdanfar and Öhman (2015). Negative coefficient of TANGIBILITY ratio is consistent with existing studies of Muritala (2012), Thanh and Ha (2013), Vătavu (2015); indicating that larger proportion of fixed assets can retard the profitability of non-financial firms. Consistent with findings of Goddard, Tavakoli, and Wilson (2005), Lazar (2016); the study reports a negative effect of SIZE on performance of non-financial sample firms. Coefficient of one macroeconomic variable namely GDP per capita growth rate is positive and significant while for inflation rate it is negative and significant. The growth of economy generated more demand for products and thereby facilitated non-financial firms in achieving higher profitability. Similar positive contribution of economic growth for financial performance of firms has earlier been reported by Mwangi, Makau, and Kosimbei (2014), Vithessonthi and Tongurai (2015).

Coefficient of crisis dummy is negative and insignificant indicating that profitability of sample firms is not significantly affected by the crisis. Interaction terms "GFC*BB" and "GFC*D" are used to capture the relative effect of crisis upon profitability of firms in bank based and developed as compared to market based and underdeveloped economies, respectively. Inclusion of these interactions resulted in change of dummy's coefficient from negative to positive while interaction terms are negative and insignificant. This again implies that the effect of crisis on performance of non-financial firms does not significantly differ across countries of diverse financial structure and economic development level. This result is consistent with findings of Demirguç-Kunt, Maksimovic

(2002) that access of firms to external finance is independent of financial system structure. The present study is extending this argument by observing that performance of firms in crisis period is also independent of country's financial structure and its level of economic development.

4.2.4 Macro Level Findings

Overall results of country level analysis and firms at macro level suggests that global financial crisis has negatively affected the sample economies. The economic growth significantly declined while stocks volatility enhanced in majority of sample economies. Effect on financial performance of firms, however, remained negative and insignificant. Regarding negative effect of global financial crisis, there is a general consensus among researchers. Earlier, negative effect of crisis on economic growth of different countries has documented by Siddiqui (2009), Zaman and Georgescu (2009), Yuan et al. (2010), Raz et al. (2012), Long et al. (2012), Ksantini and Boujelbène (2014), Poshakwale and Ganguly (2015), Cevik, Dibooglu, and Kenc (2016), Fukuda (2016), Sithole et al. (2017). Similarly, researchers including Anbarasu and Srinivasan (2009), Angabini and Wasiuzzaman (2011), Verma and Mahajan (2012), Ali and Afzal (2012), Rejeb and Salha (2013), Bianconi et al. (2013), Sekmen and Hatipoglu (2015), Dua and Tuteja (2016), Banchit et al. (2016) recorded a significant increase in volatility of stock markets during crisis episodes. To this extent, the results of this study are consistent with the findings of earlier studies.

Regarding financial structure to economic growth association, the consensus among economists and researchers has not been developed. Relevance of financial structure with superior role of either banks or markets has been documented by Caporale

et al. (2004), Hondroyiannis et al. (2005), Chakraborty and Ray (2006), Pinno and Serletis (2007), Salami and Ujunwa (2009), Arestis, A.D. Luintel, and K.B. Luintel (2010), Yeh et al. (2013), Deltuvaite and Sineviciene (2014a), Mishra and Narayan (2015), Kim, Lin, and Chen (2016), Rapp and Udoieva (2018). In parallel, researchers including Levine (2002), Beck and Levine (2002), Wang and Ma (2009), Song and Thakor (2010), Lee (2012), Solo (2013), Dima et al. (2014), Apergis et al. (2015) reported the irrelevance of financial structure and supported for role of financial services and co-existence of both banks and markets in economies. In current study, diverse category countries are compared in the backdrop of financial crisis.

Results of comparative analysis do not show any significant variation across divergent category countries in terms of bearing consequences of crisis. It is neither found in countries of dissimilar financial structure nor of different economic development level. Earlier, Mirzaei and Kutan (2016) noted a better resistance to crisis by the economies having diversified banking system. This is, however, limited to bank based economies only. Lartey and Farka (2011) also reported a slightly stronger effect of crisis upon developed countries. The researchers focused on crises episodes limited to some specific countries or regions only. Current study is in the background of global financial crisis which has a boarded and stronger effect across the globe. From harmful effects of crisis, there is not a complete survival of any country and it has transmitted globally with a rapid pace. Findings of this study are, therefore, more extensive and broader to describe the phenomenon of comparative financial systems. In consistent with irrelevance approach and earlier findings of Bartram and Bodnar (2009), Fornari and Stracca (2012), Allen et al. (2012), Moore and Mirzaei (2016), results of study propose that structure of financial

system does not matter in the modern, integrated, and globalized world. It is concluded that coexistence of both markets and banks alongwith their proper functioning can help in improving overall economic growth and resilience during crisis episodes.

4.2.5 Effect of Global Financial Crisis in Pakistan: Firm Level Analysis

This section is concerned with examining the relative effect of crisis on financial and stock performance of non-financial firms in Pakistan. Financial performance of firms is initially examined by applying panel data methodology. Summary statistics of variables used in panel regression is in Table 9.

Table 9. Descriptive Statistics of Variables used in Performance Analysis of Non-Financial Firms (Pakistan)

	Mean	Median	Maximum	Minimum	Std. Dev.	Observations
ROA	0.0429	0.0303	0.2381	-0.1089	0.0865	2104
QUICK	0.7717	0.5448	2.7602	0.1658	0.6463	2104
TURNOVER	7.1377	4.6991	27.1362	1.0177	6.6340	2104
LEVERAGE	1.8567	1.5297	6.2523	-1.5511	1.7699	2104
TANGIBILITY	0.4666	0.4727	0.8247	0.0812	0.2157	2104
SIZE	14.6491	14.5420	17.2322	12.4344	1.3326	2104
AGE	3.3964	3.3673	5.0239	0.6931	0.4711	2104
FINANCING	0.4464	0.4895	3.9884	0.0000	0.2944	2104
GROWTH	0.0175	0.0103	0.0550	-0.0050	0.0201	2104
INFR	0.1175	0.1080	0.2029	0.0760	0.0394	2104

The statistics show highest mean value of size while largest deviation is noted in inventory turnover. The overall pattern is almost similar to that of macro aspect in firm level analysis. Dispersion in inventory turnover may be due to earlier described reason that

the inventory management policies differ across firms and industries. Data is also winsorized to remove the effect of outliers. Appropriateness of model is then checked for which likelihood ratio and Hausman tests are applied. Results of both are in Table 10.

Table 10. Selection of Appropriate Model in Micro Aspect of Firm Level Analysis

Redundant Fixed Effects Tests			
Effects Test	**Statistic**	**d.f.**	**Prob.**
Cross-section F	6.73	(262,1832)	0.0000
Cross-section Chi-square	1418.36	262	0.0000
Correlated Random Effects - Hausman Test			
Test Summary	**Chi-Sq. Statistic**	**Chi-Sq. d.f.**	**Prob.**
Cross-section random	19.83	9	0.0190

The significant test values in both cases suggest that fixed effect model is more appropriate for this data set. Diagnostic tests are also applied to establish the suitability of selected model. Dummy variable and interaction terms are then added in regression model to examine the overall and relative effect of crisis across different categories. In order to check the relative effect, firms are initially classified into two categories of "HIGH" and "LOW". Interaction term "GFC*LOW" is used to grab the relative effect of crisis across two categories. Further investigation is made by categorizing firms more broadly. For this purpose, firms are classified into four categories namely "A", "B", "C", and "D". Description of these categories has already been given in methodological section and list of categorized firms is placed at Appendix K. Interaction of "GFC" with each category helps to identify the relative effect of crisis on firms with different level of bank dependence. "HIGH" and "A" are used as reference categories and are not included in

regression model to avoid dummy variable trap. Results of panel regression model are summarized in Table 11.

Table 11. Effect of Crisis on Performance of Non-Financial Firms in Pakistan

	Dependent Variable: ROA		
	(1)	(2)	(3)
Intercept	0.0546 (0.1003)	0.0519 (0.1001)	0.0495 (0.1001)
QUICK	0.0266*** (0.0041)	0.0265*** (0.0041)	0.0263*** (0.0041)
TURNOVER	0.0017*** (0.0004)	0.0017*** (0.0004)	0.0017*** (0.0004)
LEVERAGE	-0.0050*** (0.0010)	-0.0048*** (0.0010)	-0.0048*** (0.0010)
TANGIBILITY	-0.1383*** (0.0156)	-0.1388*** (0.0156)	-0.1390*** (0.0156)
SIZE	0.0054 (0.0049)	0.0055 (0.0049)	0.0057 (0.0049)
AGE	-0.0192 (0.0198)	-0.0190 (0.0198)	-0.0191 (0.0198)
FINANCING	-0.0340*** (0.0092)	-0.0332*** (0.0092)	-0.0332*** (0.0092)
GROWTH	0.4514*** (0.1471)	0.4521*** (0.1468)	0.4544*** (0.1467)
INFR	0.2475*** (0.0700)	0.2478*** (0.0699)	0.2482*** (0.0699)
GFC	-0.0249*** (0.0045)	-0.0325*** (0.0052)	-0.0443*** (0.0091)
GFC*LOW		0.0168*** (0.0056)	
GFC*B			0.0130 (0.0095)
GFC*C			0.0262*** (0.0101)
GFC*D			0.0301*** (0.0100)
*, **, *** indicates significance at 10%, 5% and 1% levels, respectively and the values in parenthesis shows standard errors			
Adjusted R-squared	0.59	0.60	0.60
Durbin-Watson stat	1.76	1.76	1.76

Model 1: $ROA_{it} = \gamma_0+\gamma_1 QUICK_{it}+\gamma_2 TURNOVER_{it}+\gamma_3 LEVERAGE_{it}+\gamma_4 TANGIBILITY_{it}+\gamma_5 SIZE_{it}+\gamma_6 AGE_{it}+ \gamma_7 FINANCING_{it}+ \gamma_8 GDPG+\gamma_9 IR+\gamma_{10} GFC+\varepsilon_{it}$

Model 2: $ROA_{it} = \gamma_0+\gamma_1 QUICK_{it}+\gamma_2 TURNOVER_{it}+\gamma_3 LEVERAGE_{it}+\gamma_4 TANGIBILITY_{it}+\gamma_5 SIZE_{it}+ \gamma_6 AGE_{it}+ \gamma_7 FINANCING_{it}+ \gamma_8 GDPG+\gamma_9 IR+\gamma_{10} GFC+\gamma_{11} GFC*LOW+ \varepsilon_{it}$

Model 3: $ROA_{it} = \gamma_0+\gamma_1 QUICK_{it}+\gamma_2 TURNOVER_{it}+\gamma_3 LEVERAGE_{it}+\gamma_4 TANGIBILITY_{it}+\gamma_5 SIZE_{it}+ \gamma_6 AGE_{it}+ \gamma_7 FINANCING_{it}+ \gamma_8 GDPG+\gamma_9 IR+\gamma_{10} GFC+\gamma_{11} GFC*B+\gamma_{12} GFC*C+ \gamma_{13} GFC*D+ \varepsilon_{it}$

The dependent variable in regression model is return on assets while other variables are used as regressors. Model 1 is used to examine the impact of global financial crisis on performance of non-financial firms in Pakistan. Model 2 and 3 are aimed at investigating relative effect of crisis on firms with different level of bank dependence, as described earlier. Results demonstrate a positive and significant effect of QUICK and TURNOVER ratios on performance of non-financial firms in Pakistan. These results are similar to those described in macro perspective of firm level analysis and are consistent with findings of Zainudin (2006), Ajanthan (2013), Thanh and Ha (2013), Ismail (2016). On the other side, effect of LEVERAGE ratio on profitability of firms is negative and significant. High debt ratio means that firms have incurred more interest expenses which slowed their profitability. Similar is the case of FINANCING from banking companies. Financial institutions usually impose certain restrictive covenants that can limit further financing from different sources. Firms in such a situation may forego some profitable projects. Similar negative effect of leverage on profitability of firms has earlier been observed by researchers including, Hijazi and Tariq (2006), Papadogonas (2007), Thanh and Ha (2013), Enqvist et al. (2014), Vithessonthi and Tongurai (2015), Yazdanfar and Öhman (2015).

Consistent with previous findings of Muritala (2012), Thanh and Ha (2013), Vătavu (2015), Lazar (2016), the study reports a negative effect of TANGIBILITY on profitability of non-financial firms in Pakistan. High proportion of tangible assets, if not properly utilized, can negatively affect the performance of firms. Effect of SIZE and AGE are insignificant, however, larger firms seems more profitable while mature firms loses the profitability. Larger firms can be able to attract and retain more skilled workforce than the smaller firms. Larger firms can also seek benefits from economies of scale and

diversification opportunities. The positive effect of size on financial performance of firms has earlier documented by Castelli et al. (2012), Doğan (2013), Mule, Mukras, and Nzioka (2015), Lee (2015). Negative effect of age on profitability can be explained with the help of life cycle theory and is consistent with the view that performance of firms weakens with increase in age. Similar evidence has previously been reported by Majumdar (1997), Coad, Segarra, and Teruel (2013), Yazdanfar and Öhman (2015).

Macro-economic variables are positively effecting the profitability of firms in Pakistan. Higher economic growth and inflation rate have strengthened the performance of firms. Expansion of economic activities can generate and increase the demand of products in markets. Companies in such a situation can be able to boost their sales and enjoy higher profit margin. The positive impact of economic growth on profitability is similar to the macro aspect of firm level analysis and in line with existing studies of Mwangi et al. (2014), Vithessonthi and Tongurai (2015). Similarly, positive effect of inflation rate on profitability is consistent with findings of Vătavu (2015). Dummy variable "GFC" remains negative and significant meaning that the performance of non-financial firms in Pakistan is negatively affected by the global financial crisis. Negative effect of crisis on performance of firms has also been reported in earlier studies of Channar and Ram (2011), Shahzad et al. (2015).

While investigating the relative effect, it is observed that firms with above-average bank financing effected more by the crisis. Additionally, in crisis duration, firms belonging to category "C" and "D" performed better than those of category "A". The significant difference across "A" and "B" category firms is, however, not noted. This comparative analysis indicates that firms with higher proportion of bank financing effected more by the

crisis. This is consistent with the findings of Tsoukas (2011) that higher intermediation activities can maximize the failure of bank dependent firms. Similar negative effect of crisis on performance of bank dependent firms in U.S. has earlier been observed by Chava and Purnanandam (2011). Bank financing became much expensive during crisis period and bank based firms remained unable to approach alternative sources to fulfill their financing requirements. These problems associated with bank financing have been highlighted in market based view.

After examining the effect of crisis on financial performance, the next step is to observe the volatility behavior of stocks during crisis period. EGARCH methodology is used for this purpose. ARCH effect is initially checked and then EGARCH technique is applied only on firms where this effect is present. Dummy of "GFC" is added in variance equation to capture the effect of crisis on stocks volatility. It takes value of '1' for crisis period and '0', otherwise. Analysis of individual firms is made and coefficients are then compared to examine the relative volatility pattern of firms with different bank dependence level. Firms, as described earlier, are classified to four different categories on the basis of their bank financing ratios. The positive and significant value of dummy variable means that stocks volatility of firms increased during crisis period. Major difference in volatility pattern across firms of different bank dependence level is, however, not noted. Results are summarized in Table 12.The event of bank(s) failure and severe panic in banking sector during crisis period, like many other countries of developed world, has not occurred in Pakistan. Absence of such failure and positive news of banking sector survival can be a reason due to which stocks volatility do not differ much across different category firms.

Table 12. Comparative Effect of Crisis on Stocks Volatility of Non-Financial Firms in Pakistan

Category A		Category B		Category C		Category D	
Symbol	**GFC**	**Symbol**	**GFC**	**Symbol**	**GFC**	**Symbol**	**GFC**
CRTM	-0.0176 (0.0205)	AACIL	0.0304*** (0.0110)	AABS	0.0164 (0.0358)	ABOT	0.0352 (0.0256)
DGKC	0.1546*** (0.0326)	ANSM	0.0710*** (0.0046)	ACPL	0.0756* (0.0394)	ADOS	-0.1950*** (0.0432)
FASM	0.2422*** (0.0731)	AASM	2.3889*** (0.8821)	ALNRS	-0.0461*** (0.0148)	AGIL	0.7138*** (0.1112)
ISTM	0.0475 (0.0838)	BAPL	0.0035 (0.0061)	ALQT	0.0107 (0.0810)	ATRL	0.3203*** (0.0331)
KTML	0.0193** (0.0076)	BCML	0.1256*** (0.0071)	ATBA	0.2727** (0.1151)	BATA	0.0991** (0.0499)
NML	0.0713** (0.0298)	BILF	0.0169*** (0.0062)	BAFS	-0.0056 (0.1538)	BIFO	-0.1305 (0.1666)
TATM	-0.0521 (0.0765)	BCL	0.2187*** (0.0813)	BNWM	0.0254*** (0.0040)	BROT	0.0255*** (0.0063)
		BERG	-0.0662 (0.0510)	CEPB	0.1542** (0.0635)	CLOV	0.2307*** (0.0597)
		CHAS	0.0699*** (0.0248)	CWSM	0.1015*** (0.0164)	COLG	1.1960*** (0.0683)
		CHCC	-0.0043 (0.0256)	DKTM	0.8907*** (0.1209)	DIIL	0.1428* (0.0860)
		CFL	0.0107* (0.0061)	DMTM	1.4443*** (0.2557)	DLL	0.2600*** (0.0541)
		DSML	0.0306* (0.0167)	DNCC	-0.0132** (0.0065)	FEROZ	0.4345*** (0.0578)
		ECOP	0.0721*** (0.0173)	DYNO	-0.0106 (0.0361)	GLAXO	0.0674*** (0.0249)
		EMCO	0.0188** (0.0087)	ENGRO	0.1808*** (0.0264)	GLPL	0.0415* (0.0223)
		EXIDE	-0.00004 (0.03680)	FFBL	0.2535*** (0.0246)	HCAR	-0.0317*** (0.0069)
		FCCL	0.1356*** (0.0208)	FRCL	0.0251** (0.0104)	HINO	0.2048*** (0.0519)
		FTHM	-0.2574 (0.3827)	GATI	-0.0386 (0.0341)	HSPI	0.4781*** (0.0596)

		GADT	-0.0111 (0.0100)	GHNL	-0.0067 (0.0088)	ICI	0.4928*** (0.0504)
		GTYR	0.0496*** (0.0183)	GWLC	-0.0565*** (0.0125)	INDU	0.1606*** (0.0591)
		ICL	-0.1471 (0.1455)	HMIM	0.0468*** (0.0114)	JOPP	-0.1255*** (0.0207)
		IDRT	0.0161* (0.0092)	JUBS	0.0051 (0.0447)	KSBP	0.1263*** (0.0358)
		IDSM	0.0451*** (0.0144)	MIRKS	0.3494*** (0.0574)	MARI	-0.0126* (0.0069)
		IDYM	-0.0725 (0.0602)	NESTLE	0.5654*** (0.1484)	MTL	0.3502*** (0.0169)
		JDMT	0.0909*** (0.0124)	NICL	0.4376*** (0.0325)	NRL	0.4152*** (0.0554)
		JDWS	0.2588** (0.1022)	NPSM	0.2393*** (0.0584)	OGDC	0.2218*** (0.0329)
		KOSM	0.0603*** (0.0041)	OTSU	0.0610 (0.0596)	PAKT	-0.0285 (0.0199)
		LPCL	0.1372*** (0.0161)	PIOC	0.0004 (0.0166)	PPL	0.0279 (0.0241)
		LUCK	0.0322 (0.0247)	QUICE	0.3084*** (0.0250)	PPVC	0.1778*** (0.0363)
		LPGL	-0.2959 (0.2706)	RAVT	-0.0590*** (0.0171)	PRL	0.1637*** (0.0350)
		MLCF	0.0948*** (0.0170)	SAPL	0.0918*** (0.0185)	PSMC	0.0382 (0.0398)
		MQTM	-0.0315 (0.0576)	SCL	-0.1100 (0.1760)	PSO	0.3217*** (0.0450)
		MZSM	0.1713*** (0.0260)	SEARL	0.0020 (0.0039)	RMPL	-0.0056 (0.1588)
		NONS	-0.3941** (0.1866)	SHEL	0.1588*** (0.0123)	SAZEW	0.1104*** (0.0172)
		OLSM	-0.1006*** (0.0234)	SITC	-0.0277 (0.0455)	SEPL	-0.0329 (0.0253)
		PAEL	-0.0609* (0.0349)	SJTM	0.0515 (0.0401)	SHJS	-0.3074* (0.1646)
		PAKL	0.2288*** (0.0214)	SSML	0.0332** (0.0148)	WHETH	0.0880 (0.0610)
		PGCL	-0.0882 (0.1034)	TGL	-0.0019 (0.0510)	ZIL	0.4716*** (0.1105)

		PKGS	0.3760*** (0.0381)	THALL	0.8455*** (0.0333)		
		REST	0.1851*** (0.0619)	WHAN	-0.0780 (0.0623)		
		RUBY	0.1108*** (0.0173)				
		SAIF	0.0156* (0.0094)				
		SALT	1.5109*** (0.4121)				
		SGML	-0.0158 (0.0119)				
		SHCI	-0.0192 (0.0397)				
		SHSML	0.0932*** (0.0320)				
		SIEM	0.0601 (0.0408)				
		SING	-0.0946* (0.0491)				
		SNAI	0.0420** (0.0180)				
		SRSM	0.0640*** (0.0152)				
		STML	0.1014*** (0.0251)				
		TOWL	-15.5795*** (1.1553)				
		TREET	-0.1619*** (0.0515)				
		TRIPF	0.1163*** (0.0447)				
		TSML	1.6130*** (0.1033)				

*, **, *** indicates significance at 10%, 5% and 1% levels, respectively and the values in parenthesis shows standard errors

4.2.6 Micro Level Findings

Micro aspect of firm level analysis is related to domestic economy of Pakistan. In this aspect, the effect of global financial crisis on performance of non-financial firms is examined. This study finds an overall negative and significant effect of crisis on performance of sample firms. Earlier, Channar and Ram (2011), Shahzad et al. (2015) also reported a negative effect of crisis on performance of firms in textile sector of Pakistan. Results of this domain are not surprising as performance of firms declined in many countries during the crisis episodes. Negative effect of crisis on sales, financial performance, and investment of firms in different countries has been reported by Wu (2012), Akbar et al. (2013), Buca and Vermeulen (2017). These studies are, however, mostly addressing the adverse outcomes of credit contraction by banks for financing, investment policies, and performance of non-financial firms. Analysis is then extended to observe the relative effect of crisis across different category firms. For this purpose, firms are categorized on the basis of bank financing proportion in capital mix.

Regarding bank financing, there are contradictory arguments in existing literature. Researchers including Chakraborty and Ray (2006), Castelli et al. (2012), Dewally and Shao (2014), Davydov (2016), Diallo (2018) supported for closer association with banks as it can facilitate the firms to secure more finances, minimize credit constraints, and improve financial performance. Chava and Purnanandam (2011), Iacoviello (2015), however, pointed out that banking relationship can be problematic for bank dependent firms in times of financial distress. In Pakistan, the issue of credit contraction did not remain much bitter as banking sector has not substantially affected by the crisis. Due to lesser integration with global banks, the banking sector of Pakistan survived from harmful

effects of crisis to a larger extent (Chaudhary & Abbas, 2017). As a remedial measure, the central bank has, however, continuously tightened its monetary policy and raised discount rates during entire crisis period (State Bank of Pakistan, 2009). Following SBP, commercial banks also substantially increased the lending rates for individual and corporate sector borrowers (Government of Pakistan, 2009). Firms with higher proportion of bank financing remained unable to identify and approach alternative sources immediately and on reasonable terms. Costly bank financing raised the cost of capital and performance of firms. This is evident from the results of categorized firms in which it is observed that firms with higher proportion of bank financing in their capital mix effected more by the crisis.

4.2.7 Discussion of Objectives, Hypotheses, and Results

This study is aimed at relatively examining the financial systems in backdrop of financial crisis. Analysis covers cross country and cross firm aspects from economic growth, stocks volatility, and financial performance perspectives. The country level analysis covers all major areas that can represent economic situation in any country. Countries are initially segregated according to their economic development level and then placed into market and bank based categories on the basis of financial structure. Firm level analysis focuses both macro and micro domains. Non-financial firms from selected sample economies come under macro aspect while micro part concentrates the performance analysis of domestic firms. Theoretical and empirical literature is surveyed to extract hypotheses of the study. The overview of framed hypotheses and analysis results is summarized in following paragraphs.

First three hypotheses are formulated to examine the effect of crisis on economic growth, stock markets volatility, and performance of non-financial firms in sample countries, respectively. Hypotheses are only presented in their alternate form. Empirical results of study are supporting first two hypothesis. It is observed that global financial crisis has negatively and significantly affected the economic growth of sample countries. Similarly, in sample countries, volatility of stock indices remained significantly higher during the crisis period. Effect of crisis on performance of sample non-financial firms, however, remained insignificant. Next three hypotheses are structured to analyze the relative effect of crisis on economic growth, stock markets volatility, and performance of non-financial firms in market and bank based financial systems. For examination of fourth and sixth hypotheses, panel regression model is applied while for fifth hypothesis, coefficients and significance level of stocks volatility are similarly compared across the sample countries. In terms of bearing consequences of crisis, the significance difference across countries of diverse financial structure is not found. The countries are further compared on the basis of economic development level but again no significant difference across two categories is noted.

Micro portion of firm level analysis is related to domestic firms of Pakistan and this aspect is covered in seventh to tenth hypotheses. Seventh hypothesis is designed to examine the effect of crisis on performance of non-financial firms in Pakistan. Relative effect across firms of different bank dependence level is examined in eighth hypothesis. Results of analysis depicts that financial performance of sample firms is significantly and negatively affected by the global financial crisis. It is further observed that the effect of crisis remained more pronounced in firms of relatively higher bank dependence level. Ninth hypothesis is

formulated for examining the stocks volatility of non-financial firms in Pakistan. This hypothesis is empirically tested through specification of EGARCH technique. Results of this analysis shows a significant increase in stocks volatility of sample firms during the crisis period. The purpose of tenth hypothesis is to examine the volatility pattern of stocks across firms of different bank dependence level. For this purpose, coefficients and significance level of crisis dummy are simply compared across different category firms. The conclusive evidence in support of this hypothesis is, however, not found. The volatility of stocks, no doubt, increased in majority of sample firms but considerable variation in different category firms is not present.

Overall results of study is highlighting a negative impact of global financial crisis both at country level and firm level. Economic growth of sample countries significantly declined while stock markets volatility enhanced during the crisis period. Negative effect of crisis upon performance of non-financial firms selected from different sample countries is also noted; however, it remained insignificant. In terms of relative effect, significant distinction among different financial structure countries is not observed. The difference is found in non-financial firms of Pakistan where financial performance of firms with higher bank financing proportion affected more by the crisis. Similar impact on stocks performance of non-financial firms is, however, missing. Overall results of this study are supporting the viability of a moderate and balanced financing approach. Financing relationships with both banks and markets can help in resilience and better performance of firms and countries during normal as well as crisis periods.

CHAPTER 5

SUMMARY AND CONCLUSION

5.1 Chapter Summary

This chapter is basically a concluding part of the study. Initially, it summarizes overall relevant discussion of the study to facilitate readers in understanding subject matter and general roadmap of the study. The chapter then presents major findings and conclusion drawn from analytical results. In addition, implications of the study and recommendations for different officials on the basis of study findings are also a part of this chapter. At the end, limitations of study are presented for readers so that they could not be misled by results and findings of the study. The potential areas for further research in this domain are also identified to keep discussion alive and uncover the phenomenon more comprehensively.

5.2 Summary of the Study

Financial system has always played a crucial role in the economic growth of nations. It facilitates exchange of funds among surplus and deficit units, thereby ensuring utilization of resources to their best possible level. It helps in achieving higher productivity and economic progression (Thakor, 1996). In addition to intermediation activities, it serves numerous other functions in an economy that can enhance the well-being of all concerned. Financial intermediaries and markets are major components of a financial system. Relative importance of each component in economic progression has widely been discussed in theoretical and empirical literature. Earlier discussion on comparative financial systems has been revolved around four developed countries of the world. This debate has expanded

to a broader cross country level with studies of Demirguç-Kunt and Levine (1999), Levine (2002), followed by many other researchers.

Discussion on comparative financial systems is yet inconclusive and the current study is an attempt to contribute in this discussion by examining financial systems in context of global financial crisis. This crisis started with failure of some major banks in U.S. and then spread across the globe. Globalization and integration of economies resulted in rapid transmission of crisis across countries and sooner it spread at global level. The crisis has negatively affected almost all advanced and emerging market economies of the world (Dovern & Roye, 2014). Analysis of current study covers country level and firm level aspects. Economic growth and stock markets volatility of market and bank based systems are examined in country level analysis. Panel regression model is applied and dummy variables are added to observe the effect of crisis in overall sample economies. Interaction terms are then added for its comparison across countries of relatively dissimilar financial structure and development level. After this, volatility pattern of stocks is examined by employing EGARCH technique and crisis dummy is added in variance equation. Coefficients and significance level are then simply compared to observe cross country variations.

Firm level analysis covers both macro and micro domains. Its macro part is intended to observe the effect of crisis on performance of non-financial firms from selected sample economies and then to compare it by incorporating the aspect of financial structure and economic development level. Panel regression is again applied and dummy variables alongwith interaction terms are added to check the overall and relative effect of crisis on performance of sample firms. Micro domain of firm level analysis is associated with the

domestic economy of Pakistan. It examines the effect of crisis on non-financial firms of the country initially and then relatively analyze the performance of firms with different level of banking relationships. Effect of crisis on performance non-financial firms in Pakistan is examined by applying panel regression model. For comparative trend analysis, sample firms are categorized according to their bank dependence level. At the end, stocks volatility is determined and compared for selected non-financial firms of Pakistan.

5.3 Findings and Conclusion of the Study

At country level, the negative impact of crisis on economic growth of overall sample countries is found without having any differential effect across market based and bank based or developed and underdeveloped category countries. Similar trend is noted in stock markets volatility perspective where an overall increase in volatility of stocks is noted but again much variation across countries of diverse financial structure is not observed. In macro part of firm level analysis, the insignificant negative effect of crisis is noted without having any significant variation across countries of different structure and development level. The overall results of country level analysis and firms at macro level do not support for relevance of financial structure in crisis periods. Irrelevance of financial structure in economic growth has already been noted by some researchers including, Levine (2002), Beck and Levine (2002), Solo (2013), Moore and Mirzaei (2016). Results of this research are supporting and extending these studies by observing that financial structure does not matter much for countries in terms of bearing the consequences of crisis.

In micro perspective of firm level analysis, the overall effect of crisis on financial performance of firms is initially examined and then is compared across firms of different bank dependence level. Financial performance of firms in Pakistan is negatively affected

by the crisis. The comparative analysis has pointed out that firms with higher proportion of bank financing affected relatively more than their less bank dependent counterparts. Relative behavior of stocks volatility is then observed for different category firms. Volatility though increased for different individual stocks but considerable variation in pattern across firms of different bank dependence level is not found. Overall results of micro level analysis reports a negative effect of global financial crisis in Pakistan that is relatively more pronounced in firms of higher bank financing ratios. This is consistent with the proposition of market based view and is supporting the critique of Rajan (1992), Shen and Huang (2003) on bank financing. Absence of larger variation in stocks volatility of different category firms can be attributed to the fact that event of banking failure did not occur in Pakistan.

5.4 Implications of the Study

In debate of comparative financial systems, effect of different financial structure views upon economic growth has been mainly examined in existing studies. The prevailing discussion remained very much concentrated on relative merits of market based and bank based financial systems for their contribution in economic growth. The current study contributes in literature by studying relative behaviour and performance of financial systems in a crisis situation. In line with findings of some previous studies including those of Levine (2002), Beck and Levine (2002), Song and Thakor (2010), Lee (2012), Moore and Mirzaei (2016), it is observed and proposed that the structure of financial system does not matter much in globalized, integrated, and contemporary world. Efforts should be made to strengthen both banks and markets for better and vibrant economic outcomes. This study provides an insight into relative merits of banks and stock markets and can facilitate the

choice of individuals and firms in this context. Results of the study can also enable investors to analyse behaviour of stock markets domestically and across globe during crisis situation and thereby facilitates in making better investment decisions.

This study also offers important practical implications for managers, officials, individual investors, and numerous others in the domestic economy. For financial managers of corporate enterprises, the choice of appropriate financing source always remained a challenge. Individuals also usually face a difficult situation in making choice from amongst banks and stock markets, for putting their savings. There are many factors that may influence the decision in this context; including liquidity, risk, return, etc. Additionally, panic in economy may affect numerous small investors through fluctuation and decline in stock prices. It may also affect the availability of finances in economy, reduction in viability of investments projects, decline in employment, and so on. In global financial crisis period, bank lending to corporate sector declined substantially that negatively affected the financing and investment strategies of non-financial firms (Ivashina & Scharfstein, 2010; Akbar et al., 2013; Spatareanu, Manole, & Kabiri, 2017). Everyone is virtually effected by crisis and interested to enhance the knowledge in this context. Results of this study can be helpful in financial decision making of individuals and managers of corporate enterprises. It can pave a way to devise and adopt more dynamic, hybrid, and balanced financing strategy in the country.

5.5 Recommendations of the Study

The choice of appropriate financing mix and source is an important and challenging issue for financial managers of corporate sector. Firms are not only concerned with composition of debt and equity in its capital structure but also consider the relative

attractiveness of financing from either financial intermediaries or markets. On the basis of these comparative preferences, countries have also been placed in bank and market based categories. Within each category, officials are primarily devising the policies to strengthen institutions that have been traditionally playing a leading role in financing activities, with little efforts to establish and support alternative mechanism. Findings of this study, however, show that traditional dichotomy of financial systems now does not matter much because of globalization and interlinkages of institutions. The extreme dependence upon any system is not rational. The bank based systems are traditionally considered more prone to external shocks especially those started from the banking system. It is noted that panic started from any sector or country cannot be limited to only that sector or country in modern globalized world. Indeed, globalization and integration of economies has resulted in rapid transmission of global financial crisis. It is recommended to strengthen both banks and markets for rapid and sustainable growth. Existence and proper functioning of each can enable to minimize the effects of crisis. Measures should be taken to improve the overall infrastructure and strengthen internal systems. This can also help the system to become more resilient and quickly recover from crisis.

It is also recommended that tightening of monetary policy is not a suitable mechanism to avoid the crisis. It may support the financial sector but creates trouble for non-financial firms. It should be attempted to develop institutions and alternative arrangements that can ensure resilience of firms and preserve the confidence of investors. Officials of firms should also adopt a balanced and vibrant financing strategy. Financial decisions should not be based upon cost and availability of finances in short term only but other factors should also be incorporated in such decisions. It is recommended for firms to

avoid extreme proportion of bank financing and should choose appropriate financing mix from banks and markets. It can minimize the sternness of banking distress and enhance the resilience of firms.

5.6 Limitations and Scope for Future Research

The comparison of financial systems in context of global financial crisis is the scope of current study. It is attempted to study and investigate the phenomenon from all possible spectrums, however, there are certain limitations that should be considered while interpreting findings of the study. First limitation is related to classification mechanism of countries on the basis of financial structure. It is a matter of fact that no country in the world is absolutely bank based or market based. The study adopts a relative classification scheme on the basis of available standard indicators. The structure should, therefore, be considered as a relative measure. Second limitation is about the transmission mechanism of crisis. The crisis started from U.S. and transmitted across globe through different channels. The study only concentrates upon relative analysis of economies and firms on the basis of their dependence over banking sector and/or markets during crisis period, without incorporating its transmitting mechanism across the globe. A separate study is required to examine the transmission mechanism of crisis.

Third limitation is relevant to macro perspective of firm level analysis. Selected sample for this aspect is not much broader due to non-availability of consistent data for all cross sections. Maximum and balanced representation is, however, assured. Inclusion of more firms in analysis may enable to get extensive and consistent results. Similarly, firm level analysis of other countries in parity of domestic economy can produce more comprehensive results. Fourth limitation is concerned with the timeline of crisis. Effect of

crisis did not appear at same time across all countries, however, standard and broader duration is opted in study to ensure generalization of results. Identification of exact crisis period for each country, incorporation of individual country and market efficiency elements, and other factors that contributed in transmission of crisis may produce more detailed and consistent results. One more possible extension in the study can be the incorporation of qualitative approach in support of quantitative data. Responses of financial managers regarding relative preference of financing source in normal and crisis periods could be a valuable addition. These and such other extensions in future may produce more interesting and conclusive evidences for discussion on comparative financial systems.

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APPENDIX A

GDP Per Capita Growth of Sample Countries (Annual %)

Country	2007	2008	2009	2010	Country	2007	2008	2009	2010
Argentina	6.85	2.02	(0.97)	8.33	Australia	3.11	1.65	(0.26)	0.44
Austria	3.29	1.23	(4.05)	1.68	Bangladesh	5.78	4.83	3.89	4.38
Belgium	2.64	(0.05)	(3.07)	1.76	Brazil	4.92	4.02	(1.11)	6.49
Canada	1.08	(0.09)	(4.05)	1.94	Chile	3.99	2.16	(2.12)	4.60
China	13.60	9.06	8.69	10.10	Colombia	5.60	2.33	0.50	2.84
Czech Republic	4.92	1.86	(5.38)	2.00	Denmark	0.38	(1.30)	(5.59)	1.17
Egypt, Arab Rep.	5.25	5.29	2.78	3.09	Finland	4.74	0.25	(8.71)	2.52
France	1.73	(0.36)	(3.44)	1.46	Germany	3.40	1.27	(5.38)	4.24
Greece	3.01	(0.60)	(4.55)	(5.60)	Hong Kong	5.55	1.52	(2.67)	5.99
Hungary	0.58	1.02	(6.41)	0.97	India	6.99	2.38	6.95	8.75
Indonesia	4.96	4.63	3.27	4.84	Ireland	2.54	(4.14)	(6.59)	(0.15)
Israel	4.27	1.24	(1.12)	3.61	Italy	0.96	(1.70)	(5.91)	1.37
Japan	2.07	(1.09)	(5.52)	4.69	Kazakhstan	7.66	2.05	(1.43)	5.80
Korea, Rep.	4.97	2.09	0.23	6.00	Malaysia	4.44	3.03	(3.16)	5.67
Mexico	1.60	(0.22)	(6.20)	3.51	Netherlands	3.47	1.30	(4.26)	0.88
New Zealand	1.91	(2.14)	(1.53)	0.25	Norway	1.87	(0.86)	(2.86)	(0.64)
Pakistan	2.70	(0.37)	0.72	(0.50)	Peru	7.20	7.81	(0.20)	7.08
Philippines	4.97	2.62	(0.34)	6.02	Poland	7.26	3.91	2.56	4.00
Portugal	2.29	0.05	(3.07)	1.85	Romania	8.45	10.28	(6.29)	(0.21)
Russian Federation	8.72	5.29	(7.85)	4.46	Singapore	4.66	(3.49)	(3.56)	13.22
South Africa	3.90	1.73	(2.96)	1.52	Spain	1.87	(0.48)	(4.42)	(0.45)
Sweden	2.64	(1.33)	(5.99)	5.09	Switzerland	3.21	0.99	(3.34)	1.89
Thailand	5.15	1.57	(0.88)	7.27	Turkey	3.45	(0.53)	(6.05)	7.57
Ukraine	8.55	2.86	(14.42)	4.61	U. K.	1.79	(1.25)	(4.91)	0.75
U.S.	0.82	(1.23)	(3.62)	1.68	Vietnam	5.98	4.54	4.29	5.31

(Source: World Development Indicators, World Bank)

APPENDIX B

Stock Index Values of Sample Countries (Annual Average)

Country	2007	2008	2009	2010	Country	2007	2008	2009	2010
Argentina	7735	6564	5686	8934	Australia	6221	5036	4070	4677
Austria	4619	3358	2134	2558	Bangladesh	5514	8350	9820	18854
Belgium	4411	3124	2136	2557	Brazil	53242	55227	52812	67294
Canada	13622	12476	10173	12081	Chile	14135	13076	14281	19853
China	4030	3168	2936	3080	Colombia	10675	8910	9599	13257
Czech Republic	1776	1358	964	1172	Denmark	465	359	264	352
Egypt, Arab Rep.	8099	8791	5595	6678	Finland	11106	8435	5676	6900
France	5728	4340	3345	3750	Germany	7466	6203	5023	6196
Greece	4869	3401	2176	1708	Hong Kong	23172	20918	18029	21491
Hungary	26097	19740	16076	22487	India	15544	14425	13625	18201
Indonesia	2176	2100	1984	3061	Ireland	8724	4903	2718	2929
Israel	1087	970	880	1185	Italy	41643	29074	20576	21638
Japan	16984	12152	9348	10022	Kazakhstan	2574	2093	1180	1630
Korea, Rep.	1715	1535	1428	1764	Malaysia	1310	1149	1081	1373
Mexico	29675	26753	25344	33320	Netherlands	522	392	273	335
New Zealand	4161	3300	2895	3176	Norway	549	443	334	422
Pakistan	12751	11815	7664	10217	Peru	19249	13578	11925	16322
Philippines	3421	2623	2479	3531	Poland	4664	2648	1860	2523
Portugal	12500	9152	7331	7641	Romania	9256	5887	3534	5230
Russian Federation	1980	1694	1001	1509	Singapore	3423	2687	2277	2967
South Africa	25513	24789	21012	25516	Spain	14828	11865	9992	10429
Sweden	1309	957	719	960	Switzerland	7265	5750	4842	5708
Thailand	767	687	582	849	Turkey	48264	37627	37599	59545
Ukraine	2231	1710	1037	2015	U.K.	6404	5366	4569	5472
U.S.	1942	1700	1493	1946	Vietnam	1006	505	428	487

(Source: Yahoo Finance, and author's calculations)

APPENDIX C

List of Sample Countries

S. No.	Name of the Country	S. No.	Name of the Country
1.	Argentina	2.	Australia
3.	Austria	4.	Bangladesh
5.	Brazil	6.	Belgium
7.	Canada	8.	Chile
9.	China	10.	Colombia
11.	Czech Republic	12.	Denmark
13.	Egypt, Arab Rep.	14.	Finland
15.	France	16.	Germany
17.	Greece	18.	Hong Kong SAR, China
19.	Hungary	20.	India
21.	Indonesia	22.	Ireland
23.	Israel	24.	Italy
25.	Japan	26.	Kazakhstan
27.	Korea, Rep.	28.	Malaysia
29.	Mexico	30.	Netherlands
31.	New Zealand	32.	Norway
33.	Pakistan	34.	Peru
35.	Philippines	36.	Poland
37.	Portugal	38.	Romania
39.	Russian Federation	40.	Singapore
41.	South Africa	42.	Spain
43.	Sweden	44.	Switzerland
45.	Thailand	46.	Turkey
47.	Ukraine	48.	United Kingdom
49.	United States	50.	Vietnam

(Source: World Development Indicators Database, World Bank, 1st July, 2013)

APPENDIX D

Sample Countries Included in Analysis of Non-Financial Firms

S. No.	Country	S. No.	Country
Developed and Bank Based Category			
1.	Austria	2.	Belgium
3.	France	4.	Germany
5.	Greece	6.	Italy
7.	Japan	8.	Norway
9.	Spain		
Developed and Market Based Category			
1.	Denmark	2.	Finland
3.	Hong Kong SAR, China	4.	Korea, Rep.
5.	Singapore	6.	Sweden
7.	Switzerland	8.	United Kingdom
9.	United States		
Underdeveloped and Bank Based Category			
1.	Argentina	2.	Egypt, Arab Rep.
3.	India	4.	Indonesia
5.	Pakistan	6.	Poland
7.	Thailand		
Underdeveloped and Market Based Category			
1.	Brazil	2.	Chile
3.	China	4.	Mexico
5.	Philippines	6.	Russian Federation
7.	Turkey		

(Source: Author's own compilation)

APPENDIX E

List of Sample Non-Financial Firms (Pakistan)

S.No.	Symbol	Name	S.No.	Symbol	Name
1.	ABOT	Abbot Laboratories (Pakistan) Limited	2.	ADOS	Ados Pakistan Limited
3.	AGIL	Agriautos Industries Limited	4.	AHTM	Ahmed Hassan Textile Mills Limited
5.	AABS	Al-Abbas Sugar Mills Limited	6.	AASM	Al-Abid Silk Mills Limited
7.	AGTL	Al-Ghazi Tractors Limited	8.	AKGL	Al-Khair Gadoon Ltd.
9.	ALNRS	Al-Noor Sugar Mills Limited	10.	ALQT	Al-Qadir Textile Mills Limited
11.	AATM	Ali Asghar Textile Mills Limited	12.	AWTX	Allawasaya Textile & Weaving Mills Limited
13.	ANSM	Ansari Sugar Mills Limited	14.	APOT	Apollo Textile Mills Ltd.
15.	ADMM	Artistic Denim Mills Limited	16.	ASHT	Ashfaq Textile Mills Limited
17.	ASTM	Asim Textile Mills Limited	18.	ATBA	Atlas Battery Limited
19.	ATLH	Atlas Honda Limited	20.	ACPL	Attock Cement (Pakistan) Limited
21.	APL	Attock Petroleum Limited	22.	ATRL	Attock Refinery Limited
23.	BAFS	Baba Farid Sugar Mills Limited	24.	BCML	Babri Cotton Mills Limited
25.	BGL	Baluchistan Glass Limited	26.	BWHL	Baluchistan Wheels Limited
27.	BNWM	Bannu Woollen Mills Limited	28.	BATA	Bata Pakistan Limited
29.	BAPL	Bawany Air Product Limited	30.	BERG	Berger Paints Pakistan Limited
31.	BWCL	Bestway Cement Limited	32.	BHAT	Bhanero Textile Mills Limited
33.	BIFO	Biafo Industries Limited	34.	BILF	Bilal Fibres Limited
35.	BTL	Blessed Textile Mills Limited	36.	BCL	Bolan Casting Limited
37.	BROT	Brothers Textile Mills Limited	38.	BUXL	Buxly Paints Limited
39.	BYCO	Byco Petroleum Pakistan Limited	40.	CEPB	Century Paper and Board Mills Limited
41.	CWSM	Chakwal Spinning Mills Limited	42.	CHAS	Chashma Sugar Mills Limited.
43.	CHCC	Cherat Cement Company Limited	44.	CPPL	Cherat Packaging/papersack Limited.
45.	CECL	Climax Engineering Company Limited	46.	CLOV	Clover Pakistan Limited
47.	COLG	Colgate Palmolive (Pakistan) Limited	48.	CJPL	Crescent Jute Products Limited
49.	CFL	Crescent Fibres Limited	50.	CSAP	Crescent Steel & Allied Products Limited
51.	CRTM	Crescent Textile Mills Limited	52.	DADX	Dadex Eternit Limited
53.	DBCI	Dadabhoy Cement Industries Limited	54.	DBSL	Dadabhoy Sack Limited

55.	DNCC	Dandot Cement Company Limited	56.	DSML	Dar-es-Salaam Textile Mills Limited
57.	DAWH	Dawood Hercules Corporation Limited	58.	DLL	Dawood Lawrancepur Limited
59.	DWAE	Dewan Automotive Engineering Limited	60.	DCL	Dewan Cement Limited
61.	DFML	Dewan Farooque Motors Limited	62.	DFSM	Dewan Farooque Spinning Mills Limited
63.	DKTM	Dewan Khalid Textile Mills Limited	64.	DMTM	Dewan Mushtaq Textile Mills Limited
65.	DSFL	Dewan Salman Fibre Limited	66.	DWSM	Dewan Sugar Mills Limited
67.	DWTM	Dewan Textile Mills Limited	68.	DIIL	Diamond Industries Limited
69.	DINT	Din Textile Mills Limited	70.	DYNO	Dynea Pakistan Limited
71.	DGKC	D.G. Khan Cement Company Limited	72.	ECOP	Ecopack Limited
73.	ELSM	Ellcot Spinning Mills Limited	74.	EMCO	Emco Industries Limited
75.	ENGRO	Engro Corporation Limited	76.	EXIDE	Exide Pakistan Limited
77.	FASM	Faisal Spinning Mills Limited	78.	FRSM	Faran Sugar Mills Limited
79.	FSWL	Fateh Sports Wear Limited	80.	FTHM	Fateh Textile Mills Limited
81.	FCCL	Fauji Cement Company Limited	82.	FFBL	Fauji Fertilizer Bin Qasim Limited
83.	FFC	Fauji Fertilizer Company Limited	84.	FZCM	Fazal Cloth Mills Limited
85.	FZTM	Fazal Textile Mills Limited	86.	FECTC	Fecto Cement Limited
87.	FEROZ	Ferozsons Laboratories Limited	88.	FML	Feroze 1888 Mills Limited
89.	FRCL	Frontier Ceramics Limited	90.	GADT	Gadoon Textile Mills Limited
91.	GAMON	Gammon Pakistan Ltd.	92.	GATI	Gatron Industries Limited
93.	GTYR	General Tyre and Rubber Co. of Pakistan Limited	94.	GHNI	Ghandhara Industries Limited
95.	GHNL	Ghandara Nissan Limited	96.	GWLC	Gharibwal Cement Limited
97.	GAIL	Ghani Automobile Industries Limited	98.	GHGL	Ghani Glass Mills Limited
99.	GFIL	Ghazi Fabrics International Limited	100.	GLPL	Gillette Pakistan Limited
101.	GLAXO	GlaxoSmithKline (Pakistan) Limited	102.	GRAYS	Grays Of Cambridge (Pakistan) Limited
103.	GATM	Gul Ahmed Textile Mills Limited	104.	GUSM	Gulistan Spinning Mills Limited
105.	GSPM	Gulshan Spinning Mills Limited	106.	GUTM	Gulistan Textile Mills Limited
107.	HABSM	Habib Sugar Mills Limited	108.	HAL	Habib-ADM Limited
109.	HMIM	Haji Mohammed Ismail Mills Limited	110.	HWQS	Haseeb Waqas Sugar Mills Limited

111.	HINOON	Highnoon Laboratories Limited	112.	HINO	Hino Pak Motors Limited
113.	HCAR	Honda Atlas Cars (Pakistan) Limited	114.	HSPI	Huffaz Seamless Pipe Industries Limited
115.	HUSI	Hussain Industries Limited	116.	HUSS	Hussain Sugar Mills Limited
117.	IBFL	Ibrahim Fibre Limited	118.	ICCT	I.C.C. Textile Limited
119.	ICI	I.C.I. Pakistan Limited	120.	IDSM	Ideal Spinning Mills Limited
121.	IDRT	Idrees Textile Mills Limited	122.	IDYM	Indus Dyeing Manufacturing Company Limited
123.	INDU	Indus Motor Company Limited	124.	INIL	International Industries Limited
125.	ISTM	Ishaq Textile Mills Limited	126.	ILTM	Island Textile Mills Limited
127.	ISIL	Ismail Industries Limited	128.	ICL	Ittehad Chemical Limited
129.	JDMT	Janana-de-Malucho Textile Mills Limited	130.	JVDC	Javedan Corporation Limited
131.	JOPP	Johnson and Phillips (Pakistan) Limited	132.	JUBS	Jubilee Spinning and Weaving Mills Limited
133.	JATM	J.A. Textile Mills Limited	134.	JDWS	J.D.W. Sugar Mills Limited
135.	KCL	Karam Ceramics Limited	136.	KPUS	Khairpur Sugar Mills Limited
137.	KSTM	Khalid Siraj Textile Mills Limited	138.	KOHC	Kohat Cement Limited
139.	KOHTM	Kohat Textile Mills Limited	140.	KML	Kohinoor Mills Limited
141.	KOSM	Kohinoor Spinning Mills Limited	142.	KOHS	Kohinoor Sugar Mills Limited
143.	KTML	Kohinoor Textile Mills Limited	144.	KHTC	Khyber Tobacco Company Limited
145.	KSBP	K.S.B. Pumps Co. Limited	146.	LPCL	Lafarge Pakistan Cement Limited
147.	LMSM	Land Mark Spinning Industries Limited	148.	LEUL	Leather Up Industries Limited
149.	LPGL	Leiner Pak Gelatine Limited	150.	LUCK	Lucky Cement Limited
151.	MACFL	Macpac Films Limited	152.	MLCF	Maple Leaf Cement Factory Limited
153.	MQTM	Maqbool Textile Mills Limited	154.	MARI	Mari Petroleum Company Limited
155.	MSOT	Masood Textile Mills Limited	156.	MEHT	Mehmood Textile Mills Limited
157.	MRNS	Mehran Sugar Mills Limited	158.	MERIT	Merit Packaging Limited
159.	MTL	Millat Tractors Limited	160.	MIRKS	Mirpurkhas Sugar Mills Limited
161.	MZSM	Mirza Sugar Mills Limited	162.	MFFL	Mitchells Fruit Farms Limited
163.	MFTM	Mohummed Farooq Textile Mills Limited	164.	MUREB	Murree Brewery Company Limited
165.	NAGC	Nagina Cotton Mills Limited	166.	NATF	National Foods Limited
167.	NRL	National Refinery Limited	168.	NESTLE	Nestle Pakistan Limited
169.	NICL	Nimir Industrial Chemicals Limited	170.	NCL	Nishat Chunian Limited
171.	NML	Nishat Mills Limited	172.	NOPK	Noon Pakistan Limited

173.	NONS	Noon Sugar Mills Limited	174.	NPSM	N.P. Spinning Mills Limited
175.	OGDC	Oil and Gas Development Company Limited	176.	OLSM	Olympia Spinning and Weaving Mills Limited
177.	OLTM	Olympia Textile Mills Limited	178.	OSTU	Otsuka Pakistan Ltd.
179.	PKGS	Packages Limited	180.	PAEL	Pak Elektron Limited
181.	PAKL	Pak Leather Crafts Limited	182.	PSMC	Pak Suzuki Motor Company Limited
183.	PCAL	Pakistan Cables Limited	184.	PECO	Pakistan Engineering Company Limited
185.	PGCL	Pakistan Gum and Chemicals Limited	186.	POL	Pakistan Oilfields Limited
187.	PPP	Pakistan Paper Products Ltd.	188.	PPL	Pakistan Petroleum Limited
189.	PPVC	Pakistan PVC Limited	190.	PRL	Pakistan Refinery Limited
191.	PSO	Pakistan State Oil Company Limited	192.	PSYL	Pakistan Synthetics Limited
193.	PAKT	Pakistan Tobacco Company Limited	194.	PNGRS	Pangrio Sugar Mills Limited
195.	PASM	Paramount Spinning Mills Limited	196.	PIOC	Pioneer Cement Limited
197.	POWER/ AACIL	Power Cement Limited/ A l-Abbas Cement Industries	198.	PMRS	Premier Sugar Mills and Distillery Company Limited
199.	PRET	Premium Textile Mills Limited	200.	PRWM	Prosperity Weaving Mills Limited
201.	POML	Punjab Oil Mills Limited	202.	QUAT	Quality Textile Mills Limited
203.	QUET	Quetta Textile Mills Limited	204.	QUICE	Quice Food Limited
205.	RMPL	Rafhan Maize Products Limited	206.	RAVT	Ravi Textile Mills Limited
207.	RCML	Reliance Cotton Spinning Mills Limited	208.	REWM	Reliance Weaving Mills Limited
209.	REST	Resham Textile Industries Limited	210.	RUBY	Ruby Textile Mills Limited
211.	RUPL	Rupali Polyester Limited	212.	SFAT	Safa Textiles Limited
213.	SAIF	Saif Textile Mills Limited	214.	SJTM	Sajjad Textile Mills Limited
215.	SKRS	Sakrand Sugar Mills Limited	216.	SALT	Salfi Textile Mills Limited
217.	SANE	Salman Noman Enterpries Limited	218.	SNAI	Sana Industries Limited
219.	SANSM	Sanghar Sugar Mills Limited	220.	SAPL	Sanofi-Aventis Pakistan Limited
221.	SFL	Sapphire Fibers Limited	222.	SAPT	Sapphire Textile Mills Limited
223.	SRSM	Sargodha Spinning Mills Limited	224.	SSML	Saritow Spinning Mills Limited
225.	SAZEW	Sazgar Engineering Works Limited	226.	SEARL	Searle Company Limited
227.	SEPL	Security Paper Limited	228.	SRVI	Service Industries Limited

229.	STCL	Shabbir Tiles and Ceramics Limited	230.	SHDT	Shadab Textile Mills Limited
231.	SHCM	Shadman Cotton Mills Limited	232.	SHCI	Shaffi Chemical Industries Limited
233.	SHSML	Shahmurad Sugar Mills Limited	234.	SHJS	Shahtaj Sugar Mills Limited
235.	STJT	Shahtaj Textile Mills Limited	236.	SZTM	Shahzad Textile Mills Limited
237.	SGML	Shakerganj Mills Limited	238.	STML	Shams Textile Mills Limited
239.	SHEL	Shell Pakistan Limited	240.	SHEZ	Shezan International Limited
241.	SCL	Shield Corporation Limited	242.	STPL	Siddiqsons Tin Plate Limited
243.	SIEM	Siemens Pakistan Engineering Co. Limited	244.	SING	Singer Pakistan Limited
245.	SITC	Sitara Chemical Industries Limited	246.	SUHJ	Suhail Jute Mills Limited
247.	SUTM	Sunrays Textile Mills Limited	248.	SURC	Suraj Cotton Mills Limited
249.	THAS	Taha Spinning Mills Limited	250.	TSML	Tandlianwala Sugar Mills Limited
251.	TGL	Tariq Glass Industries Limited	252.	TATM	Tata Textile Mills Limited
253.	THALL	Thal Limited	254.	TOWL	Towellers Limited
255.	TREET	Treet Corporation Limited	256.	TRIPF	Tri-Pack Films Limited
257.	UPFL	Unilever Pakistan Foods Limited	258.	UDPL	United Distributors Pakistan Limited
259.	WAHN	Wah Noble Chemicals Limited	260.	WYETH	Wyeth Pakistan Limited
261.	YOUW	Yousuf Weaving Mills Limited	262.	ZTL	Zephyr Textile Limited
263.	ZIL	ZIL Limited			

(Source: Pakistan Stock Exchange Ltd. Formerly Karachi Stock Exchange Ltd.)

APPENDIX F

Economically Developed and Underdeveloped Category Countries

S. No.	Name of the Country	S. No.	Name of the Country
Economically Developed Countries			
1.	Australia	2.	Austria
3.	Belgium	4.	Canada
5.	Czech Republic	6.	Denmark
7.	Finland	8.	France
9.	Germany	10.	Greece
11.	Hong Kong SAR, China	12.	Korea, Rep.
13.	Ireland	14.	Israel
15.	Italy	16.	Japan
17.	Netherlands	18.	New Zealand
19.	Norway	20.	Portugal
21.	Singapore	22.	Spain
23.	Sweden	24.	Switzerland
25.	United Kingdom	26.	United States
Economically Underdeveloped Countries			
1.	Argentina	2.	Bangladesh
3.	Brazil	4.	Chile
5.	China	6.	Colombia
7.	Egypt, Arab Rep.	8.	Hungary
9.	India	10.	Indonesia
11.	Kazakhstan	12.	Malaysia
13.	Mexico	14.	Pakistan
15.	Peru	16.	Philippines
17.	Poland	18.	Romania
19.	Russian Federation	20.	South Africa
21.	Thailand	22.	Turkey
23.	Ukraine	24.	Vietnam

(Source: World Economic Outlook, International Monetary Fund, October, 2013)

APPENDIX G

Definition of Indicators used in Classification Scheme

Ratio	Definition
Stock market capitalization to GDP (%)	Value of listed shares to GDP.
Outstanding domestic private debt securities to GDP (%)	Total amount of domestic private debt securities (amounts outstanding) issued in domestic markets as a share of GDP. It covers data on long-term bonds and notes, commercial paper and other short-term notes.
Outstanding domestic public debt securities to GDP (%)	Total amount of domestic public debt securities (amounts outstanding) issued in domestic markets as a share of GDP. It covers long-term bonds and notes, treasury bills, commercial paper and other short-term notes.
Stock market total value traded to GDP (%)	Total value of all traded shares in a stock market exchange as a percentage of GDP.
Deposit money banks' assets to GDP (%)	Claims on domestic real nonfinancial sector by deposit money banks as a share of GDP.
Private credit by deposit money banks to GDP (%)	Private credit by deposit money banks and other financial institutions to GDP.
Bank deposits to GDP (%)	Demand, time and saving deposits in deposit money banks as a share of GDP.

(Source: World Development Indicators, World Bank)

APPENDIX H

Average Values of Financial Structure Indicators

Economically Developed Category			Economically Underdeveloped/Emerging Category		
S.No.	**Name of Country**	**Index**	**S.No.**	**Name of Country**	**Index**
1.	Australia	1.10	1.	Argentina	0.61
2.	Austria	0.30	2.	Bangladesh	0.12
3.	Belgium	0.66	3.	Brazil	0.77
4.	Canada	0.95	4.	Chile	0.73
5.	Czech Republic	0.41	5.	China	0.91
6.	Denmark	1.08	6.	Colombia	0.46
7.	Finland	1.33	7.	Egypt, Arab Rep.	0.31
8.	France	0.87	8.	Hungary	0.64
9.	Germany	0.60	9.	Indonesia	0.50
10.	Greece	0.61	10.	Kazakhstan	0.31
11.	Hong Kong, SAR	1.59	11.	Malaysia	1.04
12.	Ireland	0.46	12.	Mexico	0.77
13.	Israel	0.66	13.	Peru	0.82
14.	Italy	0.80	14.	Philippines	0.86
15.	Japan	0.64	15.	Poland	0.63
16.	Korea, Rep.	1.66	16.	Romania	0.17
17.	Netherlands	0.90	17.	Russian Federation	1.18
18.	New Zealand	0.31	18.	South Africa	1.62
19.	Norway	0.83	19.	Thailand	0.54
20.	Portugal	0.36	20.	Turkey	1.14
21.	Singapore	1.21	21.	Ukraine	0.20
22.	Spain	0.84	22.	Vietnam	0.34
23.	Sweden	1.71	**Sample Average**		**0.67**
24.	Switzerland	1.29			
25.	United Kingdom	1.04			
Sample Average		**0.89**			

APPENDIX I

Classification of Market Based and Bank Based Countries

S. No.	Name of the Country	S. No.	Name of the Country
Developed and Bank Based Countries			
1.	Austria	2.	Belgium
3.	Czech Republic	4.	France
5.	Germany	6.	Greece
7.	Ireland	8.	Israel
9.	Italy	10.	Japan
11.	New Zealand	12.	Norway
13.	Portugal	14.	Spain
Underdeveloped and Bank Based Countries			
1.	Argentina	2.	Bangladesh
3.	Colombia	4.	Egypt, Arab Rep.
5.	Hungary	6.	India*
7.	Indonesia	8.	Kazakhstan
9.	Pakistan*	10.	Poland
11.	Romania	12.	Thailand
13.	Ukraine	14.	Vietnam
Developed and Market Based Countries			
1.	Australia	2.	Canada
3.	Denmark	4.	Finland
5.	Hong Kong SAR, China	6.	Korea, Rep.
7.	Netherlands	8.	Singapore
9.	Sweden	10.	Switzerland
11.	United Kingdom	12.	United States*
Underdeveloped and Market Based Countries			
1.	Brazil	2.	Chile
3.	China	4.	Malaysia
5.	Mexico	6.	Peru
7.	Philippines	8.	Russian Federation
9.	South Africa	10.	Turkey

* excluded from classification scheme and followed traditional financial structure pattern.

(Source: Global Financial Development Database, and author's own calculations)

APPENDIX J

Effect of Crisis on Stocks Volatility: A Phase-Wise Analysis

Index	D1	D2	D3	Index	D1	D2	D3
Bank Based Economies				**Market Based Economies**			
ATX	0.0046 (0.0088)	0.0365 (0.0232)	0.0604** (0.0240)	AORD	0.0225** (0.0110)	0.0544** (0.0248)	0.0553** (0.0221)
Bel20	0.0018 (0.0091)	0.0234 (0.0161)	0.0438** (0.0207)	SPTSX	0.0208*** (0.0070)	0.0875*** (0.0204)	0.0579*** (0.0211)
CAC40	-0.0071 (0.0065)	0.0282** (0.0139)	0.0351** (0.0152)	HEX	0.0060 (0.0057)	0.0247* (0.0127)	0.0346** (0.0161)
DAX	-0.0104 (0.0072)	0.0437*** (0.0162)	0.0555*** (0.0176)	NASDAQ 100	0.0423*** (0.0106)	0.1389*** (0.0243)	0.1172*** (0.0276)
NIKKEI 225	0.0358*** (0.0129)	0.1345*** (0.0300)	0.1043*** (0.0270)	FTSE100	0.0183*** (0.0065)	0.0444*** (0.0170)	0.0423** (0.0190)
ISEQ	0.0173* (0.0102)	0.0457*** (0.0165)	0.0444** (0.0198)	KOSPI	0.0402*** (0.0127)	0.1763*** (0.0311)	0.1328*** (0.0276)
TA25	0.000004** (0.000002)	0.00006*** (0.00002)	0.00002** (0.00001)	STI	0.0347*** (0.0084)	0.0330** (0.0150)	0.0511*** (0.0164)
OSEAX	0.0076 (0.0118)	0.1126*** (0.0278)	0.0653* (0.0335)	OMX COPEN	0.0081 (0.0111)	0.0970*** (0.0206)	0.0520* (0.0305)
PX	0.0096 (0.0139)	0.1009*** (0.0279)	0.0928*** (0.0280)	HANG SANG	0.0348*** (0.0088)	0.0550*** (0.0188)	0.0494** (0.0217)
NZ50	0.0362*** (0.0128)	0.0968*** (0.0291)	0.0728*** (0.0244)	AEX	-0.0010 (0.0065)	0.0336** (0.0141)	0.0442** (0.0175)
PSI20	0.5773*** (0.0432)	1.3461*** (0.1023)	0.5216*** (0.1632)	SPI	0.0131 (0.0087)	0.0489*** (0.0164)	0.0471** (0.0192)
IBEX35	-0.0015 (0.0056)	0.0110 (0.0129)	0.0220 (0.0145)	OMX NORDIC4	0.0006 (0.0059)	0.0204 (0.0131)	0.0327* (0.0171)
ASE	-0.0069 (0.0071)	-0.0037 (0.0141)	0.0230* (0.0137)				
ITLMS	-0.0070 (0.0062)	0.0076 (0.0133)	0.0332** (0.0156)				
BURCAP	-0.0257 (0.0150)	0.1940*** (0.0389)	0.1235*** (0.0392)	IBOVESPA	0.0512*** (0.0138)	0.1817*** (0.0388)	0.1008*** (0.0299)
IGPC	0.0035 (0.0160)	0.1051*** (0.0364)	-0.0379 (0.0465)	CSI300	0.0170*** (0.0056)	0.0070 (0.0108)	0.0030 (0.0106)
EGX30	-0.0574*** (0.0130)	0.2730*** (0.0330)	0.1354*** (0.0351)	IGPA	0.0858*** (0.0310)	0.3904*** (0.0606)	0.1919*** (0.0491)
BSESENSEX	0.0511*** (0.0109)	0.0893*** (0.0272)	0.0869*** (0.0240)	XU100	0.0435*** (0.0151)	0.1391*** (0.0356)	0.0802** (0.0341)
JKSE	0.0511*** (0.0146)	0.2502*** (0.0295)	0.0589* (0.0342)	KLSE	-0.0135*** (0.0045)	0.0159 (0.0171)	-0.0141 (0.0187)
KSE100	0.0511*** (0.0102)	0.0375** (0.0187)	0.1530*** (0.0387)	IGBVL	0.0187 (0.0178)	0.1477*** (0.0325)	0.0742 (0.0482)

WARSAW MIG40	0.0089 (0.0098)	0.0412** (0.0186)	0.0436** (0.0197)	IPC	0.0079 (0.0076)	0.0469*** (0.0166)	0.0601*** (0.0197)
BET	0.0288* (0.0164)	0.1327*** (0.0354)	0.2491*** (0.0367)	FTSE JSE	0.0101 (0.0078)	0.0337 (0.0209)	0.0302* (0.0183)
SET	-0.0019 (0.0175)	0.1967*** (0.0373)	0.0627** (0.0319)	RTSI	-0.0065 (0.0066)	0.1040*** (0.0215)	0.1014*** (0.0212)
UX	0.0210*** (0.0077)	0.0151 (0.0186)	0.0730*** (0.0151)	PSEI	-1.7226*** (0.0983)	-0.1437 (0.1581)	-2.0148*** (0.2008)
CASPI	-0.0088 (0.0087)	0.0431** (0.0201)	-0.0227 (0.0303)				
BUX	-0.0203** (0.0097)	0.0778*** (0.0243)	0.0404 (0.0256)				
KASE	-0.0168*** (0.0048)	0.0268** (0.0116)	-0.0037 (0.0125)				
VN	-0.000004 (0.015664)	0.0057 (0.0395)	0.0415 (0.0278)				

*, **, *** indicates significance at 10%, 5% and 1% levels, respectively and the values in parenthesis shows standard errors.

APPENDIX K

Categorization of Non-Financial Firms on the Basis of Bank Financing (Pakistan)

S.No.	Symbol	Name	S.No.	Symbol	Name
Category A					
1.	AATM	Ali Asghar Textile Mills Limited	2.	ADMM	Artistic Denim Mills Limited
3.	APOT	Apollo Textile Mills Ltd.	4.	BWCL	Bestway Cement Limited
5.	CRTM	Crescent Textile Mills Limited	6.	DAWH	Dawood Hercules Corporation Limited
7.	DGKC	D.G. Khan Cement Company Limited	8.	ELSM	Ellcot Spinning Mills Limited
9.	FASM	Faisal Spinning Mills Limited	10.	FZCM	Fazal Cloth Mills Limited
11.	GATM	Gul Ahmed Textile Mills Limited	12.	GSPM	Gulshan Spinning Mills Limited
13.	INIL	International Industries Limited	14.	ISTM	Ishaq Textile Mills Limited
15.	KML	Kohinoor Mills Limited	16.	KTML	Kohinoor Textile Mills Limited
17.	MEHT	Mehmood Textile Mills Limited	18.	NCL	Nishat Chunian Limited
19.	NML	Nishat Mills Limited	20.	PRET	Premium Textile Mills Limited
21.	PRWM	Prosperity Weaving Mills Limited	22.	RCML	Reliance Cotton Spinning Mills Limited
23.	REWM	Reliance Weaving Mills Limited	24.	SFL	Sapphire Fibers Limited
25.	SAPT	Sapphire Textile Mills Limited	26.	STPL	Siddiqsons Tin Plate Limited
27.	SUTM	Sunrays Textile Mills Limited	28.	TATM	Tata Textile Mills Limited
29.	ZTL	Zephyr Textile Limited			
Category B					
1.	AHTM	Ahmed Hassan Textile Mills Limited	2.	AASM	Al-Abid Silk Mills Limited
3.	AWTX	Allawasaya Textile & Weaving Mills Limited	4.	ANSM	Ansari Sugar Mills Limited
5.	ASHT	Ashfaq Textile Mills Limited	6.	ASTM	Asim Textile Mills Limited
7.	BCML	Babri Cotton Mills Limited	8.	BAPL	Bawany Air Product Limited
9.	BERG	Berger Paints Pakistan Limited	10.	BHAT	Bhanero Textile Mills Limited
11.	BILF	Bilal Fibres Limited	12.	BTL	Blessed Textile Mills Limited
13.	BCL	Bolan Casting Limited	14.	CHAS	Chashma Sugar Mills Limited.
15.	CHCC	Cherat Cement Company Limited	16.	CPPL	Cherat Packaging/papersack Limited.
17.	CFL	Crescent Fibres Limited	18.	CSAP	Crescent Steel & Allied Products Limited
19.	DSML	Dar-es-Salaam Textile Mills Limited	20.	DFML	Dewan Farooque Motors Limited

21.	DFSM	Dewan Farooque Spinning Mills Limited	22.	DWSM	Dewan Sugar Mills Limited
23.	DWTM	Dewan Textile Mills Limited	24.	DINT	Din Textile Mills Limited
25.	ECOP	Ecopack Limited	26.	EMCO	Emco Industries Limited
27.	EXIDE	Exide Pakistan Limited	28.	FTHM	Fateh Textile Mills Limited
29.	FCCL	Fauji Cement Company Limited	30.	FZTM	Fazal Textile Mills Limited
31.	FML	Feroze 1888 Mills Limited	32.	GADT	Gadoon Textile Mills Limited
33.	GTYR	General Tyre and Rubber Co. of Pakistan Limited	34.	GFIL	Ghazi Fabrics International Limited
35.	GUSM	Gulistan Spinning Mills Limited	36.	GUTM	Gulistan Textile Mills Limited
37.	HUSI	Hussain Industries Limited	38.	IBFL	Ibrahim Fibre Limited
39.	ICCT	I.C.C. Textile Limited	40.	IDSM	Ideal Spinning Mills Limited
41.	IDRT	Idrees Textile Mills Limited	42.	IDYM	Indus Dyeing Manufacturing Company Limited
43.	ISIL	Ismail Industries Limited	44.	ICL	Ittehad Chemical Limited
45.	ILTM	Island Textile Mills Limited	46.	JDWS	J.D.W. Sugar Mills Limited
47.	JDMT	Janana-de-Malucho Textile Mills Limited	48.	JVDC	Javedan Corporation Limited
49.	KOHC	Kohat Cement Limited	50.	KOHTM	Kohat Textile Mills Limited
51.	KOSM	Kohinoor Spinning Mills Limited	52.	KOHS	Kohinoor Sugar Mills Limited
53.	LPCL	Lafarge Pakistan Cement Limited	54.	LPGL	Leiner Pak Gelatine Limited
55.	LUCK	Lucky Cement Limited	56.	MLCF	Maple Leaf Cement Factory Limited
57.	MQTM	Maqbool Textile Mills Limited	58.	MSOT	Masood Textile Mills Limited
59.	MZSM	Mirza Sugar Mills Limited	60.	MFFL	Mitchells Fruit Farms Limited
61.	MFTM	Mohummed Farooq Textile Mills Limited	62.	NAGC	Nagina Cotton Mills Limited
63.	NATF	National Foods Limited	64.	NONS	Noon Sugar Mills Limited
65.	OLSM	Olympia Spinning and Weaving Mills Limited	66.	PKGS	Packages Limited
67.	PAEL	Pak Elektron Limited	68.	PAKL	Pak Leather Crafts Limited
69.	PCAL	Pakistan Cables Limited	70.	PGCL	Pakistan Gum and Chemicals Limited
71.	PNGRS	Pangrio Sugar Mills Limited	72.	PASM	Paramount Spinning Mills Limited
73.	POWER/ AACIL	Power Cement Limited/ A l-Abbas Cement Industries	74.	QUAT	Quality Textile Mills Limited
75.	QUET	Quetta Textile Mills Limited	76.	REST	Resham Textile Industries Limited
77.	RUBY	Ruby Textile Mills Limited	78.	SAIF	Saif Textile Mills Limited
79.	SKRS	Sakrand Sugar Mills Limited	80.	SALT	Salfi Textile Mills Limited

81.	SNAI	Sana Industries Limited	82.	SRSM	Sargodha Spinning Mills Limited
83.	STCL	Shabbir Tiles and Ceramics Limited	84.	SHDT	Shadab Textile Mills Limited
85.	SHCM	Shadman Cotton Mills Limited	86.	SRVI	Service Industries Limited
87.	SHCI	Shaffi Chemical Industries Limited	88.	SHSML	Shahmurad Sugar Mills Limited
89.	STJT	Shahtaj Textile Mills Limited	90.	SZTM	Shahzad Textile Mills Limited
91.	SGML	Shakerganj Mills Limited	92.	STML	Shams Textile Mills Limited
93.	SIEM	Siemens Pakistan Engineering Co. Limited	94.	SING	Singer Pakistan Limited
95.	SUHJ	Suhail Jute Mills Limited	96.	SURC	Suraj Cotton Mills Limited
97.	THAS	Taha Spinning Mills Limited	98.	TSML	Tandlianwala Sugar Mills Limited
99.	TOWL	Towellers Limited	100.	TREET	Treet Corporation Limited
101.	TRIPF	Tri-Pack Films Limited			
Category C					
1.	AABS	Al-Abbas Sugar Mills Limited	2.	AKGL	Al-Khair Gadoon Ltd.
3.	ALNRS	Al-Noor Sugar Mills Limited	4.	ALQT	Al-Qadir Textile Mills Limited
5.	ATBA	Atlas Battery Limited	6.	ACPL	Attock Cement (Pakistan) Limited
7.	BAFS	Baba Farid Sugar Mills Limited	8.	BGL	Baluchistan Glass Limited
9.	BNWM	BannuWoollen Mills Limited	10.	CEPB	Century Paper and Board Mills Limited
11.	CWSM	Chakwal Spinning Mills Limited	12.	CJPL	Crescent Jute Products Limited
13.	DBCI	Dadabhoy Cement Industries Limited	14.	DADX	Dadex Eternit Limited
15.	DNCC	Dandot Cement Company Limited	16.	DKTM	Dewan Khalid Textile Mills Limited
17.	DMTM	Dewan Mushtaq Textile Mills Limited	18.	DSFL	Dewan Salman Fibre Limited
19.	ENGRO	Engro Corporation Limited	20.	FSWL	Fateh Sports Wear Limited
21.	DYNO	Dynea Pakistan Limited	22.	FFBL	Fauji Fertilizer Bin Qasim Limited
23.	FFC	Fauji Fertilizer Company Limited	24.	FECTC	Fecto Cement Limited
25.	FRCL	Frontier Ceramics Limited	26.	GATI	Gatron Industries Limited
27.	GHNL	Ghandara Nissan Limited	28.	GHGL	Ghani Glass Mills Limited
29.	GWLC	Gharibwal Cement Limited	30.	HAL	Habib-ADM Limited
31.	HMIM	Haji Mohammed Ismail Mills Limited	32.	HWQS	HaseebWaqas Sugar Mills Limited
33.	HINOON	Highnoon Laboratories Limited	34.	HUSS	Hussain Sugar Mills Limited

35.	JUBS	Jubilee Spinning and Weaving Mills Limited	36.	KCL	Karam Ceramics Limited
37.	KSTM	Khalid Siraj Textile Mills Limited	38.	LEUL	Leather Up Industries Limited
39.	MACFL	Macpac Films Limited	40.	MRNS	Mehran Sugar Mills Limited
41.	MERIT	Merit Packaging Limited	42.	MIRKS	Mirpurkhas Sugar Mills Limited
43.	NESTLE	Nestle Pakistan Limited	44.	NICL	Nimir Industrial Chemicals Limited
45.	NOPK	Noon Pakistan Limited	46.	NPSM	N.P. Spinning Mills Limited
47.	OSTU	Otsuka Pakistan Ltd.	48.	PSYL	Pakistan Synthetics Limited
49.	PIOC	Pioneer Cement Limited	50.	QUICE	Quice Food Limited
51.	RAVT	Ravi Textile Mills Limited	52.	SFAT	Safa Textiles Limited
53.	SJTM	Sajjad Textile Mills Limited	54.	SANE	Salman Noman Enterpries Limited
55.	SAPL	Sanofi-Aventis Pakistan Limited	56.	SSML	Saritow Spinning Mills Limited
57.	SEARL	Searle Company Limited	58.	SHEL	Shell Pakistan Limited
59.	SCL	Shield Corporation Limited	60.	SITC	Sitara Chemical Industries Limited
61.	TGL	Tariq Glass Industries Limited	62.	THALL	Thal Limited
63.	WAHN	Wah Noble Chemicals Limited	64.	YOUW	Yousuf Weaving Mills Limited
Category D					
1.	ABOT	Abbot Laboratories (Pakistan) Limited	2.	ADOS	Ados Pakistan Limited
3.	AGIL	Agriautos Industries Limited	4.	AGTL	Al-Ghazi Tractors Limited
5.	ATLH	Atlas Honda Limited	6.	APL	Attock Petroleum Limited
7.	ATRL	Attock Refinery Limited	8.	BWHL	Baluchistan Wheels Limited
9.	BATA	Bata Pakistan Limited	10.	BIFO	Biafo Industries Limited
11.	BROT	Brothers Textile Mills Limited	12.	BUXL	Buxly Paints Limited
13.	BYCO	Byco Petroleum Pakistan Limited	14.	CECL	Climax Engineering Company Limited
15.	CLOV	Clover Pakistan Limited	16.	COLG	Colgate Palmolive (Pakistan) Limited
17.	DBSL	Dadabhoy Sack Limited	18.	DLL	Dawood Lawrancepur Limited
19.	DWAE	Dewan Automotive Engineering Limited	20.	DCL	Dewan Cement Limited
21.	DIIL	Diamond Industries Limited	22.	FRSM	Faran Sugar Mills Limited
23.	FEROZ	Ferozsons Laboratories Limited	24.	GAMON	Gammon Pakistan Ltd.
25.	GHNI	Ghandhara Industries Limited	26.	GAIL	Ghani Automobile Industries Limited
27.	GLPL	Gillette Pakistan Limited	28.	GLAXO	GlaxoSmithKline (Pakistan) Limited
29.	GRAYS	Grays Of Cambridge (Pakistan) Limited	30.	HABSM	Habib Sugar Mills Limited

31.	HINO	HinoPak Motors Limited	32.	HCAR	Honda Atlas Cars (Pakistan) Limited
33.	HSPI	Huffaz Seamless Pipe Industries Limited	34.	ICI	I.C.I. Pakistan Limited
35.	INDU	Indus Motor Company Limited	36.	JATM	J.A. Textile Mills Limited
37.	JOPP	Johnson and Phillips (Pakistan) Limited	38.	KHTC	Khyber Tobacco Company Limited
39.	KPUS	Khairpur Sugar Mills Limited	40.	KSBP	K.S.B. Pumps Co. Limited
41.	LMSM	Land Mark Spinning Industries Limited	42.	MARI	Mari Petroleum Company Limited
43.	MTL	Millat Tractors Limited	44.	MUREB	Murree Brewery Company Limited
45.	NRL	National Refinery Limited	46.	OGDC	Oil and Gas Development Company Limited
47.	OLTM	Olympia Textile Mills Limited	48.	PSMC	Pak Suzuki Motor Company Limited
49.	PECO	Pakistan Engineering Company Limited	50.	POL	Pakistan Oilfields Limited
51.	PPL	Pakistan Petroleum Limited	52.	PPVC	Pakistan PVC Limited
53.	PPP	Pakistan Paper Products Ltd.	54.	PRL	Pakistan Refinery Limited
55.	PSO	Pakistan State Oil Company Limited	56.	PAKT	Pakistan Tobacco Company Limited
57.	PMRS	Premier Sugar Mills and Distillery Company Limited	58.	POML	Punjab Oil Mills Limited
59.	RMPL	Rafhan Maize Products Limited	60.	RUPL	Rupali Polyester Limited
61.	SANSM	Sanghar Sugar Mills Limited	62.	SAZEW	Sazgar Engineering Works Limited
63.	SEPL	Security Paper Limited	64.	SHJS	Shahtaj Sugar Mills Limited
65.	SHEZ	Shezan International Limited	66.	UDPL	United Distributors Pakistan Limited
67.	UPFL	Unilever Pakistan Foods Limited	68.	WYETH	Wyeth Pakistan Limited
69.	ZIL	ZIL Limited			

(Source: Pakistan Stock Exchange Ltd. Formerly Karachi Stock Exchange Ltd., Annual Reports, and Author's own calculations)