

**An Analysis of Financial Market Integration in Case of
Pakistan**



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19/M.Phil/EAF/PIDE/2014

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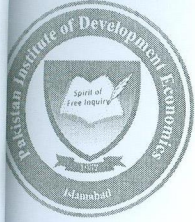
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2018



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CERTIFICATE

This is to certify that this thesis entitled “An Analysis of Financial Market Integration in Case of Pakistan” submitted by **Mr. Khurram Bashir** is accepted in its present form by the Department of Economics and Finance, Pakistan Institute of Development Economics (PIDE) Islamabad as satisfying the requirements for partial fulfillment of the Degree of Master of Philosophy in Economics and Finance.

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Declaration

I proclaim that this dissertation is exclusively my own endeavor, and has never been published or presented in any form elsewhere.

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Dedication

I dedicate this thesis to our beloved Prophet Muhammad (PBUH). The Noblest person the world has ever seen. And to my affectionate parents, who taught me the first word to speak, the first step to take and to one of the best teacher I have ever met Dr. Attiya Yasmin Javaid. Also to my beloved brothers and sisters; particularly my dearest brother, Mazhar, who stands by me when things look bleak. My friends who encourage and support me, and to all the people in my life who touch my heart, I dedicate this research.

ACKNOWLEDGMENT

All credit goes to ALLAH, the most Merciful and the most Gracious, who guide me in dizziness and help me in impenetrability. All compliments are for His Holy Prophet, Hazrat Muhammad (PBUH) who enables me to identify my creator.

From the formative stage of this thesis, to the final draft, I owe an immense debt of gratitude to my supervisor, Dr. Attiya Yasmeen Javaid. I am forever indebted to her for unwavering support, encouragements and patience through this process. I can never pay you back for all the help you have provided me and the precious time you spent making sure my thesis is always on track. Thank you so much!

I also would like to express my wholehearted thanks to my parents and to all my family members, particularly my brothers Mazhar Hussain and Azhar, my sisters Musarat and Shagufta for their generous support they provided me throughout my entire life. Because of their unconditional love and prayers, I have the chance to complete this thesis.

Loving thanks to my friends, Atiq, Shakeel, Ibrar, and Zeeshan, who played such important roles along the journey.

To each of the above, I extend my deepest appreciation.

Khurram Bashir

ABSTRACT

This study examines the issue of financial markets integration of three Asian financial markets China, India and Pakistan with the international markets using London Interbank Offer Rate -LIBOR as reference and with Asia regional market Singapore Interbank Offer Rate-SIBOR as reference from 1992-2016. Financial markets all over the world have witnessed growing integration within as well as across boundaries, spurred by deregulation, globalization and advances in information technology. Capital has become more mobile across national boundaries as nations are increasingly relying on savings of other nations to supplement the domestic savings. This study examines the integration of financial markets by using monthly data on call money rates, 6-month Treasury bill rates, domestic currency/US dollar exchange rate and stock market return of Bombay Stock market (India), Karachi stock market (Pakistan) and Shanghai Stock market (China) with London interbank offered rate (LIBOR) as international and Singapore interbank offered rate (SIBOR) as regional bench mark for borrowers and lenders. Co-integration technique is used to determine long run relationship with the international returns. The results indicated that in case of China there is one cointegrating vector from exchange rate to SIBOR. However, in case of India and Pakistan short term money market is still in the development stage and Exchange rate has no long run relationship with the LIBOR and SIBOR.

The results of vector error correction model show the presence of positive long run relationship between call money rate and LIBOR, and T-bill rate and LIBOR in Chinese financial market. Granger Causality results indicate LIBOR causes KSE 100 index and SIBOR causes exchange rate, however, T-bill and call money rate have no causal link with LIBOR or SIBOR.

Key Words: Financial Market Integration, Co-Integration, call money rate, Treasury bill rate, London interbank Offer /rate, Singapore Interbank Offer Rate.

CHAPTER 1

INTRODUCTION

1.1 Background:

The global financial integration started in the mid-1980s, consequently, risk and return co-movements between the financial markets were observed at that time. The upward trend in economic integration of intercontinental financial markets has become significance since last three decades. The major factors behind this observed globalization are extensive growth of technology, easy capital flow and financial links between the economies. That is why the analysis of the nature and level of linkages between different financial markets is significant for financial institutes, portfolio managers and market players (Ghous & Khan, 2017).

Integration of the financial market is a key issue in the international economy, and the reimbursements of economic growth through risk sharing, asset allocation enhancements and bargains in macroeconomic volatility and transaction costs are all well-accepted (Prasad et al., 2003; Baele et al., 2004).

According to Cournot (1838) and Marshall (1930), integration of financial market principle is based on the law of one price. This definition means that two comparable securities with the same risk must have same return if they are issued within a country or outside a country. The literature provides different alternative definitions of financial integration. However, Baele et al. (2004) assume that the market for a given set of financial instruments and / or services is fully integrated if all potential market participants have the same relevant characteristics: (1) face a single set of rules, when they decide to deal with those financial instruments or services, (2) have equivalent

access to the same set of financial instruments or services, and (3) are treated correspondingly when they are active in market.

This definition of financial market integration encompasses three key features. Firstly, it is independent of financial structures in the regions. Financial structures include all financial intermediaries – markets or institutions - and in what way they relate to each other in terms of cash flow to and from households, companies and governments. Secondly, frictions in the intermediation process, viz access to or investment of capital either through or markets institutions can persist when financial integration is complete. Financial integration is concerned with the symmetrical or asymmetric effects of existing frictions in different areas. Even in presence of friction, numerous areas can be integrated financially as long as frictions affect these areas symmetrically. On the other hand, if frictions have asymmetric effects on the areas, the progression of economic integration cannot reach to the accomplishment point.

Thirdly, the definition of financial integration split up the two components of a financial market, namely supply and demand for investment opportunities. Full integration necessitates the same access to the banks or trading, clearing and settlement platforms for the both investors (demand for investment opportunities) and the firms (delivery of investment opportunities, such as listings), regardless of their region of the origin. In addition to this, when access is given, full integration requires that there is no discrimination among comparable market participants based merely on the origin. When a structure thoroughly discriminates in contrast to foreign investment opportunities due to national legal restrictions, the area is not integrated financially. An area may also be partly financially integrated. Furthermore, in simple words, financial market integration is the procedure of reconciling diverse segments of the market and

approving for convergence of risk-adjusted return on assets with a corresponding maturity across markets.

According to the Reserve Bank of India (RBI), financial market integration can be categorized into three general categories, viz nationally, regionally and globally (Reddy, 2002) and (BIS, 2005-06). From an alternative perspective, financial market integration could take place horizontally and vertically. In the horizontal integration, interrelationships exist between domestic financial market segments, while vertical integration occurs between domestic markets and international / regional financial markets. Domestic financial market integration leads to horizontal relationships between different segments, reflecting portfolio diversification of savers, investors and intermediaries. Under horizontal integration, market rates typically turn around a basic reference rate, which is defined as the price of a short-term, low-risk financial instrument in a liquid and competitive market. It usually provides the basic liquidity of the formal financial system, and central banks often use it to measure the rigidity of monetary policy. Domestic markets can be closely integrated because intermediaries function simultaneously in different market segments. For example, commercial banks operate both in the savings and loan markets.

Global integration denotes to the opening of domestic markets and institutions to free cross-border movements of capital and financial services by removing obstacles such as withholding taxes and capital controls. A deeper aspect of worldwide integration involves removing barriers to the movement of people, market participants and technology across the border (BIS, 2006 cited in Report on Currency and Finance. Global integration is encouraged through the harmonization of national standards and laws, either by the adoption of jointly agreed minimum standards or mutual recognition of standards (Reddy, 2005 quoted in Report on currency and finance). Similarly,

regional financial integration ensues due to ties between a particular region and the large financial center serving the region. Economic integration may be easier at regional level because of network externalities and marketers tend to concentrate in some geographic centers. Gravity models, taking into account the economic size and the distance between two nations, elucidate bilateral trade and investment movements. Furthermore, regional financial integration proved to be an important means of developing local financial markets, for example through peer pressure to build up institutions and upgrading local practices (BIS, 2006 quoted in Report on currency and finance).

The empirical results of paper written by Qayyum and Kamal (2006) proposes that volatility spillover takes place from the stock market to the foreign exchange market, but not vice versa. Pakistan's recent trend of financial sector reforms and globalization in developing markets have perceived interlink in numerous sectors of national financial markets.

For instance, the presence of strong linkage: between the stock prices and exchange rates is a popular topic of professional research. Similarly, the variations in stock prices and exchange rates are likely to affect interest rate changes. There are a number of hypotheses recommend such a causal connection. For illustration, using a goods market approach, any currency changes affecting the competitiveness of multinational companies and thus affecting the stock prices [Dornbusch and Fischer (1980)]. Similarly, the hypothesis of 'exchange rate pass-through and 'interest rate pass-through' recommends that variations in exchange rates and / or in interest rates may affect stock prices. The portfolio balance model proposes that variations in stock prices affect exchange rate fluctuations.

1.2. Measuring Financial Integration:

Degree of financial market integration can be measured in different ways e.g., real interest parity (RIP), purchasing power parity (PPP), covered interest parity (CIP), uncovered interest parity (UIP) and savings and investment correlation techniques. Purchasing power parity is based on a comparison of the returns on identical goods whereas the covered interest parity and uncovered interest parity conditions are used for the comparison of returns on perfectly substitutable financial assets across countries (Jain and Bhanumurthy, 2005) Financial integration is measured in various ways in the academic and policy literature. Fung et al. (2008) suggest two broad measurement categories: price-based measures, and quantity-based measures. Price-based measures examine price differentials — or correlations — across markets. Many studies relate financial integration to the ‘law of one price’, which hypothesis that assets of similar risk and return profiles should be identically priced. Discrepancies in prices or returns on identical (or comparable) assets would tend to be used as evidence that financial markets are not integrated. Price-based analytical approaches are commonly applied to markets for tradable securities, such as foreign exchange, equities and bonds, where daily price movements allow for robust analysis. Quantity based measures are typically simple ratios intended to capture the extent of cross-border activities, like the ratio of total stocks of aggregate foreign assets and liabilities to GDP or the ratio of capital flows to GDP. Quantity based measures are useful for non-tradeable financial flows (and those with a low frequency of data collection), such as cross border investment, lending and payments. In addition to price and quantity based measures, Park (2013) and others set out the case for the *de jure* approach that measures financial openness by quantifying legal and regulatory restrictions on cross-border trade or capital flows. *De facto* measures, on the other hand, assess actual cross-border trade or capital flows.

1.3. The Case for Asian Financial Integration:

The case for Asia's financial development and integration is clear-cut, yet the rationale for regional, rather than global, financial integration requires careful nuance. In theory, global financial integrations preferable. If, say, Japanese investors seek more profitable opportunities overseas, they would do better to weigh up the merits of American, European, and even African assets, rather than focus on Asian ones alone. Likewise, if firms from the PRC are to seek funds from foreign investors, they would stand to gain most by tapping global markets, rather than limiting themselves to regional ones. In other words, there are potentially more opportunities for diversification and thus higher risk-adjusted returns from investing globally. Global financial markets trend to be deeper, more liquid, and more diversified. In most of the world, though, practice does not conform to this (perhaps too) simple theory. A strong own-country and own-region effect in investment is often observed. While some of the regional bias to financial integration is doubtless due to inefficient regulations and harmful protectionism, geographic proximity may also have important advantages. Investors may have better information about opportunities in their own region, or may simply feel more comfortable investing within it. Intermediation may be cheaper and easier in a regional financial center. Time zones still matter, as do personal contacts, while regional intermediaries may generate research that helps match local investors to local companies. Yet the regional effect is surprisingly weak in Asia. Whereas European investors favor investing in Europe, Asian ones often prefer to invest outside the region. Perhaps Asian investors, scarred by the crisis, are particularly wary of regional risks and therefore keen to diversify outside Asia. Perhaps they have more information about opportunities in transparent global markets than in opaque Asian ones. This may have become a vicious circle because Asian investors tend to

invest outside the region, Asia may have less incentive to invest in improving the information, legal, and technical infrastructure of its capital markets than otherwise. That is damaging in itself. But it also prevents Asia from reaping the broader benefits of deeper and more liquid regional markets. These could stimulate improvements in market information, oversight, and corporate governance. They could also eventually generate more sophisticated investment vehicles—such as venture capital funds—that would expand the range of financing options for fledgling companies, for instance, as well as for infrastructure projects. In large part, though, the lack of regional integration can be traced back to deeper causes, such as the underdevelopment and weaknesses of national financial systems, and the patchiness of market opening and capital market liberalization across Asian economies. Given that most national bond markets remain fragmented and lack liquidity, it is perhaps not surprising that an integrated Asian market in government and corporate bonds has yet to develop. The consolidation of equity markets remains a proposal.⁴⁰ Asia is home to highly sophisticated global financial centers: notably two—Hong Kong, China and Singapore which by some measures are ranked third and fourth in the world respectively.

However, Asian economies remain hobbled by bank-dominated financial intermediation, underdeveloped capital markets, and the legacy of financial repression. Clearly, financial-market development is a national, as well as a regional, priority. Regional financial institutions may help national authorities develop and reform their financial sectors and thus permit greater financial integration. Priorities include improving access to financial markets, boosting competition, and abolishing inefficient regulations. Carefully sequenced capital account liberalization is also vital. National capital markets need to be developed and connected to improve liquidity. Such measures may be easier and more rewarding regionally rather than nationally.

Regional institutions could also foster dialogue, information sharing, and peer pressure that promote financial development and integration, as well as best practices in financial regulation and supervision. They might also seek to upgrade and harmonize regulations and market practices and develop mutually recognized regional standards. Examples include providing technical support in implementing the Basel II international banking regulations, fostering domestic credit bureaus and rating agencies, sponsoring further training for supervisors and regulators, and encouraging the development of academic expertise in finance in the region. This would also facilitate financial integration, not least in securities markets, and could stimulate demand for regionally-oriented financial services and products.

In economic terms, integration implies price convergence. Fully integrated financial markets imply that traders can perform transactions freely anywhere within an area. In a financially integrated region, therefore, prices for similar financial assets—i.e., those with similar expected risk-adjusted returns—should converge. Arbitrage will tend to erode price differentials that may have arisen due to market power, different regulations, and imperfect flows of information. Financial integration therefore implies greater co-movement of prices in the region and is typically accompanied by an increase in the share of financial assets traded within the region and that held by regional participants. Greater regional integration also affects macroeconomic variables. In a financially integrated region, an economy's investment and savings can increasingly diverge, as it is free to borrow and lend with other economies in the region. Fluctuations in national consumption may thus become less dependent on changes in national output—the consumption-smoothing effect. National and regional consumption may also become increasingly correlated.

1.4 Obstacles to Asian Financial Integration:

Asia's legacy of underdeveloped national financial markets and institutions is perhaps the biggest impediment to greater regional financial integration and intermediation. While some economies have more developed financial sectors than others, and all have made huge progress over the past decade, the traditional dependence on bank financing and the legacy of financial repression have stunted the growth of equity and bond markets in many economies. Likewise, while regulatory frameworks vary across the region and are generally much improved, many countries suffer from an inadequate legal framework, weak regulation, low accounting and auditing standards, poor transparency, weak corporate governance, and weak investor protection (Lee 2008). Considerable barriers to financial flows still exist in many Asian economies. Inadequate deregulation and the limited openness of national financial markets impede their development. It hinders the issuance of local currency bonds, limits investment in foreign bonds by domestic investors, and prevents foreign borrowers from issuing bonds denominated in different currencies in Asian markets. Restrictions on capital account transactions and barriers to the entry of foreign financial institutions also impede financial integration. Chinn and Ito (2007) calculated the openness to capital of various East Asian economies using principal component analysis of four variables—capital controls, multiple exchange rates, current account controls, and export proceed give-backs—before and after the crisis. They found little progress in opening up to international capital flows, at least until 2005. Where it has occurred—notably in Singapore and Hong Kong, China capital account liberalization has stimulated greater cross the border, and financial flows, and financial-integration. But even when capital account opening is slow and patchy, allowing in foreign financial institutions boosts competition as well as financial development and integration.

Foreign ownership of banks has increased since the 1990s; commercial banking has received the largest share of foreign investment (Parreñas 2007). In two important capital market services—primary market underwriting and secondary market operations—European and American banks have established a near-monopoly position, which is not necessarily desirable (Park and Bae 2002). Chelleg-Steeley and Steeley (1999) likewise posit that the abolition of exchange controls would promote the integration of regional equity markets, as it has in Europe. To sum up, while there is little evidence of increasing regional financial integration, cross-border bank claims have increased, money market rate differentials are converging, and stock market indices are increasingly moving together (Kawai 2008b, Kim and Lee 2008).

As Asian economies continue to grow and their financial markets become more integrated, it makes crystal clear that the Asia's financial centers can play an increasingly important role as both regional and international financial markets.

1.5 Objectives of the Study

The main focus of the study is

- To examine the integration of three Asian financial markets (China, India and Pakistan) with the international markets (using London Inter-bank Offer Rate - LIBOR) and with Asian regional market (Singapore Inter-bank Offer Rate- SIBOR as reference).
- To examine whether there exists long run relationship between call money rates, 6-month Treasury bill rates and domestic currency/US dollar exchange rate in these markets.

- To examine the short run dynamics and error adjustments by using vector error correction model
- To examine the causal relationship between the domestic and international financial variables
- To trace a response of financial variables due to a shock or innovation in each of the international and Asian regional benchmark interest rate by using impulse response functions.

1.6 Significance of the Study

As per the available literature, the related studies describing the financial integration of Asia with the rest of the World are not up to the mark and the relationship is not very much clear as looking to the globalization and IT revolution around the World Asian markets can't remain separate from the rest of the World. The present study, which is a pioneer in its nature, will fill the research gap existing in the field of Financial Market Integration of selected Asian markets; India, Pakistan and China. It will provide to the readers, an understanding of the factors playing their role in the financial integration of Asian markets regionally and internationally. These countries are selected on the basis of their share in financial linkages and availability of data. This study provides detailed overview that whether financial integration exists in Asian context or not between the periods of 1992 to 2016. Moreover this analysis will be helpful for investors, policy makers and regulators to take policy measures that will boost the economic and monetary planning for India, Pakistan and China.

1.7 Organization of the Study

The plan of the study is as follows. The literature review is presented in chapter 2. The methodology and data is discussed in chapter 3. Chapter 4 presents empirical results and last chapter concludes the study.

CHAPTER 2

LITERATURE REVIEW

There is huge body of empirical literature examines integration of financial market and commodity market for the developed markets. For developing markets this matter is less investigated. This section reviews the related literature in this area.

The integration of financial market and the commodity market has improved during 1990 drawing the attention of economist and the policy makers towards this phenomenon, due to globalization and the technological advancement. In last few decades factor contributing in the worldwide financial market integration is the decline of restrictions on the movement of capital across the borders. It originates from policy decision to liberalize financial markets. Furthermore, this factor also plays a key role in integrating the financial markets within European Union. Developments in the field of technology and institutional structure that facilitates investors in one country to maneuver the financial markets of the another country.

By asymmetric GJR-GARCH model, Cakan, Doytch, and Upadhyaya (2015) examine the influences of US macroeconomic announcement surprises (about inflation and unemployment) on the volatility of the some developing stock markets. They conclude that volatility shocks are: persistent and asymmetric. Their findings suggest that asymmetric volatility surges with bad news and declines with good news. To bring intuitions to how subprime crisis might had affected the MENA region, Neaime (2012) has pursued to identify not only worldwide and regional financial associations between the MENA stock markets and more advanced ones, but also intra-regional financial connections among the MENA countries' financial markets. Based on VAR and GARCH model, the author concluded that there are vital aspects of financial contagion

in MENA stock markets, and that the Saudi market is the utmost central market among oil producing MENA markets. In addition to this, Guyot, Lagoarde-Segot, and Neaime (2014) studies, whether the foreign financial shocks can dislocate cost of equity in the MENA markets using PVAR methodology. This study ripens annual metrics for the international cost of equity, the financial integration, spillovers and the shift-contagion vulnerability in sample of 535 Middle East and the North African firms. Results of study indicate that external shocks can surge the cost of equity in emerging markets.

Khan (2013) in his Philosophy of doctor thesis had studied the long run relationship among: four emerging markets, using multivariate co-integration tests, Vector error correction model (VECM), Engle Granger causality test, Impulse Response Function analysis and the Variance Decomposition analysis. Results indicate that there are short and long run associations among the four emerging economies. Khan (2013) in his thesis has identified further area of research in the field of the Financial Markets Integration; an analysis: cross-country integration with respect to economic information. Hence, future research could perceive whether any integration among markets is due to the associations among economic fundamentals in diverse markets.

Undoubtedly, India and Pakistan are the rival nations in the South East Asia. However, these two nations have great potential for trade but barriers in trade affecting not only both countries, but also impeding regional development. In addition to this, Aisha and H. Fehmida (2012) have studied: the interrelationship of KSE 100 index with the major south Asian exchanges. They have applied Engel Granger approach for the co integration analysis. Their study results indicate KSE 100 index is co integrated with BSE (30 Index). However, there is no co integration between the KSE 100 index and KOSPI. Similarly, there is no co integration between the KSE 100 index and FTSE.

Abbas, Khan and Shah (2013) have pointed out that as for as matter regarding: portfolio

risk reduction is concerned, International portfolio diversification has unique facet which may be seen as the returns of securities that have less correlation with the other foreign countries as compare to within an indigenous country and these are owing to several factors, viz institutional, economic, financial, psychological and even political. Because of all these factors, affect security returns are inclined to move an immense deal across countries with low correlation between the international securities. In 2012, Thao & Daly commemorated in paper that had studied the long-run relationship among the six equity markets in Southeast Asian region, viz Thailand, Malaysia, Philippines, Singapore, Indonesia and Vietnam using the daily market indices composed over the period of 2006-2010. Three testing methods were used in the paper include; multivariate co-integration test based on vector autoregressive (VAR) model bi-variate co-integration test based on residuals and co-integration tests with the presence of structural breaks.

Similarly, integration of financial markets may affect macroeconomic volatility. This issue is studied by Alan Sutherland (1996) and in his study he found that with the exception of monetary shocks, increasing financial market integration leans towards to decrease the short run volatility. However, in case of monetary shocks the financial integration: tends to upsurge the short run volatility of the nominal exchange rate and the output.

Hoffmann and Tillmann (2008) have investigated the effect of international financial integration on the national price level under the role of the exchange rate volatility. They found that under accomplished exchange rate financial integration leads to raise the national price level, whereas under the floating exchange rate the financial integration leads to lowers national price level. Furthermore, a regime dependent influence of financial integration was also found.

It is pivotal to determine; whether there has been a genuine escalation in monetary market integration. It has to be accepted in mind that the similar technological innovations that have paved the way for the cross border financial trades have also improved the worldwide transmission of information in real time. Consequently, it might be the case that central driving force lasts the apparent upsurge in the financial market associations: is the globalization of news that distresses financial prices as a substitute of higher degree market integration. The assessment of hypothetical upturn in financial market associations is worth noting will depend on the causes of the surge. Ayuso and Blanco (1999) have studied the stock market returns for the Germany, the United States and Spain in nineties and they have founded: there has been a rise in degree of the financial integration among the markets measured. It depicts higher financial market competence and an enhancement in the risk and return amalgamations accessible to investors.

Integration in the financial market is associated with economies where domestic investors are capable to invest in the foreign assets and the foreign investors in domestic assets. Liberalization of capital markets is a complex and gradual process; it is unlikely that capital market reforms will be informative of the true date of market integration. Bekaert, Harvey and Lumsdaine (1998) have studied the integration of world stock markets by estimating market liberalization dates for twenty nations with ninety percent confidence intervals and have founded that stock markets on average are bigger and more fluid than before and the returns are more volatile and strongly Correlated with world market returns. Lane and Milesi Ferretti (2003) study the dynamics of international financial integration: using the data on the level and the composition of foreign assets and also liabilities for a number of industrialized countries. The paper identified an increase in retail trade and stock market value as two important co-

variables of development in the scale of international balances. The usual modeling postulate of a common "global interest rate" on international investments are not supported by data, which indicates that the returns vary over time and the across asset classes. Chang (1997) have studied an economy where economic integration surges world welfare in the face of international policy coordination, but reduces world welfare in its absence. The policy statement in the paper is that financial integration can succeed if and only if the government decides to coordinate their macroeconomic policies. Kim, Wu and Moshirian, (2004) have studied the impact of European Monetary Union (EMU) on dynamic process of the stock market integration over period 2 January 1989–29 May 2003: by using a bivariate EGARCH framework with time varying conditional correlation. There was a clear regime shift in European stock market integration with the introduction of the EMU was founded. Furthermore, linear systems regression analysis depicts that an increase in both the regional and the global stock market integration over this period was considerably driven in part by macroeconomic merging allied with introduction of EMU and the financial development levels.

Feng and Gena (2003) conducted a comparative analysis of regional integration in America, Pacific Asia and in Western Europe (1975 to 1995) using a granger causality test that confirms that the establishment of an economic union entails the homogeneity of domestic economic institutions and process of regional Integration enhances each other.

Kleimier and Slander (2002) uses co-integration methodology to study integration in European financial market during the emergence of a single banking market for euro area banks, found a limited evidence of integration before 1 January 1999. The euro introduction manifests itself in structural breakdowns after which evidence of an Emerging unified euro zone banking market is growing. It has also been concluded that

the investigation of interest goes through the single currency having the potential to "complete" single market, but not so much in terms of cross border arbitration, but using a consistent and uniform pass through process in the presence of a sole monetary policy. One of the main features of global financial integration over the past decade has been the vivid increase in net private capital movements from developed nations to developing nations. The biggest flow has been in terms of FDI and portfolio movements. Although, these capital flows have been linked to high growth rates in some developing nations, a number of nations have practiced periodic breakdowns in growth rates and significant financial crises in the same period, crises that have demanded a serious toll in the form of macroeconomic and social expenses. As a result, there has been an intense debate in both academic and political circles about the impact of financial integration for emerging economies. Prasad, Wei Rogoff, and Kose (2003) have examined the effects of financial worldwide integration on developing countries by reviewing the accessible empirical evidence and the country experiences. In the paper it is concluded that it is challenging to find robust evidence in the support of proposition that the financial integration supports developing countries in improving growth and reduction in macroeconomic volatility. Furthermore, it is also concluded that in absence of robust evidence on these magnitudes does not essentially mean that financial globalization has no remunerations and carries only great risks. Undeniably, despite temporary setbacks most nations that have introduced financial integration have continued along this path.

Stulz (2005) has discussed in his paper that despite reducing obstacles to international investment over past 50 years, the influence of financial globalization has been limited countries are still matter of great deal. Furthermore, he acknowledged that the finance is analytically exaggerated by twin agency problems: Firstly, those who control a

company can use their power to their own advantage, which creates "the agency problem of corporate insider direction." Secondly, those whom the state is controlled can practice their powers to progress their welfare, which creates the agency the problem of state ruler judgment. Emunds (2003) identified that the key issue of financial integration is that depending on the way it has achieved, can make the country more exposed by this integration to a currency crisis. Firstly, this vulnerability increases if the capital movements into the country, mainly in form of portfolio investments. However, in case of bad news, foreign investors whom shares were bought, money or bonds market can hastily sell these securities and further will withdraw the money, hence, exerting high stress to devaluate the country's currency. Nonetheless, more and more fundamentally, vulnerability of currency crises is enlarged only by the fact of external net debt, because in case of a developing country, such a large debtor position entails the expectation of devaluation. In order to reduce the vulnerability of currency crises and to increase the chances of an effective and vigorous domestic banking system, it is anticipated that countries restrict and provide capital. Moreover, an emerging country's government should be allowed to decide according to particular constellation in its state, whether the limits for entry and operation for the foreign financial institutions should be introduced, sustained or eliminated. Lastly, monetary cooperation can be achieved by leading central bank of North region, helping its counterpart to the south to protect its currency contrary to speculative attacks. Furthermore, the author accentuates the co-responsibility of industrialized countries for development of developing nations.

Bekaert (1995) has developed market integration return based measure for nineteen emerging stock markets. Furthermore, he investigated the relationship between that measure and other return characteristics and, broadly defined investment obstacles.

Some conclusions have been made in paper. First, universal factors account for a small part of the time variation in the expected return on most markets, and worldwide predictability has fallen over time. Second, emerging markets depict different degrees of market integration with US market, and differences are not necessarily connected to direct investment fences. Third, the most significant de facto fences to the global equity market integration are meager credit rating, exchange rate control, high and flexible inflation, lack of high quality regulatory and, accounting structures, inadequate country funds or cross-border securities and, the limited size of individual stock markets. Emerging countries are moving towards the free trade, but the WTO agenda is followed with careful approach. Though, the procedure of liberalization in the developing countries had started in the late 1980s, and furthermore, this process had gained momentum in the 1990s. Hence, these economies are still in progress and have not been fully liberalized yet. Currency crises of the ASEAN economies in 1997 forced some of the countries to be more cautious in following the free capital mobility policy. Capital mobility is considered a two-way process, viz capital inflows, and the outflow. Since some of emerging countries still have capital controls, therefore, little capital mobility. Mohsin and Qayyum (2005) have studied the integration of financial markets in the Southeast Asian countries: by using domestic savings and investment strategies. Data for the period 1972 to 2002 were used for the five countries in Southeast Asia: Pakistan, Bangladesh, Sri Lanka, India and Nepal. The results indicate that in case of India, Sri Lanka, and Pakistan there is no significant evidence found for the benefit of increased financial integration in 1990s. Jain and Bhanumurthy (2005) have examined the financial market integration in case of India period from 1993 to 2002: using monthly data on call rates, Indian Rupee / US Dollar Exchange Rates, 91-day Treasury bill rates and, London Interbank Offered Rate (LIBOR). Furthermore, they have used a multiple

co integration technique and founded that there exist a strong integration of domestic call market with LIBOR.

CHAPTER 3

METHODOLOGY AND DATA

This chapter presents the methodology and data used for analysis

3.1 Methodology

This study examines the integration of three Asian financial markets (China, India and Pakistan) with the international markets (using London Inter-bank Offer Rate -LIBOR as reference) and with Asia regional market (Singapore Inter-bank Offer Rate-SIBOR as reference).

It uses call money rates, 6-month Treasury bill rates. Stock market indices and exchange rate as a measure of returns in three Asian financial markets; namely, India, Pakistan and China.

Two set of analysis are undertaken. Firstly, the study examines whether there exists long run relationship between call money rates, Treasury bill rates, stock market index and domestic currency/US dollar exchange rate as a measure of returns in the Asian financial markets with the-LIBOR and SIBOR by applying Johanson cointegration analysis for the period 1992 to 2016. Secondly, the VAR model is estimated and then impulse response functions and variance decompositions are used in order to trace a response of to a shock to each of the financial variables and international and Asian regional bench mark interest rate.

The Granger causality tests are used to examine the direction of causality between Asian financial market (China, India and Pakistan) and international market financial variables.

3.2 Empirical Specification of the Model

The financial integration model that is used following Jain and Bhanumrthy (2005) is expressed as below

$$I_{t,k} = \alpha + \beta i^*_{t,k} + \epsilon_t \quad (3.1)$$

where 'I' and 'i*' are the return (interest rates, exchange rate and stock returns) in Asian (India, Pakistan and China) with international market (LIBOR as reference) regional market (SIBOR as reference) respectively. The constant term is a wedge parameter between interest rates possibly caused by a risk premium or other asset differences. The above model is the same model as it is used by Jain and Bhanumrthy (2005) to find the integration between the domestic financial markets and the international markets. Following Jain and Bhanumrthy (2005) we used variables: call money rates (CR), Treasury bill rates (TB), exchange rate (EX) and returns on stock market index as a measure of returns in the Asian financial markets and attempts to find whether they are co-integrated with the London Inter-bank Offer Rate–LIBOR and with Asia regional market (Singapore Inter-bank Offer Rate-SIBOR as reference).

Co-integration method is used to find the long run relationship between the variables which is suitable technique and supported by the extensive literature review. Co-integration method was first introduced by Engle and Granger (1987) for bivariate analysis. But the multivariate co-integration test was developed by Johansen and Julius (1990). In this study the co-integration technique given by Johansen and Julius is applied. Before testing the co-integration between the variables it is pre-requisite to check the stationarity of the variables, because the co-integration test is only applied when the returns are non-stationary at level and stationary of same order.

3.1.1 Unit root test

Several tests of non-stationarity called unit root tests (DF, ADF, PP, KPSS and others) have been developed in the time series econometrics literature. If the non-stationarity hypothesis is rejected then the traditional econometrics methods can be used. Otherwise the theory of co-integration may provide useful insight into the relationship between the variables. The general requirement for applying the co-integration technique is to have variables of the same order of integration at hand. A time series, which is stationary after being differenced once is said to be integrated of order 1 and is, denoted $I(1)$. A series that is stationary without differencing is said to be $I(0)$. A series which is $I(1)$ is said to have a unit root and a series which is $I(d)$ has d unit roots. Empirically most of the important economic variables are found to be integrated of order 1. Therefore, an adequate analysis of economic and financial variables should examine the order of integration.

To test the data series for unit roots, Augmented Dickey-Fuller (ADF) test developed by Dickey and Fuller (1979) and non-parametric tests of Phillips -Perron (1988) are used. ADF test is based on the following regressions:

$$\Delta Y_t = \psi + \gamma Y_{t-1} + \sum \beta_j \Delta Y_{t-j} + \varepsilon_t \dots \dots (1)$$

$$\Delta Y_t = \psi + \gamma Y_{t-1} + \beta t + \sum \beta_j \Delta Y_{t-j} + \varepsilon_t \dots (2)$$

where ε_t is assumed to be Gaussian white noise, test statistics based on (2) and (3) are called τ_μ and τ_τ respectively. Z^* statistics of the Phillips -Perron (1988) are considered to have more power in finite samples than τ statistics.

3.1.2 Johansen Co-Integration Test

The results of the unit root tests are then followed by Co-integration tests. The existence of long-run equilibrium (stationary) relationships among variables is called as co-integration. The Johansen procedure is employed to investigate the issue of co-integration and this procedure not only provides an estimation methodology but also explain precise procedures to check for the number of cointegrating vectors.

Johansen's methodology takes its starting point in the vector auto regression (VAR). The results of the Johansen's co-integration test are sensitive to the lag length. The lag length is selected using Schwarz Bayesian Criterion (SBC). Johansen and Juselius (1990) provide the critical values based on two tests, namely maximum likelihood test and the trace test. Once we establish the presence of co-integration between two variables, we estimate the co-integrating relation. While the estimates of the co-integrating relation indicate the direction of attractions that maintain long-run stationarity in each system, however they offer no information about the adjustment speeds of the variables to deviations from their common stochastic trend in the short-run. To capture the speed of adjustment between two non-stationary variables, we estimate the error correction mechanism (ECM). The ECM restricts the long-run behavior of the endogenous variables to converge to their co integrating relationships while allowing for a wide range of short-run dynamics. The co-integration term is known as the error correction term since the deviation from long-run equilibrium is corrected gradually through a series of partial short-run adjustments.

Johansen's methodology takes its starting point in the vector autoregression (VAR) of order p is given below:

$$Y_t = \alpha + \Delta_1 y_{t-1} + \Delta_p y_{t-p} + \varepsilon_t$$

Here Y_t is an $n \times 1$ vector of variables which are integrated of order commonly denoted by (1) and ε_t is an $n \times 1$ vector of variations. The VAR can also be written as

$$\Delta y_t = \alpha + \eta_{y_{t-1}} + \sum \tau_i \Delta y_{t-p} + \varepsilon_t$$

Where

$$\eta = \sum A_{i-1} \text{ and } \tau_i = - \sum A_j$$

In order to determine the number of co-integrating vectors, Johansen (1988, 1989) and Johansen and Juselius (1990) recommended two statistic test, “the first one is the trace test (λ trace), It tests the null hypothesis that the number of distinct cointegrating vector is less than or equal to q against a general unrestricted alternatives $q = r$ ”. The trace test is calculated as follows:

$$\lambda = -T \sum \ln (1 - \lambda_t)$$

“Where T is the number of usable observations and the λ 's are the estimated eigen value from the matrix, The second statistical test is the maximum eigen value test (λ max) that is calculated according to the following formula”

$$\lambda \text{ max } (r, r + 1) = -T \ln (1 - \lambda_{r+1})$$

It is a test of the null hypothesis that there is r of co-integrating vectors against the alternative that $r + 1$ co-integrating vector.

3.1.3 Error Correction Model

Once the cointegrating vectors have been estimated among a set of variables one can proceed to carry out VECM analysis. If variables in the system are non-stationary and co-integrated, the Granger-causality test in VECM framework will be based on the following equations:

$$\Delta X_t = \alpha_x + \sum \beta_{x,i} \Delta Y_{t-i} + \sum \gamma_{x,i} \Delta Y_{t-i} + \phi_x \text{ECT}_{t-1} \varepsilon_{x,t} \dots (3)$$

$$\Delta Y_t = \alpha_y + \sum \beta_{y,i} \Delta X_{t-i} + \sum \gamma_{y,i} \Delta X_{t-i} + \phi_y \text{ECT}_{t-1} \varepsilon_{y,t} \dots (4)$$

Here ϕ_x and ϕ_y measure the error correction mechanism, are the parameters of the term ECT, that compel the X_t and Y_t to move back to their long run equilibrium relationship. The null hypothesis (H_0) for the equation no (3) is as follows:

$$H_0: \sum \gamma_{x,i} = 0 \dots \dots \dots (5)$$

Equation (5) suggests that the lagged terms ΔY does not Granger cause ΔX . The null hypothesis (H_0) for the equation (4) is

$$H_0: \sum \gamma_{y,i} = 0 \dots \dots \dots (6)$$

Equation (6) Suggest that the lagged terms ΔX do not Granger cause ΔY . The Granger causality within though the error correction frame work is applied to determine the direction of causality.

3.1.4 Granger Causality Test

Granger causality test is useful in finding whether one time-series (CR) can be predicted by another time-series (EX) for example using equations (3) to (6). The test is carried out by regressing CR_t on its lagged values and the lagged values of EX_t . If the results indicate that CR_t can be predicted by EX_t , it is said that EX_t Granger causes CR_t as specified in equations (3) and (4). Likewise we can analyze the causality between EX, T Bill, stock market returns with LIBOR and SIBOR and vice versa.

3.1.5 Impulse Response Function

The basic idea behind impulse response is that the shock in one variable is not restricted to that variable but it is transmitted to all other endogenous variables as well as owing to dynamic interaction among the considered variables. An impulse response traces the effect of one time shock to one of the innovation on the current and future value of an endogenous variable. In our study we have examined the response of call money rates,

6-month Treasury bill rates, exchange rate and stock market returns as a measure of returns in the domestic financial markets when one standard deviation shock is given to the London Inter-bank Offer Rate—LIBOR and Singapore interbank offer rate—SIBOR.

3.2 Data Collection

Monthly data for the period of 1992-2016 on call money rates (CR), 6-month Treasury bill rates (TB), exchange rate (EX), stock market index of Bombay for India, KSE 100 index for Pakistan and Shanghai stock market index for China. The London interbank offered rate (LIBOR) and Singapore interbank offered rate (SIBOR) are used as international and regional bench mark. Sources used for the data collection are the website of State Bank of Pakistan, International Financial Statistic (IFS) CD and the website of Mortgage (ARM) indexes.

CHAPTER 4

EMPIRICAL RESULTS

The main focus of the study is to examine the integration of three Asian financial markets (China, India and Pakistan) with the international markets (using London Inter-bank Offer Rate -LIBOR as reference) and with Asia regional market (Singapore Inter-bank Offer Rate-SIBOR as reference). Two set of analysis are undertaken. First the study examines whether there exists long run relationship between call money rates, 6-month Treasury bill rates and domestic currency/US dollar exchange rate as a measure of returns in the Asian financial markets with the-LIBOR and SIBOR. Second, the VAR model is estimated and then impulse response functions and variance decompositions are used in order to trace a response of to a shock to each of the financial variables and international and Asian regional bench mark interest rate.

4.1 Unit Root Test

The first step is to determine the stationarity of CR, ER, TB and Stock market index (SSE for China, BSE for India and KSE for Pakistan) and reference borrowing rate international LIBOR and for Asia region SIBOR series before applying the co-integration test. It is necessary to have all the series non stationary at level and stationary at the same order. Augment Dickey Fuller test is used to find the unit root of CR, ER, TB, SIBOR and LIBOR. The results of ADF test that all variables have a unit root at level, however, the variables are stationary at 1st difference so full filling the condition to apply multiple co-integration test.

Table 4.4 1: Unit Root Tests: Level Form and First Difference

	ADF Test		PP Test	
	Level	Ist Difference	Level	Ist Difference
Pakistan				
CMR	-1.37	-3.85***	-1.75	-7.49***
ER	-2.04	-16.12***	0.47	-13.34***
TBILL	-1.51	-12.36***	-1.92	-16.21***
KSE	0.48	-14.71***	-0.57	-14.71***
India				
CMR	-1.55	-12.05***	-1.53	-13.08***
ER	-2.21	-15.93***	-2.24	-16.93***
TBILL	-1.27	-14.83***	-1.52	-15.05***
BSE	-0.59	-15.93***	-0.63	-15.90***
China				
CMR	-1.04	-15.53***	-1.14	-15.67***
ER	-2.21	-15.92***	-2.23	-15.93***
TBILL	-1.24	-19.44***	-1.18	-19.44***
SSE	-2.39	-18.14***	-2.70	-18.24***
Asian and International Reference				
SIBOR	-1.33	-13.43***	-1.16	-14.87***
LIBOU	-1.16	-9.32***	-0.96	-9.28***

Note: MacKinnon (1991) critical values for rejection of hypothesis of a unit root for both ADF and PP at 10%, 5% and 1% level of significance with constant and trend and -2.57,-2.87, -3.45 respectively. The *, **, *** indicates 10%, 5% and 1% level

4.2 Cointegration

Since the variables in the model are non-stationary and are integrated of same order we now apply the Johansen co-integration test to determine the long term relationship between the variables. The "VAR" method is used to determine the optimal lag length. The VAR is estimated and optimal lag length is selected by Schwatz Information criteria. Unrestricted co-integration rank test (Trace) and unrestricted co-integration test (Max. Eigen value) are used to find the long run relation between CR and LIBOR/SIBOR, ER and LIBOR/SIBOR, and TB and LIBOR/SIBOR of three Asian countries China, India and Pakistan. This allows checking whether these three Asian financial markets are using regional market SIBOR or international market LIBOR as bench mark for borrowing and lending.

Table 4.2a. Cointegration between CMR and LIBOR/SIBOR

INDIA						
	CMR with LIBOR			CR with SIBOR		
Hypothesized No. of CE(s)	Trace Statistic	0.05 Critical Value	P value	Trace Statistic	0.05 Critical Value	P value
None *	7.20	15.49	0.33	11.20	20.26	0.22
At most 1	2.40	4.11	0.46	3.68	9.16	0.39
PAKISTAN						
Hypothesized No. of CE(s)	Trace Statistic	0.05 Critical Value	P value	Trace Statistic	0.05 Critical Value	P value
None *	11.89	15.49	0.16	10.33	15.49	0.25
At most 1	0.65	3.84	0.41	0.75	3.84	0.38
CHINA						
Hypothesized No. of CE(s)	Trace Statistic	0.05 Critical Value	P value	Trace Statistic	0.05 Critical Value	P value
None *	5.64	15.49	0.73	3.01	15.49	0.096
At most 1	1.36	3.88	0.25	0.36	3.64	0.55

Note: Co-integration Rank Test (Trace) show that there is no co-integrating vector at 5 percent level.

Table 4.2b. Cointegration between TB and LIBOR/SIBOR

INDIA						
	TB with LIBOR			TB with SIBOR		
Hypothesized No. of CE(s)	Trace Statistic	0.05 Critical Value	P value	Trace Statistic	0.05 Critical Value	P value
None *	16.61	15.49	0.03	6.50	15.49	0.63
At most 1	1.47	3.84	0.22	0.35	3.84	0.55
PAKISTAN						
Hypothesized No. of CE(s)	Trace Statistic	0.05 Critical Value	P value	Trace Statistic	0.05 Critical Value	P value
None *	14.34	15.49	0.07	4.87	15.49	0.82
At most 1	3.51	3.84	0.06	0.80	3.38	0.36
CHINA						
Hypothesized No. of CE(s)	Trace Statistic	0.05 Critical Value	P value	Trace Statistic	0.05 Critical Value	P value
None *	17.18***	15.49	0.02	7.63	15.55	0.50
At most 1	1.40	3.84	0.23	0.18	3.34	0.66

Note: Co-integration Rank Test (Trace) show that China T Bill has one cointegrating vector with LIBOR, there is no co-integrating vector at 5 percent level with T bill and LIBOR/SIBOR.

Table 4.2c. Cointegration between Exchange rate and LIBOR/SIBOR

INDIA						
	EX with LIBOR			EX with SIBOR		
Hypothesized No. of CE(s)	Trace Statistic	0.05 Critical Value	P value	Trace Statistic	0.05 Critical Value	P value
None *	4.83	15.55	0.82	6.78	15.55	0.60
At most 1	0.48	3.58	0.48	0.87	3.33	0.34
PAKISTAN						
	EX with LIBOR			EX with SIBOR		
Hypothesized No. of CE(s)	Trace Statistic	0.05 Critical Value	P value	Trace Statistic	0.05 Critical Value	P value
None *	8.31	15.44	0.43	13.01	15.55	0.11
At most 1	2.84	3.64	0.09	0.11	3.36	0.73
CHINA						
	EX with LIBOR			EX with SIBOR		
Hypothesized No. of CE(s)	Trace Statistic	0.05 Critical Value	P value	Trace Statistic	0.05 Critical Value	P value
None *	13.41	15.49	0.10	16.56***	15.49	0.03
At most 1	1.11	3.23	0.25	2.25	3.28	0.13

Note: Co-integration Rank Test (Trace) show that there is only China exchange rate has one co-integrating vector with SIBOR co-integrating vector at 5 percent level..

Table 4.2d. Cointegration between Stock Market Index and LIBOR/SIBOR

INDIA						
	BSE with LIBOR			BSE with SIBOR		
Hypothesized No. of CE(s)	Trace Statistic	0.05 Critical Value	P value	Trace Statistic	0.05 Critical Value	P value
None *	4.56	15.55	0.85	9.75	15.47	0.29
At most 1	0.33	3.37	0.56	0.06	3.57	0.80
PAKISTAN						
	KSE with LIBOR			KSE with SIBOR		
Hypothesized No. of CE(s)	Trace Statistic	0.05 Critical Value	P value	Trace Statistic	0.05 Critical Value	P value
None *	4.73	15.54	0.83	5.90	15.44	0.70
At most 1	0.10	3.36	0.74	0.11	3.23	0.74
CHINA						
	SSE with LIBOR			SSE with SIBOR		
Hypothesized No. of CE(s)	Trace Statistic	0.05 Critical Value	P value	Trace Statistic	0.05 Critical Value	P value
None *	8.58	15.49	0.40	13.99	15.49	0.08
At most 1	1.73	3.34	0.18	0.23	3.84	0.62

Note: Co-integration Rank Test (Trace) show that there is no co-integrating vector at 5 percent level..

The trace statistics is applied to check the cointegration by Johessian Julious approach. The results obtained from the test applied are presented in the Table 4.2a, Table 4.2b, Table 4.2c and Table 4.2d shown above. The results indicate in case of China there is one cointegrating vector from exchange rate to SIBOR; and one cointegrating vector between T Bill and LIBOR. T-bills have a one co-integration equation with LIBOR at 5 percent level. It means the CR and T-bill returns are integrated with the LIBOR returns. The two Chinese returns T Bill and exchange rate have a long run equilibrium relationship with the international returns (LIBOR) and Regional return SIBOR respectively. China SSE market index and call money rate have no cointegration with LIBOR and SIBOR

In case of India and Pakistan short term money market is still in the development stage. With greater powers to formulate monetary policy, the central bank of these two countries moved to market oriented monetary policy where it relied more on interest rate to serve as a policy fulcrum and developed its capacity to manage financial markets and related activities effectively. Exchange rate has no long run relationship with the LIBOR and SIBOR showing that two returns are not co-integrated with each other as results shown in table 4.

4.3 Vector Error Correction Results

In order to test the short run relationship and error adjustment between CR, T-bill and LIBOR series VECM analysis is conducted, error correction model shows the short run dynamics of the cointegrating variables. Results of Vector error correction model given below shows the presence of positive long run relationship between call money rate and

LIBOR, and T-bill rate and LIBOR. The error adjustment has expected negative sign and significant confirming the long run relationship.

Table 4.3: Results of Vector Error Correction for China

		Δ SIBOR	ECT	R ²
Δ EX	0.007 (0.38)	0.10* (2.23)	-0.04** (-3.40)	0.52
		Δ SIBOR	ECT	R ²
Δ T-bill	0.02 (0.59)	0.10* (1.90)	-0.03** (-1.89)	0.59

Note: The * indicates significance at 10%, ** at 5% and *** at 1%.

The Vector Error Correction results by Johanson are shown in Table 4.3 indicate the speed of adjustment to maintain the long run relationship between EX and SIBOR, and T-bill and LIBOR in case of China.

The long run results are given by the following normalized co-integration results which suggest long run relationship exists between EX and SIBOR and between T-bill and LIBOR for China.

The normalized co-integrating equation is $EX = 0.105 \text{ SIBOR} - 2.40$

The normalized co-integrating equation is $T\text{-bill} = 1.59 \text{ LIBOR} + 7.09$

4.4 Causality Relationship

To check the causality relationship between variables Granger Causality test is used. If p value is greater than the level of significance; the null hypothesis is rejected, that there does exist causal relationships between the variables. The results indicate that in case of India LIBOR causes T Bill, Bombay Stock Index causes SIBOR but call money rate, exchange rate has no causal effect with LIBOR or SIBOR. For Pakistan LIBOR causes

KSE 100 index and SIBOR causes exchange rate, however T-bill and call money rate have no causal link with LIBOR or SIBOR. In China financial market SIBOR causes T-bills and Shanghai Stock market, T Bill, while exchange rate and T-bills causes LIBOR.

Table 5: Granger Causality Results

Null Hypothesis	F-Statistics	Probability
INDIA		
LIBOR does not Granger Cause CR	0.12	0.88
CR does not Granger Cause LIBOR	0.65	0.51
SIBOR does not Granger Cause CR	0.15	0.85
CR does not Granger Cause SIBOR	0.84	0.43
LIBOR does not Granger Cause TB	6.88***	0.001
TB does not Granger Cause LIBOR	10.21	0.92
SIBOR does not Granger Cause TB	3.16***	0.04
TB does not Granger Cause SIBOR	0.96	0.96
LIBOR does not Granger Cause EX	1.63	0.19
EX does not Granger Cause LIBOR	1.44	0.23
SIBOR does not Granger Cause EX	0.68	0.50
EX does not Granger Cause SIBOR	0.20	0.81
LIBOR does not Granger Cause BSE	0.92	0.39
BSE does not Granger Cause LIBOR	0.46	0.62
SIBOR does not Granger Cause BSE	0.25	0.77
BSE does not Granger Cause SIBOR	5.94***	0.00
PAKISTAN		
LIBOR does not Granger Cause CR	0.14	0.86
CR does not Granger Cause LIBOR	1.42	0.24
SIBOR does not Granger Cause CR	2.08	0.12
CR does not Granger Cause SIBOR	0.07	0.92
LIBOR does not Granger Cause TB	1.98	0.13
TB does not Granger Cause LIBOR	4.02***	0.01
SIBOR does not Granger Cause TB	0.91	0.40
TB does not Granger Cause SIBOR	1.08	0.34
LIBOR does not Granger Cause EX	0.35	0.70
EX does not Granger Cause LIBOR	2.39	0.09
SIBOR does not Granger Cause EX	3.52***	0.03
EX does not Granger Cause SIBOR	0.73	0.48
LIBOR does not Granger Cause KSE	2.49**	0.09
KSE does not Granger Cause LIBOR	0.14	0.85
SIBOR does not Granger Cause KSE	1.22	0.29
KSE does not Granger Cause SIBOR	2.10	0.12
CHINA		
LIBOR does not Granger Cause CR	0.27	0.76
CR does not Granger Cause LIBOR	1.56	0.21
SIBOR does not Granger Cause CR	0.93	0.39
CR does not Granger Cause SIBOR	0.64	0.52
LIBOR does not Granger Cause TB	1.29	0.27
TB does not Granger Cause LIBOR	12.08***	0.00
SIBOR does not Granger Cause TB	4.27***	0.01
TB does not Granger Cause SIBOR	0.09	0.91
LIBOR does not Granger Cause EX	1.98	0.13
EX does not Granger Cause LIBOR	4.86***	0.00
SIBOR does not Granger Cause EX	3.02**	0.05
EX does not Granger Cause SIBOR	0.76	0.45
LIBOR does not Granger Cause SSE	0.67	0.50

SSE does not Granger Cause LIBOR	1.87	0.15
SIBOR does not Granger Cause SSE	5.75***	0.00
SSE does not Granger Cause SIBOR	1.13	01

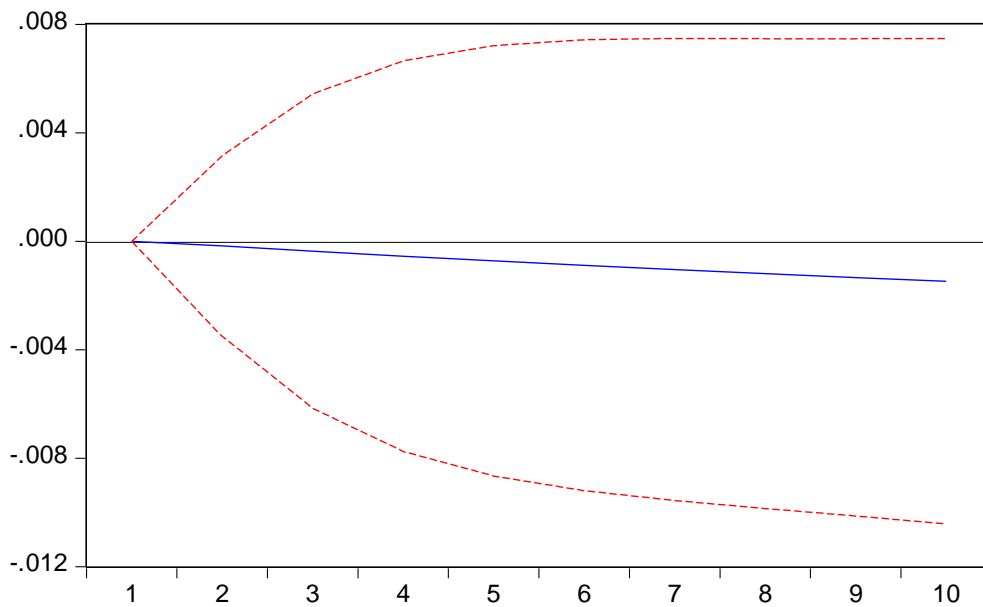
Note: The *** indicates significance at 1%

4.5 Impulse Response Function

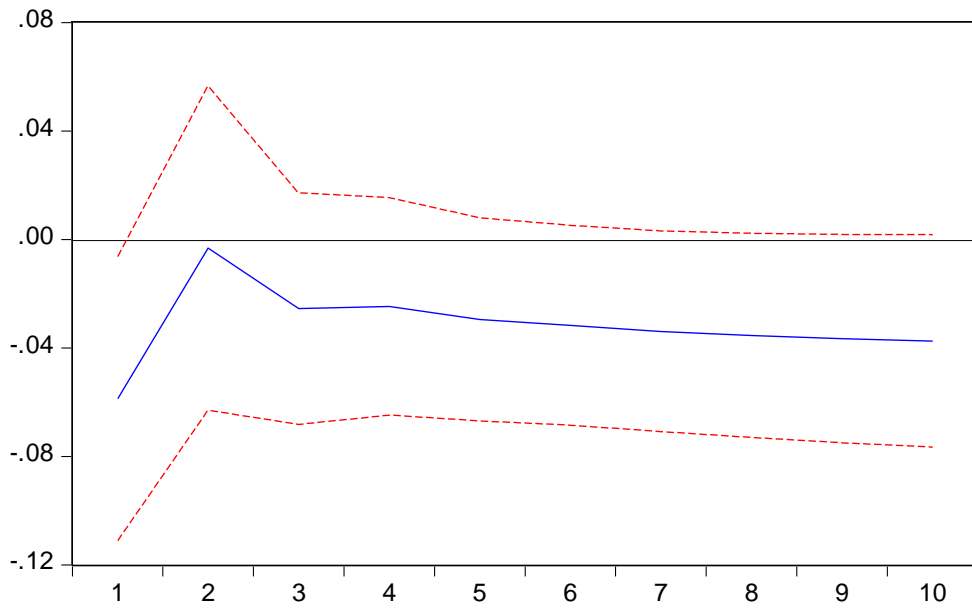
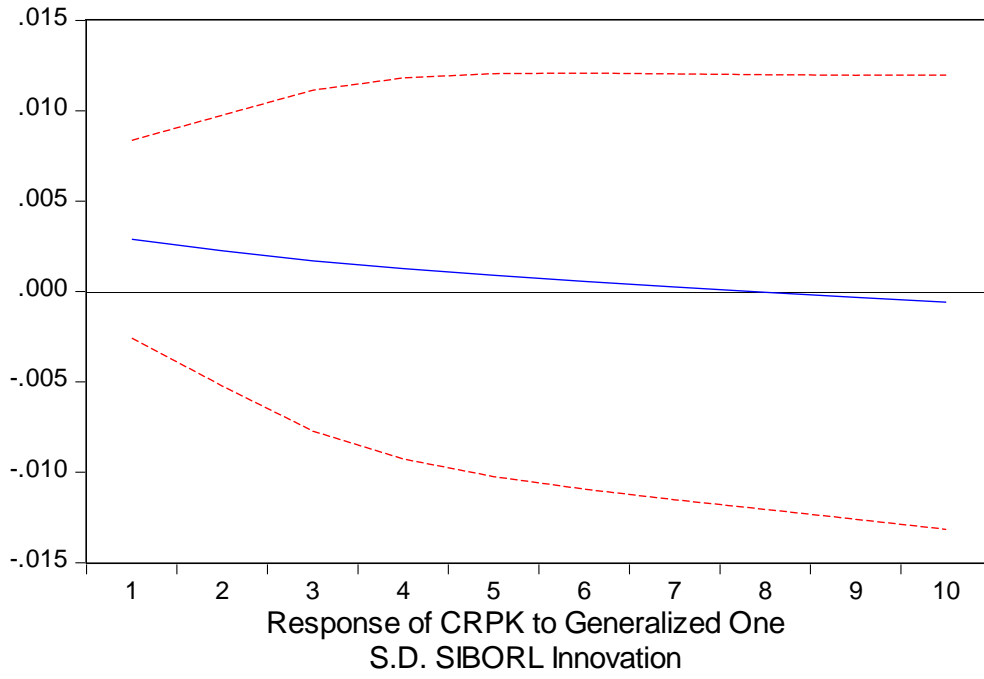
Figures below present impulse response functions for call money rate, T bill, and exchange rate and stock market index when shock is given to LIBOR and SIBOR for three Asian countries India, Pakistan and China. Responses of T bill for all three Asian countries with 1 standard deviation shock in both LIBOR and SIBOR has same impact upward. The responses of these three countries are different with respect to call money rate, exchange rate, stock market returns when innovation is given to LIBOR and SIBOR.

Impulse on LIBOR and SIBOR and Response of Call Money Rate

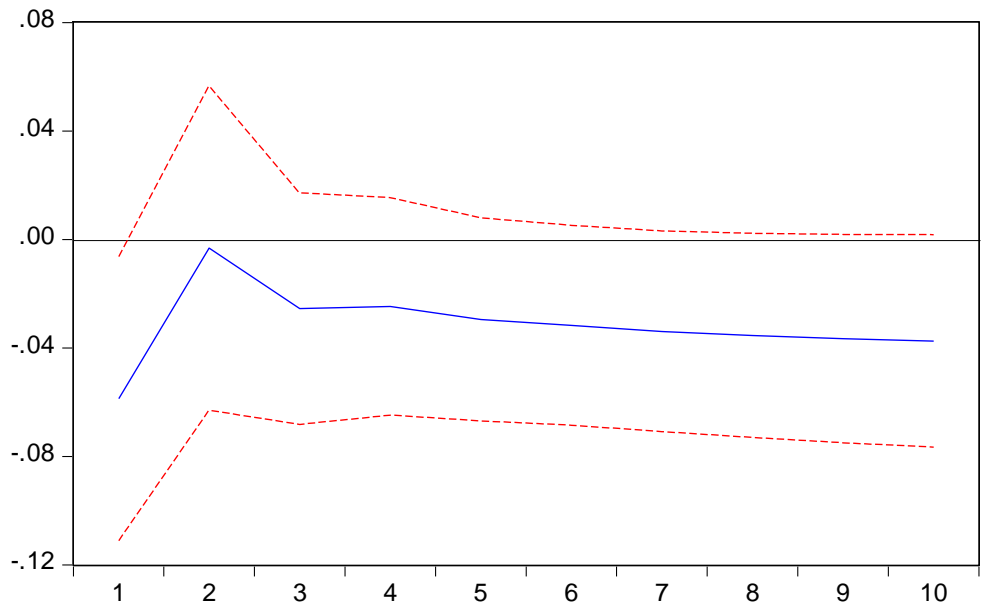
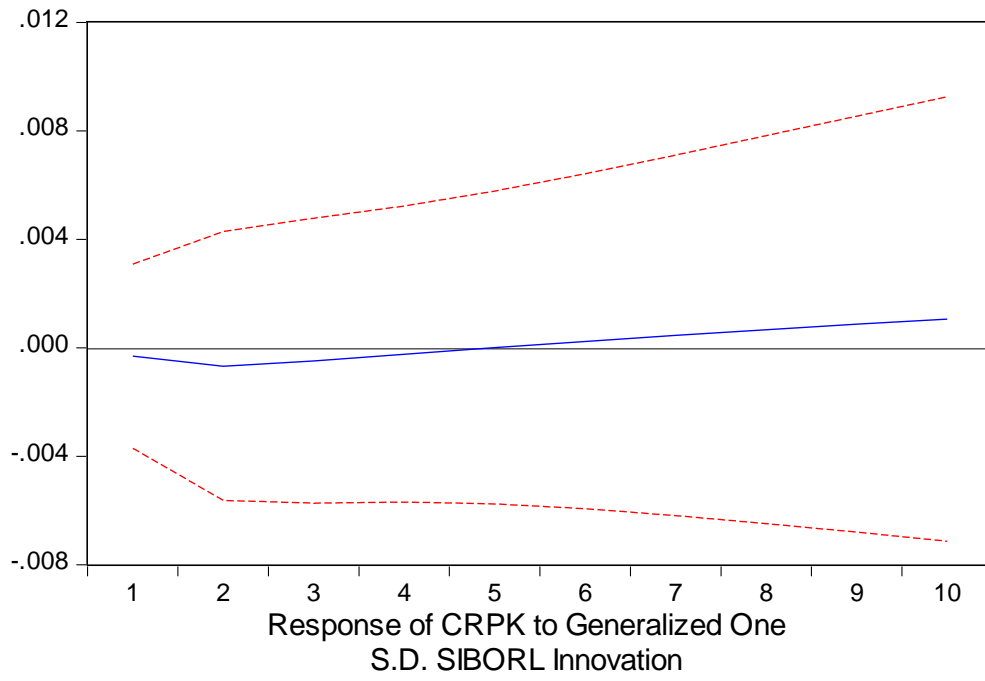
Response of CRI to Cholesky
One S.D. LIBORL Innovation



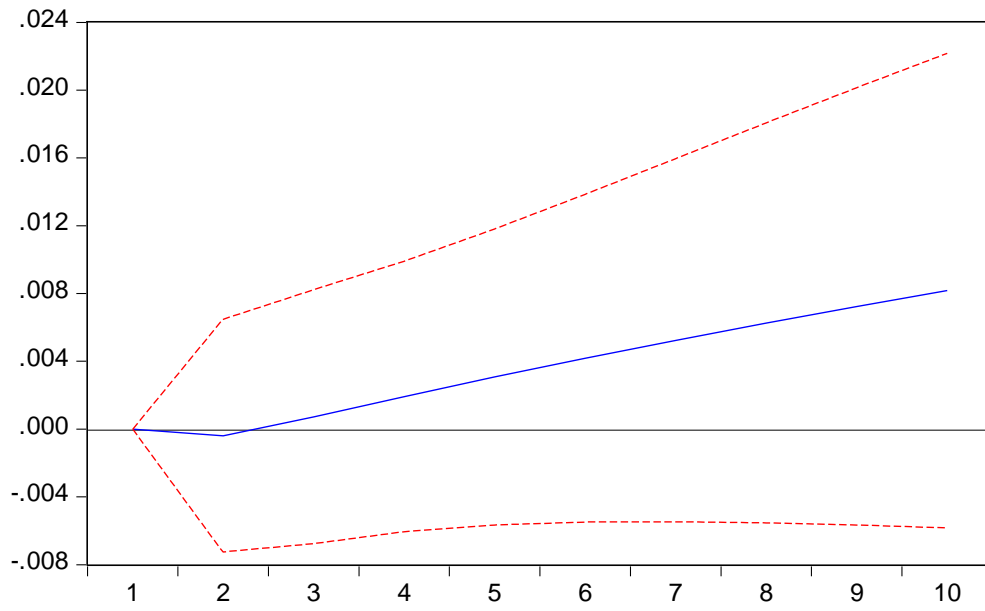
Response of CRCH to Generalized One
S.D. LIBORL Innovation



Response of CRI to Generalized One
S.D. SIBORL Innovation

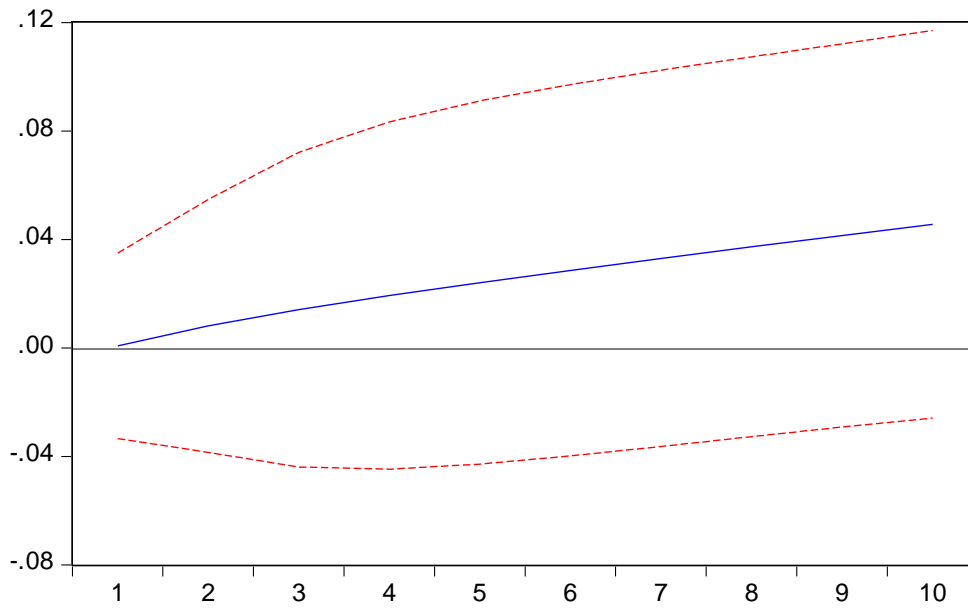
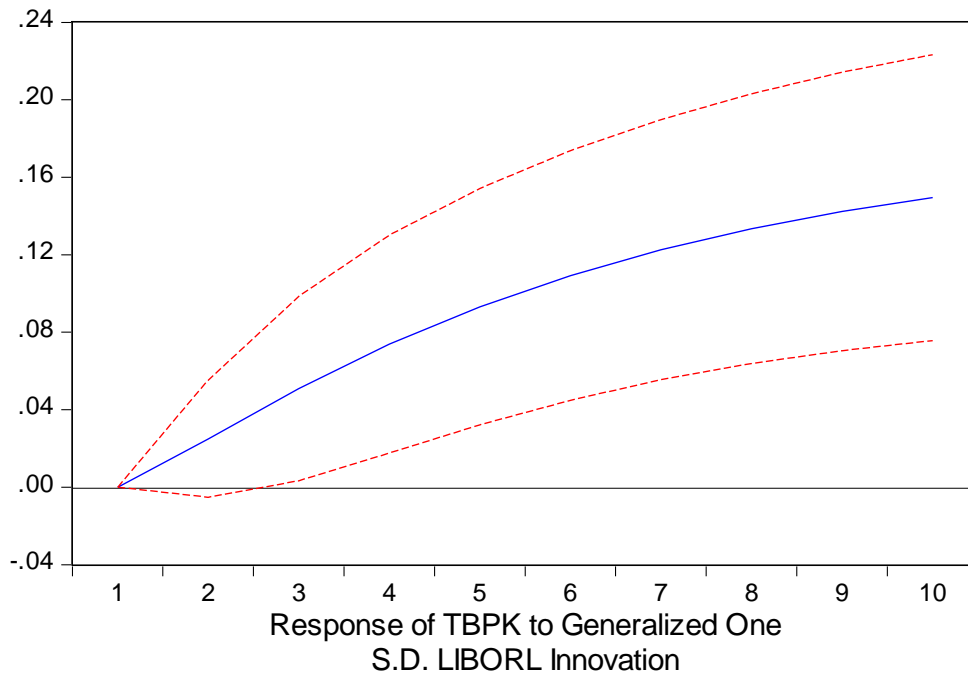


Response of CRCH to Cholesky
One S.D. SIBORL Innovation

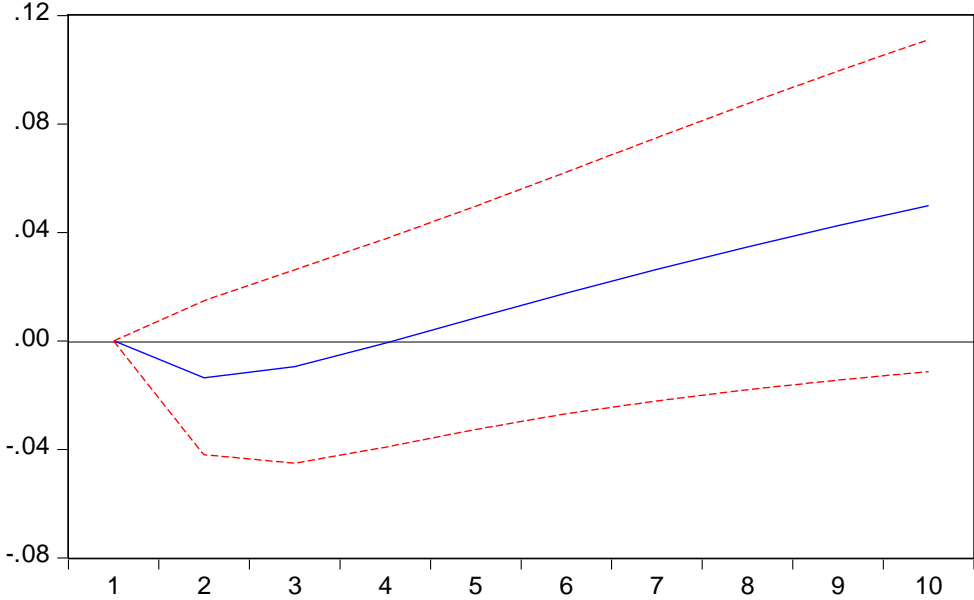
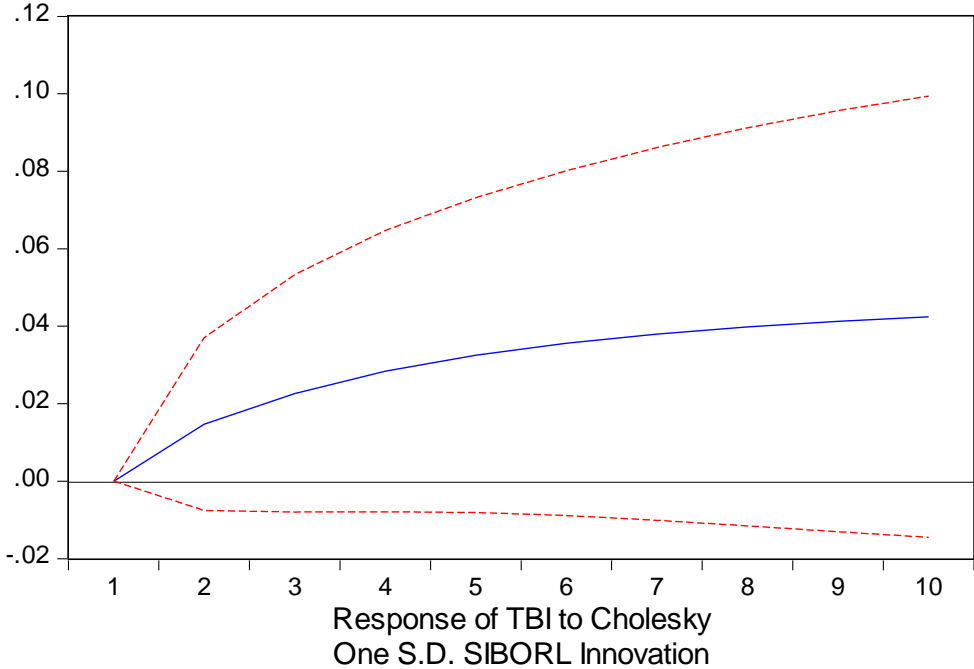


Impulse on Libor and Sibor and Response of TBill

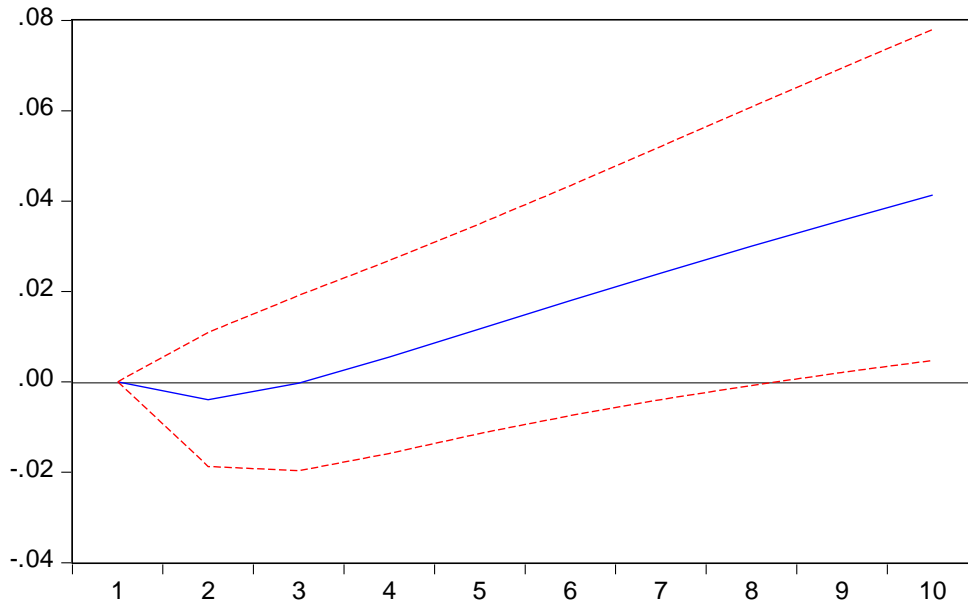
Response of TBI to Cholesky
One S.D. LIBORL Innovation



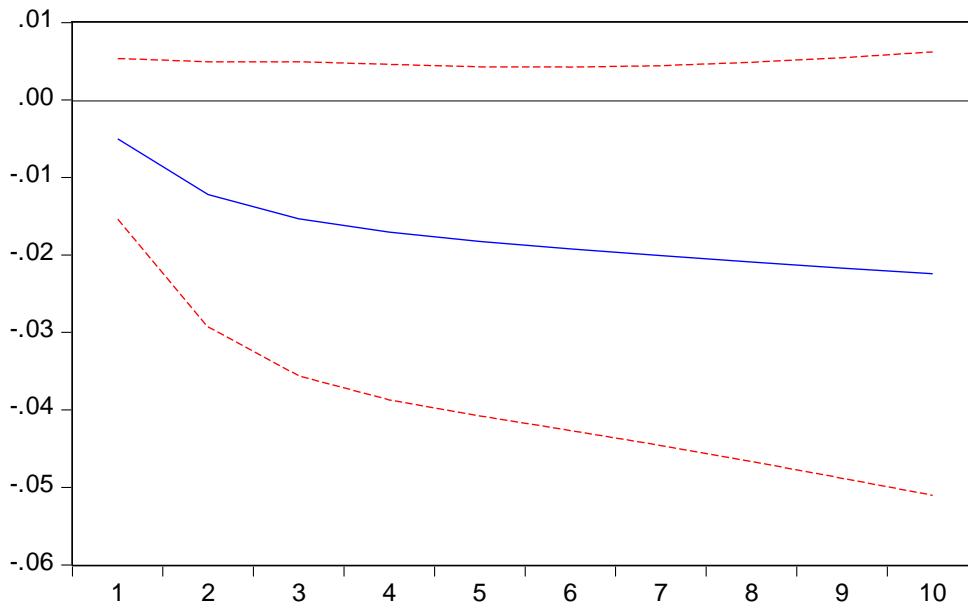
Response of TBCH to Cholesky
One S.D. LIBORL Innovation



Response of TBCH to Cholesky
One S.D. SIBORL Innovation

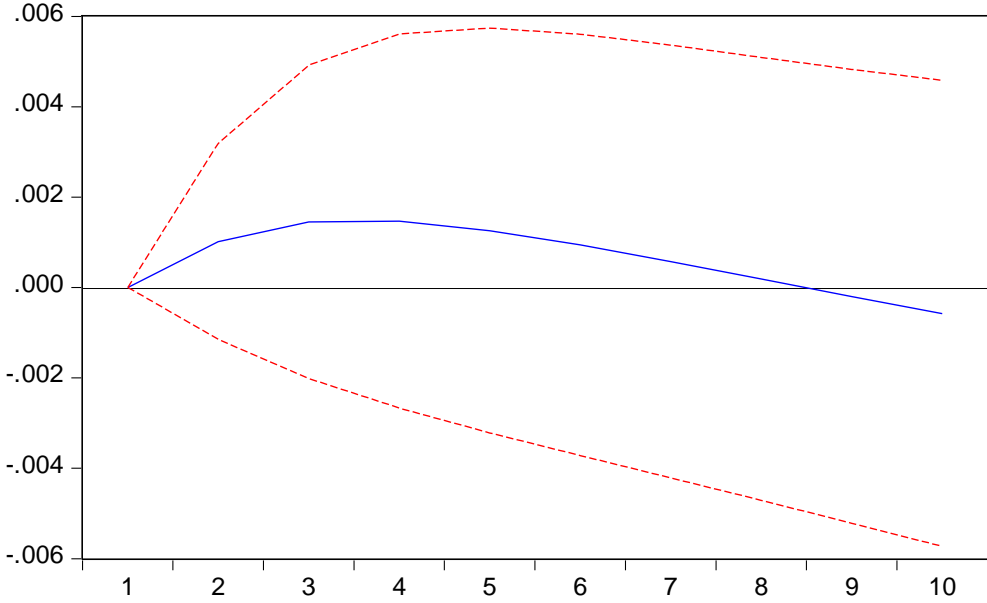


Response of TBPK to Generalized One
S.D. SIBORL Innovation

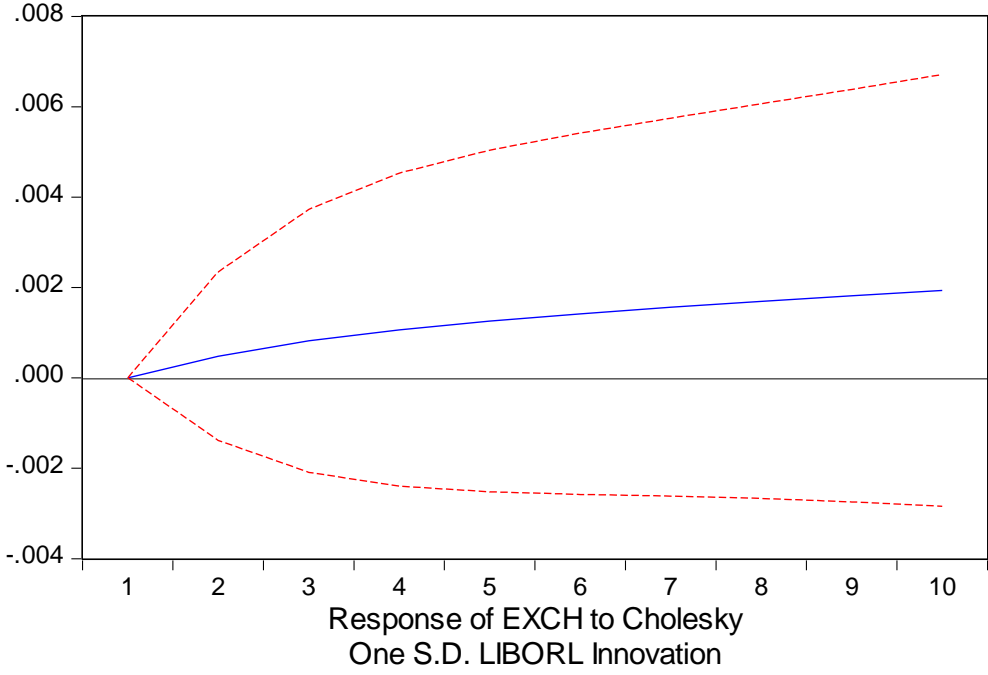


Impulse in LIBOR/SIBOR Response of Exchange Rate

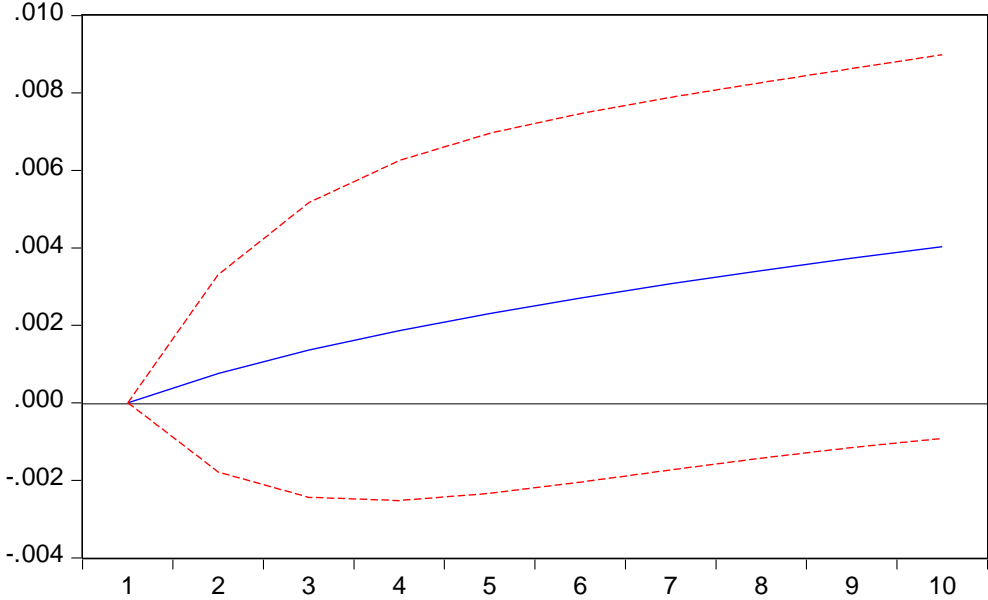
Response of EXI to Cholesky
One S.D. LIBORL Innovation



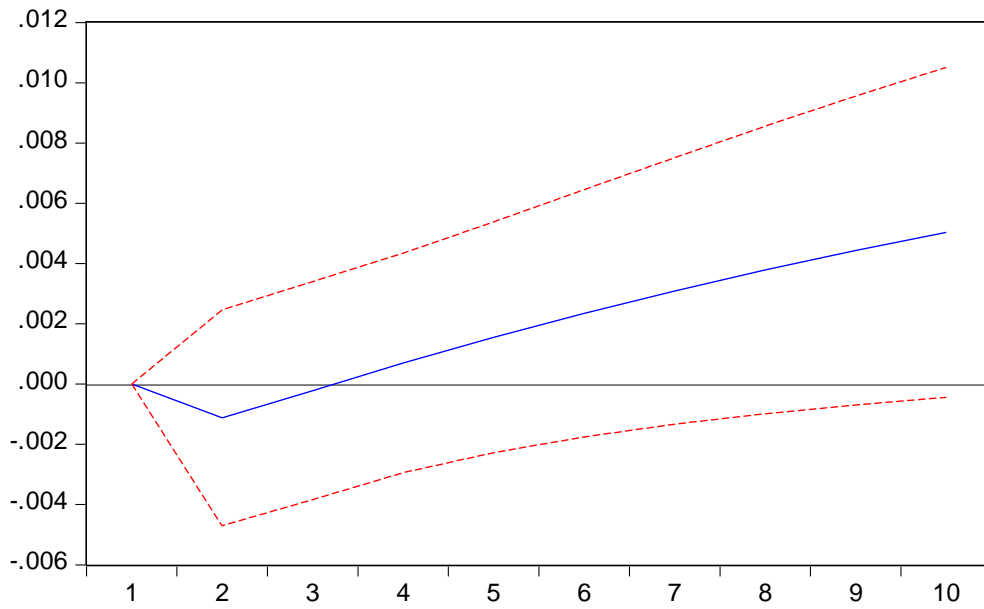
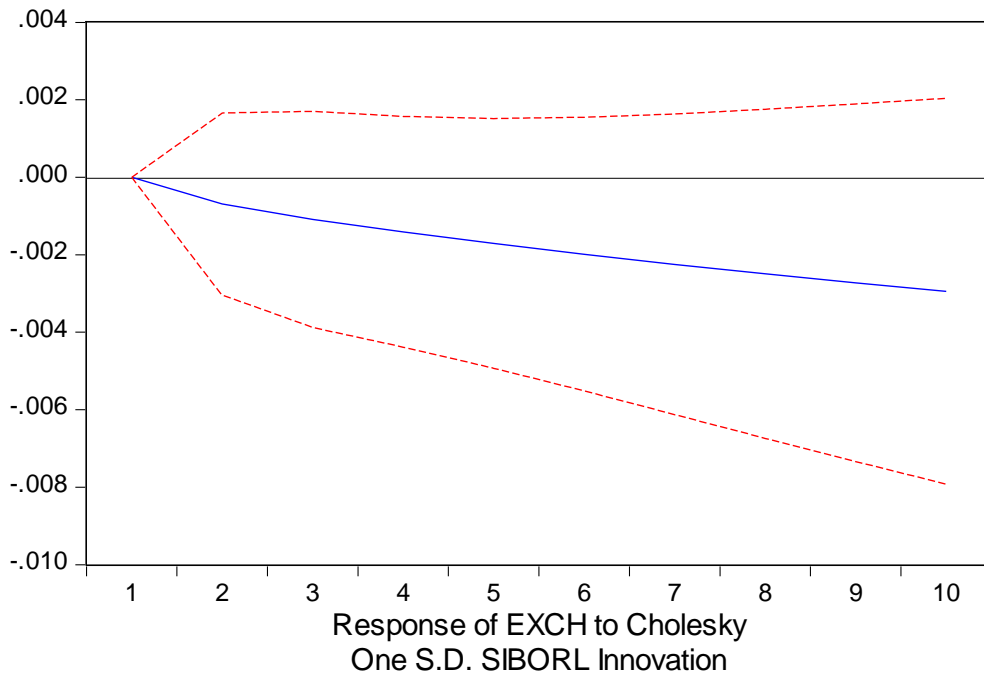
Response of EXPK to Cholesky
One S.D. LIBORL Innovation



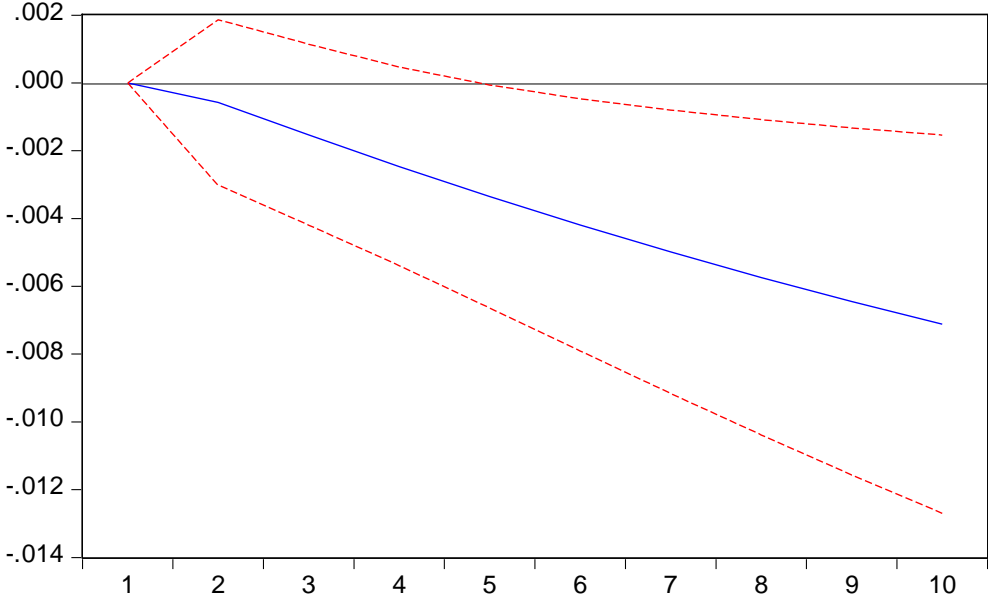
Response of EXCH to Cholesky
One S.D. LIBORL Innovation



Response of EXI to Cholesky
One S.D. SIBORL Innovation

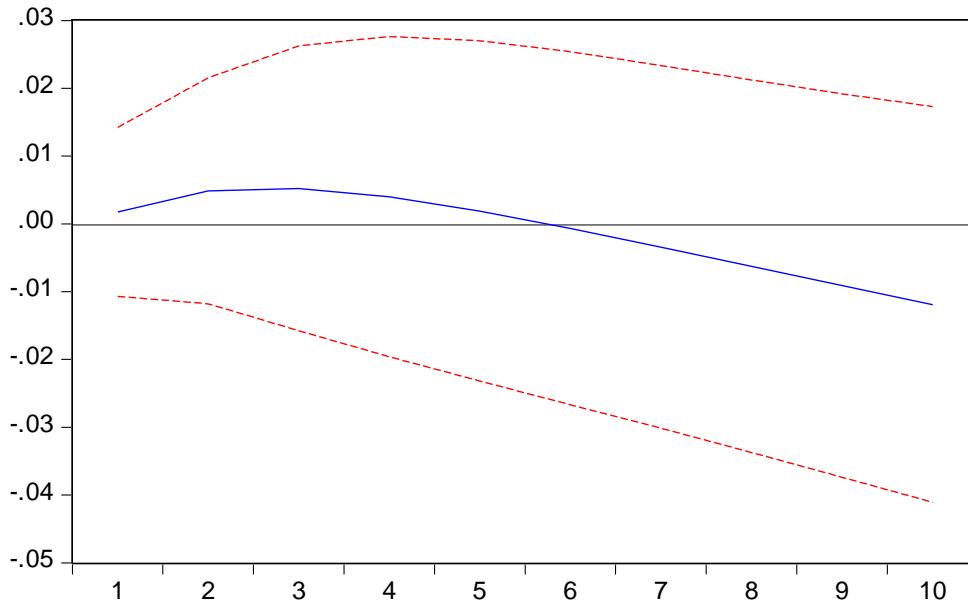
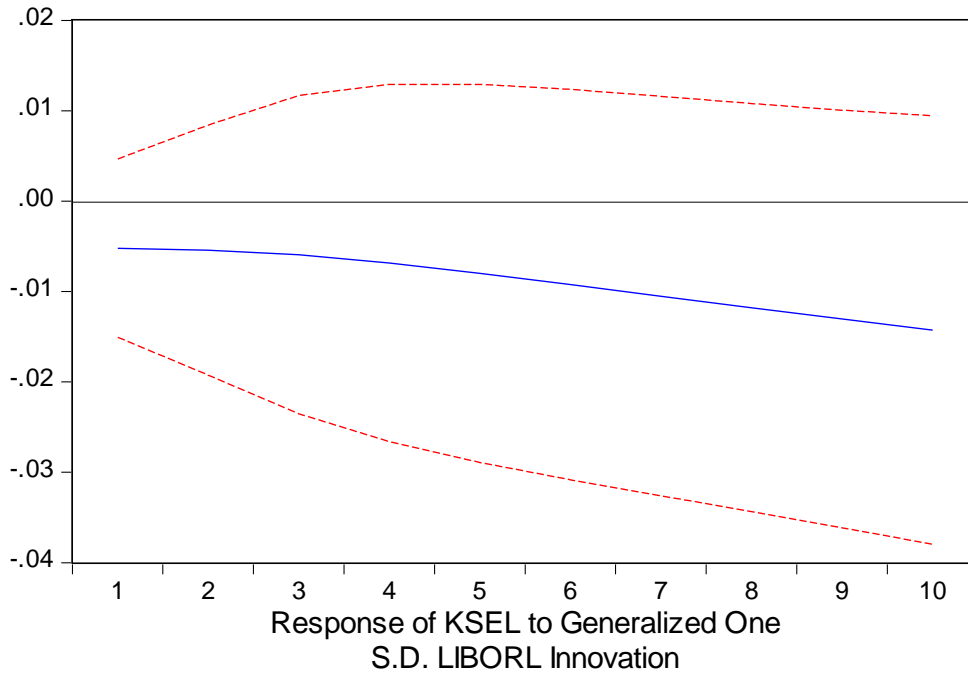


Response of EXPK to Cholesky
One S.D. SIBORL Innovation

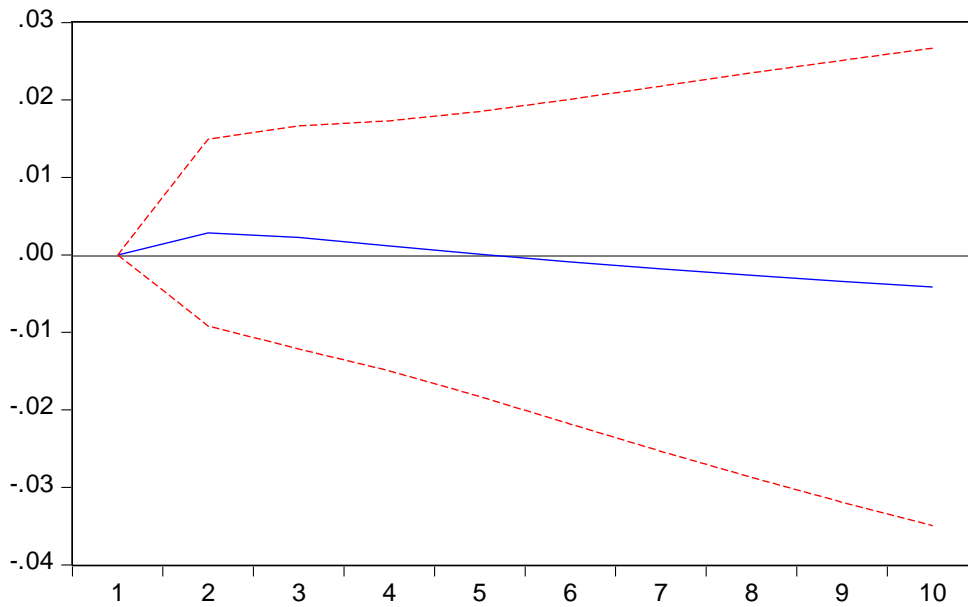
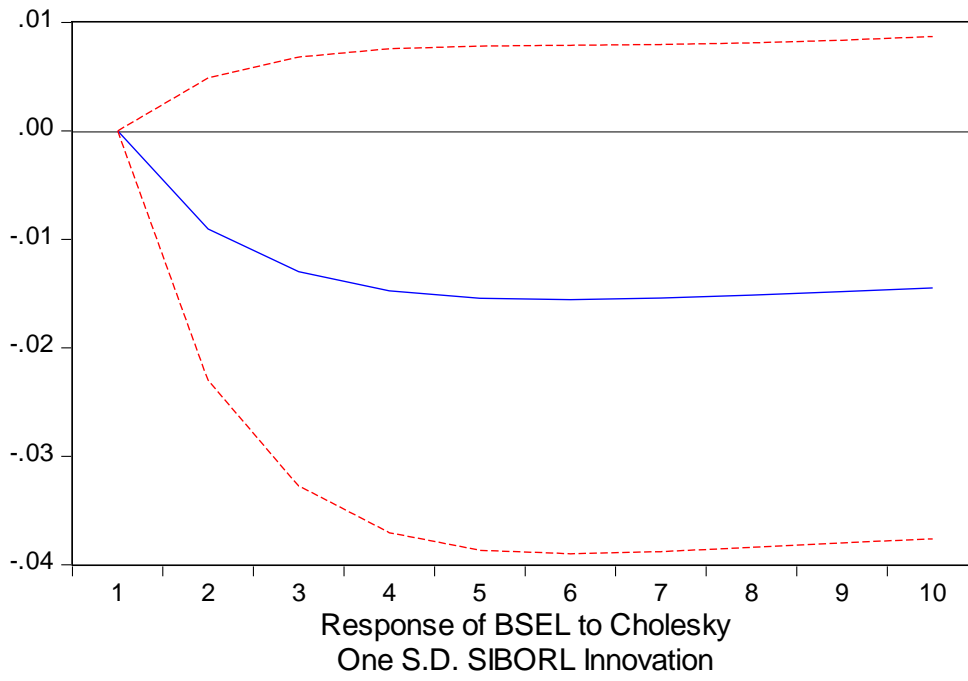


Impulse of LIBOR/KIBOR Reponses of Stock Market Indices

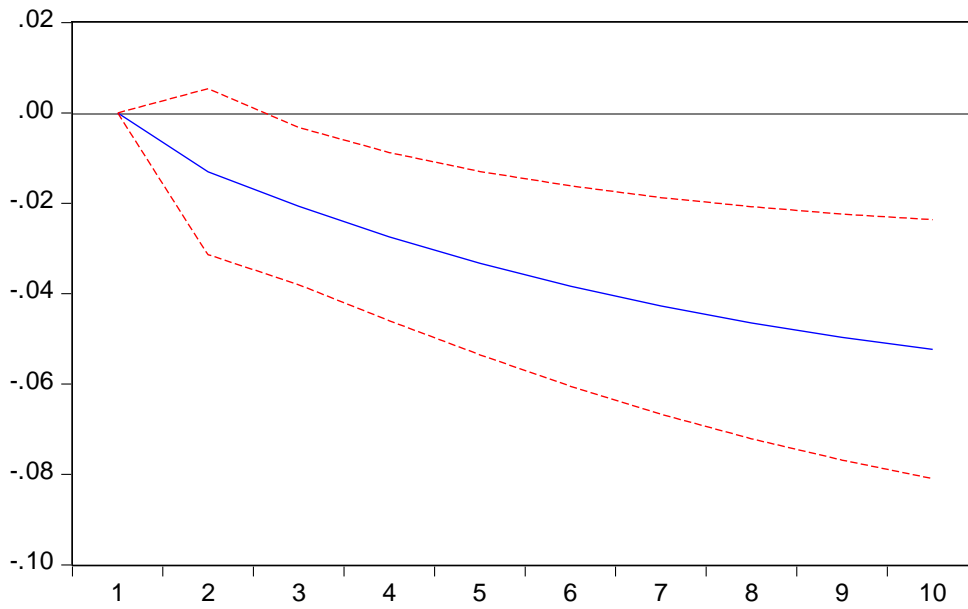
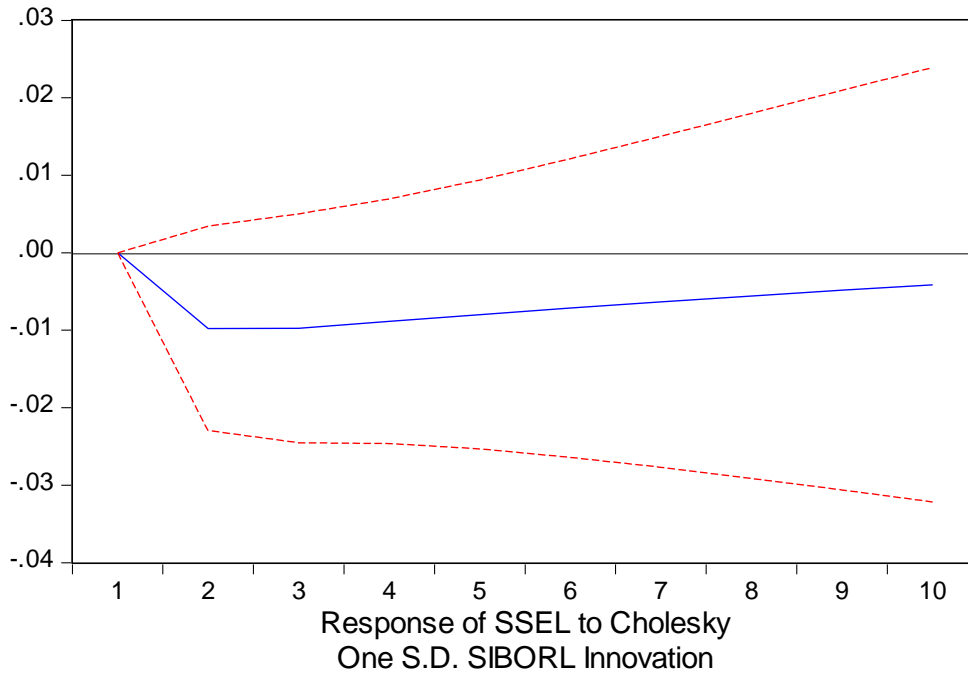
Response of BSEL to Generalized One
S.D. LIBORL Innovation



Response of SSEL to Cholesky
One S.D. LIBORL Innovation



Response of KSEL to Cholesky
One S.D. SIBORL Innovation



CHAPTER 5

CONCLUSION AND IMPLICATIONS

In this study we find financial integration of three Asian financial markets (China, India and Pakistan) with the international markets (using London Inter-bank Offer Rate - LIBOR as reference) and with Asia regional market (Singapore Inter-bank Offer Rate- SIBOR as reference).

We examined long run relationship between call money rates, 6-month Treasury bill rates, domestic currency/US dollar exchange rate and stock market returns of respective countries as a measure of returns in the Asian financial markets with the LIBOR and SIBOR using cointegration approach. Second, the VAR model is estimated and then impulse response functions and variance decompositions are used in order to trace a response of to a shock to each of the financial variables and international and Asian regional bench mark interest rate.

Due to globalization and most liberal financial policies around the developed and developing countries Asian countries (China, India and Pakistan) can't remain separate from the effects of the economic. Financial policies of Asian countries and fast flow of information around the world have encouraged arbitragers to capitalize their position and hence could cause large differences in economic figures, the downturn of East Asian countries economies are the best example to support the above statement. As we know research findings play pivotal role for understanding significance of study, so results of our study clearly depicts the whole story. Co-integration results depicts that China SSE market index and call money rate have no co-integration with LIBOR and SIBOR. However, in case of India and Pakistan short term money market is still in the development stage. Furthermore, Vector error correction model shows the presence of

positive long run relationship between call money rate and LIBOR, and T bill rate and LIBOR and the error adjustment has expected negative sign and significant confirming the long run relationship.

Moreover, Granger causality indicate that in case of India LIBOR causes T bill, Bombay Stock Index causes SIBOR but call money rate, exchange rate has no causal effect with LIBOR or SIBOR. For Pakistan LIBOR causes KSE 100 index and SIBOR causes exchange rate. On the other hand, T Bill and call money rate have no causal link with LIBOR or SIBOR. In case of China financial market SIBOR causes T bills and Shanghai Stock market, T bill, while exchange rate and T bills causes LIBOR. In addition, the variance decomposition of LIBOR and SIBOR indicate that most variation is explained by LIBOR and SIBOR compared to call money rate, T bill rate and exchange rate for all three Asian countries India, Pakistan and China. This suggests that LIBOR and SIBOUR contribution a significant variability in the financial returns call money rate, exchange rate and T bill.

Pakistan where the liberalization of economy started from 1990's and with the passage of time more need for it was felt as the Government want to reap out the benefits of financial integration but one can't say that the liberalization is carried out 100% as the government can't bear the negativities of it. Financial integration if severely positive could affect the fiscal and monetary policies of the country and the Government up to some extent could lose control on its policies.

The best example in Pakistan context is the exchange rate of Pakistan currency with US \$, in spite of tough monetary policy the control on exchange rate is not in control of the government and now at present the exchange rate reaches up to 90 rupees per dollar the variability in exchange rate is very much high after the second phase of liberalization

period 1998-99 this shows the negative side of integrations due to this the capital and current account of the country deteriorates. If the country position is positive it could capitalize its position with the help of its integration with the rest of the world. Integration is high in Pakistan when less Government Intervention is involved and this is what I tried to check in this paper by taking CMR, T Bill, Exchange rate data from 1997 to 2016.

State Bank of Pakistan frequently intervenes in the exchange market which might be a result of no integration of exchange rate with the LIBOR. A recent money laundering crisis in Pakistan is an eye opening for the state and the regulatory bodies; it is their obligation to formulate such policies which can prevent such incidence in the future. It is important to have political stability, well developed institutions and coordinated policies then Pakistan India and even developing countries because of sharing same problems can reap benefit from the process of increased financial market integration. Otherwise increasing integration of financial markets may leave welfare loss for the country.

The implications that come out of these results is that Asian market has to go one way to improve financial integration regionally and internationally. /these results are useful for researchers and academicians in financial economics, policy makers and authorities.

Future research can be extended by taking other international bench mark interest rate for borrowers and lenders, including other regions and countries to investigate the financial integration.

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