CAPITAL UNIVERSITY OF SCIENCE AND TECHNOLOGY, ISLAMABAD

Mean and Volatility Spillover from Currency Market to Equity Market: Evidence from South Asian Countries

by

Rida Yousaf

A thesis submitted in partial fulfillment for the degree of Master of Science

in the

Faculty of Management & Social Sciences
Department of Management Sciences

2019

This thesis is dedicated to my parents and siblings for their love, understanding, prayers and continuing support to complete this research work.

CERTIFICATE OF APPROVAL

Mean and Volatility Spillover from Currency Market to Equity Market: Evidence from South Asian Countries

by

Rida Yousaf

(MMS173010)

THESIS EXAMINING COMMITTEE

S. No.	Examiner	Name	Organization
(a)	External Examiner	Dr. Hassan Raza	NUML, Islamabad
(b)	Internal Examiner	Dr. Arshad Hassan	CUST, Islamabad
(c)	Supervisor	Dr. Nousheen Tariq Bhutta	CUST, Islamabad

Dr. Nousheen Tariq Bhutta
Thesis Supervisor
December, 2019

Dr. Mueen Aizaz Zafar
Head
Dept. of Management Sciences
December, 2019

Dr. Arshad Hassan
Dean
Faculty of Management & Social Sciences
December, 2019

Author's Declaration

I, **Rida Yousaf** hereby state that my MS thesis titled "**Mean and Volatility Spillover from Currency Market to Equity Market: Evidence from South Asian Countries**" is my own work and has not been submitted previously by me for taking any degree from Capital University of Science and Technology, Islamabad or anywhere else in the country/abroad.

At any time if my statement is found to be incorrect even after my graduation, the University has the right to withdraw my MS Degree.

(Rida Yousaf)

Registration No: MMS173010

Plagiarism Undertaking

I solemnly declare that research work presented in this thesis titled "**Mean and Volatility Spillover from Currency Market to Equity Market: Evidence from South Asian Countries**" is solely my research work with no significant contribution from any other person. Small contribution/help wherever taken has been duly acknowledged and that complete thesis has been written by me.

I understand the zero tolerance policy of the HEC and Capital University of Science and Technology towards plagiarism. Therefore, I as an author of the above titled thesis declare that no portion of my thesis has been plagiarized and any material used as reference is properly referred/cited.

I undertake that if I am found guilty of any formal plagiarism in the above titled thesis even after award of MS Degree, the University reserves the right to withdraw/revoke my MS degree and that HEC and the University have the right to publish my name on the HEC/University website on which names of students are placed who submitted plagiarized work.

(Rida Yousaf)
Registration No: MMS173010

Acknowledgements

"In the Name of Allah, the Most Beneficent, and the Most Merciful".

Oh Allah! You are my Lord. There is no deity but You. You created me and I am your slave-servant. I am trying my best to keep my oath of faith to You, and to seek to live in the hope of Your promise. I seek refuge in You from my greatest evil deeds. I acknowledge Your blessings upon me, and I acknowledge my sins. So forgive me, for none but You can forgive sins.

All the praises and thanks be to **ALLAH**, the lord of the Alamin (mankind, jinns and all that exists), who bestowed me with His uncountable blessings and strength to stood at best.

Greetings to the Holy Apostles who were selected by the Lord for the guidance of mankind, especially the Prophet of Islam **Hazrat Muhammad (P.B.U.H)**. Greetings and praise to the successors of the dignified Prophet and the guardians of the humanizing school of Islam.

I am extremely grateful to my **parents and siblings** for their love, prayers, caring and sacrifices for educating and preparing me for my future.

I would like to express my deep and sincere gratitude to my research supervisor **Dr. Nousheen Tariq Bhutta** for providing invaluable guidance throughout this research. Her dynamism, vision, sincerity and motivation have deeply inspired me.

I would also like to thank all my teachers, friends and well-wishers in my academic career for their support that has always been a source of motivation for me.

Finally, my thanks go to all the people who have supported me to complete the research work directly or indirectly.

(Rida Yousaf)

Registration No: MMS173010

Abstract

The basic idea is to the study and analyze the return & volatility transmission change in currency and equity markets of south Asian countries (Pakistan, India, Sri Lanka, Nepal and Bangladesh) during electioneering using event study methodology. The 19 years data from 1/2000 till 12/2018 of currency and equity market is collected from south Asian countries, which employs the daily closing prices of these markets. ARMA GARCH (1, 1)-model is used to evaluate market-to- market Return and spillover volatility for exchange rates and DCC-ADCC models are also used to further explore the time-varying nature of conditional correlation.

The research findings provide strong evidence of transmission of return and volatility spillover across the currency market-to-equity market in Pakistan, India and Sri Lanka and Nepal but there is limited evidence of diversification in Bangladesh. In DCC GARCH which reveals the time varying nature of conditional correlation. The results also show the presence of asymmetric behavior among different countries.

Keywords: Return & Volatility Spillovers, South Asian Countries, Currency and Equity market, ARMA GARCH (1, 1), DCC, ADCC.

Contents

List of Figures

List of Tables

Chapter 1

Introduction

One of the most significant macroeconomic parameter is the exchange rate. Exchange rate has captured the whole economy very strongly that all the major activities such as the policy making, economic agendas and academics are influenced by exchange rate. In 1970s, a lot of queries were arrived when the decision about the use of pegged, floating and fixed exchange rate regime were raised. Since that different currencies were used as exchange medium until the recently when the euro was introduced. Still it is an important problem which is being discussed by most nations of the world today for selection that which exchange rate regime is most beneficial to be adopt.

There have been a number of studies on the exchange rate worldwide, which depicts a positive results of exchange rates (Albulescu et all, 2018; Ji et all,2018). According to Xuping et all, 2018, the literature of exchange rate have three basic criteria's of research which has been focused previously, that is:-

1. **Determinants of Exchange Rate:** A well-established literature in which the researchers mostly concentrated on trade terms, government budget, interest rate fluctuations, net foreign debt, risk premia awareness, and the technological improvements which leads to the fluctuations of exchange rate.

2. **Spillover Effect:** The second one literature studies the effect of spillover on currency market.

3. **Markets Relationship:** The third literature studies the association between currency market and asset market such as demand for commodities. The study of the relationship between the currency market and the oil market is one of the most popular study being researched in this context (Sari et al., 2010).

In light of the foregoing, the focus of our study is second criteria, which is exchange rate volatility spillover along with this we are also focusing on monetary policy spillover. Exchange rate volatility has strong influence on the capital market prices which impact on trading and foreign investment in the real economy (Xuping et al., 2018). If exchange rate volatility effect any country then it means, that country is not only affected in trade but also has its impacts on whole economy and affect the other countries as well (Backman, 2006).The exchange rate volatility effect is weaker in developed countries as of developing countries in case of microeconomics and financial variables(Grossmanna et al., 2014).

International trading and foreign investment and resident's welfare are interlink with each other as trading and investment decreases it also decrease the level of welfare for the residents of all trading countries (Edmonds, 2004).

Policymakers and other economic agents of financial markets are very much interested in determination of exchange rate regime. In order to find and develop a most appropriate policy, the influence of exchange rate volatility is used as the information for policymakers about different macro variables (Backman, 2006).

Next, in the small open market, the central bank follows an interest rate policy only replied to worldwide shareholder inflows to the extent that they have an impact on price levels and do not monitor their (and thus the real rate) asset prices. In other words, as if it were in a large economy, the central bank "thinks like the Federal Reserve". This results in deflationary (inflationary) inflows (outflows). The second item is the presumption (information carried out) that the small economy's non-commercial products have higher prices than those that are tradable. It means that tradable commodity prices will determine the inflationary effect of capital

flows, contributing to significant swings in the nominal exchange rate (Plantin and Shin, 2018).

1.1 Theoretical Background

1.1.1 Market Efficiency Theory

An efficient market can be defined as the market in which stock prices incorporate all available information, past or present, and represent it. This implies that prices follow a random walk model in an efficient market. Since the information is easily accessible to everyone, there is no place for anyone to earn abnormal returns. A host of factors are key to the efficiency of a security market.

Dyckman and Morse (1986) state "A security market is generally defined as efficient if (1) the price of the security traded in the market act as though they fully reflect all available information and (2) these prices react instantaneously, or nearly so, and in unbiased fashion to new information".

Efficient market hypothesis (EMH) was widely discussed in the financial literature due to its significant implications. The Efficient Market Hypothesis is an investment theory. Robert Shiller first proposed the efficient market hypothesis in the 1960s and then further developed in the 1970s by Eugene Fama. Fama (1970) defined three varieties of market efficiency, weak/poor efficiency form, semi-strong efficiency form, and strong efficiency.

Under weak form efficiency, the current price represents the information contained in all previous prices, implying that graphs and technical analyzes using past prices alone would not be useful in finding undervalued stocks. Therefore, investors are unable to forecast the demand if they use traditionally priced models. Under semi-strong efficiency, the current price represents the information contained in past prices as well as all public information (including financial statements and news reports) and no statistical approach to using and massaging this information would be useful in finding undervalued stocks. Therefore, investors will not be able to generate excess returns on the basis of this publicly available information,

as security rates must automatically adjust to their new level of balance once the information is released.

Under strong form efficiency, the current price represents all data, both public and private, and no investors will be able to consistently find undervalued stocks. Investors are therefore unable to use their own private information to forecast value and earn extra returns.

Hadi (2006) investigated the types of Efficient Market Hypothesis. He conducted a detailed analysis that examined weak, semi-strong and strong market efficiency modes. It is noticed that in semi-strong form accounting-based research usually indicates market's efficiency. This is because when the financial reports have been released on the market at once, they are considered as public information. He provided evidence from the Jordanian market stating that the security market reacted to the release of profitability, liquidity and solvency information with mixed signals.

About Pakistan's situation, Hasan, Shah and Abdullah (2007) analyzed Karachi Stock Exchange's weak-form market efficiency (KSE). The results show that the behavior of prices does not support random walks, and therefore they are not efficient in weak form. Technical analysis can be useful in forecasting short-term behaviors on the equity markets for such situations.

Samarakoon's (2005) research findings verify that Sri Lankan stock market is indeed predictable and inefficient in terms of weak market effectiveness. The outcome discovered here contrasts with the finding of an efficient market hypothesis in a semi-strong form. In addition, in Colombo Stock Exchange, Sri Lanka, Abeyratna, Bandara, and Colombage (1999) tested the semi-strong version of the efficient market hypothesis showing similar results.

The theory of market efficiency strongly supports this study. Efficient market hypothesis (EMH) theoretically notes that financial asset market prices fully reflect all available information on the asset's worth. Therefore, when all data is combined, it is impossible to predict an asset's future value. It also indicate that trading on the stock market makes it impossible for anyone to earn the profit

above average return. This means that no investor could be able to outperform the market as all the new information is already reflected in current stock prices.

1.2 Gap Analysis

Number of studies has been conducted which explains the effect of exchange rate volatility spillover and but no study has been conducted which reported forex and stock markets. Most of the studies illuminate on analyzing return and volatility on same markets. However, there exists a gap that nobody has touched them together in markets. In this research we have studied stock market and forex market.

I have also researched the effects of electioneering on forex market spillover and electioneering impact on stock market which has been not done before. With the passage of time the researchers are showing more curiosity on electioneering. So this research will be the gateway for upcoming researchers to work on this domain.

1.3 Problem Statement

Our approach is most closely related to models of financial instability that involve coordination problems and self-fulfilling speculative episodes. It is difficult to understand these financial instabilities of exchange rate in various markets as they influence the both imports and exports of a country as well as for policy making of a country. In previous studies, most of the researchers showed that information created in one market immediately transmits to the other market through contagion effect. That's why any change in one market influences the volatility of other markets. With the passage of time, globalization has decreases the fact of isolation and markets are getting closer to each other world widely. Most of the previous literature shows that, the information about the co-movement between different markets is already studied. Moreover, the past literature also tells that the spillover effects are mostly seen across different countries or regions. Exchange rate has direct effect on all markets. Information about exchange rate to different markets is available but the evidences on electioneering information are

inconclusive especially in South Asian markets i.e. India, Pakistan, Bangladesh, Sri Lanka and Nepal. So, the debate on the response of these types of transmission of information is still unexplored.

1.4 Research Questions

This study has the following research questions

1. How information created in one market transmits to the other market in South Asian countries?
2. Is correlation among different markets in South Asia time-varying?
3. Does the correlation among different markets show asymmetric behavior?
4. Is there any interdependence of markets in South Asian?
5. More specifically, how much influence of electioneering on various markets in South Asian Countries?

1.5 Objective of the Study

This research has the following objectives

1. To analyze the return and volatility spillover in various markets from South Asian countries.
2. To review the possibility of dynamic conditional correlation in different markets of south Asian Countries.
3. To review the asymmetric behavior of conditional correlation in different markets of South Asian Countries.

1.6 Significance of the Study

Exchange rate volatility spillover interacts closely with capital market prices and has a huge impact on import-export trade and foreign investment in the real economy. So there is a need to study the impact of exchange rate volatility spillover on various markets. This study will contribute in the literature through investigating the impact of exchange rate volatility spillover on various markets during electioneering period. This study will help the policymakers and monetary authorizers while making the decisions about policies regulation and for long run. This study will also help the investors to control the currency fluctuation in exchange market. Along with, it will also be helpful for researchers to examine that how electioneering is controlled by money bags? And how electioneering impacts exchange rate?

1.7 Contribution of the Study

This study will contribute in the literature on relationship between monetary policy spillover and exchange rate volatility spillover during electioneering period.

1.8 Organization of the Study

Chapter 1 provides the introduction, Theoretical Background, Gap Analysis, Problem Statement, Questions, Objectives and Significance of the Research. Chapter 2 includes the literature reviews of the past studies and hypotheses for the study. Chapter 3 covers the research methodology of the current research study. Data analysis and results are covered in Chapter 4. Finally, Chapter 5 covers the conclusion, recommendations and limitation of the current research study.

Chapter 2

Literature Review

Interest in the international financial markets integration process has triggered a considerable amount of spillover effects work. Mean returns and volatility can be used to calculate the transmission of information between markets. This mechanism of transmission is also highlighted in some important paper that includes Rezitis (2003), Bhar (2007), Theodossiou and Lee (1993), Darbar and Deb (1997), Koutmos (1996). However, there is a lack in the previous literature that most of these studies are conducted on some specific financial markets but do not provide information about spillover mean and volatility or transmission of shocks across Asian countries during electioneering. With the passage of time, the distance between financial markets is almost removing, so it's becoming the demand of investors that how information created in one market influence on other markets. Such findings are also used by different policy makers and analysts to render the decision-making system more efficient with respect to asset pricing, market techniques and hedging.

2.1 Exchange Rate

Exchange rates play a central role in international trade because they allow us to compare the prices of goods and services produced in different countries.The

exchange rate is defined as the price of one currency in terms of another currency.Exchange rate is one of the broadly observed, investigated and manipulated economic measures (Bergen, 2003).

Manuelli and Peck (1990) determined the exchange rate and its uncertainty through the model of overlapping generation along with the stochastic Endowments. In this theory they focus on: 1) use one commodity; 2) history of endowments for exchange rate; 3) the role of international currencies. Exchange rate volatility can be measured in terms of variance, while considering the available information. However they found that exchange rate processes including equilibrium processes known as exchange rate equilibrium of indeterminacy. They justified the presence of equilibria under flexible exchange regime despite of volatility in fundamentals; they also proved that the consumption process occurs due to the constant exchange regime.

Furthermore, Betts and Devereux (1996) pursued the exchange rate in a pricing-to Market model. They assumed the price stability as introduced by Obstfeld and Rogoff (1995) and they worked on optimizing behavior model. The exchange rate is determined as function of consumption differentials that elasticity of demand for money as well as goods consumption, and the part of goods underpriced to market regime. They found that there is strong relationship between the goods underpricing-to-market regime and exchange rate variance, as one increases the other will also increase.

Asad et al. (2012) evaluated the impact of real effective exchange rate on inflation in Pakistan while using the time series data of nominal GDP, real GDP, real effective exchange rate, money supply and prices for the period of 1973 to 2007. They concluded that the inflation rate in Pakistan is effected through the real effective exchange rate and there found a significant and strong relationship among the real effective exchange rate and inflation. Country specific variables, such as the exchange rate regime (e.g., Liang, 1998; Mussa, 1986; Grilly and Kaminsky, 1991; Baxter and Stockman, 1989; Flood and Rose, 1995; Kent and Naja, 1998; Rogers, 1995; Carrera and Vuletin, 2003; Morales-Zumaquero and Sosvilla-Rivero, 2010) Kocenda and Valachy, 2006; and openness of the economy (Obstfeld and

Rogoff, 2000; Hausmann et al., 2006; Calvo et al., 2003) are also often linked to the exchange rate volatility.

2.2 Exchange Rate Volatility Spillover

The rate at which one currency is converted into another is an exchange rate. How rapidly the exchange rate fluctuates is its volatility. Whereas volatility is defined as an unrealized and hidden variable. Many researcher work on volatility with combination of exchange rate to make it observable, with varied results (Bauwens and Sucarrat, 2005).The research by Xuping (2018) has confirm presence of relationship between the spillover effect and the exchange rates of the most currencies worldwide. Volatility of exchange rate is higher in short run but has reactive impact on monetary policy, political events, and changes in expectations. Exchange rate volatility include price, money supply shocks, Trade balance, and government spending and output volatility The stability of exchange rates is determined by the existence of contemporary shocks in money supply and cost, money supply and government spending, prices and balance of trade, government spending and demand, and production and trade balance (Backman , 2006). Bulk of studies conducted which elaborate the negative relationships implemented by exchange rate volatility. For example, the inflationary rate is negative pressurized by exchange rate volatility (Ramasamy & Abar, 2015; Danmola, 2013), whereas the results of volatility is founded significantly negative on growth. Negative relationship is reported between interest rate, money supply, output,real GDP per capita and FDI (Alagidede & Ibrahim, 2017). Past studies indicate that real exchange rate fluctuations might be the fail to create single-price rule (Jenkins and Rogers, 1995; and Engel, 1999 and 1993). They founded a conclusion that in such failure, both the cross border and the distance played significant characters. These researches propose the need for study of exchange rate fluctuations to include the range and border impacts. Diebold and Yilmaz (2009) have also shown that spillovers are significant, and the actions of spillovers of return and volatility that differ. Through real and financial networks, exchange rate movements can affect economic growth.

The financial system of fluctuations in the exchange rate also works in another direction from the net export stream. Real economic output is growing rapidly when the national currency depreciates under the net export stream (Avdjiev et al., 2019). Local currency exchange rate fluctuations against the US dollar have an effect on the risk premium for local currency sovereign bonds (Hofmann et al., 2016), thereby influencing domestic financial conditions more broadly. Avdjiev et al. (2019) and Bruno & Shin (2015a) reported that an increase in the US dollar may lead to a decrease in cross-border bank loans because of its effect on the balance sheets of global banks. Kohn et al. (2017) and Bebczuk et al. (2010) demonstrated that local currency devaluations could be contractionary.

2.3 Monetary Returns Spillover

The Forex trading evidence shows the interdependencies and spillovers in uncertainty lead to central bank decisions (Menkhoff, 2013), effect Foreign trade (Rose, 2000), Influence on global stock prices (Baum et al., 2001), which impact risk management and diversification of investments directly (Garcia & Tsafack, 2011; Fengler & Gisler, 2015 and Kanas, 2001). Return spillovers can also lead to spillovers of volatility (Phylaktis & Ravazzolo, 2005).

2.4 Return and Volatility Spillover Across Markets

2.4.1 Relationship of Exchange Rate Volatility Spillover on Markets

Since a long time, international economics has been focusing on exchange rate volatility.Exchange rates are an important policy instrument of monetary authorities in especially developing countries, as in these countries it is often used as

a substitute for operating target instrument (Ghartey, E.E, 2019). Zettelmeyer (2004) proved that the effect of exchange rate on markets is appreciable.

High volatility of exchange rates may be attributed to monetary unexpected shocks, Dornbusch (1976). Ali et al. (2015) used monthly data from July 2000 till June 2009 to assess the impact of interest rate, inflation and money supply on exchange rate volatility in Pakistan. The results showed that the uncertainty of the exchange rate had a negative impact on interest rate, unemployment and money supply. The study showed that the supply of money and the interest rate have positive relationship which causes raise in the inflation which eventually increases the level of exchange rate volatility. This research showed good long-term and short-term exchange rate and inflation convergence.

Kamin, and Klau, (2003) noted that in most developing countries there is a strong relationship between money supply and exchange rate volatility. Moreover, Mandeep, (2010) concluded that the interest rate and exchange rate fluctuations have a negative relationship. Asari's case study of Malaysia in (2011), stated that the impact of the volatility of the exchange rate could be prevent the increase of interest rate. Hausman and Wongswan (2011) find that the interest rates in economies with less flexible exchange rates are more responsive to US monetary policy surprises.

Another research conducted in Malaysia by Khin. et al. (2017) in which the relationship between the volatility of the exchange rate and the consumer price index, the interest rate and the money supply was discussed. This study concluded that there is a negative relationship between interest rate and exchange rate, as it inversely affects foreign direct investment when there is a fall in domestic interest rate. Furthermore, Klein & Rosengren (1994) and Froot & Stein (1991) also discussed an analytical framework adopted by incorporating the impact on real exchange rate volatility as shown by Engel and Rogers (1996) of the one-price law failures between different markets. Milunovich and Thorp (2006) indicated that spillover of uncertainty occur widely respectively on energy and financial markets. Ghosh (2014) found evidence of significant co-movements in volatility and/or spillover impact on the foreign exchange market in India from

various financial markets. The association of financial volatility through capital and markets is widely accepted (Jondeau et al. 2007). Kim and Kim (2015) studied the U.S. economy and the results showed that the high exchange rate against the U.S. dollar increases national index volatility but decreases U.S. stock market volatility.

Francis, Hasan and Hunter (2002) examine the dependence on fluctuations between equity and currency markets as well as the extent to which shifts in one market justify movements in the other on the lines of research on the effect of the stream of orders on Evans and Lyons (2001) the exchange rate determination. The study also investigates whether, due to changes in currency market volatility, the relationship between international equity markets has changed. The study finds that past currency market volatility has important predictive power for current equity securities volatility and that higher than average currency volatility results in increased equity market correlation. It states that while equity markets predict currency market volatility, the relationship is much weaker than the reverse, especially in the post-1987 period. In contrast, there is hardly any mean predictability between stock and currency markets except for Canada It is observed that for exchange rate effect filtering, the cross-relation between the U.S. and global equity markets is robust. In the post-1987 era, such cross-relations deteriorated, except for Canada, where only in that sub-period it is significant. The relationship between currency and equity markets is found to be bi-directional, important, continuous and independent of the equity market relationship alone, and more precisely best captured in conditional second moments. Mikhaylov, (2018) indicates that the impact of volatility spillovers between national stock indexes and exchange rates takes place in both directions. Because currency market breaks can trigger currency rate change and the currency shock on the stock market is reflected.

Previously, Andreu et al. (2013) investigated the stock-to-FX market relationship for twelve emerging markets and found that in all selected countries, except Colombia, there is significant positive impact in both directions. Zhao (2010) showed that for the Chinese market there is also a correlation in the volatility dynamics of

the exchange rates and volatility of prices of Chinese equities in the period from 2001 to 2009. The relationship between stock and exchange rate in Japan has been established by Jayasinghe and Tsui (2008). The researchers concluded that the volatility of stock prices in six Japanese sectors has a spillover effect. In these markets, stock volatility increases more than exchange rate volatility. Kasman et al. (2011) study results are great: the main determinants of asset price volatility are interest rates and currency fluctuations. Abrupt changes resulting from breaks in volatility between equity and currency markets have a short-term effect. There should be no room for long-term investors about this. Kanas (2000) found significant positive effects of the stock market on shifts in all countries except Germany's exchange rates. Assoe (2001) explores 5 developed and 11 emerging markets (including India) for domestic stock market spillovers, foreign exchange rates, and an international stock market (USA). Assoe (2001) considers the relationship between India's stock markets and the foreign exchange markets to be the least studied country. The research also finds substantial spillovers of proprietary risk in equity and foreign exchange markets, suggesting that past proprietary developments are boosting existing volatility in both markets. Spreading risk from foreign exchange markets to Indian domestic stock markets are not significant, indicating that exchange rate innovation has no significant impact on stock market volatility. On the other hand, Assoe (2001) finds evidence that stock market volatility has a strong impact on the rupee with the spillover of cross-market volatility from the stock market to the foreign market. The study finds that India's stock market asymmetry parameter (0.169) is substantially positive, suggesting that in these markets, positive past innovations increase volatility more than negative innovations. On the other side, the variable of asymmetry is significantly negative and the parameter of risk spillover on the foreign exchange market is strong. However, the transition of risk from the foreign exchange market to the stock market is asymmetrical, with negative shocks / news on foreign currency markets growing stock market volatility more than positive shock / news. The parameters of the stock markets (0.968) and the foreign currency markets (0.894) of persistence of volatility are less than 1 showing that the contingent variances are not integrated

and that absolute variances are finite. Nonetheless, both are still very broad and critical, exhibiting a high degree of uncertainty in both markets. Assoe (2001) also finds that the two markets ' conditional estimates 'pair correlation differ substantially from the unconditional correlations, suggesting that the dynamic structure of the correlation needs to be taken into account in order to design appropriate strategies for foreign exchange risk hedging. Engel and West (2006) and Mark (2009) present quantitative single-equation exchange rate models based on general equilibrium macroeconomic models in which monetary policymakers are committed to instrumental regulations. Engel (2016) developed a Nagel (2016) model where the expected return on U.S. bonds falls relative to the higher U.S. bond return. That is, if the U.S. bond has some interest on its liquidity, it must be expected that the international bond will pay a higher monetary return. Engel (2016) indicates that when the U.S. interest rate is relatively high, the volatility yield of the U.S. debt will be relatively high. Through above past research we come to know that the money supply and interest rate can lead exchange rate volatility for future, so we can say that monetary returns hold information for regulation of exchange rate volatility.

2.4.2 Impact Exchange Rate Volatility Spillover on Various Markets during Electioneering

In any event, as exchange rates face high risks and uncertainties, shareholders and strategic companies become apprehensive. For example, profit-maximizing shareholders such as equity investors are concerned about the risk of currency fluctuations, whereas policymakers are intensely concerned about cost, exchange, expenditure, and uncertainty multiplier effects on the macroeconomy and demand. Therefore, when the exchange rate exhibits excessive uncertainty, the effects on the macroeconomy are quite grievous.

Empirical research has predominantly found that financial markets are poorly established and mainly inefficient in emerging nations. However, the swooping effects of the latest global financial crisis in 2007-2009 on Africa's economic markets

(Collins and Bekpe, 2004). They revived confidence in finding out how well emerging countries ' economic systems are incorporated into global financial markets.

Spillovers were, after all, deemed as essential prerequisite for economic inclusion (McMillan and Speight, 2010). There is a recorded untoward behavior in their economic framework in the emerging countries. First, as countries become more and more incorporated into global financial markets (Collins and Bekpe, 2004), and are obliged to respond to global financial behavior through contagion impacts.

Second, most of these countries "financial aspect depends on their political' barometers". This allows electioneering procedures significantly influence the path of foreign exchange conduct where noise depends on the pace at which national currencies are swapped for certain quoted global currencies. Moreover, the electioneering method of the "money bag" in the nations engenders some irrational conduct that continues to bring internal changes into the economy with consequences on macroeconomic fundamentals, including the exchange rate.

Because of the high risks and uncertainties that generally characterize a nascent representative system, equity managers wishing to enhance their profits are generally skeptical about effective changes from one military law to another. Thus, the use of the subsamples determined by the electioneering era can discern more insightful results.

Political "barometers" most emerging countries rely mainly on their policies for the financial dimension of most developing nations. This allows electioneering procedures significantly influence the foreign exchange conduct path where noise depends on the pace at which national currencies are swapped for certain global currencies. Moreover, the electioneering method of the "money bag" in the nations engenders some irrational conduct that continues to bring internal political developments impacting the macroeconomic dynamics, including the exchange rate. However, in Uganden's (2010) terms, Nigeria's electoral process, marked by buying votes, election bribery, and outright violence, remains unable to deliver leadership imbued with the public accountability spirit. Moreover, the former has a somewhat growing spillover impact, while the latter has a declining spillover impact.

2.5 Time-Varying Conditional Correlation

There is a range of interesting study and experimental research using the dynamic conditional correlation method (DCC) of Enlge (2002) which is a flexible framework which allows for time-varying comparison and plausibility of estimation. Lee (2006) uses the DCC approach to track the ability of the overall price level to change in the same direction as output in the well before-World War II periods but in the opposite direction after the war. Through examining the role of macroeconomic and financial variables with the DCC and related modified DCC models, provide proof of the origins of co-movement of monthly stock returns in the US and UK (Aslanidis, Osborn and Sensier, 2008).

Longin and Solnik (1995), Pelletier (2006) and Silvennoinen and Teraesvirta (2005, 2009) examine variations in comparisons across various market systems by applying the Bollerslev (1990) GARCH method of constant conditional correlation (CCC). For the volatile market times, Longin and Solnik (1995) allow the approximate correlation coefficient to vary from the constant correlation coefficient for the rest of the study by adding a threshold conditional on the contemporary volatility.

Sheppard (2003) makes a significant improvement to the approximation of the DCC model by minimizing MVGARCH's estimation for a set of GARCH univariates plus an additional association estimator. Solnik et al. (1996) found out that in periods of high market volatility, the connection of industrialized countries is rising. Nonetheless, there is a small literature on the behavior of asymmetric stock market correlations, but with regard to adverse shocks and more volatility, global financial crises lend it more significance.

Asymmetric effect occurs when unexpected downward trends in an asset's price increase the conditional volatility of returns more than when unexpected upward trends occur (Nelson, 1991 & Engle, 1993).

Pan et al. (2014) performs a study to determine the feasibility of hedging between crude oil prices and other petroleum products such as oil and gasoline using the RS-ADCC GARCH method. In this study, the BEKK model's hedging efficiency has proven to be the best way to hedge crude future with gasoline futures. The

policy changing RS-ADCC scheme provides the highest productivity of hedging crude oil and heating oil.

The relationship between S&P 500 and commodity markets is investigated by Demiralay and Ulusoy (2014). They study conditional correlation between the Dow Jones UBS-commodity index and its subindices with S&P 500 using the asymmetric dynamic conditional correlation ADCC GARCH model. They use the weekly return data in their study and use the Exponential GARCH EGARCH model during the 1992-2013 period. They report a highly volatile correlation between equities and commodity indices. In fact, during financial crises, they often consider an increasing trend.

Although there is a huge amount of literature on time-varying conditional correlations and contagion on developed countries' stock and bond markets (Missio and Watzka, 2011: Kenourgios et al., 2011; Dungey and Fry, 2009; Bartram et al., 2007; Cappiello et al., 2006; Engle, 2002). However, related literature on emerging markets is limited to conditional correlations between stock markets and currency markets. Past research in South Asian countries, which captured the positive or negative asymmetric effects over time, is limited on the comparisons between different markets.

2.6 Hypotheses of the study

H_1: There exists exchange rate volatility spillover on different markets.

H_2: There exists a time-varying conditional correlation between forex market and stock market.

H_3: There exists an asymmetric behavior of time-varying conditional correlation between forex market and stock market.

H_4: There exists exchange rate volatility spillover on different markets during electioneering.

Chapter 3

Research Methodology

The methodology was split into three primary components. The first portion of this research uses the GARCH In-Mean model described by (Liu and Pan, 1997) to examine the spillover volatility of exchange rates on forex market and stock market in South Asian countries. In the second portion, Dynamic Conditional Correlation (DCC) and Asymmetric-DCC (ADCC), Multivariate Generalized Autoregressive Conditional Heterosexuality (MV-GARCH) designs suggested by Engle (2002) and Cappiello et al. (2006), used to measure conditional correlations between different markets.

3.1 Data Description

3.1.1 Population and Sample

The data samples used for this study are the daily closing prices of equity market and forex market for Pakistan (KSE), India (Nifty50), Bangladesh (DSE),Sri Lanka (CSE) and Nepal (NEPSE).The sample period is taken of 19 years starting from the period between January 2000 and December 2018. As due to holidays in one market while the other markets are open, some values are missing. In this case the previous day's closing price was used. The daily data is used for the reason that it capture detailed information about markets as of weekly and monthly basis. The data were sourced from investing.com.

Karachi Stock Exchange (KSE) was chosen as Pakistan's official stock market. As the national currency of Pakistan is Pakistani Rupee (PKR). For India, the National Stock Exchange of India (Nifty 50) is chosen. India's exchange rate is Indian Rupee (INR). Sri Lanka is regarded to be the Colombo Stock Exchange (CSE). Sri Lankan Rupee (LKR) is considered as Sri Lanka's domestic currency. For Nepal, Nepal Stock Exchange is chosen (NEPSE). Nepal's domestic currency is Nepalese rupee (NPR).Bangladesh is chosen for the Dhaka Stock Exchange (DSE). Bangladesh's national currency is Bangladeshi Taka (BDT).

In this study we assess the exchange rate volatility on various markets. This study examine the daily closing exchange rates closing of South Asian countries to examine the impact of volatility spillovers on different currency and equity markets , also examine the time varying conditional correlations between markets.

The selected five South Asian countries are according to the GDP ranking 2017, these are India, Pakistan, Bangladesh, Sri Lanka and Nepal. The ranking of South Asian countries is given in table below.

Rank	**Country**	**2017 GDP PPP billions of USD**
1	India	$9,459
2	Pakistan	$1,061
3	Bangladesh	$751.949
4	Sri Lanka	$278.4
5	Nepal	$84.4

Currency and equity returns are calculated using the relative price index's natural logarithm. The serial correlation analyses showed that the presence of conditional heteroskedasticity in the returns of regular equity index is highly likely due to the absolute value of daily returns and the squared value of daily returns. Heteroskedasticity existence supports the use of the family ARCH / GARCH.

3.2 Description of Variables

3.2.1 Exchange Rate

The rate of conversion of one currency into another currency is exchange rate. It is calculated as an annual average based on monthly averages (by using currency and equity units of South Asian counties to the U.S. Dollar).The current study used the daily closing prices of South Asian countries to USD for the period of 1/2000 to 1/2018 from investing.com website.

Exchange rate return is described as the continuously compounded exchange rate percentage returns at time t calculated as below:

$$R_t = \ln(ER_t/ER_{t-1})$$

Where,

ln = Natural Log

R_t = Exchange rate returns of a given country at time t

ER_t = Exchange rate of that country at time t

ER_{t-1} = Exchange rate of $t-1$ day (lag term as one period in the exchange rate)

3.3 Econometric Model

3.3.1 Volatility Spillover - ARMA GARCH-M

3.3.1.1 Market-to-Market Spillover

The same two-stage GARCH-in-mean approach (GARCH-M) was used to examine the return and volatility transmission across currency and equity markets of South Asian countries. In the first stage, the relevant market return series are modeled through an ARMA (1, 1)-GARCH (1, 1)-M econometric model

$$r_{m,t} = \eta_0 + \eta_1.r_{m,t-1} + \eta_2.\upsilon_{m,t} + \eta_3.\epsilon_{m,t-1} + \epsilon_{m,t}, \epsilon_{m,t}N(0, \upsilon_{m,t})\upsilon_{m,t} = \theta_0 + \theta_1.\mu^2_{m,t-1} + \theta_2.\upsilon^2_{m,t-1}$$

Where $r_{m,t}$ is the daily returns of currency markets at time t and $\epsilon_{m,t}$ is the residual or unexpected return in other words, the error term. Basically, the adjustment of the serial correlation in the data is major purpose of the inclusion of ARMA (1, 1) and/or MA (1) structure in the model.

In the second stage, the influence of mean return and volatility spillover across markets are determined by obtaining the standardized error term and its square in the first stage and substituting them into the mean and volatility equations of other markets also with the inclusion of elections as follows

$$r_{n,t} = \eta_{n,0} + \eta_{n,1}.r_{n,t-1} + \eta_{n,2}.\upsilon_{n,t} + \eta_{n,3}.\epsilon_{n,t-1} + \psi_n.\epsilon_{m,t} + \psi_n.Elc + \epsilon_{n,t}, \epsilon_{n,t}N(0, \upsilon_{n,t})$$

$$\upsilon_{n,t} = \theta_{n,0} + \theta_{n,1}.\mu^2_{n,t-1} + \theta_{n,2}.\upsilon_{n,t-1} + \phi_n.e^2_{m,t} + \phi_n.Elc$$

Where m, t is the standardized currency market error term and captures from these sources the mean return spillover effect. To examine the spillover volatility, the exogenous variable $e^2_{m,t}$ is included in the conditional volatility equation as the square of the standardized error term and is defined as $e^2_{m,t} = \epsilon^2_{m,t}/\upsilon_{m,t}$. Elc is a electioneering dummy variable that is capturing the effect of elections since 2000 till 2018.

3.3.2 Time-Varying Conditional Correlation- DCC and ADCC

The above model assumes that the correlation is constant over the period of the time but that correlation may be time varying. In that case, Engle (2002) suggested the dynamic conditional correlation DCC GARCH method will be used and

possibility of any asymmetry in the model will be captured by ADCC GARCH model that was proposed by (Cappiello et al., 2006). Engle's (2002) suggestion for a generalized multivariate autoregressive conditional heteroskedasticity (GARCH) model for estimating dynamic conditional correlations (DCC) has three benefits over many other estimation approaches. First, the DCC – GARCH model estimates the standardized coefficients of residual correlation and thus accounts for heteroskedasticity in general. Second, to insure the function is properly described, the model allows additional explanatory variables to be included in the mean equation. Third, the multivariate GARCH method can be used without incorporating too many variables to analyze multiple asset returns. Nevertheless, in conditional variances, co-variances and correlations it does not compensate for asymmetries. Cappiello et al. (2006) recently proposed a DCC (ADCC) asymmetric variant to address asymmetries in conditional variances, co-variances and two asset correlations.

- Dynamic Conditional Correlation DCC

  DCC is defined as

$$Q_t = \bar{R} + \sum_{i=1}^{m} \pi_i(\epsilon_{t-i}\epsilon'_{t-i} - \bar{R}) + \sum_{i=1}^{m} \xi_i(Q_{t-1} - \bar{R})$$

  For most of the data sets used in this research, DCC (1,1) is proved to be a adequate model.

- Diagonal Generalized GDCC

  For the estimation of Diagonal Generalized DCC, the following steps are followed

  (a) Choose a parameterization for P and Q as,

$$P = \alpha\alpha' = \beta\beta'$$

  (b) So that for any Z,

$$A.Z = diag\{\alpha\}.Zdiag\{\alpha\}$$

(c) Hence for any i and j

$$Q_{i,j,t+1} = \theta_{i,j} + \alpha_i\alpha_j(\epsilon_{i,t}–\theta_{i,j}) + \beta_i\beta_j(Q_{i,j,t}–\theta_{i,j})$$

- Asymmetric Dynamic Conditional Correlation ADCC

  ADCC is defined as

$$\sigma_t = min(\epsilon_t, 0), \bar{N} = \frac{1}{T}\sum_{T=1}^{N}\sigma_t\sigma_t'$$

  (a) Asymmetry can be introduced with terms that are zero except when both returns are negative such as,

$$\mu\sigma_{i,t}\sigma_{i,t}$$

  (b) Or more generally (and averaging to zero),

$$G(\sigma_t\sigma_t' - N)$$

- Asymmetric Generalized DCC AGDCC

  The Asymmetric Generalized DCC can be expressed as,

$$Q_t = \bar{R} + A(\epsilon_{t-i}\epsilon_{t-i}' - \bar{R}) + B(Q_{t-1} - \bar{R}) + G(\sigma_t\sigma_t' - N)$$

  And assuming a diagonal structure for A,B and G, the typical equation becomes,

$$Q_{i,j,t+1} = \bar{\theta}_{i,j} + \alpha_i\alpha_j(\epsilon_{i,t}\epsilon_{j,t}–\bar{\theta}_{i,j}) + \beta_i\beta_j(Q_{i,j,t}–\bar{\theta}_{i,j}) + \gamma_i\gamma_j(\sigma_{i,t}\sigma_{j,t}–\bar{N}_{i,j})$$

Chapter 4

Data Analysis and Results

This chapter discuss the different tests that are being applied to analyze the phenomena under debate and interprets the results obtained.

4.1 Graphical Representation

4.1.1 Stationarity of Series

Before applying any of the test the data is thoroughly visualization at first. The first basic step is to see which type and behavior of data is being used. This could be done through checking the Stationarity of series that, data selected must be stationary to examine the spillover. It means that the mean of the series must be constant. The Stationarity graphs are attached in Appendix A.

4.1.2 Descriptive Statistics

After testing the stationarity of series the next step is to examine the descriptive statistics of each series to analyze the behavior of data. Closing rates of exchange rate equity market and currency market of South Asian is show in Table 4.1 respectively. Descriptive statistics will tell us about measure of location, measure of dispersion and about its measure of shape of data.

Table 4.1 includes four portions i.e. Mean describes the average return, Maximum and Minimum average responses and Standard deviation tells us about spread and dispersion of data, whereas Skewness and Kurtosis gives information about shape of data. In this research the 19 years data of daily closing prices currency and equity market is used from 1/2000 to 12/2018.

TABLE 4.1: Descriptive Statistics.

	Mean	Maximum	Minimum	Standard Deviation	Skewness	Kurtosis	Jarque-Bera
Equity Market							
Pakistan	0.000690	0.085071	-0.077414	0.013350	-0.265190	6.780867	2847.836
India	0.000406	0.163343	-0.130539	0.014483	-0.306865	12.12900	16488.44
Sri Lanka	0.000555	0.182881	-0.138931	0.011155	0.335810	38.92770	239258.0
Nepal	0.000342	0.378760	-0.381525	0.014951	0.049346	195.4188	6806430
Bangladesh	0.000165	0.534623	-0.527966	0.035066	0.143521	210.5656	2563472
Currency Market							
Pakistan	0.000181	0.079599	-0.054095	0.003436	2.634294	87.66064	1639002
India	0.0000938	0.036938	-0.035504	0.004069	0.152558	11.97049	16854.42
Sri Lanka	0.000187	0.040107	-0.025060	0.002575	2.303280	53.54309	534698.1
Nepal	0.000183	0.055980	-0.045189	0.006532	0.605480	13.70912	13289.70
Bangladesh	0.0000989	0.063556	-0.054222	0.003675	2.141723	79.21845	1210684

This table covers the descriptive statistics for the series of exchange rate of equity and currency market.

Average mean returns measure the south Asian currency and equity market performance. The study resulted that all mean returns of both markets are positive. The highest value of mean return in equity market is of Pakistan i.e, (0.069%) and the lowest is of Bangladesh i.e, (0.016%). And the highest value of mean return in currency market is of that is Bangladesh (0.0181%) and lowest isof India that is (0.0093%). In addition, the standard deviation the standard deviation of both markets is positive. From currency market the volatility of Bangladesh is highest (3.5%) confirming that Bangladesh is more volatile than rest of other selected south Asian countries. It also depicts the relationship between risk and return, it means that higher the rate of risk the higher will be the return. Whereas, the Sri Lanka shows lowest volatility that is (1.11%) which depict that Sri Lanka is less volatile in currency market.

Sri Lanka resulted (0.25%) only which is least than all. Maximum and Minimum statistics exhibits the daily return earned at maximum and minimum level by both markets. Such as the daily mean return of Pakistan in equity market is (0.069%),

its maximum return or profit earned is (8.5%) and the minimum return/maximum loss earned is (7.74%).

4.2 Return and Volatility Spillover from Currency Market to Equity Market

After preliminary analyzes, the first aspect of the methodology is to use an appropriate econometric model to examine the volatility spillover and return from currency market to equity market. Table 4.2 demonstrates the spillover volatility forecasts of currency market returns on equity market returns using respectively an ARMA GARCH (p, q) method. Moreover, a dummy variable is also used in the study as an "Electioneering" with both return and volatility spillover. In these analyses, currency market is taken as bench mark market and then its effect is seen on the equity market of that country and for all countries the same procedure is carried out. In simple words, shocks created from benchmark market, transmitted to the other market to determine that, is there any transmission of return or volatility takes place or not? All coefficients of ARCH and GARCH are recorded with their p-value in parenthesis.

For Nepal the η_1 is found to be significant and positive it means that, we can predict the mean returns of Nepal by using past prices behavior showing past price behavior influences current volatility. In other words, market of Nepal is inefficient, demonstrating that there are no possibilities for diversification in Nepal.

TABLE 4.2: Return & Volatility Spillovers from currency market-to- equity market ARMA GARCH Model.

	Pakistan		**India**		**Sri Lanka**		**Nepal**		**Bangladesh**	
	Curr.	**Mkt**	**Curr.**	**Mkt**	**Curr.**	**Mkt**	**Curr.**	**Mkt**	**Curr.**	**Mkt**
η_0	0.000149	3.87E-05	-2.08E-06	0.000559	6.60E-05	0.000438	5.98E-05	-0.00066	2.58E-05	-0.00555
	(0.5533)	(0.323)	(0.9557)	(0.7933)	(0.0017)	(0.7835)	(0.5398)	(0.3686)	(0.6221)	(0.3486)
η_1	0.763475	0.005211	1.247939	-0.42661	-0.33888	-0.01087	0.251617	0.496616	0.187406	-0.41296
	(0.0001)	(0.9335)	(0.5573)	(0.4741)	(0.0195)	(0.9415)	(0.0913)	(0.0017)	(0.0085)	(0.3402)
η_2	0.795892	12.74837	-0.10701	1.680964	2.86115	1.174093	0.185517	5.172913	-3.34227	6.250236
	(0.6135)	(0.0022)	(0.9791)	(0.6759)	(0.613)	(0.7665)	(0.9604)	(0.2442)	(0.5872)	(0.0018)
η_3	-0.69354	-0.24264	-1.25611	0.462457	0.451302	0.196058	-0.38313	-0.3784	-0.50288	0.133292
	(0.0005)	(0.0000)	(0.5547)	(0.4406)	(0.0014)	(0.2048)	(0.0108)	(0.0188)	(0.0000)	(0.6743)
ψ	-	-0.00016	-	-0.00405	-	0.000136	-	0.000138	-	-0.00087
		(0.0000)		(0.0000)		(0.8257)		(0.6286)		(0.8064)
$\psi \times Elc$	-	0.000734	-	0.000733	-	-0.00107	-	0.002638	-	0.001235
		(0.4585)		(0.814)		(0.7103)		(0.352)		(0.9735)
θ_0	4.79E-06	4.08E-07	4.51E-08	0.000168	4.73E-08	0.00012	9.25E-08	4.60E-05	1.02E-07	0.000852
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0033)
θ_1	0.132521	0.260178	0.102915	0.150000	0.164285	0.150000	0.041037	0.150000	0.134845	0.150000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.1284)
θ_2	0.836653	0.62682	0.904628	0.600000	0.879607	0.600000	0.957503	0.600000	0.877622	0.600000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
ϕ	-	6.65E-11	-	-3.56E-12	-	-3.93E-13	-	-2.28E-11	-	-2.12E-11
		(0.0000)		(0.0000)		(0.0074)		(0.0000)		(0.1322)
$\phi \times Elc$	-	8.20E-06	-	7.36E-08	-	-7.31E-13	-	-1.03E-06	-	-4.96E-11
		(0.0000)		(0.9961)		(1.0000)		(0.8983)		(1.0000)

Values in parenthesis are the p-values. Each country has its own bechmarket that is currency maket. ψ denotes the parameters of mean spillover and ϕ denotes the parameters of volatility spillover. Theinteractionterms($\psi \times Elc$ and $\phi \times Elc$) show the effect of electioneering with mean and volatility spillovers.

On the other hand, for Pakistan, India, Sri Lanka and Bangladesh there was no effect on today's returns from past price behavior, which means that these markets are efficient and provide investment opportunities. Investors can take advantage of diversification.

The coefficient of GARCH η_2 is significant for Pakistan and Bangladesh indicating that, mean returns can be predicted through forecasted volatility.

The coefficient of standardized residual error term, η_3 has insignificant impact on India, Sri Lanka and Bangladesh. Whereas, it has significant negative impact on Pakistan and Nepal resulting that these markets make some necessary adjustments for the next day on the basis of past shocks. Simply, the markets will move opposite to make correction.

The θ_1 coefficient is positively significant for all countries except Bangladesh which indicates that, through past prices behavior we can predict the volatility of the current period. The θ_2 coefficient is also significant and positive for all countries that indicates the presence about persistence of the volatility. Nandy & Chattopadhyay (2019), examines the interdependence of Indian inventory exchanges with other national economic markets. The study identified asymmetric spillover volatility between the domestic stock market and the Asian stock market and its unidirectional change from the global stock market to the domestic stock market. The results of mean spillover ψ shows a significant negative impact on Pakistan and India that mean, the returns of all these industries are influenced by the fluctuations in the currency market. This negative relationship indicate that, the mean returns of currency markets decreasing the mean returns of equity markets of these countries. In contrast, the insignificant variations are found in Sri Lanka, Nepal and Bangladesh which shows, there exists no return spillover across these countries. In a previous study, Franck and Young (1972) also report that there exists no significant impact of one variable on another variable. Meanwhile, when the effect of electioneering is applied with mean spillover i.e. $\psi \times Elc$, all results become insignificant which provides a strong theoretical evidence that when elections took place, any variation comes from currency market is not reflected across these countries.

Similarly, the spillover volatility ϕ results show a significant positive impact on Pakistan which also indicates the currency market volatility to the equity market. These effect of volatility spillover categories Pakistan as a highly volatile sector in South Asian countries. Whereas, the results of volatility spillover show a significant negative impact on India, Sri Lanka and Nepal. It reveals that, the volatility in the currency market decreasing the volatility of stock market of these countries. In short, it is bringing the cooling down effect of all these countries.

When the same electioneering variable is used with the volatility spillover i.e. $\phi \times Elc$, Pakistan shows significant positive result. And rest of all countries resulted insignificant. It reveals that they didn't show any relationship with currency market. It means that, the volatility of these countries is not influenced by elections.

The increasing and decreasing effect of volatility spillover is also documented by Beer and Hebein (2011) in which they find unidirectional currency market volatility spillover to stock market for India. Whereas, Chkili (2012) analyses reveals that between the two financial markets there exist bidirectional informational spillover.

4.3 Time-Varying Conditional Correlation – DCC & ADCC

As mentioned in the methodology, ARMA GARCH model only incorporates the spillover effect by assuming Constant Conditional Correlation CCC. But if the correlation varies in moment, then Dynamic Condition Correlation DCC model will be used in this research. The importance of using this model is the detection over time of possible changes in conditional correlations, enabling us to detect dynamic investor behavior in response to any news and changes. In addition, the DCC metric is suitable to explore feasible contagion impacts conduct in evolving financial markets. In addition, the effects of any asymmetry are also recorded using the expanded variant of the DCC model, Asymmetric Conditional Dynamic Correlation ADCC.

4.3.1 DCC – GARCH (1, 1) Model between Currency & Equity Market

The appropriate uni-variate DCC models and estimates between currency and equity markets are shown in Tables 4.3 and 4.4, respectively. On the grounds of the smallest possible Akaike Information Criteria-AIC, the suitable model is selected. NA means that, the stability condition for specified country is not met, so model cannot be applied. In short, the dynamic conditional correlation doesn't exists in that market (here, we found this in Sri Lankan markets).

TABLE 4.3: DCC MV - GARCH Estimates between Currency and Equity market.

Sr. No	South Asian Countries	Selected Model
1	Pakistan	GARCH
2	India	GARCH
3	Sri Lanka	NA
4	Nepal	GARCH
5	Bangladesh	GJR/TARCH

This table shows the optimal univariate DCC GARCH model with respect to each industry and then the appropriate model is chosen on the basis of lowest possible Akaike Information Criteria (AIC).

Table 4.3 outlines the outcomes of the currency-to-equity market correlation using the DCC-GARCH model that explains the effect of previous residual shocks. The θ_1 represents past residual shocks and θ_2 shows lagged dynamic correlation with their p-values between currency market and equity market.

While working for DCC model the first condition is to verify the stability condition as it must be less than 1 (i.e. $\theta_1 + \theta_2 < 1$).From the results rest of all countries successfully met the required stability condition. This confirmation insures that for measuring the time varying conditional correlation DCC model must be used. The parameters of θ_1 is found significantly positive for India and Nepal. And found insignificant for i.e; Pakistan and Bangladesh. This result interprets that there found highly significant correlation between Indian and Nepalese currency and equity markets. This significant variation implies that, there exists the impact

of past residual shocks on correlation, which indicates that, there exists the lagged dynamic conditional correlation in these markets. On the other side this result also interprets that there is no correlation found in currency and equity market of Pakistan and Bangladesh.

TABLE 4.4: DCC MV - GARCH Estimates between Currency and Equity market.

South Asian Countries	**Currency Market**	
	θ_1	θ_2
Pakistan	0.0087	0.5855
	(0.1094)	(0.1984)
India	0.0167	0.9770
	(0.0001)	(0.0000)
Sri Lanka	NA	NA
Nepal	-0.0150	-0.1074
	(0.0000)	(0.8864)
Bangladesh	0.0275	0.9571
	(0.1908)	(0.0000)

This table summarizes the estimated coefficients from the DCC-MV-GARCH model in a bi-variate framework between currency & equity markets. Values in parenthesis are the p-values. Theta(1) and Theta(2) are reported above the p-values. The Akaike Information Criteria (AIC) is used for the selection of a suitable uni-variate GARCH model.

While discussing the second parameters of θ_2, we found significantly positive results in India and Bangladesh which express the impact of partial lagged dynamic conditional correlation. Whereas, insignificant results are examined in Pakistan and Nepal it means that the markets of these countries doesn't show any lagged effect on correlation.

4.3.2 ADCC MV - GARCH Models

The appropriate uni-variate ADCC models and estimates between currency and equity markets are shown in Tables 4.5 and 4.6 respectively. On the grounds of the

smallest possible Akaike Information Criteria-AIC, the suitable model is selected. The results of ADCC GARCH model across currency and equity markets of south Asian countries are shown in Table 4.6.

TABLE 4.5: ADCC MV - GARCH Estimates between Currency and Equity market.

Sr. No	**South Asian Countries**	**Selected Model**
1	Pakistan	GARCH
2	India	GARCH
3	Sri Lanka	EGARCH
4	Nepal	EGARCH
5	Bangladesh	GJR/TARCH

This table shows the optimal univariate ADCC GARCH model with respect to each industry and then the appropriate model is chosen on the basis of lowest possible Akaike Information Criteria (AIC).

TABLE 4.6: ADCC MV - GARCH Estimates between Currency and Equity market.

South Asian Countries	**Currency Market**		
	θ_1	θ_2	θ_3
Pakistan	0.0024	0.6486	0.0073
	(0.8210)	(0.0755)	(0.5277)
India	0.0168	0.9769	-0.0010
	(0.0001)	(0.0000)	(0.6057)
Sri Lanka	0.0011	0.8663	-0.0082
(0.8496)	(0.0000)	(0.4929)	
Nepal	-0.0121	0.4340	-0.0491
	(0.0000)	(0.0000)	(0.0000)
Bangladesh	0.0299	0.9519	-0.0137
	(0.2138)	(0.0000)	(0.5992)

This table summarizes the estimated coefficients from the DCC-MV-GARCH model in a bi-variate framework between currency & equity markets. Values in parenthesis are the p-values. Theta(1) and Theta(2) are reported above the p-values. The Akaike Information Criteria (AIC) is used for the selection of a suitable uni-variate GARCH model.

In this model there are four parameters, from which the first two parameters are similar to the DCC GARCH models i.e. θ_1 reporting the impact of the past residual shocks and θ_2 as lagged dynamic conditional correlation. An additional parameter includes that is θ_3. Which gives the information about the shocks created by negative and positive news on dynamic conditional correlation. As of DCC model, stability of model is checked at first. In this model the stability of model is met in all countries (i.e. $\theta_1 + \theta_2 < 1$).

The first parameter of θ_1 is found highly significantly for India and Nepal expressing the impact of past residual shocks and lagged dynamic correlation in markets of these countries and insignificant for Pakistan, Sri Lanka and Bangladesh. The second parameter θ_2 is examined highly significant for all countries except Pakistan that is India, Sri Lanka, Nepal and Bangladesh it means that, there exists the lagged dynamic conditional correlation in these countries. In results of parametric values of θ_3 expresses a negative significant results only for Nepal which shows that when the negative new is spread in market it reduce the correlation in the markets while, rest of all countries Pakistan, India, Sri Lanka and Bangladesh are found insignificant results.

In contrast with DCC model, the results of ADCC model are more reliable and more authentic as it also capturing the asymmetric effect between the series. Now, we can say that in this study the most of the countries returns show significant time variation in its conditional correlations and few of them show asymmetric behavior.

Chapter 5

Discussion and Conclusion

The transition from currency to equity market of returns and spillover volatility is discussed in this study. South Asia's top five countries are selected to check the spillover in returns and volatility from currency to equity, according to GDP rankings since January 1, 2000 till December 31, 2018 all closing prices are considered for calculation using ARMA GARCH model. These countries are Pakistan, India, Sri Lanka, Nepal and Bangladesh. For Pakistan and India there calculated significantly negative impact of return spillover which results the appreciation of currency. The negative sign indicates that, the mean returns of Pakistan's and India's currency markets decreasing the mean returns of equity markets of these countries. It reflects that, the returns of equity market in these countries are moving downwards with respect to the variations in currency markets. Since currency appreciation and depreciation concern revenues and expenditures and most of the inputs are imported into different regions, this leads to increased costs. It explains that the returns are interconnected with good or bad news in market so that bad news decreases the return whereas good news will increase the return. It means that currency depreciation decreasing the returns. In the case of Sri Lanka, Nepal and Bangladesh, there was no proof of a return spillover on the currency market to the equity market. Therefore, there is no return spillover from currency market to equity market in these countries. While in election period ($\psi \times Elc$) all results become insignificant which provides a strong theoretical evidence that when elections took place, any variation comes from currency market is not reflected across

these countries. According to Shrestha (2014), positive political stability perspective has a positive effect on the index of the stock market. The performance of the stock market was discovered to be affected by modifications in policy similar to finding of Dangol (2008) in his paper he stated that it may be inferred that Nepalese stock market is inefficient, but there is a powerful connection between political uncertainty and generating common stock returns.

Similarly, in South Asian countries, spillover volatility is also measured from currency market to equity market. Pakistan shows a significantly positive volatility spillover with respect to currency market. It means that Pakistan among these south Asian countries is a highly volatile sector, small shocks are creating less volatilities in the case of Pakistan. Whereas, India, Sri Lanka and Nepal showed significant negative impact of volatility spillover which reveals that the volatility in the currency market decreasing the volatility of stock market of these countries. In short, it is bringing the cooling down effect of all these countries. When the same electioneering variable is used with the volatility spillover i.e. $\phi \times Elc$, Pakistan shows significant positive result. And rest of all countries resulted insignificant. It reveals that they didn't show any relationship with currency market. It means that, the volatility of these countries is not influenced by elections.

While concluding, almost all countries strongly reflect that return and volatility spillover exist between them except Bangladesh. This positive effect influences in such a way that means and returns of currency market increases the returns of the equity market. It means that there is strong relationship found in currency and equity market if these countries. So, any change occur in one market quickly transmit to the remaining ones that indicates, both the markets are interlinked with each other. Whereas, Bangladesh is not showing any return spillover with currency and equity market resulting insignificant variations.

A similar study of empirical evidence conducted by Jebran & Iqbal (2016) shows statistically significant spillover of bidirectional stock and foreign currency markets volatility for China, Hong Kong, Pakistan, and Sri Lanka. Their study findings suggest unidirectional spillover to the foreign exchange market in India in the

uncertainty of the stock market. There is no evidence of spillover volatility between the two economic sectors (foreign exchange and stock market) for Japan. Asymmetric in nature has been discovered the spillover of volatility in all markets (Adverse shocks result in more volatility than similar-sized favorable shocks). The average strength of the foreign exchange market volatility was greater than the stock market volatility. Khan et. al, (2013) examined the effect on the share prices of Pakistan's economic industry of occurrences of distinct nature events such as: political, natural disasters and terrorism. The findings show that incidents have important effect on inventory prices, and when a major event arises on the domestic or global front, prices act negatively. Either the event is negative or positive it has a significant impact on the stock returns of the index movement KSE 100-INDEX and the volume of trading captured by Mailk et. Al, (2009), Marwe & Smit (2009), Khan & Ahmed (2009).

Along with this, it is also reported that there is no impact of electioneering is found on mean and volatility spillover of these south Asian countries. According to Balaji et al. (2018), in the short term, an individual election has maximum impact (positive or negative), which decreases in the medium term and further decreases in the long term compared to the pre-election period. MA Rahaman et al. (2013), has examine stock market performance in Bangladesh during different political leadership and they found significant results. A similar study is conducted in Nigeria by Shehu Usman Rano, A. (2019), assessing the effect on NSE stock returns of the presidential elections held in Nigeria between 1999 and 2019. The coefficient was discovered statistically significant in their research.

Volatile elections have an adverse effect on market place activities and by instilling fear on investors and destroying infrastructure, they stop securities from being sold or purchased. The study states that market return is a good predictor of inventory return. The market reacted with announcements of the election results. The reaction, however, was either positive or negative.

Our findings are also consistent with the amount of research such as (Aloui 2007 ; Beer and Hebein 2011; Mishra et al. 2007; Walid et al. 2011 ; Kumar 2013; Kanas 2000; Yang and Doong 2004; Francis et al. 2006), which reported volatility

impact between the two markets that is foreign exchange market & stock market. Such results help market-oriented system conceptual analysis which shows adverse exchange-rate interactions and stock prices. The significant positive foreign exchange effect.

In next step we calculated correlation. As the correlation between the variables is found time varying, so Dynamic Condition Correlation (DCC) model is used and asymmetric behavior is assessed by Asymmetric Dynamic Conditional Correlation (ADCC). Most of the results are found significantly positive as well as negative at some parameters but found no correlation in Pakistan. All the significant variations and stability of models show that, correlation is not constant so dynamic conditional correlation model is strongly recommended.

The implications of DCC and ADCC models provide a strong conceptual understandings that, currency and equity markets are interconnected to each other and with the passage of time, correlation also becomes time varying. All these results are similar to Sakthivel, Bodkhe, and Kamaiah (2012) studies of correlation and transmission of volatility across US, Indian, UK, Japan and Australian stock markets and long-term co-integration across global stock indices.

5.1 Recommendations

After concluding results, this research highly recommends that all market players, including investors, portfolio managers and policy makers, keep an eye on the markets that arises in south Asian countries. The combination of both currency and equity markets shows a spillover of return and volatility with each other, which implies that currency market returns and volatility influence equity market yields and volatility. Simply put, there is interdependence between the economies between them. Most nations show a time-varying conditional correlation that shows the vibrant nature of their market correlation. In addition, there is also an asymmetric conduct. Investors can use these findings in South Asian nations in the decision-making process for investments. As market volatility is more influenced

than returns are discovered. In addition, the significant differences in the financial industry also provide policymakers with instructions for developing effective monetary and fiscal policies for each nation.

The research also suggests that investors should take preventive measures in the era of political uncertainty before trading in stock. Investors should analyze closely whether stocks are to be held or sold before or after the general election occurrences. In order to save investors from losses that culminate in herd behavior on the securities market during the election phases, a compromise position of the portifolio to be kept during the period must be closely regarded in order. Investors who are unwilling to take risks should therefore remain away from trade in political uncertainty in order to resolve the additional danger associated with political uncertainty.

The government should implement measures through the Capital Markets Authority directed at cushioning the market from political interference and controlling money baging interference during elections. The strategies should aim to encourage more local investors to enter the exchange of securities. The state should make the people aware of the need to adopt democracy and therefore peaceful elections through civic education. This is because undemocratic elections can lead to uncertainties and adverse effects on inventory prices as a result of postelection violence.

5.2 Limitations

While this research provides a thorough knowledge of the market-wide transmission mechanism, this research is restricted to South Asian equity and monetary markets, i.e. country-specific work. Including more emerging markets in the sample size, a comparative analysis can also be performed.

Furthermore, all GARCH models used in this research (GARCH, GJR GARCH / TARCH & EGARCH) were drawn over all allocation. The present research proposes that the investor take precautionary measures in the uncertain political setting before trading.

Bibliography

Abeyratna, G., & Guneratne Bandara, W. M, G., and Colombage, SRN. (1999). Lead-Lag Relationships in Stock Returns: A test of market efficiency in Sri Lanka. *Sri Lankan Journal of Management*, 4(1&2), 1-16.

Adjasi, C. K., & Biekpe, N. B. (2006). Co integration and Dynamic Causal Links amongst African Stock Markets. *Investment Management and Financial Innovations*, 4, 102-119.

Ake, C. (1995). The new world order: A view from Africa. *Whose World Order*, 19-42.

Alagidede, P., & Ibrahim, M. (2017). On the causes and effects of exchange rate volatility on economic growth: Evidence from Ghana. *Journal of African Business*, 18(2), 169-193.

Albulescu, C. T., Aubin, C., Goyeau, D., & Tiwari, A. K. (2018). Extreme co-movements and dependencies among major international exchange rates: A copula approach. *The Quarterly Review of Economics and Finance*, 69, 56-69.

Ali, T. M., Mahmood, M. T., & Bashir, T. (2015). Impact of interest rate, inflation and money supply on exchange rate volatility in Pakistan. *World Applied Sciences Journal*, 33(4), 620-630.

Aloui, C. (2007). Price and volatility spillovers between exchange rates and stock indexes for the pre-and post-euro period. *Quant Finan*, 7(6), 669–685.

Andreu, L., Swinkels, L., Tjong-A-Tjoe, L. (2013), Can exchange traded funds be used to exploit industry and country momentum? *Financial Markets and Portfolio Management*, 27(2), 127–148.

Asad, I., Ahmad, N., & Hussain, Z. (2012). Impact of real effective exchange rate on inflation in Pakistan. *Asian Economic and Financial Review*, 2(8), 983-990.

Asari, F. F. A. H., Baharuddin, N. S., Jusoh, N., Mohamad, Z., Shamsudin, N., & Jusoff, K. (2011). A vector error correction model (VECM) approach in explaining the relationship between interest rate and inflation towards exchange rate volatility in Malaysia. *World Applied Sciences Journal*, 12(3), 49-56.

Aslanidis, N., Osborn, D. R., & Sensier, M. (2008). Co-movements between US and UK stock prices: The roles of macroeconomic information and time-series varying conditional correlations. *Working Papers 2072/8950*, Universitat Rovira i Virgili, Department of Economics.

Assoe, K. (2001). Volatility spillovers between foreign exchange and emerging stock markets (No. 2001-04). *Ecole des Hautes Etudes Commerciales de Montreal*.

Avdjiev, S., Bruno, V., Koch, C., & Shin, H. S. (2019). The dollar exchange rate as a global risk factor: Evidence from investment. *IMF Economic Review*, 67(1), 151-173.

Backman, M. (2006). Exchange rate volatility How the Swedish export is influenced? *PhD Thesis*.

Balaji, Ch., G.D.V. Kusuma, B. Ravi Kumar. (2018). Impact of General Elections on Stock Markets in India. *Open Journal of Economics and Commerce*, 1(2), 1-7.

Bartram, S. M., Taylor, S. J., and Wang, Y.-H. (2007). The euro and European financial market dependence. *Journal of Banking & Finance*, 31(5), 1461–1481.

Baum, C. F., Caglayan, M., & Barkoulas, J. T. (2001). Exchange rate uncertainty and firm profitability. *Journal of Macroeconomics*, 23(4), 565-576.

Bauwens, L., Rime, D., & Sucarrat, G. (2006). Exchange rate volatility and the mixture of distribution hypothesis. *Empirical Economics*, 30(4), 889-911.

Baxter, M., & Stockman, A. C. (1989). Business cycles and the exchange-rate regime: Some international evidence. *Journal of Monetary Economics*, 23(3), 377-400.

Bebczuk, R., A. Galindo, & U. Panizza. (2010). An Evaluation of the Contractionary Devaluation Hypothesis. *In Economic Development in Latin America*, Palgrave Macmillan, London, 102–117.

Beer, F., Hebein, F. (2011). An Assessment of the stock market and exchange rate Dynamics in industrialized and emerging markets. *Int Busi Econ Research J*, 7(8), 59–70.

Bergen, J. V. (2003). Six factors influence exchange rate. ISBN: 978-0-9965808-8-5.

Betts, C., & Devereux, M. B. (1996). The exchange rate in a model of pricing-to-market. *European Economic Review*, 40(3-5), 1007-1021.

Bilal, A.R., Abu Talib, N., Haq I., Khan, M.N.A., Islam, T., (2012). How Terrorism and Macroeconomic Factors Impact on Returns: A Case Study of Karachi Stock Exchange. *World Applied Sciences Journal*, 19(11), 1575-1584.

Bollerslev, T. (1990). Modeling the Coherence in Short-Run Nominal Exchange Rates: A Multivariate Generalized ARCH Model. *Review of Economics and Statistics*, 72, 498–505.

Bruno, V., and H.S. Shin. (2015). Capital Flows and the Risk-Taking Channel of Monetary Policy. *Journal of Monetary Economics*, 71:119–132.

Calvo, G. A., & Mishkin, F. S. (2003). The mirage of exchange rate regimes for emerging market countries. *Journal of Economic Perspectives*, 17(4), 99-118.

Cappiello, L., Engle, R. F., & Sheppard, K. (2006). Asymmetric dynamics in the correlations of global equity and bond returns. *Journal of Financial Econometrics*, 4(4), 537-572.

Carrera, J., & Vuletin, G. (2003). The Effects of Exchange Rate Volatility: A Dynamic Panel Data Approach. *Working Paper*, University of La Plata and University of Maryland.

Chkili, W. (2012). The dynamic relationship between exchange rates and stock returns in emerging countries: Volatility spillover and portfolio management. *Int J Manag Sci Eng Manag*, 7(4), 53–262.

Dangol, J. (2008). Unanticipated Political Events and Stock Returns: An Event Study. *Economic Review*, 20, 86-110.

Danmola, R. A. (2013). The impact of exchange rate volatility on the macro economic variables in Nigeria. *European Scientific Journal*, 9(7), 152-165.

Demiralay, S., & Ulusoy, V. (2014). Links between commodity futures and stock market: Diversification benefits, financialization and financial crises. *Munich Personal RePEc Archive*, Yeditepe University.

Diebold, F. X., & Yilmaz, K. (2009). Measuring financial asset return and volatility spillovers, with application to global equity markets. *The Economic Journal*, 119(534), 158-171.

Dornbusch, R. (1976). Exchange rate expectations and monetary policy. *Journal of International Economics*, 6(3), 231-244.

Downes, D. H., & Magee, R. P. (1975). *Efficient capital markets and accounting: a critical analysis*. Englewood Cliffs, NJ: Prentice-Hall, Inc.

Dungey, M. and Fry, R. (2009). The identification of fiscal and monetary policy in a structural var. *Economic Modelling*, 26(6), 1147–1160.

Edmonds Jr, R. G., & So, J. Y. (2004). Is exchange rate volatility excessive? An ARCH and AR approach. *The Quarterly Review of Economics and Finance*, 44(1), 122-154.

Engel, C. (1993). Real Exchange Rates and the Relative Prices: An Empirical Investigation. *Journal of Monetary Economics*, 32(1), 35–50.

Engel, C. (1999). Accounting for U.S. Real Exchange Rate Changes. *Journal of Political Economy*, 107(3), 507–38.

Engel, C. and J. H. Rogers. (1996). How Wide Is the Border? *American Economic Review*, 86(5), 1112–24.

Engel, C. (2016). Interest rates, exchange rates and the risk premium. *Am. Econ. Rev.*, 106, 436–474.

Engel, C., West, K.D. (2006). Taylor rules and the deutschemark-dollar real exchange rate. *J. Money Credit Bank.*, 38, 1175–1194.

Engle, R. (2002). Dynamic conditional correlation: A simple class of multivariate generalized autoregressive conditional heteroskedasticity models. *Journal of Business & Economic Statistics*, 20(3), 339-350.

Engle, R.F. and V.K. Ng (1993). Measuring and Testing the Impact of News on Volatility. *Journal of Finance*, 48, 987-1008.

Evans, M. D., & Lyons, R. K. (2002). Order flow and exchange rate dynamics. *Journal of Political Economy*, 110(1), 170-180.

Fama, E. F., Fisher, L., Jensen, M. C., & Roll, R. (1969). The adjustment of stock prices to new information. *International Economic Review*, 10(1), 1-21.

Fengler, M. R., & Gisler, K. I. (2015). A variance spillover analysis without covariances: What do we miss? *Journal of International Money and Finance*, 51, 174-195.

Flood, R. P., & Rose, A. K. (1995). Fixing exchange rates a virtual quest for fundamentals. *Journal of Monetary Economics*, 36(1), 3-37.

Francis, B.B., Hasan, I., Hunter, D.M. (2006). Dynamic Relations between International Equity and Currency Markets: The Role of Currency Order Flow. *J Business*, 79(1), 219–258.

Francis, B., Hasan, I., & Hunter, D. M. (2002). Return-volatility linkages in the international equity and currency markets. *SSRN Electronic Journal*, 1-39.

Franck, P., & Young, A. (1972). Stock price reaction of multinational firms to exchange realignments. *Financial Management* (pre-1986), 1(3), 66-73.

Froot, K. A. and J. C. Stein (1991). Exchange Rates and Foreign Direct Investment: An Imperfect Capital Markets Approach. *Quarterly Journal of Economics*, 106(4), 1191–217.

Garcia, R., & Tsafack, G. (2011). Dependence structure and extreme comovements in international equity and bond markets. *Journal of Banking & Finance*, 35(8), 1954-1970.

Ghartey, E. E. (2019). Asymmetries in exchange rate pass-through and monetary policy principle: Some Caribbean empirical evidence. *The North American Journal of Economics and Finance*, 47, 325-335.

Ghosh, S. (2014). Volatility spillover in the foreign exchange market: the Indian experience. *Macroeconomics and Finance in Emerging Market Economies*, 7(1), 175-194.

Grilly, V., & Kaminsky, G. (1991). Nominal exchange rate regimes and real exchange rate: Evidence from the United States and Britain, 1885–86. *Journal of Monetary Economics*, 27(2), 191-212.

Grossmanna, A., Loveb, I., Alexei, G. (2014). The Dynamics of Exchange Rate volatility: A Panel VAR approach. *International Financial Markets, Inst. and Money*, 33(2014), 1-2.

Hadi, M. M. (2006). Review of capital market efficiency: Some evidence from Jordanian market. *International Research Journal of Finance and Economics*, 3(3), 13-27.

Hausman, J., & Wongswan, J. (2011). Global asset prices and FOMC announcements. *Journal of International Money and Finance*, 30(3), 547-571.

Hausmann, R., Panizza, U., & Rigobon, R. (2006). The long-run volatility puzzle of the real exchange rate. *Journal of International Money and Finance*, 25(1), 93-124.

Hofmann, B., I. Shim, and H.S. Shin. (2016). Sovereign Yields and the Risk-Taking Channel of Currency Appreciation. *BIS Working Papers No. 538.*

Jayasinghe, P., & Tsui, A. K. (2008). Exchange rate exposure of sectoral returns and volatilities: Evidence from Japanese industrial sectors. *Japan and the World Economy*, 20(4), 639-660.

Jebran, K., & Iqbal, A. (2016). Dynamics of volatility spillover between stock market and foreign exchange market: evidence from Asian Countries. *Financial Innovation*, 2(1), 1-20.

Jondeau, E., Poon, S. H., & Rockinger, M. (2007). *Financial modeling under non-Gaussian distributions*. Springer Science & Business Media.

Kamin, S. B., & Klau, M. (2003). A multi-country comparison of the linkages between inflation and exchange rate competitiveness. *International Journal of Finance & Economics*, 8(2), 167-184.

Kanas, A. (2000). Volatility spillovers between stock returns and exchange rate changes: International evidence. *Journal of Business Finance & Accounting*, 27(3-4), 447-467.

Kasman, S., Vardar, G., & Tunç, G. (2011). The impact of interest rate and exchange rate volatility on banks' stock returns and volatility: Evidence from Turkey. *Economic Modelling*, 28(3), 1328-1334.

Kenourgios, D., Samitas, A., and Paltalidis, N. (2011). Financial crises and stock market contagion in a multivariate time-varying asymmetric framework. *Journal of International Financial Markets, Institutions and Money*, 21(1), 92–106.

Kent, C., & Naja, R. (1998). Effective real exchange rates and irrelevant nominal exchange-rate regimes. *RBA Research Discussion Papers rdp9811*, Reserve Bank of Australia.

Khan M.A., Javed, S., Ahmad, S., MAhreen, Faisal, & Shahzad. (2009). Impact of Pak-US Relationship News on KSE-100 Index. *International Review of Business Research Papers*, 5(5), 273-288.

Khin, A. A., Chau, W. H., Yean, U. L., Keong, O. C., & Bin, R. L. L. (2017). Examining between exchange rate volatility and natural rubber prices: Engle-Granger Causality Test. *International Journal of Economics and Financial Issues*, 7(6), 33-40.

Kim, B. H., Kim, H., & Lee, B. S. (2015). Spillover effects of the US financial crisis on financial markets in emerging Asian countries. *International Review of Economics & Finance*, 39, 192-210.

Klein, M. W. and E. Rosengren (1994). The Real Exchange Rate and Foreign Direct Investment in the United States: Relative Wealth vs. Relative Wage Effects. *Journal of International Economics*, 36(3/4), 373–89.

Kočenda, E., & Valachy, J. (2006). Exchange rate volatility and regime change: A Visegrad comparison. *Journal of Comparative Economics*, 34(4), 727-753.

Kohn, D., F. Leibovici, and M. Szkup. (2017). Financial Frictions and Export Dynamics in Large Devaluations. *Working Paper 2017-013A*, Federal Reserve Bank of St. Louis.

Kumar, M. (2013). Returns and volatility spillover between stock prices and exchange rates: Empirical evidence from IBSA countries. *Int J Emerg Market*, 8(2), 108–128.

Lee, J. (2006). The comovement between output and prices: Evidence from a dynamic conditional correlation GARCH model. *Economics Letters*, 91(1), 110-116.

Liang, M. H. (1998). Real exchange rate volatility: Does the nominal exchange rate regime matter? (No. 98-147). *International Monetary Fund (IMF) Working Paper*.

Liu, Y. A., & Pan, M. S. (1997). Mean and volatility spillover effects in the US and Pacific-Basin stock markets. *Multinational Finance Journal*, 1(1), 47-62.

Longin, F., & Solnik, B. (1995). Is the correlation in international equity returns constant: 1960–1990? *Journal of International Money and Finance*, 14(1), 3-26.

Ma, X., Wang, J., & Sun, X. (2018). A study on the dynamics of exchange rate volatility spillover network: Evidence from Central Asia. *Procedia Computer Science*, 139, 76-81.

Malik, S., Hussain, S. & Ahmed, S. (2009). Impact of Political Event on Trading volume and Stock Returns: The Case of KSE. *International Review of Business Research Papers*, 5(40), 354-36.

Manuelli, R. E., & Peck, J. (1990). Exchange rate volatility in an equilibrium asset pricing model. *International Economic Review*, 559-574.

Mark, N.C. (2009). Changing monetary policy rules, learning, and real exchange rate dynamics. *J. Money Credit Bank*, 41, 1047–1070.

McMillan, D. G., & Speight, A. E. (2010). Return and volatility spillovers in three euro exchange rates. *Journal of Economics and Business*, 62(2), 79-93.

Menkhoff, L. (2013). Foreign exchange intervention in emerging markets: A survey of empirical studies. *The World Economy*, 36(9), 1187-1208.

Merwe, R.V.D. & Smit, E.M. (1997). The influence of Political news events on share market activity on South Africa. *Investment Analysts Journal*, 26(44), 11-23.

Mikhaylov, A. Y. (2018). Volatility spillover effect between stock and exchange rate in oil exporting countries. *International Journal of Energy Economics and Policy*, 8(3), 321-326.

Milunovich, G., & Thorp, S. (2006). Valuing volatility spillovers. *Global Finance Journal*, 17(1), 1-22.

Mishra, A.K., Swain, N., Malhotra, D.K. (2007). Volatility spillover between stock and foreign exchange markets: Indian evidence. *Int J Business*, 12(3), 343–359.

Missio, S. and Watzka, S. (2011). Financial contagion and the european debt crisis. cesifo, munich. *Technical Report*, Germany.

Morales-Zumaquero, A., & Sosvilla-Rivero, S. (2010). Structural breaks in volatility: Evidence for the OECD and non-OECD real exchange rates. *Journal of International Money and Finance*, 29(1), 139-168.

Mussa, M. (1986). Nominal exchange rate regimes and the behavior of real exchange rates: Evidence and implications. *In Carnegie-Rochester Conference Series on Public Policy* (Vol. 25, pp. 117-214). North-Holland.

Nagel, S. (2016). The liquidity premium of near-money assets. *Quart. J. Econ.*, 131, 1927–1971.

Nelson, D.B. (1991). Conditional Heteroskedasticity in Asset Returns: A New Approach. *Econometrica*, 59, 347-370.

Obstfeld, M., & Rogoff, K. (1995). Exchange rate dynamics redux. *Journal of Political Economy*, 103(3), 624-660.

Obstfeld, M., & Rogoff, K. (2000). Do we really need a new international monetary compact? (No. w7864). *National Bureau of Economic Research*.

Pan, Z., Wang, Y., & Yang, L. (2014). Hedging crude oil using refined product: A regime switching asymmetric DCC approach. *Energy Economics*, 46, 472-484.

Pelletier, D. (2006). Regime Switching for Dynamic Correlations. *Journal of Econometrics*, 127, 445–473.

Phylaktis, K., & Ravazzolo, F. (2005). Stock prices and exchange rate dynamics. *Journal of international Money and Finance*, 24(7), 1031-1053.

Plantin, G., & Shin, H. S. (2018). Exchange rates and monetary spillovers. *Theoretical Economics*, 13(2), 637-666.

Rahaman, M. A., Hasan, M. B., & Ahsan, A. M. (2013). Stock Market Performance under Different Government Periods: Evidence from Bangladesh. *Universal Journal of Accounting and Finance*, 1(2), 42-50.

Ramasamy, R., & Abar, S. K. (2015). Influence of macroeconomic variables on exchange rates. *Journal of Economics, Business and Management*, 3(2), 276-281.

Rogers, J. H. (1995). Real shocks and real exchange rates in really long-term data (No. 493).

Rogers, J. H. and M. Jenkins. (1995). Haircuts or Hysteresis? Sources of Movements in Real Exchange Rates. *Journal of International Economics*, 38(3/4), 339–60.

Rose, A. K. (2000). One money, one market: the effect of common currencies on trade. *Economic Policy*, 15(30), 8-45.

Sakthivel, P., Bodkhe, N., & Kamaiah, B. (2012). Correlation and volatility transmission across international stock markets: A bivariate GARCH analysis. *International Journal of Economics and Finance*, 4, 253–262.

Samarakoon, L.P. (2005). Efficiency of the Sri Lankan Stock Market. *Sri Lankan Journals of Business Economics*, 1, 1-22.

Sari, R., Hammoudeh, S., & Soytas, U. (2010). Dynamics of oil price, precious metal prices, and exchange rate. *Energy Economics*, 32(2), 351-362.

Shehu Usman Rano, A. (2019). Do presidential elections affect stock market returns in Nigeria? *Munich Personal RePEc Archive*, Bayero University Kano PMB 3011, Kano-Nigeria.

Shrestha, P. K., & Subedi, B. R. (2014). Determinants of stock market performance in Nepal. *NRB Economic Review*, 26(2), 25-40.

Silvennoinen, A., & Terasvirta, T. (2005). Multivariate Autoregressive Conditional Heteroskedasticity with Smooth Transitions in Conditional Correlations. *SSE/EFI Working Paper Series in Economics and Finance No. 577.*

Silvennoinen, A., & Terasvirta, T. (2009). Modelling Multivariate Autoregressive Conditional Heteroskedasticity with the Double Smooth Transition Conditional Correlation GARCH Model. *Journal of Financial Econometrics*, 7, 373–411.

Solnik, B., Boucrelle, C., & Le Fur, Y. (1996). International market correlation and volatility. *Financial Analysts Journal*, 52(5), 17-34.

Suleman, M.T. (2012). Stock Market Reaction to Terrorist Attacks: Empirical Evidence from a Front Line State. *Australasian Accounting Business and Finance Journal*, 6(1), 97-110.

Uganden, I.A. (2010). Political Accountability in Nigerian Governance: Implications Implications for long-term development. *Journal of Social Science and Public Policy*, 2, 86-95.

Walid, C., Chaker, A., Masood, O., Fry, J. (2011). Stock market volatility and exchange rates in emerging countries: A Markov-state switching approach. *Emerg Market Rev*, 12(3), 272–292.

Yang, S.Y., Doong, S.C. (2004). Price and volatility spillovers between stock prices and exchange rates: Empirical evidence from the G-7 countries. *Int J Business Econ*, 3(2), 139–153.

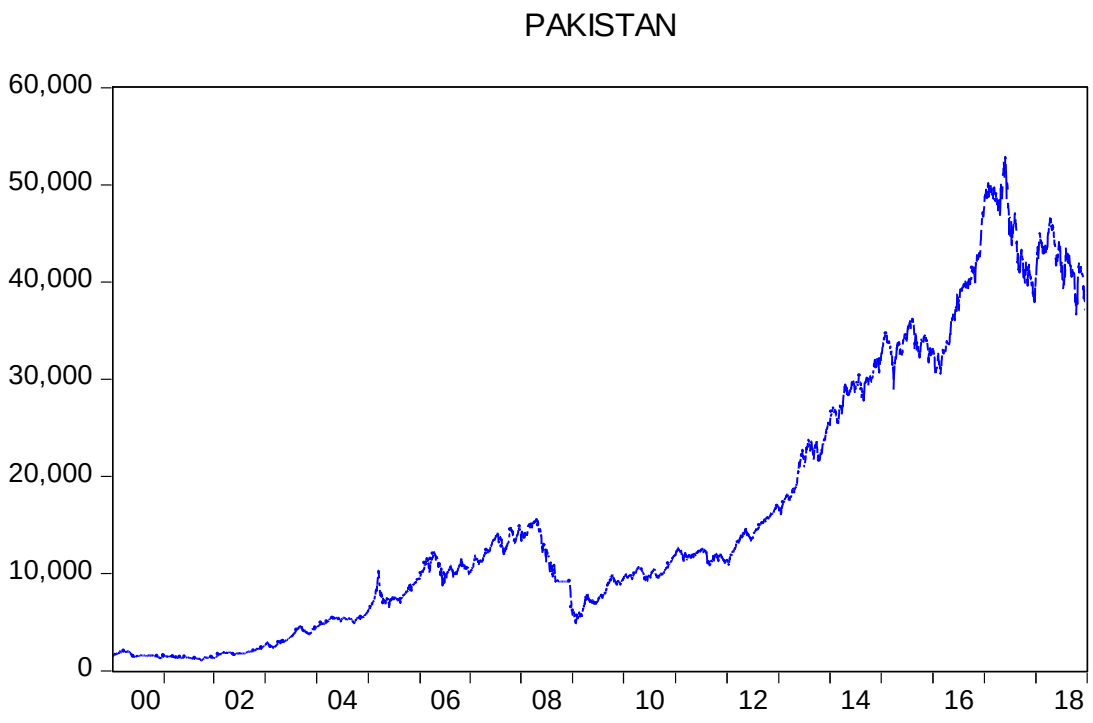
Zettelmeyer, J. (2004). The impact of monetary policy on the exchange rate: evidence from three small open economies. *Journal of Monetary Economics*, 51(3), 635-652.

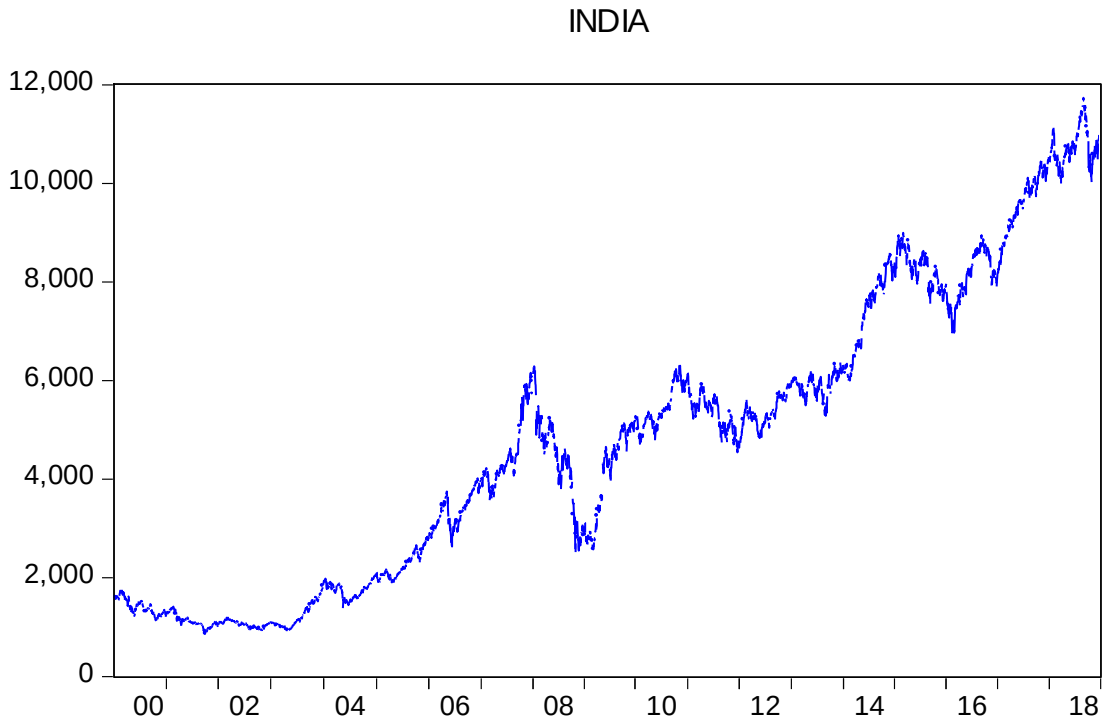
Zhao, H. (2010). Dynamic relationship between exchange rate and stock price: Evidence from China. *Research in International Business and Finance*, 24(2), 103-112.

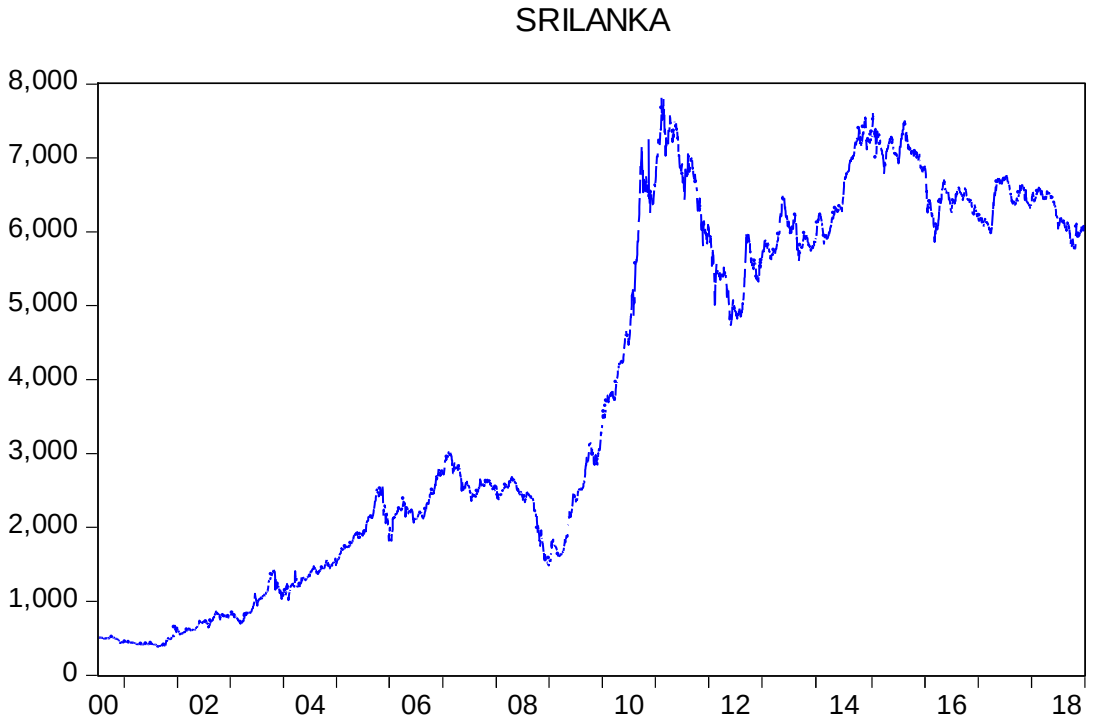
Appendix-A

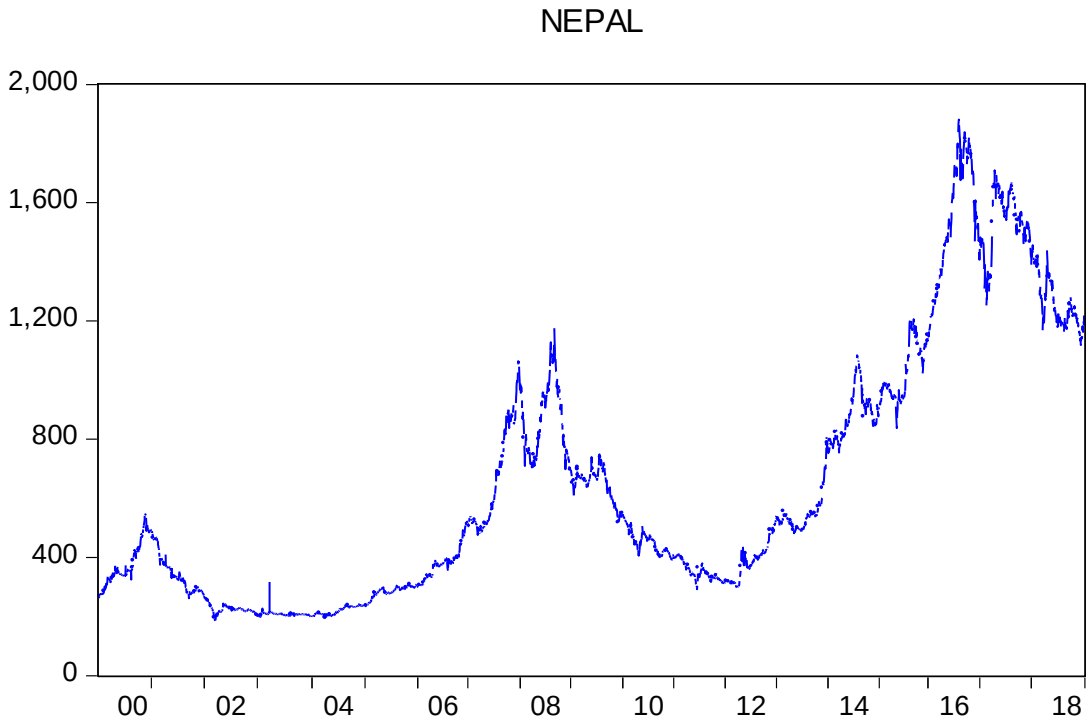
Stock Market

Price Series Graphs




INDIA
12,000
10,000
8,000
6,000
4,000
2,000
0
00
02
04
06
08
10
12
14
16
18


SRILANKA
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
00
02
04
06
08
10
12
14
16
18



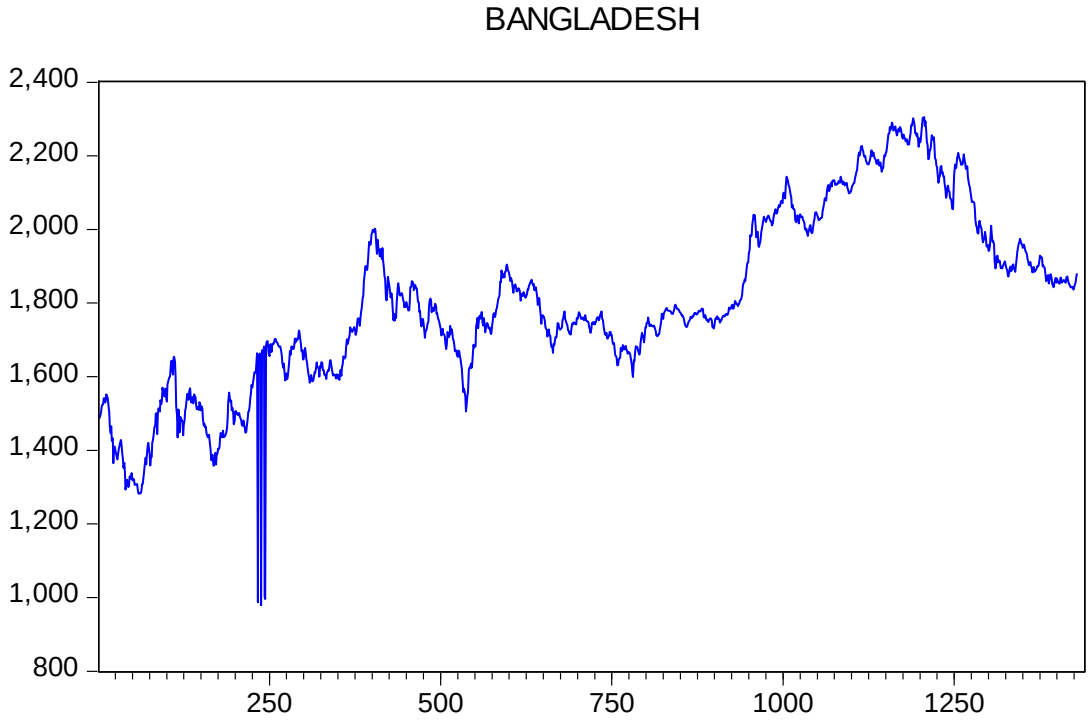
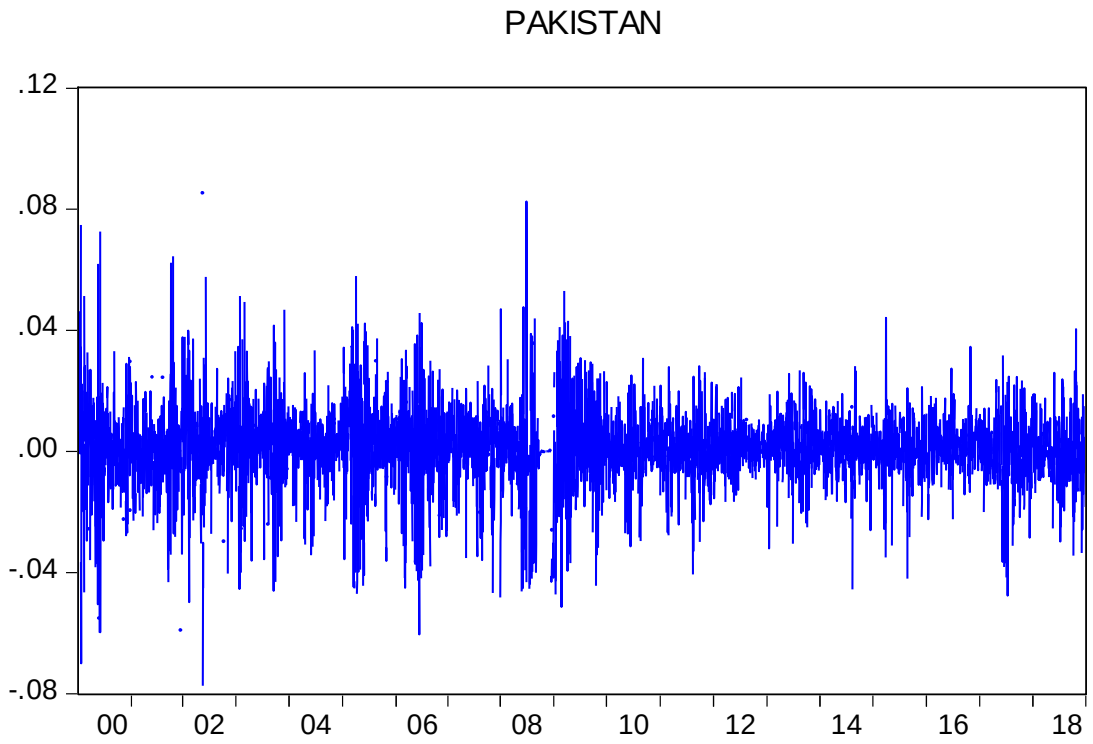
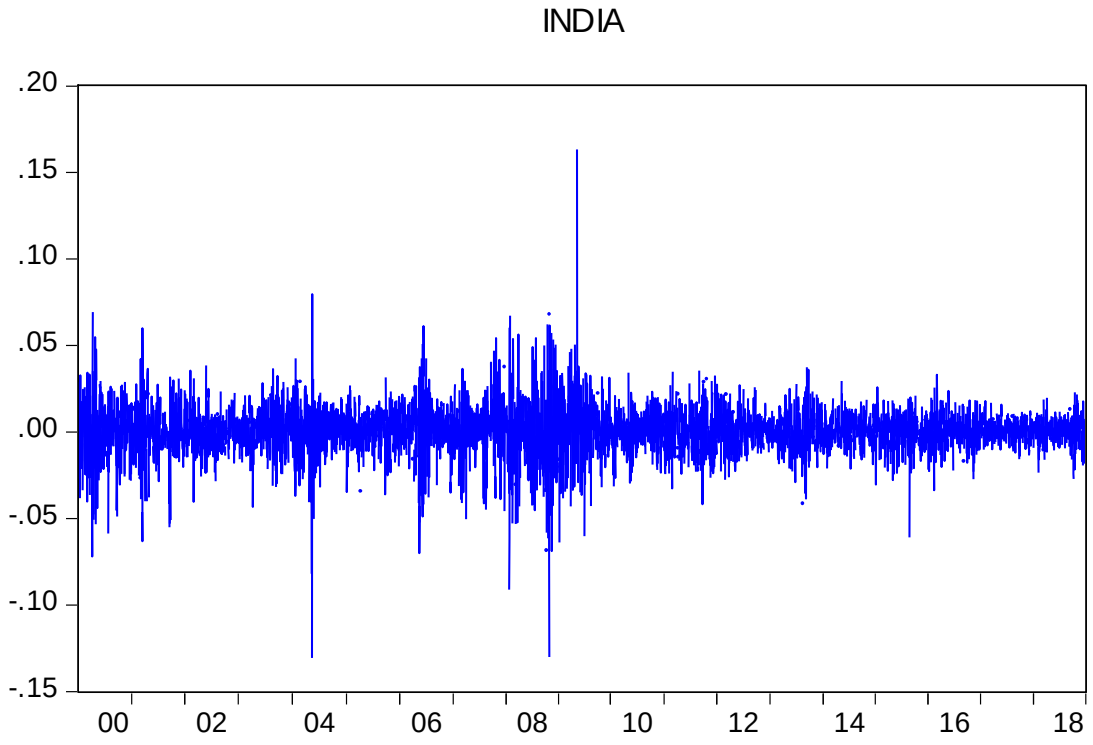
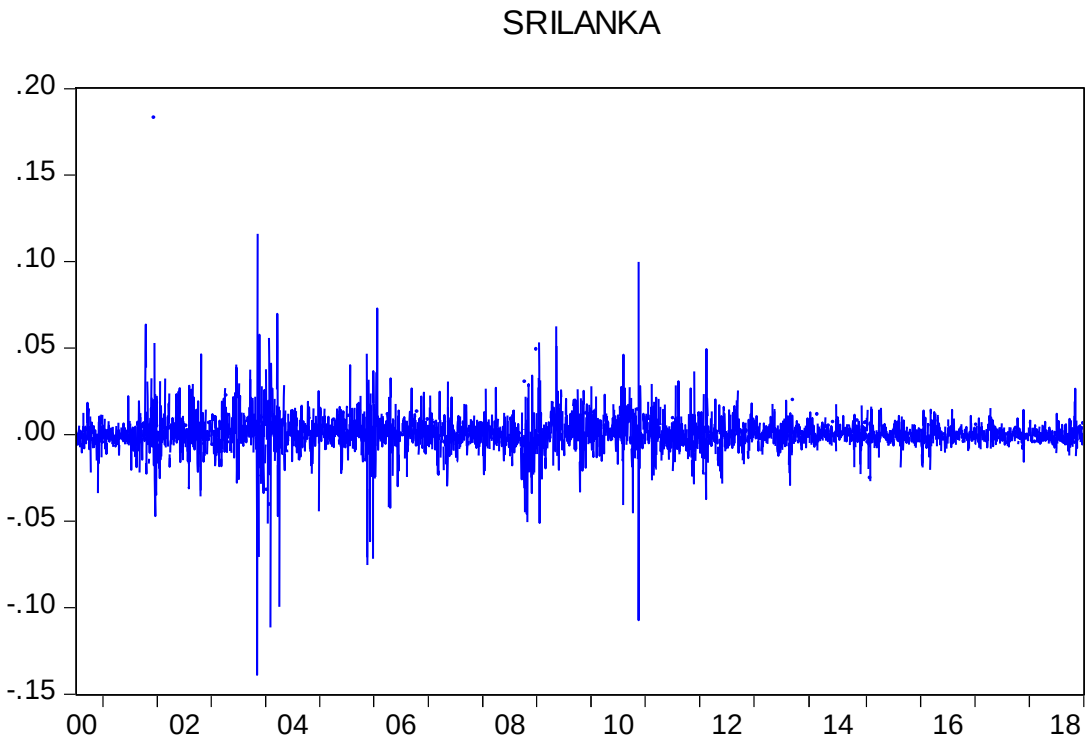


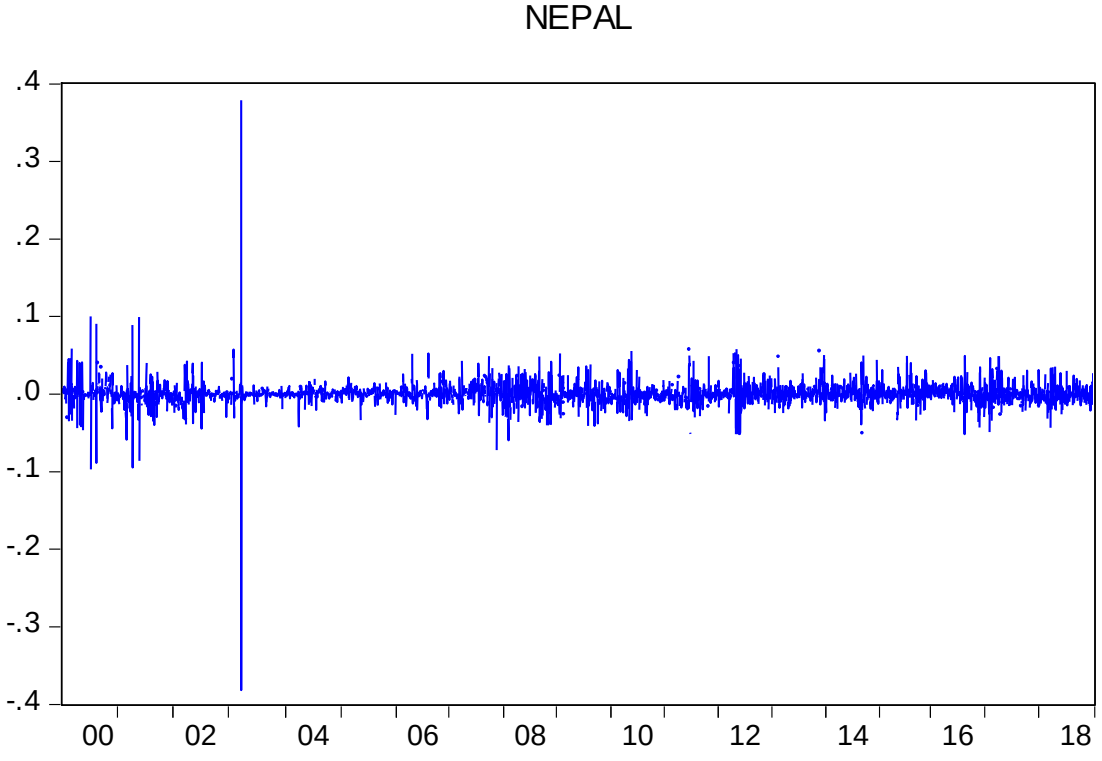
FIGURE A1: South Asian countries stock market price series.

Stationarity Graphs






SRILANKA
.20
.15
.10
.05
.00
-.05
-.10
-.15
00
02
04
06
08
10
12
14
16
18


NEPAL
.4
.3
.2
.1
.0
-.1
-.2
-.3
-.4
00
02
04
06
08
10
12
14
16
18

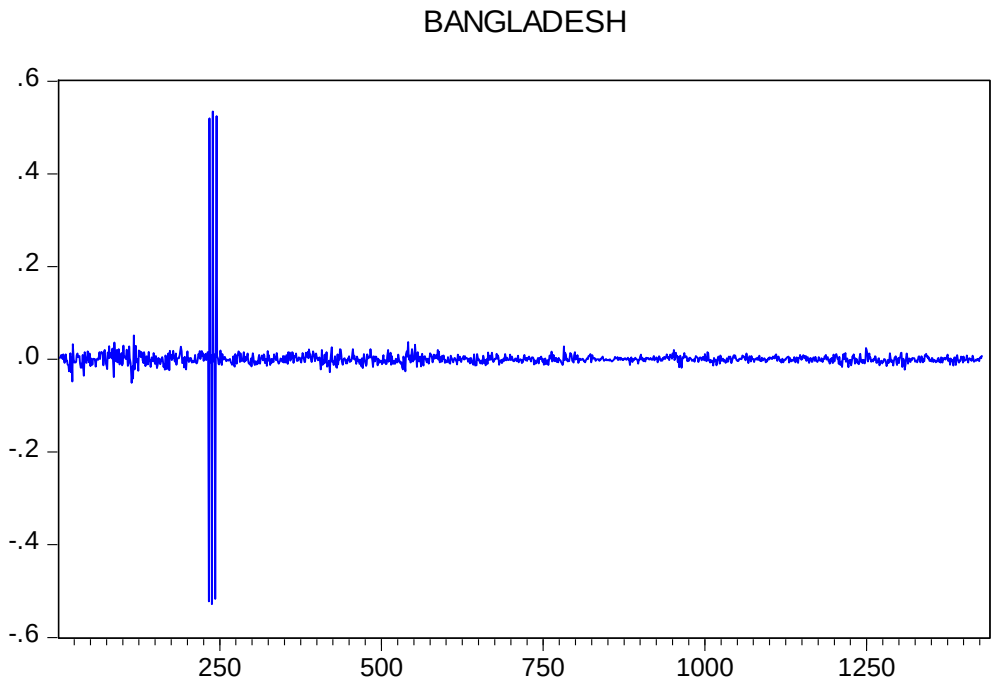
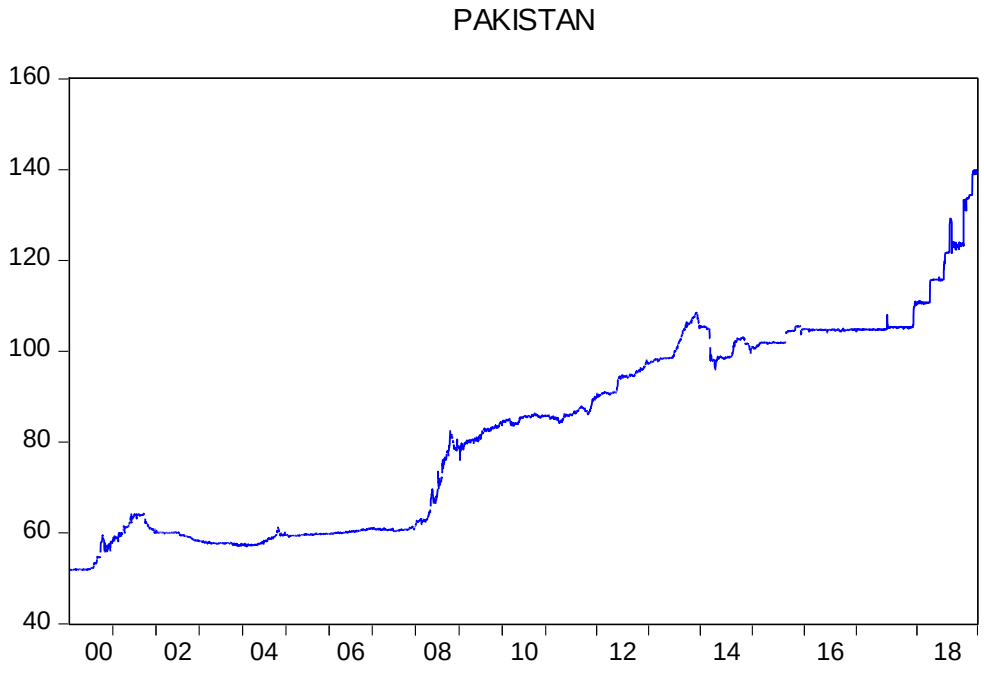
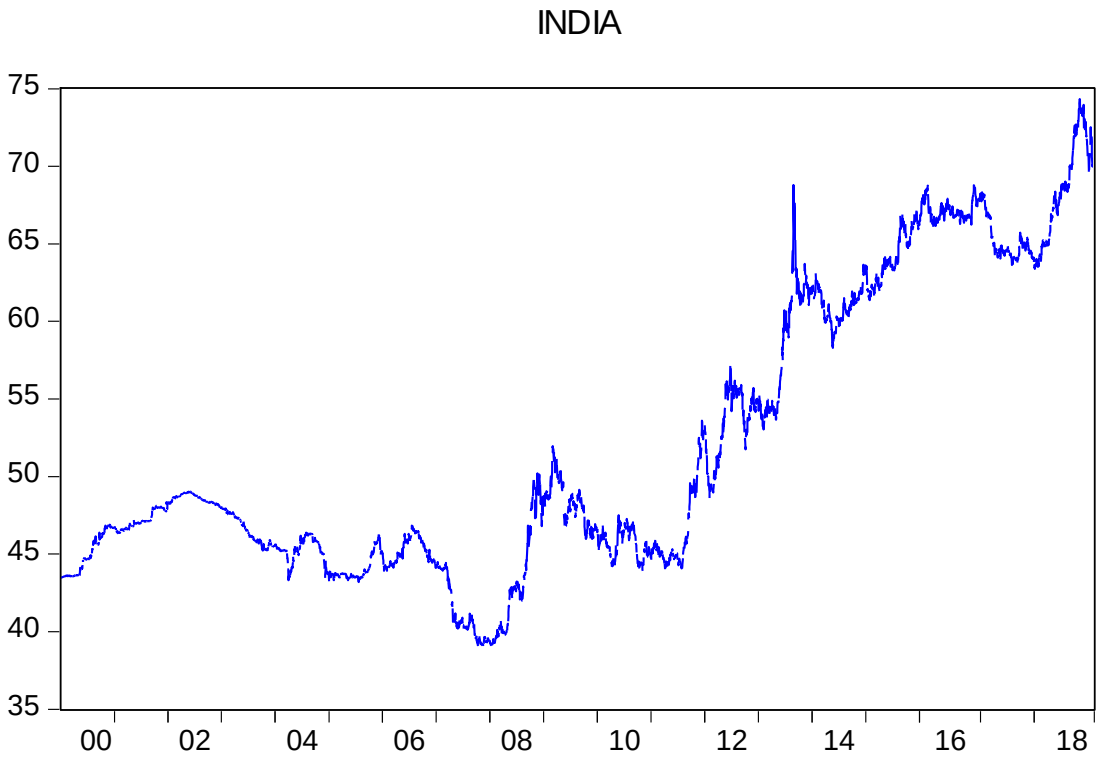


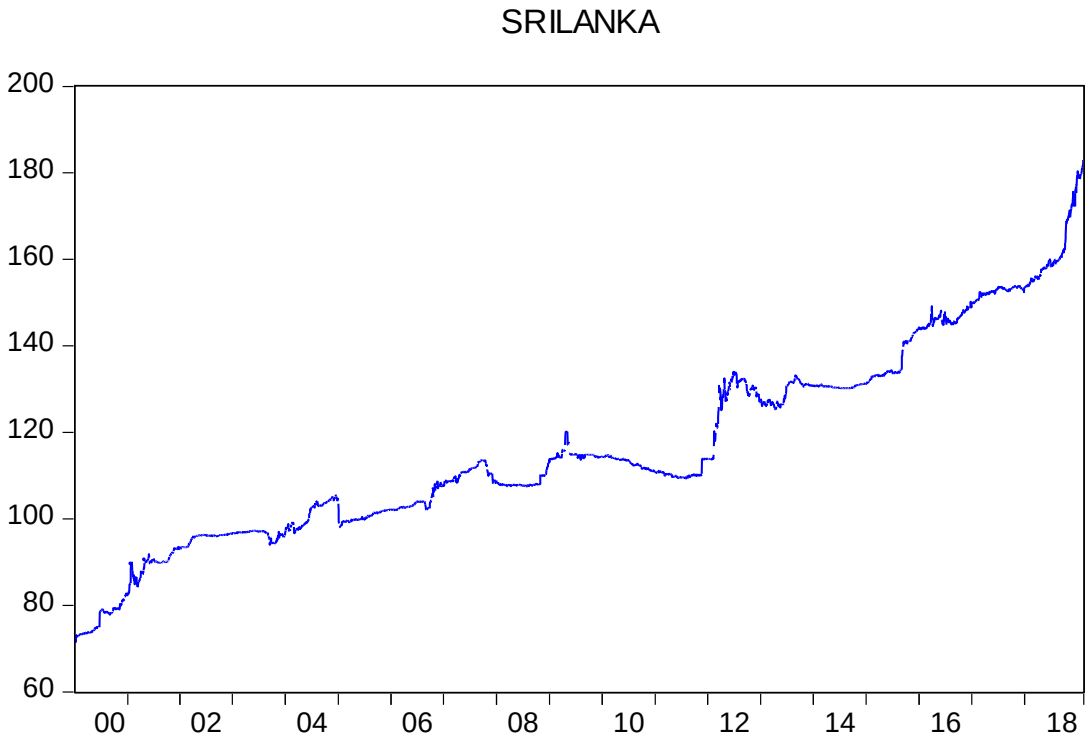
FIGURE A2: South Asian countries stock markets stationarity test.

Forex Market

Price Series Graphs




INDIA
75
70
65
60
55
50
45
40
35
00
02
04
06
08
10
12
14
16
18


SRILANKA
200
180
160
140
120
100
80
60
00
02
04
06
08
10
12
14
16
18

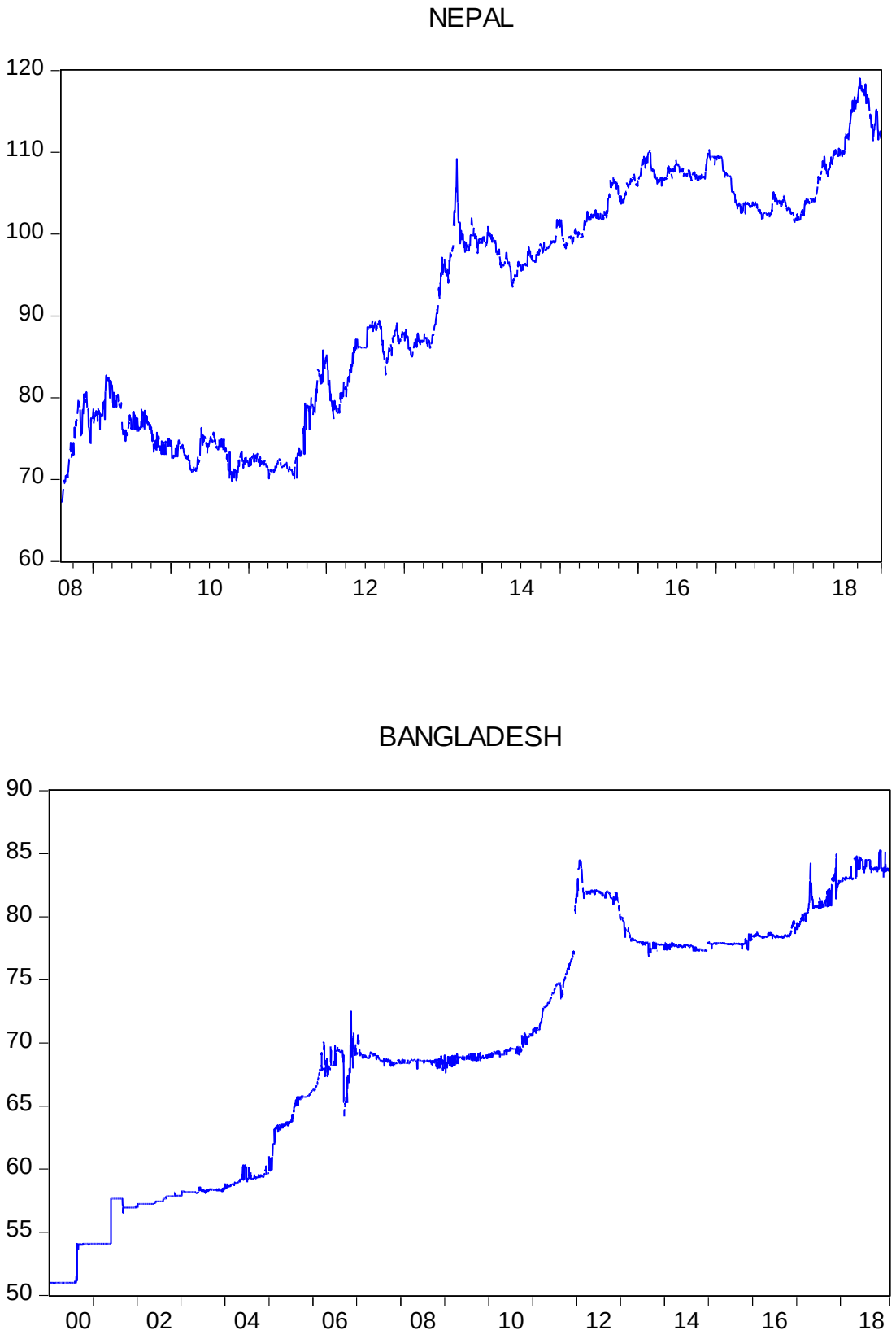
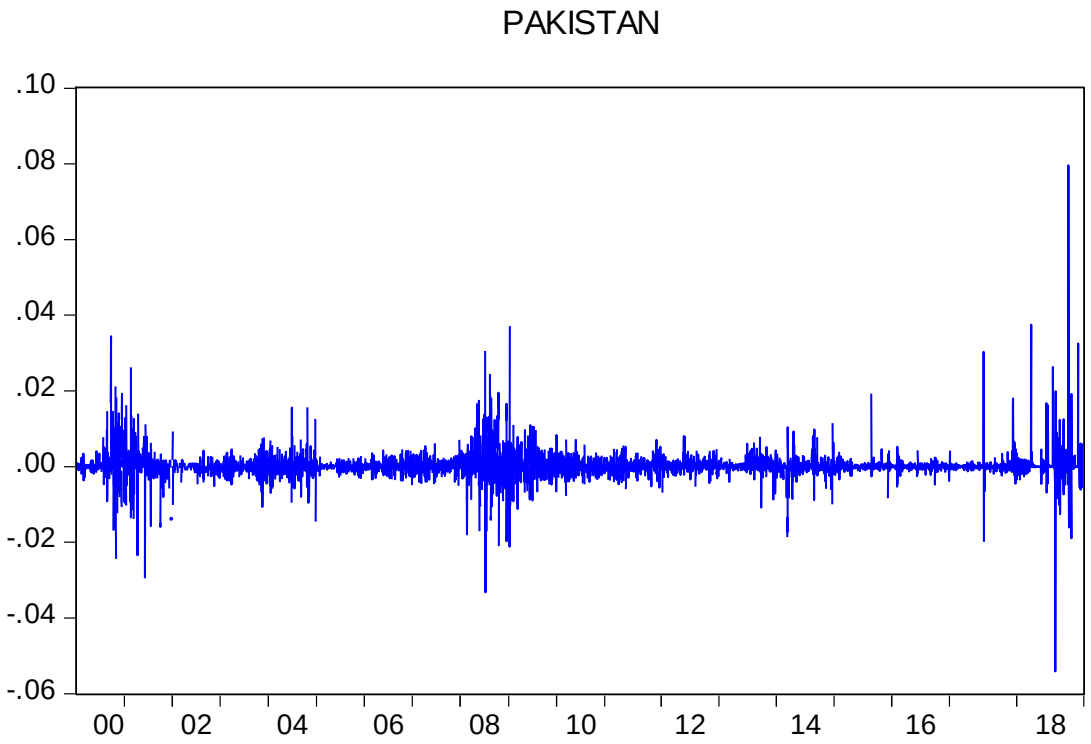
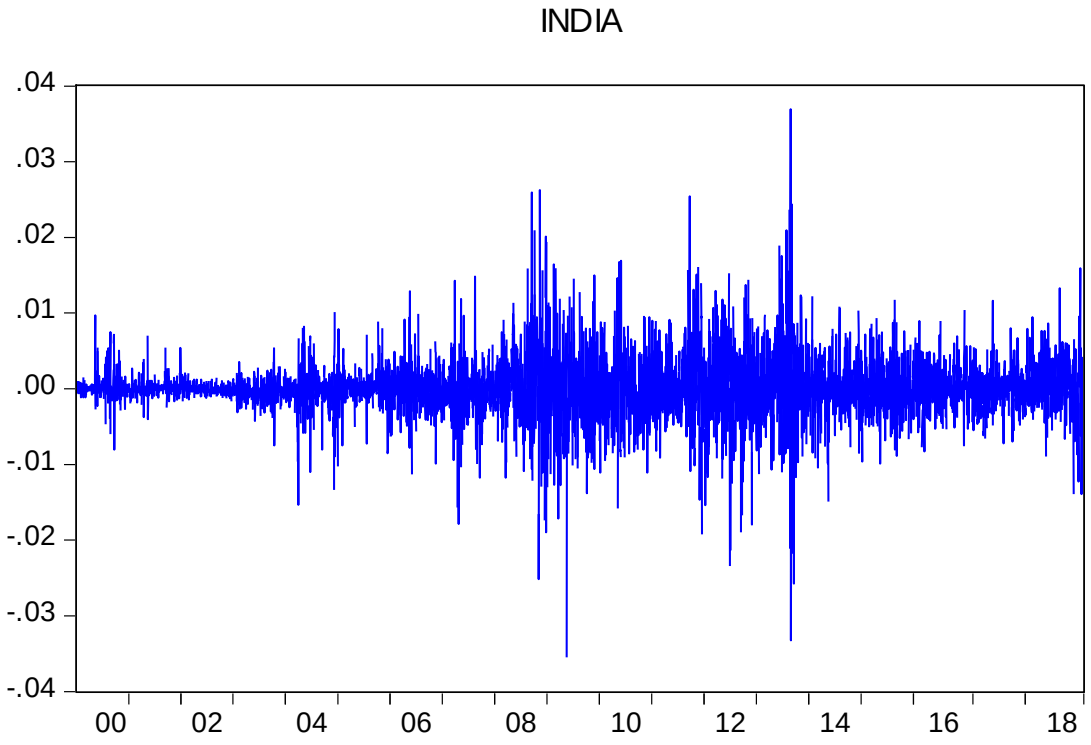
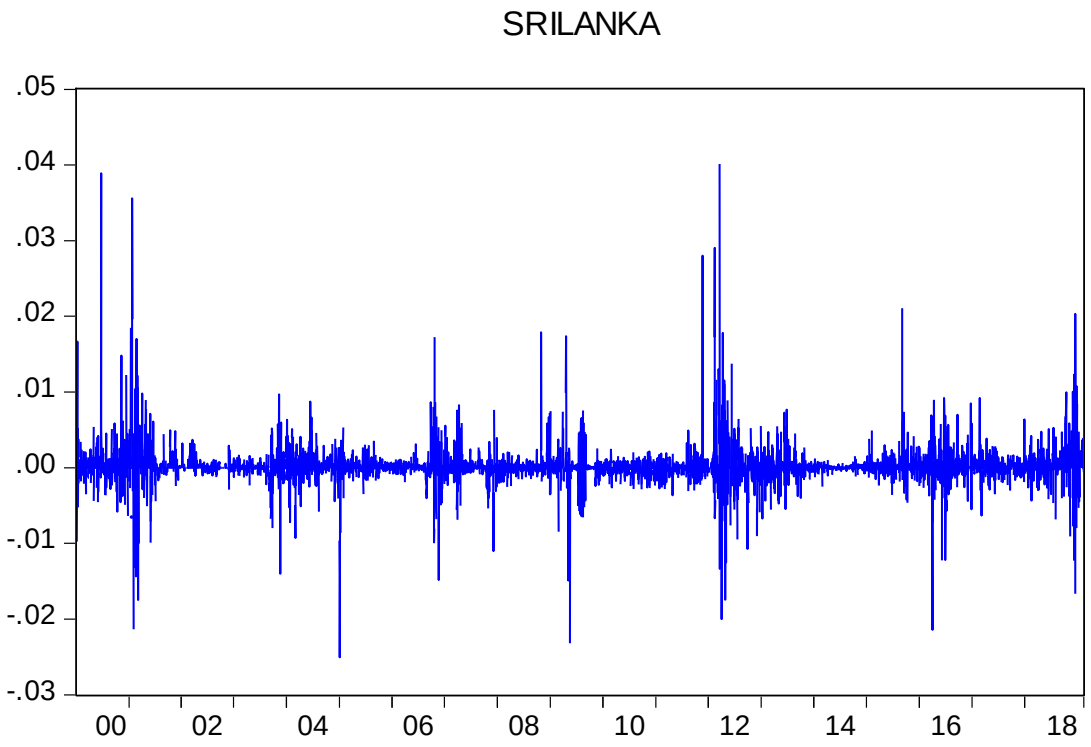


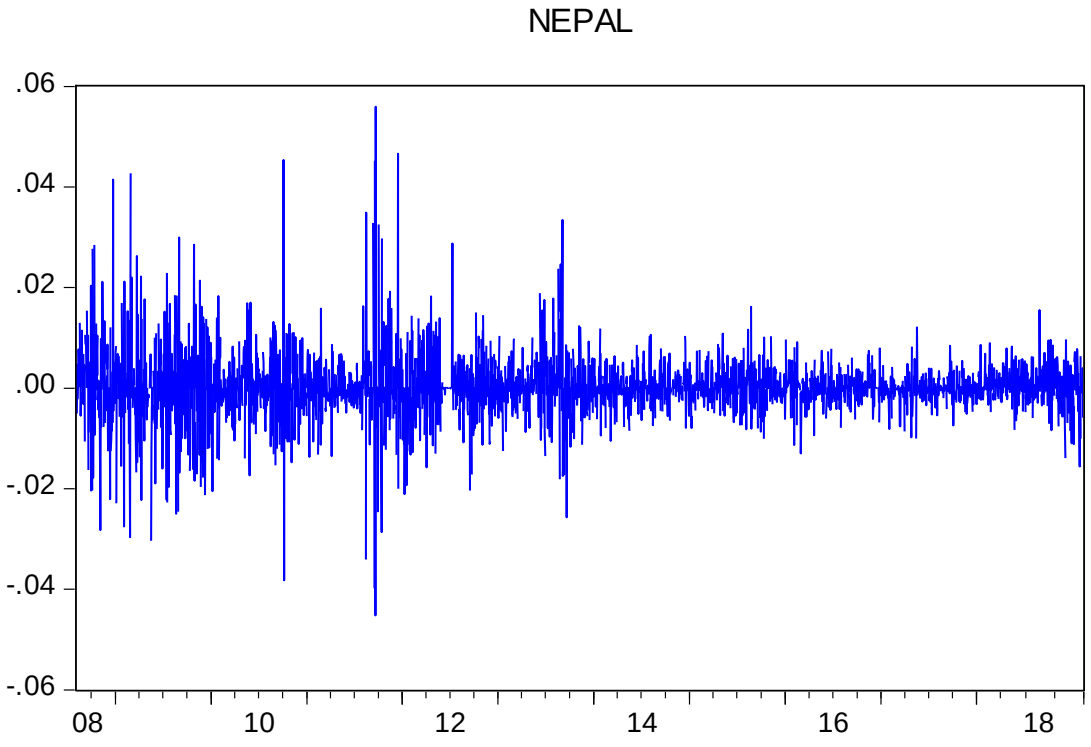
FIGURE A3: South Asian countries FOREX market price series.

Stationarity Graphs






SRILANKA
.05
.04
.03
.02
.01
.00
-.01
-.02
-.03
00
02
04
06
08
10
12
14
16
18


NEPAL
.06
.04
.02
.00
-.02
-.04
-.06
08
10
12
14
16
18

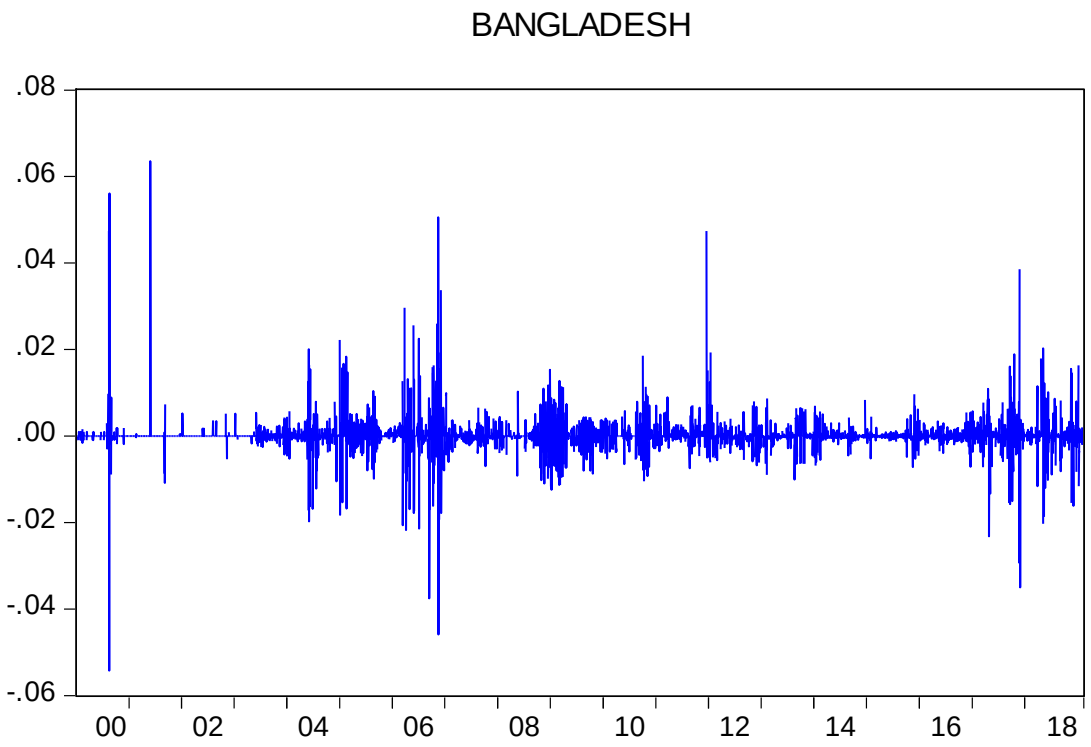


FIGURE A4: South Asian countries FOREX markets stationarity test.