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**“DYNAMIC LINKAGES AMONG INTERNATIONAL STOCK MARKETS.
THE EFFECT OF LIBERALIZATION”.**

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ABSTRACT

Many studies have examined the relationships among international stock markets but few of them have considered the effect of liberalization on them.
The main purpose of this paper is to fill this gap by examining the causality relationship and volatility spillover effects before and after the liberalization period for seven international stock markets U.S.A., India, Japan, Malaysia, Philippines, Pakistan and Thailand.
Through cross – country analysis, we are interested in studying the returns of above international stock markets and trying to derive some valuable information of the dynamic linkages and relationships among above stock markets by pointing how much correlated they were or are during pre and post liberalization period.
Two methodologies have been applied. The methodology developed by Cheung and Ng in 1996, causality –in-variance test and a VAR analysis, through which we try to capture the interdependencies between the time series returns of these seven stock market indices.

Introduction

Nowadays, in era of increasing globalization, the role of stock markets in the modern economic environment is getting more and more important for investors, companies and policy-makers.

The fluctuations of stock markets, especially in periods like now where markets are very agitated, can provide us with information about the markets' expectations and the future economic developments. International investors and corporate managers base their investment decisions upon that information. This explains why the study of the relationship of stock market returns has become almost imperative to those exercising economic and financial policies.

Throughout the last two decades, we have seen leading personalities in financial and macroeconomic field presenting several studies trying to show the relationship among international stock market returns. The level of interaction and interdependence between stock markets has important consequences in terms of predictability, portfolio diversification and asset allocation. There have been several reasons that postulate the growing interest in stock market integration. They range from: the increased flow of capital across national boundaries due to the relaxation of controls on asset market transactions, improvements in the flow of information and a reduction in the transaction costs themselves, to the potential gains from diversification of investments on an international level. Therefore investigations into the dynamic linkages of individual established markets over time and across markets are of crucial importance to all investors and financial policymakers.

According to Wacziarg and Welch (2003) the percentage of countries open to trade increased from 16 to 73% between 1960 and 2000, and Edwards (2004) reports that the degree of capital mobility has increased in all regions of the world between 1970 and 2000. As such, the need for an analysis in the face of such dramatic developments associated with globalization and liberalization of stock markets becomes all the more relevant and the conclusions that can be derived from such analysis can help us to organize a better and more efficient economic system. A good financial system with a well-functioning competitive market as well as a well-supporting financial institution, are essential ingredients for sustainable economic growth.

The integration and interdependence of stock markets underlies a major cornerstone of modern portfolio theory that addresses the issue of diversifying assets. In essence, this theme advocates that investors diversify their assets across national borders provided that stock returns in these markets are less than perfectly correlated with the domestic market.

Theory predicts that gains can be achieved through international portfolio diversification if returns in the different markets are not perfectly correlated. Policies of deregulation and the liberalization of capital markets, coupled with technological advances, suggest that markets have become more integrated over time, while for others the benefits on the aggregate of lifting barriers to trade and capital flows, and particularly the latter, are still debated. The fact is that increasing levels of integration suggests that opportunities for portfolio diversification are reduced.

This issue is of important concern for investors since greater integration among world markets implies stronger co-movements between markets, therefore the opportunities for international diversification are been reduced and the risk at a given level of expected return is been maximized. Furthermore, market co-movements can also lead to market contagion as investors incorporate into their trading decisions information about price changes in other markets in an attempt to form complete information set carrying the risk that errors in one market may be transmitted elsewhere.

A number of studies have attempted to document the real effects of international integration (Sachs and Warner, 1995; Quinn, 1997).

One important implication of integrated markets is that assets associated with similar levels of risk in different countries should also lead to a similar level of return. This issue has been empirically addressed in several studies (Errunza and Losq, 1985; Hietala, 1989) and it was placed under critical scrutiny due to inconsistent results. For example, Wheatly (1988) who argues that even without market integration, assets that are diversified internationally could be "mean-variance efficient".

The advantages of asset diversification have already been widely discussed in the literature in which much effort was devoted to quantify risk-reduction and it's associated benefits available to the internationally diversified portfolio (Solnik, 1991). Closely tied with this issue is the observation that stock prices tend to move closely together and trend upward over time. Kasa's (1992) finding of a unique common stochastic trend in a system of five stock markets held implications that these markets were perfectly correlated over the long run (although there could be significant deviations over the short term). In this respect, the analytical tool of cointegration lends itself quite conveniently to investigating the long run relationships of stock market movements.

There has also been a serious research focused on volatility between asset markets in developed economies and emerging markets. Understanding and careful estimation of the time varying nature of volatilities, covariances and correlations, is paramount to capture changes in risk and identify the nature of co-movement between markets.

Evidence of spillover and volatility transmission from one market to another is well established (see, Engle, Ito, & Lin, 1990; Hamao, Masulis, & Ng, 1990). Further evidence on contagion and financial crises such as the Asian crisis and the Russian crisis, highlights the impact of these events on other markets across the globe (see, Kaminsky & Reinhart, 1998; Edwards & Susmel, 2001; Bae, Karolyi, & Stulz, 2003).

In addition to these short-run relationships, there is a body of evidence suggesting capital markets share common trends over the long term (Kasa, 1992; Garrett & Spyrou, 1999). This suggests that for investors with long-term investment horizons, the benefits of international portfolio diversification could be overstated. Despite the existence of such long-run relationships, it is unlikely that the benefits of diversification will be eroded since returns may only react very slowly to the trend. Indeed the benefits of diversification are likely to remain and hence accurate measurement of volatilities and correlations between markets is of great importance.

Moreover, it is well established that stock return correlations are not constant through time. Correlations tend to rise with economic or equity market integration (Erb, Harvey, & Viskanta, 1994; Longin & Solnik, 1995; Goetzmann, Li, & Rouwenhorst, 2005). They also tend to decline in bull markets and increase during bear markets (Longin & Solnik, 2001; Ang & Bekaert, 2002).

Longin and Solnik (1995, 2001) showed that correlations between markets increase during periods of high market volatility, with the result that correlations would be higher than average exactly in the moment when diversification promises to yield gains. Consequently, such changes in correlations imply that the benefits of portfolio diversification may be rather modest during bear markets (Baele, 2005).

A large proportion of the empirical literature concerning stock market dynamics which employs times series techniques can be broadly classified into two groups. One group follows the work initiated by Kasa (1992), which uses multivariate cointegration techniques to examine the number of common stochastic trends in a system of national stock market prices. This method provides insights into how much integrated markets have become and the popular intuitive notion of whether or not stock markets share long run relationships over time. Relevant studies include Chung and Liu (1994) and Corhay et al. (1995) on Pacific-Rim country stock markets, Blackman et al. (1994) on 17 OECD markets, Jeon and von Furstenberg (1990) and Kwan et al. (1995) on major world equity markets. The second group has attempted to investigate lead–lag relationships among prices of national stock markets (Eun and Shim, 1989; Cheung and Mak, 1992; Malliaris and Urrutia, 1992; Arshanapalli and Doukas, 1993; Smithi et al., 1993; Brocato, 1994).

Cheung (1998) examined linkages between Asia-Pacific equity markets and the US by using vector autoregression (VAR) model, establishing that the US has a significant influence on these markets in addition to a number of interrelationships within the Asia-Pacific region. Further, while such research establishes spillovers in mean relationships between markets, there has been much research (initiated by Engle et al., 1990; Hamao et al., 1990) by examining the presence of spillovers in volatility.

Masih and Masih (1999) applied recent time series econometric techniques, including VECM and VAR model due to Toda and Yamamoto (1995), in order to examine the long and short–term dynamic linkages among a set of eight international stock indices, with a particular focus on four Asian emerging stock markets: Hong Kong, Singapore, Thailand and Malaysia.

In addition to the evidence of significant interdependencies among them, their analysis revealed the leading role of the USA at the global level. Applying a similar methodology in 2001, investigating nine major international stock markets, an interesting statistical finding that came out was the growing role of the Japanese market as a long run leader.

In addition to mean and volatility spillovers, there is strong evidence to suggest that markets display common trends over the long term. A number of studies have investigated the existence of a long-run equilibrium relationship between Asia-Pacific stock markets and between these markets and the developed markets (see, Chan, Gup, & Pan, 1992; Garrett & Spyrou, 1999; Ghosh, Saidi, & Johnson, 1999; Darrat & Zhong, 2002). However, recently studies have investigated the stability of this long-run relationship. Yang, Kolari, and Sutanto (2004) found no evidence of long-run cointegrating relationships between emerging markets and US prior to the Asian financial crisis, but such relationships existed during the crisis period. Further, Yang, Kolari, and Min (2003) examined both long-run relationships and short-run dynamics around the period of the Asian crisis demonstrating that linkages between markets strengthen during the crisis and that markets have remained more integrated post-crisis.

Manning (2002) argued that the convergence of South East Asian equity markets was abruptly halted and somewhat reversed by the crisis. The various alternative findings suggest that relationships vary through time and are naturally impacted by events such as the Asian crisis.

The contribution of other researchers to the body of empirical literature involving Asian stock markets should not also be neglected. Bilson et al. (2000) found that the regional integration among stock indices in Malaysia, Philippines, South Korea, Taiwan and Thailand was faster than their integration with the global markets. Interestingly, the most recent studies tend to find greater instability suggesting that the interrelationships among national stock markets may have undergone a substantial change during 1980s.

The last 30 years, we have witnessed a burst in trade and capital account liberalization. During the late 1980s and early 1990s we have shown a substantial development of financial markets, in both developed and emerging economies. Several Asian economies went through a number of economic reforms, financial liberalization and global integration process, which explains why many international investors and researchers have focused their attention on those of Asia.

The decade since the mid-1990s has been a tumultuous time of economic and political changes that have altered the course of development in East Asia. In the make of the crises most East Asian economies including the crisis-hit ones embraced liberal economic reforms that had deregulated and opened their financial regimes. Against all the odds and earlier expectations, these countries were able to bounce back quickly from the financial meltdown. So after the economic crisis of these countries known as Asia Tiger, the focus of international investors has been turned to countries like India, Pakistan, India and Malaysia, whose GDP growth per year is continuously increased (see Appendix A with GDP growth of 2007, as per list of International Monetary Fund).

Cheung and Mak (1992), for example, indicate that several of the world's leading fund managers have established financial vehicles concentrated only in this region as media for international risk diversification.

Given the fact that during the last decades, the market capitalization of those countries was practically multiplied, made these countries attractive investment opportunities to foreign investors. They have become investment icons in the global financial markets; in other words, these countries are attractive investment opportunity for foreign investors and can play a major role in a global financial market, especially after their financial liberalization, which has led to an accelerate growth in their capital markets. Equity market liberalization gave foreign investors the opportunity to invest in domestic equity securities and domestic investors the right to transact in foreign equity securities.

It is very interesting to examine the linkages among international markets pre and post liberalization period in order to explore the existence of interdependences or not.

In the literature, very few works have focused on what impact had the event of liberalization on international stock markets. Most of them examine the stock market integration and the interdependencies with regards to others variables. These studies can give us an indication of stock markets' behavior but in this paper, we try to examine and identify more information regarding the relationships among international stock markets with regards to pre and post liberalization period.

We will focus our study on the relationship of stock markets returns of seven international stock markets: Malaysia, Philippines, India, Thailand, Pakistan, Japan and USA before and after the liberalization period.

As per the list of International Finance Corporations (in Emerging Markets Fact book, 1997), Malaysia, Philippines and Thailand have been described as emerging economies. Japan is considered to belong to advanced economies while USA belongs to developed economies. The choice of these countries is not at al irrelevant (see Appendix B with economic information for these seven countries). Apart from USA, these nations are the most developed in this growing region of the world economy and are of strategic significance to the further development of Asia, for example Japan is the world's second largest economy.

For R. Mundell, these six countries apart from USA are actually considered as a basis for consideration of an Asian one-currency area, a fact that makes much more interesting the study of linkages and their degree of interdependence among them. More particularly R. Mundell thinks that in the future, these countries can form a third currency area, similar to those of the United States and of course that of the European Monetary Union. Of course, a creation of a currency area in Asia is a long term one, due to the fact that currency areas are formed after years of growth, changes on the economies and reforms of the political relationships among the countries which are going to be part of this union.

In the following pages, we will define financial liberalization and stock market liberalization and we will try to identify the dynamic linkages among stock markets returns by applying two methodologies, a VAR analysis and Cheung and Ng's methodology.

1. ECONOMIC LIBERALIZATION

By economic liberalization, we mean a comprehensive reform that extends the scope of the market. It refers to large alterations in the economic environment, likely to be associated with relevant changes in government incentives and constraints.
Financial liberalization is a more complex, multidimensional process and can be defined as some combination of the following six kinds of constraint relaxation:

1. Eliminations of interest rate controls.
2. Lowering of bank reserve requirements
3. Reductions of government interference in bank's lending decisions
4. Privatization of nationalized banks
5. Introduction of foreign bank competition facilitation and encouragement of capital inflows.

Financial liberalization may induce financial fragility or deepen the financial system in short term, but its long-term benefits on the economy are ambiguous, from both empirical and theoretical perspectives. We could consider it as a kind of balancing act, with most governments attempting to get the benefits while avoiding the possible instabilities. This is most likely to succeed when strong foundations have been made laid in law and regulation. Indeed, financial liberalization in the absence of appropriate law and regulation, as happened in the case of Russia, gives rise to chaos. Therefore, most governments choose to go slowly with the procedure.
Financial liberalization has strong affects at economic outcomes such as growth and investments, macroeconomic policies such as inflation and budget surplus and structural policies such as indicators of protection of property rights and control corruption.

1.1 Stock market liberalization

Stock market liberalization is the decision of a government to allow foreign investors to purchase shares in the local stock market and domestic investors to purchase shares abroad.
Since the mid-1980s, the majority of the developing nations has liberalized their equity markets and allows foreign investors to purchase and trade shares in their

domestic markets. For most emerging markets, liberalization is an essential policy tool that attracts much needed foreign capital for investment purposes.
Stock market liberalization can have a favorable impact on the economy in many aspects. For instance, several empirical studies have shown that liberalization had a positive effect on developing economies via the decreased cost of equity, increased returns and increased private physical investment.
It has been long argued that financial liberalization increased allocation efficiency on investment. Since financial liberalization generally increases the likelihood that markets operate effectively, banks operating in developed financial markets will be efficient as well (Bekaert, Harvey and Lundblad, 2001). When an economy has strong institutions, the impact of financial liberalization on the fragility of banking system will be mitigated through changes in institutions by supporting a better functioning of financial market (Demirguc-Kunt and Detragiache, 1998; Kaminsky and Schmukler, 2002).

1.2 Liberalization Date

Researchers take special care to identify liberalization dates (Henry, 2000, Bekaert and Harvey, 2000), but it is difficult to pinpoint an exact date on which a country's stock market can be considered liberalized because liberalizations are typically gradual processes, not one-time events. In addition, stock markets liberalization is often concurrent with other economic reforms, and thus it is difficult to disentangle the separate effects of these multiple events on performance. It is unclear whether liberalization causes performance improvements or whether countries' time liberalization coincides with periods of strong economic growth.
Our data in this study for dating the liberalization of stock markets come from Bekaert et al. (2000), who, based on a variety of sources, had determining the Official Liberalization dates, date of the first American Depository Receipt (ADR) issuance, and first country fund.

Table 1: Dating financial liberalization

Country	Official Liberalization	Reason for Official Liberalization dating.
India	**1992**	Government announces that foreign portfolio investors will be able to invest directly in listed Indian securities **(September)**.
Japan	**1983**	Finance Ministry announces easing restrictions on investments by stocks by foreigners **(September)**.
Malaysia	**1988**	Budget calls for liberalization of foreign ownership policies to attract more foreign investors **(October)**.
Pakistan	**1991**	No restrictions on foreigners or nonresident Pakistanis purchasing shares of a listed company or subscribing to public offerings of shares subject to some approvals **(November)**.
Philippines	**1991**	Foreign Investment Act is signed into law, The Act removes, over a period of three years, all restrictions on foreign investments **(June).**
Thailand	**1987**	Inauguration of the Alien Board on Thailand's Stock Exchange. The Alien Board allows foreigners to trade stocks of those companies that have reached their foreign investment limit **(September)**.

1.3 Review of bibliography for economic liberalization

A number of papers assess the impact of stock market liberalization on the cost of equity capital, finding evidence of an increase in share prices around the liberalization date and a reduction in the cost of capital afterwards. Regarding stock market development, liberalization increases the pool of capital available to local firms and broadens the investor base. This is likely to lead to increased liquidity and larger amounts of research. Furthermore, the scrutiny of foreign investors may increase transparency and promote the adoption of better corporate governance practices (Stulz, 1999; Errunza, 2001).

When markets are imperfect, equity market liberalization could have strong effects as well. Financing constraints (see, e.g., Hubbard, 1997, and Gilchrist and Himmelberg, 1999), make external finance more costly than internal finance and cause investment to be sensitive to cash flows. Equity market liberalization directly reduces financing constraints in the sense that more foreign capital becomes available, and foreign investors could insist on better corporate governance, which indirectly reduces the cost of internal and external finance. Hence, the cost of capital could go down because of improved risk sharing or because of the reduction in financing constraints or both.

In general, better corporate governance and investor protection should promote financial development (La Porta et al., 1997) and hence growth (King and Levine, 1993). A related literature analyzes the impact of stock market liberalization on real variables, reporting significant increases in investment and economic growth following liberalization (see, for example, Henry, 2000, 2003 and Bekaert et al., 2005).

The paper of Francesco Giavazzi and Guido Tabellini (2005) confirms the finding that economic liberalization is accompanied by better structural policies and better macroeconomic policies and it is followed by improved economic performance. Henry (2000) shows that liberalization is associated with an increase in a country's overall level of private investment.

The opening of a country's stock market to foreign investors is associated with an increase in stock price indexes in the liberalizing country (Henry, 2000; Kim and Singal,2000).

Bekaert et al. (2005) estimate that stock market liberalizations lead to a 1% increase in a country's annual economic growth. Gupta and Yuan (2004) and Li (2003) also find a positive relation between liberalizations and growth using alternative methodologies.

Wacziarg and Welch (2003) confirm that an increased trade volume, faster growth and an acceleration of investment follow episodes of economic liberalizations.

However, empirical observation suggests that financial liberalization, if carried out inappropriately, may induce destabilization in the financial system and trigger financial crises.

Stiglitz (2000) argues that the increased frequency of financial crises is closely associated with financial market liberalization. Liberalization is systematically related to greater instability since capital flows are cyclical in nature, and this worsens economic fluctuations. As Arestis and Demetriades (1999) pointed out, the financial liberalization hypothesis is based on a set of unrealistic assumptions, including perfect competition, perfect information, a sound institutional framework and limited influence of stock markets. The fact that these assumptions are unlikely to be met in practice may explain the failure of the financial liberalization programs undertaken by many developing countries, particularly in the 1970s.

Others have doubts that liberalization has led to integration. For example Bekaert and Harvey (1995) found that in the first two or three years after liberalization, some countries had become less integrated into the world market while in 2000, Bekaert and Harvey, found that liberalization reduces the cost of capital by less than it was expected.

The uncertainty about the effect of liberalization on integration offers little guidance to currently liberalized markets facing the problem of whether to extend or curtail the process. This is a dilemma because further liberalization may not lead to the promised benefits of integration as we have discussed earlier and could expose the emerging markets to more of the negative consequences of liberalization. This includes the destabilizing effect of ‘‘hot money’’ flowing across borders (Bhagwati, 1998; Eichengreen and Mussa, 1998) and increases susceptibility to currency crises (Wyplosz, 1998).

If it is not clear that the last decade liberalization has led to integration, then other emerging and transitional economies that are contemplating the initiation of liberalization may be overly cautious of doing so. This happens because liberalization has caused some markets to become less integrated (Bekaert and Harvey, 1995) and due to the fact that further liberalization via the expansion of an ADR program retards, rather than facilitates the development of the local market (Karolyi, 2003).

Finally, if the markets remain segment due to the existence of direct barriers, then the authorities can repeal or amend the existing laws, if they consider the possible gains from further liberalization enough to outweigh the potential negative consequences. Conversely, if indirect barriers are the cause of segmentation and some are related to foreign investors' fear and irrationality (Gultekin et al., 1989; Bosner-Neal et al., 1990), then further liberalization may not be able to effectively address these concerns. This distinction cannot be made by merely observing that restrictive laws exist, because if foreign investors can circumvent them, they will not cause segmentation.

1.4 Liberalization and stock market volatility

The measure of an asset's risk is its volatility, which is defined as the conditional variance of its return. Financial market volatility is central to the theory and practice of asset pricing, asset allocation and risk management. Although most textbook models assume volatilities and correlations to be constant, it is widely recognized among both finance academics and practitioners that they vary importantly over time.

Empirical studies as early as in Mandelbrot (1963) have demonstrated that the variance of stock returns is time varying and persistent. Moreover, there is relationship between volatility and the information arrival or trading volume. Due to globalization and liberalization on equity markets, news affecting equity prices in one market may also change the fundamentals in distant markets (volatility "spillovers"). Volatility is often related to the rate of information flow (e.g Ross 1989). Therefore the study on volatility spillover can help us understand how information is transmitted across markets.

The effect of stock market liberalization on return volatility in particular is an important issue that all economies and mostly emerging market economies must consider before their decision to liberalize and perhaps even after. This is because volatility is an unattractive feature that has adverse implications for decisions pertaining to the effective allocation of resources and, therefore, for investment.

For instance, volatility makes investors more averse to holding stocks due to uncertainty. Investors in turn demand a higher risk premium in order to insure against the increased uncertainty. A greater risk premium results in a higher cost of capital, which then leads to less private physical investment. In addition, greater volatility may increase the value of the adoption to wait and thereby delaying investment. Also, weaker regulatory systems in developing markets reduce the efficiency of market signals and the process of information, which further magnifies the problem of volatility.

Some would agree that the 1997 East Asian crisis is an example of turmoil in domestic stock markets due partly to equity market liberalization policies. Global events impact all countries, but this impact is generally short lived and does not cause structural changes in the economies. We have to consider that liberalization makes markets more open to large shocks. This has led some to suggest that volatility increases after liberalization, but some believe that the correct interpretation would be one of lower average volatility although subject to the possibility of occasional large shocks.

One main question might be “Why should stock market liberalization affect return volatility”?

One explanation is that liberalization attracts a new group of investors, mostly institutional investors from already developed markets, whose decisions are based more on rational investment analyses and whose strategies focus on fundamental valuation factors. Hence, there is possibility of reduced volatility after liberalization.

On the other hand, a market’s opening may expose the liberalized country to uncertainties abroad that could be reflected in increased domestic stock price volatility. Therefore, there is possibility of increased volatility after liberalization.

1.5 Empirical Evidence

Considerable research has focused on stock market liberalization and stock market volatility and the empirical evidence is mixed. The studies have shown empirically that market's opening may decrease or increase volatility.

According to finance literature, stock market volatility could either increase or decrease when markets are opened (Bekaert and Harvey, 1997, 2000, 2002). On the one hand, markets may become informational more efficient, thus leading to higher — though less persistent — volatility as prices react fully and more quickly to relevant information; also, increased volumes of speculative capital may induce excess volatility. On the other hand, in the pre-liberalization process there may be larger swings from fundamental values leading to higher volatility and more intense reaction to shocks. After liberalization, the gradual development and diversification of the markets could lead to lower volatility and to a lower sensitivity to new information. Additionally, given the evidence that volatility of some market fundamentals such as economic growth seems to decrease after liberalization (Bekaert et al., 2006), the previous effect is likely to be reinforced.

Bekaert and Harvey (1997), investigating a large cross- section of liberalized and segmented markets and by using information before and after liberalization, have established that volatility generally decreases after liberalization. This is because a fully integrated market is influenced by world factors rather than local factors such as political risk and unstable macroeconomic policies that are prevalent in countries with poorly developed stock markets. De Santis and Imrohoroglu (1997) also found evidence that volatility decreased after liberalization in a subset of countries, such as Argentina. However, Huang and Yang (1999), using the dates of financial liberalization from De Santis and Imrohoroglu (1997), showed that the unconditional volatility of the stock markets in three of the countries analyzed (South Korea, Mexico and Turkey) is increased after liberalization, whereas it is decreased in another four countries (Argentina, Chile, Malaysia and the Philippines).

A related stream of literature has opted for not specifying a priori the dates of the breaks, which are instead estimated endogenously, either in parametric settings (mostly Markov switching processes, Edwards and Susmel (2003) or through some nonparametric methodology (i.e turning point detection, as in Edwards et al., 2003 or Kaminsky and Schmukler, 2003 or endogenous breakpoint detection, as in Aggarwal et al., 1999). The results of these papers are also mixed.

Edwards et al. (2003) find that volatility after financial liberalization has increased in Asian countries. Aggarwal et al. (1999) find that most events around the time period, when shifts in volatility occurred, are local but liberalization processes seem not to have induced the changes in variance. Also, they both find increase or decrease in volatility depending on the country and on the sequence of events. Ng (2000) finds that both the US and Japan influence volatility in the Pacific-Basin region.

While liberalization is likely to be a key event, its influence describes only a small proportion of the total variation suggesting that other intra-region influences are important. Similarly, Worthington and Higgs (2004) provide evidence of the transmission of return and volatility among nine developed and emerging Asia-Pacific markets by finding significant spillovers across markets with the use of multivariate GARCH models. Kim (2005) investigated the linkages between advanced Asia-Pacific markets (Australia, Hong Kong, Japan and Singapore) with the US. Uncovering contemporaneous return and volatility linkages had been intensified after the Asian crisis.

In the paper of Juncal Cunado, Javier Gomez Biscari and Fernando Perez de Gracia (2006), it is pointed out that financial liberalization of emerging markets has generally reduced the level of market volatility and sensitivity to news.

Chu – Sheng Tai (2007) found that stocks markets for India, Malaysia, Philippines and Thailand were segmented from the world capital markets before their liberalization dates but all four markets have become fully integrated since then.

There is still not a clear answer on whether financial liberalization leads to significant changes in the behavior of volatility and in what direction these changes occur. For instance, competing effects may offset each other and liberalization may not have a significant impact on volatility after all.

2. First methodology

VECTOR AUTOREGRESSIVE MODEL (VAR).

Vector autoregression (VAR) is an econometric model used to capture the evolution and the interdependencies between multiple time series, generalizing the univariate AR models. All the variables in a VAR are treated symmetrically by including for each variable an equation explaining its evolution based on its own lags and the lags of all the other variables in the model. Based on this feature, Christopher Sims advocates the use of VAR models as a theory-free method to estimate economic relationships, thus being an alternative to the "incredible identification restrictions" in structural models.
The vector autoregression (VAR) is commonly used for forecasting systems of interrelated time series and for analyzing the dynamic impact of random disturbances on the system of variabes. The VAR approach sidesteps the need for structural modeling by treating every endogenous variable in the system as a function of the lagged values of all of the endogenous variables in the system.

The mathematical representation of a VAR is

$$y_t = c + A_1 y_{t-1} + ... + A_p y_{t-p} + u_t$$

Where y_t is a k vector of endogenous variables, t=1…..T, c is a kx1 matrix of a constant, A_1, A_p are matrices of coefficients to be estimated, and u_t is a vector of innovations that may be contemporaneously correlated but are uncorrelated with their own lagged values and with that of the right hand side variables.
Furthermore, the multivariate vector autoregression modeling technique is a useful alternative to the conventional structural modeling procedure. VAR analysis works with unrestricted reduced forms, treating all variables as potential y endogenous. The results of causality tests within a multivariate VAR system are considerably more general and reliable as compared to bivariate test results.
Actually, a VAR model will help us to examine the causal relations among the seven stock market returns, to establish their dynamic interactions and how rapidly events in one variable are transmitted to the other variable. Here in our work k=2.

3. Second Methodology

Cheung and Ng

A standard method of volatility spillover is the Granger (1969) - type regression-based test. Examples of this include Krylova et al (2005) and Nikkinen et al. (2005). Having firmly established time series stationarity, these studies use vector autoregressive (VAR) modeling to describe volatility dynamics. However, while most of the existing empirical studies on volatility spillover use techniques such as VAR modeling, the uncertainty of potential interaction between time series makes such modeling extremely challenging. In our study, we will apply the causality-in-variance test developed by Cheung and Ng (1996).

Cheung and Ng (1996) propose an alternative test for volatility spillover using the cross-correlation function between two squared residuals standardized by their respective conditional variance estimators. This test is relatively simple and convenient to implement and can analyze causation patterns in both first – and second moment dynamics. More over, this test has a well-defined asymptotic distribution, and its asymptotic behavior does not depend on the normality assumption. Clearly, there are advantages when using the test, since it does not depend on a specific model selection, has a considerable power against causality in mean and causality in variance alternatives, and is robust to nonsymmetrical and leptokurtic errors.

The testing procedure is easier to implement than those based on specifying and estimating multivariate GARCH models, because it involves estimation of univariate models and the testing statistics have standard asymptotic distributions under the null hypothesis. Furthermore, in the multivariate GARCH modeling approach, there is uncertainty surrounding both the first- and second-moment dynamics, the potential interdependence between the series under examination, as well as the asymptotic distribution of the maximum likelihood estimator (Engle and Kroner, 1993). In contrast to Markov switching models, this methodology enables us not only to assess the existence, but also to measure the intensity of any spillover effects.

The Cheung and Ng (1996) test considers two stationary time series - $\{Y_{1t}\}$ and $\{Y_{2t}\}$ – that exhibit conditional heteroskedasticity. Let I_{it}, i =1, 2 be the information set of time series $\{Y_{it}\}$ available at period t, and let $I_t = (I_{1t}, I_{2t})$. We say that Y_{2t} Granger-causes Y_{1t} in variance if

$$E\{(Y_{1t} - m_{1t})^2 \big| I_{1t-1}\} \neq E\{(Y_{1t} - m_{1t})^2 \big| I_{t-1}\} ,$$

where m_{1t} is the mean of Y_{1t} conditioned on I_{1t-1}. Feedback in variance occurs if Y_{1t} Granger-causes Y_{2t} in variance and Y_{2t} Granger-causes Y_{1t} in variance (see, Granger et al., 1986).

Suppose that Y_{1t} and Y_{2t} are characterized by the following processes:

$$Y_{it} = m_{it} + u_{it}\sqrt{h_{it}}\,,\ i=1, 2,$$

where $\{u_{1t}\}$ and $\{u_{2t}\}$ are two independent white noise processes with zero mean and unit variance. Although both u_{1t} and u_{2t} are unobservable, we can use their estimators $-\hat{u}_{1t}$ and $\hat{u}_{2t}$ – to test the hypothesis. The conditional mean m_{it} and variance h_{it} are characterized by time series models, such as ARMA and GARCH.

The Cheung and Ng (1996) test is based on the sample residual cross-correlation function. Suppose we have a sample of size T. Let $\hat{u}_{1t} = \hat{u}_{it}^2 - T^{-1}\Sigma_{S=1}^{T}\hat{u}_{is}^2$ and let $\hat{r}_{u1u2}(k)$ be the sample cross-correlation function between two squared standardized residuals given by

$$\hat{r}_{u1u2}(k) = \hat{C}_{u1u2}(k)\{\hat{C}_{u1u1}(0)\hat{C}_{u2u2}(0)\}^{-1/2},$$

where $\hat{C}_{u1u2}(k)$ is the sample cross-covariance function defined as

$$\hat{C}_{u1u2}(k) = \begin{cases} T^{-1}\sum\limits_{t=1+k}^{T} \hat{u}_{1t}\hat{u}_{2t-k}, k \geq 0 \\ T^{-1}\sum\limits_{t=1+k}^{T} \hat{u}_{2t}\hat{u}_{1t+k}, k < 0, \end{cases}$$

and $\hat{C}_{uiui}(0) = T^{-1}\Sigma_{t=1}^{T}\hat{u}_{it}^2$. Under the assumptions and some regularity conditions, $\sqrt{T}\,\hat{r}_{u1u2}(k)$ has an asymptotic normal distribution as follows:

$$\sqrt{T}\,(\hat{r}_{u1u2}(k_1),\ldots\ldots,\hat{r}_{u1u2}(k_m)) \xrightarrow{L} N(0, I_m),$$

where $k_1,\ldots\ldots\ldots,k_m$ are m different integers, I_m the m x m identity matrix and $\xrightarrow{L}$ shows the convergence in distribution.

We can use the cross-correlation function between two squared standardized residuals to test the null hypothesis of no causality in variance. No causality in variance between two original series is equivalent to no correlation between two corresponding squared standardized residuals. For example, if $\hat{r}_{u1u2}(k)$ is significantly different from zero for some k>0, then there is evidence that Y_{2t} Granger-causes Y_{1t} in variance. As most existing empirical studies on volatility spillover use techniques similar to a Granger (1969) –type test, the existence of causality in variance can be interpreted as evidence of volatility spill over.

Although this paper gives weight to causality in variance, the study of causality in mean also helps account for the nature of the interaction between two time series. Hence, the test for causality in mean is also worth a mention. We say that Y_{2t} Granger-causes Y_{1t} in mean if

$$E(Y_{1t}\,|\,I_{1t-1}) \neq E(Y_{1t}\,|\,I_{t-1}).$$

Feedback in mean occurs if Y_{1t} Granger-causes Y_{2t} in mean and Y_{2t} Granger-causes Y_{1t} in mean.

The above approach can be immediately extended to the test for causality in mean by using the cross-correlation function between two standardized residuals. Let $\hat{u}_{it} = \hat{z}_{it} - T^{-1}\sum_{s=1}^{T}\hat{z}_{is}$, and let $\hat{r}_{u1u2}(k)$ be the sample cross-correlation function between two standardized residuals given by

$$\hat{r}_{u1u2}(k) = \hat{C}_{u1u2}(k)\left\{\hat{C}_{u1u1}(0)\hat{C}_{u2u2}(0)\right\}^{-1/2}$$

where $\hat{C}_{uiui}(0) = T^{-1}\sum_{t=1}^{T}\hat{u}_{it}^{2}$ is the sample cross-covariance function defined as

$$\hat{C}_{u1u2}(k) = \begin{cases} T^{-1}\sum_{t=1+k}^{T}\hat{u}_{1t}\hat{u}_{2t-k}, & k\geq 0, \\ T^{-1}\sum_{t=1-k}^{T}\hat{u}_{2t}\hat{u}_{1t+k}, & k<o \end{cases}$$

and $\hat{C}_{uiui}(0) = T^{-1}\sum_{t=1}^{T}\hat{u}_{it}^{2}$. Under the assumptions and some regularity conditions, $\sqrt{T}\,\hat{r}_{u1u2}(k)$ has an asymptotic normal distribution as follows:

$$\sqrt{T}(\hat{r}_{u1u2}(k_1),\ldots.., \hat{r}_{u1u2}(k_m)) \xrightarrow{L} N(0, I_m).$$

As in the test for causality in variance, we can use the cross-correlation function between two standardized residuals to test the null hypothesis of no causality in mean between two originals series is equivalent to no correlation between two corresponding standardized residuals. For example, if $\hat{r}_{u1u2}(k)$ is significantly different from zero for some k>0, then there is evidence that Y_{1t} Granger-causes Y_{1t} in mean. Accordingly, the Cheung and Ng (1996) test is simple and convenient to implement and can provide valuable information on the nature of the interaction between Y_{1t} and Y_{2t}.

4. Data

As an empirical illustration of the testing methodologies outlined above, we have investigated the presence of volatility linkages across seven international stock markets by splitting the sample of observations in two periods, pre and post liberalization which have been defined as per Table 1.
In this study, index returns of seven international stock markets have been analyzed for a 58 years period, from April 5, 1950 to April 30, 2008. We have created a time series observations for each of the seven indices. All data have been obtained from DataStream. All the stock-price indices are in local currency, dividend-unadjusted and based on daily closing prices in each national market.
The preference for local currency denomination of individual share price indices is governed by the objectives of the study, which include the domestic causes of share price interdependence. By converting these indices to a common currency, there is the possibility that the impact of local economic conditions and domestic economic policy on interdependence may not be captured. This is particularly relevant if the spot exchange rate used to convert to common currency is also influenced by local conditions and policy.
These seven indices are reflecting a broad category of share prices. The stock markets are the following: NIKKEI 225 STOCK AVERAGE - PRICE INDEX (JPN) of Japan, KUALA LUMPUR COMPOSITE - PRICE INDEX (KLPC) of MALAYSIA, Standard & Poor's 500 COMPOSITE - PRICE INDEX (S&P 500) of USA, BSE (SENSEX) 30 SENSITIVE - PRICE INDEX (SENSEX) of INDIA, KARACHI SE 100 - PRICE INDEX (PKSE 100) of PAKISTAN, DJTM PHILIPPINES - PRICE INDEX (DJPHILL) of Philippines, DJTM THAILAND - PRICE INDEX (DJTHAIL) of Thailand.
Following the conventional approach, stock returns are calculated as the first difference of the natural log of each stock-price index:

$$r_{it} = \log(P_{it}) - \log(P_{it-1})$$

When data were unavailable, because of national holidays, bank holidays, or any other reasons, stock prices were assumed to stay the same as those of the previous trading day. Daily stock index data are been preferred over weekly or monthly data, because daily data are capable of capturing speedy transmission of information between markets in the short run since we are interested in both short-run and long run dynamic linkages.
An important problem that arises in any study of movements, concerning financial markets of different continents, is that of timing, which can be problematic with daily observations. In our case we have a problem with all the Asian stock markets, which trade after U.S.A's stock markets. Therefore, there is a trading overlap between USA and Asian stock markets. The effects of the U.S. market, if any, are only reflected the next trading day in all Asian stock markets. In order to make trading days of these six Asian markets consistent with Usa's, the data of Asian's stock markets daily returns had been moved one day after.

For simplification in our study, we have titled each country's stock market as follows: R1=JPN -JAPAN, R2=KLPC - MALAYSIA, R3=S&P 500 - USA, R4=SENSEX - INDIA, R5=PKSE 100 - PAKISTAN, R6= DJPHILL - PHILIPPINES, R7=DJTHAIL – THAILAND.

Table 2: Descriptive Statistics

	R1	R2	R3	R4	R5	R6	R7
Mean	0.000209	0.000247	0.000252	0.000651	0.000646	0.000229	0.000105
Maximum	0.124303	0.208174	0.087089	0.189000	0.127622	0.152287	0.123257
Minimum	-0.161354	-0.241534	-0.228330	-0.136607	-0.132143	-0.079974	-0.165947
Std. Dev.	0.011399	0.014573	0.009366	0.015621	0.015044	0.014784	0.017423
Skewness	-0.355846	-0.393630	-1.310996	0.091380	-0.292221	0.465208	0.264292
Kurtosis	12.54762	38.15287	38.21529	11.67244	10.22640	10.99754	10.31945
Jarque-Bera	44174.23	380639.3	600946.0	23780.41	11042.48	11503.97	9556.793
Probability	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Sum	2.421466	1.826969	2.916127	4.941496	3.258125	0.973389	0.445903
Sum Sq. Dev.	1.502766	1.569057	1.014557	1.850598	1.140932	0.930666	1.292540
Observations	11566	7389	11566	7585	5042	4259	4259

Table 2 presents some basic descriptive statistics for the return series of each country's stock market, in local currency, for the total number of observations without taking into account in this step the split between pre and post liberalization period. A comparative analysis of the characteristics of each stock indice shows the following: All stock markets offer positive mean returns. India has the highest mean return (0.000651) by any of the six stock markets. Pakistan has also the second higher mean return of 0.000646. More volatile judging from standard deviation is Thailand with 0.017423 while less volatile has been USA with 0.009366.
Skewness is a measure of the asymmetry of series' distribution around the mean. The skewness of a symmetric distribution, such as the normal distribution, is zero. Positive skewness means that the distribution has a long right tail and negative skewness implies that the distribution has a long left tail. For series of Japan, Malaysia, USA and Pakistan, the skewness coefficient is negative, i.e. are been skewed to the left. For India, Philippines and Thailand, the skewness coefficient is positive, i.e. are been skewed to the right.

Kurtosis measures the peakedness or flatness of series distribution. The kurtosis of the normal distribution is 3. If the kurtosis exceeds 3, the distribution is leptokurtic and if less than 3 platykurtic, relative to the normal distribution. For all series, kurtosis coefficients are larger than 3, indicating that stock return distributions are leptokurtic.

The Jarque – Bera statistic summarizes the skewness and kurtosis measures and tests whether the series are normally distributed. Probability is the probability that a Jarque – Bera statistic exceeds (in absolute value) the observed value under the null hypothesis – a zero or a small probability value leads to the rejection of the null hypothesis of a normal distribution. The above-mentioned characteristic can justify the values of the Jarque-Bera statistic, which rejects normality of returns at the 0.05 significance level for all markets.

4.1 VAR Analysis

By using EViews program, we specified a VAR model for each couple of stock markets returns to be examined. First, we have to test for the stationary or non – stationary of data series. In order to check for stationary or not, we used the Augmented Dickey Fuller test. When the probability of Augmented Dickey Fuller test is greater than 0,05 than the series have a unit root and they are not stationary. If probability of Augmented Dickey Fuller test is below 0,05 than the series are stationary. It's worth saying that variables are stationaries, when the mean and variance of the series during time are stable. Judging from the results of above test (see Appendix C), all series have probability below 0.05, which indicates that the time series are stationary.

In a VAR system, each variable is regressed on its own lags plus the lags of the other variables. The appropriate lag length (p), which should be specified long enough for the residuals not to be serially correlated, can be determined by using standard model selection criteria, such as the AIC (Akaike Information Criterion), SBC (Schwarz-Bayesian Criterion) and HQC (Hannan – Quinn Criterion). By using the lag length criteria option from VAR, we estimated the lag order for each model. According to theory and past studies, Akaike and Schwarz information criteria best indicate the best lag order for each VAR model. Here, the AIC, Akaike criterion had been used. According to this criterion, the lag orders selected for each couple of stock market returns, are shown at the following tables:

Table 3: Pre – Liberalization

COUPLE OF STOCK MARKET RETURNS' VAR MODEL	LAG ORDER BY AKAIKE at 5% level
S&P 500 (USA) - SENSEX (INDIA)	5
S&P 500 (USA) - JPN (JAPAN)	3
S&P 500 (USA) - KLPC (MALAYSIA)	9
S&P 500 (USA) - PKSE 100 (PAKISTAN)	3
JPN (JAPAN) - SENSEX (INDIA)	0
JPN (JAPAN) - KLPC (MALAYSIA)	1
JPN (JAPAN) - PKSE 100 (PAKISTAN)	10
SENSEX (INDIA) - KLPC (MALAYSIA)	1
SENSEX (INDIA)- PKSE 100 (PAKISTAN)	2
KLPC (MALAYSIA) - PKSE 100 (PAKISTAN)	3

Table 4: Post – Liberalization

COUPLE OF STOCK MARKET RETURNS' VAR MODEL	LAG ORDER BY AKAIKE at 5% level
S&P 500 (USA) - SENSEX (INDIA)	13
S&P 500 (USA) - JPN (JAPAN)	7
S&P 500 (USA) - KLPC (MALAYSIA)	7
S&P 500 (USA) - PKSE 100 (PAKISTAN)	12
S&P 500 (USA) - DJPHILL (PHILIPPINES)	13
S&P 500 (USA) - DJTHAIL (THAILAND)	13
JPN (JAPAN) - SENSEX (INDIA)	10
JPN (JAPAN) - KLPC (MALAYSIA)	12
JPN (JAPAN) - PKSE 100 (PAKISTAN)	3
JPN (JAPAN) - DJPHILL (PHILIPPINES)	1
JPN (JAPAN) - DJTHAIL (THAILAND)	2
SENSEX (INDIA) - KLPC (MALAYSIA)	6
SENSEX (INDIA) - PKSE 100 (PAKISTAN)	12
SENSEX (INDIA) - DJPHILL (PHILIPPINES)	4
SENSEX (INDIA) - DJTHAIL (THAILAND)	13
KLPC (MALAYSIA) - PKSE 100 (PAKISTAN)	10
KLPC (MALAYSIA) - DJPHILL (PHILIPPINES)	15
KLPC (MALAYSIA) - DJTHAIL (THAILAND)	15
PKSE 100 (PAKISTAN) - DJPHILL (PHILIPPINES)	1
PKSE 100 (PAKISTAN) - DJTHAIL (THAILAND)	13
DJPHILL (PHILIPPINES)- DJTHAIL (THAILAND)	13

From above tables, we can see that the number of lags for each couple model vary from zero (for JPN (JAPAN) - SENSEX (INDIA)) to 10 (for JPN (JAPAN) - PKSE 100 (PAKISTAN)) in the pre – liberalization period and from 1 (for JPN

(JAPAN) - DJPHILL (PHILIPPINES) and PKSE 100 (PAKISTAN) - DJPHILL (PHILIPPINES)) to 15 (for KLPC (MALAYSIA) - DJPHILL (PHILIPPINES) and KLPC (MALAYSIA) - DJTHAIL (THAILAND)) in post – liberalization period.

<u>4.1.2 VARS' ESTIMATION OUTPUT REPRESENTATIONS</u>

According to the lag order for each VAR model as per Akaike criterion, estimation outputs and equations of every VAR couple model before (pre) and after (post) liberalization period are been presented below:

<u>For Pre – liberalization period</u>

<u>S&P 500 (USA) – JPN (JAPAN)</u>

VAR Model - Substituted Coefficients:
===============================
R3 = 0.1749929613*R3(-1) - 0.01702420356*R3(-2) + 0.00550458524*R3(-3) +
0.02661130048*R1(-1) - 0.005574198343*R1(-2) - 0.02589432035*R1(-3) + 0.0001296741224

R1 = 0.02402326913*R3(-1) + 0.1552717708*R3(-2) + 0.02640981076*R3(-3) +
0.02594394622*R1(-1) + 0.04161691312*R1(-2) + 0.03582257984*R1(-3) + 0.0003220501696

<u>S&P 500 (USA) – KLPC (MALAYSIA)</u>

VAR Model - Substituted Coefficients:
===============================
R3 = 0.05337247261*R3(-1) - 0.04415459554*R3(-2) - 0.001258320528*R3(-3) -
0.03830937776*R3(-4) + 0.04645563874*R3(-5) - 0.00140758975*R3(-6) + 0.01122441536*R3
(-7) + 0.01003139179*R3(-8) + 0.00427646643*R3(-9) - 0.02326771928*R2(-1) +
0.005891974508*R2(-2) - 0.009496316154*R2(-3) + 0.02171846859*R2(-4) -
0.01643877789*R2(-5) - 0.01084392748*R2(-6) - 0.02265594062*R2(-7) + 0.00891535588*R2
(-8) + 0.005556474106*R2(-9) + 0.0003936203332

R2 = 0.1426437753*R3(-1) + 0.3926172892*R3(-2) + 0.1221050091*R3(-3) -
0.07063220473*R3(-4) + 0.08645559015*R3(-5) + 0.04347072239*R3(-6) + 0.02761281725*R3
(-7) + 0.1635917973*R3(-8) - 0.0265107865*R3(-9) + 0.1240097436*R2(-1) -
0.001821502057*R2(-2) + 0.01571218632*R2(-3) + 0.003816106371*R2(-4) +
0.003797463826*R2(-5) + 0.004983874744*R2(-6) + 0.008416026895*R2(-7) -
0.02174426913*R2(-8) + 0.05943179418*R2(-9) - 0.0001953737331

S&P 500 (USA) – SENSEX (INDIA)

VAR Model - Substituted Coefficients:
===============================
R3 = 0.053437716*R3(-1) - 0.03896225805*R3(-2) - 0.01566962815*R3(-3) - 0.03803488823*R3(-4) + 0.04734337735*R3(-5) - 0.01931195792*R4(-1) + 0.007436266677*R4(-2) + 0.002091116778*R4(-3) - 0.02475485163*R4(-4) - 0.01014924261*R4(-5) + 0.0004387245435

R4 = - 0.01097270994*R3(-1) - 0.003304339194*R3(-2) - 0.02810380885*R3(-3) + 0.07257849728*R3(-4) - 0.01368365822*R3(-5) + 0.0857879329*R4(-1) - 0.02795404178*R4(-2) + 0.01795523135*R4(-3) - 0.02091263109*R4(-4) + 0.01423818403*R4(-5) + 0.0008530774099

S&P 500 (USA) – PKSE 100 (PAKISTAN)

VAR Model - Substituted Coefficients:
===============================
R3 = 0.03333267746*R3(-1) + 0.004381756395*R3(-2) - 0.04025620165*R3(-3) - 0.03338432909*R5(-1) - 0.02557080884*R5(-2) - 0.03342253836*R5(-3) + 0.0004849489909

R5 = 0.01829536382*R3(-1) + 0.02380459496*R3(-2) - 0.02559749171*R3(-3) + 0.173620209*R5(-1) + 0.08132089879*R5(-2) + 0.1112892484*R5(-3) + 0.0007184442235

JPN (JAPAN) – KLPC (MALAYSIA)

VAR Model - Substituted Coefficients:
===============================
R1 = 0.04322684294*R1(-1) + 0.003158371185*R2(-1) + 0.0003527980383

R2 = 0.1787955405*R1(-1) + 0.1771892875*R2(-1) + 0.0004894666899

JPN (JAPAN) – SENSEX (INDIA)

VAR Model - Substituted Coefficients:
===============================
R1 = 0.000381045547

R4 = 0.0005500950201

JPN (JAPAN) – PKSE 100 (PAKISTAN)

VAR Model - Substituted Coefficients:
===============================
R1 = 0.06124147934*R1(-1) - 0.1270116686*R1(-2) - 0.006229067422*R1(-3) + 0.02838780372*R1(-4) - 0.07645661531*R1(-5) - 0.004178235667*R1(-6) + 0.004011223067*R1(-7) + 0.008082071883*R1(-8) + 0.1624842022*R1(-9) + 0.09924148992*R1(-10) + 0.004385240637*R5(-1) + 0.0009285121099*R5(-2) - 0.006081230468*R5(-3) - 0.05138037415*R5(-4) + 0.06779312325*R5(-5) + 0.1029737371*R5 (-6) - 0.1392583738*R5(-7) - 0.02023294818*R5(-8) - 0.007321845929*R5(-9) - 0.09890030992*R5(-10) - 0.0002419273246

R5 = - 0.01169224081*R1(-1) + 0.0216808696*R1(-2) - 0.01184299671*R1(-3) + 0.01537397156*R1(-4) - 0.004159042506*R1(-5) - 0.02993345853*R1(-6) - 0.01539504559*R1(-7) - 0.00336162647*R1(-8) - 0.003249876855*R1(-9) + 0.01130445174*R1(-10) + 0.1618101288*R5(-1) + 0.06857796305*R5(-2) + 0.09730987441*R5(-3) + 0.04719515554*R5(-4) + 0.05743618216*R5(-5) - 0.02248849808*R5(-6) + 0.02291703444*R5(-7) - 0.02913515797*R5(-8) + 0.06780792555*R5(-9) + 0.06790371875*R5(-10) + 0.0005605971374

KLPC (MALAYSIA) – PKSE 100 (PAKISTAN)

VAR Model - Substituted Coefficients:
===============================
R2 = 0.1032076233*R2(-1) + 0.1074589369*R2(-2) - 0.09470756468*R2(-3) + 0.01815916911*R5(-1) + 0.004856162123*R5(-2) - 0.01374677362*R5(-3) + 0.0004539860221

R5 = - 0.0178259557*R2(-1) + 0.01646420259*R2(-2) + 0.01906208993*R2(-3) + 0.1736182587*R5(-1) + 0.08127829816*R5(-2) + 0.1089797771*R5(-3) + 0.000717879434

SENSEX (INDIA) – KLPC (MALAYSIA)

VAR Model - Substituted Coefficients:
===============================
R4 = 0.08393355466*R4(-1) + 0.01962350532*R2(-1) + 0.0009115678497

R2 = 0.009134945062*R4(-1) + 0.1641377976*R2(-1) + 0.0002619548435

SENSEX (INDIA) – PKSE 100 (PAKISTAN)

VAR Model - Substituted Coefficients:
===============================
R4 = 0.08918627009*R4(-1) - 0.06075006179*R4(-2) - 0.04301318071*R5(-1) + 0.0452362675*R5(-2) + 0.001601669507

R5 = - 0.0003260425681*R4(-1) + 0.007168405116*R4(-2) + 0.2605222836*R5(-1) + 0.09852797945*R5(-2) + 0.0004824938557

Post - liberalization

S&P 500 (USA) – JPN (JAPAN)

VAR Model - Substituted Coefficients:
===============================
R3 = - 0.005382928616*R3(-1) - 0.03712059652*R3(-2) - 0.03329451141*R3(-3) - 0.03608943676*R3(-4) + 0.01038395058*R3(-5) - 0.01759499224*R3(-6) - 0.02071145652*R3(-7) + 0.003199649623*R1(-1) + 0.00711400747*R1(-2) + 0.01072727851*R1(-3) - 0.0151059306*R1(-4) - 0.00449123817*R1(-5) - 0.007271377868*R1(-6) - 0.02592420728*R1(-7) + 0.0003775320683

R1 = 0.1430592433*R3(-1) + 0.442762338*R3(-2) + 0.0597504854*R3(-3) + 0.02413885451*R3(-4) + 0.03558372029*R3(-5) + 0.0458236735*R3(-6) - 0.008563834806*R3(-7) - 0.06317183279*R1(-1) - 0.04624736926*R1(-2) - 0.008137761702*R1(-3) -

0.002644014522*R1(-4) - 0.008714785518*R1(-5) - 0.01269223013*R1(-6) + 0.009226267931*R1(-7) - 0.0001762912727

S&P 500 (USA) – KLPC (MALAYSIA)

VAR Model - Substituted Coefficients:
===============================
R3 = - 0.02256179277*R3(-1) - 0.01799208901*R3(-2) - 0.0367939385*R3(-3) - 0.02283514793*R3(-4) - 0.01560812174*R3(-5) - 0.03504181163*R3(-6) - 0.03860660196*R3(-7) + 0.007219794683*R2(-1) - 0.002803438986*R2(-2) + 0.003273378441*R2(-3) + 0.00467803942*R2(-4) - 0.004614718872*R2(-5) + 0.01513174659*R2(-6) - 0.004679472187*R2(-7) + 0.0003700940695

R2 = 0.03689427017*R3(-1) + 0.3772942914*R3(-2) + 0.008759446082*R3(-3) + 0.05376401294*R3(-4) + 0.04818409233*R3(-5) - 0.005678369106*R3(-6) + 0.01918638753*R3(-7) + 0.06544620136*R2(-1) + 0.01916503546*R2(-2) + 0.01031991774*R2(-3) - 0.07508040348*R2(-4) + 0.05389921011*R2(-5) - 0.04726533497*R2 (-6) - 0.00317525847*R2(-7) + 8.163151922e-005

S&P 500 (USA) – SENSEX (INDIA)

VAR Model - Substituted Coefficients:
===============================
R3 = - 0.03173558181*R3(-1) - 0.02338388236*R3(-2) - 0.03909462523*R3(-3) 0.02407799459*R3(-4) - 0.0245240201*R3(-5) - 0.02881603922*R3(-6) - 0.034313291*R3(-7) + 0.0006001289062*R3(-8) - 0.001529293055*R3(-9) + 0.03057999116*R3(-10) - 0.0231605771*R3(-11) + 0.0221631499*R3(-12) + 0.04704993523*R3(-13) + 0.01913201598*R4(-1) - 0.008367252494*R4(-2) + 0.005894902423*R4(-3) - 0.0196861932*R4(-4) + 0.005428498168*R4(-5) - 0.0001361215945*R4(-6) - 0.00324907766*R4(-7) - 0.0007396950873*R4(-8) - 0.01740813195*R4(-9) - 0.0004624859303*R4(-10) - 0.01850364969*R4(-11) - 0.009538492123*R4(-12) + 0.00275468396*R4(-13) + 0.0003517777922

R4 = 0.08758876613*R3(-1) + 0.2238978458*R3(-2) + 0.05603197876*R3(-3) + 0.1029361468*R3(-4) + 0.05304279573*R3(-5) + 0.02417382303*R3(-6) - 0.0006775489623*R3(-7) + 0.03033023891*R3(-8) + 0.01982300598*R3(-9) + 0.03482301392*R3(-10) + 0.03666388651*R3(-11) - 0.007609698866*R3(-12) + 0.09557019599*R3(-13) + 0.06971604219*R4(-1) - 0.02098862467*R4(-2) - 0.008236036419*R4(-3) + 0.03168582131*R4(-4) - 0.01883199467*R4(-5) - 0.04015826572*R4(-6) - 0.01129430966*R4(-7) + 0.0002427795961*R4(-8) + 0.01435929282*R4(-9) + 0.04663452567*R4(-10) - 0.03426685513*R4(-11) - 0.01702353247*R4(-12) + 0.01202296159*R4(-13) + 0.0001807997223

S&P 500 (USA) – PKSE 100 (PAKISTAN)

VAR Model - Substituted Coefficients:
===============================
R3 = - 0.03092560527*R3(-1) - 0.0213525681*R3(-2) - 0.03257038404*R3(-3) - 0.02309581815*R3(-4) - 0.0243944949*R3(-5) - 0.03458121522*R3(-6) - 0.0321402407*R3(-7) - 0.0006817655825*R3(-8) - 0.003822053301*R3(-9) + 0.02609633292*R3(-10) - 0.0268840309*R3(-11) + 0.01917503369*R3(-12) + 0.004823640201*R5(-1) +

0.004193440418*R5(-2) + 0.007109607687*R5(-3) + 0.0008730180065*R5(-4) - 0.02124371565*R5(-5) - 0.01264185886*R5(-6) + 0.0006942434667*R5(-7) + 0.003404678781*R5(-8) + 0.005861156141*R5(-9) - 0.001354905403*R5(-10) - 0.01816564141*R5(-11) + 0.003624160084*R5(-12) + 0.0003744152928

R5 = 0.01620775659*R3(-1) + 0.09770701387*R3(-2) + 0.04248936276*R3(-3) + 0.03058240326*R3(-4) + 0.04777982954*R3(-5) + 0.02712736941*R3(-6) + 0.03129243271*R3(-7) + 0.005035590319*R3(-8) + 0.03140549289*R3(-9) + 0.05455047474*R3(-10) + 0.02246237824*R3(-11) + 0.03667713197*R3(-12) + 0.07026961045*R5(-1) + 0.01665868983*R5(-2) + 0.03329800482*R5(-3) + 0.02452557576*R5(-4) + 0.003964580468*R5(-5) - 0.000204382909*R5(-6) + 0.02251125411*R5(-7) + 0.01463531304*R5(-8) + 0.03776498384*R5(-9) + 0.04316495353*R5(-10) - 0.0243443565*R5(-11) + 0.04308598758*R5(-12) + 0.0002698511675

S&P 500 (USA) – DJPHILL (PHILIPPINES)

VAR Model - Substituted Coefficients:
===============================
R3 = - 0.0319970105*R3(-1) - 0.02173296339*R3(-2) - 0.03609499786*R3(-3) - 0.02631984993*R3(-4) - 0.02319051877*R3(-5) - 0.03027139772*R3(-6) - 0.04035620817*R3(-7) - 0.0008033506134*R3(-8) - 0.001807809457*R3(-9) + 0.02842600501*R3(-10) - 0.01904920659*R3(-11) + 0.02041340968*R3(-12) + 0.04739530739*R3(-13) - 0.001305694014*R6(-1) + 0.009664326369*R6(-2) - 0.003690901258*R6(-3) - 0.009594170934*R6(-4) + 0.02120090928*R6(-5) - 0.009371142134*R6(-6) + 0.0002159151138*R6(-7) - 0.003339066538*R6(-8) - 0.01916083326*R6(-9) + 0.009217711675*R6(-10) - 0.0204389869*R6(-11) + 0.001702209307*R6(-12) + 0.01611840401*R6(-13) + 0.0003261638341

R6 = 0.07402276262*R3(-1) + 0.3839637958*R3(-2) + 0.01728389122*R3(-3) + 0.05032921031*R3(-4) + 0.03915047863*R3(-5) + 0.03972112443*R3(-6) - 0.021638559*R3(-7) + 0.07388102415*R3(-8) - 0.02775893346*R3(-9) + 0.05637625786*R3(-10) + 0.0160809974*R3(-11) + 0.04822931529*R3(-12) + 0.05828905704*R3(-13) + 0.1484513649*R6(-1) - 0.005467323093*R6(-2) - 0.008335399071*R6(-3) + 0.03315390518*R6(-4) - 0.01560045297*R6(-5) - 0.02085189251*R6(-6) + 0.01223490846*R6(-7) - 0.007092650367*R6(-8) + 0.01907681155*R6(-9) + 0.0256845638*R6(-10) - 0.003374498639*R6(-11) + 0.0385279515*R6(-12) + 0.03212518172*R6(-13) - 8.379818113e-005

S&P 500 (USA) – DJTHAIL (THAILAND)

VAR Model - Substituted Coefficients:
===============================
R3 = - 0.03272341415*R3(-1) - 0.02126270399*R3(-2) - 0.03436533464*R3(-3) - 0.02160652863*R3(-4) - 0.02161340831*R3(-5) - 0.03415446981*R3(-6) - 0.02983349426*R3(-7) - 0.002975852098*R3(-8) - 0.006543152873*R3(-9) + 0.0255342032*R3(-10) - 0.02643281968*R3(-11) + 0.02090655745*R3(-12) + 0.04140609836*R3(-13) + 9.351873359e-005*R7(-1) - 0.006476871608*R7(-2) - 0.00680437619*R7(-3) + 0.009878584907*R7(-4) - 0.01125945569*R7(-5) + 0.001111775676*R7(-6) + 0.009216588992*R7(-7) + 0.001932129396*R7(-8) + 0.0005660872018*R7(-9) - 0.006017814158*R7(-10) - 0.0008827370847*R7(-11) + 0.003858128532*R7(-12) + 0.003760870921*R7(-13) + 0.0003263665769

R7 = 0.0953572273*R3(-1) + 0.3458134404*R3(-2) + 0.08415296896*R3(-3) + 0.0744643816*R3(-4) + 0.06587034851*R3(-5) - 0.01966236482*R3(-6) - 0.00153821881*R3(-7) + 0.02596962921*R3(-8) - 0.01818717107*R3(-9) + 0.0005484352292*R3(-10) - 0.01289802895*R3(-11) - 0.005556435673*R3(-12) + 0.03060015135*R3(-13) + 0.08601583596*R7(-1) + 0.01847043858*R7(-2) - 0.01042321203*R7(-3) + 0.008879977698*R7(-4) + 0.02308151763*R7(-5) - 0.0390919309*R7(-6) - 0.01203528603*R7 (-7) + 0.04174874753*R7(-8) + 0.002570574186*R7(-9) + 0.0395203511*R7(-10) + 0.02392499775*R7(-11) - 0.0006779734566*R7(-12) + 0.05082093985*R7(-13) - 0.0001320954637

JPN (JAPAN) – KLPC (MALAYSIA)

VAR Model - Substituted Coefficients:
===============================
R1 = - 0.02489956136*R1(-1) - 0.04825305981*R1(-2) - 0.002344019214*R1(-3) + 0.008029270545*R1(-4) - 0.008044153993*R1(-5) - 0.0154330648*R1(-6) + 0.007551919019*R1(-7) - 0.006371359738*R1(-8) + 0.01804221478*R1(-9) + 0.03023923186*R1(-10) + 0.01410169223*R1(-11) + 0.01850008965*R1(-12) + 0.03941152665*R2(-1) - 0.01626686967*R2(-2) + 0.01143720751*R2(-3) + 0.003203881831*R2(-4) + 0.00648002848*R2(-5) - 0.02783288391*R2(-6) - 0.01168648574*R2(-7) + 0.012928111*R2(-8) + 0.002764485856*R2(-9) - 0.02483396504*R2 (-10) - 0.002857145421*R2(-11) - 0.01424322556*R2(-12) + 6.499917509e-005

R2 = 0.02391560354*R1(-1) - 0.02322721108*R1(-2) + 0.01959796449*R1(-3) + 0.02913402857*R1(-4) - 0.022635858*R1(-5) + 0.02035822901*R1(-6) - 0.03224441315*R1(-7) - 0.005447843812*R1(-8) + 0.0023792368*R1(-9) - 0.0214578813*R1(-10) + 0.007643282654*R1(-11) + 0.05012613733*R1(-12) + 0.08986112831*R2(-1) + 0.02272502296*R2(-2) + 0.01725021459*R2(-3) - 0.06726484418*R2(-4) + 0.07071597744*R2 (-5) - 0.02553487671*R2(-6) + 0.00374719727*R2(-7) - 0.01725096361*R2(-8) + 0.01212051398*R2(-9) + 0.005699126212*R2(-10) + 0.007127583159*R2(-11) + 0.02352195673*R2(-12) + 0.0001541721177

JPN (JAPAN) – SENSEX (INDIA)

VAR Model - Substituted Coefficients:
===============================
R1 = - 0.01975101203*R1(-1) - 0.05096853749*R1(-2) - 0.0007286275643*R1(-3) + 0.01000956446*R1(-4) - 0.003086715031*R1(-5) - 0.01913298648*R1(-6) + 0.008144626155*R1(-7) - 0.002234983679*R1(-8) + 0.01856835389*R1(-9) + 0.02314429164*R1(-10) + 0.02168214269*R4(-1) + 0.001329214782*R4(-2) + 0.003938054967*R4(-3) + 0.01817520872*R4(-4) - 0.01850888676*R4(-5) - 0.02994978279*R4(-6) - 0.02669955273*R4(-7) - 0.01138010899*R4(-8) - 0.0007584709147*R4(-9) + 0.004087850129*R4(-10) + 8.789632361e-005

R4 = - 0.007409011041*R1(-1) + 0.0209482179*R1(-2) + 0.01442597508*R1(-3) + 0.01247533892*R1(-4) + 0.00775915437*R1(-5) + 0.01787821079*R1(-6) + 0.0002829888558*R1(-7) + 0.00201088108*R1(-8) - 0.03924593157*R1(-9) + 0.002010215383*R1(-10) + 0.08662301502*R4(-1) - 0.01842916787*R4(-2) + 0.007442384162*R4(-3) + 0.0152096696*R4(-4) - 0.008203493849*R4(-5) - 0.03179796997*R4(-6) - 0.02211712134*R4(-7) + 0.007395190881*R4(-8) + 0.01973109513*R4(-9) + 0.06170089863*R4(-10) + 0.0005894901431

JPN (JAPAN) – PKSE 100 (PAKISTAN)

VAR Model - Substituted Coefficients:
===============================
R1 = - 0.03793109479*R1(-1) - 0.03240586739*R1(-2) - 0.0008248372324*R1(-3) + 0.01575881506*R5(-1) - 0.01640409072*R5(-2) - 0.02392260162*R5(-3) - 0.0001113585218

R5 = 0.03066096153*R1(-1) + 0.01047247795*R1(-2) + 0.02524475169*R1(-3) + 0.07617385561*R5(-1) + 0.02323232773*R5(-2) + 0.04252487863*R5(-3) + 0.0004972658588

JPN (JAPAN) – DJPHILL (PHILIPPINES)

VAR Model - Substituted Coefficients:
===============================
R1 = - 0.03996815071*R1(-1) + 0.01393843835*R6(-1) - 0.0001342814031

R6 = 0.05537123659*R1(-1) + 0.1550988473*R6(-1) + 0.0001927674586

JPN (JAPAN) – DJTHAIL (THAILAND)

VAR Model - Substituted Coefficients:
===============================
R1 = - 0.04215993189*R1(-1) - 0.03666190704*R1(-2) + 0.01400814413*R7(-1) + 0.02048726727*R7(-2) - 0.0001393805495

R7 = 0.01094450725*R1(-1) + 0.04014197139*R1(-2) + 0.1080295508*R7(-1) + 0.02334837333*R7(-2) + 9.223812931e-005

KLPC (MALAYSIA) – PKSE 100 (PAKISTAN)

VAR Model - Substituted Coefficients:
===============================
R2 = 0.07188007963*R2(-1) + 0.0177454622*R2(-2) + 0.03021019071*R2(-3) - 0.09060763034*R2(-4) + 0.07677251682*R2(-5) - 0.05005871679*R2(-6) - 0.008639484723*R2(-7) - 0.007084555966*R2(-8) + 0.0184413215*R2(-9) - 0.01186820157*R2(-10) + 0.001557765027*R2(-11) + 0.01950419154*R2(-12) + 0.008395703203*R2(-13) - 0.002051913407*R2(-14) + 0.06840602656*R2(-15) - 0.01740486218*R2(-16) + 0.009291845186*R2(-17) + 0.03968948211*R2(-18) - 0.02447901603*R2(-19) - 0.03146303971*R2(-20) - 0.004171261808*R2(-21) + 0.0278437133*R2(-22) + 0.02058664492*R2(-23) - 0.00280598609*R2(-24) + 0.01888252323*R2(-25) + 0.03671616558*R2(-26) - 0.01676817909*R2(-27) - 0.002439805611*R2(-28) + 0.005669485963*R2(-29) - 0.01143645086*R2(-30) + 0.02345769682*R5(-1) - 0.003975348025*R5(-2) - 0.005663067742*R5(-3) + 0.000958626946*R5(-4) - 0.02994182688*R5(-5) - 0.02334038674*R5(-6) + 0.00161358537*R5(-7) + 0.004187903494*R5(-8) + 0.001346099884*R5(-9) + 0.01148274342*R5(-10) + 0.01470303153*R5(-11) - 0.003646443974*R5(-12) +

0.004845542618*R5(-13) - 0.01167065234*R5(-14) + 0.004585012603*R5(-15) - 0.006361227646*R5(-16) + 0.01377891634*R5(-17) - 0.002135360095*R5(-18) + 9.727687028e-005*R5(-19) + 0.02736277611*R5(-20) + 0.03000105892*R5(-21) - 0.04478002519*R5(-22) + 0.03728999125*R5(-23) - 0.004743662236*R5(-24) - 0.01872568887*R5(-25) - 0.02103346723*R5(-26) - 0.01435244029*R5(-27) + 0.02943530267*R5(-28) - 0.009230021879*R5(-29) + 0.06032943861*R5(-30) + 0.0001257761319

R5 = 0.01462178396*R2(-1) + 0.03350634689*R2(-2) + 0.02576189583*R2(-3) + 0.03379746675*R2(-4) + 0.03371429166*R2(-5) + 0.007127853858*R2(-6) - 0.01397562206*R2(-7) + 0.007028298008*R2(-8) - 0.01011540739*R2(-9) + 0.04496686417*R2(-10) - 0.01351328326*R2(-11) - 0.01523414573*R2(-12) + 0.02977086755*R2(-13) + 0.02660469008*R2(-14) + 0.01903806226*R2(-15) - 0.01460640136*R2(-16) + 0.03959099032*R2(-17) - 0.02078928962*R2(-18) + 0.03045985797*R2(-19) - 0.02418158162*R2(-20) - 0.01105216575*R2(-21) - 0.02854156269*R2(-22) - 0.04328213442*R2(-23) + 0.0281974048*R2(-24) - 0.05135618807*R2(-25) - 0.01003324534*R2(-26) - 0.008637295267*R2(-27) + 0.03555007456*R2(-28) - 0.005751367969*R2(-29) + 0.0008834601111*R2(-30) + 0.07165944505*R5(-1) + 0.01109943161*R5(-2) + 0.03446823602*R5(-3) + 0.02123688857*R5 (-4) + 0.006165973058*R5(-5) + 0.005563754633*R5(-6) + 0.02491503955*R5(-7) + 0.02297583863*R5(-8) + 0.03600813057*R5(-9) + 0.04299501645*R5(-10) - 0.0299303575*R5 (-11) + 0.04273611987*R5(-12) - 0.00748421766*R5(-13) - 0.001045307744*R5(-14) - 0.01536427492*R5(-15) + 0.01830313923*R5(-16) - 0.0363200877*R5(-17) + 0.004555591495*R5(-18) + 0.03330959538*R5(-19) + 0.01524930425*R5(-20) - 0.003507887652*R5(-21) + 0.00612976135*R5(-22) + 0.001923596634*R5(-23) - 0.01381366188*R5(-24) - 0.003645341287*R5(-25) - 0.02293325008*R5(-26) - 0.02336268255*R5(-27) - 0.03007040471*R5(-28) - 0.02214449832*R5(-29) + 0.03427963112*R5(-30) + 0.0004114666739

KLPC (MALAYSIA) – DJPHILL (PHILIPPINES)

VAR Model - Substituted Coefficients:
=====================================
R2 = 0.05410583208*R2(-1) + 0.001171857819*R2(-2) + 0.02448978177*R2(-3) - 0.10063015*R2(-4) + 0.0685757009*R2(-5) - 0.05737759801*R2(-6) - 0.01290223447*R2(-7) - 0.01281601515*R2(-8) + 0.01360204866*R2(-9) - 0.01516384427*R2(-10) - 0.01115803187*R2(-11) + 0.004583131824*R2(-12) + 0.004507983749*R2(-13) - 0.0189412027*R2(-14) + 0.05898251402*R2(-15) + 0.05796343974*R6(-1) + 0.03150153141*R6(-2) + 0.0104734352*R6(-3) + 0.01657573304*R6(-4) - 0.02264233535*R6 (-5) + 0.001576291899*R6(-6) + 0.01893832192*R6(-7) + 0.0115682213*R6(-8) - 0.0001109233972*R6(-9) + 0.009579812464*R6(-10) + 0.03042367338*R6(-11) + 0.01090838924*R6(-12) + 0.02847942816*R6(-13) + 0.02457188462*R6(-14) + 0.00238062147*R6(-15) + 0.0001401261536

R6 = 0.115967964*R2(-1) + 0.01290646766*R2(-2) + 0.01160445662*R2(-3) + 0.02567527679*R2(-4) + 0.01988752325*R2(-5) - 0.002737303942*R2(-6) - 0.02623669545*R2(-7) + 0.06644216902*R2(-8) + 0.0107080223*R2(-9) + 0.04960562246*R2 (-10) + 0.01205951548*R2(-11) - 0.01228333481*R2(-12) + 0.04696623027*R2(-13) - 0.01028164239*R2(-14) + 0.03062150972*R2(-15) + 0.1360607341*R6(-1) - 0.009929618141*R6(-2) - 0.01662193586*R6(-3) + 0.03327402052*R6(-4) - 0.03697363373*R6(-5) - 0.008116041137*R6(-6) + 0.007672240969*R6(-7) - 0.01542363765*R6(-8) + 0.01289158833*R6(-9) + 0.01759434699*R6(-10) - 0.006131561272*R6(-11) + 0.03017682935*R6(-12) + 0.01541364972*R6(-13) + 0.001564041242*R6(-14) + 0.004665039595*R6(-15) + 8.782950112e-005

KLPC (MALAYSIA) – DJTHAIL (THAILAND)

VAR Model - Substituted Coefficients:
===============================
R2 = 0.04988052005*R2(-1) - 0.002293372662*R2(-2) + 0.02709112444*R2(-3) - 0.1068308983*R2(-4) + 0.07133417836*R2(-5) - 0.06229075009*R2(-6) - 0.01168971856*R2(-7) - 0.01287624091*R2(-8) + 0.01838117132*R2(-9) - 0.01003562804*R2(-10) - 0.01304399271*R2(-11) + 0.006821226707*R2(-12) + 0.002494364959*R2(-13) - 0.01605055453*R2(-14) + 0.0613964015*R2(-15) + 0.04547540099*R7(-1) + 0.03958021035*R7(-2) + 0.00649537433*R7(-3) + 0.02906169118*R7(-4) - 0.01411374513*R7(-5) + 0.0142507119*R7(-6) + 0.01284658261*R7(-7) + 0.01234923216*R7(-8) - 0.007030920357*R7(-9) - 0.005477107124*R7(-10) + 0.02826140373*R7(-11) + 0.01239601263*R7(-12) + 0.02569837264*R7(-13) + 0.01538381712*R7(-14) + 0.001889549483*R7(-15) + 0.0001710143219

R7 = 0.03695780209*R2(-1) + 0.014989235*R2(-2) + 0.009847309949*R2(-3) - 0.025320538*R2(-4) + 0.009969383904*R2(-5) - 0.03897066827*R2(-6) + 0.006052773319*R2(-7) + 0.00699049399*R2(-8) + 0.02575259003*R2(-9) + 0.04516896105*R2(-10) + 0.007984569379*R2(-11) - 0.02898474335*R2(-12) + 0.05124359125*R2(-13) - 0.0008544083808*R2(-14) + 0.02806947524*R2(-15) + 0.09762263456*R7(-1) + 0.02303268821*R7(-2) - 0.009773528758*R7(-3) + 0.009290061231*R7(-4) + 0.01631522025*R7(-5) - 0.02850014635*R7(-6) - 0.01818404808*R7(-7) + 0.03850789499*R7(-8) - 0.002525018098*R7(-9) + 0.02854517288*R7(-10) + 0.02400559039*R7(-11) + 0.002990037226*R7(-12) + 0.03792159536*R7(-13) + 0.001199208142*R7(-14) - 0.03319697322*R7(-15) + 3.531478962e-005

PKSE 100 (PAKISTAN) – DJPHILL (PHILIPPINES)

VAR Model - Substituted Coefficients:
===============================
R5 = 0.07955334156*R5(-1) + 0.01771609749*R6(-1) + 0.0004696459517

R6 = 0.008281516812*R5(-1) + 0.1641150119*R6(-1) + 0.0001799401235

PKSE 100 (PAKISTAN) – DJTHAIL (THAILAND)

VAR Model - Substituted Coefficients:
===============================
R5 = 0.07084606024*R5(-1) + 0.01354364993*R5(-2) + 0.03071414569*R5(-3) + 0.02004055823*R5(-4) + 0.0003700018213*R5(-5) - 0.002031726303*R5(-6) + 0.02505633882*R5(-7) + 0.01549722316*R5(-8) + 0.03627174082*R5(-9) + 0.04043814746*R5(-10) - 0.02933151358*R5(-11) + 0.03918004462*R5(-12) - 0.008347528733*R5(-13) + 0.003721656506*R7(-1) + 0.02878946178*R7(-2) + 0.04166732831*R7(-3) + 0.01747383777*R7(-4) + 0.01924013133*R7(-5) + 0.005640746391*R7(-6) - 0.01519604989*R7(-7) + 0.0262271554*R7(-8) + 0.003115576772*R7(-9) + 0.02600358683*R7(-10) + 0.001115418137*R7(-11) - 0.007865805704*R7(-12) + 0.03236966986*R7(-13) + 0.0003795636106

R7 = 0.0114601786*R5(-1) + 0.01078181412*R5(-2) - 0.001675735341*R5(-3) + 0.0008516497854*R5(-4) - 0.03035513101*R5(-5) - 0.03560275696*R5(-6) + 0.01573599145*R5(-7) + 0.008720779562*R5(-8) + 0.0154001035*R5(-9) + 0.02247495651*R5(-10) + 0.01389280843*R5(-11) - 0.01691226282*R5(-12) – 0.03103162399*R5(-13) + 0.1048960859*R7(-1) + 0.02801557237*R7(-2) - 0.004529490571*R7(-3) + 0.003287407092*R7(-4) + 0.02111216223*R7(-5) - 0.03695001458*R7(-6) - 0.0211884712*R7(-7) + 0.0432213719*R7(-8) + 0.005021917637*R7(-9) + 0.03916648457*R7(-10) + 0.02609775563*R7(-11) - 0.001464034473*R7(-12) + 0.05167293677*R7(-13) + 6.265076632e-005

DJPHILL (PHILIPPINES) – DJTHAIL (THAILAND)

VAR Model - Substituted Coefficients:
================================
R6 = 0.1168552024*R6(-1) - 0.01335534063*R6(-2) - 0.01823373365*R6(-3) + 0.02882229449*R6(-4) - 0.03773106107*R6(-5) - 0.02887061185*R6(-6) - 0.003242585435*R6(-7) - 0.01205036387*R6(-8) + 0.01859901412*R6(-9) + 0.01865600291*R6(-10) - 0.007050879631*R6(-11) + 0.02910891638*R6(-12) + 0.01653882323*R6(-13) + 0.1231535802*R7(-1) + 0.01657351391*R7(-2) + 0.01840794665*R7(-3) + 0.003844519275*R7(-4) + 0.02552266335*R7(-5) + 0.02711202116*R7(-6) + 0.02506456924*R7(-7) + 0.02704261038*R7(-8) - 0.009181877736*R7(-9) + 0.0322285752*R7 (-10) + 0.009176202392*R7(-11) + 0.01901311001*R7(-12) + 0.02159117518*R7(-13) + 0.0001431684174

R7 = 0.06658548195*R6(-1) + 0.01393497625*R6(-2) + 0.03284049561*R6(-3) - 0.01480928664*R6(-4) + 0.007828311515*R6(-5) + 0.01842831266*R6(-6) + 0.005169141767*R6(-7) - 0.03067862732*R6(-8) + 0.01317268081*R6(-9) - 0.03151405869*R6(-10) + 0.001333695592*R6(-11) + 0.02009945704*R6(-12) - 0.0322166413*R6(-13) + 0.09344735171*R7(-1) + 0.01537405826*R7(-2) - 0.01565662983*R7(-3) - 0.0004912004454*R7(-4) + 0.01674926089*R7(-5) - 0.04510304909*R7(-6) - 0.0225660283*R7(-7) + 0.04487099947*R7(-8) + 0.003679512944*R7(-9) + 0.04570863111*R7(-10) + 0.02775747931*R7(-11) - 0.003926985409*R7(-12) + 0.05335800271*R7(-13) + 4.527654844e-005

SENSEX (INDIA) – KLPC (MALAYSIA)

VAR Model - Substituted Coefficients:
================================
R4 = 0.08381832912*R4(-1) - 0.0117127529*R4(-2) - 0.003964560845*R4(-3) + 0.02968121628*R4(-4) - 0.01929396419*R4(-5) - 0.0468320415*R4(-6) + 0.004055794699*R2(-1) + 0.004889753056*R2(-2) + 0.02298913516*R2(-3) + 0.00814596982*R2(-4) + 0.01992156613*R2(-5) + 0.03913150403*R2(-6) + 0.0003845122347

R2 = 0.0552375245*R4(-1) + 0.001481935378*R4(-2) - 0.001269743769*R4(-3) + 0.02689300383*R4(-4) + 0.003139420441*R4(-5) - 0.02630151188*R4(-6) + 0.06131992743*R2(-1) + 0.01934357964*R2(-2) + 0.03559868805*R2(-3) - 0.09711986353*R2(-4) + 0.06824324729*R2(-5) - 0.05446713673*R2(-6) + 0.0001548331147

SENSEX (INDIA) – PKSE 100 (PAKISTAN)

VAR Model - Substituted Coefficients:
===============================
R4 = 0.0842132897*R4(-1) - 0.008488940231*R4(-2) + 0.001657861035*R4(-3) + 0.03138441668*R4(-4) - 0.01695607784*R4(-5) - 0.04553344016*R4(-6) - 0.01136190867*R4(-7) + 0.00117338915*R4(-8) + 0.01815098873*R4(-9) + 0.04306184376*R4(-10) - 0.03301345272*R4(-11) - 0.0193772961*R4(-12) - 0.002696853762*R5(-1) - 0.00944971242*R5(-2) - 0.005754627293*R5(-3) + 0.02613124754*R5(-4) - 0.009824411244*R5(-5) + 0.0296049443*R5(-6) + 0.0295901336*R5(-7) + 0.01222569035*R5(-8) + 7.769955323e-005*R5(-9) + 0.0215332729*R5(-10) - 0.00280271668*R5(-11) + 0.002270335786*R5(-12) + 0.0003396323894

R5 = 0.04538978479*R4(-1) + 0.009944569206*R4(-2) + 0.03910713816*R4(-3) + 0.01054291644*R4(-4) + 0.04802750492*R4(-5) + 0.03394466592*R4(-6) + 0.01460609611*R4(-7) - 0.003873342396*R4(-8) + 0.0381424676*R4(-9) + 0.0273213574*R4 (-10) + 0.01467670918*R4(-11) - 0.01499478346*R4(-12) + 0.05203218468*R5(-1) + 0.008632546765*R5(-2) + 0.02912203183*R5(-3) + 0.01750827371*R5(-4) - 0.002810005907*R5(-5) - 0.006220224172*R5(-6) + 0.02139690446*R5(-7) + 0.01460857282*R5(-8) + 0.03089639087*R5(-9) + 0.03994649558*R5(-10) - 0.0288583889*R5(-11) + 0.04110924584*R5(-12) + 0.0003725621148

SENSEX (INDIA) – DJPHILL (PHILIPPINES)

VAR Model - Substituted Coefficients:
===============================
R4 = 0.09070913165*R4(-1) - 0.02757581038*R4(-2) + 0.008513278353*R4(-3) + 0.02981166123*R4(-4) + 0.01259216326*R6(-1) + 0.02767139724*R6(-2) + 0.03057711404*R6(-3) + 0.02474644271*R6(-4) + 0.0004392145201

R6 = 0.04194740703*R4(-1) - 0.01705923151*R4(-2) + 0.00259886489*R4(-3) - 0.007332601522*R4(-4) + 0.1587343892*R6(-1) + 0.008079778615*R6(-2) - 0.004000839621*R6(-3) + 0.03750780609*R6(-4) + 0.0001620388273

SENSEX (INDIA) – DJTHAIL (THAILAND)

VAR Model - Substituted Coefficients:
===============================
R4 = 0.0909727409*R4(-1) - 0.02689156185*R4(-2) + 0.0109698148*R4(-3) + 0.02894766378*R4(-4) - 0.01625357272*R4(-5) - 0.03299192127*R4(-6) - 0.02377306732*R4(-7) - 0.005715697806*R4(-8) + 0.01388199595*R4(-9) + 0.04237485417*R4(-10) - 0.02970173514*R4(-11) - 0.006572868684*R4(-12) - 0.004735165904*R4(-13) + 0.009663199027*R7(-1) + 0.009289028221*R7(-2) + 0.01879701342*R7(-3) + 0.01678149411*R7(-4) + 0.01621547616*R7(-5) + 0.02497776132*R7(-6) - 0.005706486802*R7(-7) + 0.009514618712*R7(-8) + 0.02465394545*R7(-9) + 0.006639294534*R7(-10) + 0.02551799329*R7(-11) - 0.006405016661*R7(-12) + 0.03195285651*R7(-13) + 0.0004599516547

R7 = 0.04292073411*R4(-1) - 0.01023555*R4(-2) + 0.007553637199*R4(-3) - 0.0001037393378*R4(-4) + 0.02338409363*R4(-5) - 0.01420140846*R4(-6) + 0.009352390509*R4(-7) - 0.0411773304*R4(-8) - 0.02034970828*R4(-9) - 0.02438975932*R4(-10) + 0.008243088322*R4(-11) + 0.02897357617*R4(-12) - 0.002667795704*R4(-13) + 0.1010227325*R7(-1) + 0.02779585119*R7(-2) - 0.004854186591*R7(-3) + 0.001212928462*R7(-4) + 0.01578141552*R7(-5) - 0.03753269245*R7(-6) - 0.02041757349*R7(-7) + 0.04804269277*R7(-8) + 0.007928321812*R7(-9) + 0.04238340796*R7(-10) + 0.02501418311*R7(-11) - 0.003301524525*R7(-12) + 0.05324086469*R7(-13) + 5.13945617e-005

4.1.3 GRANGER CAUSALITY

In this part of analysis we performed a causality-in-mean test to check whether each country's stock market returns is related with the others. We use Granger Causality Tests provided by EVIEWS.

Although Weiner was the first one who formed the idea of "causality relationships" in 1948, Granger was the one who linked the meaning of "causality" with the probability of estimating. According to Granger, if we have a specific total of variables, which includes variables X and Y, then variable X "causes" variable Y, if the present value of variable Y can be well predicted by past values of variable X. This relationship can be of course vice versa. Granger causality has more to do with the usefulness of a variable in the prediction of another one rather than creation.

The causality relationship is estimated by applying double regression:

$$Y_t = a_{11} Y_{t-1} + a_{12} X_{t-1} + u_{1t}$$

$$X_t = a_{21} Y_{t-1} + a_{22} X_{t-1} + u_{2t}$$

If in the first equation a_{12} = 0 then we come to the conclusion that variable X fails according to Granger to cause variable Y. Also, if the second equation a_{21} = 0 then variable Y fails to cause variable X. The final conclusion is that the two variables do not correlate.

If $a_{12} \neq 0$ in the first equation and $a_{21} = 0$ in the second equation then variable X causes variable Y. If $a_{12} = 0$ in the first equation and $a_{21} \neq 0$ in the second equation then variable Y causes variable X. Finally, if a_{12} and a_{21} are different than zero then we conclude that variables X and Y granger cause each other.
Pair wise Granger causality tests have been carried out by testing whether an endogenous variable can be treated as exogenous in an applicable level of 5% significance while the numbers of lags remain the same with that of Var analysis. The results of Granger Causality tests are been presented in tables below for pre and post liberalization period:

Table 5: PRE – LIBERALIZATION PERIOD

→	**S&P 500 (USA)**	**JPN (JAPAN)**	**SENSEX (INDIA)**	**KLPC (MALAYSIA)**	**PKSE 100 (PAKISTAN)**	**DJPHILL (PHILIPPINES)**	**DJTHAIL (THAILAND)**
S&P 500 (USA)	-	YES	NO	YES	NO	-	-
JPN (JAPAN)	YES	-	NO	YES	NO	-	-
SENSEX (INDIA)	NO	NO	-	NO	NO	-	-
KLPC (MALAYSIA)	NO	NO	NO	-	NO	-	-
PKSE 100 (PAKISTAN)	NO	NO	NO	NO	-	-	-
DJPHILL (PHILIPPINES)	-	-	-	-	-	-	-
DJTHAIL (THAILAND)	-	-	-	-	-	-	-

Table 6: POST – LIBERALIZATION PERIOD

→	S&P 500 (USA)	JPN (JAPAN)	SENSEX (INDIA)	KLPC (MALAYSIA)	PKSE 100 (PAKISTAN)	DJPHILL (PHILIPPINES)	DJTHAIL (THAILAND)
S&P 500 (USA)	-	YES	YES	YES	YES	YES	YES
JPN (JAPAN)	NO	-	NO	YES	NO	YES	NO
SENSEX (INDIA)	NO	YES	-	YES	YES	YES	YES
KLPC (MALAYSIA)	NO	YES	NO	-	YES	YES	YES
PKSE 100 (PAKISTAN)	NO	NO	NO	YES	-	NO	NO
DJPHILL (PHILIPPINES)	NO	NO	YES	YES	NO	-	YES
DJTHAIL (THAILAND)	NO	NO	NO	YES	YES	YES	-

From above and taking into account the Appendix E, we note the following regarding the diachronic dependences of relative stock markets' returns :

For pre – liberalization period, DJPHILL (PHILIPPINES) and DJTHAIL (THAILAND) have no data in pre-liberalization period.

The results indicates that there are no interdependences to most of the stock markets except S&P 500 (USA), JPN (JAPAN) and KLPC (MALAYSIA) which Granger cause each other stock market, while SENSEX (INDIA), KLPC (MALAYSIA) and PKSE 100 (PAKISTAN) do not Granger Cause any other stock market.

For post-liberalization period, S&P 500 has significant impact on all stock markets. S&P 500 (USA) Granger causes all the other countries' stock markets. Japan Granger causes Malaysia and Philippines' stock markets but not USA's, India and Pakistan's indices. India seems to Granger causes Japan's, Malaysia's, Pakistan's and Philippines's indices but not Usa's. KLPC (MALAYSIA) Granger causes the indices of Japan, Pakistan and Philippines. While Pakistan do not Granger causes all the other indices except from KLPC. DJPHILL (PHILIPPINES) Granger causes SENSEX, DJTHAIL and KLCP. Finally, DJTHAIL (THAILAND) Granger causes only KLCP, DJPHILL and PKSE.

The last results enforce the fact that geographical position place important role after liberalization and increase the interdependence between countries with close regional position.

4.2 Application of second methodology

4.2.1 Pre-Estimation Analysis

We use auto-correlation and partial auto-correlation analyses to identify whether the rate of change of an index at time "t" can be described by its own past value as well as by the past and present values of the rates of other indices.

For this reason, we examine the ACF and the PACF and perform also preliminary tests such as Q-test. In Appendix F, the graphs of ACF are presented. From the figures of ACF and PACF as well, we conclude that the majority of returns exhibits little correlation.
Quantifying the preceding qualitative checks for correlation, formal hypothesis tests have been used, such as the Ljung-Box- Pierce Q-test and Eagle's ARCH test. The Ljung-Box statistics calculated for both the return and the squared return time series indicate second-moment (nonlinear) time dependencies. This is usually interpreted as evidence of the presence of ARCH-type effects in conditional volatility. Under the null hypothesis that no significant correlation exists (H=0) that is, do not reject the null hypothesis. While H=1 means that significant correlation exists that is, reject the null hypothesis. We conclude that there is no significant correlation presented in the raw returns when tested for up to 10,15,20 lags of the ACF at the level of 5% significance. However there is significant serial correlation in the squared returns when we test them with the same inputs. From performing Engle's ARCH test, we also conclude that significant evidences in support of Garch effects (heteroskedasticity) exist.
We select the model to calculate the standardized innovations based on the Akaike criteria. The model is:

$$R_t=\alpha_o+\sum_{i=1}^{m}\alpha_i R_{t-1}+\sum_{i=0}^{n}\Phi_i X_{t-1}+\lambda C_{t-1} + u_t$$

$$u_t=\varepsilon_t h_t^{1/2},\ \varepsilon_t \sim NID\ (0,1),$$

$$h_t=\beta o+\sum_{i=1}^{p}\beta_i h_{t-1}+\sum_{i=1}^{q}\delta_i \varepsilon^2_{t-1}+\sum_{i=0}^{v} n_i X^2_{t-1}$$

The post –estimate analysis uses standardized innovations based on the estimated models below. These same tests now indicates acceptance of the null hypothesis (H=0 with highly significant pValues) for 10 lags.
Where R is the return of stock market indice of every chosen country and X_t is a measure of external global shocks on the returns on general indices. The presence of heteroscedasticity indicates that GARCH modeling is appropriate and that is GARCH (1,1).
We apply the methodology of Cheung and Ng for 30 lags. With cross- correlation function between two squared standardized residuals, we test the null hypothesis of no causality in variance. When estimating parameters of a composite conditional mean or variance model, we may occasionally encounter convergence problems. For example, the estimation may appear to stall, showing little or no progress. We can avoid many of such kind of difficulties by selecting the simplest model that adequately describes our data and then performing a pre-fit analysis.
The term conditional implies explicit dependence on a past sequence of observations. No causality in variance between two original series is equivalent to no correlation between two corresponding squared standardized residuals. Chi-square statistics can be constructed to test the null hypothesis of independence between the two time series. Test statistic is for independence between first stock market return and the second stock market return.
We compute test statistic $\sqrt{T}\,\hat{r}_{u1u2}(k)$ and compare it with the critical value of N(0,1) at the 5% level. If $\sqrt{T}\,\hat{r}_{u1u2}(k)$ is larger than the critical value of N(0,1) at 5 percent level then we reject the null hypothesis of no causality in variance, otherwise, the null hypothesis is not rejected. The results are shown below:

For Pre – liberalization period

S&P 500 (USA) – JPN (JAPAN)

Mean: AR (3), Variance: GARCH (1,1)

Number of lags	S&P→JPN	JPN→S&P
1	9.4621*	0.6116
2	1.6289	-1.8765
3	0.6215	-0.9894
4	0.5358	-0.0728
5	-0.1448	0.5224
6	0.7703	-0.3732
7	-1.6897	0.6522
8	-1.1342	1.6105
9	-0.2655	-0.0105
10	1.3067	1.0779
11	-0.1650	-0.5935
12	-0.0992	-0.3605
13	0.4499	0.1957
14	-0.2343	0.5310
15	1.0330	-1.6296
16	0.0962	-1.0710
17	-1.3687	-0.5522
18	-0.4313	1.3007
19	-0.2994	1.4812
20	-0.6611	-0.7350
21	-0.0920	0.0221
22	-1.5533	-0.5248
23	0.4403	-0.5249
24	-0.5579	-0.7125
25	0.1639	0.6163
26	1.9542	-0.6066
27	-0.4114	-0.6116
28	-0.0448	-1.2587
29	-0.0894	0.1135
30	0.2161	-1.3874

In 1st lag, there is causality in variance, implying strong impact of S&P on JPN.

S&P 500 (USA) – KLPC (MALAYSIA)

Mean: AR (9), Variance: GARCH (1,1)

Number of lags	S&P→KLPC	KLPC→S&P
1	24.3456*	-0.0876
2	5.1953*	-0.5199
3	0.6691	-0.4822
4	1.7321	1.1066
5	0.6783	-0.4512
6	0.6896	0.7493
7	-0.2278	-0.4281
8	0.2799	0.4377
9	-0.0037	-0.2674
10	1.3892	-0.3991
11	0.2108	-1.0726
12	-0.8849	-0.0230
13	-0.1618	-0.5693
14	-0.7448	-0.3411
15	0.0308	-0.6133
16	-0.4680	-0.6042
17	-0.0497	0.2940
18	0.5504	-0.3272
19	-0.6020	0.3552
20	1.3752	-0.3785
21	0.2132	-0.5993
22	-0.6879	-0.8070
23	-0.7771	0.5218
24	-0.5077	2.6092*
25	-0.0922	-0.2735
26	-0.4665	-0.5478
27	0.0433	-0.4551
28	-0.5325	0.1618
29	-0.5085	0.7105
30	-0.3146	-0.6908

In 1^{st},2^{nd} and 24^{th} lag, there is causality in variance, implying strong simultaneous interactions between S&P and KLPC.

S&P 500 (USA) – SENSEX (INDIA)

Mean: AR (5), Variance: GARCH (1,1)

Number of lags	SENSEX→S&P	S&P→SENSEX
1	-1.3063	-0.6381
2	-0.8991	-0.5327
3	0.8876	-0.4171
4	1.6868	0.9820
5	-0.0009	-0.7962
6	-1.0039	0.3616
7	0.5740	-0.4708
8	-0.2377	-0.5181
9	-0.6400	-0.1348
10	0.1220	-0.0919
11	-0.7197	-0.2522
12	-0.4844	0.1090
13	-0.3519	0.4337
14	-0.2051	-0.3415
15	-0.5651	-0.2440
16	0.6859	-0.8605
17	-0.5686	1.0253
18	-1.3042	-0.2247
19	-0.2735	0.4253
20	-0.7948	0.1792
21	1.0122	-0.5282
22	-0.8855	-0.5806
23	-1.1724	0.9657
24	1.2466	1.3464
25	-0.5554	1.2344
26	-0.3245	-0.8911
27	-0.2887	-0.1309
28	0.1385	-0.7428
29	0.1965	-0.4124
30	-0.0967	-0.2496

No interactions between SENSEX and S&P in variance.

S&P 500 (USA) – PKSE 100 (PAKISTAN)

Mean : AR (3), Variance: GARCH (1,1)

Number of lags	S&P→PKSE 100	PKSE 100→S&P
1	0.4686	-0.7222
2	0.1809	0.7228
3	0.6357	0.0596
4	-0.4903	0.5680
5	1.0253	-0.3685
6	1.6739	-1.0884
7	-0.1556	-0.0917
8	-0.4306	-0.3888
9	-0.6554	0.6992
10	0.7106	-0.2692
11	0.5541	-0.0929
12	0.4721	1.0374
13	0.7033	-0.0945
14	-0.6932	-0.1195
15	-0.9469	-0.9453
16	0.1221	-0.3686
17	0.1552	0.3637
18	0.1609	0.7397
19	0.7336	-0.0123
20	0.0870	-0.3113
21	-0.0184	0.4977
22	-0.5330	-0.4085
23	-0.7591	0.3022
24	-1.0791	-1.1659
25	-0.1772	-0.5797
26	-0.3060	-0.0154
27	-0.0385	-0.2844
28	5.2760*	0.2099
29	0.0135	1.6781
30	3.7845*	0.0811

At 28 and 30^{th} lag, there is causality in variance, implying strong impact of S&P on PKSE 100.

JPN (JAPAN) – KLPC (MALAYSIA)

Mean: AR (1), Variance: GARCH (1,1)

Number of lags	JPN→KLPC	KLPC→JPN
1	23.0323*	-0.0856
2	0.5959	1.0027
3	-0.8234	1.1528
4	-0.5091	-0.2422
5	0.1886	-0.4656
6	-0.3424	0.2232
7	-0.6851	0.2317
8	-0.3420	-0.7549
9	0.2246	-0.8474
10	0.3085	-0.1131
11	-1.0683	-0.2781
12	0.2459	0.3711
13	-0.8000	-0.6107
14	-0.4345	0.0363
15	-0.0634	4.9159*
16	-0.0651	0.4613
17	-0.1013	-0.6651
18	-0.5406	-0.6376
19	1.2861	-0.3864
20	-0.0520	-0.3431
21	0.3862	-0.2900
22	-0.5911	-0.2553
23	-0.3487	0.1437
24	-0.5286	-0.8250
25	-0.3279	-0.5774
26	-0.8136	-0.6795
27	0.1510	-0.2017
28	-0.3216	0.2718
29	0.1440	-0.5714
30	3.4137*	2.5404*

At 1, 15 and 30 lag, there is causality in variance implying strong simultaneous interactions between KLPC and JPN.

<u>JPN (JAPAN) – SENSEX (INDIA)</u>

Mean : AR (0), Variance: GARCH (1,1)

Number of lags	SENSEX→JPN	JPN→SENSEX
1	-0.4066	-0.5706
2	0.5600	-0.5553
3	-0.1430	-0.7068
4	-0.6636	-0.2686
5	1.2837	-0.9288
6	0.0215	-0.4000
7	-0.6060	0.2870
8	0.4950	-0.0363
9	0.0545	-0.5404
10	-0.3874	1.1840
11	0.1347	0.3511
12	-0.2441	-0.0507
13	0.9207	0.3947
14	0.2940	0.1537
15	-0.2016	-0.3550
16	-0.1871	0.0427
17	-0.1981	0.5318
18	0.3326	0.2460
19	0.5851	0.5379
20	-0.2654	-0.0461
21	1.3265	1.6899
22	-0.1660	0.4084
23	-0.2386	-0.6274
24	-0.1503	-0.3537
25	-0.2785	-0.4038
26	0.7003	0.9686
27	-0.0563	-0.3514
28	-0.4551	-0.5323
29	0.1343	0.6170
30	0.5255	-1.0961

No interactions between SENSEX and JPN in variance.

<u>JPN (JAPAN) – PKSE 100 (PAKISTAN)</u>

Mean: AR (10), Variance: GARCH (1,1)

Number of lags	JPN→PKSE 100	PKSE 100→JPN
1	0.5276	-0.1218
2	-0.2360	0.1189
3	0.5952	-0.8258
4	0.3938	1.4962
5	-0.5028	0.6224
6	0.0736	-0.4870
7	0.5780	0.7815
8	0.0469	-1.3490
9	-0.3466	-0.6757
10	-0.5453	-1.0661
11	2.5661*	-0.0427
12	-0.6454	-0.2871
13	-0.8661	0.6190
14	-0.7800	-0.4939
15	-0.2071	0.6970
16	0.5752	-0.1290
17	-0.9370	0.9060
18	0.4182	0.4049
19	-0.7747	1.0880
20	0.7238	-0.9060
21	-0.5131	0.3698
22	-0.6339	-0.0812
23	2.9803*	1.6133
24	0.3571	-0.1979
25	0.5216	0.0683
26	0.9348	0.1453
27	1.2121	-0.8818
28	1.0253	-1.0414
29	0.8474	-0.8326
30	2.0930*	-0.7064

At 11, 23 and 30^{th} lag, there is causality in variance, implying strong impact of JPN on PKSE 100.

<u>KLPC (MALAYSIA) – PKSE 100 (PAKISTAN)</u>

Mean: AR (3), Variance: GARCH (1,1)

Number of lags	PKSE 100→KLPC	KLPC→PKSE 100
1	-0.3141	-0.5677
2	-0.2752	-0.2490
3	-0.4724	-0.1389
4	-0.0638	-0.1436
5	0.0793	0.0442
6	0.6223	-0.5224
7	-0.2533	0.3583
8	0.7440	-0.4982
9	-0.2779	-0.6244
10	-0.4769	-0.1793
11	0.1924	-0.6564
12	0.1719	0.4797
13	-0.4663	-0.0587
14	0.1211	-0.1660
15	0.4411	-0.4605
16	-0.3619	0.6461
17	-0.4908	-0.3080
18	0.1967	-0.6131
19	0.6814	-0.4540
20	-0.0724	-0.4622
21	0.3049	-0.1481
22	0.6713	1.7297
23	-0.5019	-0.3413
24	-0.3648	-0.6277
25	0.2569	-0.3997
26	-0.3970	-0.0505
27	-0.4711	-0.3497
28	-0.3716	-0.4627
29	-0.1813	-0.2019
30	-0.0046	-0.4205

No interactions between PKSE 100 and KLPC in variance.

<u>SENSEX (INDIA) – KLPC (MALAYSIA)</u>

Mean: AR (1), Variance: GARCH (1,1)

Number of lags	SENSEX→KLPC	KLPC→SENSEX
1	1.1708	-0.0522
2	1.1261	-0.6279
3	0.5463	-0.5824
4	0.4149	-0.8922
5	-0.2884	0.2510
6	0.0915	-0.6368
7	-0.4278	-0.1413
8	-0.2571	0.6975
9	-0.1990	-0.0546
10	0.1937	1.5172
11	0.0544	0.3032
12	-0.4167	-0.1285
13	-0.4912	-0.2631
14	-0.0592	-0.1210
15	0.2332	0.0479
16	-0.2873	-0.5209
17	-0.6061	-0.2426
18	-0.8580	-0.3959
19	0.5333	-0.6610
20	-0.5261	-0.3742
21	0.7912	0.9777
22	0.1825	0.1202
23	-0.3173	0.0246
24	-0.4996	-0.2323
25	-0.3514	0.0302
26	-0.3729	0.1607
27	-0.3051	-0.0348
28	-0.5109	-0.2811
29	-0.0448	-0.4771
30	0.2955	0.4891

No interactions between SENSEX and KLPC in variance.

SENSEX (INDIA) – PKSE 100 (PAKISTAN)

Mean: AR (2), Variance: GARCH (1,1)

Number of lags	SENSEX→PKSE 100	PKSE100→SENSEX
1	-0.3024	-0.6306
2	-0.2666	-0.4632
3	0.2682	-0.5381
4	-0.5303	-0.1683
5	-0.2225	0.5481
6	-0.0108	0.0339
7	-0.0837	0.7433
8	-0.7545	-0.3091
9	-0.9195	0.3789
10	-0.7628	-0.4567
11	0.2510	0.0841
12	-0.7440	-0.3873
13	-0.8966	-0.3337
14	2.3301	0.5806
15	1.4764	-0.8112
16	1.2784	-0.4164
17	0.4206	-1.1983
18	-0.2352	-0.0251
19	-1.1643	1.6603
20	0.6974	1.2012
21	0.0451	0.2096
22	0.2055	-0.6821
23	0.0105	-0.0738
24	-0.1276	0.9104
25	-0.5505	-0.5580
26	-0.0849	-1.4965
27	-0.0889	0.6128
28	-0.7838	-0.8760
29	1.6126	0.9851
30	0.0494	-0.1388

No interactions between SENSEX and PKSE 100 in variance.

Post - liberalization

S&P 500 (USA) – JPN (JAPAN)

Mean: AR (7), Variance: GARCH (1,1)

Number of lags	S&P→JPN	JPN→S&P
1	2.4063*	0.3988
2	40.0883*	0.6915
3	3.7935*	0.1752
4	0.8154	-0.1693
5	2.2693*	-0.0083
6	0.5762	-0.0749
7	-0.8878	0.0159
8	-0.1843	0.8959
9	-0.8878	-1.1233
10	-0.1877	-0.1862
11	1.2807	-0.2310
12	-0.3182	0.2803
13	-1.3377	0.0027
14	0.3444	1.4582
15	0.1790	-0.4596
16	-0.1951	-0.3878
17	-0.2137	-1.0463
18	-0.3538	-0.6393
19	-0.4864	-1.3998
20	-0.0270	-0.9796
21	1.2179	-0.4982
22	-0.2292	-0.8154
23	-0.0534	-0.8282
24	-0.9133	-0.4634
25	-0.3015	-1.1182
26	0.0539	-0.7539
27	-0.0781	-0.7372
28	0.7294	-0.4100
29	0.0047	1.4151
30	-0.5774	-0.3205

At 1,2,3 and 5th lag, there is causality in variance, implying strong impact of S&P on JPN.

S&P 500 (USA) – KLPC (MALAYSIA)

Mean: AR(7), Variance: GARCH(1,1)

Number of lags	S&P→KLPC	KLPC→S&P
1	2.6760*	0.3399
2	38.4614*	-0.1829
3	0.3277	0.5356
4	0.1189	0.2778
5	-0.0145	0.3118
6	0.0605	0.4696
7	0.1297	0.1172
8	-0.3822	0.3224
9	-0.7530	-0.7265
10	0.4055	0.0493
11	-0.3521	-0.5307
12	-0.5198	-0.1337
13	0.2693	-0.1377
14	0.0136	0.2848
15	-1.0264	0.4108
16	0.1035	0.0581
17	-0.2109	-0.7704
18	0.5971	-0.6459
19	0.1809	-0.8050
20	-0.6158	-0.4152
21	-0.6771	-0.4666
22	-0.7485	-0.0999
23	0.5478	-0.7671
24	-0.0007	0.3433
25	-0.5965	-1.0078
26	-0.3777	-0.4190
27	-0.8247	-0.7809
28	-0.5886	1.0063
29	-0.5475	-0.2955
30	-0.3900	-0.2055

At 1 and 2 lag, there is causality in variance, implying strong impact of S&P on KLPC.

S&P 500 (USA) – SENSEX (INDIA)

Mean: AR (13), Variance: GARCH (1,1)

Number of lags	SENSEX→S&P	S&P→SENSEX
1	0.3429	0.1173
2	3.8967*	0.4471
3	0.8210	0.3516
4	1.8852	0.6271
5	0.1835	1.0836
6	1.7105	-1.0314
7	-0.6537	3.4312*
8	-0.4814	2.3046*
9	-0.9707	-1.1368
10	2.1772*	0.7208
11	-1.2585	-0.0863
12	0.9586	-0.6500
13	3.3554*	-0.7216
14	0.2500	0.7641
15	0.0046	0.6888
16	-0.8033	-0.9366
17	-0.4789	-0.1419
18	0.3501	-0.5582
19	0.4873	0.4145
20	-0.6205	1.2632
21	0.3964	-1.6297
22	-0.1783	-1.1217
23	-0.0248	1.1567
24	-1.4779	-0.2596
25	1.2553	-1.3537
26	2.2985*	-0.7181
27	-1.4960	-1.1880
28	1.1031	0.4243
29	-0.3686	0.8330
30	-0.8719	-1.3896

At 2, 7, 8,10, 13 and 26th, there is causality in variance, implying strong simultaneous interactions between SENSEX and S&P.

<u>S&P 500 (USA) – PKSE 100 (PAKISTAN)</u>

Mean: AR (12), Variance: GARCH (1,1)

Number of lags	PKSE 100→S&P	S&P→PKSE 100
1	0.1004	-0.0508
2	5.6166*	0.6174
3	-0.3737	1.1700
4	-1.1403	-0.3148
5	-0.3642	0.5047
6	-0.5127	-1.0966
7	0.8975	1.7918
8	-0.2843	-0.1263
9	1.1541	1.4461
10	-0.0646	1.3035
11	1.9486	-0.1818
12	-0.4041	-0.5572
13	-0.2489	-0.7160
14	0.5765	0.2752
15	0.0591	-2.3858*
16	-0.0226	0.0952
17	0.0995	-0.7519
18	-0.1007	0.2301
19	0.0801	0.2117
20	0.0368	-0.9533
21	-1.1099	0.1275
22	0.1363	0.5030
23	-0.8518	0.5526
24	-0.0573	-0.4369
25	-0.4482	1.6147
26	0.3127	-0.8873
27	-0.2778	-1.1153
28	0.5889	-0.6961
29	1.0003	0.7190
30	0.8173	1.2322

At 2nd and 10th lag, there is causality in variance, implying strong simultaneous interactions between S&P and PKSE 100.

S&P 500 (USA) – DJPHILL (PHILIPPINES)

Mean: AR (13), Variance: GARCH (1,1)

Number of lags	S&P 500→DJPHILL	DJPHILL→S&P 500
1	-0.2210	1.0367
2	6.8388*	0.8766
3	0.3056	0.7153
4	-0.7181	0.3165
5	0.1387	0.8963
6	-0.0974	-0.1023
7	-0.3034	0.3626
8	0.1039	0.2185
9	0.4286	-0.1902
10	-0.6838	-0.7950
11	-0.7009	0.5892
12	0.1762	-0.5002
13	2.1333*	-0.4136
14	1.0591	-0.5763
15	1.7345	-0.1290
16	-0.5679	0.2610
17	3.4889*	0.0245
18	2.4326*	-0.7172
19	0.6988	-0.0105
20	0.0750	3.0611*
21	-0.5973	0.4584
22	1.7300	-1.0974
23	-0.9330	-0.2519
24	0.1089	0.2250
25	0.0566	-0.4623
26	-0.4699	0.2451
27	0.7416	-0.4370
28	2.9952*	0.1780
29	-1.0003	-0.7146
30	0.0988	-0.2652

At 2, 13, 17, 18, 20 and 28 lag, there is causality in variance, implying strong simultaneous interactions between DJPHILL and S&P 500.

S&P 500 (USA) – DJTHAIL (THAILAND)

Mean: AR (13), Variance: GARCH (1,1)

Number of lags	S&P 500→DJTHAIL	DJTHAIL→S&P 500
1	0.1443	0.2607
2	3.7308*	-0.0836
3	-0.0479	-0.3752
4	0.8064	0.0253
5	-0.4769	0.0375
6	0.0398	-0.8864
7	0.7002	0.1848
8	-0.6139	-0.5301
9	-0.3776	-0.6183
10	-0.3783	-0.0344
11	-0.7275	-0.8649
12	0.6449	0.3008
13	-0.2462	-0.6123
14	-0.6529	-0.0513
15	0.6355	-0.2635
16	-0.2663	0.7902
17	4.2649*	-0.2374
18	-0.0569	-1.1584
19	0.9806	-0.0154
20	-0.7312	-0.6147
21	-0.4190	-0.6877
22	-0.2891	0.0043
23	-0.7980	0.0119
24	-0.7891	-0.5681
25	-0.2111	0.5418
26	-0.7701	2.3166*
27	-0.5439	-0.2261
28	-0.5436	-0.6329
29	0.5455	-0.5773
30	-1.1172	0.8557

At 2, 26 and 17th lag, there is causality in variance, implying strong simultaneous interactions between DJTHAIL and S&P 500.

JPN (JAPAN) – KLPC (MALAYSIA)

Mean: AR (12), Variance: GARCH (1,1)

Number of lags	JPN→KLCP	KLPC→JPN
1	1.0328	1.2821
2	0.3035	1.0979
3	-0.2127	0.4993
4	-0.1971	-0.3891
5	-0.3016	-0.2466
6	-0.6543	0.4934
7	0.3411	-0.2682
8	-0.3463	-0.6960
9	-0.3661	0.3584
10	-0.1509	0.4847
11	-0.5232	-1.1223
12	-0.5471	0.8156
13	0.1712	-0.2129
14	-0.7395	1.3210
15	0.1190	-0.8119
16	-0.4524	-0.3343
17	0.1426	0.4890
18	0.3747	-1.3952
19	-0.4130	-0.5510
20	-0.9202	-0.6821
21	-0.2019	-0.7535
22	-0.3980	-0.1623
23	-0.6700	-0.3808
24	-0.6180	0.0753
25	0.1025	0.6839
26	-0.1138	-0.6942
27	0.2466	-0.6199
28	0.4912	-0.1605
29	-0.0472	-0.5914
30	0.4376	0.3153

No interactions between JPN and KLCP in variance.

JPN (JAPAN) – SENSEX (INDIA)

Mean: AR (10), Variance: GARCH (1,1)

Number of lags	SENSEX→JPN	JPN→SENSEX
1	0.8532	1.7915
2	0.7486	1.6419
3	-0.4325	0.4061
4	1.4200	3.6580*
5	2.7132*	5.1735*
6	0.1888	2.1690*
7	1.0649	-0.3737
8	-1.5130	-0.8972
9	-0.5370	4.7298*
10	-0.1128	0.2669
11	0.4429	-0.2199
12	-0.8090	0.6357
13	-0.3839	1.4577
14	-1.1591	0.7097
15	0.8582	1.6965
16	0.3109	-0.0647
17	-1.0656	-0.7693
18	0.1901	0.6239
19	-1.2798	-0.3146
20	0.7167	-0.1131
21	0.7251	-0.5385
22	0.9867	0.8035
23	2.7037*	0.8620
24	-0.0508	-1.1135
25	-0.5741	0.5056
26	-1.0073	0.4339
27	0.6887	-0.0059
28	0.3186	-1.0171
29	0.5172	-1.4337
30	0.1442	0.0643

At 4, 5, 6, 9 and 23rd lag, there is causality in variance, implying strong simultaneous interactions between SENSEX and JPN.

<u>JPN (JAPAN) – PKSE 100 (PAKISTAN)</u>

Mean: AR (3), Variance: GARCH (1,1)

Number of lags	PKSE 100→JPN	JPN→PKSE 100
1	1.5166	-0.4230
2	0.7356	-0.5473
3	-0.1014	-0.8033
4	1.2988	3.2808*
5	-0.7012	-0.8445
6	-1.1536	-0.2091
7	-0.0088	-1.0191
8	0.0162	-0.4466
9	1.4496	1.9936
10	-0.7361	-0.6201
11	0.3686	0.4743
12	0.2059	-0.7965
13	-0.2557	-0.0704
14	-0.0730	1.8686
15	1.5276	-0.1948
16	1.8940	1.4772
17	-0.7260	-0.2499
18	1.5985	-0.2931
19	-0.8099	0.4537
20	0.3720	1.7032
21	0.1104	1.9294
22	0.9736	1.0545
23	-0.2836	1.3342
24	1.6145	1.5771
25	-0.1682	-0.6358
26	-0.4293	-1.5473
27	0.1447	0.3865
28	-0.5687	-1.0724
29	-0.1739	-0.7289
30	0.3540	-0.3750

At 4th lag, there is causality in variance, implying strong impact of JPN on PKSE 100.

JPN (JAPAN) – DJPHILL (PHILIPPINES)

Mean: **AR (1), Variance: GARCH (1,1)**

Number of lags	DJPHILL→JPN	JPN→DJPHILL
1	-0.1323	0.4445
2	0.0120	0.0375
3	0.8478	0.3018
4	0.0224	-0.3504
5	1.1073	-0.3302
6	1.7365	0.1742
7	-0.5266	-0.4090
8	-0.3608	0.2997
9	-0.4323	-0.3219
10	1.0254	-0.1464
11	-0.4572	-0.0526
12	-0.3876	-0.0474
13	0.3296	2.4692*
14	-0.0786	-0.0160
15	1.8574	0.3140
16	-0.9035	-0.5478
17	0.4170	-0.4893
18	-0.4902	0.3764
19	-0.6348	-0.5462
20	-0.6419	0.7859
21	0.9641	-0.4636
22	-0.1428	-0.5264
23	-0.1253	0.5364
24	-0.6144	-0.0862
25	1.5447	1.8417
26	-0.2011	-0.9542
27	-0.6598	-0.7459
28	0.7318	-0.1145
29	2.0552*	0.3339
30	-0.1501	0.3763

At 13 and 29th lag, there is causality in variance, implying strong simultaneous interactions between JPN and DJPHILL.

JPN (JAPAN) – DJTHAIL (THAILAND)

Mean: AR (2), Variance: GARCH (1,1)

Number of lags	JPN→DJTHAIL	DJTHAIL→JPN
1	0.6567	0.3944
2	-0.2279	-0.5133
3	0.3071	-0.6112
4	-0.1522	-0.4233
5	-0.4908	-0.2311
6	0.1472	-0.3186
7	0.7895	-0.0130
8	-0.7532	-1.1164
9	0.1835	0.2242
10	0.1449	0.5406
11	-0.6041	-0.3789
12	-0.1459	-1.3052
13	1.1705	0.5103
14	1.0618	0.0092
15	0.1985	0.0027
16	1.4958	0.2524
17	-0.6902	0.4696
18	0.7000	-0.2449
19	0.2244	0.0228
20	-0.5836	0.1474
21	-0.0522	2.6853
22	-0.2506	-0.4541
23	-0.3713	-0.0910
24	-0.2480	-0.4505
25	-0.0491	1.5183
26	-0.6705	-0.7807
27	-0.1132	-0.2395
28	0.0334	-0.1903
29	-0.3599	1.2299
30	-0.3213	1.1104

No interactions between JPN and KLCP in variance.

KLPC (MALAYSIA) – PKSE 100 (PAKISTAN)

Mean: AR (10), Variance: GARCH (1,1)

Number of lags	PKSE 100→KLPC	KLPC→PKSE 100
1	-0.1909	1.7045
2	1.0427	0.5946
3	-1.1551	0.9939
4	-0.4647	-0.2887
5	0.4686	0.6990
6	0.6545	-0.8258
7	1.5440	-0.3152
8	0.4373	-1.1976
9	0.1955	1.5473
10	-0.6500	-0.5253
11	0.0821	-0.5140
12	-1.0490	0.4552
13	0.8478	-0.9177
14	-0.6431	-0.2426
15	-0.1223	0.4578
16	0.3693	8.8745*
17	0.4805	0.5371
18	0.5987	-0.4195
19	-1.0129	-0.6424
20	-1.6681	-1.1153
21	0.5035	1.0436
22	0.7215	0.8820
23	-1.4712	-0.2669
24	-0.5417	-0.4345
25	1.1072	1.3385
26	-0.2308	0.6341
27	2.1171	-0.0577
28	-0.1805	-1.2684
29	0.0989	-1.2569
30	1.2070	0.0008

At 16 lag, there is causality in variance, implying strong impact of KLPC on PKSE 100.

KLPC (MALAYSIA) – DJPHILL (PHILIPPINES)

Mean: AR (15), Variance: GARCH (1,1)

Number of lags	DLPHILL→KLPC	KLPC→DJPHILL
1	1.1170	2.0428*
2	1.8904	1.0159
3	0.4270	0.0944
4	0.3841	1.1954
5	1.1090	1.5458
6	0.6746	-0.1782
7	-0.2856	-0.5455
8	-0.7143	-0.0510
9	-0.6164	-0.0668
10	-0.7775	-0.5022
11	1.8714	-0.1604
12	0.0064	-0.1204
13	-0.3551	0.4041
14	-0.0689	-0.5673
15	1.0457	0.0713
16	-0.9073	-0.0317
17	0.3899	5.4234*
18	-0.4540	-0.0462
19	0.8068	0.7828
20	-0.8063	-0.4389
21	-0.1253	-0.4605
22	0.3280	-0.1000
23	-0.2511	-0.4664
24	-0.8928	-0.4217
25	-1.1215	0.0456
26	0.5825	0.1264
27	-0.7610	-0.3096
28	-0.2628	-0.1126
29	0.6925	-0.8177
30	-0.1051	-0.1555

At 1 and 17 lag, there is causality in variance, implying strong impact of KLPC on DLPHILL.

KLPC (MALAYSIA) – DJTHAIL (THAILAND)

Mean: AR (15), Variance: GARCH (1,1)

Number of lags	KLPC→DJTHAIL	DJTHAIL→KLPC
1	0.8245	1.8573
2	0.9462	0.6638
3	0.2464	0.2803
4	-0.6354	0.4232
5	-0.5053	1.0526
6	-0.2986	-1.0770
7	-0.2412	-0.8464
8	-0.6889	-0.4775
9	-0.2224	0.0616
10	-0.1324	0.1409
11	2.1897*	0.6432
12	0.4009	-0.5336
13	-0.0530	0.2426
14	1.1141	0.2102
15	0.1018	1.3903
16	0.0291	0.0809
17	0.1884	1.6028
18	0.1909	-0.4875
19	-0.1907	0.1279
20	-0.3369	-0.5549
21	-0.8484	0.0698
22	0.3069	0.2945
23	-0.1398	0.2009
24	-0.0713	-0.4921
25	-0.3275	0.2830
26	-0.0144	-0.2514
27	-0.4676	-0.4636
28	-0.3354	1.2667
29	-0.0970	-0.0388
30	-0.1222	1.1725

At lag 11, there is causality in variance, implying strong impact of KLPD on JTHAIL.

PKSE 100 (PAKISTAN) – DJPHILL (PHILIPPINES)

Mean: AR (1), Variance: GARCH (1,1)

Number of lags	PKSE 100→DJPHILL	DJPHILL→PKSE 100
1	0.3257	0.2841
2	-0.2516	-0.2908
3	-0.1247	1.4384
4	-0.2481	1.3561
5	0.7787	0.0274
6	0.2308	-0.0081
7	0.6274	0.6500
8	-0.3808	0.4958
9	-0.5170	-0.4294
10	0.1362	0.5355
11	0.2275	0.7565
12	-0.3637	0.9950
13	0.2603	-0.0633
14	2.0873*	0.8843
15	1.6068	0.4093
16	0.8256	0.3009
17	-0.1976	0.5920
18	0.2970	0.4248
19	-0.2481	-0.0052
20	0.0413	-0.0429
21	-0.5029	-0.7914
22	1.0583	0.1750
23	-0.1037	-0.2617
24	-0.5590	0.2751
25	0.0455	1.2048
26	0.0806	0.2899
27	-0.5990	-0.4253
28	0.4791	0.2148
29	-0.7852	0.6726
30	0.0657	-0.1741

At lag 14, there is causality in variance, implying strong impact of PKSE 100 on DJPHILL.

PKSE 100 (PAKISTAN) – DJTHAIL (THAILAND)

Mean: AR (13); Variance: GARCH (1,1)

Number of lags	DJTHAIL→PKSE 100	PKSE 100→DJTHAIL
1	1.7910	0.7848
2	0.4907	1.2902
3	-0.4551	-0.3627
4	0.0048	-0.8035
5	1.1529	-0.0010
6	-0.4662	-0.5840
7	0.0695	-0.0644
8	-0.3502	-0.0368
9	-0.2446	1.2097
10	0.3335	-0.5523
11	-0.5566	-0.8306
12	0.4275	0.5707
13	0.3191	0.2579
14	1.4099	0.5570
15	-0.0328	1.8391
16	0.2707	0.1655
17	0.1865	0.4134
18	-0.1031	-0.1822
19	-0.3987	-0.7973
20	0.5458	-0.1072
21	0.7947	-0.8234
22	1.0795	0.9326
23	0.0388	0.7408
24	0.1085	0.0053
25	-0.1321	0.4869
26	-0.4270	1.1278
27	0.6283	0.3842
28	-1.0258	0.9348
29	-0.4140	-0.0082
30	-0.6919	0.1076

No interactions between DJTHAIL and PKSE 100 in variance.

DJPHILL (PHILIPPINES) – DJTHAIL (THAILAND)

Mean: AR (13), Variance: GARCH (1,1)

Number of lags	DJTHAIL→DJPHILL	DJPHILL→DJTHAIL
1	0.0008	1.8739
2	0.1120	0.0762
3	0.7240	0.9745
4	0.3049	-0.3401
5	0.4626	0.2786
6	0.1231	0.2321
7	-0.3264	0.7146
8	-0.4653	0.0474
9	0.0350	0.0671
10	0.5576	-0.3789
11	-0.2046	0.1180
12	-0.4451	0.4079
13	0.0447	0.4469
14	-0.3021	0.3969
15	0.2029	0.1645
16	-0.0300	0.1195
17	-0.2656	0.6930
18	0.1400	0.3368
19	0.7309	0.0034
20	-0.1089	0.5167
21	0.1167	-0.0119
22	-0.6455	-0.2748
23	-0.1095	-0.0477
24	-0.2172	0.0180
25	-0.5651	0.1369
26	0.3409	-0.3813
27	0.0797	-0.4932
28	0.2462	1.5192
29	0.1352	-0.5845
30	0.2575	-0.2051

No interactions between DJTHAIL and DJPHILL in variance.

SENSEX (INDIA) – KLPC (MALAYSIA)

Mean: AR (6), Variance: GARCH (1,1)

Number of lags	SENSEX→KLPC	KLPC→SENSEX
1	1.4531	3.1170*
2	0.5578	0.7926
3	1.5679	0.9853
4	-0.8232	-1.1356
5	0.4419	1.8835
6	-0.4625	1.8545
7	0.4655	-0.0783
8	0.2968	-0.8733
9	-1.1941	3.7947*
10	-0.2994	1.0984
11	2.4023*	-0.8717
12	-1.1022	-0.9280
13	-1.4768	-0.3372
14	0.6513	-0.8016
15	3.3451*	-0.1272
16	-0.0356	-0.4406
17	-0.1484	-0.6086
18	1.7704	-0.0991
19	2.0625*	-1.5738
20	0.6083	-0.7427
21	-0.5952	-0.9156
22	-0.4458	-0.2333
23	0.1348	2.5537*
24	1.7460	0.0500
25	-0.5644	0.6937
26	-1.1310	0.3136
27	-1.3117	-0.2418
28	-0.2917	-0.2454
29	-0.5501	0.0939
30	-1.5911	0.6809

At 1, 9, 11, 15, 23 and 19th lag, there is causality in variance, implying strong simultaneous interactions between SENSEX and KLPC.

<u>SENSEX (INDIA) – PKSE 100 (PAKISTAN)</u>

Mean: AR (12), Variance: GARCH (1,1)

Number of lags	PKSE 100→SENSEX	SENSEX→PKSE 100
1	-0.1670	0.9429
2	1.1144	0.4176
3	-0.2169	0.0595
4	1.0370	-1.4006
5	-0.5532	4.4185*
6	-0.5692	-0.9979
7	-0.2777	0.2711
8	-1.5737	-0.7711
9	-0.5900	0.7710
10	1.3741	1.0661
11	1.2432	0.0856
12	2.7971*	-0.3454
13	0.3040	-0.1897
14	0.5056	0.2268
15	1.9027	0.3631
16	-0.1673	-0.2772
17	-0.6523	-0.0763
18	0.8130	0.5948
19	1.3416	0.3160
20	0.9453	1.1217
21	0.0612	-0.2362
22	-0.6975	-1.0387
23	-1.2248	-0.6551
24	0.5700	0.3284
25	0.0957	0.9405
26	-1.4874	3.3372*
27	-0.5591	-0.1426
28	-1.0031	-0.5803
29	-0.0782	0.8708
30	0.7197	0.9797

At lags 5, 12 and 26, there is causality in variance, implying strong simultaneous interactions between PKSE 100 and SENSEX.

SENSEX (INDIA) – DJPHILL (PHILIPPINES)

Mean: AR (4), Variance: GARCH (1,1)

Number of lags	DJPHILL→SENSEX	SENSEX→DJPHILL
1	0.5458	-0.1994
2	1.4677	1.0409
3	1.0006	0.1309
4	0.0323	0.7302
5	-0.2901	0.9466
6	-0.0986	1.6246
7	-0.1634	-0.8260
8	-0.2218	-0.4822
9	0.6993	-0.8607
10	0.9837	-0.7085
11	1.0896	-0.4774
12	0.9749	0.0789
13	-0.4631	-0.6528
14	0.0206	-0.6487
15	0.0608	0.8236
16	1.2537	0.2739
17	-0.4012	-0.7217
18	0.4368	-0.5345
19	-0.2777	-0.6212
20	-0.4808	-0.0685
21	-0.1171	-0.4720
22	-0.2248	-0.2563
23	-0.4762	-0.5576
24	-0.5107	-0.4518
25	0.9678	-0.0523
26	0.2487	0.2250
27	-0.1565	1.1565
28	-0.3254	-0.2228
29	-0.2270	3.2000*
30	0.6827	0.6379

At lag 29, there is causality in variance, implying strong impact of SENSEX on DJPHILL.

SENSEX (INDIA) – DJTHAIL (THAILAND)

Mean: AR (13), Variance: GARCH (1,1)

Number of lags	SENSEX→DJTHAIL	DJTHAIL→SENSEX
1	0.7443	0.3712
2	1.7800	-0.1615
3	0.9844	-0.2199
4	0.3831	0.2289
5	1.4520	0.7285
6	4.7955*	-0.5224
7	0.3528	0.2226
8	-0.3765	-0.7394
9	1.5225	-0.7929
10	0.1770	-0.1844
11	-0.4149	1.7623
12	-0.1576	-0.1487
13	-0.3186	-0.0841
14	-1.2851	0.2796
15	1.3001	-0.2959
16	-0.6778	-0.3233
17	-0.5356	0.9133
18	-0.8589	1.0093
19	-0.1475	0.1494
20	0.8275	0.0082
21	-0.1544	-0.7936
22	-0.1307	-0.7754
23	-0.0303	-0.8630
24	-0.7802	-0.0908
25	-0.4459	-0.0353
26	0.3524	-0.4839
27	0.4195	-0.9379
28	-0.5925	-0.0065
29	-0.1069	-1.0999
30	-0.4796	0.5032

At lag 6, there is causality in variance, implying strong impact of SENSEX on DJTHAIL.

4.2.2. Remarks

From above tables and comments we conclude to the following:

Table 5: PRE – LIBERALIZATION PERIOD

→	S&P 500 (USA)	JPN (JAPAN)	SENSEX (INDIA)	KLPC (MALAYSIA)	PKSE 100 (PAKISTAN)	DJPHILL (PHILIPPINES)	DJTHAIL (THAILAND)
S&P 500 (USA)	-	YES	NO	YES	YES	-	-
JPN (JAPAN)	NO	-	NO	YES	YES	-	-
SENSEX (INDIA)	NO	NO	-	NO	NO	-	-
KLPC (MALAYSIA)	YES	YES	NO	-	NO	-	-
PKSE 100 (PAKISTAN)	NO	NO	NO	NO	-	-	-
DJPHILL (PHILIPPINES)	-	-	-	-	-	-	-
DJTHAIL (THAILAND)	-	-	-	-	-	-	-

For pre – liberalization period, we note that S&P 500 (USA) effects the variance of, KLPC (MALAYSIA) and PKSE 100 (PAKISTAN).
No interactions in variance, which means no correlation, exist between JPN (JAPAN) and S&P 500 (USA), SENSEX (INDIA) and JPN (JAPAN), KLPC (MALAYSIA) and PKSE 100 (PAKISTAN), SENSEX (INDIA) and KLPC (MALAYSIA) and finally between PKSE 100 (PAKISTAN) and SENSEX (INDIA).

Table 6: POST – LIBERALIZATION PERIOD

→	S&P 500 (USA)	JPN (JAPAN)	SENSEX (INDIA)	KLPC (MALAYSIA)	PKSE 100 (PAKISTAN)	DJPHILL (PHILIPPINES)	DJTHAIL (THAILAND)
S&P 500 (USA)	-	YES	YES	YES	YES	YES	YES
JPN (JAPAN)	NO	-	YES	NO	YES	YES	NO
SENSEX (INDIA)	YES	YES	-	YES	YES	YES	YES
KLPC (MALAYSIA)	NO	NO	YES	-	YES	YES	YES
PKSE 100 (PAKISTAN)	YES	NO	YES	NO	-	NO	NO
DJPHILL (PHILIPPINES)	YES	YES	NO	NO	YES	-	NO
DJTHAIL (THAILAND)	YES	NO	NO	NO	NO	NO	-

For post-liberalization period, we have found interactions in variance for the majority of stock markets under examination. Especially, the results indicate that there are strong impacts in variance from S&P 500 (USA) on all other stock indices.

Conclusion

In this study, we have tried to examine the dynamic linkages among seven international stock markets USA, Japan, India, Malaysia, Philippines, Pakistan, and Thailand before and after liberalization by applying two different methodologies. According to the results, linkages and integration among them have been increased.

The empirical results converge that financial liberalization has increased the integration in the majority of stock markets and has caused dynamic linkages among them. Of course the linkages are not so strong in all our cases. There is plenty of evidence to suggest that all stock markets exhibit conditional heteroskedasticity; thus, we can say that international relationships are characterized by second-moment dynamics.

Before liberalization, few interdependencies exist especially between USA's and Malaysia's, Pakistan's and Japan's equity indices. However, after liberalization the observations are totally different, showing simultaneous interaction between most of the stock markets.

We can also note that volatility linkages exist between equity markets that are not characterized by geographical proximity and economic ties. Market practitioners usually assume that the direction of causation is from developed markets to emerging markets but here we also notice that emerging equity markets cause in volatility the strong equity markets. The leading role and influence of USA over other markets during the pre as well as in post – liberalization period cannot be ignored as well as the dynamic role of Japan. India, Malaysia and Philippines follow.

Analyzing the derived results, we can detect useful information which can help global investors to make better decisions with regard to asset and risk management including asset allocation, portfolio diversification and hedging strategy. The objective of an international investor is to minimize his/her portfolio risk at a given level of expected return. The modern portfolio theory suggests that low correlations between assets results in lower risk. From our study an investor can get an indication of the existed correlations among these stock markets and can succeed diversification by choosing to invest to those with the lower correlation.

Having taking into account the tendency of all economies towards globalization, we have to point out that the dynamic linkages among these markets it was expected.

For the time being, these seven international stock markets are still a place with great investments opportunities, giving the chance to risk averse investors to diversify their portfolio with low investment risk.

Appendix A

2007 List by the International Monetary Fund

Rank	Country	GDP (millions of USD)
—	***World***	**54,311,608**
—	*European Union*	16,830,100
1	United States	13,843,825
2	Japan	4,383,762
3	Germany	3,322,147
4	China (PRC)	3,250,827
5	United Kingdom	2,772,570
6	France	2,560,255
7	Italy	2,104,666
8	Spain	1,438,959
9	Canada	1,432,140
10	Brazil	1,313,590
11	Russia	1,289,582
12	India	1,098,945
13	South Korea	957,053
14	Australia	908,826
15	Mexico	893,365
16	Netherlands	768,704
17	Turkey	663,419
18	Sweden	455,319
19	Belgium	453,636
20	Indonesia	432,944
21	Switzerland	423,938
22	Poland	420,284
23	Norway	391,498
24	Taiwan, R.O.C.	383,307

25	Saudi Arabia	376,029
26	Austria	373,943
27	Greece	314,615
28	Denmark	311,905
29	Iran	294,089
30	South Africa	282,630
31	Argentina	259,999
32	Ireland	258,574
33	Thailand	245,659
34	Finland	245,013
35	Venezuela	236,390
36	Portugal	223,303
—	Hong Kong	206,707
37	UnitedArab Emirates	192,603
38	Malaysia	186,482
39	Czech Republic	175,309
40	Colombia	171,607
41	Nigeria	166,778
42	Romania	165,983
43	Chile	163,792
44	Israel	161,935
45	Singapore	161,349
46	Philippines	144,129
47	Pakistan	143,766
48	Ukraine	140,484
49	Hungary	138,388
50	Algeria	131,568
51	New Zealand	128,141

From Wikipedia site: The 51st countries with the biggest GDP.

Appendix B

Economy of India

The Bombay Stock Exchange, is Asia's oldest and India's largest stock exchange.

For most of its post-independence history, India adhered to a quasi-socialist approach with strict government control over private sector participation, foreign trade, and foreign direct investment. However, since 1991, India has gradually opened up its markets through economic reforms and reduced government controls on foreign trade and investment. Foreign exchange reserves have risen from US$5.8 billion in March 1991 to US$300 billion in March, 2008, while federal and state budget deficits have decreased. Privatization of publicly-owned companies and the opening of certain sectors to private and foreign participation has continued amid political debate. With a GDP growth rate of 9.4% in 2006-07, the economy is among the fastest growing in the world. India's GDP in terms of USD exchange - rate is US$1.089 trillion. When measured in terms of purchasing power parity (PPP), India has the world's fourth largest GDP at US$4.726 trillion. India's per capita income (nominal) is US$977, while its per capita (PPP) is US$2700.

India has the world's second largest labour force, with 516.3 million people, 60% of whom are employed in agriculture and related industries; 28% in services and related industries; and 12% in industry. Major agricultural crops include rice, wheat, oilseed, cotton, jute, tea, sugarcane, and potatoes. The agricultural sector accounts for 28% of GDP; the service and industrial sectors make up 54% and 18% respectively. Major industries include automobiles, cement, chemicals, consumer electronics, food processing, machinery, mining, petroleum, pharmaceuticals, steel, transportation equipment, and textiles. Along with India's fast economic growth comes its growing demand for energy. According to the Energy Information Administration, India is the sixth largest consumer of oil and third largest consumer of coal.

Although the Indian economy has grown steadily over the last two decades; its growth has been uneven when comparing different social groups, economic groups, geographic regions, and rural and urban areas. Income inequality in India is relatively small (Gini coefficient: 36.8 in year 2004), though it has been increasing of late. Wealth distribution in India is fairly uneven, with the top 10% of income groups earning 33% of the income. Despite significant economic progress, a quarter of the nation's population earns less than the government-specified poverty threshold of $0.40 per day. In 2004–2005, 27.5% of the population was living below the poverty line.

More recently, India has capitalised on its large pool of educated, English-speaking people, and trained professionals to become an important outsourcing destination for multinational corporations and a popular destination for medica tourism. India has also become a major exporter of software as well as financial, research, and technological services. Its natural resources include arable land, bauxite, chromite, coal, diamonds, iron ore, limestone, manganese, mica, natural gas, petroleum, and titanium ore.

In 2007, estimated exports stood at US$140 billion and imports were around US$224.9 billion. Textiles, jewellery, engineering goods and software are major export commodities. While crude oil, machineries, fertilizers, and chemicals are major imports. India's most important trading partners are the United States, the European Union, and China.

Economy of Japan

Japan's economy is characterized by low overall taxation and overwhelmingly private sector economy compared to most Western countries, high economic freedom, close government-industry cooperation for economic growth, emphasis on science and technology, and strong work ethic. Extraordinary relationship-based - rather than productive - arrangements in the financial sector and employment, along with relatively shallow international competition in domestic markets, are among widely acknowledged causes behind the protracted *lost decade* in the 1990s. Slowly progressing reforms took pace in the mid-2000s and higher growth rates were seen after 2005. Japan is the second largest economy in the world, after the United States, at around US$4.5 trillion in terms of nominal GDP and third after the United States and China in terms of purchasing power parity.

Banking, insurance, real estate, retailing, transportation and telecommunications are all major industries. Japan has a large industrial capacity and is home to some of the largest, leading and most technologically advanced producers of motor vehicles, electronic equipment, machine tools, steel and nonferrous metals, ships, chemicals, textiles and processed foods. Construction has long been one of Japan's largest industries, with the help of multi-billion dollar government contracts in the civil sector. Distinguishing characteristics of the Japanese economy have included the cooperation of manufacturers, suppliers, distributors and banks in closely-knit groups called *keiretsu* and the guarantee of lifetime employment in big corporations. Recently, Japanese companies have begun to abandon some of these norms in an attempt to increase profitability.

Japan is also home to some of the largest financial services companies, business groups and bank such as Sony, Sumitomo, Mitsubishi and Toyota. It is also home to the world's largest bank by asset, Japan Post Bank (US$3.2 trillion) and others such as Mitsubishi UFJ Financial Group (US$1.2 trillion), Mizuho Financial Group (US$1.4 trillion) and Sumitomo Mitsui Financial Group (US$1.3 trillion). The Tokyo Stock Exchange with a market capitalization of over 549.7 trillion Yen as of December 2006 stands as the second largest in the world.

From the 1960s to the 1980s, overall real economic growth has been called a "miracle": a 10% average in the 1960s, a 5% average in the 1970s and a 4% average in the 1980s. Growth slowed markedly in the 1990s, largely because of the after-effects of over-investment during the late 1980s and domestic policies intended to wring speculative excesses from the stock and real estate markets. Government efforts to revive economic growth met with little success and were further hampered in 2000 to 2001 by the deceleration of the global economy.

However, the economy showed strong signs of recovery after 2005. GDP growth for that year was 2.8%, with an annualized fourth quarter expansion of 5.5%, surpassing the growth rates of the US and European Union during the same period.

Because only about 15% of Japan's land is suitable for cultivation, a system of terrace farming is used to build in small areas. This results in one of the world's highest levels of crop yields per unit area, while the agricultural subsidies and protection are costly to the economy. Japan imports about 50% of its requirements of grain and fodder crops other than rice, and it relies on imports for most of its supply of meat. In fishing, Japan is ranked second in the world behind China in tonnage of fish caught. Japan maintains one of the world's largest fishing fleets and accounts for nearly 15% of the global catch. Japan relies on foreign countries for almost all oil and food. Overall taxation as a percentage of GDP was 26.4% in 2007, less than any major Western country. Less than half of employees pay income tax at all and VAT is very low at 5%, albeit corporate tax rates are high.

Transportation in Japan is highly developed. As of 2004, there are 1,177,278 km (731,683 s) of paved roadways, 173 airports, and 23,577 km (14,653 miles) of railways. Air transport is mostly operated by All Nippon Airways (ANA) and Japan Airlines (JAL). Railways are operated by Japan Railways Group among others. There are extensive international flights from many cities and countries to and from Japan.

Japan's main export partners are the United States 22.8%, the European Union 14.5%, China 14.3%, South Korea 7.8%, Taiwan 6.8% and Hong Kong 5.6% (for 2006). Japan's main exports are transport equipment, motor vehicles, electronics, electrical machinery and chemicals. With very limited natural resources to sustain economic development, Japan depends on other nations for most of its raw materials; thus it imports a wide variety of goods. Its main import partners are China 20.5%, U.S. 12.0%, the European Union 10.3%, Saudi Arabia 6.4%, UAE 5.5%, Australia 4.8%, South Korea 4.7% and Indonesia 4.2% (for 2006). Japan's main imports are machinery and equipment, fossil fuels, foodstuffs (in particular beef), chemicals, textiles and raw materials for its industries. Overall, Japan's largest trading partners are China and the United States.

Economy of Malaysia

The Malay Peninsula and indeed Southeast Asia has been a centre of trade for centuries. Various items such as porcelain and spices were actively traded even before Malacca and Singapore rose to prominence.

In the 17th century, they were found in several Malay states. Later, as the British started to take over as administrators of Malaya, rubber and palm oil trees were introduced for commercial purposes. Over time, Malaya became the world's largest major producer of tin, rubber, and palm oil. These three commodities, along with other raw materials, firmly set Malaysia's economic tempo well into the mid-20th century.

Instead of relying on the local Malays as a source of labour, the British brought in Chinese and Indians to work on the mines and plantations. Although many of them returned to their respective home countries after their agreed tenure ended, some remained in Malaysia and settled permanently.

As Malaysia moved towards independence, the government began implementing economic five-year plans, beginning with the First Malaysia Five Year Plan in 1955. Upon the establishment of Malaysia, the plans were re-titled and renumbered, beginning with the First Malaysia Plan in 1965.

In 1970s, Malaysia began to imitate the four Asian Tiger economies (Taiwan, South Korea, Hong Kong and Singapore) and committed itself to a transition from being reliant on mining and agriculture to an economy that depends more on manufacturing. With Japanese investment, heavy industries flourished and in a matter of years, Malaysian exports became the country's primary growth engine. Malaysia consistently achieved more than 7% GDP growth along with low inflation in the 1980s and the 1990s.

During the same period, the government tried to eradicate poverty with the controversial New Economic Policy (NEP), after the May 13 Incident of racial rioting in 1969. Its main objective was the elimination of the association of race with economic function, and the first five-year plan to begin implementing the NEP was the Second Malaysia Plan. The success or failure of the NEP is the subject of much debate, although it was officially retired in 1990 and replaced by the National Development Policy (NDP). Recently much debate has surfaced once again with regards to the results and relevance of the NEP. Some have argued that the NEP has indeed successfully created a Middle/Upper Class of

Malay businessmen and professionals. Despite some improvement in the economic power of Malays in general, the Malaysian government maintains a policy of discrimination that favors ethnic Malays over other races—including preferential treatment in employment, education, scholarships, business, access to cheaper housing and assisted savings. This special treatment has sparked envy and resentment between non-Malays and Malays.

The Chinese control of the locally-owned sector of the country's economy, meanwhile, has been ceded largely in favour of the Bumiputras/Malays in many essential or strategic industries such as petroleum retailing, transportation, agriculture and etc. The minority of Indian descent has by and large been the most adversely affected by this policy. Indicators point to a higher incidence of crime and gang related activities among the Indians in recent years.

The rapid economic boom led to a variety of supply problems, however. Labour shortages soon resulted in an influx of millions of foreign workers, many illegal. Cash-rich PLCs and consortia of banks eager to benefit from increased and rapid development began large infrastructure projects. This all ended when the Asian Financial Crisis hit in the fall of 1997, delivering a massive shock to Malaysia's economy.

As with other countries affected by the crisis, there was speculative short-selling of the Malaysian currency, the ringgit. Foreign direct investment fell at an alarming rate and, as capital flowed out of the country, the value of the ringgit dropped from MYR 2.50 per USD to, at one point, MYR 4.80 per USD. The Kuala Lumpur Stock Exchange's composite index plummeted from approximately 1300 points to around 400 points in a matter of weeks. After the controversial sacking of finance minister Anwar Ibrahim, a National Economic Action Council was formed to deal with the monetary crisis. Bank Negara imposed capital controls and pegged the Malaysian ringgit at 3.80 to the US dollar. Malaysia refused economic aid packages from the International Monetary Fund (IMF) and the World Bank, however, surprising many analysts.

In March 2005, the United Nations Conference on Trade and Development (UNCTAD) published a paper on the sources and pace of Malaysia's recovery, written by Jomo K.S. of the applied economics department, University of Malaya, Kuala Lumpur. The paper concluded that the controls imposed by Malaysia's government neither hurt nor helped recovery. The chief factor was an increase in electronics components exports, which was caused by a large increase in the demand for components in the United States, which was caused, in turn, by a fear of the effects of the arrival of the year 2000 upon older computers and other digital devices.

However, the post Y2K slump of 2001 did not affect Malaysia as much as other countries. This may have been clearer evidence that there are other causes and effects that can be more properly attributable for recovery. One possibility is that the currency speculators had run out of finance after failing in their attack on the Hong Kong dollar in August 1998 and after the Russian ruble collapsed.

Regardless of cause/effect claims, rejuvenation of the economy also coincided with massive government spending and budget deficits in the years that followed the crisis. Later, Malaysia enjoyed faster economic recovery compared to its neighbours. In many ways, however, the country has yet to recover to the levels of the pre-crisis era.

While the pace of development today is not as rapid, it is seen to be more sustainable. Although the controls and economic housekeeping may not have been the principal reason for recovery, there is no doubt that the banking sector has become more resilient to external shocks. The current account has also settled into a structural surplus, providing a cushion to capital flight. Asset prices are now a fraction of their pre-crisis heights.

The fixed exchange rate was abandoned in July 2005 in favour of a managed floating system within an hour of China's announcing of the same move. In the same week, the ringgit strengthened a percent against various major currencies and was expected to appreciate further. As of December 2005, however, expectations of further appreciation were muted as capital flight exceeded USD 10 billion.

In September 2005, Sir Howard J. Davies, director of the London School of Economics, at a meeting in Kuala Lumpur, cautioned Malaysian officials that if they want a flexible capital market, they will have to lift the ban on short-selling put into effect during the crisis. In March 2006, Malaysia removed the ban on short selling. Currently, Malaysia is considered a newly industrialized country.

Economy of Pakistan

Pakistan is a rapidly developing country and a major emerging market, with an economic growth rate of 7 percent per annum for four consecutive years up to 2007. Despite being a very poor country in 1947, Pakistan's economic growth rate was better than the global average during the subsequent four decades, but imprudent policies led to a slowdown in the late 1990s. Recently, wide-ranging economic reforms have resulted in a stronger economic outlook and accelerated growth especially in the manufacturing and financial services sectors. There has been great improvement in the foreign exchange position and rapid growth in hard currency reserves in recent years. The 2005 estimate of foreign debt was close to US$40 billion. However, this has decreased in recent years with assistance from the International Monetary Fund (IMF) and significant debt-relief from the United States. Pakistan's gross domestic product, as measured by purchasing power parity (PPP), is estimated to be US$475.4 billionwhile its per capita income (PCI) stands at $2,942. The poverty rate in Pakistan is estimated to be between 23% and 28%. Pakistan's GDP growth rates have seen a steady increase over the last 5 years. However, inflationary pressures and a low savings rate, among other economic factors, could make it difficult to sustain a high growth rate.

The structure of the Pakistani economy has changed from a mainly agricultural base to a strong service base. Agriculture now only accounts for roughly 20% of the GDP, while the service sector accounts for 53% of the GDP with wholesale and retail trade forming 30% of this sector. In the past few years, the Karachi Stock Exchange has increased in value along with most of the world's emerging markets. Significant foreign investments have been made in several areas including telecommunications, real estate and energy. Other major industries include software, automotives, textiles, cement, fertilizer, steel, ship building, aerospace and arms manufacturing.

In November of 2006 China and Pakistan signed a Free Trade Agreement hoping to triple bilateral trade from $4.2 billion (USD) to $15 billion (USD) within the next five years. Pakistan's exports in 2007 amounted to $20.58 billion (USD).

Economy of Philippines

The Philippines is a newly industrialized country with an economy anchored on agriculture but with substantial contributions from manufacturing, mining, remittances from overseas Filipinos and service industries such as tourism and, increasingly, business process outsourcing. The Philippines is listed in the roster of "Next Eleven" economies.

Historically, the Philippine economy has largely been anchored on the Manila galleon during the Spanish era and bilateral trade with the United States during the American era. Pro-Filipino economic policies were first implemented during the tenure of Carlos P. Garcia with the "Filipino First" policy. By the 1960s, the Philippine economy was regarded as the second-largest in Asia, next only to Japan. However, the presidency of Ferdinand Marcos would prove disastrous to the Philippine economy, sliding the country into severe economic recession, only to recover starting in the 1990s with a program of economic liberalization and the breaking of Marcos-era monopolies and the system of cronyism under Fidel V. Ramos.

The Asian Financial Crisis affected the Philippine economy to an extent, resulting in a lingering decline of the value of the Philippine peso and falls in the stock market, although the extent to which it was affected is not as severe as that of its Asian neighbors. This is largely due to the fiscal conservatism of the Philippine government partly as a result of decades of monitoring and fiscal supervision from the International Monetary Fund, in comparison to the massive spending of its neighbors on the rapid acceleration of economic growth. By 2004, the Philippine economy experienced six-percent growth in gross domestic product and 7.3% in 2007, in line with the "7, 8, 9" project of the government to accelerate GDP growth by 2009.

In a bid to further strengthen the Philippine economy, President Gloria Macapagal-Arroyo pledged to make the Philippines a developed country by 2020. As part of this goal, she instituted five economic "super regions" to concentrate on the economic strengths of various regions of the Philippines, as well as the implementation of tax reforms, continued privatization of state assets, and the building-up of infrastructure in various areas of the Philippines.

Despite the growing economy, the Philippines will have to address several chronic problems in the future. Strategies for streamlining the economy include improvements of infrastructure, more efficient tax systems to bolster government revenues, furthering deregulation and privatization of the economy, and increasing trade integration within the region and across the world. The Philippine economy is also heavily reliant on remittances as a source of foreign currency, surpassing even foreign direct investment. China and India have emerged as major economic competitors, siphoning away investors who would otherwise have invested in the Philippines, particularly telecommunications companies.

Regional development is also somewhat uneven, with Luzon and Metro Manila in particular gaining most of the new economic growth at the expense of the other regions, although the government has taken steps to distribute economic growth by promoting investment in other areas of the Philippines.

The Philippines is a founding member of the Asian Development Bank, playing home to its headquarters. It is also a member of the World Bank, the IMF, the Asia Pacific Economic Cooperation (APEC), the World Trade Organization (WTO), the Colombo Plan, and the G-77, among others.

Economy of Thailand

Thailand is a newly industrialized country. After enjoying the world's highest growth rate from 1985 to 1996 - averaging almost 9% annually - increased pressure on Thailand's currency, the baht, in 1997, the year in which the economy contracted by 1.9% led to a crisis that uncovered financial sector weaknesses and forced the government to float the currency. Pegged at 25 to the US dollar from 1978 to 1997, the baht reached its lowest point of 56 to the US dollar in January 1998 and the economy contracted by 10.8% that same year. The collapse prompted a wider Asian financial crisis.

Thailand entered a recovery stage in 1998, expanding 4.2% and 4.4% in 2000, largely due to strong exports - which increased about 20% in 2000. Growth (2.2%) was dampened by a softening of the global economy in 2001, but picked up in the subsequent years due to strong growth in the People's Republic of China, a relatively weak baht encouraging exports and increasing domestic spending as a result of several mega projects and incentives of Prime Minister Thaksin Shinawatra, known as Thaksinomics. Growth in 2002/03 and 2004 was 5-7% annually. Growth in 2007 is 4.7% due to the higher growth rate of 5.7% in the fourth quarter of the year. Due both to the weakening of the US dollar and an increasingly strong Thai currency, by March 2008, the dollar was hovering around the 30 baht mark.

Thailand exports over $105 billion worth of products annually. Major exports include rice, textiles and footwear, fishery products, rubber, jewelry, automobiles, computers and electrical appliances. Thailand is the world’s no.1 exporter of rice, exporting 6.5 million tons of milled rice annually. Rice is the most important crop in the country. Thailand has the highest percent of arable land, 27.25%, of any nation in the Greater Mekong Subregion. About 55% of the available land area is used for rice production.

Substantial industries include electric appliances, components, computer parts and automobiles, while tourism contributes about 5% of the Thai economy's GDP.

Thailand uses the metric system but traditional units of measurement and imperial measure (feet, inches) are still much in use, particularly for agriculture and building materials. Years are numbered as B.E. (Buddhist Era) in education, the civil service, government, and on contracts and newspaper datelines; in banking, however, and increasingly in industry and commerce, standard Western year (Christian or Common Era) counting prevails.

Economy of USA

The United States has a capitalist mixed economy, which is fueled by abundant natural resources, a well-developed infrastructure, and high productivity. According to the International Monetary Fund, the United States GDP of more than $13 trillion constitutes over 25.5% of the gross world product at market exchange rates and over 19% of the gross world product at purchasing power parity (PPP). The largest national GDP in the world, it was slightly less than the combined GDP of the European Union at PPP in 2006. The country ranks eighth in the world in nominal GDP per capita and fourth in GDP per capita at PPP. The United States is the largest importer of goods and third largest exporter, though exports per capita are relatively low. Canada, China, Mexico, Japan, and Germany are its top trading partners. The leading export commodity is electrical machinery, while vehicles constitute the leading import.

The private sector constitutes the bulk of the economy, with government activity accounting for 12.4% of GDP. The economy is postindustrial, with the service sector contributing 67.8% of GDP. The leading business field by gross business receipts is wholesale and retail trade; by net income it is finance and insurance. The United States remains an industrial power, with chemical products the leading manufacturing field. The United States is the third largest producer of oil in the world. It is the world's number one producer of electrical and nuclear energy, as well as liquid natural gas, sulfur, phosphates, and salt. While agriculture accounts for just less than 1% of GDP, the United States is the world's top producer of cornand soybeans. The country's leading cash crop is marijuana, despite federal laws making its cultivation and sale illegal. The New York Stock Exchange is the world's largest by dollar volume. Coca-Cola and McDonald's are the two most recognized brands in the world.

In 2005, 155 million persons were employed with earnings, of which 80% worked in full-time jobs. The majority, 79%, were employed in the service sector. With approximately 15.5 million people, health care and social assistance is the leading field of employment. About 12% of American workers are unionized, compared to 30% in Western Europe. The U.S. ranks number one in the ease of hiring and firing workers, according to the World Bank. Between 1973 and 2003, a year's work for the average American grew by 199 hours. Partly as a result, the United States maintains the highest labor productivity in the world. However, it no longer leads the world in productivity per hour as it did from the 1950s through the early 1990s; workers in Norway, France, Belgium, and Luxembourg are now more productive per hour. The United States ranks third in the World Bank's Ease of Doing Business Index. Compared to Europe, U.S. property and corporate income taxes are generally higher, while labor and, particularly, consumption taxes are lower.

Appendix C

Unit root tests

The Augmented Dickey Fuller test (results from EVIEWS)

Null Hypothesis: Japan has a unit root

Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=30)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-107.5185	0.0001
Test critical values:	1% level	-3.430741	
	5% level	-2.861597	
	10% level	-2.566842	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: Malaysia has a unit root

Exogenous: Constant
Lag Length: 4 (Automatic based on SIC, MAXLAG=30)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-36.36482	0.0000
Test critical values:	1% level	-3.431058	
	5% level	-2.861738	
	10% level	-2.566917	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: USA has a unit root

Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=30)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-101.7973	0.0001
Test critical values:	1% level	-3.430741	
	5% level	-2.861597	
	10% level	-2.566842	

Null Hypothesis: India has a unit root

Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=30)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-80.06680	0.0001
Test critical values:	1% level	-3.431035	
	5% level	-2.861727	
	10% level	-2.566911	

Null Hypothesis: Pakistan has a unit root

Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=30)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-65.06368	0.0001
Test critical values:	1% level	-3.431466	
	5% level	-2.861918	
	10% level	-2.567014	

Null Hypothesis: Philippines has a unit root

Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=30)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-55.23392	0.0001
Test critical values:	1% level	-3.431702	
	5% level	-2.862022	
	10% level	-2.567070	

Null Hypothesis: Thailand has a unit root

Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=30)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-58.22801	0.0001
Test critical values:	1% level	-3.431702	
	5% level	-2.862022	
	10% level	-2.567070	

Appendix D

Granger Cause Test - For pre-liberalization period

USA – JAPAN

VAR Granger Causality/Block Exogeneity Wald Tests

Dependent variable: R3

Excluded	Chi-sq	df	Prob.
R1	7.889894	3	0.0483
All	7.889894	3	0.0483

Dependent variable: R1

Excluded	Chi-sq	df	Prob.
R3	132.6412	3	0.0000
All	132.6412	3	0.0000

USA – MALAYSIA

VAR Granger Causality/Block Exogeneity Wald Tests

Dependent variable: R3

Excluded	Chi-sq	df	Prob.
R2	7.164807	9	0.6200
All	7.164807	9	0.6200

Dependent variable: R2

Excluded	Chi-sq	df	Prob.
R3	354.3959	9	0.0000
All	354.3959	9	0.0000

USA – INDIA

VAR Granger Causality/Block Exogeneity Wald Tests

Dependent variable: R3

Excluded	Chi-sq	df	Prob.
R4	9.458457	5	0.0921
All	9.458457	5	0.0921

Dependent variable: R4

Excluded	Chi-sq	df	Prob.
R3	9.405492	5	0.0939
All	9.405492	5	0.0939

USA – PAKISTAN

VAR Granger Causality/Block Exogeneity Wald Tests

Dependent variable: R3

Excluded	Chi-sq	df	Prob.
R5	2.566509	3	0.4634
All	2.566509	3	0.4634

Dependent variable: R5

Excluded	Chi-sq	df	Prob.
R3	1.368681	3	0.7129
All	1.368681	3	0.7129

JAPAN - MALAYSIA

VAR Granger Causality/Block Exogeneity Wald Tests

Dependent variable: R1

Excluded	Chi-sq	df	Prob.
R2	0.040109	1	0.8413
All	0.040109	1	0.8413

Dependent variable: R2

Excluded	Chi-sq	df	Prob.
R1	7.324696	1	0.0068
All	7.324696	1	0.0068

JAPAN – PAKISTAN

VAR Granger Causality/Block Exogeneity Wald Tests

Dependent variable: R1

Excluded	Chi-sq	df	Prob.
R5	11.99843	10	0.2852
All	11.99843	10	0.2852

Dependent variable: R5

Excluded	Chi-sq	df	Prob.
R1	4.516750	10	0.9210
All	4.516750	10	0.9210

MALAYSIA – PAKISTAN

VAR Granger Causality/Block Exogeneity Wald Tests

Dependent variable: R2

Excluded	Chi-sq	df	Prob.
R5	0.168896	3	0.9824
All	0.168896	3	0.9824

Dependent variable: R5

Excluded	Chi-sq	df	Prob.
R2	1.555447	3	0.6695
All	1.555447	3	0.6695

INDIA – MALAYSIA

VAR Granger Causality/Block Exogeneity Wald Tests

Dependent variable: R4

Excluded	Chi-sq	df	Prob.
R2	1.007739	1	0.3154
All	1.007739	1	0.3154

Dependent variable: R2

Excluded	Chi-sq	df	Prob.
R4	0.363572	1	0.5465
All	0.363572	1	0.5465

INDIA – PAKISTAN

VAR Granger Causality/Block Exogeneity Wald Tests

Dependent variable: R4

Excluded	Chi-sq	df	Prob.
R5	0.620061	2	0.7334
All	0.620061	2	0.7334

Dependent variable: R5

Excluded	Chi-sq	df	Prob.
R4	0.239044	2	0.8873
All	0.239044	2	0.8873

Granger Cause Test - For post-liberalization period

USA – JAPAN

VAR Granger Causality/Block Exogeneity Wald Tests

Dependent variable: R3

Excluded	Chi-sq	df	Prob.
R1	11.55674	7	0.1161
All	11.55674	7	0.1161

Dependent variable: R1

Excluded	Chi-sq	df	Prob.
R3	953.6441	7	0.0000
All	953.6441	7	0.0000

USA – MALAYSIA

VAR Granger Causality/Block Exogeneity Wald Tests

Dependent variable: R3

Excluded	Chi-sq	df	Prob.
R2	4.098599	7	0.7684
All	4.098599	7	0.7684

Dependent variable: R2

Excluded	Chi-sq	df	Prob.
R3	371.7232	7	0.0000
All	371.7232	7	0.0000

USA – INDIA

VAR Granger Causality/Block Exogeneity Wald Tests

Dependent variable: R3

Excluded	Chi-sq	df	Prob.
R4	15.31492	13	0.2881
All	15.31492	13	0.2881

Dependent variable: R4

Excluded	Chi-sq	df	Prob.
R3	134.3398	13	0.0000
All	134.3398	13	0.0000

USA – PAKISTAN

VAR Granger Causality/Block Exogeneity Wald Tests

Dependent variable: R3

Excluded	Chi-sq	df	Prob.
R5	11.70352	12	0.4698
All	11.70352	12	0.4698

Dependent variable: R5

Excluded	Chi-sq	df	Prob.
R3	32.43861	12	0.0012
All	32.43861	12	0.0012

USA – PHILIPPINES

VAR Granger Causality/Block Exogeneity Wald Tests

Dependent variable: R3

Excluded	Chi-sq	df	Prob.
R6	14.14299	13	0.3639
All	14.14299	13	0.3639

Dependent variable: R6

Excluded	Chi-sq	df	Prob.
R3	355.9307	13	0.0000
All	355.9307	13	0.0000

USA – THAILAND

VAR Granger Causality/Block Exogeneity Wald Tests

Dependent variable: R3

Excluded	Chi-sq	df	Prob.
R7	5.529505	13	0.9616
All	5.529505	13	0.9616

Dependent variable: R7

Excluded	Chi-sq	df	Prob.
R3	203.9033	13	0.0000
All	203.9033	13	0.0000

JAPAN – MALAYSIA

VAR Granger Causality/Block Exogeneity Wald Tests

Dependent variable: R1

Excluded	Chi-sq	df	Prob.
R2	26.56449	12	0.0089
All	26.56449	12	0.0089

Dependent variable: R2

Excluded	Chi-sq	df	Prob.
R1	36.72651	12	0.0002
All	36.72651	12	0.0002

JAPAN – INDIA

VAR Granger Causality/Block Exogeneity Wald Tests

Dependent variable: R1

Excluded	Chi-sq	df	Prob.
R4	31.21886	10	0.0005
All	31.21886	10	0.0005

Dependent variable: R4

Excluded	Chi-sq	df	Prob.
R1	11.35939	10	0.3302
All	11.35939	10	0.3302

JAPAN – PAKISTAN

VAR Granger Causality/Block Exogeneity Wald Tests

Dependent variable: R1

Excluded	Chi-sq	df	Prob.
R5	5.987538	3	0.1122
All	5.987538	3	0.1122

Dependent variable: R5

Excluded	Chi-sq	df	Prob.
R1	5.342054	3	0.1484
All	5.342054	3	0.1484

JAPAN – PHILIPPINES

VAR Granger Causality/Block Exogeneity Wald Tests

Dependent variable: R1

Excluded	Chi-sq	df	Prob.
R6	0.891069	1	0.3452
All	0.891069	1	0.3452

Dependent variable: R6

Excluded	Chi-sq	df	Prob.
R1	11.67352	1	0.0006
All	11.67352	1	0.0006

JAPAN – THAILAND

VAR Granger Causality/Block Exogeneity Wald Tests

Dependent variable: R1

Excluded	Chi-sq	df	Prob.
R7	4.321193	2	0.1153
All	4.321193	2	0.1153

Dependent variable: R7

Excluded	Chi-sq	df	Prob.
R1	4.566026	2	0.1020
All	4.566026	2	0.1020

MALAYSIA – PAKISTAN

VAR Granger Causality/Block Exogeneity Wald Tests

Dependent variable: R2

Excluded	Chi-sq	df	Prob.
R5	69.33199	30	0.0001
All	69.33199	30	0.0001

Dependent variable: R5

Excluded	Chi-sq	df	Prob.
R2	77.03380	30	0.0000
All	77.03380	30	0.0000

MALAYSIA – PHILIPPINES

VAR Granger Causality/Block Exogeneity Wald Tests

Dependent variable: R2

Excluded	Chi-sq	df	Prob.
R6	37.29875	15	0.0011
All	37.29875	15	0.0011

Dependent variable: R6

Excluded	Chi-sq	df	Prob.
R2	110.4281	15	0.0000
All	110.4281	15	0.0000

MALAYSIA – THAILAND

VAR Granger Causality/Block Exogeneity Wald Tests

Dependent variable: R2

Excluded	Chi-sq	df	Prob.
R7	42.15211	15	0.0002
All	42.15211	15	0.0002

Dependent variable: R7

Excluded	Chi-sq	df	Prob.
R2	30.89352	15	0.0091
All	30.89352	15	0.0091

PAKISTAN – PHILIPPINES

VAR Granger Causality/Block Exogeneity Wald Tests

Dependent variable: R5

Excluded	Chi-sq	df	Prob.
R6	1.163812	1	0.2807
All	1.163812	1	0.2807

Dependent variable: R6

Excluded	Chi-sq	df	Prob.
R5	0.342876	1	0.5582
All	0.342876	1	0.5582

PAKISTAN – THAILAND

VAR Granger Causality/Block Exogeneity Wald Tests

Dependent variable: R5

Excluded	Chi-sq	df	Prob.
R7	35.10137	13	0.0008
All	35.10137	13	0.0008

Dependent variable: R7

Excluded	Chi-sq	df	Prob.
R5	17.94907	13	0.1595
All	17.94907	13	0.1595

PHILIPPINES – THAILAND

VAR Granger Causality/Block Exogeneity Wald Tests

Dependent variable: R6

Excluded	Chi-sq	df	Prob.
R7	117.7924	13	0.0000
All	117.7924	13	0.0000

Dependent variable: R7

Excluded	Chi-sq	df	Prob.
R6	26.66445	13	0.0138
All	26.66445	13	0.0138

INDIA – MALAYSIA

VAR Granger Causality/Block Exogeneity Wald Tests

Dependent variable: R4

Excluded	Chi-sq	df	Prob.
R2	10.19420	6	0.1167
All	10.19420	6	0.1167

Dependent variable: R2

Excluded	Chi-sq	df	Prob.
R4	20.38603	6	0.0024
All	20.38603	6	0.0024

INDIA – PAKISTAN

VAR Granger Causality/Block Exogeneity Wald Tests

Dependent variable: R4

Excluded	Chi-sq	df	Prob.
R5	14.46648	12	0.2719
All	14.46648	12	0.2719

Dependent variable: R5

Excluded	Chi-sq	df	Prob.
R4	42.76537	12	0.0000
All	42.76537	12	0.0000

INDIA – PHILIPPINES

VAR Granger Causality/Block Exogeneity Wald Tests

Dependent variable: R4

Excluded	Chi-sq	df	Prob.
R6	10.21908	4	0.0369
All	10.21908	4	0.0369

Dependent variable: R6

Excluded	Chi-sq	df	Prob.
R4	11.06602	4	0.0258
All	11.06602	4	0.0258

INDIA – THAILAND

VAR Granger Causality/Block Exogeneity Wald Tests

Dependent variable: R4

Excluded	Chi-sq	df	Prob.
R7	21.21087	13	0.0689
All	21.21087	13	0.0689

Dependent variable: R7

Excluded	Chi-sq	df	Prob.
R4	25.27724	13	0.0212
All	25.27724	13	0.0212

Appendix E

Vector Autoregession Estimations

The numbers of t-statistics, which are highlighted, are those, which reject the null hypothesis that coefficient is zero. As such relative coefficient is significant at the level of 5%.

Pre – liberalization period

USA- JAPAN

Standard errors in ( ) & t-statistics in [ ]

	R3	R1
R3(-1)	0.174993	0.024023
	(0.01394)	(0.01475)
	[12.5513]	[1.62920]
R3(-2)	-0.017024	0.155272
	(0.01416)	(0.01497)
	[-1.20254]	[10.3705]
R3(-3)	0.005505	0.026410
	(0.01411)	(0.01493)
	[0.39001]	[1.76924]
R1(-1)	0.026611	0.025944
	(0.01317)	(0.01393)
	[2.01985]	[1.86193]
R1(-2)	-0.005574	0.041617
	(0.01303)	(0.01378)
	[-0.42788]	[3.02050]
R1(-3)	-0.025894	0.035823
	(0.01302)	(0.01377)
	[-1.98926]	[2.60206]
C	0.000130	0.000322
	(0.00011)	(0.00012)
	[1.16574]	[2.73744]

USA – MALAYSIA

Standard errors in ( ) & t-statistics in [ ]

	R3	R2
R3(-1)	0.053372	0.142644
	(0.02099)	(0.02580)
	[2.54254]	[5.52896]
R3(-2)	-0.044155	0.392617
	(0.02117)	(0.02601)
	[-2.08617]	[15.0933]
R3(-3)	-0.001258	0.122105
	(0.02220)	(0.02728)
	[-0.05669]	[4.47580]
R3(-4)	-0.038309	-0.070632
	(0.02228)	(0.02738)
	[-1.71952]	[-2.57956]
R3(-5)	0.046456	0.086456
	(0.02231)	(0.02743)
	[2.08183]	[3.15239]
R3(-6)	-0.001408	0.043471
	(0.02236)	(0.02749)
	[-0.06294]	[1.58159]
R3(-7)	0.011224	0.027613
	(0.02236)	(0.02748)
	[0.50205]	[1.00493]
R3(-8)	0.010031	0.163592
	(0.02237)	(0.02749)
	[0.44848]	[5.95092]
R3(-9)	0.004276	-0.026511
	(0.02251)	(0.02766)
	[0.19000]	[-0.95836]
R2(-1)	-0.023268	0.124010
	(0.01704)	(0.02094)
	[-1.36547]	[5.92142]
R2(-2)	0.005892	-0.001822
	(0.01704)	(0.02094)
	[0.34582]	[-0.08699]
R2(-3)	-0.009496	0.015712
	(0.01704)	(0.02094)
	[-0.55739]	[0.75038]
R2(-4)	0.021718	0.003816
	(0.01702)	(0.02092)
	[1.27601]	[0.18243]
R2(-5)	-0.016439	0.003797

	(0.01699)	(0.02088)
	[-0.96739]	[0.18183]
R2(-6)	-0.010844	0.004984
	(0.01695)	(0.02083)
	[-0.63973]	[0.23923]
R2(-7)	-0.022656	0.008416
	(0.01686)	(0.02072)
	[-1.34393]	[0.40620]
R2(-8)	0.008915	-0.021744
	(0.01620)	(0.01991)
	[0.55034]	[-1.09213]
R2(-9)	0.005556	0.059432
	(0.01593)	(0.01957)
	[0.34890]	[3.03638]
C	0.000394	-0.000195
	(0.00023)	(0.00029)
	[1.68302]	[-0.67970]

USA – INDIA

Standard errors in ( ) & t-statistics in [ ]

	R3	R4
R3(-1)	0.053438	-0.010973
	(0.01687)	(0.02548)
	[3.16759]	[-0.43056]
R3(-2)	-0.038962	-0.003304
	(0.01687)	(0.02548)
	[-2.30953]	[-0.12966]
R3(-3)	-0.015670	-0.028104
	(0.01688)	(0.02550)
	[-0.92820]	[-1.10202]
R3(-4)	-0.038035	0.072578
	(0.01688)	(0.02549)
	[-2.25387]	[2.84705]
R3(-5)	0.047343	-0.013684
	(0.01687)	(0.02549)
	[2.80561]	[-0.53680]
R4(-1)	-0.019312	0.085788
	(0.01118)	(0.01689)
	[-1.72691]	[5.07819]
R4(-2)	0.007436	-0.027954
	(0.01121)	(0.01694)
	[0.66321]	[-1.65037]
R4(-3)	0.002091	0.017955

	(0.01121)	(0.01694)
	[0.18648]	[1.05996]
R4(-4)	-0.024755	-0.020913
	(0.01121)	(0.01694)
	[-2.20769]	[-1.23460]
R4(-5)	-0.010149	0.014238
	(0.01118)	(0.01689)
	[-0.90760]	[0.84286]
C	0.000439	0.000853
	(0.00017)	(0.00026)
	[2.52153]	[3.24564]

USA – PAKISTAN

Standard errors in ( ) & t-statistics in [ ]

	R3	R5
R3(-1)	0.033333	0.018295
	(0.03650)	(0.03365)
	[0.91327]	[0.54369]
R3(-2)	0.004382	0.023805
	(0.03644)	(0.03360)
	[0.12023]	[0.70846]
R3(-3)	-0.040256	-0.025597
	(0.03638)	(0.03354)
	[-1.10661]	[-0.76320]
R5(-1)	-0.033384	0.173620
	(0.03942)	(0.03634)
	[-0.84693]	[4.77734]
R5(-2)	-0.025571	0.081321
	(0.03996)	(0.03684)
	[-0.63988]	[2.20717]
R5(-3)	-0.033423	0.111289
	(0.03976)	(0.03665)
	[-0.84067]	[3.03613]
C	0.000485	0.000718
	(0.00033)	(0.00031)
	[1.45226]	[2.33357]

JAPAN – MALAYSIA

Standard errors in ( ) & t-statistics in [ ]

	R1	R2
R1(-1)	0.043227	0.178796

	(0.03263)	(0.06606)
	[1.32457]	[2.70642]
R2(-1)	0.003158	0.177189
	(0.01577)	(0.03192)
	[0.20027]	[5.55026]
C	0.000353	0.000489
	(0.00021)	(0.00043)
	[1.67729]	[1.14953]

JAPAN – INDIA

Standard errors in ( ) & t-statistics in [ ]

	R1	R4
C	0.000381	0.000550
	(0.00019)	(0.00029)
	[2.03280]	[1.90653]

JAPAN – PAKISTAN

Standard errors in ( ) & t-statistics in [ ]

	R1	R5
R1(-1)	0.061241	-0.011692
	(0.03683)	(0.02246)
	[1.66297]	[-0.52058]
R1(-2)	-0.127012	0.021681
	(0.03642)	(0.02221)
	[-3.48786]	[0.97622]
R1(-3)	-0.006229	-0.011843
	(0.03672)	(0.02240)
	[-0.16961]	[-0.52876]
R1(-4)	0.028388	0.015374
	(0.03661)	(0.02233)
	[0.77548]	[0.68862]
R1(-5)	-0.076457	-0.004159
	(0.03657)	(0.02230)
	[-2.09095]	[-0.18650]
R1(-6)	-0.004178	-0.029933
	(0.03654)	(0.02228)
	[-0.11435]	[-1.34322]
R1(-7)	0.004011	-0.015395
	(0.03657)	(0.02231)
	[0.10967]	[-0.69017]
R1(-8)	0.008082	-0.003362
	(0.03658)	(0.02231)

	[0.22093]	[-0.15067]
R1(-9)	0.162484	-0.003250
	(0.03634)	(0.02217)
	[4.47064]	[-0.14662]
R1(-10)	0.099241	0.011304
	(0.03676)	(0.02242)
	[2.69967]	[0.50422]
R5(-1)	0.004385	0.161810
	(0.06073)	(0.03704)
	[0.07221]	[4.36871]
R5(-2)	0.000929	0.068578
	(0.06151)	(0.03751)
	[0.01510]	[1.82820]
R5(-3)	-0.006081	0.097310
	(0.06191)	(0.03776)
	[-0.09822]	[2.57712]
R5(-4)	-0.051380	0.047195
	(0.06219)	(0.03793)
	[-0.82614]	[1.24425]
R5(-5)	0.067793	0.057436
	(0.06219)	(0.03793)
	[1.09003]	[1.51423]
R5(-6)	0.102974	-0.022488
	(0.06211)	(0.03788)
	[1.65782]	[-0.59364]
R5(-7)	-0.139258	0.022917
	(0.06406)	(0.03907)
	[-2.17404]	[0.58662]
R5(-8)	-0.020233	-0.029135
	(0.06414)	(0.03911)
	[-0.31547]	[-0.74486]
R5(-9)	-0.007322	0.067808
	(0.06691)	(0.04081)
	[-0.10942]	[1.66161]
R5(-10)	-0.098900	0.067904
	(0.06685)	(0.04077)
	[-1.47951]	[1.66560]
C	-0.000242	0.000561
	(0.00052)	(0.00031)
	[-0.46907]	[1.78219]

MALAYSIA – PAKISTAN

Standard errors in ( ) & t-statistics in [ ]

	R2	R5
R2(-1)	0.103208	-0.017826

	(0.03638)	(0.02407)
	[2.83664]	[-0.74051]
R2(-2)	0.107459	0.016464
	(0.03638)	(0.02407)
	[2.95391]	[0.68404]
R2(-3)	-0.094708	0.019062
	(0.03640)	(0.02409)
	[-2.60154]	[0.79141]
R5(-1)	0.018159	0.173618
	(0.05493)	(0.03634)
	[0.33059]	[4.77719]
R5(-2)	0.004856	0.081278
	(0.05566)	(0.03683)
	[0.08725]	[2.20706]
R5(-3)	-0.013747	0.108980
	(0.05532)	(0.03660)
	[-0.24849]	[2.97739]
C	0.000454	0.000718
	(0.00046)	(0.00031)
	[0.97672]	[2.33434]

INDIA – MALAYSIA

Standard errors in ( ) & t-statistics in [ ]

	R4	R2
R4(-1)	0.083934	0.009135
	(0.01730)	(0.01515)
	[4.85159]	[0.60297]
R2(-1)	0.019624	0.164138
	(0.01955)	(0.01712)
	[1.00386]	[9.58842]
C	0.000912	0.000262
	(0.00027)	(0.00024)
	[3.33433]	[1.09418]

INDIA – PAKISTAN

Standard errors in ( ) & t-statistics in [ ]

	R4	R5
R4(-1)	0.089186	-0.000326
	(0.03206)	(0.01467)
	[2.78175]	[-0.02222]
R4(-2)	-0.060750	0.007168
	(0.03206)	(0.01467)

	[-1.89492]	[0.48854]
R5(-1)	-0.043013	0.260522
	(0.06981)	(0.03195)
	[-0.61617]	[8.15416]
R5(-2)	0.045236	0.098528
	(0.06983)	(0.03196)
	[0.64782]	[3.08294]
C	0.001602	0.000482
	(0.00070)	(0.00032)
	[2.30255]	[1.51553]

Post - liberalization period

USA –JAPAN

Standard errors in ( ) & t-statistics in [ ]

	R3	R1
R3(-1)	-0.005383	0.143059
	(0.01250)	(0.01505)
	[-0.43069]	[9.50674]
R3(-2)	-0.037121	0.442762
	(0.01258)	(0.01515)
	[-2.94972]	[29.2220]
R3(-3)	-0.033295	0.059750
	(0.01340)	(0.01613)
	[-2.48506]	[3.70406]
R3(-4)	-0.036089	0.024139
	(0.01340)	(0.01614)
	[-2.69284]	[1.49596]
R3(-5)	0.010384	0.035584
	(0.01340)	(0.01613)
	[0.77487]	[2.20541]
R3(-6)	-0.017595	0.045824
	(0.01340)	(0.01613)
	[-1.31319]	[2.84053]
R3(-7)	-0.020711	-0.008564
	(0.01339)	(0.01612)
	[-1.54691]	[-0.53125]
R1(-1)	0.003200	-0.063172
	(0.01039)	(0.01251)
	[0.30804]	[-5.05120]
R1(-2)	0.007114	-0.046247
	(0.01040)	(0.01252)
	[0.68403]	[-3.69336]
R1(-3)	0.010727	-0.008138

	(0.01041)	(0.01253)
	[1.03061]	[-0.64936]
R1(-4)	-0.015106	-0.002644
	(0.01041)	(0.01253)
	[-1.45150]	[-0.21101]
R1(-5)	-0.004491	-0.008715
	(0.01040)	(0.01252)
	[-0.43190]	[-0.69606]
R1(-6)	-0.007271	-0.012692
	(0.00977)	(0.01176)
	[-0.74431]	[-1.07906]
R1(-7)	-0.025924	0.009226
	(0.00970)	(0.01168)
	[-2.67339]	[0.79023]
C	0.000378	-0.000176
	(0.00013)	(0.00015)
	[2.93272]	[-1.13742]

USA – MALAYSIA

Standard errors in ( ) & t-statistics in [ ]

	R3	R2
R3(-1)	-0.022562	0.036894
	(0.01403)	(0.01985)
	[-1.60793]	[1.85829]
R3(-2)	-0.017992	0.377294
	(0.01403)	(0.01985)
	[-1.28281]	[19.0118]
R3(-3)	-0.036794	0.008759
	(0.01452)	(0.02054)
	[-2.53475]	[0.42648]
R3(-4)	-0.022835	0.053764
	(0.01452)	(0.02055)
	[-1.57248]	[2.61658]
R3(-5)	-0.015608	0.048184
	(0.01452)	(0.02055)
	[-1.07490]	[2.34521]
R3(-6)	-0.035042	-0.005678
	(0.01452)	(0.02055)
	[-2.41274]	[-0.27632]
R3(-7)	-0.038607	0.019186
	(0.01452)	(0.02055)
	[-2.65842]	[0.93372]
R2(-1)	0.007220	0.065446

	(0.00992)	(0.01404)
	[0.72757]	[4.66121]
R2(-2)	-0.002803	0.019165
	(0.00993)	(0.01405)
	[-0.28224]	[1.36365]
R2(-3)	0.003273	0.010320
	(0.00991)	(0.01403)
	[0.33024]	[0.73582]
R2(-4)	0.004678	-0.075080
	(0.00988)	(0.01398)
	[0.47364]	[-5.37244]
R2(-5)	-0.004615	0.053899
	(0.00990)	(0.01401)
	[-0.46602]	[3.84681]
R2(-6)	0.015132	-0.047265
	(0.00959)	(0.01357)
	[1.57739]	[-3.48222]
R2(-7)	-0.004679	-0.003175
	(0.00958)	(0.01356)
	[-0.48839]	[-0.23421]
C	0.000370	8.16E-05
	(0.00014)	(0.00019)
	[2.69148]	[0.41956]

USA – INDIA

Standard errors in ( ) & t-statistics in [ ]

	R3	R4
R3(-1)	-0.031736	0.087589
	(0.01572)	(0.02415)
	[-2.01905]	[3.62613]
R3(-2)	-0.023384	0.223898
	(0.01575)	(0.02420)
	[-1.48491]	[9.25185]
R3(-3)	-0.039095	0.056032
	(0.01590)	(0.02444)
	[-2.45822]	[2.29263]
R3(-4)	-0.024078	0.102936
	(0.01592)	(0.02447)
	[-1.51238]	[4.20731]
R3(-5)	-0.024524	0.053043
	(0.01595)	(0.02452)
	[-1.53712]	[2.16340]
R3(-6)	-0.028816	0.024174
	(0.01597)	(0.02453)

	[-1.80491]	[0.98528]
R3(-7)	-0.034313	-0.000678
	(0.01596)	(0.02453)
	[-2.14960]	[-0.02762]
R3(-8)	0.000600	0.030330
	(0.01596)	(0.02453)
	[0.03760]	[1.23653]
R3(-9)	-0.001529	0.019823
	(0.01596)	(0.02453)
	[-0.09579]	[0.80798]
R3(-10)	0.030580	0.034823
	(0.01595)	(0.02451)
	[1.91697]	[1.42049]
R3(-11)	-0.023161	0.036664
	(0.01595)	(0.02451)
	[-1.45197]	[1.49569]
R3(-12)	0.022163	-0.007610
	(0.01594)	(0.02450)
	[1.39000]	[-0.31056]
R3(-13)	0.047050	0.095570
	(0.01593)	(0.02448)
	[2.95402]	[3.90455]
R4(-1)	0.019132	0.069716
	(0.01022)	(0.01571)
	[1.87184]	[4.43850]
R4(-2)	-0.008367	-0.020989
	(0.01025)	(0.01575)
	[-0.81641]	[-1.33262]
R4(-3)	0.005895	-0.008236
	(0.01025)	(0.01575)
	[0.57529]	[-0.52302]
R4(-4)	-0.019686	0.031686
	(0.01023)	(0.01573)
	[-1.92357]	[2.01468]
R4(-5)	0.005428	-0.018832
	(0.01024)	(0.01574)
	[0.53009]	[-1.19663]
R4(-6)	-0.000136	-0.040158
	(0.01023)	(0.01573)
	[-0.01330]	[-2.55329]
R4(-7)	-0.003249	-0.011294
	(0.01024)	(0.01574)
	[-0.31721]	[-0.71753]
R4(-8)	-0.000740	0.000243
	(0.01024)	(0.01573)
	[-0.07227]	[0.01543]
R4(-9)	-0.017408	0.014359

	(0.01023)	(0.01572)
	[-1.70177]	[0.91343]
R4(-10)	-0.000462	0.046635
	(0.01020)	(0.01568)
	[-0.04533]	[2.97457]
R4(-11)	-0.018504	-0.034267
	(0.01021)	(0.01569)
	[-1.81224]	[-2.18387]
R4(-12)	-0.009538	-0.017024
	(0.01012)	(0.01556)
	[-0.94228]	[-1.09432]
R4(-13)	0.002755	0.012023
	(0.01008)	(0.01549)
	[0.27324]	[0.77603]
C	0.000352	0.000181
	(0.00016)	(0.00024)
	[2.21116]	[0.73951]

USA – PAKISTAN

Standard errors in ( ) & t-statistics in [ ]

	R3	R5
R3(-1)	-0.030926	0.016208
	(0.01532)	(0.02436)
	[-2.01859]	[0.66529]
R3(-2)	-0.021353	0.097707
	(0.01532)	(0.02436)
	[-1.39409]	[4.01166]
R3(-3)	-0.032570	0.042489
	(0.01534)	(0.02440)
	[-2.12279]	[1.74150]
R3(-4)	-0.023096	0.030582
	(0.01536)	(0.02442)
	[-1.50394]	[1.25236]
R3(-5)	-0.024394	0.047780
	(0.01536)	(0.02443)
	[-1.58799]	[1.95596]
R3(-6)	-0.034581	0.027127
	(0.01536)	(0.02443)
	[-2.25085]	[1.11038]
R3(-7)	-0.032140	0.031292
	(0.01536)	(0.02443)
	[-2.09224]	[1.28103]
R3(-8)	-0.000682	0.005036
	(0.01535)	(0.02441)

	[-0.04442]	[0.20631]
R3(-9)	-0.003822	0.031405
	(0.01535)	(0.02441)
	[-0.24900]	[1.28665]
R3(-10)	0.026096	0.054550
	(0.01531)	(0.02435)
	[1.70406]	[2.24007]
R3(-11)	-0.026884	0.022462
	(0.01533)	(0.02438)
	[-1.75332]	[0.92126]
R3(-12)	0.019175	0.036677
	(0.01533)	(0.02438)
	[1.25071]	[1.50443]
R5(-1)	0.004824	0.070270
	(0.00962)	(0.01530)
	[0.50119]	[4.59146]
R5(-2)	0.004193	0.016659
	(0.00964)	(0.01533)
	[0.43488]	[1.08643]
R5(-3)	0.007110	0.033298
	(0.00963)	(0.01531)
	[0.73829]	[2.17449]
R5(-4)	0.000873	0.024526
	(0.00963)	(0.01531)
	[0.09068]	[1.60197]
R5(-5)	-0.021244	0.003965
	(0.00963)	(0.01531)
	[-2.20629]	[0.25893]
R5(-6)	-0.012642	-0.000204
	(0.00962)	(0.01530)
	[-1.31391]	[-0.01336]
R5(-7)	0.000694	0.022511
	(0.00962)	(0.01530)
	[0.07214]	[1.47111]
R5(-8)	0.003405	0.014635
	(0.00960)	(0.01527)
	[0.35463]	[0.95865]
R5(-9)	0.005861	0.037765
	(0.00960)	(0.01526)
	[0.61081]	[2.47497]
R5(-10)	-0.001355	0.043165
	(0.00959)	(0.01526)
	[-0.14123]	[2.82949]
R5(-11)	-0.018166	-0.024344
	(0.00959)	(0.01525)
	[-1.89430]	[-1.59645]
R5(-12)	0.003624	0.043086

	(0.00957)	(0.01521)
	[0.37881]	[2.83207]
C	0.000374	0.000270
	(0.00015)	(0.00024)
	[2.44215]	[1.10688]

USA – PHILIPPINES

Standard errors in ( ) & t-statistics in [ ]

	R3	R6
R3(-1)	-0.031997	0.074023
	(0.01537)	(0.02169)
	[-2.08118]	[3.41317]
R3(-2)	-0.021733	0.383964
	(0.01540)	(0.02172)
	[-1.41117]	[17.6743]
R3(-3)	-0.036095	0.017284
	(0.01595)	(0.02250)
	[-2.26283]	[0.76814]
R3(-4)	-0.026320	0.050329
	(0.01596)	(0.02251)
	[-1.64927]	[2.23574]
R3(-5)	-0.023191	0.039150
	(0.01597)	(0.02252)
	[-1.45256]	[1.73841]
R3(-6)	-0.030271	0.039721
	(0.01597)	(0.02253)
	[-1.89536]	[1.76309]
R3(-7)	-0.040356	-0.021639
	(0.01597)	(0.02253)
	[-2.52659]	[-0.96038]
R3(-8)	-0.000803	0.073881
	(0.01597)	(0.02253)
	[-0.05031]	[3.27981]
R3(-9)	-0.001808	-0.027759
	(0.01599)	(0.02256)
	[-0.11303]	[-1.23040]
R3(-10)	0.028426	0.056376
	(0.01598)	(0.02255)
	[1.77832]	[2.50025]
R3(-11)	-0.019049	0.016081
	(0.01600)	(0.02257)
	[-1.19061]	[0.71252]
R3(-12)	0.020413	0.048229
	(0.01599)	(0.02256)

	[1.27640]	[2.13784]
R3(-13)	0.047395	0.058289
	(0.01599)	(0.02255)
	[2.96466]	[2.58475]
R6(-1)	-0.001306	0.148451
	(0.01090)	(0.01538)
	[-0.11979]	[9.65509]
R6(-2)	0.009664	-0.005467
	(0.01100)	(0.01552)
	[0.87836]	[-0.35226]
R6(-3)	-0.003691	-0.008335
	(0.01101)	(0.01553)
	[-0.33533]	[-0.53686]
R6(-4)	-0.009594	0.033154
	(0.01099)	(0.01550)
	[-0.87291]	[2.13839]
R6(-5)	0.021201	-0.015600
	(0.01099)	(0.01550)
	[1.92910]	[-1.00630]
R6(-6)	-0.009371	-0.020852
	(0.01098)	(0.01549)
	[-0.85321]	[-1.34586]
R6(-7)	0.000216	0.012235
	(0.01098)	(0.01549)
	[0.01966]	[0.78973]
R6(-8)	-0.003339	-0.007093
	(0.01098)	(0.01549)
	[-0.30411]	[-0.45794]
R6(-9)	-0.019161	0.019077
	(0.01098)	(0.01548)
	[-1.74574]	[1.23215]
R6(-10)	0.009218	0.025685
	(0.01097)	(0.01547)
	[0.84054]	[1.66035]
R6(-11)	-0.020439	-0.003374
	(0.01097)	(0.01548)
	[-1.86302]	[-0.21805]
R6(-12)	0.001702	0.038528
	(0.01061)	(0.01497)
	[0.16039]	[2.57360]
R6(-13)	0.016118	0.032125
	(0.01049)	(0.01479)
	[1.53715]	[2.17186]
C	0.000326	-8.38E-05
	(0.00015)	(0.00022)
	[2.12673]	[-0.38735]

USA – THAILAND

Standard errors in ( ) & t-statistics in [ ]

	R3	R7
R3(-1)	-0.032723	0.095357
	(0.01538)	(0.02614)
	[-2.12733]	[3.64751]
R3(-2)	-0.021263	0.345813
	(0.01541)	(0.02619)
	[-1.37964]	[13.2025]
R3(-3)	-0.034365	0.084153
	(0.01572)	(0.02672)
	[-2.18552]	[3.14897]
R3(-4)	-0.021607	0.074464
	(0.01575)	(0.02676)
	[-1.37227]	[2.78272]
R3(-5)	-0.021613	0.065870
	(0.01576)	(0.02679)
	[-1.37118]	[2.45883]
R3(-6)	-0.034154	-0.019662
	(0.01578)	(0.02681)
	[-2.16499]	[-0.73335]
R3(-7)	-0.029833	-0.001538
	(0.01578)	(0.02682)
	[-1.89061]	[-0.05736]
R3(-8)	-0.002976	0.025970
	(0.01578)	(0.02681)
	[-0.18864]	[0.96860]
R3(-9)	-0.006543	-0.018187
	(0.01578)	(0.02681)
	[-0.41472]	[-0.67826]
R3(-10)	0.025534	0.000548
	(0.01577)	(0.02681)
	[1.61869]	[0.02046]
R3(-11)	-0.026433	-0.012898
	(0.01577)	(0.02680)
	[-1.67602]	[-0.48120]
R3(-12)	0.020907	-0.005556
	(0.01576)	(0.02679)
	[1.32619]	[-0.20739]
R3(-13)	0.041406	0.030600
	(0.01574)	(0.02676)
	[2.63012]	[1.14367]
R7(-1)	9.35E-05	0.086016
	(0.00905)	(0.01537)

	[0.01034]	[5.59538]
R7(-2)	-0.006477	0.018470
	(0.00908)	(0.01543)
	[-0.71350]	[1.19722]
R7(-3)	-0.006804	-0.010423
	(0.00907)	(0.01542)
	[-0.74983]	[-0.67584]
R7(-4)	0.009879	0.008880
	(0.00907)	(0.01541)
	[1.08945]	[0.57623]
R7(-5)	-0.011259	0.023082
	(0.00907)	(0.01541)
	[-1.24153]	[1.49752]
R7(-6)	0.001112	-0.039092
	(0.00906)	(0.01541)
	[0.12266]	[-2.53761]
R7(-7)	0.009217	-0.012035
	(0.00907)	(0.01542)
	[1.01608]	[-0.78070]
R7(-8)	0.001932	0.041749
	(0.00907)	(0.01541)
	[0.21313]	[2.70972]
R7(-9)	0.000566	0.002571
	(0.00906)	(0.01541)
	[0.06245]	[0.16686]
R7(-10)	-0.006018	0.039520
	(0.00906)	(0.01539)
	[-0.66452]	[2.56779]
R7(-11)	-0.000883	0.023925
	(0.00906)	(0.01539)
	[-0.09748]	[1.55451]
R7(-12)	0.003858	-0.000678
	(0.00889)	(0.01512)
	[0.43375]	[-0.04485]
R7(-13)	0.003761	0.050821
	(0.00884)	(0.01503)
	[0.42536]	[3.38206]
C	0.000326	-0.000132
	(0.00015)	(0.00026)
	[2.12619]	[-0.50635]

JAPAN – MALAYSIA

Standard errors in ( ) & t-statistics in [ ]

	R1	R2
R1(-1)	-0.024900	0.023916
	(0.01289)	(0.01421)
	[-1.93121]	[1.68326]
R1(-2)	-0.048253	-0.023227
	(0.01290)	(0.01422)
	[-3.74046]	[-1.63392]
R1(-3)	-0.002344	0.019598
	(0.01291)	(0.01422)
	[-0.18161]	[1.37794]
R1(-4)	0.008029	0.029134
	(0.01291)	(0.01422)
	[0.62209]	[2.04838]
R1(-5)	-0.008044	-0.022636
	(0.01291)	(0.01423)
	[-0.62313]	[-1.59122]
R1(-6)	-0.015433	0.020358
	(0.01291)	(0.01423)
	[-1.19539]	[1.43097]
R1(-7)	0.007552	-0.032244
	(0.01291)	(0.01422)
	[0.58508]	[-2.26695]
R1(-8)	-0.006371	-0.005448
	(0.01291)	(0.01423)
	[-0.49342]	[-0.38286]
R1(-9)	0.018042	0.002379
	(0.01291)	(0.01423)
	[1.39719]	[0.16720]
R1(-10)	0.030239	-0.021458
	(0.01291)	(0.01423)
	[2.34152]	[-1.50781]
R1(-11)	0.014102	0.007643
	(0.01290)	(0.01422)
	[1.09277]	[0.53749]
R1(-12)	0.018500	0.050126
	(0.01290)	(0.01422)
	[1.43359]	[3.52490]
R2(-1)	0.039412	0.089861
	(0.01168)	(0.01288)
	[3.37287]	[6.97879]
R2(-2)	-0.016267	0.022725

	(0.01173)	(0.01293)
	[-1.38673]	[1.75803]
R2(-3)	0.011437	0.017250
	(0.01173)	(0.01293)
	[0.97496]	[1.33443]
R2(-4)	0.003204	-0.067265
	(0.01173)	(0.01293)
	[0.27309]	[-5.20287]
R2(-5)	0.006480	0.070716
	(0.01176)	(0.01296)
	[0.55119]	[5.45850]
R2(-6)	-0.027833	-0.025535
	(0.01178)	(0.01298)
	[-2.36325]	[-1.96751]
R2(-7)	-0.011686	0.003747
	(0.01178)	(0.01298)
	[-0.99203]	[0.28866]
R2(-8)	0.012928	-0.017251
	(0.01175)	(0.01295)
	[1.09989]	[-1.33186]
R2(-9)	0.002764	0.012121
	(0.01173)	(0.01292)
	[0.23572]	[0.93787]
R2(-10)	-0.024834	0.005699
	(0.01173)	(0.01292)
	[-2.11800]	[0.44108]
R2(-11)	-0.002857	0.007128
	(0.01173)	(0.01292)
	[-0.24366]	[0.55161]
R2(-12)	-0.014243	0.023522
	(0.01168)	(0.01287)
	[-1.21988]	[1.82816]
C	6.50E-05	0.000154
	(0.00017)	(0.00018)
	[0.39337]	[0.84671]

JAPAN – INDIA

Standard errors in ( ) & t-statistics in [ ]

	R1	R4
R1(-1)	-0.019751	-0.007409
	(0.01257)	(0.01555)
	[-1.57132]	[-0.47639]
R1(-2)	-0.050969	0.020948
	(0.01257)	(0.01555)
	[-4.05513]	[1.34703]

R1(-3)	-0.000729	0.014426
	(0.01259)	(0.01558)
	[-0.05788]	[0.92616]
R1(-4)	0.010010	0.012475
	(0.01258)	(0.01557)
	[0.79549]	[0.80131]
R1(-5)	-0.003087	0.007759
	(0.01257)	(0.01555)
	[-0.24555]	[0.49886]
R1(-6)	-0.019133	0.017878
	(0.01257)	(0.01555)
	[-1.52250]	[1.14981]
R1(-7)	0.008145	0.000283
	(0.01257)	(0.01555)
	[0.64798]	[0.01820]
R1(-8)	-0.002235	0.002011
	(0.01257)	(0.01555)
	[-0.17781]	[0.12930]
R1(-9)	0.018568	-0.039246
	(0.01255)	(0.01553)
	[1.47911]	[-2.52669]
R1(-10)	0.023144	0.002010
	(0.01256)	(0.01554)
	[1.84272]	[0.12936]
R4(-1)	0.021682	0.086623
	(0.01014)	(0.01255)
	[2.13744]	[6.90167]
R4(-2)	0.001329	-0.018429
	(0.01018)	(0.01259)
	[0.13061]	[-1.46361]
R4(-3)	0.003938	0.007442
	(0.01018)	(0.01259)
	[0.38687]	[0.59091]
R4(-4)	0.018175	0.015210
	(0.01018)	(0.01259)
	[1.78576]	[1.20779]
R4(-5)	-0.018509	-0.008203
	(0.01018)	(0.01259)
	[-1.81876]	[-0.65151]
R4(-6)	-0.029950	-0.031798
	(0.01018)	(0.01259)
	[-2.94224]	[-2.52472]
R4(-7)	-0.026700	-0.022117
	(0.01019)	(0.01261)
	[-2.62044]	[-1.75440]
R4(-8)	-0.011380	0.007395
	(0.01020)	(0.01261)

	[-1.11618]	[0.58623]
R4(-9)	-0.000758	0.019731
	(0.01019)	(0.01261)
	[-0.07440]	[1.56434]
R4(-10)	0.004088	0.061701
	(0.01016)	(0.01257)
	[0.40227]	[4.90727]
C	8.79E-05	0.000589
	(0.00017)	(0.00021)
	[0.52880]	[2.86631]

JAPAN – PAKISTAN

Standard errors in ( ) & t-statistics in [ ]

	R1	R5
R1(-1)	-0.037931	0.030661
	(0.01530)	(0.01730)
	[-2.47946]	[1.77266]
R1(-2)	-0.032406	0.010472
	(0.01530)	(0.01730)
	[-2.11785]	[0.60534]
R1(-3)	-0.000825	0.025245
	(0.01530)	(0.01730)
	[-0.05390]	[1.45915]
R5(-1)	0.015759	0.076174
	(0.01352)	(0.01528)
	[1.16570]	[4.98363]
R5(-2)	-0.016404	0.023232
	(0.01355)	(0.01532)
	[-1.21057]	[1.51637]
R5(-3)	-0.023923	0.042525
	(0.01351)	(0.01528)
	[-1.77043]	[2.78350]
C	-0.000111	0.000497
	(0.00021)	(0.00024)
	[-0.51888]	[2.04931]

JAPAN – PHILIPPINES

Standard errors in ( ) & t-statistics in [ ]

	R1	R6
R1(-1)	-0.039968	0.055371
	(0.01557)	(0.01621)
	[-2.56618]	[3.41665]

R6(-1)	0.013938	0.155099
	(0.01477)	(0.01536)
	[0.94396]	[10.0947]
C	-0.000134	0.000193
	(0.00021)	(0.00022)
	[-0.62564]	[0.86315]

JAPAN – THAILAND

Standard errors in ( ) & t-statistics in [ ]

	R1	R7
R1(-1)	-0.042160	0.010945
	(0.01559)	(0.01928)
	[-2.70508]	[0.56767]
R1(-2)	-0.036662	0.040142
	(0.01559)	(0.01928)
	[-2.35237]	[2.08213]
R7(-1)	0.014008	0.108030
	(0.01261)	(0.01559)
	[1.11125]	[6.92774]
R7(-2)	0.020487	0.023348
	(0.01260)	(0.01559)
	[1.62596]	[1.49796]
C	-0.000139	9.22E-05
	(0.00021)	(0.00027)
	[-0.64985]	[0.34765]

MALAYSIA – PAKISTAN

Standard errors in ( ) & t-statistics in [ ]

	R2	R5
R2(-1)	0.071880	0.014622
	(0.01540)	(0.01666)
	[4.66721]	[0.87752]
R2(-2)	0.017745	0.033506
	(0.01544)	(0.01670)
	[1.14931]	[2.00578]
R2(-3)	0.030210	0.025762
	(0.01544)	(0.01671)
	[1.95655]	[1.54213]
R2(-4)	-0.090608	0.033797
	(0.01545)	(0.01671)
	[-5.86541]	[2.02220]
R2(-5)	0.076773	0.033714

	(0.01551)	(0.01678)
	[4.94932]	[2.00891]
R2(-6)	-0.050059	0.007128
	(0.01555)	(0.01683)
	[-3.21821]	[0.42355]
R2(-7)	-0.008639	-0.013976
	(0.01557)	(0.01685)
	[-0.55472]	[-0.82940]
R2(-8)	-0.007085	0.007028
	(0.01555)	(0.01683)
	[-0.45546]	[0.41764]
R2(-9)	0.018441	-0.010115
	(0.01552)	(0.01679)
	[1.18810]	[-0.60235]
R2(-10)	-0.011868	0.044967
	(0.01551)	(0.01679)
	[-0.76497]	[2.67893]
R2(-11)	0.001558	-0.013513
	(0.01552)	(0.01679)
	[0.10039]	[-0.80493]
R2(-12)	0.019504	-0.015234
	(0.01552)	(0.01679)
	[1.25704]	[-0.90750]
R2(-13)	0.008396	0.029771
	(0.01551)	(0.01678)
	[0.54136]	[1.77432]
R2(-14)	-0.002052	0.026605
	(0.01550)	(0.01677)
	[-0.13234]	[1.58600]
R2(-15)	0.068406	0.019038
	(0.01551)	(0.01678)
	[4.41132]	[1.13476]
R2(-16)	-0.017405	-0.014606
	(0.01551)	(0.01678)
	[-1.12192]	[-0.87024]
R2(-17)	0.009292	0.039591
	(0.01552)	(0.01679)
	[0.59885]	[2.35842]
R2(-18)	0.039689	-0.020789
	(0.01553)	(0.01680)
	[2.55643]	[-1.23767]
R2(-19)	-0.024479	0.030460
	(0.01554)	(0.01681)
	[-1.57573]	[1.81227]
R2(-20)	-0.031463	-0.024182
	(0.01554)	(0.01681)
	[-2.02488]	[-1.43844]

R2(-21)	-0.004171	-0.011052
	(0.01555)	(0.01682)
	[-0.26829]	[-0.65703]
R2(-22)	0.027844	-0.028542
	(0.01555)	(0.01682)
	[1.79102]	[-1.69691]
R2(-23)	0.020587	-0.043282
	(0.01556)	(0.01683)
	[1.32328]	[-2.57147]
R2(-24)	-0.002806	0.028197
	(0.01557)	(0.01685)
	[-0.18020]	[1.67375]
R2(-25)	0.018883	-0.051356
	(0.01554)	(0.01681)
	[1.21497]	[-3.05425]
R2(-26)	0.036716	-0.010033
	(0.01552)	(0.01679)
	[2.36541]	[-0.59744]
R2(-27)	-0.016768	-0.008637
	(0.01546)	(0.01673)
	[-1.08456]	[-0.51636]
R2(-28)	-0.002440	0.035550
	(0.01545)	(0.01672)
	[-0.15788]	[2.12623]
R2(-29)	0.005669	-0.005751
	(0.01546)	(0.01672)
	[0.36682]	[-0.34394]
R2(-30)	-0.011436	0.000883
	(0.01542)	(0.01668)
	[-0.74186]	[0.05297]
R5(-1)	0.023458	0.071659
	(0.01426)	(0.01542)
	[1.64534]	[4.64569]
R5(-2)	-0.003975	0.011099
	(0.01429)	(0.01546)
	[-0.27816]	[0.71785]
R5(-3)	-0.005663	0.034468
	(0.01428)	(0.01545)
	[-0.39667]	[2.23153]
R5(-4)	0.000959	0.021237
	(0.01428)	(0.01545)
	[0.06712]	[1.37440]
R5(-5)	-0.029942	0.006166
	(0.01428)	(0.01545)
	[-2.09667]	[0.39908]
R5(-6)	-0.023340	0.005564
	(0.01427)	(0.01544)

	[-1.63548]	[0.36034]
R5(-7)	0.001614	0.024915
	(0.01426)	(0.01543)
	[0.11317]	[1.61520]
R5(-8)	0.004188	0.022976
	(0.01425)	(0.01542)
	[0.29384]	[1.49000]
R5(-9)	0.001346	0.036008
	(0.01422)	(0.01539)
	[0.09464]	[2.34005]
R5(-10)	0.011483	0.042995
	(0.01423)	(0.01539)
	[0.80701]	[2.79293]
R5(-11)	0.014703	-0.029930
	(0.01424)	(0.01540)
	[1.03270]	[-1.94307]
R5(-12)	-0.003646	0.042736
	(0.01423)	(0.01539)
	[-0.25632]	[2.77663]
R5(-13)	0.004846	-0.007484
	(0.01424)	(0.01540)
	[0.34039]	[-0.48595]
R5(-14)	-0.011671	-0.001045
	(0.01422)	(0.01538)
	[-0.82097]	[-0.06796]
R5(-15)	0.004585	-0.015364
	(0.01421)	(0.01538)
	[0.32258]	[-0.99912]
R5(-16)	-0.006361	0.018303
	(0.01421)	(0.01538)
	[-0.44756]	[1.19026]
R5(-17)	0.013779	-0.036320
	(0.01421)	(0.01538)
	[0.96954]	[-2.36214]
R5(-18)	-0.002135	0.004556
	(0.01422)	(0.01538)
	[-0.15018]	[0.29614]
R5(-19)	9.73E-05	0.033310
	(0.01420)	(0.01537)
	[0.00685]	[2.16772]
R5(-20)	0.027363	0.015249
	(0.01420)	(0.01537)
	[1.92639]	[0.99230]
R5(-21)	0.030001	-0.003508
	(0.01419)	(0.01535)
	[2.11496]	[-0.22857]
R5(-22)	-0.044780	0.006130

	(0.01418)	(0.01534)
	[-3.15742]	[0.39948]
R5(-23)	0.037290	0.001924
	(0.01420)	(0.01536)
	[2.62686]	[0.12525]
R5(-24)	-0.004744	-0.013814
	(0.01420)	(0.01536)
	[-0.33405]	[-0.89912]
R5(-25)	-0.018726	-0.003645
	(0.01420)	(0.01536)
	[-1.31861]	[-0.23726]
R5(-26)	-0.021033	-0.022933
	(0.01420)	(0.01536)
	[-1.48131]	[-1.49282]
R5(-27)	-0.014352	-0.023363
	(0.01419)	(0.01536)
	[-1.01125]	[-1.52147]
R5(-28)	0.029435	-0.030070
	(0.01418)	(0.01535)
	[2.07514]	[-1.95941]
R5(-29)	-0.009230	-0.022144
	(0.01419)	(0.01535)
	[-0.65053]	[-1.44258]
R5(-30)	0.060329	0.034280
	(0.01415)	(0.01531)
	[4.26268]	[2.23870]
C	0.000126	0.000411
	(0.00022)	(0.00024)
	[0.55945]	[1.69164]

MALAYSIA – PHILIPPINES

Standard errors in ( ) & t-statistics in [ ]

	R2	R6
R2(-1)	0.054106	0.115968
	(0.01574)	(0.01550)
	[3.43731]	[7.48326]
R2(-2)	0.001172	0.012906
	(0.01584)	(0.01560)
	[0.07397]	[0.82749]
R2(-3)	0.024490	0.011604
	(0.01584)	(0.01559)
	[1.54625]	[0.74421]
R2(-4)	-0.100630	0.025675
	(0.01584)	(0.01560)

	[-6.35206]	[1.64619]
R2(-5)	0.068576	0.019888
	(0.01592)	(0.01568)
	[4.30651]	[1.26857]
R2(-6)	-0.057378	-0.002737
	(0.01595)	(0.01571)
	[-3.59655]	[-0.17428]
R2(-7)	-0.012902	-0.026237
	(0.01598)	(0.01573)
	[-0.80745]	[-1.66777]
R2(-8)	-0.012816	0.066442
	(0.01598)	(0.01573)
	[-0.80208]	[4.22364]
R2(-9)	0.013602	0.010708
	(0.01601)	(0.01576)
	[0.84950]	[0.67928]
R2(-10)	-0.015164	0.049606
	(0.01599)	(0.01574)
	[-0.94828]	[3.15090]
R2(-11)	-0.011158	0.012060
	(0.01599)	(0.01574)
	[-0.69785]	[0.76609]
R2(-12)	0.004583	-0.012283
	(0.01590)	(0.01566)
	[0.28822]	[-0.78461]
R2(-13)	0.004508	0.046966
	(0.01590)	(0.01565)
	[0.28351]	[3.00024]
R2(-14)	-0.018941	-0.010282
	(0.01591)	(0.01566)
	[-1.19043]	[-0.65635]
R2(-15)	0.058983	0.030622
	(0.01589)	(0.01564)
	[3.71176]	[1.95732]
R6(-1)	0.057963	0.136061
	(0.01601)	(0.01576)
	[3.62102]	[8.63351]
R6(-2)	0.031502	-0.009930
	(0.01615)	(0.01590)
	[1.95064]	[-0.62454]
R6(-3)	0.010473	-0.016622
	(0.01614)	(0.01589)
	[0.64878]	[-1.04584]
R6(-4)	0.016576	0.033274
	(0.01613)	(0.01588)
	[1.02754]	[2.09512]
R6(-5)	-0.022642	-0.036974

	(0.01614)	(0.01589)
	[-1.40297]	[-2.32700]
R6(-6)	0.001576	-0.008116
	(0.01611)	(0.01586)
	[0.09784]	[-0.51167]
R6(-7)	0.018938	0.007672
	(0.01611)	(0.01586)
	[1.17571]	[0.48379]
R6(-8)	0.011568	-0.015424
	(0.01607)	(0.01582)
	[0.72006]	[-0.97514]
R6(-9)	-0.000111	0.012892
	(0.01606)	(0.01581)
	[-0.00691]	[0.81534]
R6(-10)	0.009580	0.017594
	(0.01606)	(0.01581)
	[0.59652]	[1.11280]
R6(-11)	0.030424	-0.006132
	(0.01606)	(0.01581)
	[1.89480]	[-0.38788]
R6(-12)	0.010908	0.030177
	(0.01604)	(0.01580)
	[0.67991]	[1.91049]
R6(-13)	0.028479	0.015414
	(0.01605)	(0.01580)
	[1.77461]	[0.97556]
R6(-14)	0.024572	0.001564
	(0.01605)	(0.01580)
	[1.53081]	[0.09897]
R6(-15)	0.002381	0.004665
	(0.01581)	(0.01556)
	[0.15060]	[0.29975]
C	0.000140	8.78E-05
	(0.00022)	(0.00022)
	[0.62349]	[0.39694]

MALAYSIA – THAILAND

Standard errors in ( ) & t-statistics in [ ]

	R2	R7
R2(-1)	0.049881	0.036958
	(0.01616)	(0.01906)
	[3.08665]	[1.93936]
R2(-2)	-0.002293	0.014989
	(0.01618)	(0.01908)

	[-0.14178]	[0.78578]
R2(-3)	0.027091	0.009847
	(0.01617)	(0.01907)
	[1.67498]	[0.51629]
R2(-4)	-0.106831	-0.025321
	(0.01617)	(0.01907)
	[-6.60491]	[-1.32751]
R2(-5)	0.071334	0.009969
	(0.01625)	(0.01916)
	[4.39018]	[0.52029]
R2(-6)	-0.062291	-0.038971
	(0.01628)	(0.01920)
	[-3.82616]	[-2.02989]
R2(-7)	-0.011690	0.006053
	(0.01631)	(0.01923)
	[-0.71676]	[0.31472]
R2(-8)	-0.012876	0.006990
	(0.01631)	(0.01923)
	[-0.78954]	[0.36349]
R2(-9)	0.018381	0.025753
	(0.01630)	(0.01923)
	[1.12734]	[1.33936]
R2(-10)	-0.010036	0.045169
	(0.01629)	(0.01921)
	[-0.61618]	[2.35180]
R2(-11)	-0.013044	0.007985
	(0.01626)	(0.01918)
	[-0.80209]	[0.41635]
R2(-12)	0.006821	-0.028985
	(0.01619)	(0.01909)
	[0.42138]	[-1.51837]
R2(-13)	0.002494	0.051244
	(0.01619)	(0.01909)
	[0.15410]	[2.68458]
R2(-14)	-0.016051	-0.000854
	(0.01619)	(0.01909)
	[-0.99158]	[-0.04476]
R2(-15)	0.061396	0.028069
	(0.01616)	(0.01906)
	[3.79951]	[1.47304]
R7(-1)	0.045475	0.097623
	(0.01372)	(0.01618)
	[3.31409]	[6.03301]
R7(-2)	0.039580	0.023033
	(0.01378)	(0.01626)
	[2.87134]	[1.41692]
R7(-3)	0.006495	-0.009774

	(0.01378)	(0.01625)
	[0.47151]	[-0.60163]
R7(-4)	0.029062	0.009290
	(0.01377)	(0.01624)
	[2.11050]	[0.57211]
R7(-5)	-0.014114	0.016315
	(0.01378)	(0.01625)
	[-1.02447]	[1.00426]
R7(-6)	0.014251	-0.028500
	(0.01375)	(0.01622)
	[1.03609]	[-1.75713]
R7(-7)	0.012847	-0.018184
	(0.01376)	(0.01623)
	[0.93340]	[-1.12038]
R7(-8)	0.012349	0.038508
	(0.01376)	(0.01622)
	[0.89779]	[2.37399]
R7(-9)	-0.007031	-0.002525
	(0.01376)	(0.01623)
	[-0.51094]	[-0.15560]
R7(-10)	-0.005477	0.028545
	(0.01375)	(0.01621)
	[-0.39835]	[1.76052]
R7(-11)	0.028261	0.024006
	(0.01375)	(0.01622)
	[2.05493]	[1.48017]
R7(-12)	0.012396	0.002990
	(0.01376)	(0.01622)
	[0.90100]	[0.18430]
R7(-13)	0.025698	0.037922
	(0.01376)	(0.01622)
	[1.86788]	[2.33736]
R7(-14)	0.015384	0.001199
	(0.01377)	(0.01624)
	[1.11737]	[0.07386]
R7(-15)	0.001890	-0.033197
	(0.01372)	(0.01618)
	[0.13775]	[-2.05220]
C	0.000171	3.53E-05
	(0.00022)	(0.00026)
	[0.76162]	[0.13337]

PAKISTAN – PHILIPPINES

Standard errors in ( ) & t-statistics in [ ]

	R5	R6
R5(-1)	0.079553	0.008282
	(0.01532)	(0.01414)
	[5.19279]	[0.58556]
R6(-1)	0.017716	0.164115
	(0.01642)	(0.01516)
	[1.07880]	[10.8253]
C	0.000470	0.000180
	(0.00024)	(0.00022)
	[1.93793]	[0.80429]

PAKISTAN – THAILAND

Standard errors in ( ) & t-statistics in [ ]

	R5	R7
R5(-1)	0.070846	0.011460
	(0.01542)	(0.01692)
	[4.59452]	[0.67715]
R5(-2)	0.013544	0.010782
	(0.01544)	(0.01695)
	[0.87710]	[0.63617]
R5(-3)	0.030714	-0.001676
	(0.01544)	(0.01694)
	[1.98977]	[-0.09891]
R5(-4)	0.020041	0.000852
	(0.01543)	(0.01693)
	[1.29914]	[0.05030]
R5(-5)	0.000370	-0.030355
	(0.01542)	(0.01692)
	[0.02400]	[-1.79363]
R5(-6)	-0.002032	-0.035603
	(0.01542)	(0.01692)
	[-0.13178]	[-2.10399]
R5(-7)	0.025056	0.015736
	(0.01542)	(0.01692)
	[1.62501]	[0.92983]
R5(-8)	0.015497	0.008721
	(0.01543)	(0.01693)
	[1.00468]	[0.51511]
R5(-9)	0.036272	0.015400
	(0.01542)	(0.01693)

	[2.35181]	[0.90976]
R5(-10)	0.040438	0.022475
	(0.01543)	(0.01693)
	[2.62115]	[1.32730]
R5(-11)	-0.029332	0.013893
	(0.01542)	(0.01692)
	[-1.90252]	[0.82102]
R5(-12)	0.039180	-0.016912
	(0.01540)	(0.01691)
	[2.54347]	[-1.00031]
R5(-13)	-0.008348	-0.031032
	(0.01538)	(0.01688)
	[-0.54286]	[-1.83869]
R7(-1)	0.003722	0.104896
	(0.01403)	(0.01540)
	[0.26519]	[6.81009]
R7(-2)	0.028789	0.028016
	(0.01411)	(0.01548)
	[2.04070]	[1.80933]
R7(-3)	0.041667	-0.004529
	(0.01411)	(0.01549)
	[2.95289]	[-0.29246]
R7(-4)	0.017474	0.003287
	(0.01411)	(0.01549)
	[1.23821]	[0.21224]
R7(-5)	0.019240	0.021112
	(0.01411)	(0.01549)
	[1.36311]	[1.36278]
R7(-6)	0.005641	-0.036950
	(0.01411)	(0.01549)
	[0.39980]	[-2.38610]
R7(-7)	-0.015196	-0.021188
	(0.01411)	(0.01549)
	[-1.07659]	[-1.36770]
R7(-8)	0.026227	0.043221
	(0.01410)	(0.01548)
	[1.86011]	[2.79292]
R7(-9)	0.003116	0.005022
	(0.01411)	(0.01549)
	[0.22076]	[0.32421]
R7(-10)	0.026004	0.039166
	(0.01411)	(0.01549)
	[1.84280]	[2.52889]
R7(-11)	0.001115	0.026098
	(0.01412)	(0.01550)
	[0.07897]	[1.68346]
R7(-12)	-0.007866	-0.001464

	(0.01412)	(0.01550)
	[-0.55688]	[-0.09444]
R7(-13)	0.032370	0.051673
	(0.01405)	(0.01542)
	[2.30412]	[3.35121]
C	0.000380	6.27E-05
	(0.00024)	(0.00027)
	[1.56620]	[0.23554]

PHILIPPINES - THAILAND

Standard errors in ( ) & t-statistics in [ ]

	R6	R7
R6(-1)	0.116855	0.066585
	(0.01587)	(0.01902)
	[7.36514]	[3.50164]
R6(-2)	-0.013355	0.013935
	(0.01596)	(0.01912)
	[-0.83701]	[0.72869]
R6(-3)	-0.018234	0.032840
	(0.01596)	(0.01913)
	[-1.14233]	[1.71666]
R6(-4)	0.028822	-0.014809
	(0.01595)	(0.01912)
	[1.80682]	[-0.77460]
R6(-5)	-0.037731	0.007828
	(0.01596)	(0.01912)
	[-2.36459]	[0.40934]
R6(-6)	-0.028871	0.018428
	(0.01597)	(0.01914)
	[-1.80819]	[0.96301]
R6(-7)	-0.003243	0.005169
	(0.01597)	(0.01914)
	[-0.20308]	[0.27011]
R6(-8)	-0.012050	-0.030679
	(0.01595)	(0.01912)
	[-0.75539]	[-1.60460]
R6(-9)	0.018599	0.013173
	(0.01595)	(0.01911)
	[1.16630]	[0.68922]
R6(-10)	0.018656	-0.031514
	(0.01594)	(0.01910)
	[1.17067]	[-1.64998]
R6(-11)	-0.007051	0.001334
	(0.01594)	(0.01910)
	[-0.44236]	[0.06982]

R6(-12)	0.029109	0.020099
	(0.01594)	(0.01910)
	[1.82665]	[1.05238]
R6(-13)	0.016539	-0.032217
	(0.01566)	(0.01876)
	[1.05641]	[-1.71698]
R7(-1)	0.123154	0.093447
	(0.01323)	(0.01585)
	[9.31122]	[5.89502]
R7(-2)	0.016574	0.015374
	(0.01338)	(0.01604)
	[1.23853]	[0.95861]
R7(-3)	0.018408	-0.015657
	(0.01338)	(0.01604)
	[1.37567]	[-0.97626]
R7(-4)	0.003845	-0.000491
	(0.01338)	(0.01603)
	[0.28739]	[-0.03064]
R7(-5)	0.025523	0.016749
	(0.01338)	(0.01603)
	[1.90785]	[1.04465]
R7(-6)	0.027112	-0.045103
	(0.01338)	(0.01603)
	[2.02685]	[-2.81336]
R7(-7)	0.025065	-0.022566
	(0.01339)	(0.01605)
	[1.87164]	[-1.40597]
R7(-8)	0.027043	0.044871
	(0.01338)	(0.01604)
	[2.02112]	[2.79813]
R7(-9)	-0.009182	0.003680
	(0.01339)	(0.01605)
	[-0.68551]	[0.22921]
R7(-10)	0.032229	0.045709
	(0.01339)	(0.01605)
	[2.40666]	[2.84794]
R7(-11)	0.009176	0.027757
	(0.01340)	(0.01606)
	[0.68474]	[1.72823]
R7(-12)	0.019013	-0.003927
	(0.01340)	(0.01606)
	[1.41860]	[-0.24447]
R7(-13)	0.021591	0.053358
	(0.01338)	(0.01604)
	[1.61375]	[3.32750]
C	0.000143	4.53E-05
	(0.00022)	(0.00026)

	[0.64818]	[0.17103]

INDIA – MALAYSIA

Standard errors in ( ) & t-statistics in [ ]

	R4	R2
R4(-1)	0.083818	0.055238
	(0.01580)	(0.01499)
	[5.30384]	[3.68413]
R4(-2)	-0.011713	0.001482
	(0.01587)	(0.01506)
	[-0.73787]	[0.09840]
R4(-3)	-0.003965	-0.001270
	(0.01587)	(0.01506)
	[-0.24979]	[-0.08432]
R4(-4)	0.029681	0.026893
	(0.01586)	(0.01505)
	[1.87099]	[1.78681]
R4(-5)	-0.019294	0.003139
	(0.01587)	(0.01506)
	[-1.21537]	[0.20844]
R4(-6)	-0.046832	-0.026302
	(0.01583)	(0.01502)
	[-2.95852]	[-1.75130]
R2(-1)	0.004056	0.061320
	(0.01665)	(0.01579)
	[0.24364]	[3.88264]
R2(-2)	0.004890	0.019344
	(0.01664)	(0.01579)
	[0.29385]	[1.22525]
R2(-3)	0.022989	0.035599
	(0.01656)	(0.01571)
	[1.38824]	[2.26581]
R2(-4)	0.008146	-0.097120
	(0.01656)	(0.01571)
	[0.49179]	[-6.18013]
R2(-5)	0.019922	0.068243
	(0.01664)	(0.01579)
	[1.19703]	[4.32208]
R2(-6)	0.039132	-0.054467
	(0.01663)	(0.01577)
	[2.35372]	[-3.45312]
C	0.000385	0.000155
	(0.00025)	(0.00023)
	[1.55947]	[0.66188]

INDIA – PAKISTAN

Standard errors in ( ) & t-statistics in [ ]

	R4	R5
R4(-1)	0.084213	0.045390
	(0.01579)	(0.01594)
	[5.33184]	[2.84667]
R4(-2)	-0.008489	0.009945
	(0.01585)	(0.01600)
	[-0.53551]	[0.62141]
R4(-3)	0.001658	0.039107
	(0.01584)	(0.01599)
	[0.10465]	[2.44525]
R4(-4)	0.031384	0.010543
	(0.01585)	(0.01600)
	[1.98013]	[0.65890]
R4(-5)	-0.016956	0.048028
	(0.01586)	(0.01601)
	[-1.06930]	[3.00017]
R4(-6)	-0.045533	0.033945
	(0.01587)	(0.01602)
	[-2.86873]	[2.11843]
R4(-7)	-0.011362	0.014606
	(0.01587)	(0.01602)
	[-0.71614]	[0.91194]
R4(-8)	0.001173	-0.003873
	(0.01586)	(0.01601)
	[0.07398]	[-0.24190]
R4(-9)	0.018151	0.038142
	(0.01585)	(0.01600)
	[1.14492]	[2.38324]
R4(-10)	0.043062	0.027321
	(0.01586)	(0.01602)
	[2.71433]	[1.70590]
R4(-11)	-0.033013	0.014677
	(0.01587)	(0.01602)
	[-2.08015]	[0.91604]
R4(-12)	-0.019377	-0.014995
	(0.01584)	(0.01599)
	[-1.22363]	[-0.93795]
R5(-1)	-0.002697	0.052032
	(0.01563)	(0.01578)
	[-0.17251]	[3.29687]
R5(-2)	-0.009450	0.008633
	(0.01565)	(0.01580)
	[-0.60394]	[0.54651]

R5(-3)	-0.005755	0.029122
	(0.01563)	(0.01578)
	[-0.36818]	[1.84562]
R5(-4)	0.026131	0.017508
	(0.01561)	(0.01576)
	[1.67389]	[1.11094]
R5(-5)	-0.009824	-0.002810
	(0.01562)	(0.01576)
	[-0.62916]	[-0.17826]
R5(-6)	0.029605	-0.006220
	(0.01560)	(0.01575)
	[1.89791]	[-0.39500]
R5(-7)	0.029590	0.021397
	(0.01559)	(0.01574)
	[1.89756]	[1.35920]
R5(-8)	0.012226	0.014609
	(0.01558)	(0.01573)
	[0.78467]	[0.92877]
R5(-9)	7.77E-05	0.030896
	(0.01558)	(0.01573)
	[0.00499]	[1.96450]
R5(-10)	0.021533	0.039946
	(0.01556)	(0.01571)
	[1.38348]	[2.54229]
R5(-11)	-0.002803	-0.028858
	(0.01558)	(0.01572)
	[-0.17994]	[-1.83530]
R5(-12)	0.002270	0.041109
	(0.01554)	(0.01569)
	[0.14607]	[2.62000]
C	0.000340	0.000373
	(0.00025)	(0.00025)
	[1.37025]	[1.48892]

INDIA – PHILIPPINES

Standard errors in ( ) & t-statistics in [ ]

	R4	R6
R4(-1)	0.090709	0.041947
	(0.01543)	(0.01338)
	[5.87786]	[3.13405]
R4(-2)	-0.027576	-0.017059
	(0.01550)	(0.01344)
	[-1.77933]	[-1.26918]
R4(-3)	0.008513	0.002599

	(0.01550)	(0.01344)
	[0.54924]	[0.19332]
R4(-4)	0.029812	-0.007333
	(0.01544)	(0.01339)
	[1.93070]	[-0.54754]
R6(-1)	0.012592	0.158734
	(0.01779)	(0.01543)
	[0.70787]	[10.2887]
R6(-2)	0.027671	0.008080
	(0.01801)	(0.01562)
	[1.53646]	[0.51728]
R6(-3)	0.030577	-0.004001
	(0.01802)	(0.01562)
	[1.69730]	[-0.25606]
R6(-4)	0.024746	0.037508
	(0.01778)	(0.01542)
	[1.39181]	[2.43232]
C	0.000439	0.000162
	(0.00026)	(0.00022)
	[1.70276]	[0.72432]

INDIA – THAILAND

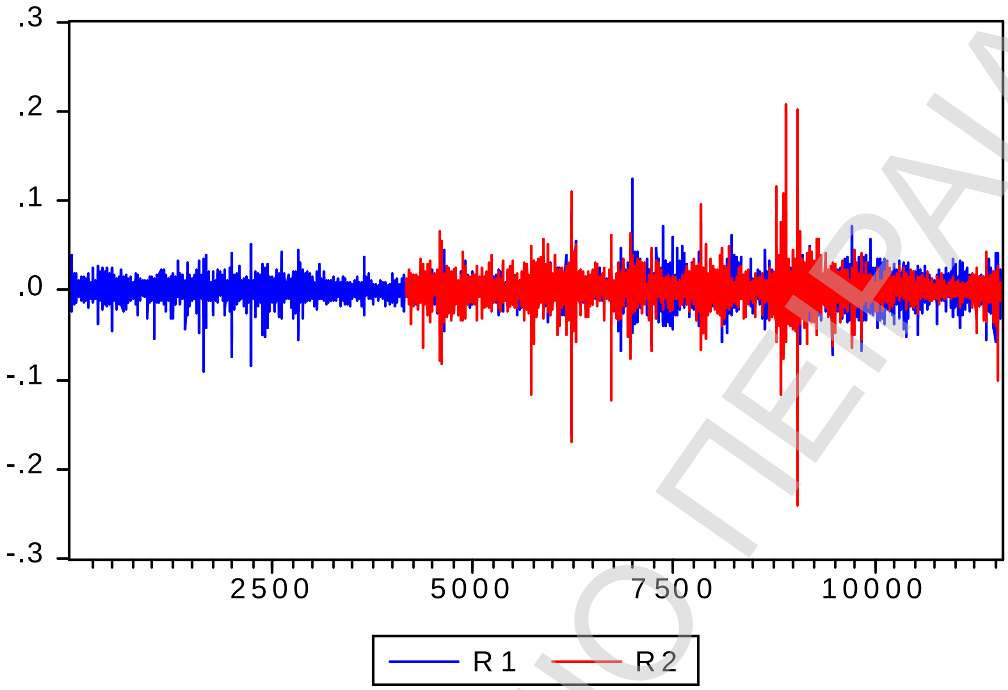
Standard errors in ( ) & t-statistics in [ ]

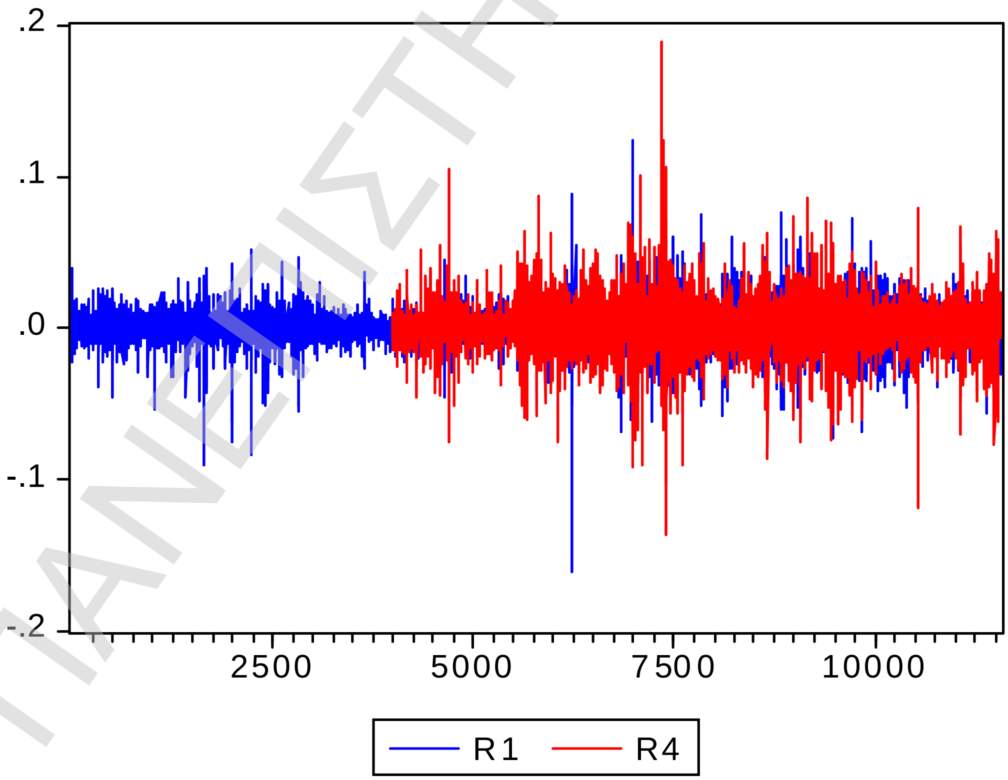
	R4	R7
R4(-1)	0.090973	0.042921
	(0.01554)	(0.01597)
	[5.85577]	[2.68733]
R4(-2)	-0.026892	-0.010236
	(0.01559)	(0.01602)
	[-1.72533]	[-0.63878]
R4(-3)	0.010970	0.007554
	(0.01558)	(0.01602)
	[0.70398]	[0.47152]
R4(-4)	0.028948	-0.000104
	(0.01557)	(0.01600)
	[1.85961]	[-0.00648]
R4(-5)	-0.016254	0.023384
	(0.01556)	(0.01600)
	[-1.04427]	[1.46138]
R4(-6)	-0.032992	-0.014201
	(0.01557)	(0.01601)
	[-2.11889]	[-0.88718]
R4(-7)	-0.023773	0.009352
	(0.01558)	(0.01601)
	[-1.52626]	[0.58404]

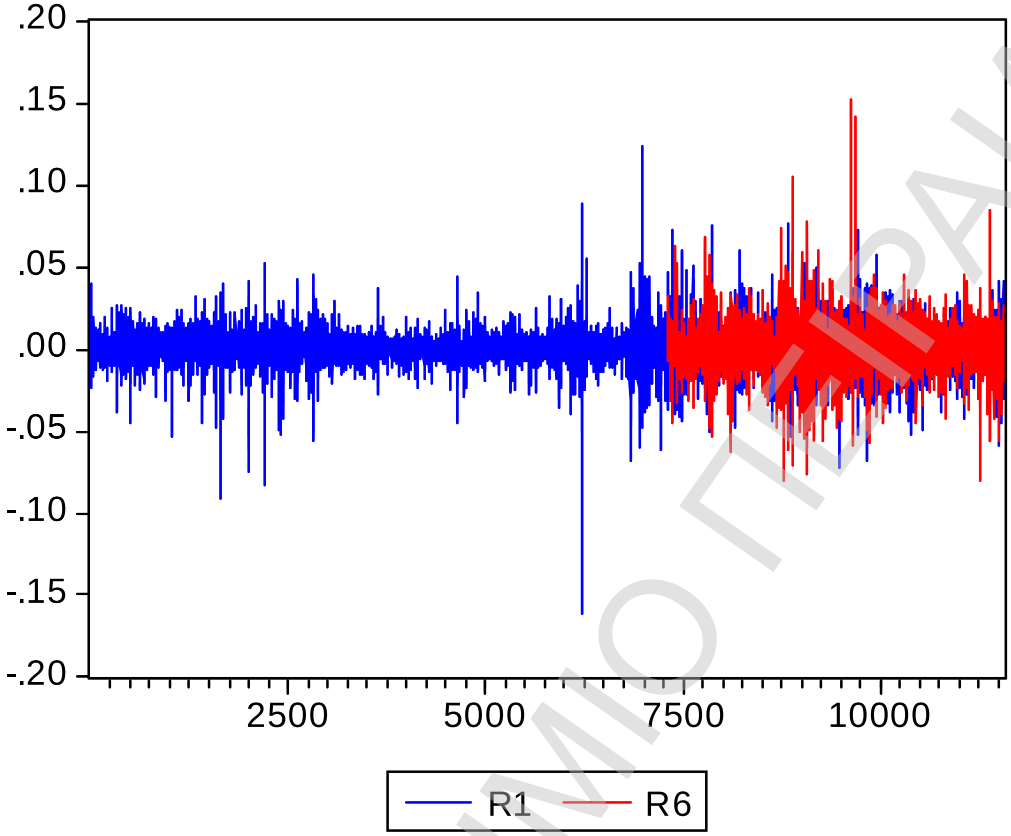
R4(-8)	-0.005716	-0.041177
	(0.01557)	(0.01601)
	[-0.36713]	[-2.57273]
R4(-9)	0.013882	-0.020350
	(0.01558)	(0.01601)
	[0.89116]	[-1.27070]
R4(-10)	0.042375	-0.024390
	(0.01557)	(0.01601)
	[2.72140]	[-1.52361]
R4(-11)	-0.029702	0.008243
	(0.01558)	(0.01602)
	[-1.90583]	[0.51448]
R4(-12)	-0.006573	0.028974
	(0.01559)	(0.01602)
	[-0.42170]	[1.80814]
R4(-13)	-0.004735	-0.002668
	(0.01554)	(0.01597)
	[-0.30478]	[-0.16703]
R7(-1)	0.009663	0.101023
	(0.01510)	(0.01552)
	[0.64013]	[6.50954]
R7(-2)	0.009289	0.027796
	(0.01516)	(0.01559)
	[0.61255]	[1.78292]
R7(-3)	0.018797	-0.004854
	(0.01516)	(0.01559)
	[1.23967]	[-0.31140]
R7(-4)	0.016781	0.001213
	(0.01515)	(0.01557)
	[1.10786]	[0.07789]
R7(-5)	0.016215	0.015781
	(0.01515)	(0.01557)
	[1.07045]	[1.01336]
R7(-6)	0.024978	-0.037533
	(0.01513)	(0.01556)
	[1.65073]	[-2.41276]
R7(-7)	-0.005706	-0.020418
	(0.01514)	(0.01557)
	[-0.37681]	[-1.31142]
R7(-8)	0.009515	0.048043
	(0.01513)	(0.01556)
	[0.62875]	[3.08812]
R7(-9)	0.024654	0.007928
	(0.01514)	(0.01557)
	[1.62805]	[0.50927]
R7(-10)	0.006639	0.042383
	(0.01515)	(0.01557)

	[0.43837]	[2.72204]
R7(-11)	0.025518	0.025014
	(0.01516)	(0.01558)
	[1.68361]	[1.60532]
R7(-12)	-0.006405	-0.003302
	(0.01516)	(0.01559)
	[-0.42248]	[-0.21183]
R7(-13)	0.031953	0.053241
	(0.01507)	(0.01550)
	[2.11991]	[3.43585]
C	0.000460	5.14E-05
	(0.00026)	(0.00027)
	[1.77924]	[0.19338]

<u>**Var Graphs for each couple**</u>



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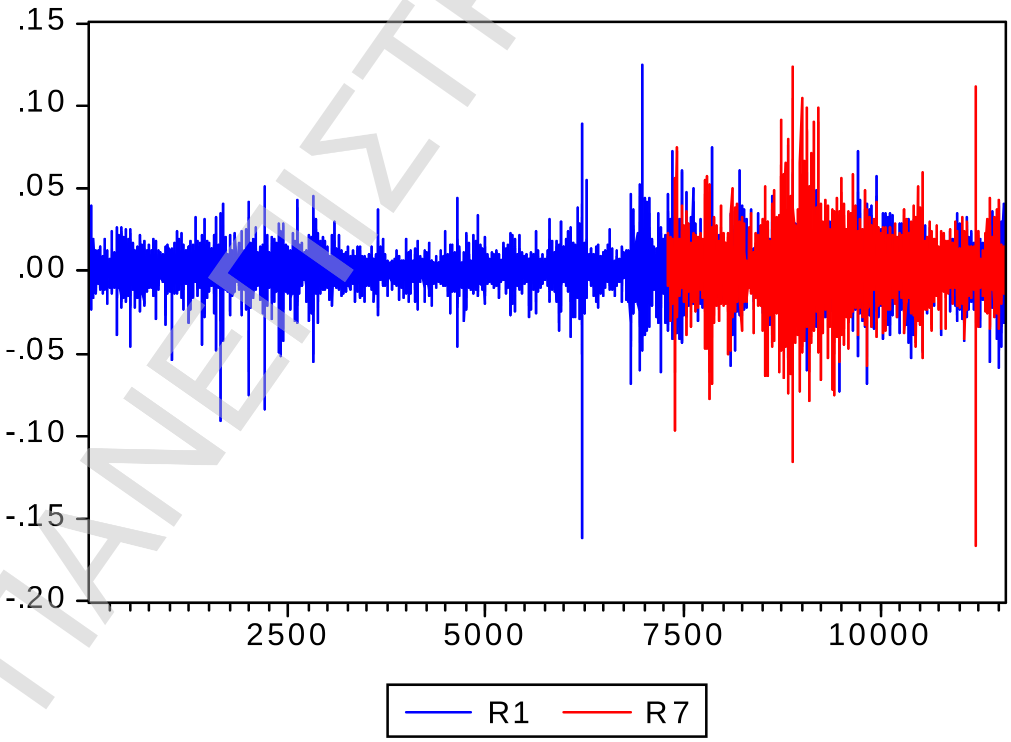
10000
R1
R6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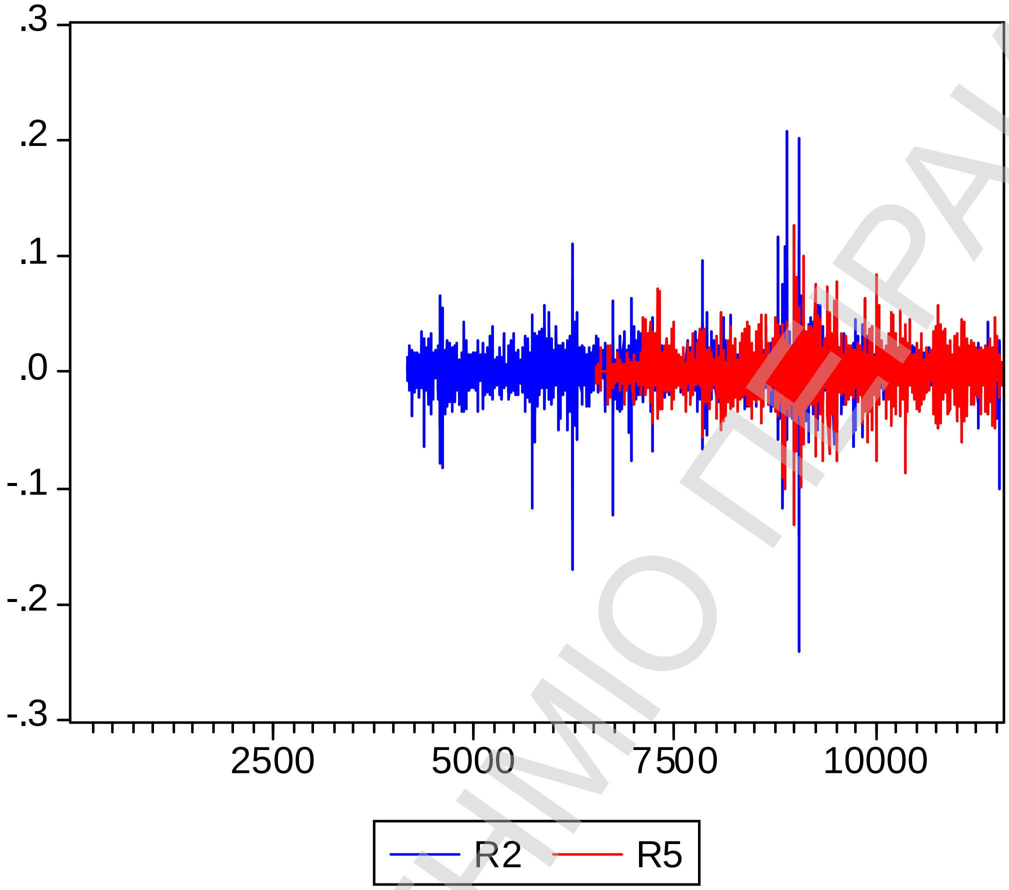
-.10
-.15
-.20
2500
5000
7500
10000
R1
R7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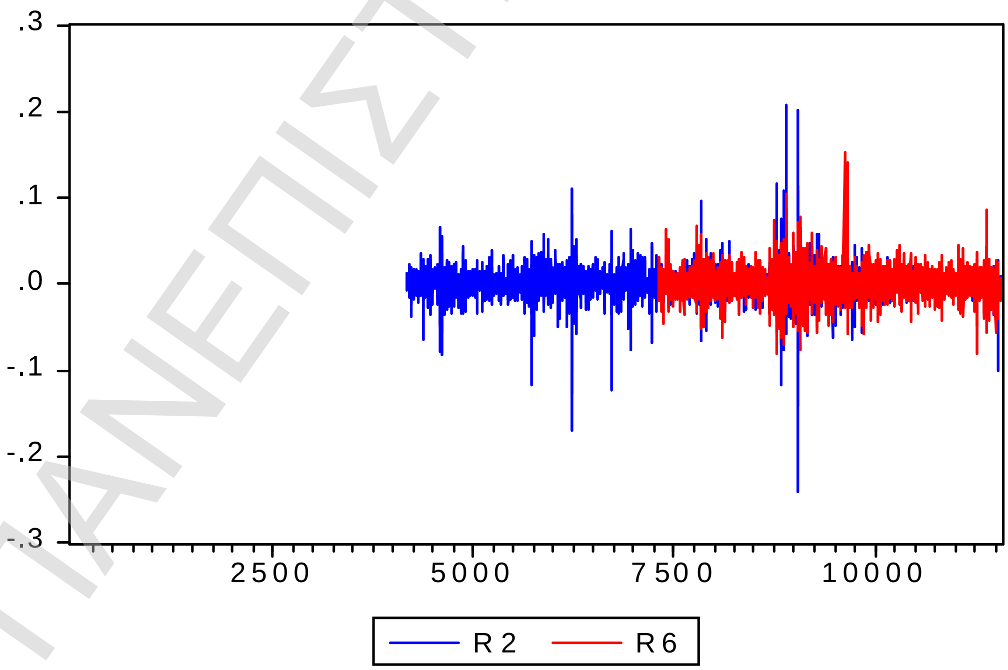
-.1
-.2
-.3
2500
5000
7500
10000
R2
R5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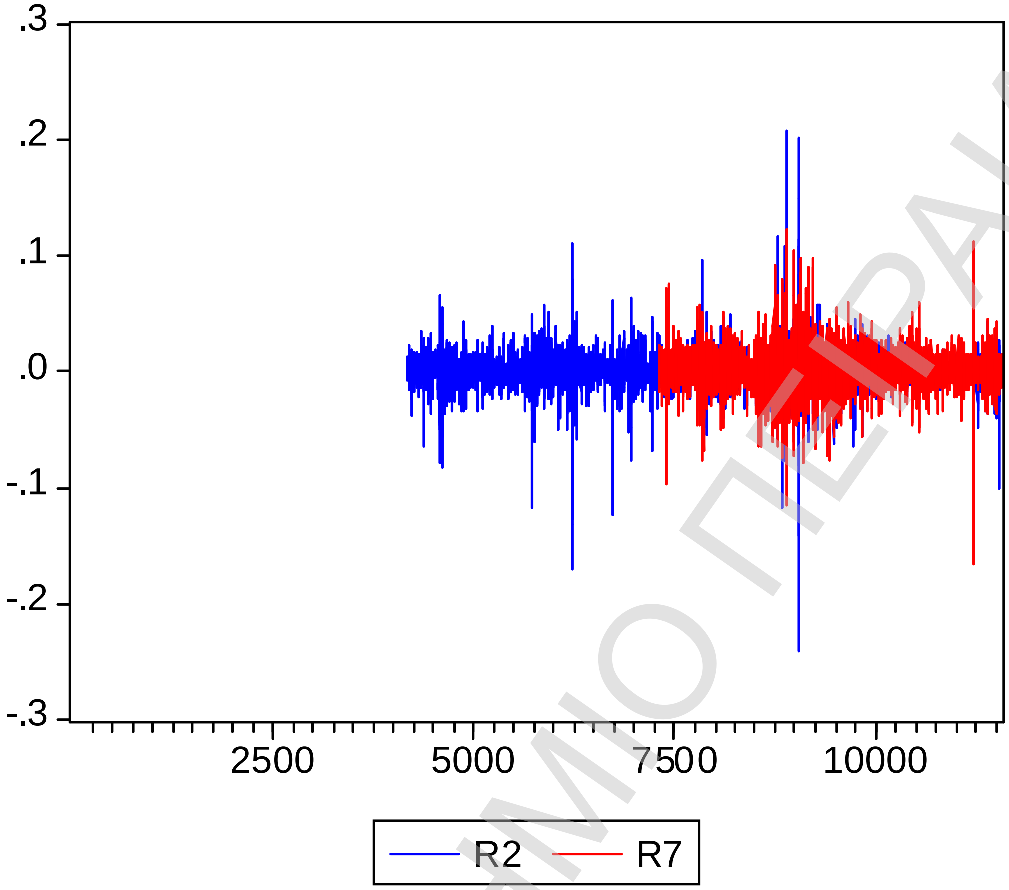
.0
-.1
-.2
-.3
2500
5000
7500
10000
R2
R6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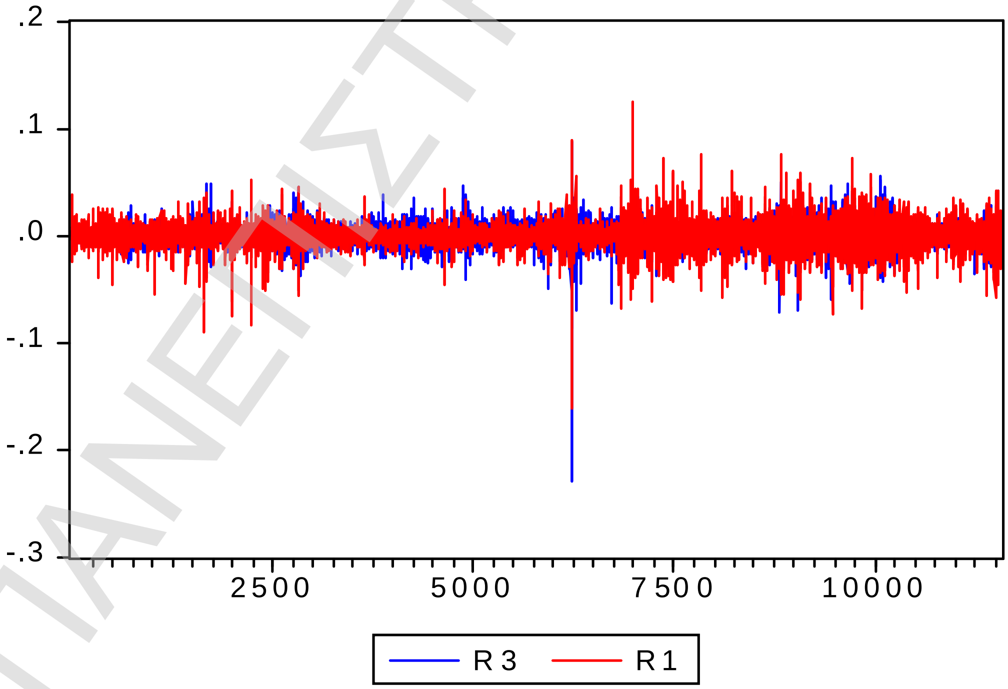
-.2
-.3
2500
5000
7500
10000
R2
R7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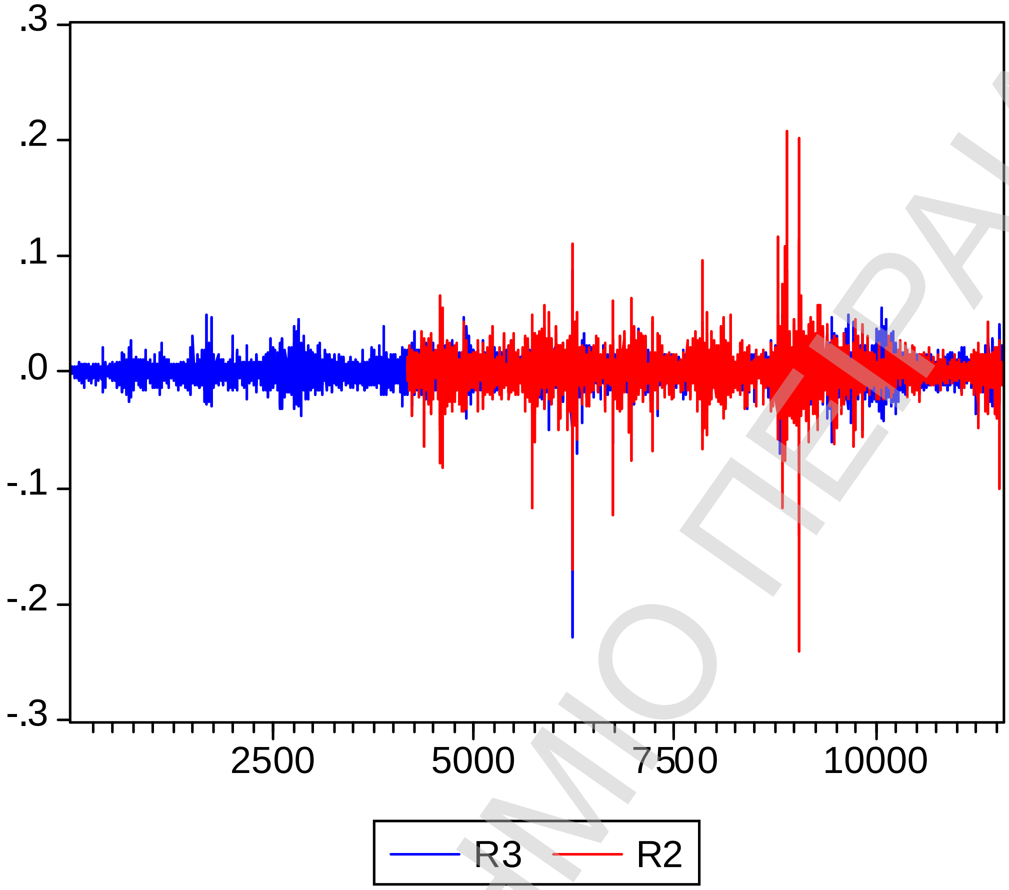
-.3
2500
5000
7500
10000
R3
R1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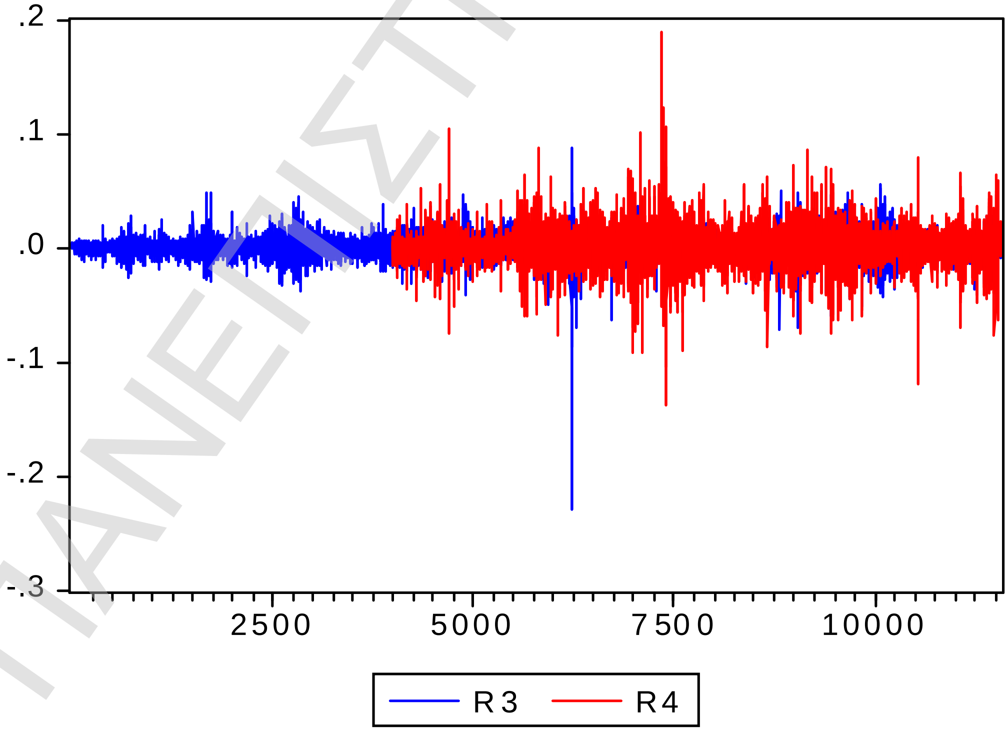
5000
7500
10000
R3
R2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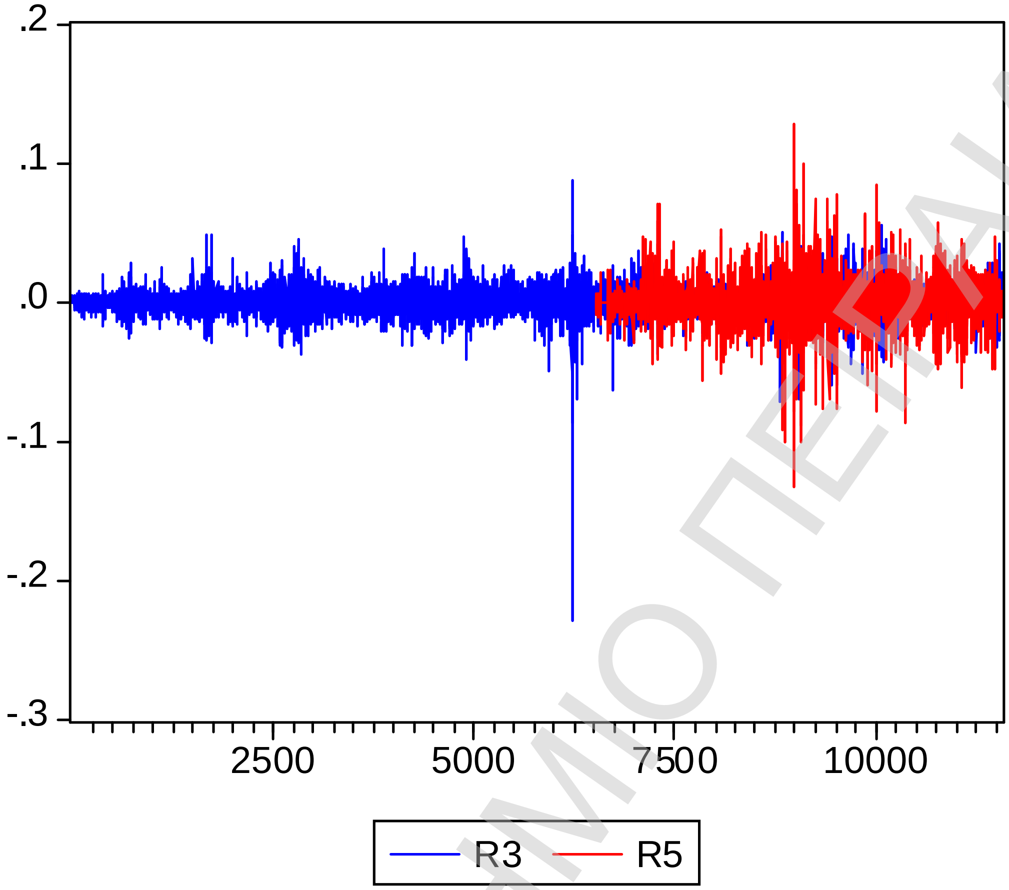
5000
7500
10000
R3
R4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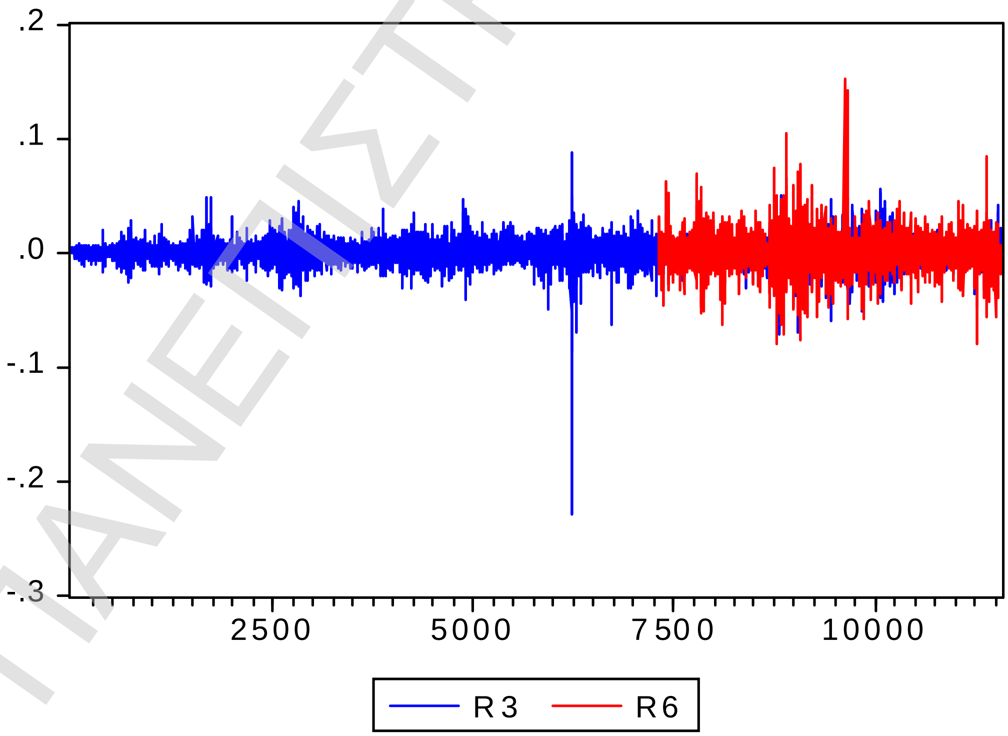
-.2
-.3
2500
5000
7500
10000
R3
R5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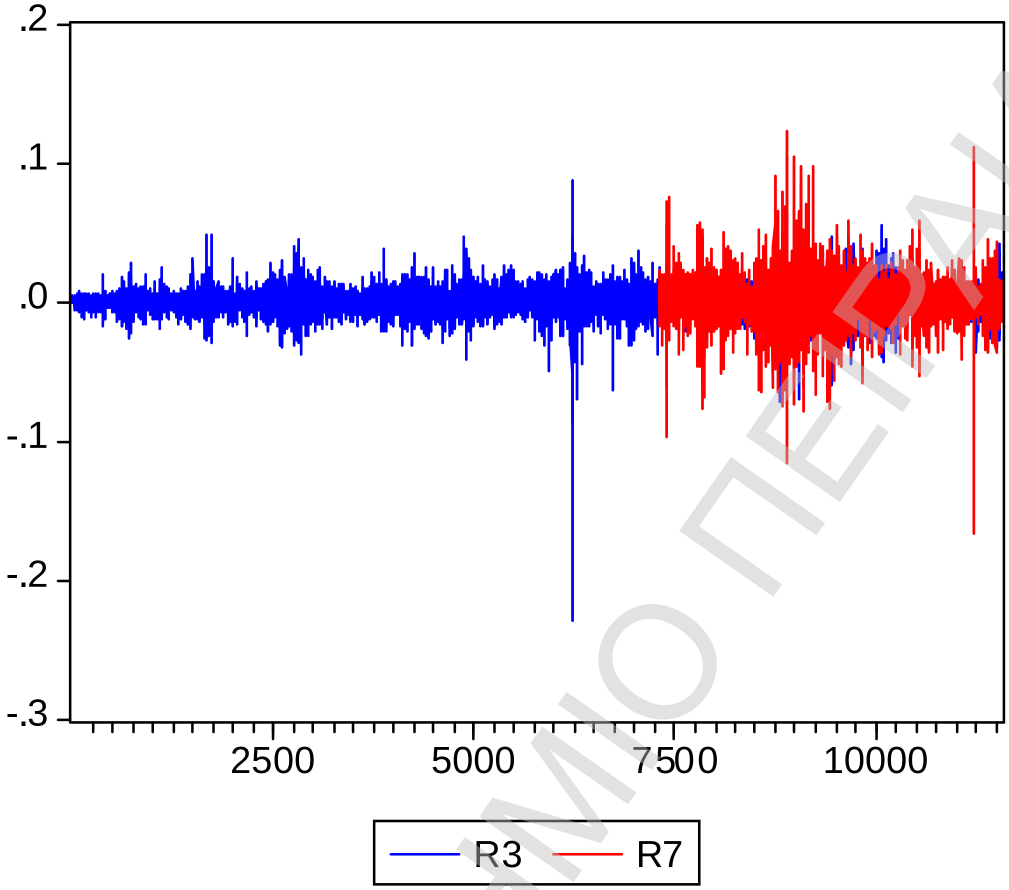
-.3
2500
5000
7500
10000
R3
R6



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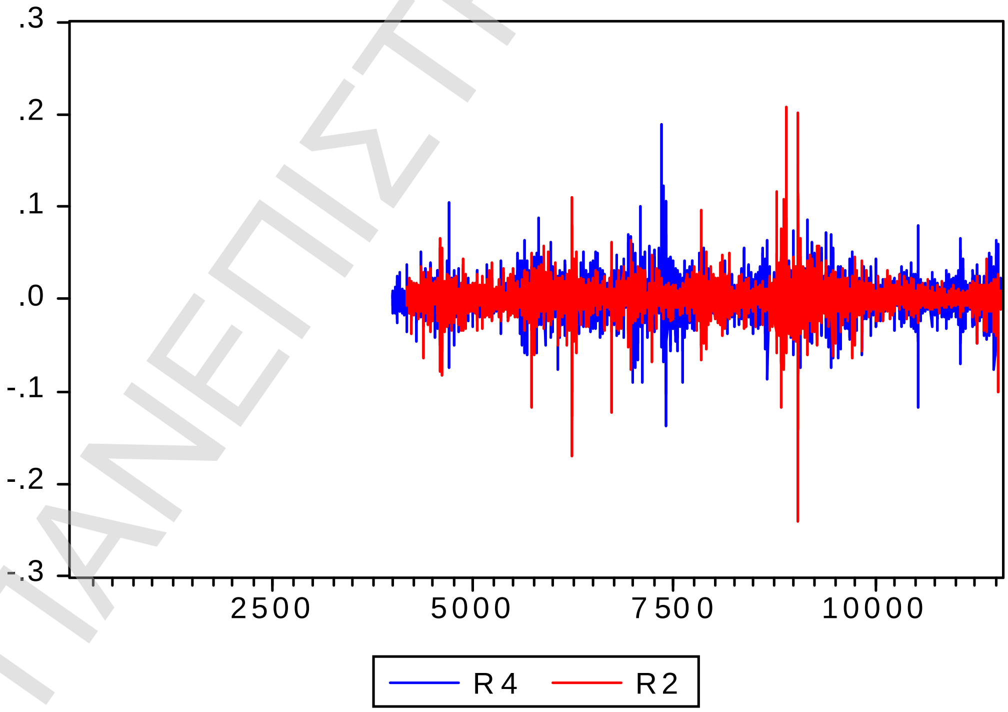
-.1
-.2
-.3
2500
5000
7500
10000
R3
R7



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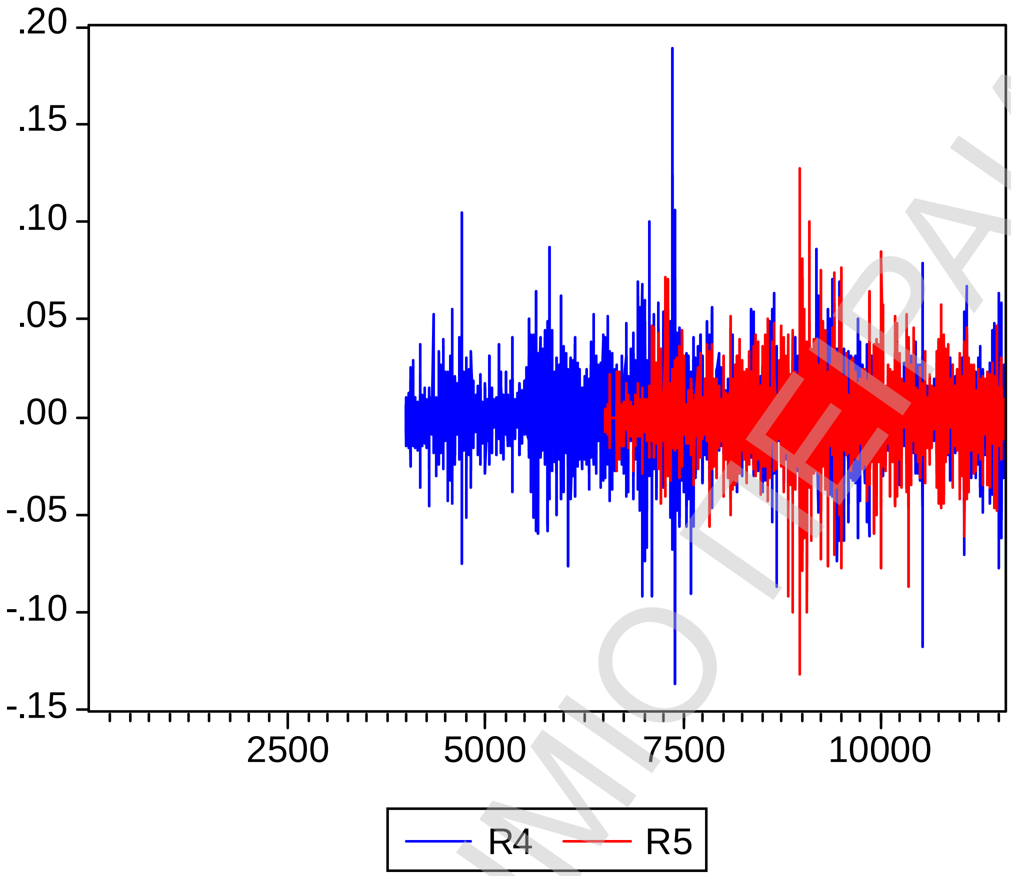
.0
-.1
-.2
-.3
2500
5000
7500
10000
R4
R2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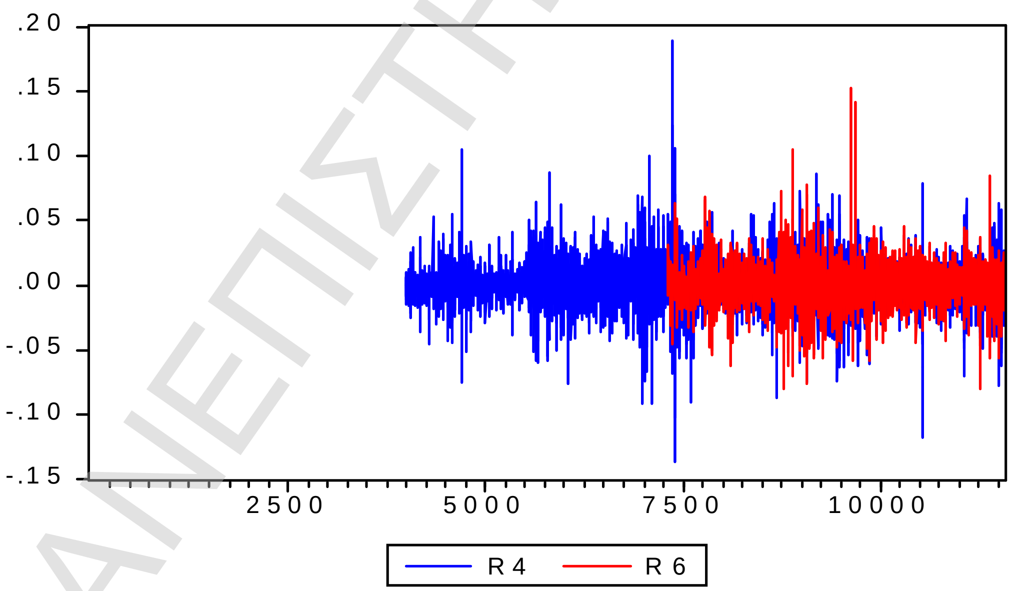
2500
5000
7500
10000
R4
R5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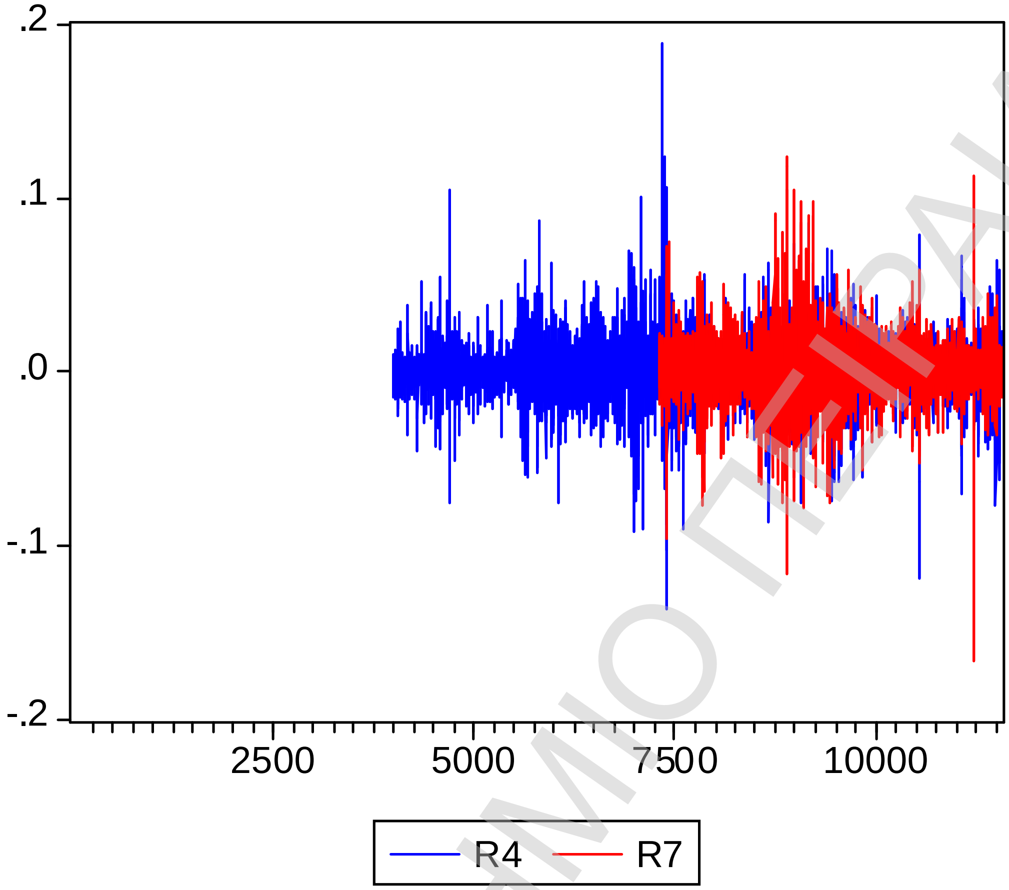
.00
-.05
-.10
-.15
2500
5000
7500
10000
R4
R6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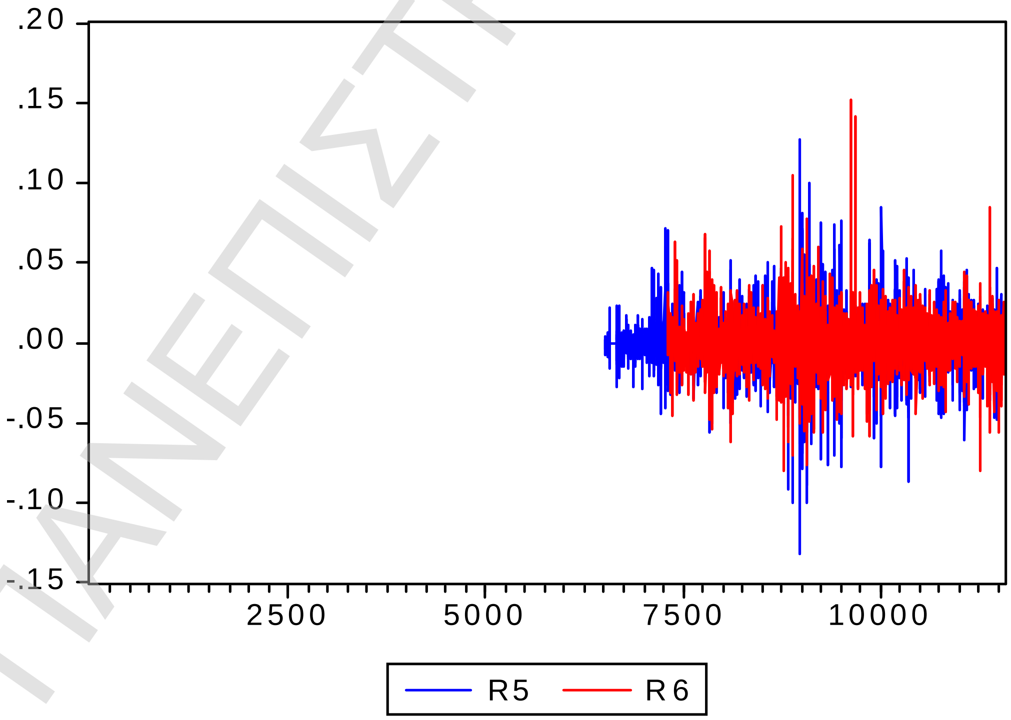
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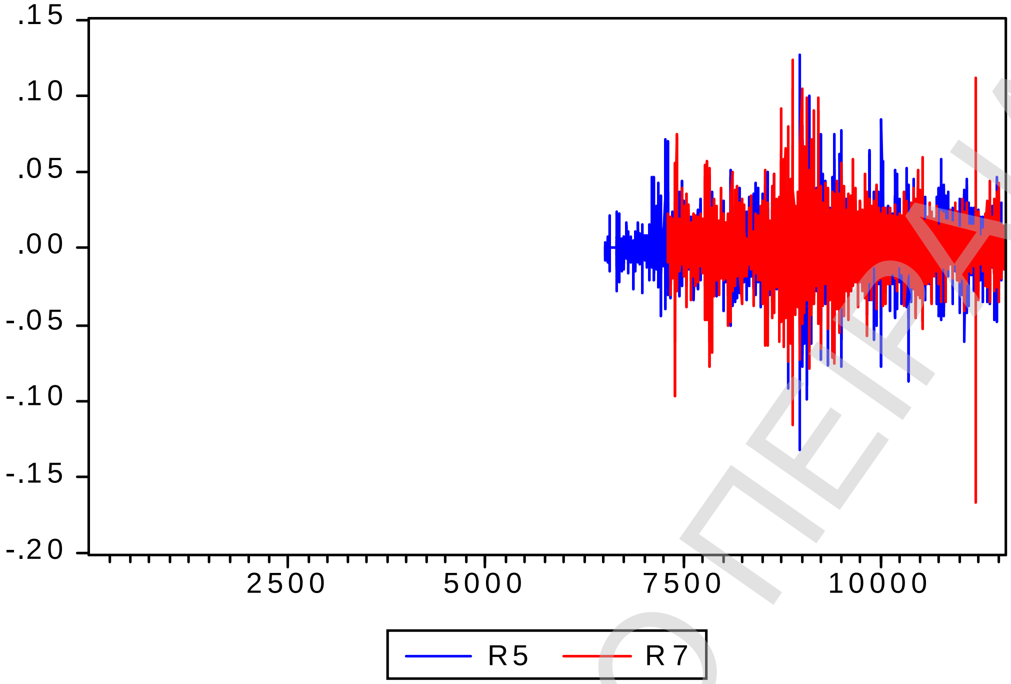
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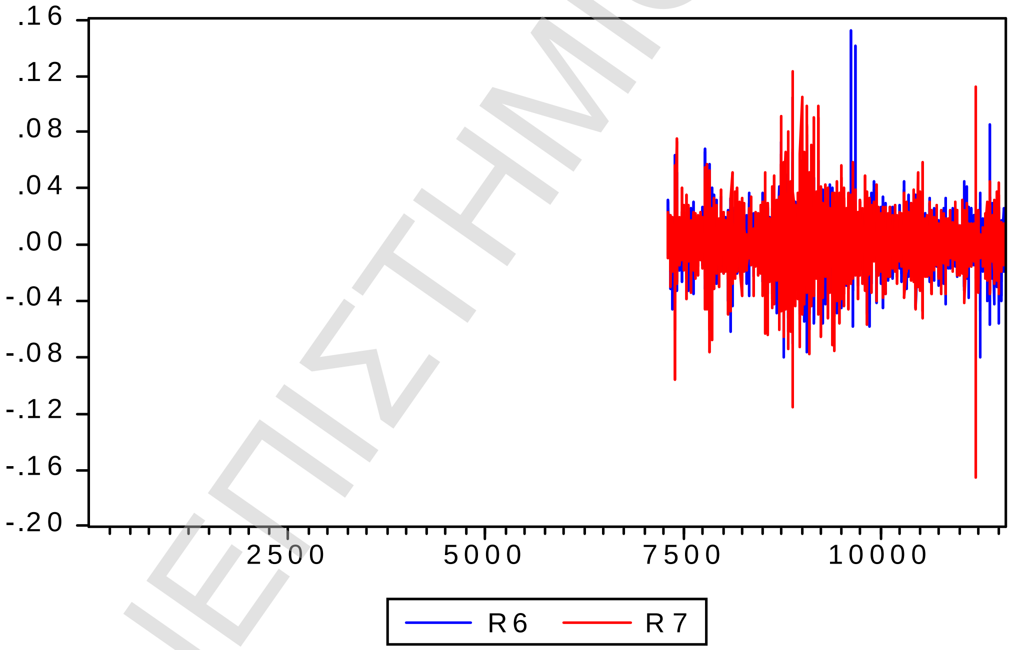
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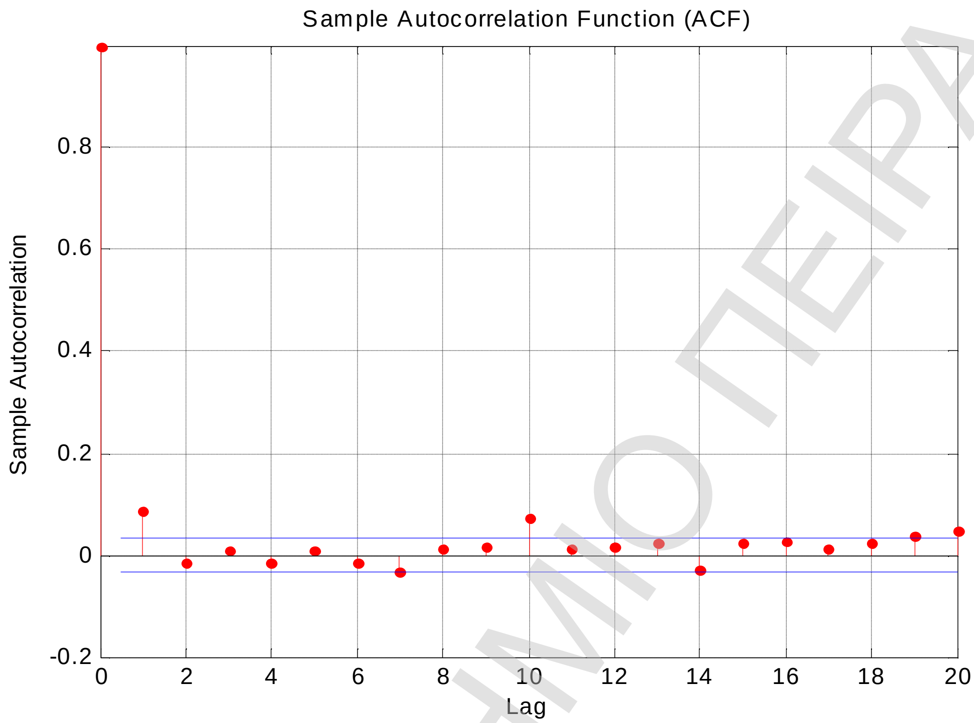
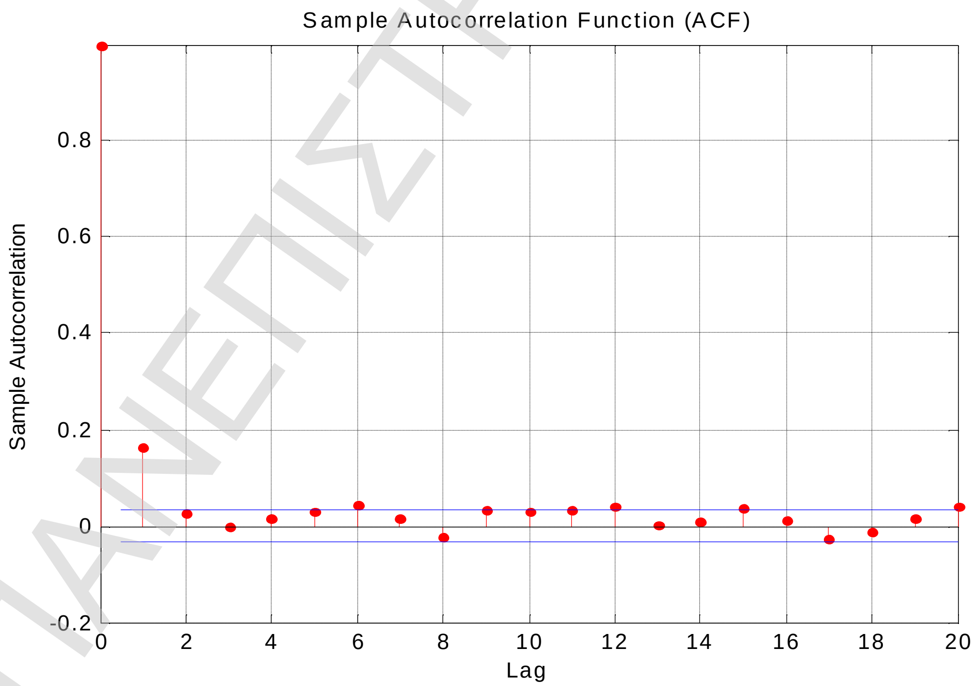
Appendix F

INDIA - MALAYSIA PRE-LIBERALIZATION





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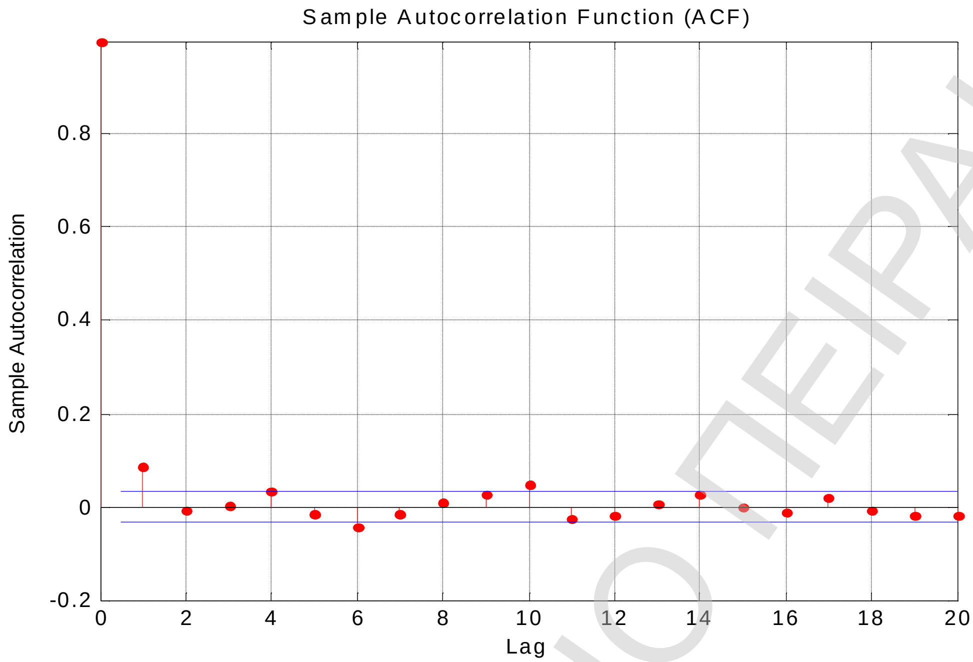

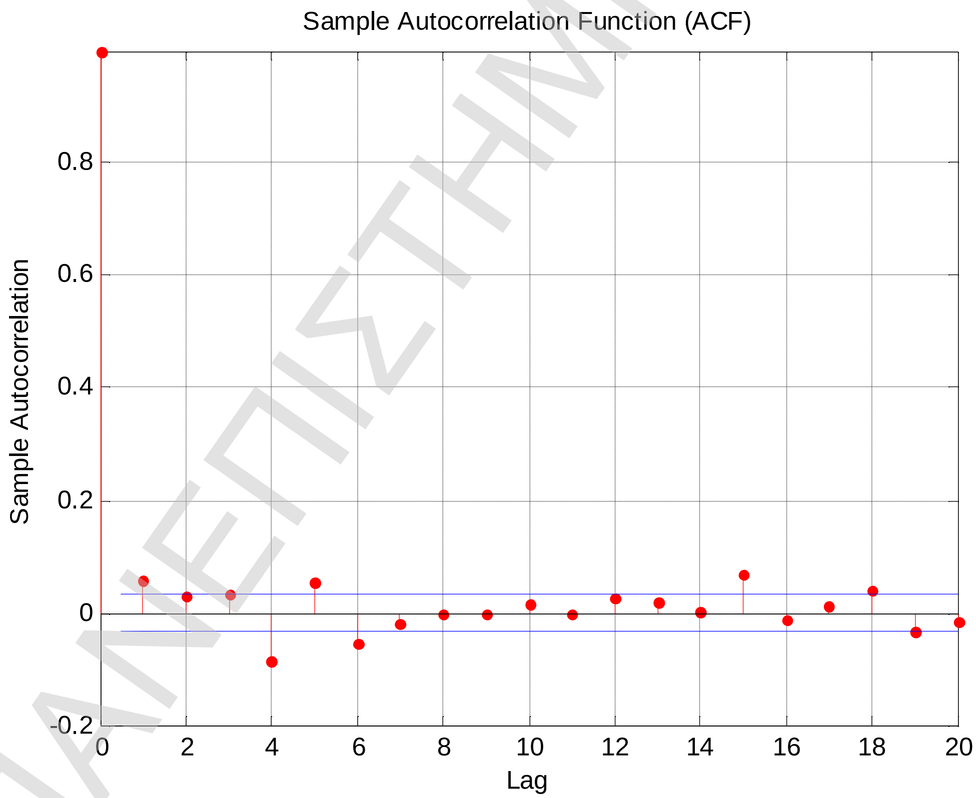

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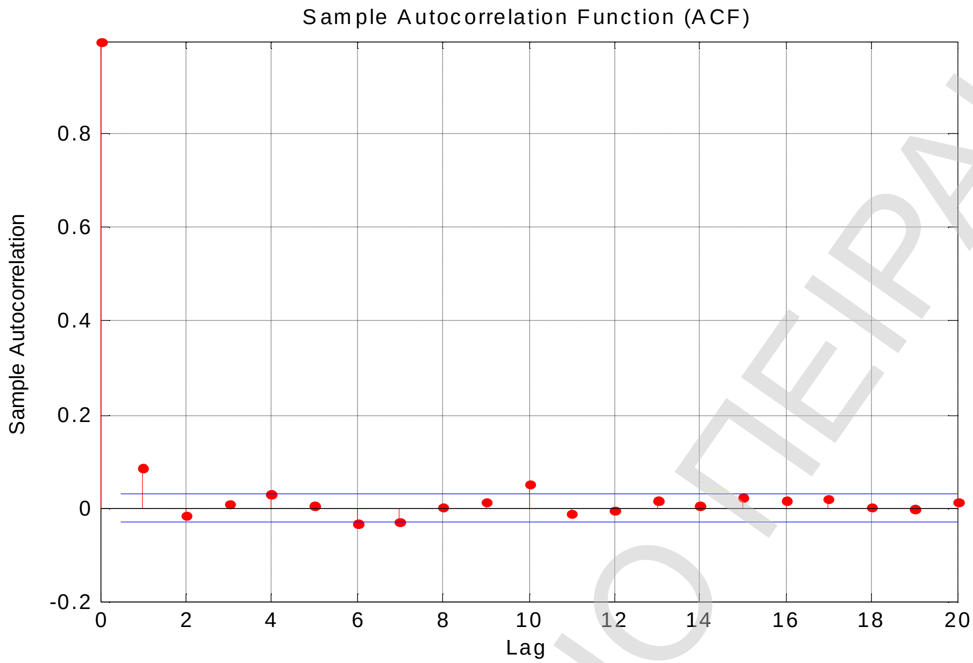

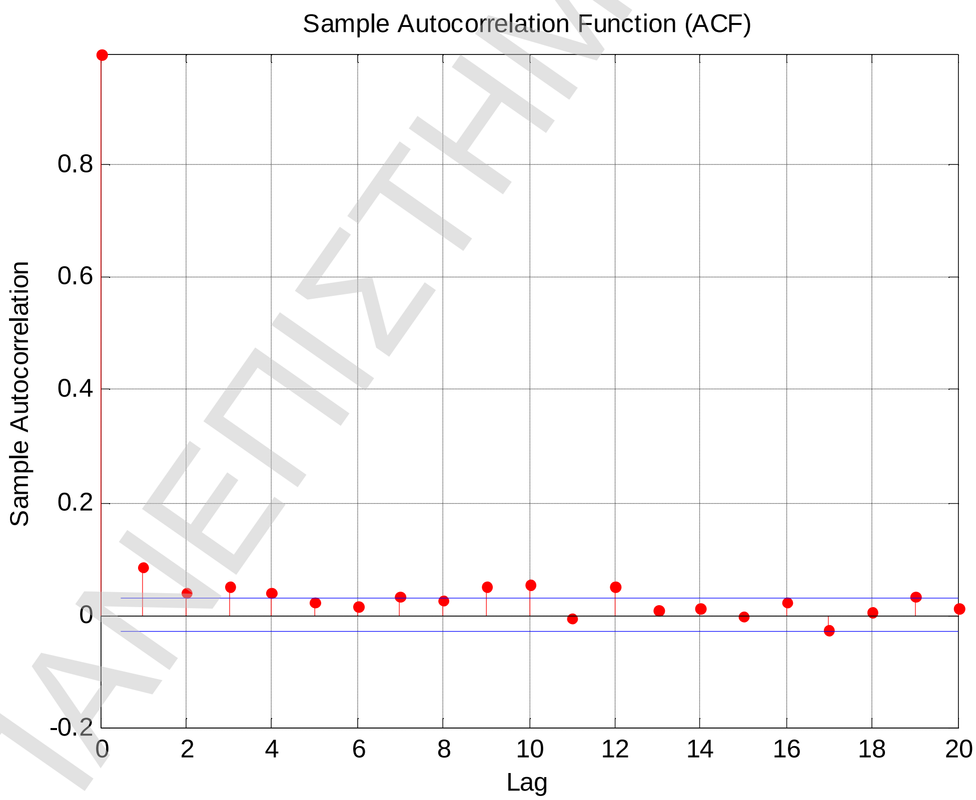

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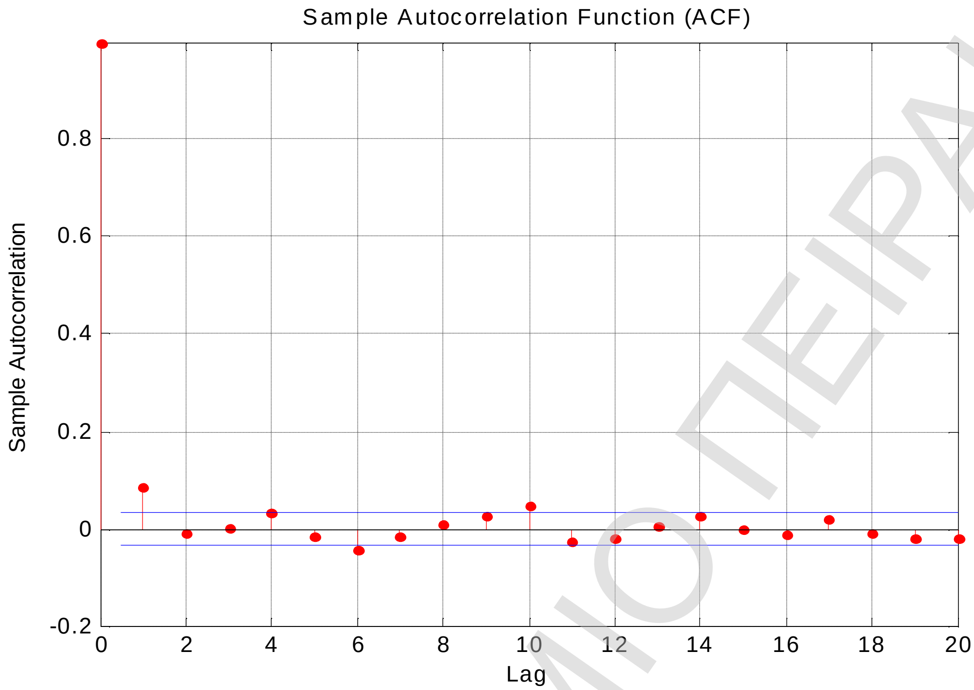

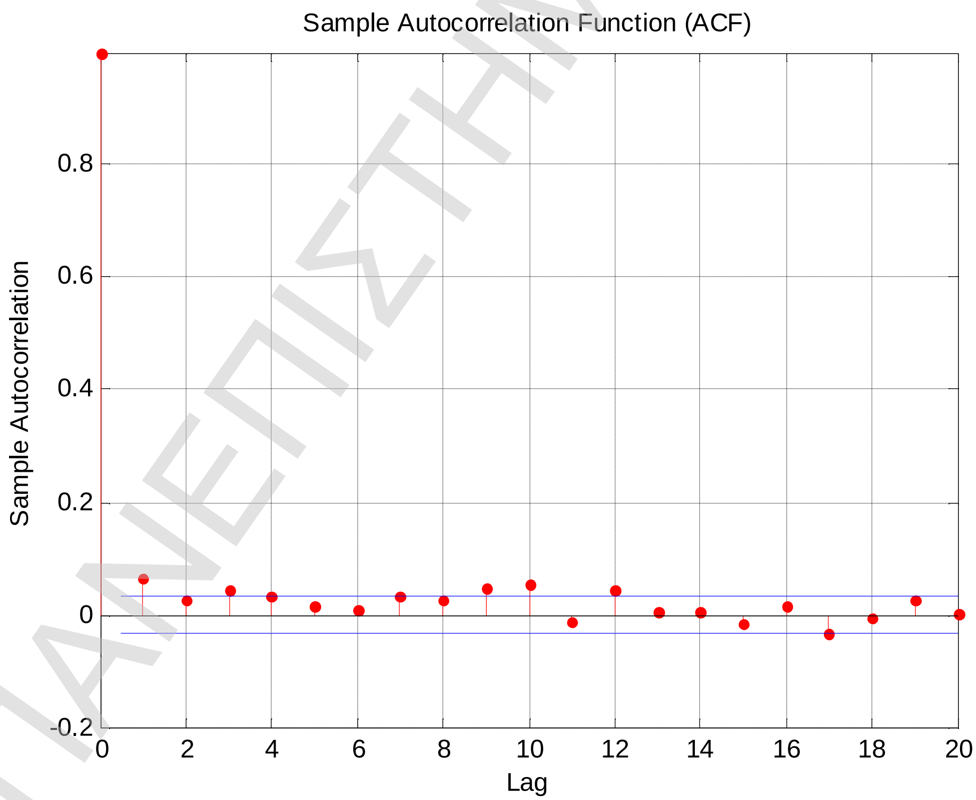

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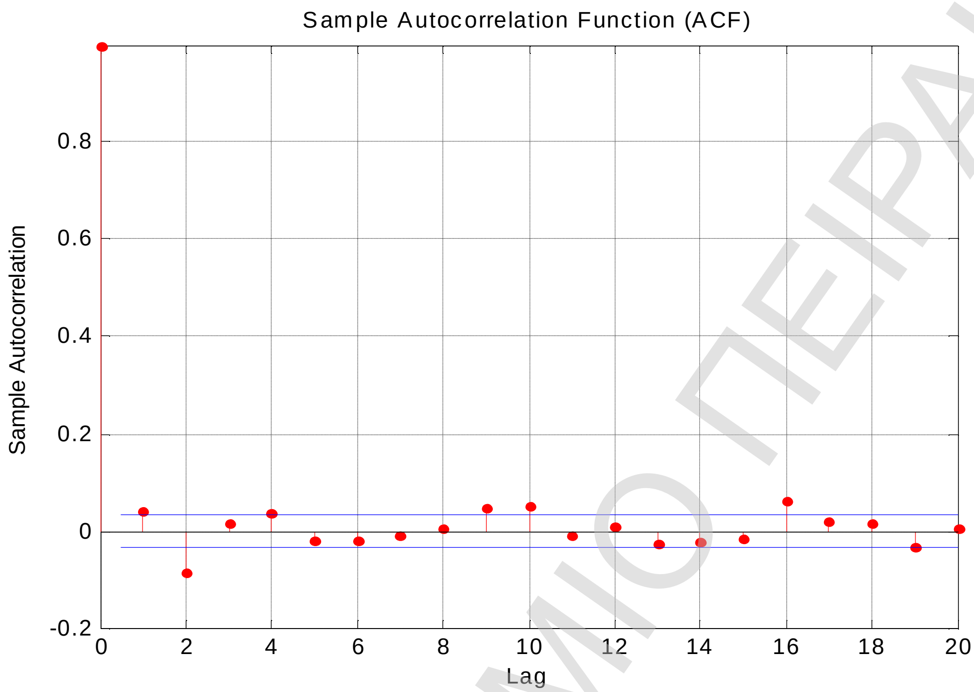

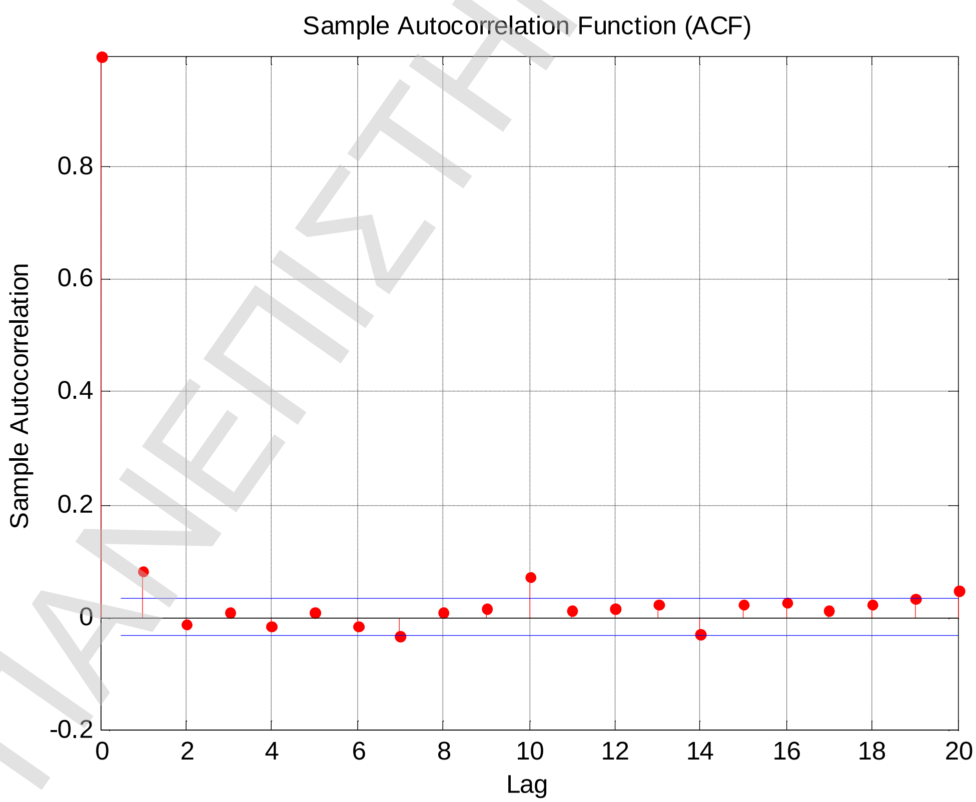

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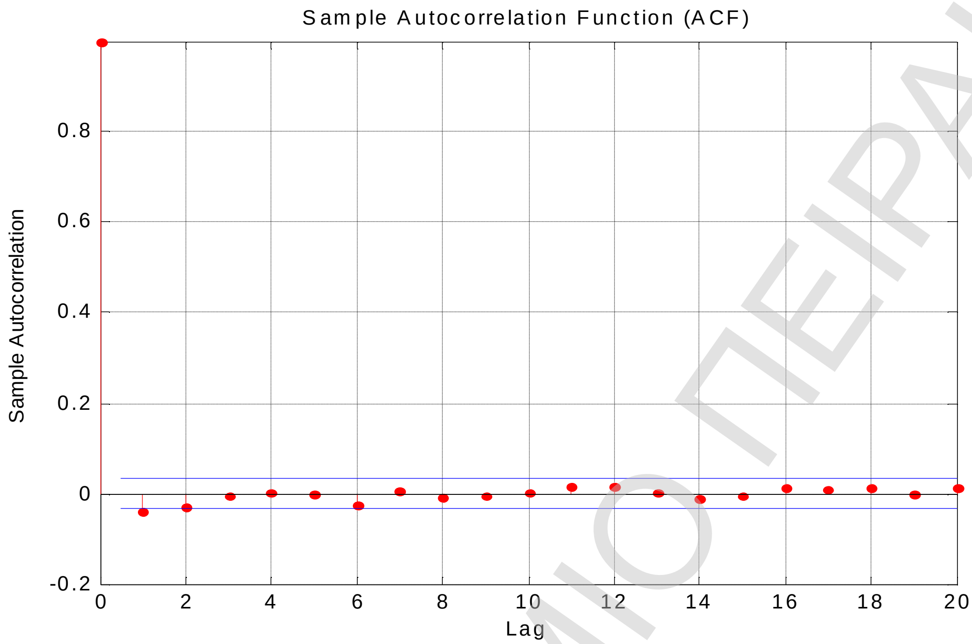

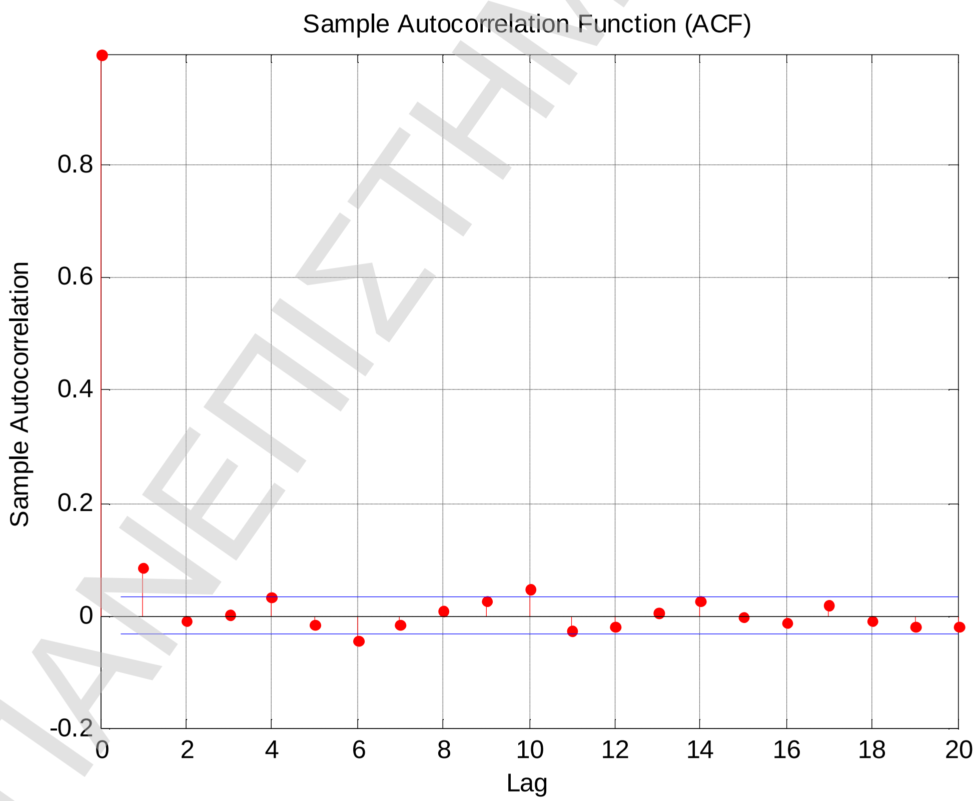

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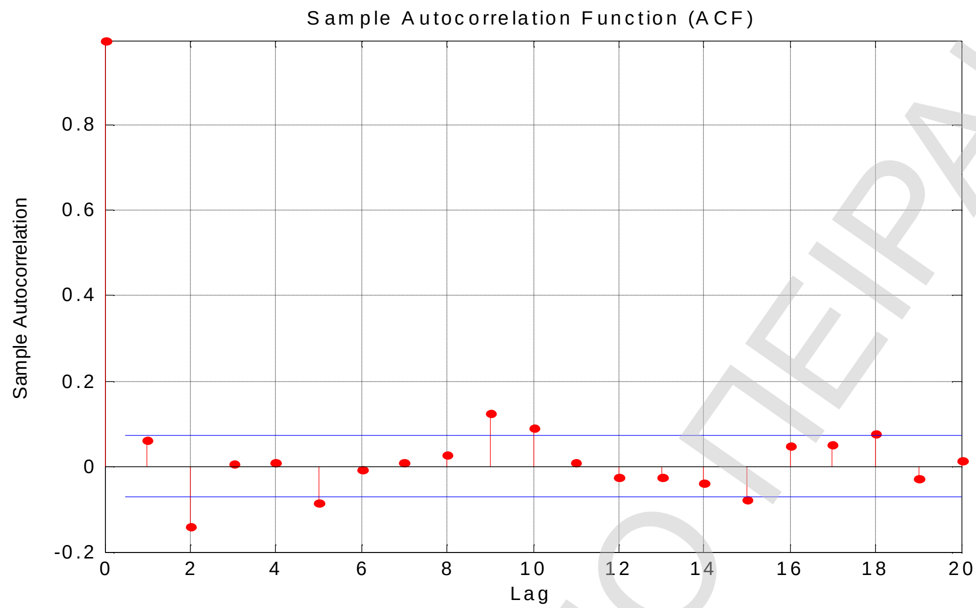

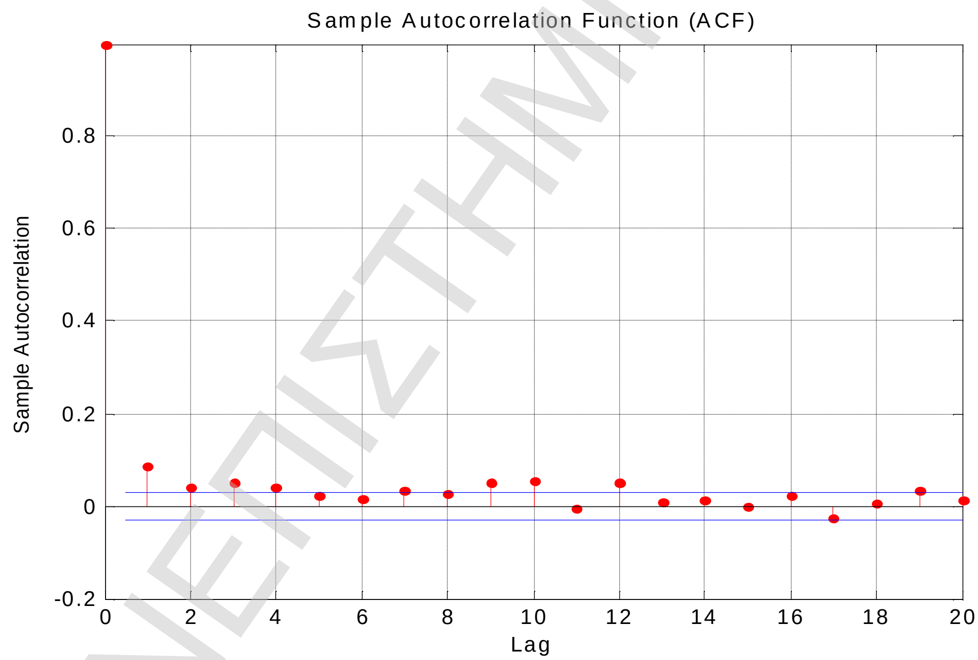

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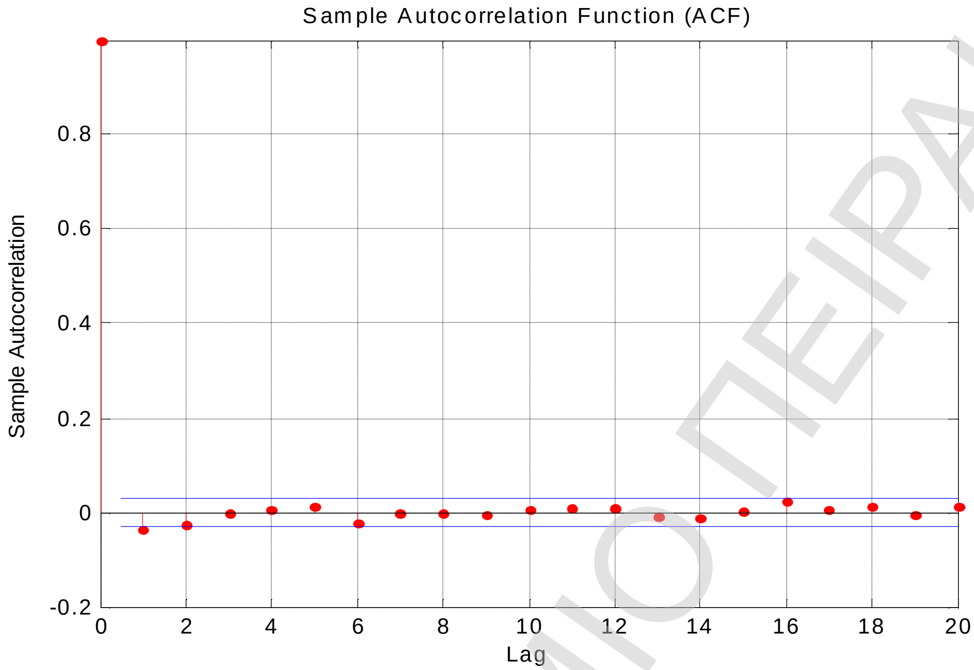
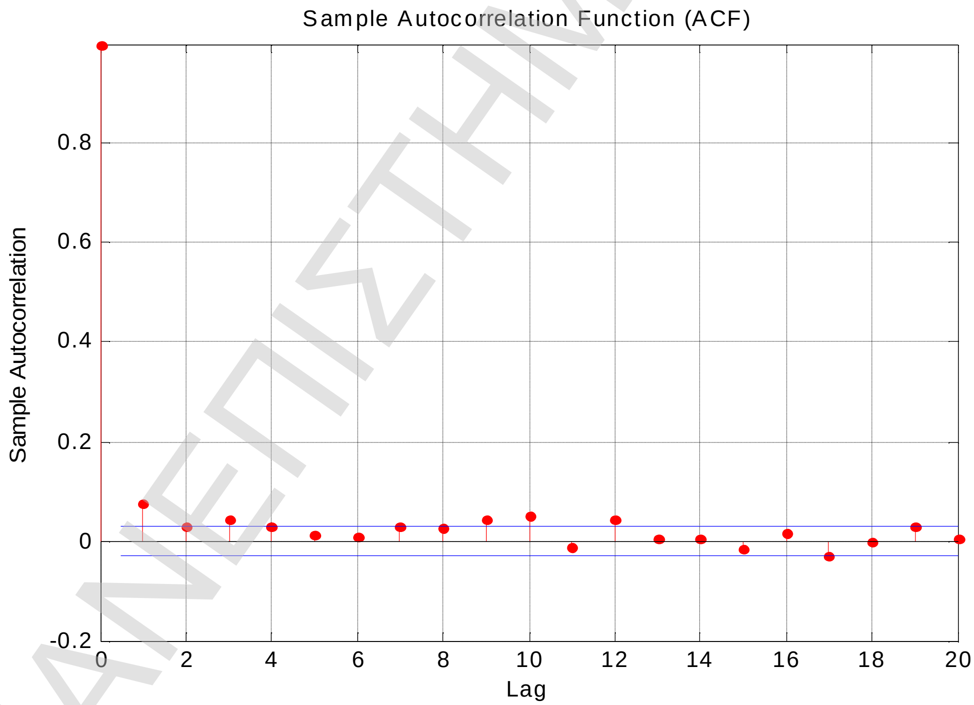
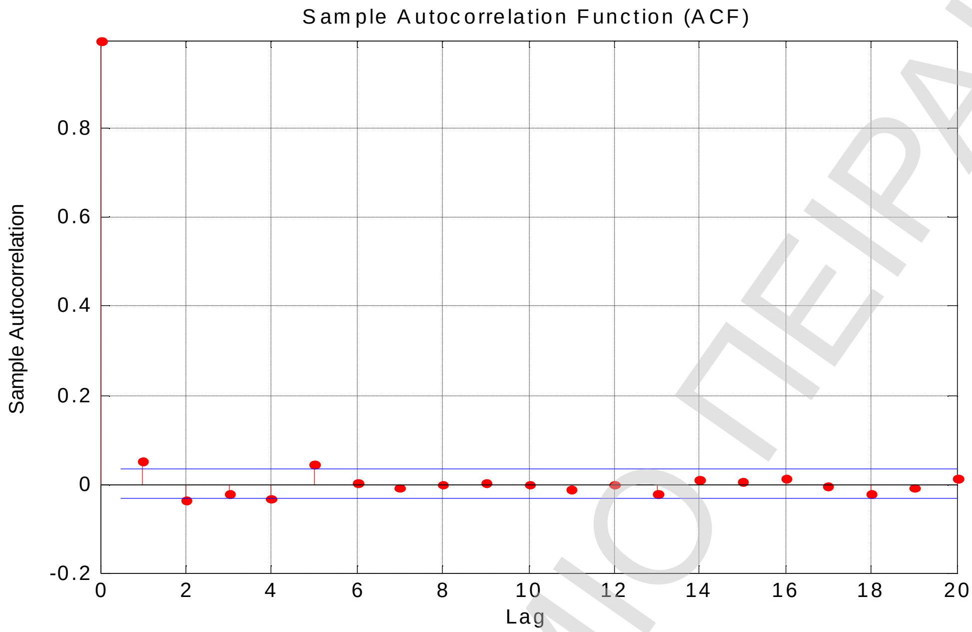
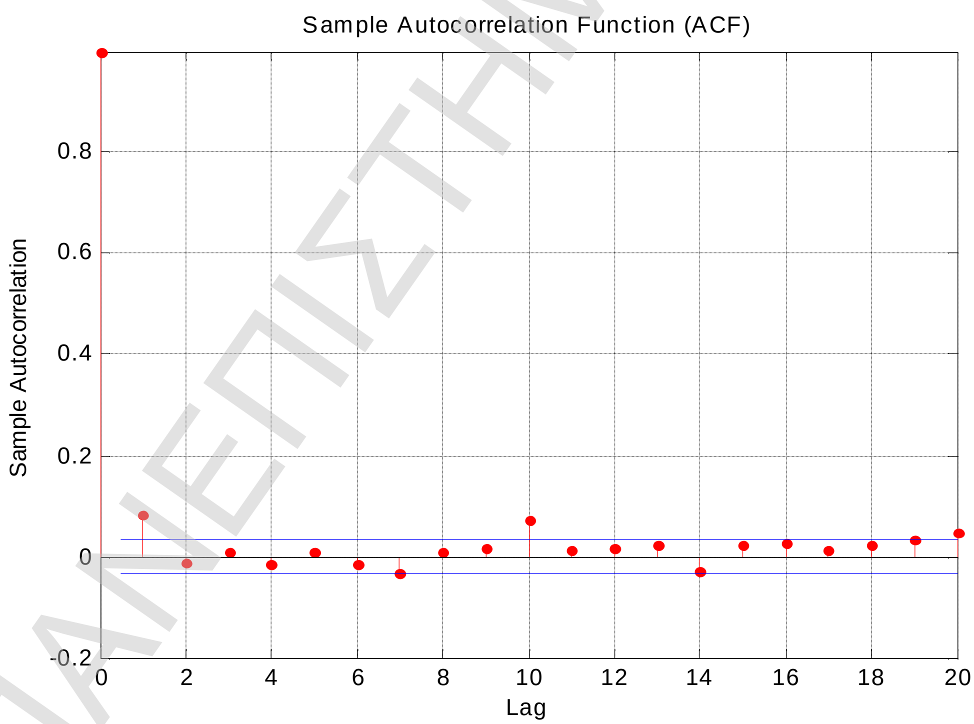




USA – INDIA PRE – LIBERALIZATION





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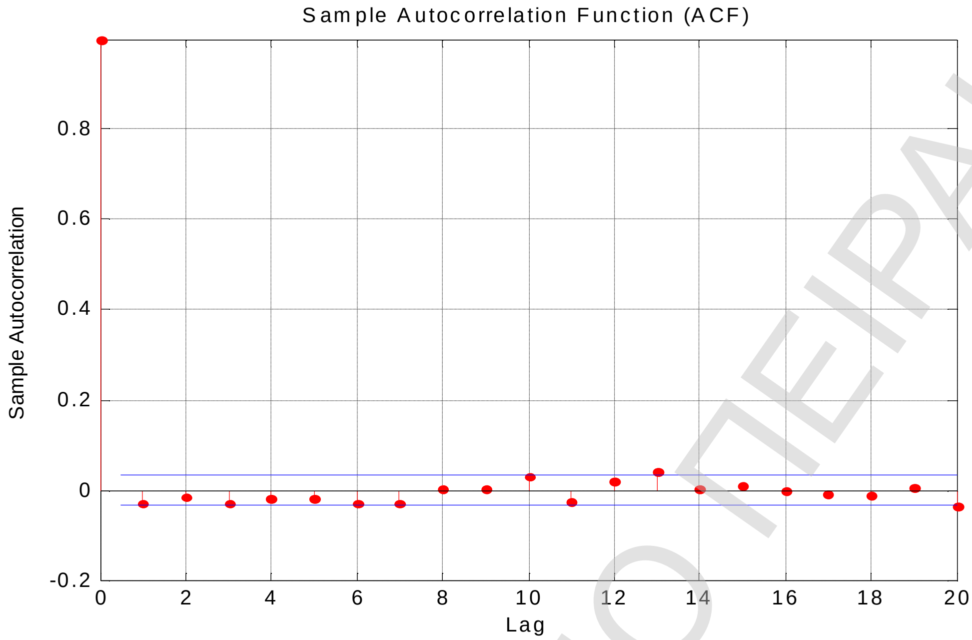

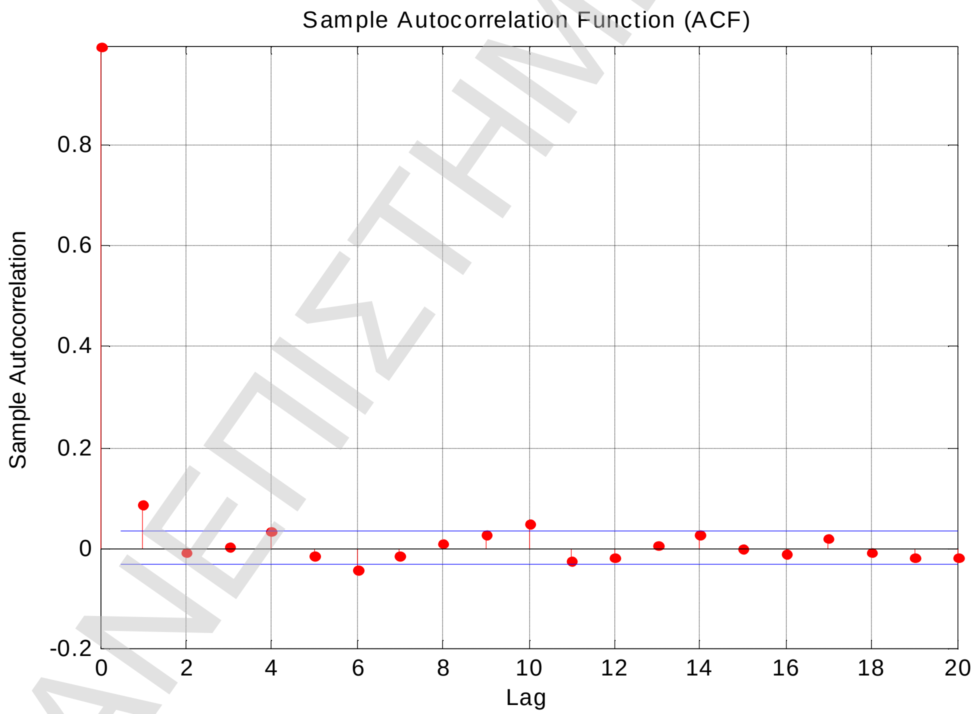

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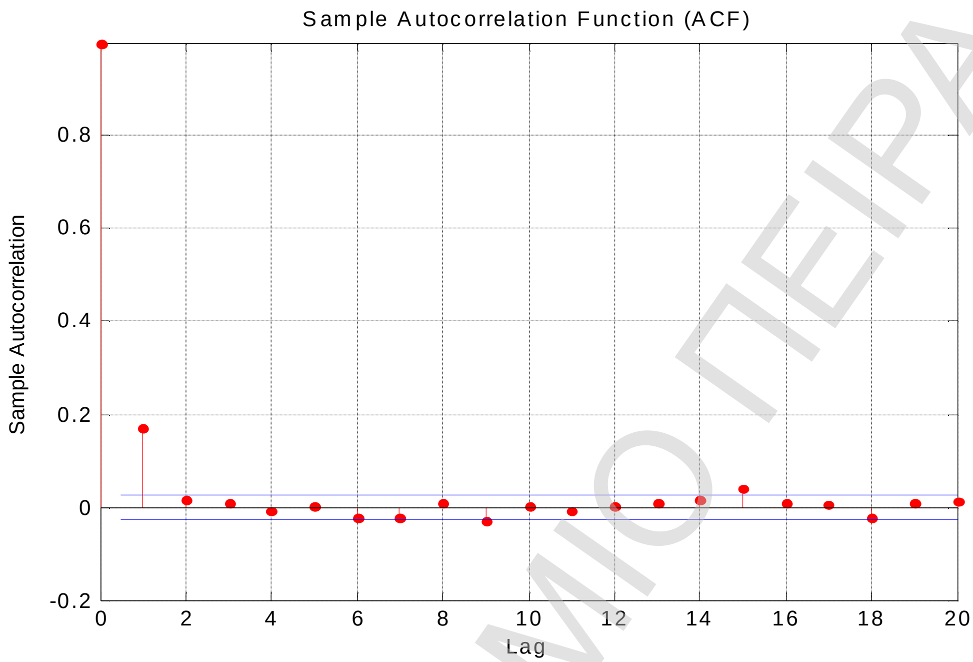

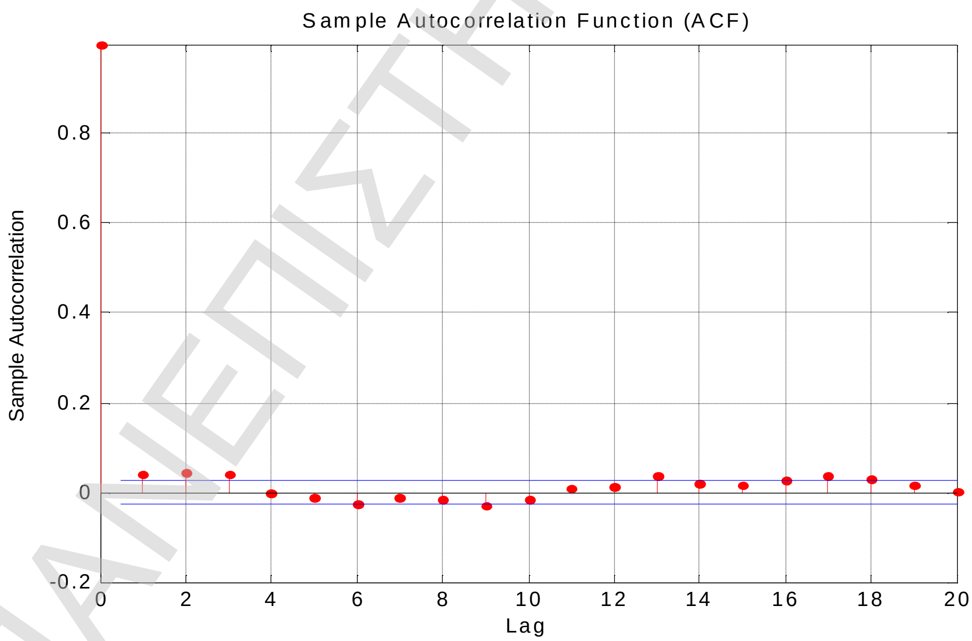

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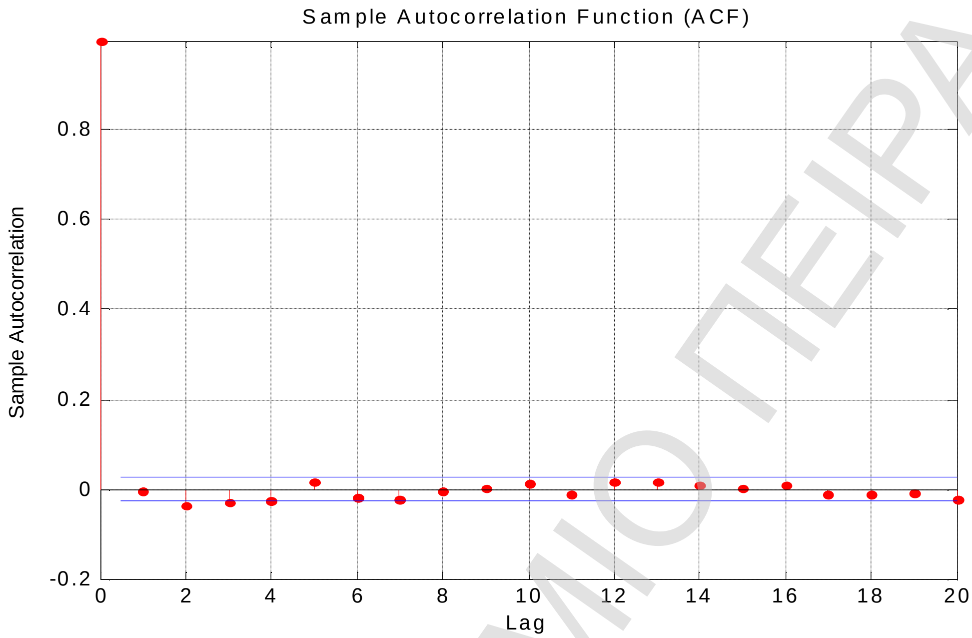

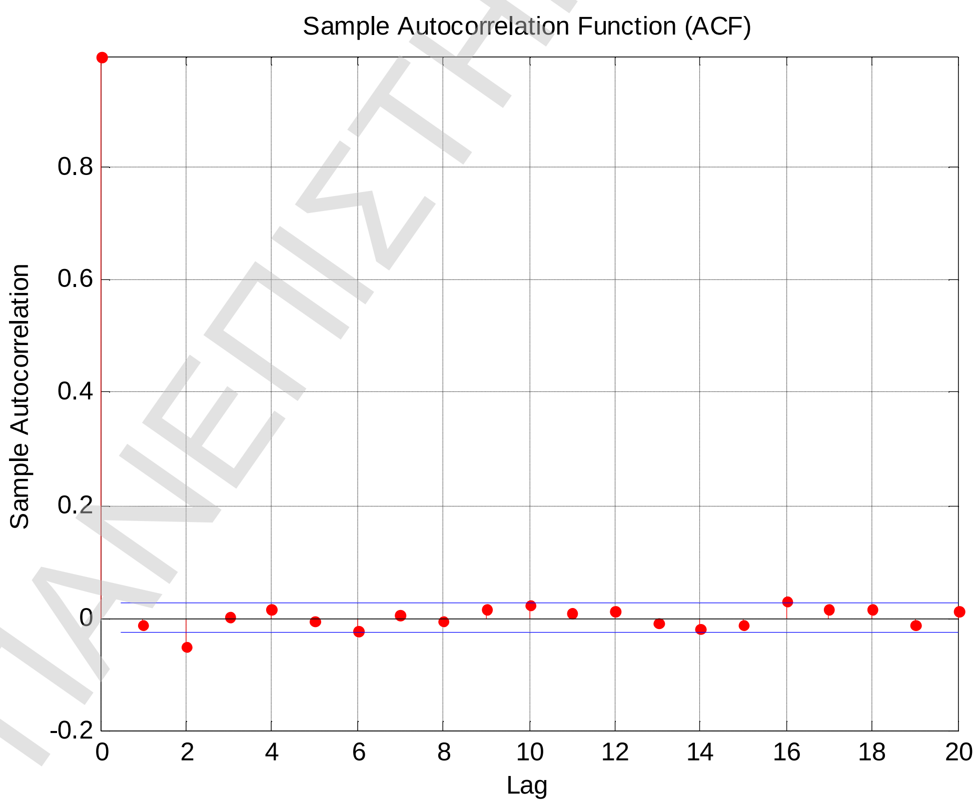

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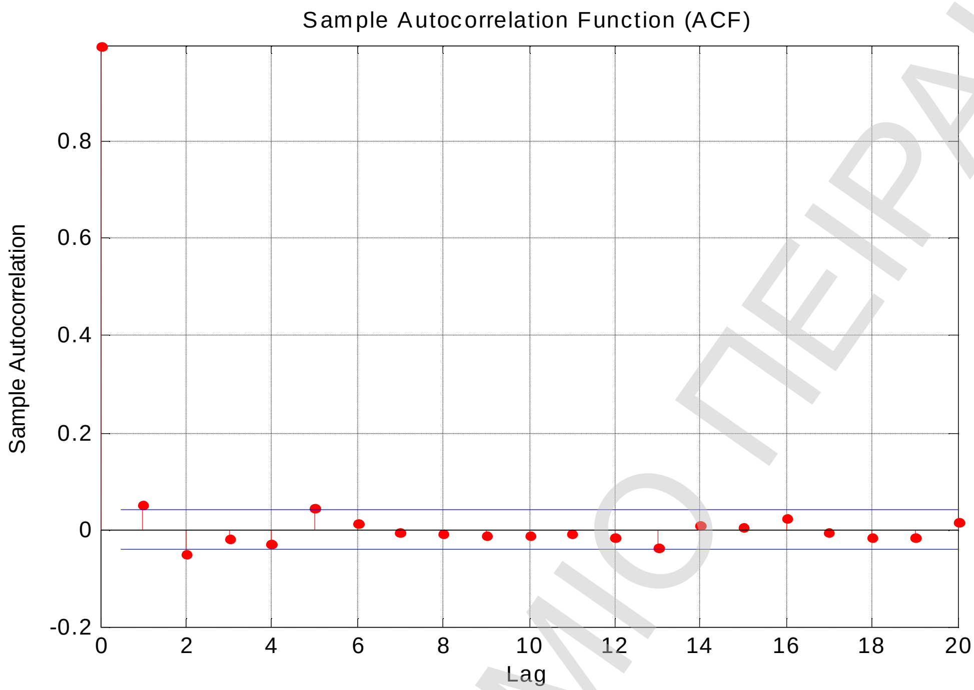

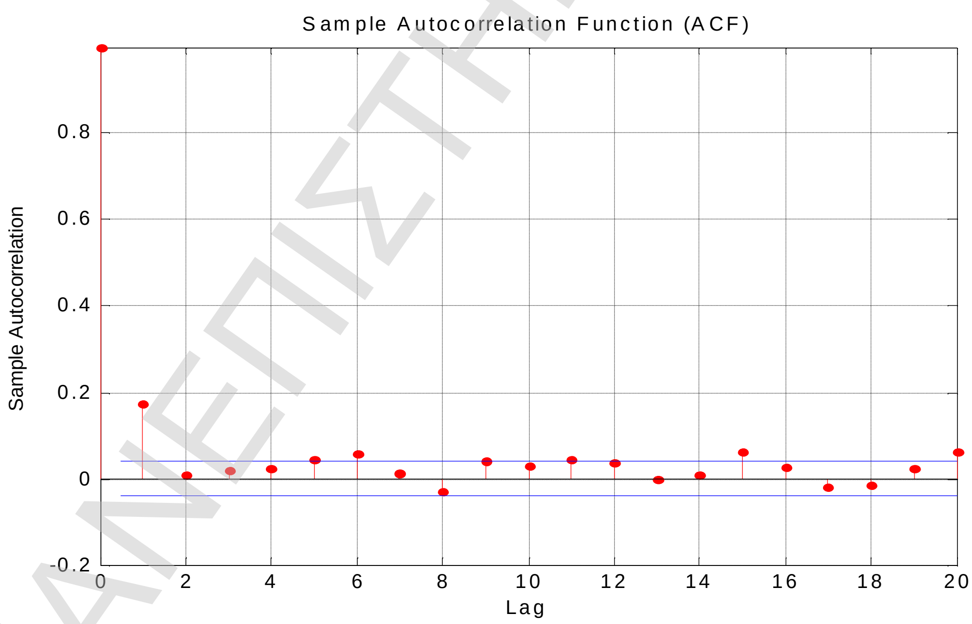

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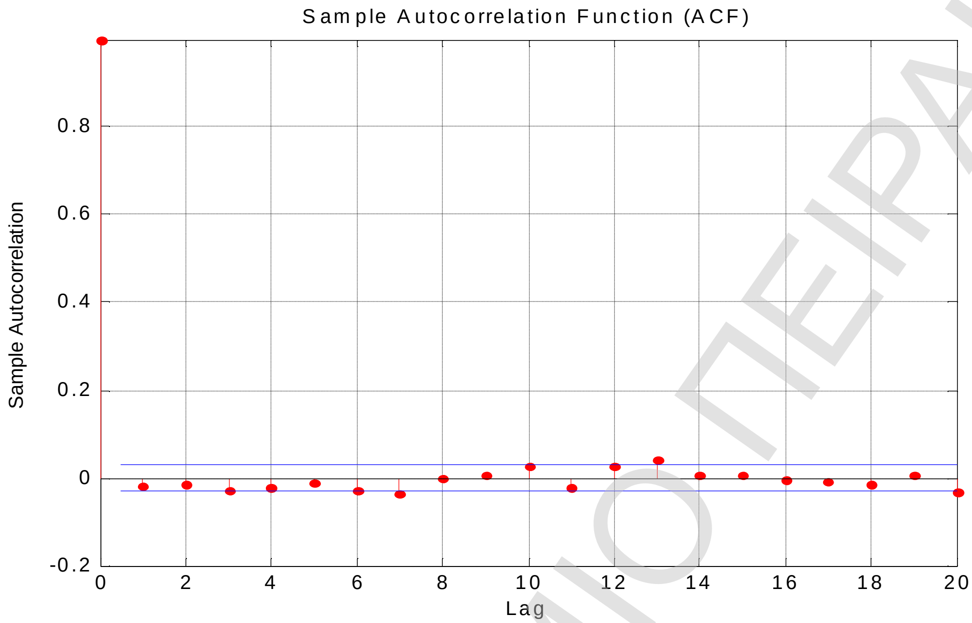

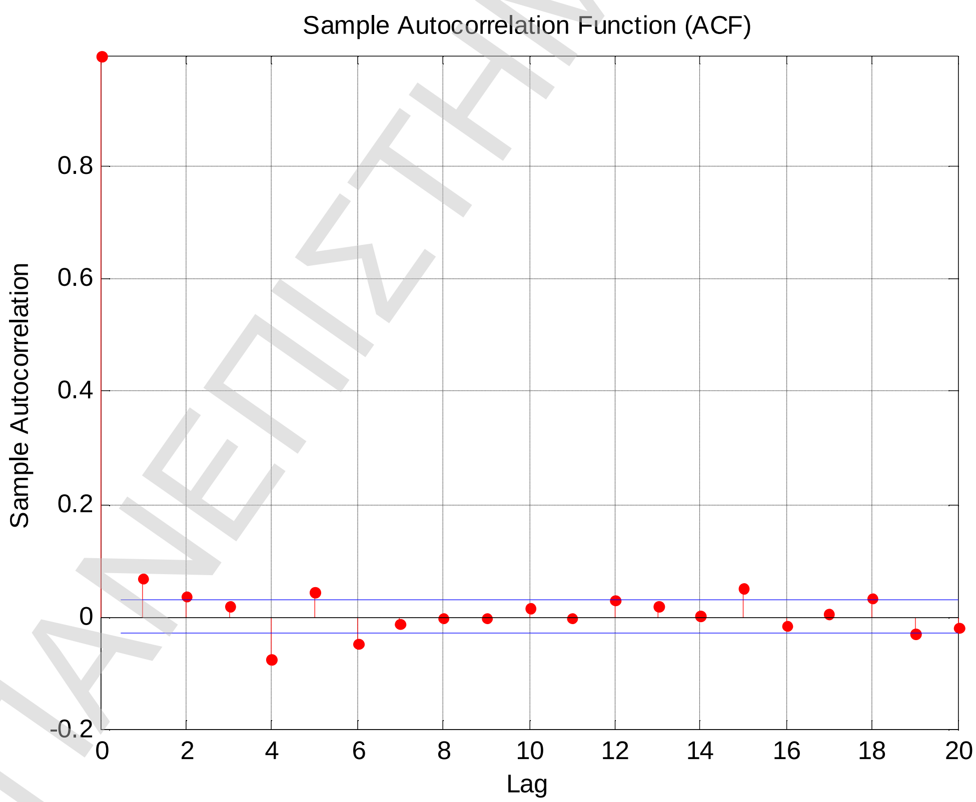

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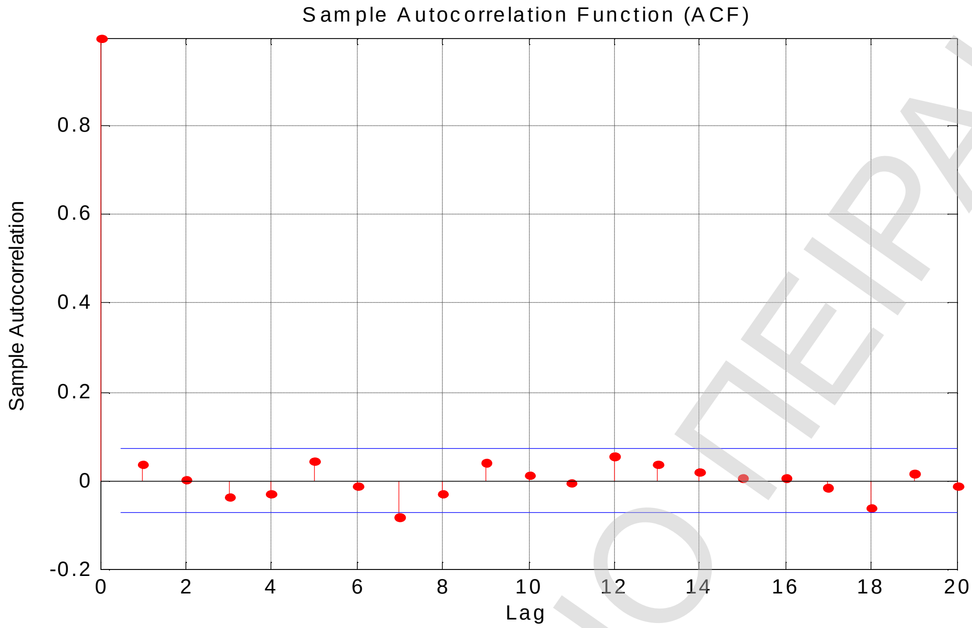

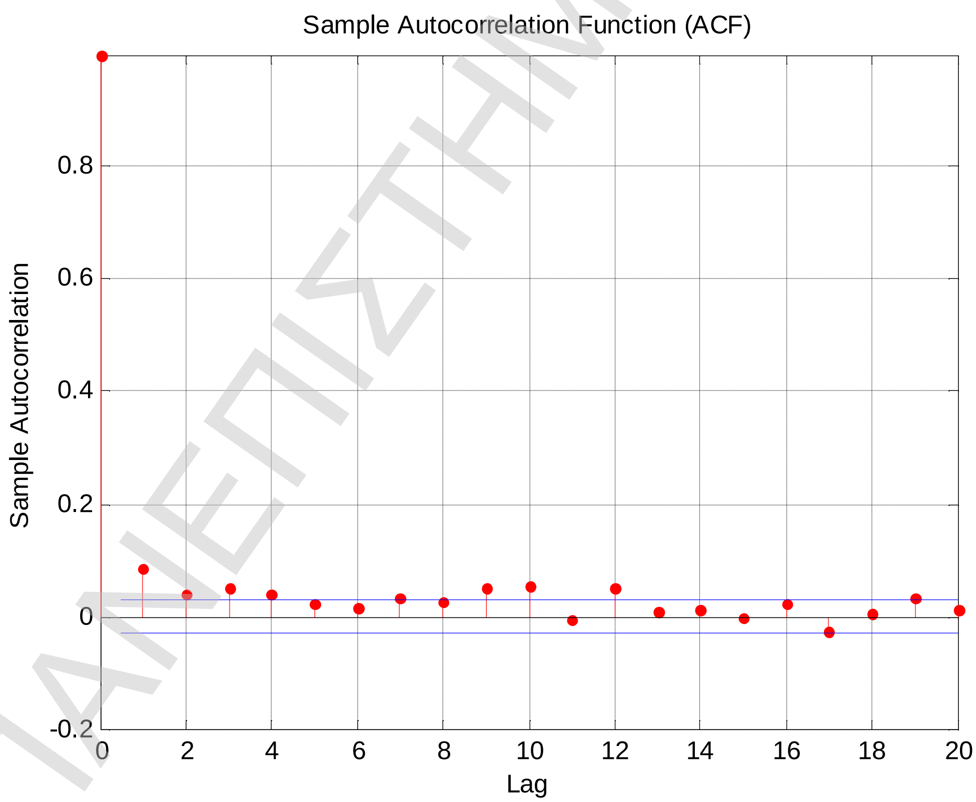

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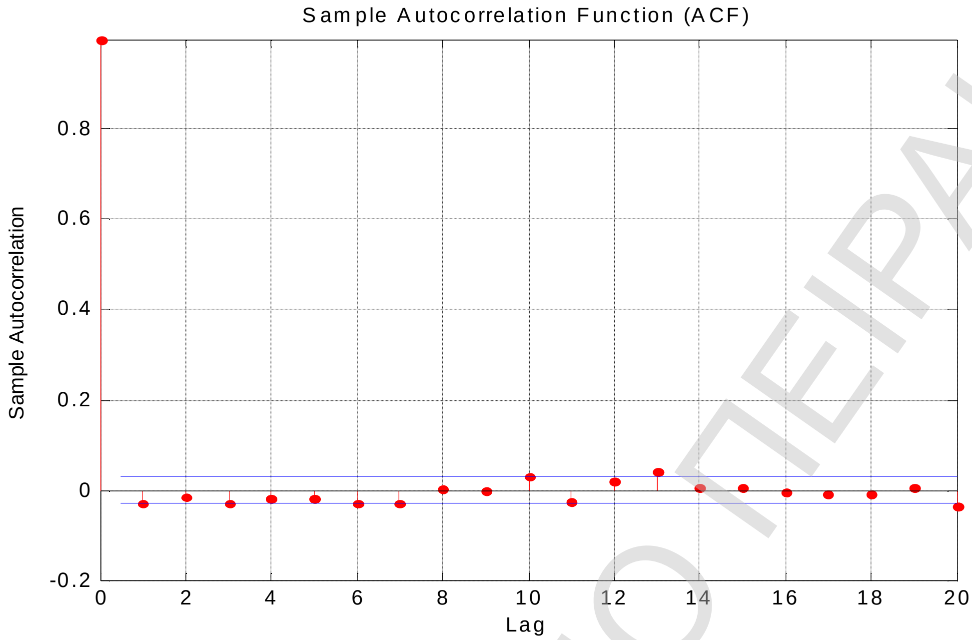

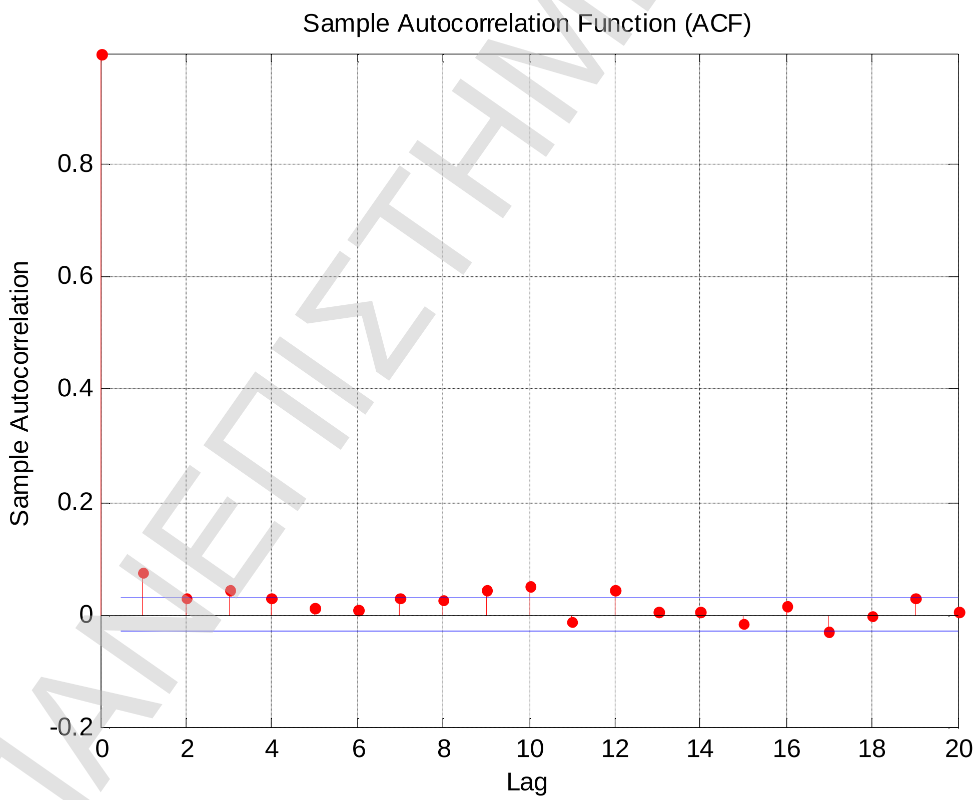

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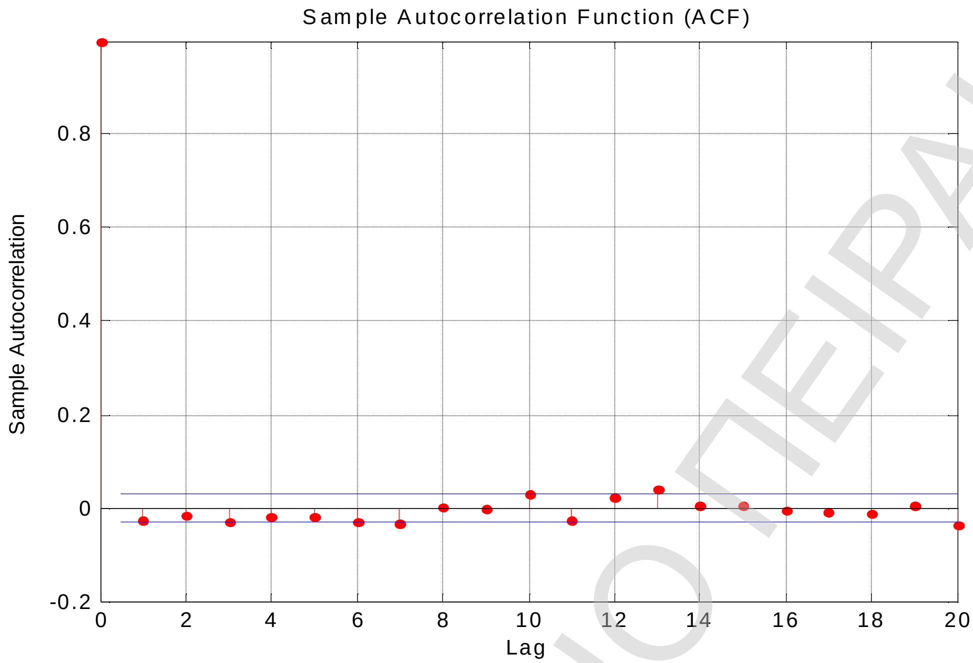

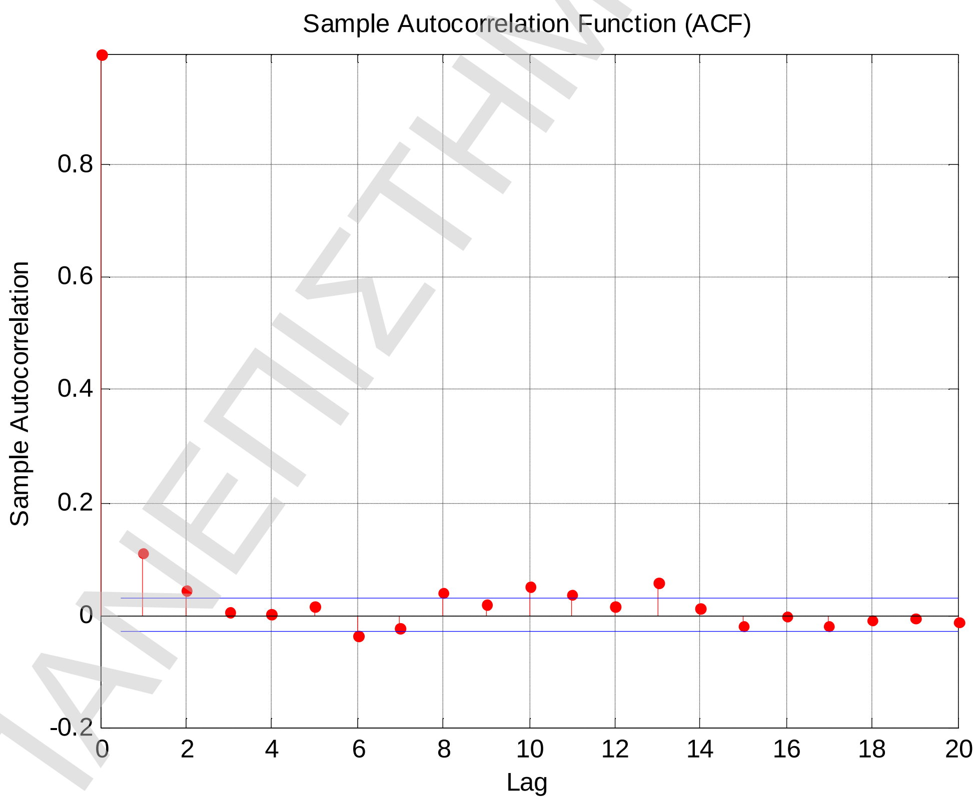

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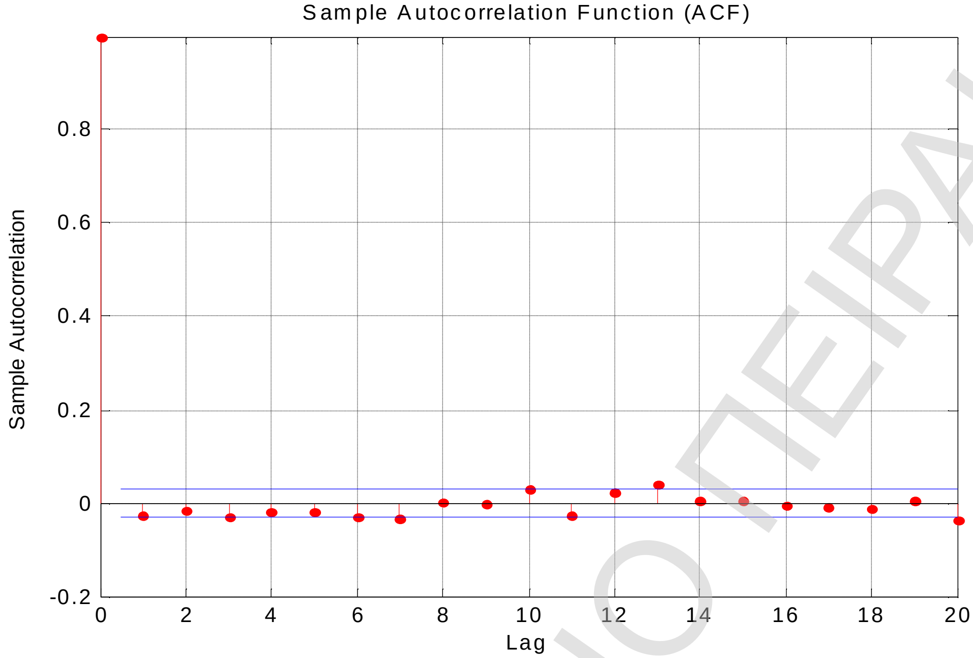

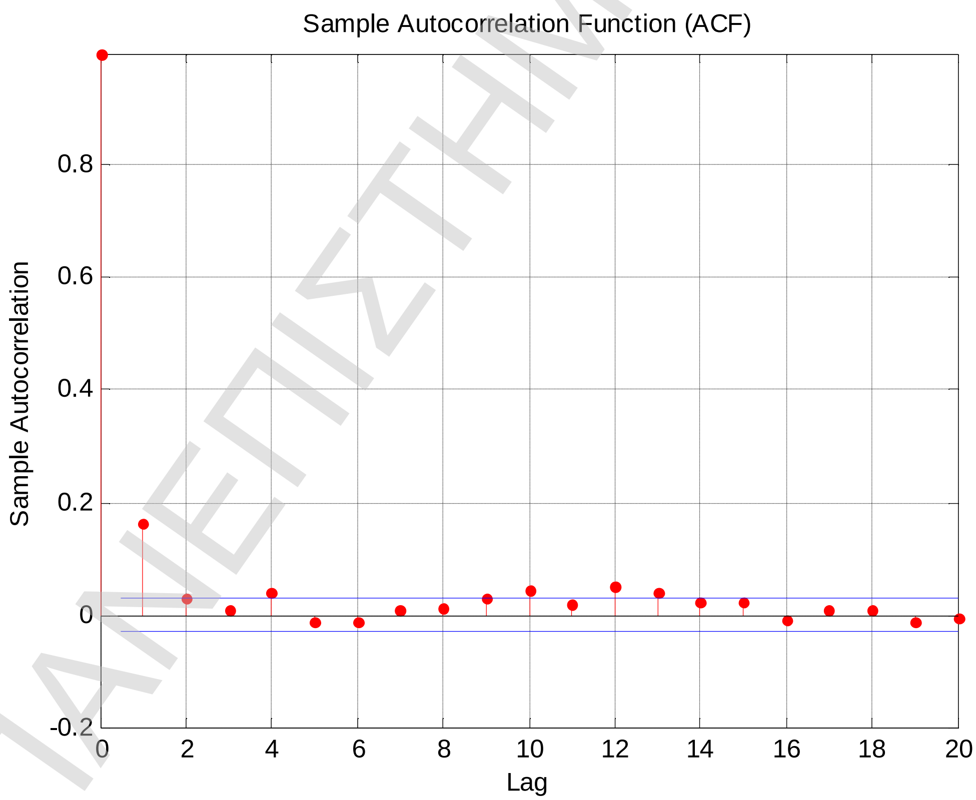

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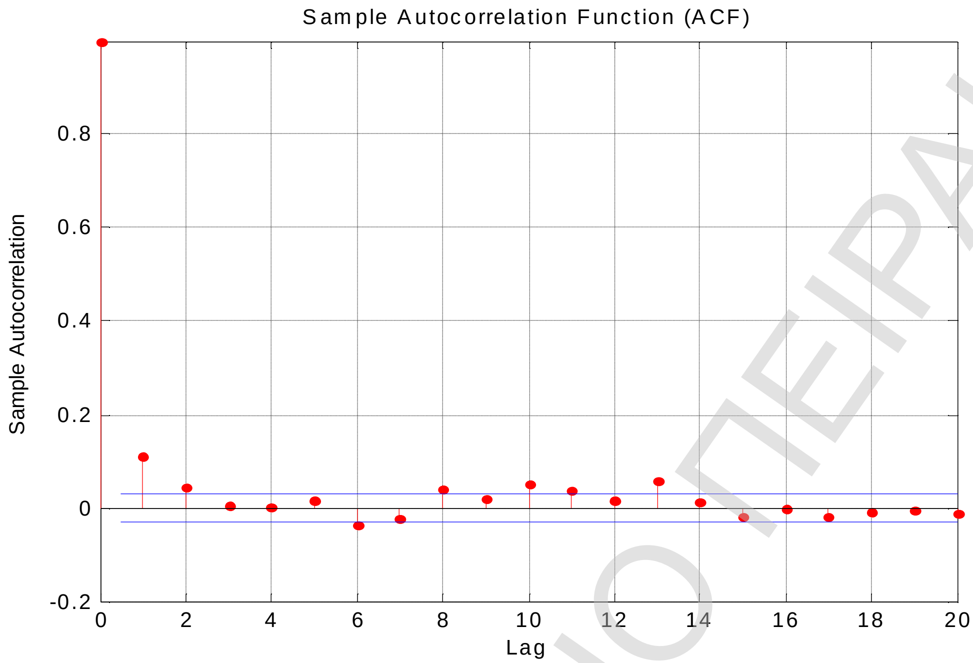

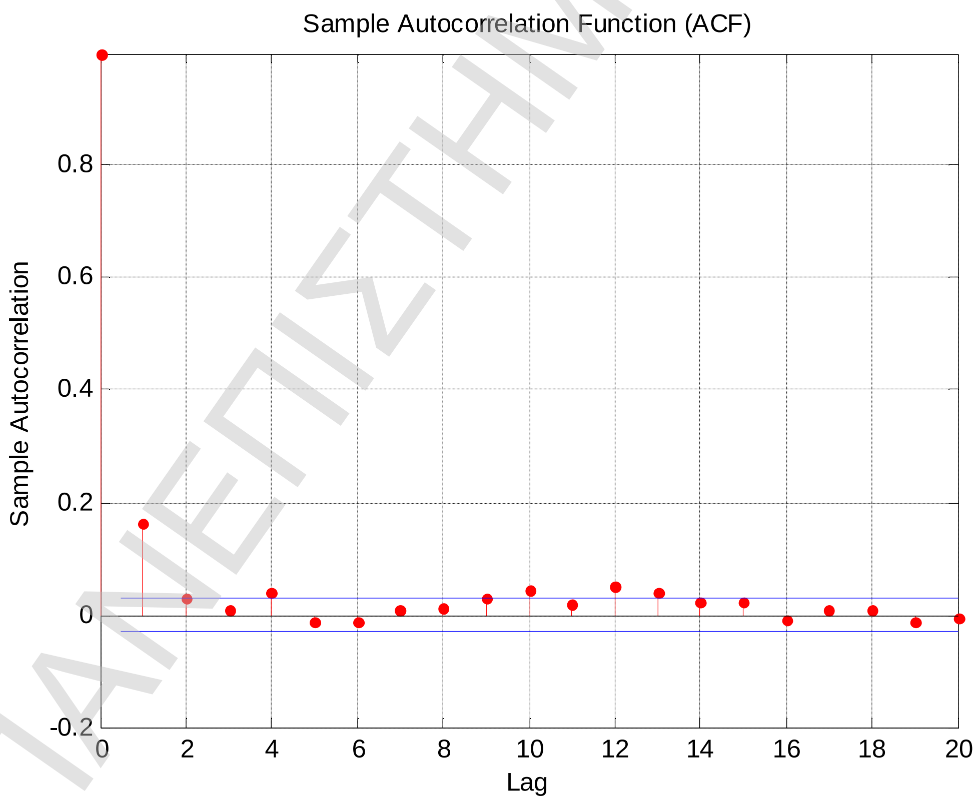

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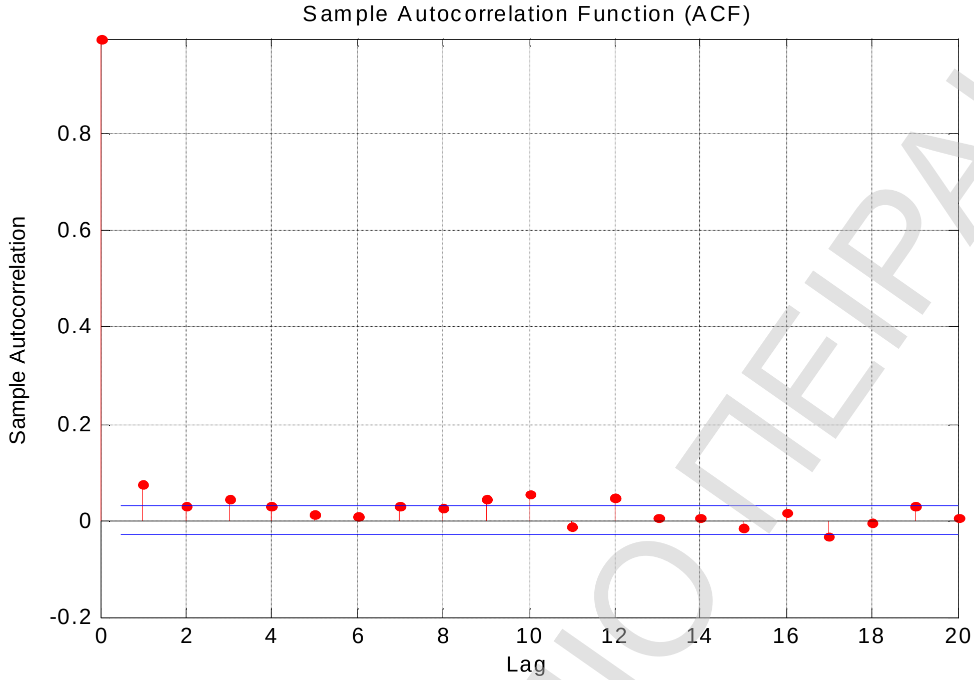

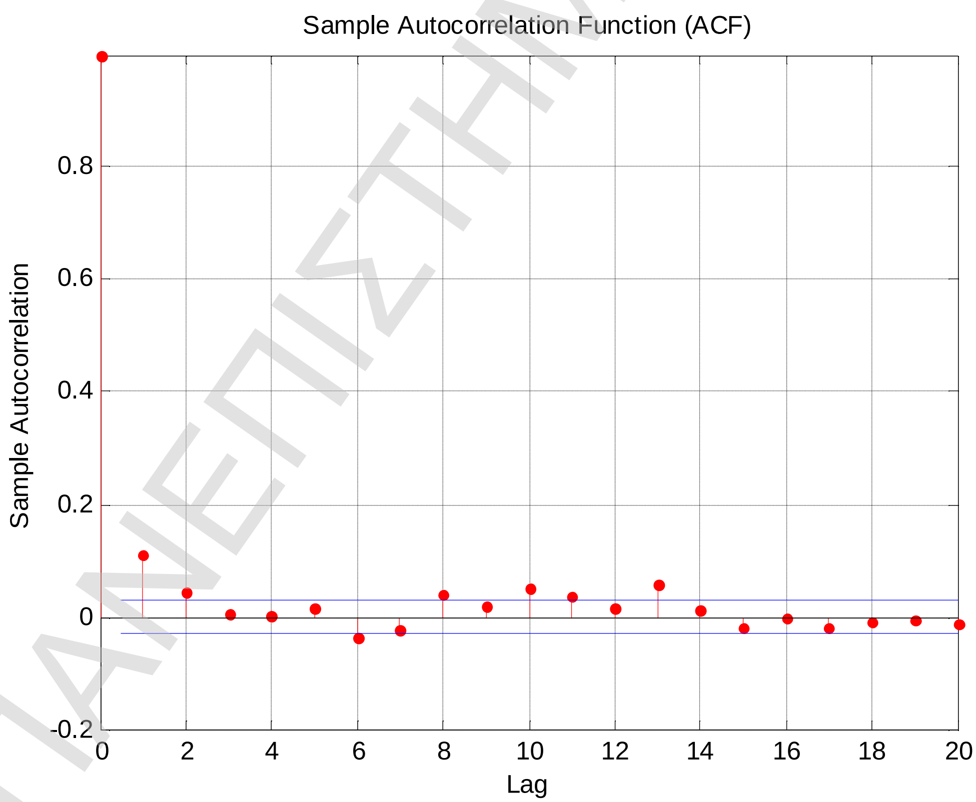

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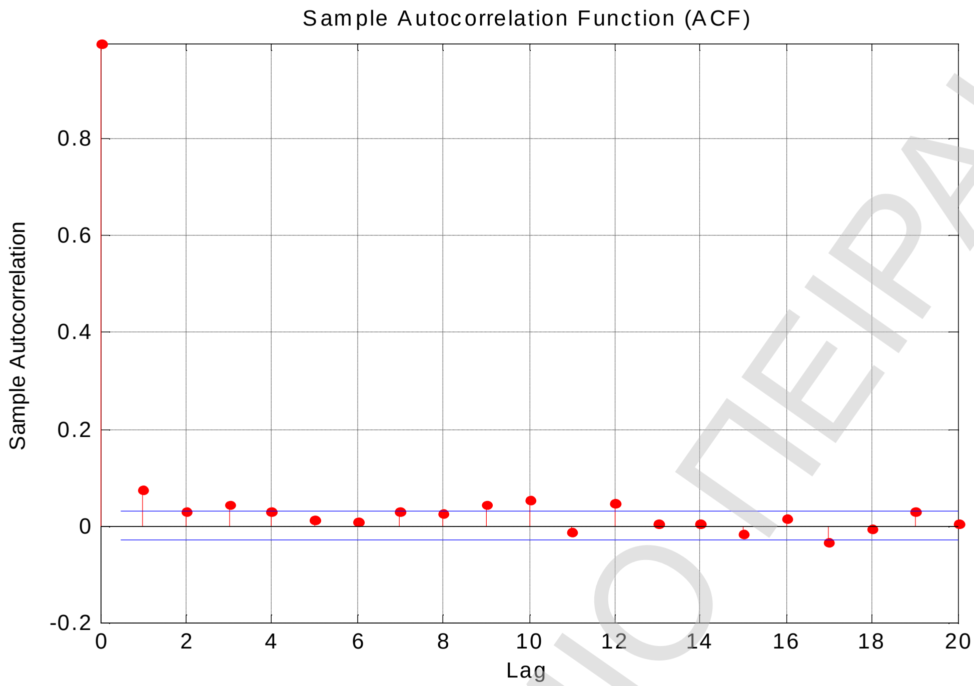

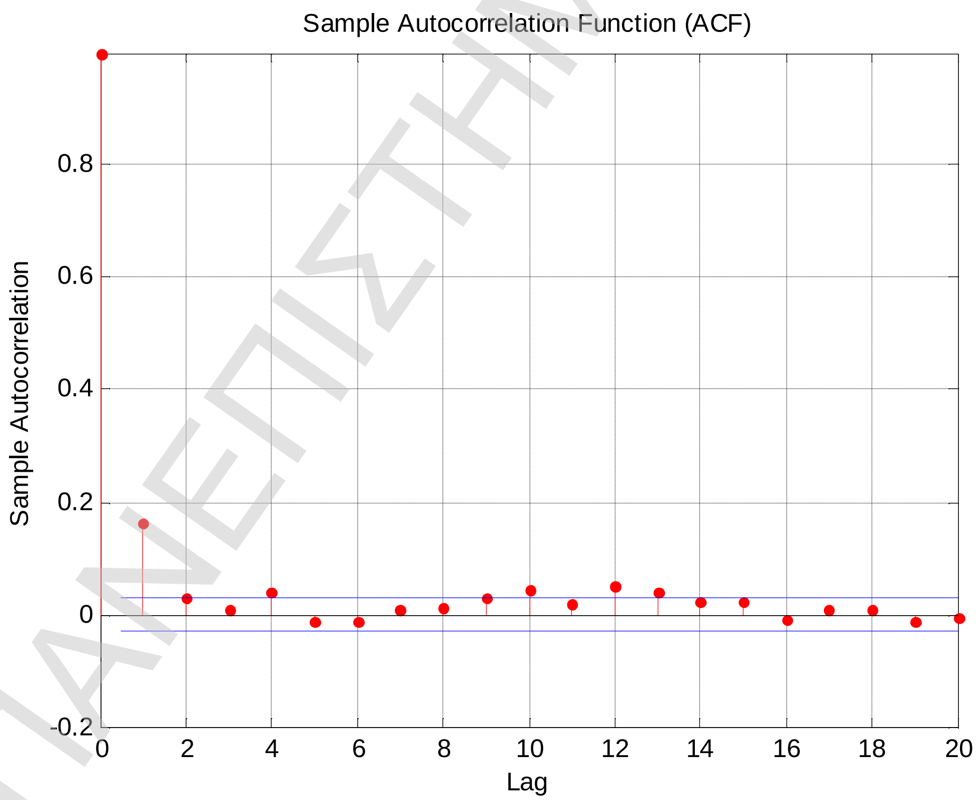

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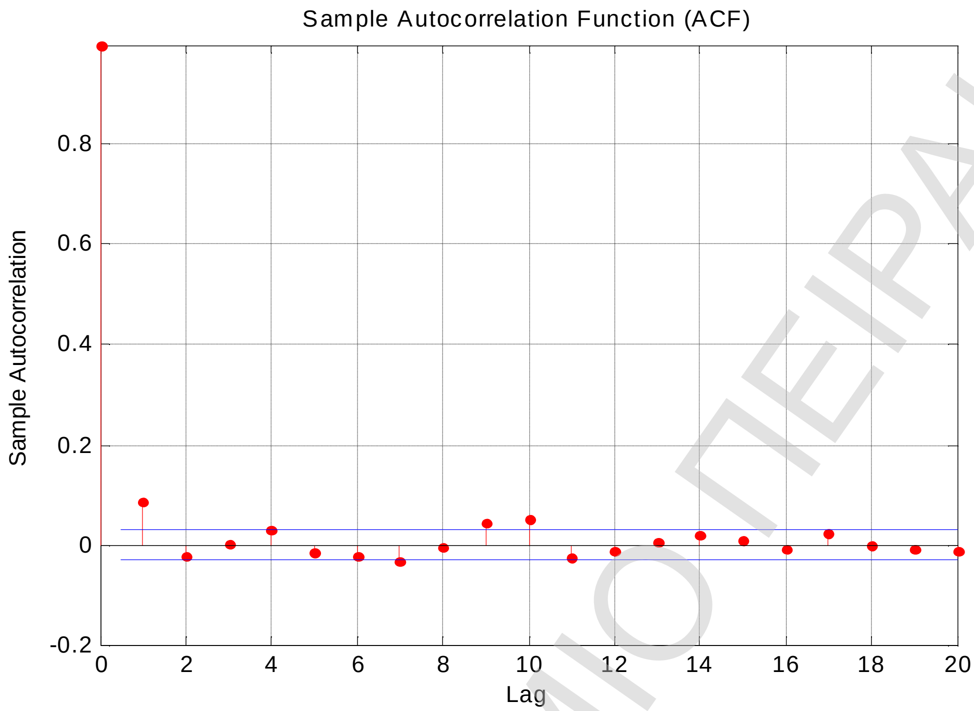

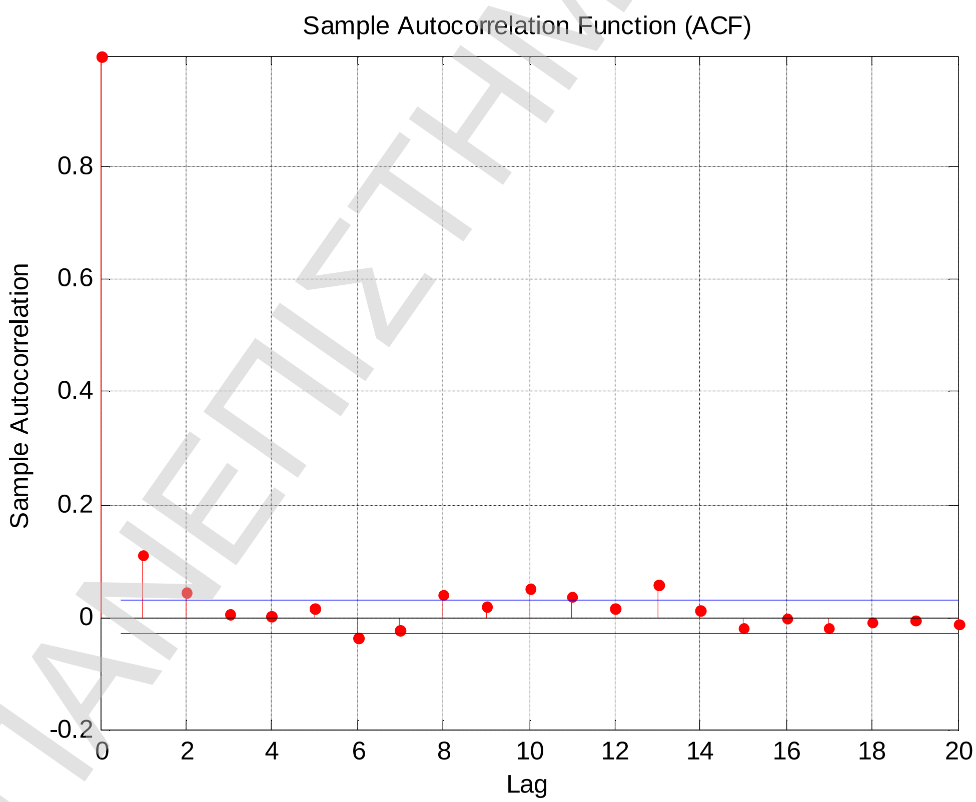

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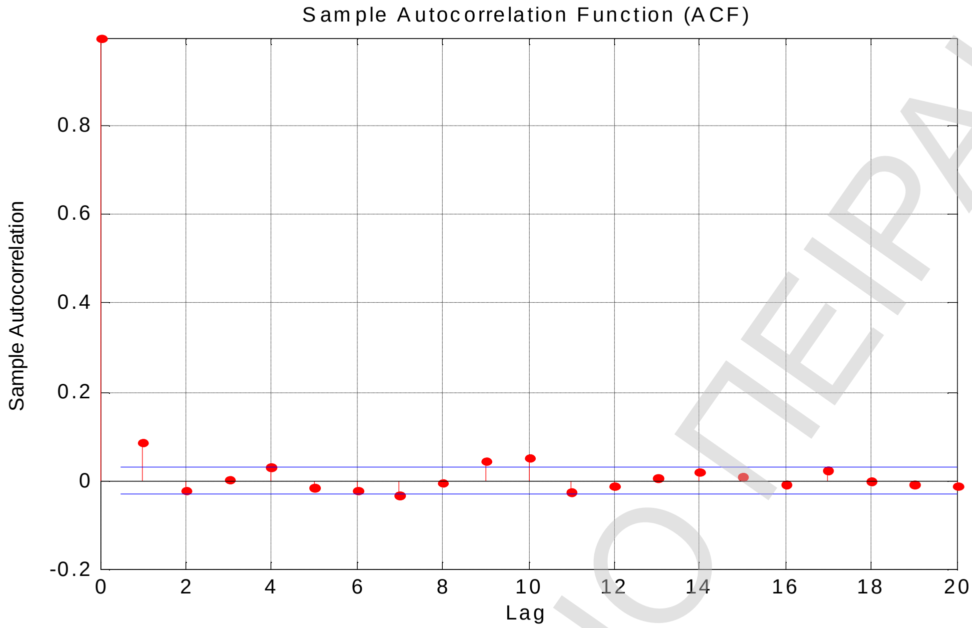

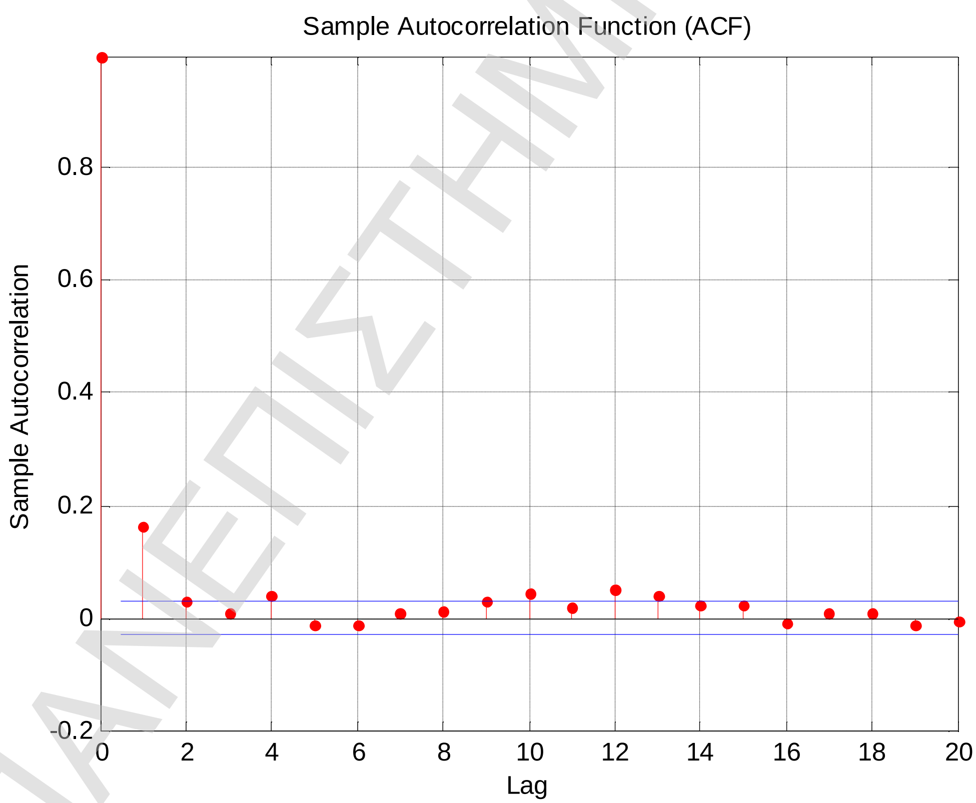

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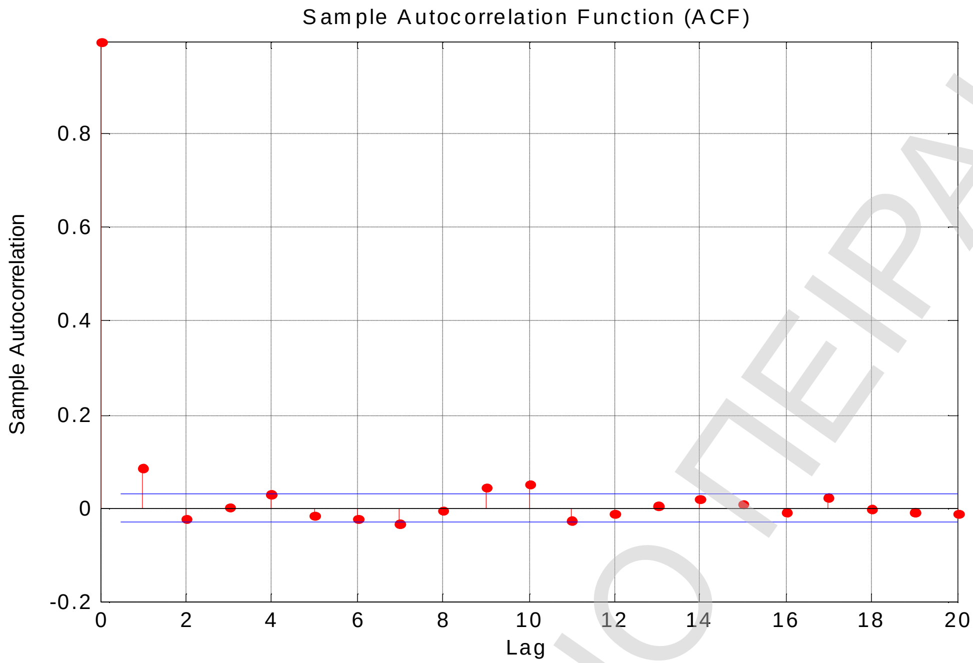

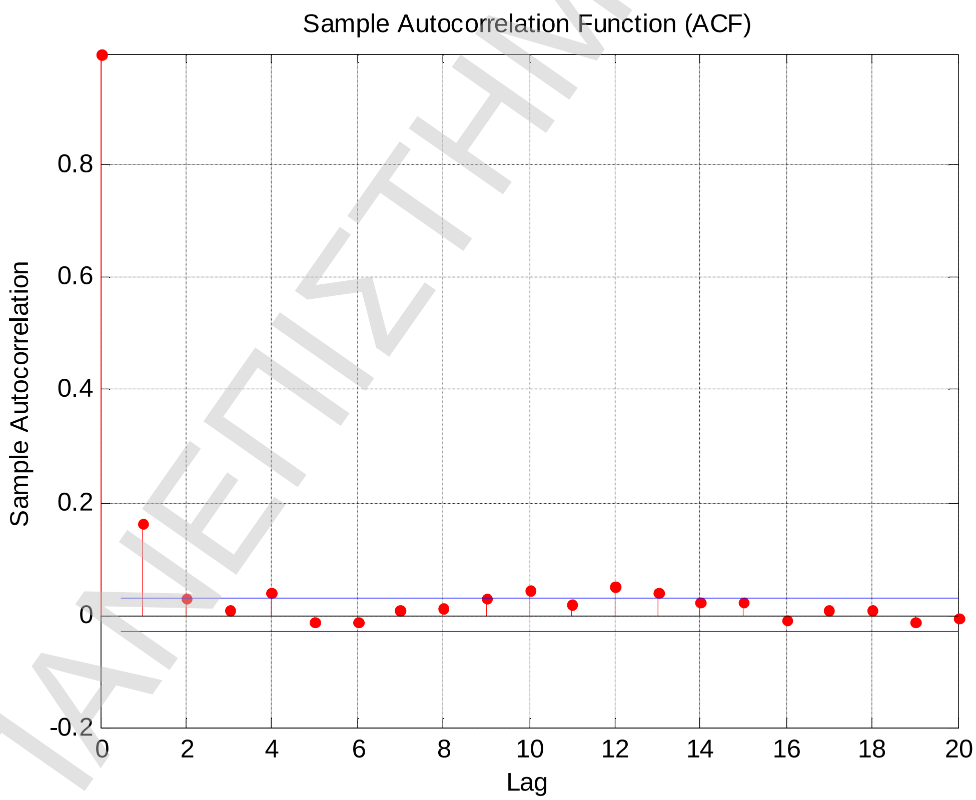

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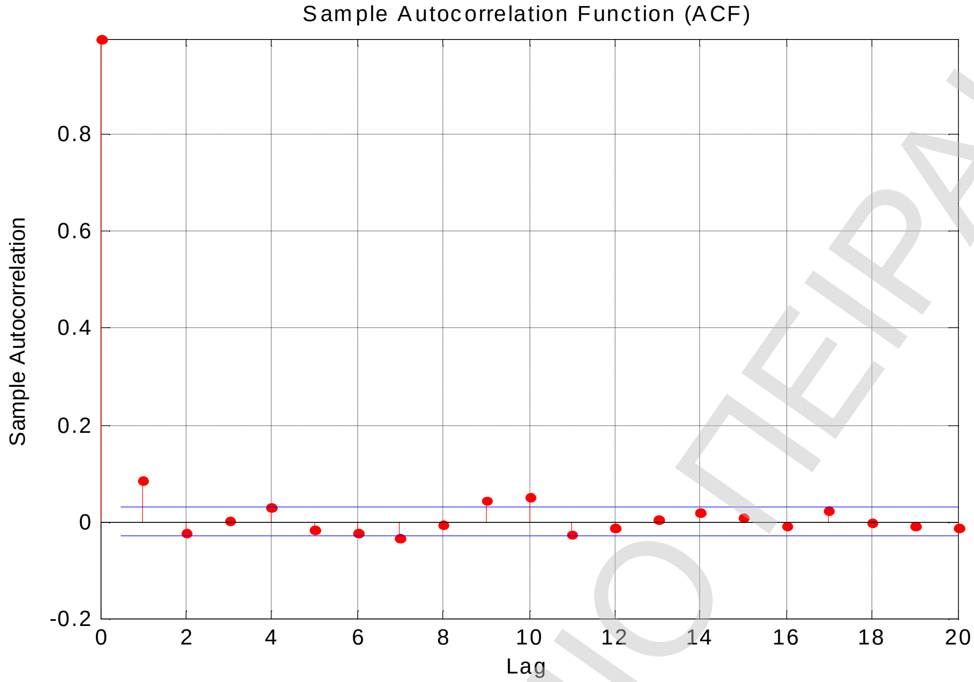
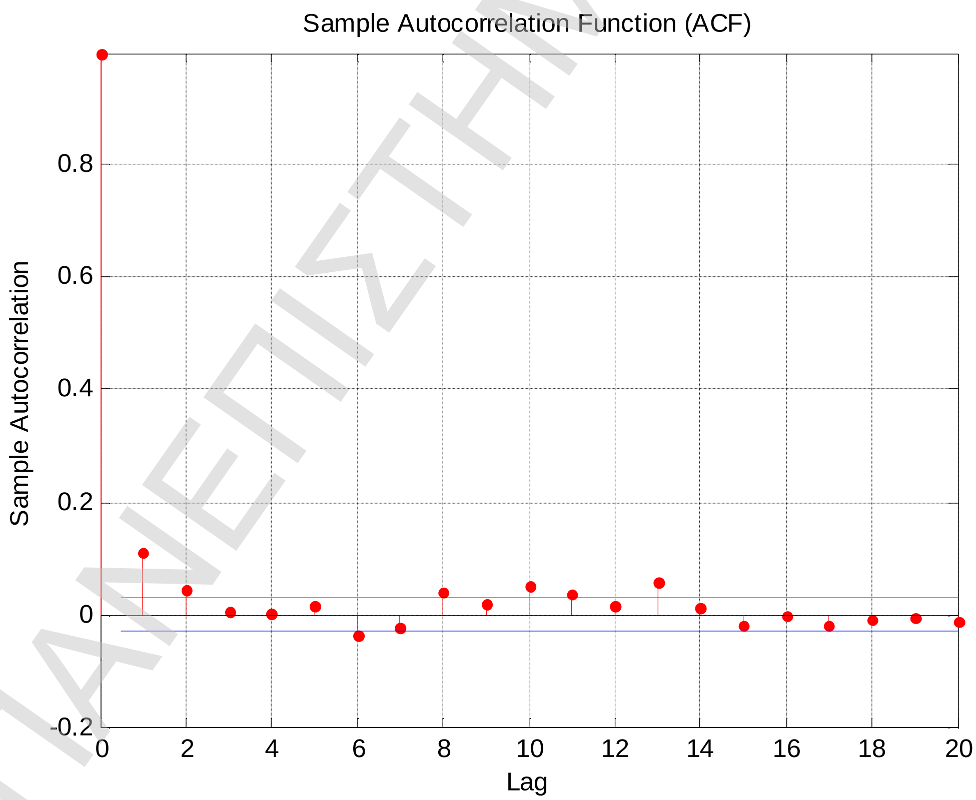
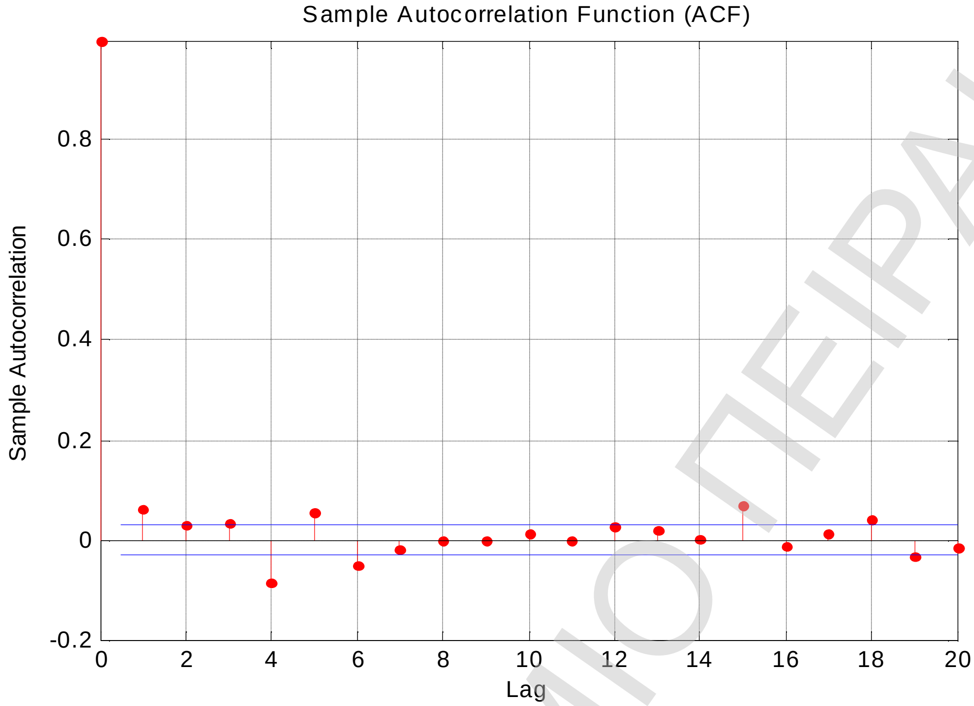
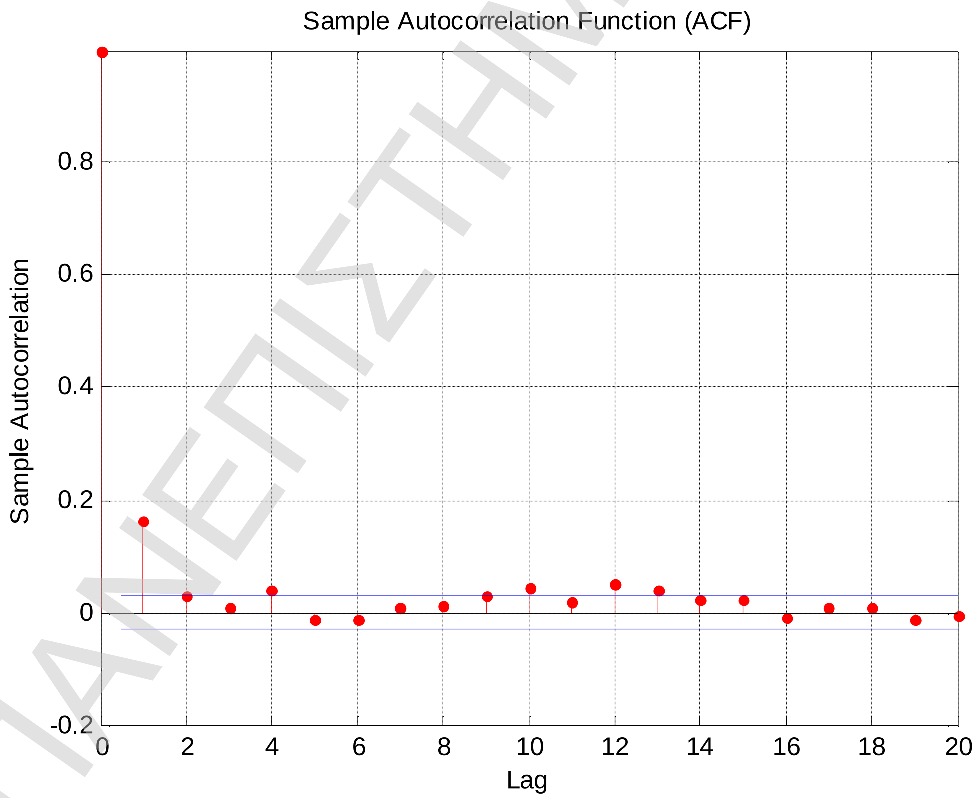




MALAYSIA – PHILIPPINES POST – LIBERALIZATION





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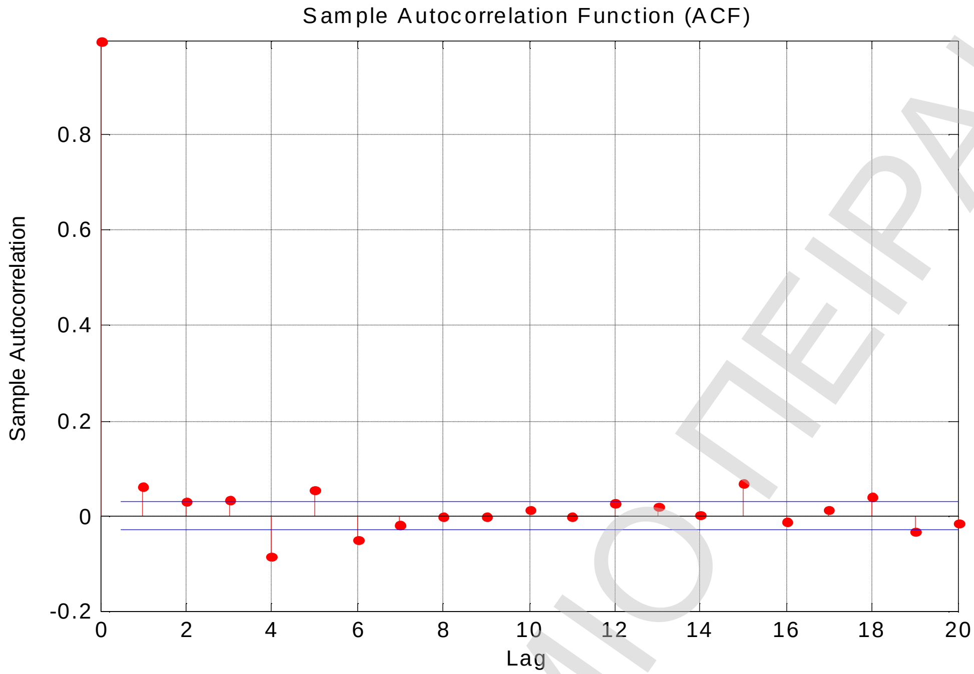

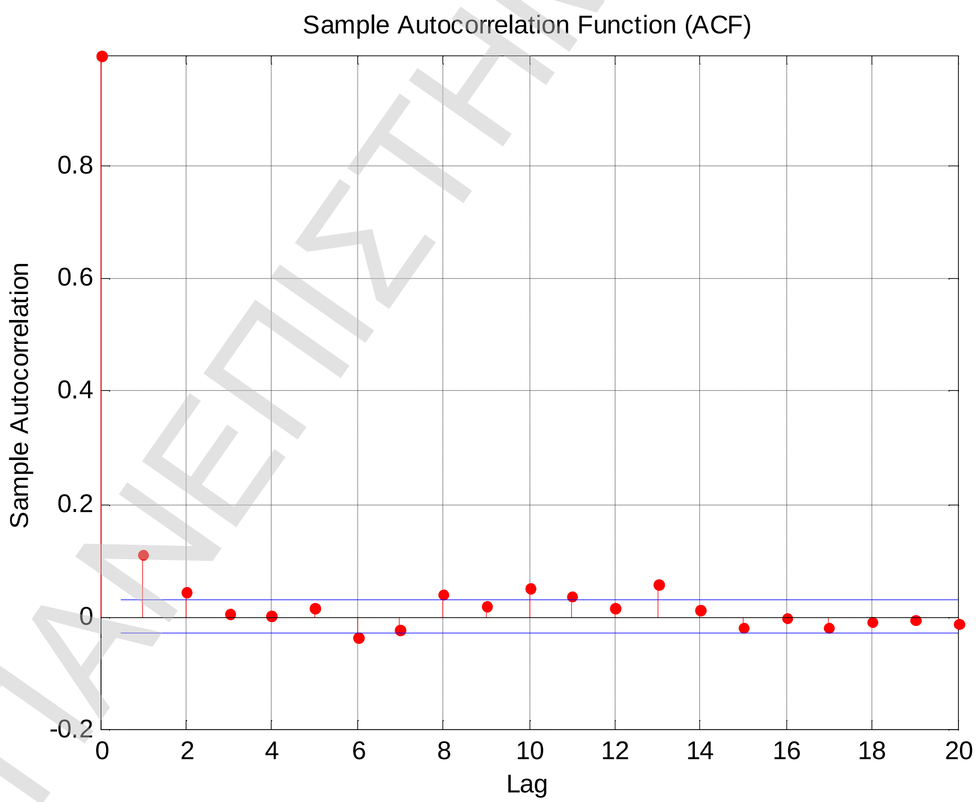

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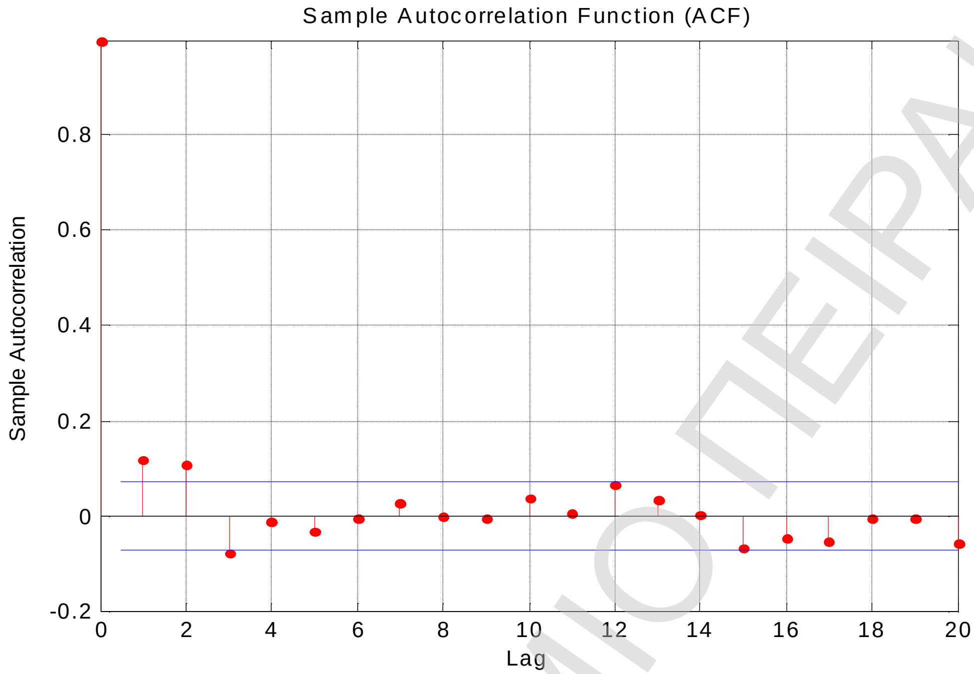

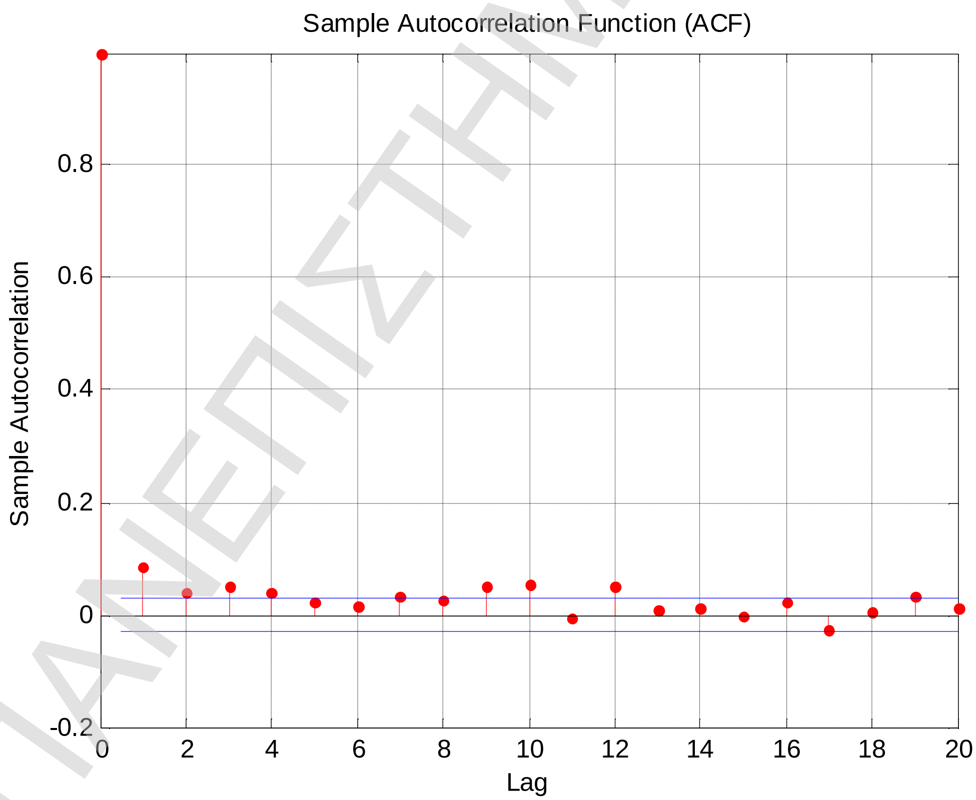

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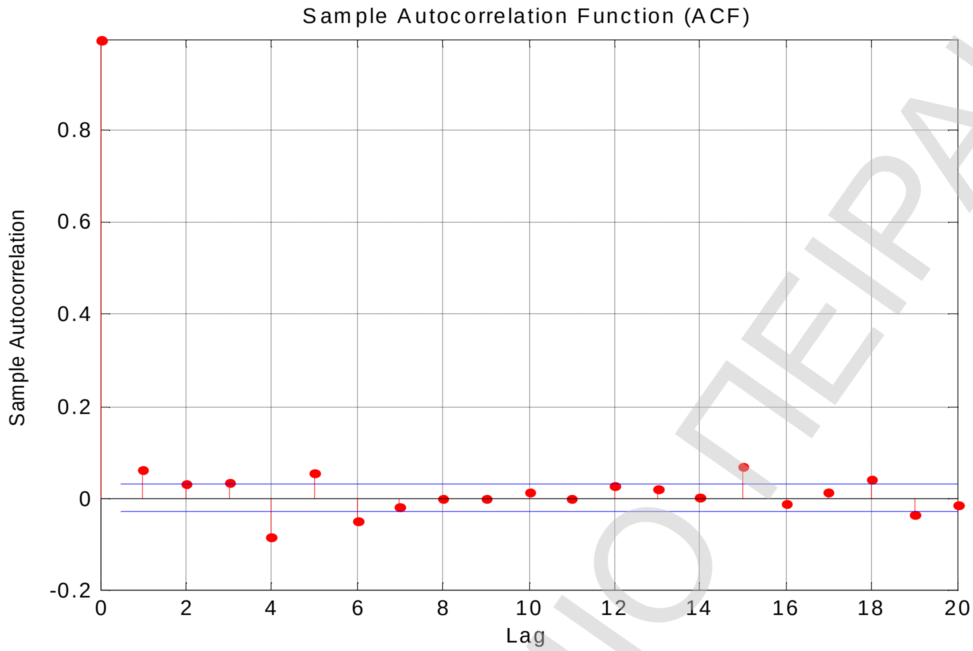

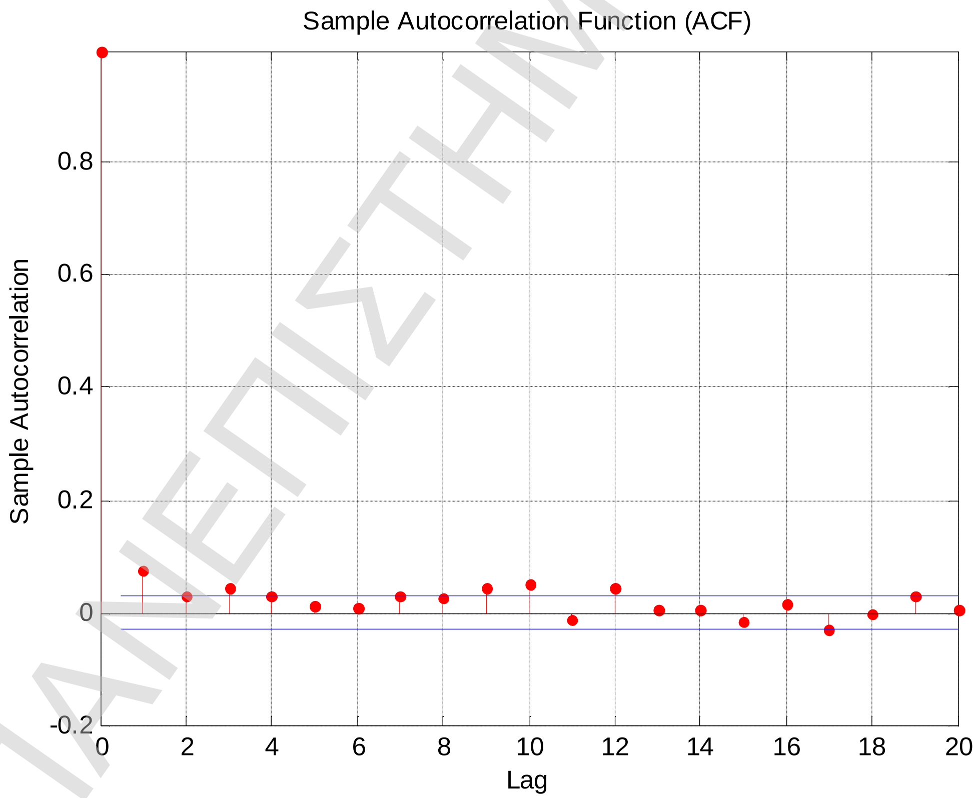

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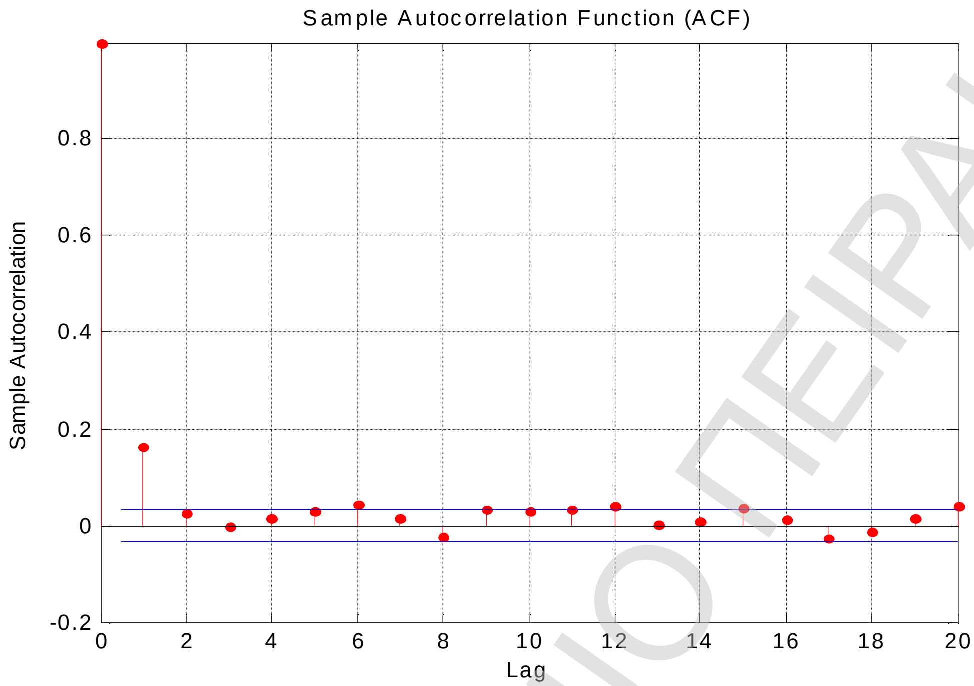
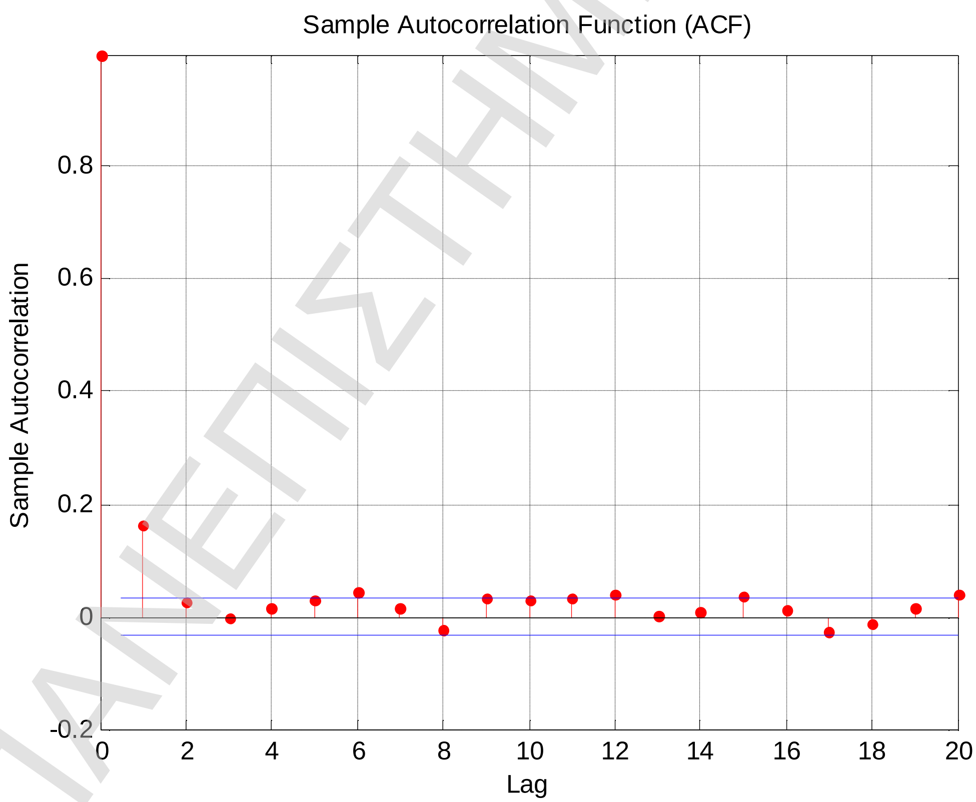
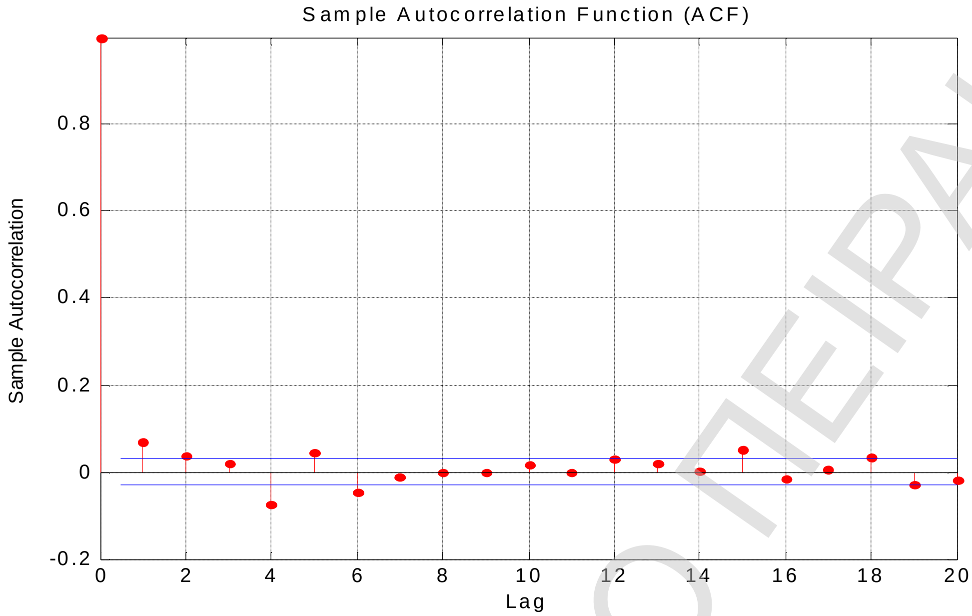
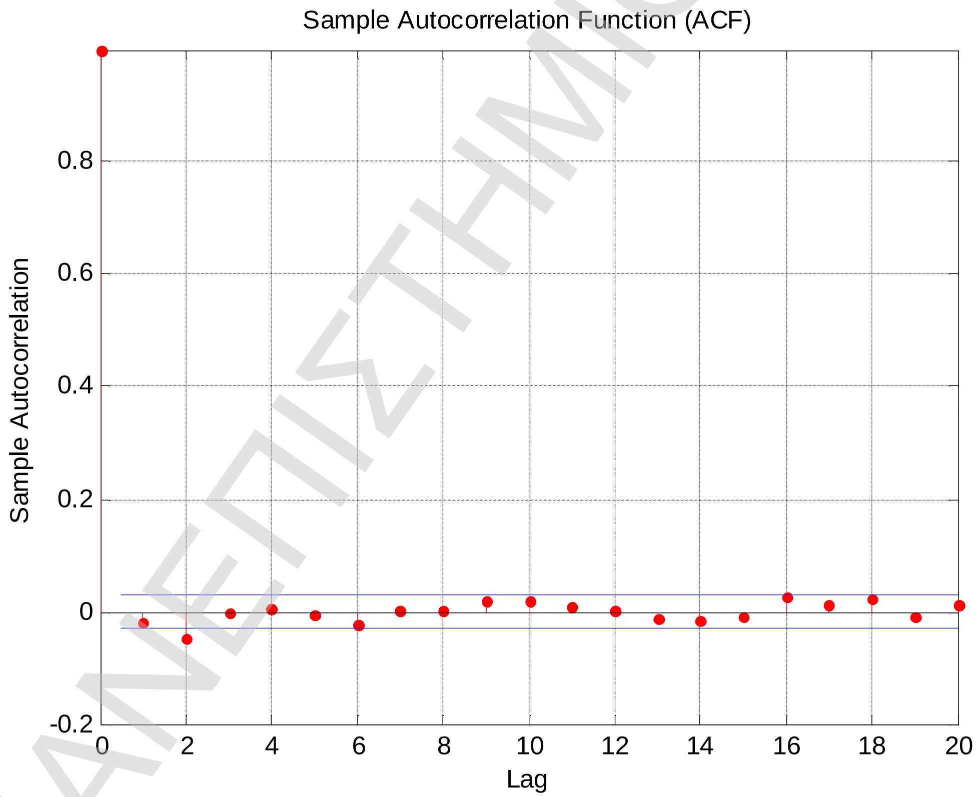




MALAYSIA – JAPAN POST-LIBERALIZATION





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