
# DYNAMIC IMPACT OF EXTERNAL SHOCKS ON MACROECONOMIC FUNDAMENTALS OF SELECTED SOUTH ASIAN COUNTRIES

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## ABSTRACT

This research investigates the relative importance of a set of exogenous shocks in deriving the fluctuations in macroeconomic fundamentals of selected South Asian countries. We have employed the panel structural VAR model to cater to the idiosyncratic and contagion impact of shocks, for 1999Q1-2018Q2, relying on a set of exogenous shocks (Oil Price shock, Trade shock, MSCI world shock, and structural shock (GFC). The variance decomposition forecasting error and impulse response function confirm pronounce impact of external shocks on macroeconomic fundamentals, particularly in the pre-global financial crises GFC period. Moreover, the oil price shock and trade shock have a significant effect on macroeconomic fundamentals for South Asian countries with more asymmetric response vis-à-vis to financial shocks. Variance decompositions and impulse-response functions display that South Asian countries appear more sensitive to the trade channel rather than to the financial channel.

**Keywords**: External shock, real output, prices, interest rates, exchange rates, PSVAR model
**JEL Codes:** O10, E43, O24

## I. INTRODUCTION

Nearly all South Asian countries have witnessed staggering economic performance when confronted by external shocks (financial crisis, trade imbalances, oil price shocks, or external exchange rate fluctuations). The vulnerability of these developing countries to exogenous shocks is adhering to the potential implication of yielding economic integration. South Asian economies are highly vulnerable to external shocks (Maćkowiak, 2007; Allegret et al, 2012), particularly the macroeconomic fluctuations originating from the developed economies such as the USA. It is only because the USA dollar has been the leading reserve currency and has been an instrument used for worldwide international trade transactions. After the considerable expansion of intra-regional trade, the global dimension of the financial crisis following the Asian Financial crisis and Global Financial crisis has lifted the concern of the vulnerability of Asian countries to external shocks. The trade and financial openness along the region-wide attempts to harmonize the policy and coordination among South Asian countries highlights the importance of exogenous disturbances. Hence, many studies have a workout on the impact of external shocks in the South Asian region (Ansari & Gul, 2017).

Many studies have observed that the USA has been a dominant source of the variations and fluctuations in the concerned economies (Bagliano and Morana, 2012). Moreover, international financial shocks (MSCI World Index shock) are also considered an influence on domestic macroeconomic variables fluctuations in many countries. Allegret et.al, (2012) have demonstrated that a considerable variation in the nominal exchange rate had explained by the MSCI world index shock. They examined the impact of external shocks with VAR models. But this has limitation to impose the restrictions indicated by economic theory. So, to incorporate the structural aspect and imposed the restrictions, this study employ Structural Vector Auto Regression (SVAR) model proposed by Sims (1986). Huang and Guo (2006) have employed a four-dimensional SVAR model to estimate the variation influenced by global external shock. The SVAR model analyze the idiosyncratic and contagion impacts of exogenous shocks on selected South Asian countries

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(Ansari & Gul, 2017; Utlaut & Van, 2011; Hur & Park, 2018). There have been several studies that have used many techniques to assess the impact of external shocks, the more utilized techniques is VAR because it examines the relative contribution of each shock (Blanchard & Quah, 1989; Jordan & Lenz, 1994; Koray & Lastrapes, 1989; Eltony & Al-Awadi, 2001). Considering the structural characteristics of Asian countries, exogenous shocks play a pivotal role in exerting fluctuations (Ahmed et al., 2019). An external shock is an unanticipated variation that has been occurred at the outskirt of an economy and induces a significant impact on the concerned economy. In the wake of the financial crisis as the Asian Financial crisis (AFC) or Global Financial Crisis (GFC) and many other exogenous shocks, South Asian countries have witnessed a very overwhelming performance. However, GFC has descended the world into an unprecedented level of financial crisis, fall of economic activities, and recession.

The subprime crisis initiated in the USA at the beginning of 2007 has resulted in a severe drop in real sector macroeconomics activities. It also induced banking emergencies throughout the USA. The crisis is considered to be the most lethal one after the incident of the Great Depression (1930). As it led to severe economic decline and had altered the outlook of the financial system throughout the world. The crisis that erupted in the USA imparted considerable impacts on other emerging and developing countries. Frank and Hesse (2009) had submitted the spillover effect on the emerging economies of the recession (mainly GFC) erupted in the USA. In 2007, these subprime mortgage crises were accompanied by the collapse of the Lehman brothers. The collapse of the investment bank (Lehman Brothers), eventually lead to panic and restlessness in international banking and induced distress throughout the world. The impact of GFC had been transmitted to other countries mainly through the trade channel. The South Asian countries received devastating impact of GFC, as the countries hardly recovered from the earlier global fuel crisis. Countries faced long lasting impacts of crises because their complex political and social environments. However, Bangladesh had witnessed to perform substantially well and managed to insulate from the impacts of the financial crises. It is because of its sound macroeconomic policy responses to financial changes. Moreover, its exposure to financial markets has been relatively small and not much connected to the international markets.

In this study, we investigate three more important shocks; the first external shock is the MSCI index shock. MSCI stands for "Morgan Stanley Capital International" created in 1968. It has been the seminal global market indexes to measures the performance of the stock market. Fluctuations in international financial shocks (MSCI World Index) capture a considerable variation in macroeconomic fundamentals in most Asian countries (Maćkowiak, 2007; Moneta & Rüffer, 2009; Gimet, 2011). The second external shock is the oil price shock. Underlying the potential influence of this shock exerts a negative and pronounced impact on Asian countries. History has evident that oil price shocks have played an important role in deriving the fluctuations of macroeconomic fundamentals of many emerging and developing countries. The oil price shock of 1973 had induced devastating and considerable impacts on the macroeconomic fundamentals of both the developed and developing countries, of which South Asian economies are no exception (Darby, 1982; Pierce & Enzler, 1974; Hammes & Wills, 2005). Many researchers have examined the causal links between oil price shocks and macroeconomic fundamentals and found that impacts significantly diverge across the countries (Iwayemi & Fowowe, 2011). The majority of the studies analyzed the inverse and detrimental effect of the oil price shocks on economic growth (Rafiq & Bloch, 2016). The third external shock is the trade shock. The South Asian countries are more shares with the trading industrialized countries, especially with the USA. Following Allegret et.al., (2012) this piece of research approximated trade shock by USA GDP shock. Thus, through the trade channels, any fluctuation in industrialized exert a significant impact on fluctuations of developing and emerging countries.

This paper investigates the impacts of a set of exogenous shocks (Oil price shock, trade shock, and MSCI index shock) on exerting variation in macroeconomic fluctuations (real output, inflation, interest rates, and exchange rates) of selected South Asian economies. This research attempts to answer the following questions: To what extent the macroeconomic fluctuations in selected South Asian countries are explained by external shocks? How structural and exogenous shocks change the movement of macroeconomic fundamentals, symmetric or asymmetric impact? To the best of our knowledge, no study has so far examined the impact of exogenous shocks all in one (USA GDP shock, MSCI shock, and Oil price shock) on exerting fluctuations on the macroeconomic fundamentals of South Asian countries. Thus, the responses of economies to exogenous shocks deliver valuable opportunities to expand their trade basket, search for alternatives, and gain the advantages of diversification. Moreover, from the perspective of policymakers, this research submits pivotal information regarding the direction for possible undertaking measures to protect markets of developing countries from contagion effects during future crises. The potential benefit of this research will suggest policymakers make changes in policies regarding the nature and extent of external shocks.

## II. LITERATURE REVIEW

Many studies have confirmed the importance of exogenous shocks in exerting considerable fluctuations in the macroeconomic fundamentals of Asian countries. Considering the structural characteristics (trade and financial openness) of South Asia it is understandable to emphasize this subject. Undoubtedly, the analysis of the responses of macroeconomic fundamentals to exogenous shocks provides an additional signal to the distinctive examination of domestic shocks. Moreover, it indicates the degree of homogeneity amid the countries' area. The most significant empirical review on effect of external shocks such as, Fung (2002) estimated the impacts of monetary shocks in domestic fluctuations of Asian countries. He employed the VAR model with restrictions. The main findings show that financial shocks have a significant effect on the domestic macroeconomic variables of Asian countries. Asghar, et al (2013) investigated the impacts of external shocks on the domestic macroeconomic fluctuation i.e. (inflation rate). The autoregressive Distributive Lag (ARDL) approach is used for estimation. The result shows that the money supply has a positive and significant impact on the level of inflation in Pakistan. Munir and Aslam (2007) analyzed the relationship of exchange rate shocks on the macroeconomic indicators of developing countries. Utilizing, VAR model examined the impacts of exchange rate shocks on the GDP and inflation. They found that exchange rate shocks have significantly influenced the macroeconomic indicators positively or negatively.

Ito and Sato (2006) checked the effects of exchange rate shock on the domestic economy of the East Asian countries. They investigated VAR model to check the impacts of pass-through exchange rate shocks on the domestic economy of East Asian countries. They concluded that the exchange rate shocks have a significant and positive effect. Utlaut and Van (2011) analyzed the impacts of external shocks on East Asian countries using the Bayesian Vector Autoregressive model (BVAR). They estimated the two shocks i.e. global shocks, China GDP shock. They found that global shocks have a positive effect on emerging Asia economy and the China GDP shock has an insignificant impact on the Asia countries economy. In addition, they evaluated the BVAR model and Standard VAR model. They found that there is a lack of accuracy with the standard VAR.

Allegret, et al (2012) used the SVAR model with blocked homogeneity to analyze the effects of external shocks in domestic fluctuations of East Asia countries ranging from 1990 to 2012. They applied both long-run and short-run restrictions and documents a noticeable impact of external shocks (oil price shock, trade shock, and Fed funds) on their domestic variables. The results revealed that external disturbances are significant and positively correlated due to their symmetric nature. The oil price shock and USA GDP shocks have a pronounced impact on the USA financial & monetary shock. Gimet (2011) has analyzed the vulnerability of financial shocks on Southeast Asian countries. For this using an SVAR model, the result shows that the financial shocks have significant impacts on Southeast Asian countries. The main finding shows that Southeast countries have insignificant responses to international financial shocks after the subprime crisis.

Abdalla (2012) examined the impact of external shocks in domestic fluctuations of Sudan. He took the monthly data sample from 1970 to 2013. He used the structural Autoregression (SVAR) model for estimation. The main objective of this study is to check causation links between external shocks and domestic macroeconomic variables. The main finding shows that oil price shocks are more sensitive than domestic shocks. In addition, he shows that external shocks have significant impacts on domestic fluctuations. Allegret and Benkhodja (2011) quantified the effect of external shocks on the oil-exporting countries. They used a Bayesian Vector Autoregression (BVAR) model to investigate the impact of four external shocks on macroeconomic fluctuations. They found that the appropriate monetary policy is more helpful to control external shocks on macroeconomic indicators. Othman, et al., (2015) investigated the effects of external and internal shocks in domestic fluctuations of Malaysia. They used the structural vector autoregression (SVAR) model without any restrictions from 2000 to 2013. They found that the external shocks have significant impacts on the domestic macroeconomic disturbances of Malaysia.

Ansari and Gul (2017) purposed that external shocks have a significant impact on the developing economy i.e. Pakistan, for the period ranging from 1980 to 2015. The author investigated the weak influence of the U. S Trade shock on the GDP of Pakistan. Moreover, this study shows that Pakistan is highly sensitive to external shocks because of its dependability on external variables along with internal shocks. However, results concluded that the Terms of Trade and Consumer Price Index can destabilize the economy of Pakistan. Bartram and Bodnar (2009) analyzed the effects of Asian and Global financial crises on world stock markets. The main finding of the study shows that during a crisis, the external shock has a stronger impact on the real and financial sectors.

Dooley and Hutchison (2009) examined the impacts of U.S financial shocks on the emerging Asian economies markets in the duration of the subprime crises. They found that U.S. financial shocks have significantly influenced the emerging Asian markets. Junior and Franca (2012) investigated the impacts of the subprime crisis and other crises on emerging and developing economies. They took the sample data from 1980 to 2010, including the market crisis/ crash 1987, 9/11, and GFC. They found that the rise in unpredictability in world markets precedes the high variation in stock markets and distorts the stock markets of developing countries. Ali & Afzal (2012) evaluated the impacts of financial shock on the developing Asian markets. They took the daily sample data from 2003 to 2010. The results confirm that there is a significant negative response of the selected Asian stock markets indices to the financial shocks.

Khan and Ahmed (2011) examined the effects of the oil price and food price shocks on the macroeconomic indicators of Asian countries. By utilizing (SVAR) model, they concluded that both oil and food prices shocks have significant impacts on the macroeconomic fluctuations. One concerned limitation that these studies have not employed a systematic analysis of external shocks i.e. real, financial shocks. To overwhelm this shortcoming, we define, in this study, several types of external shock to compute their respective impact on South Asian countries. Those external shocks include a real oil price shock, a trade shock, a financial shock. Moreover, the effect and relative importance of external shocks are determined using an SVAR and PSVAR model.

## III. RESEARCH METHODOLOGY AND DATA SOURCES

This research contains four main macroeconomic fundamentals i.e. output ($y_t$), interest rate ($r_t$), inflation ($\pi_t$) and exchange rate ($ex\_r_t$) of South Asian countries, subjecting to a set of exogenous shocks (MSCI shock, USA GDP shock and oil price shock). In the model, change in each South Asian country is illustrated by the vector of five endogenous variables:

$$\Delta G = \begin{pmatrix} \Delta ext_t \\ \Delta i_t \\ \Delta y_t \\ \Delta \pi_t \\ \Delta rer_t \end{pmatrix}$$

where,
G represent each South Asian country, *ext* symbolize each external shock from the set of external shocks (Oil price shock, Trade shock, MSCI index); *y* represents the real gross domestic product; *rer* is the real exchange rate, *i* represent interest rate and $\pi$ is the consumer prices index.

The PSVAR model is employed to examine the impact of exogenous shocks. For each South Asian country, the representative of real economic sector is real gross domestic product and real exchange. The main objective in incorporating both the monetary and real sector is to provide useful insights to the reactions of policy makers to different shocks. In the context of exogenous shocks, PSVAR model accounts for the cross-sectional dependence that is conceivable from the fact that individual members of the panel respond not only to the idiosyncratic shocks (member- specific), but also to shocks that are common across members of the panel. To model panel SVAR, the time series of endogenous variables should be stationary, with no co-integration between them. So, the variables are taken as log differenced. The reduced-form of P-SVAR is given as below,

$$X_{it} = \gamma_1 X_{it-1} + \gamma_2 X_{it-2} + \ldots . + \gamma_p X_{it-p} + f_i + \cdots + \varepsilon_{it} \quad \ldots\ldots\ldots (1)$$

$$X_{it} = \gamma_1(L) X_{it} + f_i + \cdots + \varepsilon_{it} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

where, subscripts *i* and *t* denotes countries and years respectively. $X_{it}$is a 5×1 vector (including ext, i, y, $\pi$ and rer). $\gamma(L)$ is a 5×5 coefficient matrix; $f_i$ is an observable individual effect and $\varepsilon_{it}$ is composite error term. Matrix of restrictions on P-SVAR is as,

$$\begin{bmatrix} \beta_{11} & 0 & 0 & 0 & 0 \\ \beta_{21} & \beta_{22} & 0 & 0 & 0 \\ \beta_{31} & \beta_{32} & \beta_{33} & 0 & 0 \\ \beta_{41} & \beta_{42} & \beta_{43} & \beta_{44} & 0 \\ \beta_{51} & \beta_{52} & \beta_{53} & \beta_{54} & \beta_{55} \end{bmatrix} \begin{bmatrix} \mu_t^{logUSA} \\ \mu_t^{logy} \\ \mu_t^{log\pi} \\ \mu_t^{logz} \\ \mu_t^{i} \end{bmatrix} = \begin{bmatrix} \varepsilon_t^{logUSA} \\ \varepsilon_t^{logy} \\ \varepsilon_t^{log\pi} \\ \varepsilon_t^{logz} \\ \varepsilon_t^{i} \end{bmatrix} \quad (3)$$

PSVAR model is employing the data of four selected South Asian countries (Pakistan. India, Bangladesh and Sri Lanka), to take into accounts the responses of macroeconomic fundamentals to both the idiosyncratic and common structural and exogenous shocks. However, the model allows to have the response dynamics with full cross member heterogeneity. The analysis is performed by utilizing with quarterly time series data for all variables, for the time

period 1999Q1–2018Q2. The data set have been divided in two subsets, pre-GFC period (1999Q1-2007Q2) and post-GFC period (2008Q2-2018Q2). The major data sources are International Financial Statistics (IFS), Organization for Economic Cooperation and Development (OECD) database, the Economic Statistics and Indicators Database (Econ Stats), Asia Regional Integration Center (ARIC) and the database of EIA (Energy Information Administration). MSCI (Morgan Stanley Capital International) index has been extracted from the DataStream database.

## IV. RESULTS AND DISCUSSION

In order to determine the ability of external shocks to explain domestic variables fluctuations at different horizons, and the relative importance of each shock, a standard variance decomposition exercise is contained in the PSVAR model.

**Table-1 Variance Decomposition of GDP in pre-GFC period**

| Shocks | Horizon | India | Bangladesh | Pakistan | Sri Lanka | Panel |
|---|---|---|---|---|---|---|
| Oil price shock | 1-5 | 5.512 | 2.868 | 0.589 | 9.218 | 97.13 |
| | 15-20 | 6.051 | 27.89 | 9.648 | 39.67 | 25.29 |
| US GDP shock | 1-5 | 1.592 | 1.533 | 10.06 | 14.82 | 11.72 |
| | 15-20 | 13.29 | 10.48 | 9.735 | 11.40 | 7.138 |
| MSCI shock | 1-5 | 0.437 | 0.646 | 1.182 | 2.498 | 0.229 |
| | 15-20 | 1.741 | 0.510 | 3.517 | 3.738 | 3.392 |
| Sum | 1-5 | 7.542 | 5.047 | 11.83 | 26.54 | 109.0 |
| | 15-20 | 21.08 | 38.89 | 22.90 | 54.81 | 35.82 |

The Table-1 presents the variance decomposition of GDP to exogenous shocks (oil price shock, GDP shock and Trade shock) in pre-GFC period. Oil price shock tends to be persistent as their weight in the real GDP variances increases with time horizon. In GDP, oil price shock accounts for 97 percent in the 5$^{th}$ period and then decrease to 25 percent till 20$^{th}$ period. U.S GDP shock accounts for approximately 11 percent in 2$^{nd}$ period, which decrease to percent in 20$^{th}$ period. However, MSCI world index shock experiences an increase in variation i.e. from less than 1 percent in 5$^{th}$ period to approximately 3 percent in 20$^{th}$ period.

The Table-2 presents the variance decomposition of GDP to exogenous shocks in post-GFC period. Oil price shock accounts for 9 percent variance in GDP by 5$^{th}$ period but nearly 11% increases in 20$^{th}$ period. While U.S GDP shock explains 0.6 percent variation in 5$^{th}$ period which increases to 1 percent in 20$^{th}$ period However, MSCI world index shock explains 6 percent variance in 5$^{th}$ period and then decreases 5 percent till 20$^{th}$ period.

**Table -2 Variance Decomposition of GDP in post-GFC period**

| Shocks | Horizon | India | Bangladesh | Pakistan | Sri Lanka | Panel |
|---|---|---|---|---|---|---|
| Oil price shock | 1-5 | 1.228 | 9.030 | 71.35 | 10.97 | 9.677 |
| | 15-20 | 5.596 | 12.06 | 22.16 | 15.54 | 11.49 |
| US GDP shock | 1-5 | 4.998 | 33.36 | 5.476 | 2.814 | 0.616 |
| | 15-20 | 20.74 | 23.70 | 11.93 | 11.35 | 1.436 |
| MSCI shock | 1-5 | 4.581 | 12.29 | 1.718 | 5.287 | 6.412 |
| | 15-20 | 4.580 | 11.63 | 3.831 | 6.518 | 5.619 |
| Sum | 1-5 | 10.80 | 54.68 | 78.58 | 19.07 | 16.78 |
| | 15-20 | 30.91 | 47.46 | 37.93 | 33.42 | 18.54 |

**Table-3 Variance Decomposition of Inflation Rate in pre-GFC period**

| Shocks | Horizon | India | Bangladesh | Pakistan | Sri Lanka | Panel |
|---|---|---|---|---|---|---|
| Oil price shock | 1-5 | 2.200 | 8.712 | 73.71 | 14.39 | 0.043 |
| | 15-20 | 3.938 | 9.246 | 14.62 | 13.32 | 0.038 |
| US GDP shock | 1-5 | 10.38 | 8.391 | 6.133 | 9.405 | 0.058 |
| | 15-20 | 16.47 | 39.51 | 14.21 | 51.94 | 1.111 |
| MSCI shock | 1-5 | 0.765 | 0.646 | 42.27 | 23.26 | 0.019 |
| | 15-20 | 1.316 | 0.510 | 13.04 | 69.29 | 0.311 |
| Sum | 1-5 | 13.34 | 17.75 | 122.1 | 47.06 | 0.122 |
| | 15-20 | 21.77 | 49.26 | 41.90 | 134.5 | 1.461 |

The Table-3 presents the variance decomposition of Inflation rate to exogenous shocks in pre-GFC period. Oil price shock accounts for an average of 0.04 percent in 5th period and then declines to 0.03 percent till 20th period. While U.S GDP shock explain variation 0.05 percent in 5th period which increases to 1.1 percent in 20th period. While MSCI index shock accounts for 0.01 percent in 5th period which slightly increase to 0.3 percent in 20th period.

The Table 4 presents the variance decomposition of Inflation rate to exogenous shocks in post-GFC period. Variation in CPI, Oil price shock accounts for 7 percent in 5th period which increases to 9 percent in 20th period. While U.S GDP shock explain 0.42 percent in 5th period to 0.67 percent in 20th period. Whereas MSCI world index shock accounts from less than 0.05 percent in 5th period to less than 1 percent in 20th period. The results of panel also confirm a pronounced impact of oil prices and a less significant impact of MSCI shock. The sum of exogenous shock confirms the importance of external shocks for exerting variation in South Asian countries.

**Table -4 Variance Decomposition of Inflation Rate in post-GFC period**

| Shocks | Horizon | India | Bangladesh | Pakistan | Sri Lanka | Panel |
|---|---|---|---|---|---|---|
| Oil price shock | 1-5 | 85.92 | 10.18 | 5.170 | 72.09 | 7.310 |
| | 15-20 | 47.53 | 22.31 | 5.519 | 57.49 | 9.274 |
| US GDP shock | 1-5 | 6.373 | 10.55 | 1.555 | 1.124 | 0.421 |
| | 15-20 | 7.878 | 33.30 | 7.225 | 1.202 | 0.677 |
| MSCI shock | 1-5 | 1.406 | 0.216 | 0.913 | 8.380 | 0.176 |
| | 15-20 | 2.296 | 0.279 | 1.872 | 17.03 | 0.134 |
| Sum | 1-5 | 93.70 | 20.94 | 7.640 | 81.60 | 7.915 |
| | 15-20 | 57.71 | 55.81 | 14.62 | 75.72 | 10.08 |

The Table 5 presents the variance decomposition of exchange rate to exogenous shocks in pre-GFC period. Oil price shock accounts for 4 percent in 5th period to approximately 5 percent till 20th period. While U.S GDP shock accounts for 1 percent variation in 5th period and then drastic increases to 12 percent in 20th period. The MSCI world index shock accounts for 1.1 percent in 5th period to 1.9 percent in 20th period.

**Table-5 Variance Decomposition of Exchange Rate in pre-GFC period**

| Shocks | Horizon | India | Bangladesh | Pakistan | Sri Lanka | Panel |
|---|---|---|---|---|---|---|
| Oil price shock | 1-5 | 2.063 | 0.788 | 2.291 | 11.84 | 4.397 |
| | 15-20 | 4.847 | 5.079 | 26.73 | 4.230 | 5.255 |
| US GDP shock | 1-5 | 0.265 | 0.304 | 13.68 | 11.92 | 1.575 |
| | 15-20 | 1.490 | 2.976 | 23.92 | 10.45 | 12.63 |
| MSCI shock | 1-5 | 2.280 | 2.174 | 3.646 | 2.562 | 1.118 |
| | 15-20 | 5.641 | 12.15 | 1.185 | 2.318 | 1.900 |
| Sum | 1-5 | 4.605 | 3.266 | 19.61 | 26.32 | 7.091 |
| | 15-20 | 11.97 | 20.20 | 51.85 | 17.00 | 19.79 |

The Table 6 presents the variance decomposition of exchange rate to exogenous shocks (oil price shock, GDP shock and Trade shock) in post-GFC period. Oil price shock explains variance of 1 in 5th period which increases at an average approximately 3 percent in 20th period. While U.S GDP shock explain variance of less than 1 percent in 5th period which increases to 1.7 percent in 20th period. Whereas, the MSCI index shock accounts for 0.12 percent variance in 5th period which decreases 0.07 percent in 20th period.

**Table-6 Variance Decomposition of Exchange Rate in post-GFC period**

| Shocks | Horizon | India | Bangladesh | Pakistan | Sri Lanka | Panel |
|---|---|---|---|---|---|---|
| Oil price shock | 1-5 | 0.774 | 0.899 | 8.262 | 0.4291 | 1.556 |
| | 15-20 | 13.59 | 2.381 | 25.45 | 0.917 | 2.908 |
| US GDP shock | 1-5 | 1.024 | 7.546 | 1.558 | 3.212 | 0.073 |
| | 15-20 | 1.764 | 1.426 | 2.921 | 9.460 | 0.237 |
| MSCI shock | 1-5 | 4.476 | 0.621 | 0.779 | 1.911 | 0.121 |
| | 15-20 | 5.193 | 1.213 | 6.016 | 6.391 | 0.076 |
| Sum | 1-5 | 6.275 | 9.068 | 10.60 | 5.553 | 1.751 |
| | 15-20 | 20.55 | 5.022 | 34.40 | 16.76 | 3.229 |

The Table 7 presents the variance decomposition of interest rate to exogenous shocks in pre-GFC period. Oil price shock accounts variance in interest rate by only 0.2 percent. It increases to approximately 3 percent in 20th period. Whereas U.S GDP shock explain 0.03 percent of variance in 5th period which increases to 0.1 percent in 20th period. While MSCI world index shock explains only o.5 percent in 5th period to 0.5 percent in 20th period.

**Table-7 Variance Decomposition of Interest Rate in pre-GFC period**

| Shocks | Horizon | India | Bangladesh | Pakistan | Sri Lanka | Panel |
|---|---|---|---|---|---|---|
| Oil price shock | 1-5 | 1.835 | 0.195 | 0.757 | 12.37 | 0.287 |
| | 15-20 | 3.058 | 7.258 | 25.01 | 2.322 | 2.591 |
| US GDP shock | 1-5 | 2.024 | 4.500 | 3.653 | 4.137 | 0.032 |
| | 15-20 | 5.342 | 10.86 | 8.186 | 3.951 | 0.170 |
| MSCI shock | 1-5 | 2.421 | 5.745 | 1.699 | 4.970 | 0.534 |
| | 15-20 | 8.810 | 15.85 | 1.413 | 3.375 | 0.561 |
| Sum | 1-5 | 6.281 | 10.44 | 6.110 | 21.48 | 0.853 |
| | 15-20 | 17.21 | 33.95 | 34.63 | 9.649 | 3.324 |

The Table-8 presents the variance decomposition of interest rate to exogenous shocks in post-GFC period**,** Oil price shock accounts for 6 percent 5th period and then increases at an average of 7 percent in 20th period. Whereas U.S GDP shock accounts for 2 percent in 5th period which increases to 4 percent till 20th period. While MSCI world index shock accounts for 2 percent in 5th period which increases to 7 percent in 20th period.

**Table- 8 Variance Decomposition of Interest Rate in post-GFC period**

| Shocks | Horizon | India | Bangladesh | Pakistan | Sri Lanka | Panel |
|---|---|---|---|---|---|---|
| Oil price shock | 1-5 | 1.600 | 1.088 | 4.683 | 4.315 | 6.521 |
| | 15-20 | 2.030 | 1.997 | 15.86 | 5.790 | 7.152 |
| US GDP shock | 1-5 | 1.682 | 30.04 | 1.028 | 6.739 | 2.101 |
| | 15-20 | 2.424 | 18.34 | 4.044 | 17.49 | 4.541 |
| MSCI shock | 1-5 | 0.350 | 1.114 | 0.615 | 7.569 | 2.422 |
| | 15-20 | 2.889 | 2.177 | 11.54 | 10.07 | 7.102 |
| Sum | 1-5 | 3.633 | 32.21 | 6.327 | 18.62 | 11.04 |
| | 15-20 | 7.345 | 22.54 | 31.46 | 33.35 | 18.80 |

Furthermore, this study investigates the pre and post GFC shocks with the impulse response analysis. This shocks performed to investigate the impact of one-unit shock of oil prices on the fluctuations in macro-economic fundamentals. In SVAR system, restrictions are imposed as implied by economic theory. The analytical (asymptotic) method is used for the calculation of standard error and Cholesky ordering with degree of freedom adjustment selected to evaluate the results. The vertical axes represent the log of output, log of exchange rate and log of inflation rate (CPI).

Figure-1 displays the responses of macroeconomic fundamentals of South Asian countries as a panel to one-unit shock of oil prices in pre-GFC period. The result confirms that exogenous shocks impart negative and significant impact on the macroeconomic fundamentals of South Asian counties. The response of GDP displays a sharp decline for up to third time periods. However, it remains close to stability on the long run. The result indicates that oil price shock imparts an immediate negative effect of on South Asian's GDP. The interest rate responds positively to oil price shock for the complete time horizon. As anticipated, inflation remains positive for the short run as well as long run. Exchange rate witnesses a sharp decline till 3rd period, it remains positive at long horizon.

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The results of PSVAR confirms that the exertion of oil price shock tend to be less as developing countries explores more alternatives. The impact remains only in the short run. Exchange rate displays an insignificant response. Interest rate and inflation rate remain positive for all horizons. GDP remain negative till three quarters and then become

positive. Concentrate on the Post GFC period (2009Q2-2018Q4), responses of South Asian countries to external shock USA GDP Shock. All the variables display trends and cyclical patterns. In PANEL SVAR, GDP display an increasing trend till 3rd period and afterwards it becomes significantly negative till 20th period. CPI remains significant and positive till 20th period. While a sharp decline in interest rate is witness in 2nd period and yields yet remaining negative till 20th period. The exchange rate depicts a positive response till 20th period.

**Figure-1 Pre and Post GFC USA GDP Shock**

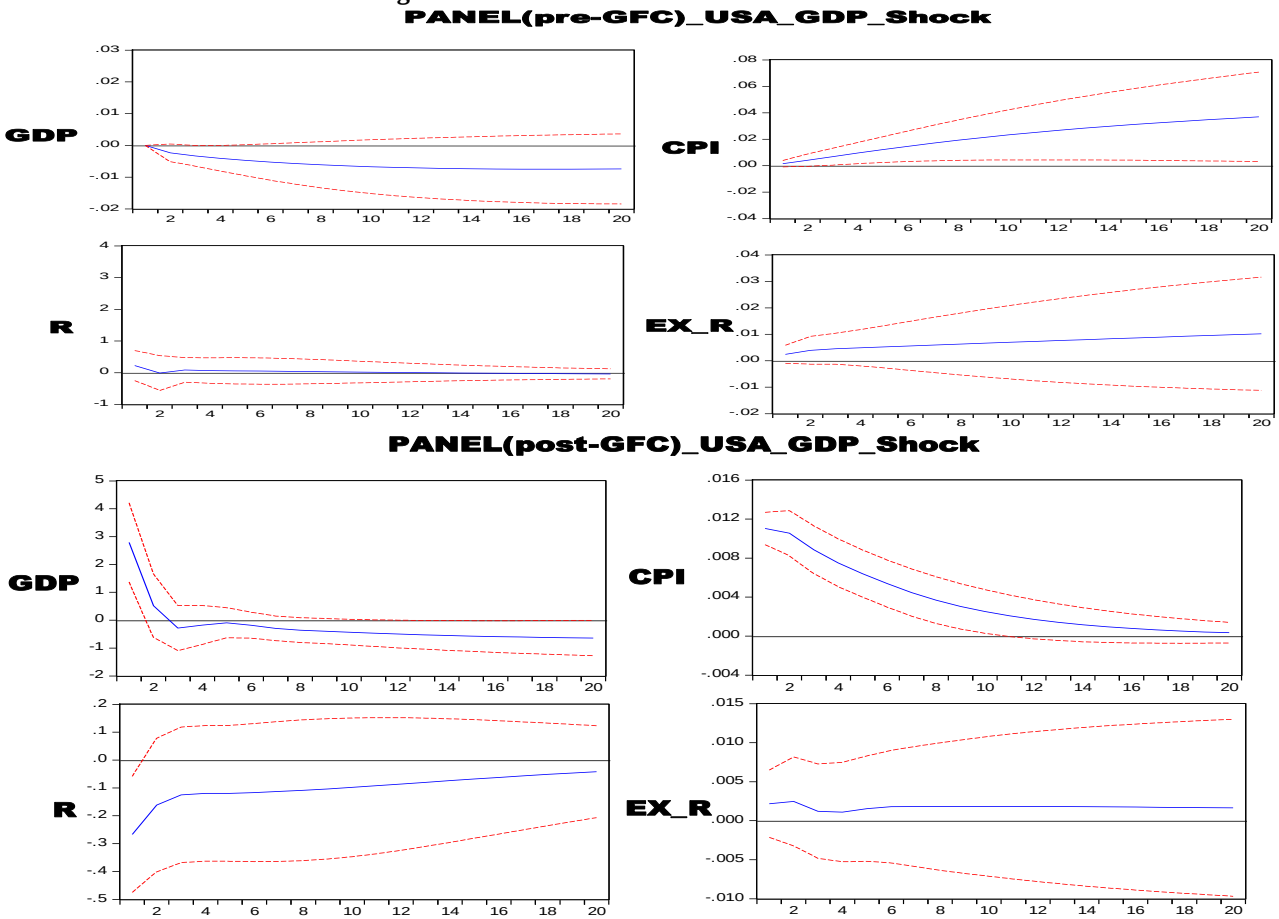



Figure-3 reported that the responses of macroeconomic fundamentals of selected South Asian countries to MSCI shock in pre-GFC period. The results of panel SVAR confirm the idiosyncratic responses of countries. The variable GDP displays a significant and negative response till 20th periods. It owes to the yielding trade patterns and high dependency of developing countries on the developed countries (Maćkowiak, 2007). While CPI displays a positive and significant response till 20th periods. The variable interest rate does not exhibit any significant response. However, exchange rate displays a positive and significant response till 20th periods.

In panel SVAR, GDP displays a decreasing trend till 13th period and then achieves stability till 20th period. CPI displays an increasing trend significantly positive response till 20th period. The interest rate displays a positive response till 20th period. The exchange rate depicts a significant negative response till 20th period.

In post GFC panel SVAR, the GDP display an increasing trend till 3rd period then it declines in 4th period. Afterward it increases and achieves stability till 20th period. CPI displays a significant positive response till 20th period. The variable interest rate displays a declining trend till 3rd period then it increases and positive response till 20th period. While exchange rate displays a positive response till 7th period, and it reach stability line in 8th period. Afterward it declines till 20th period.

**Figure-2 Pre and Post GFC Oil Shock**

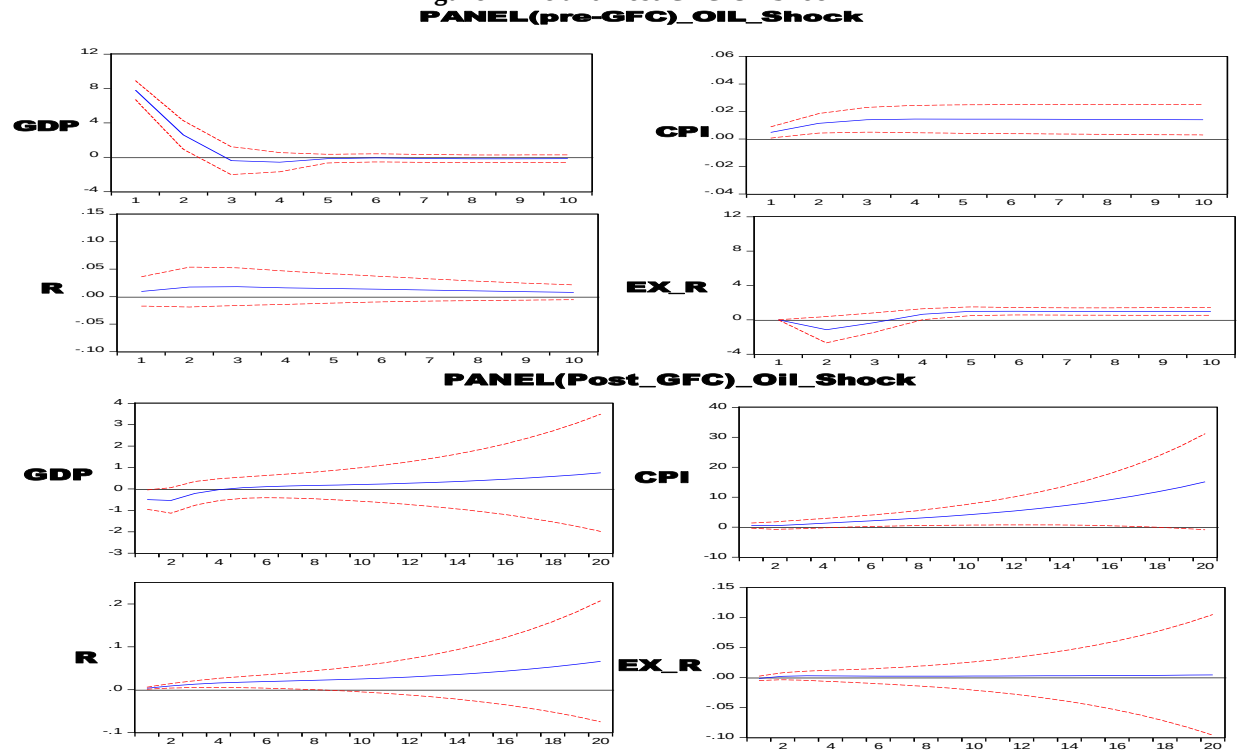
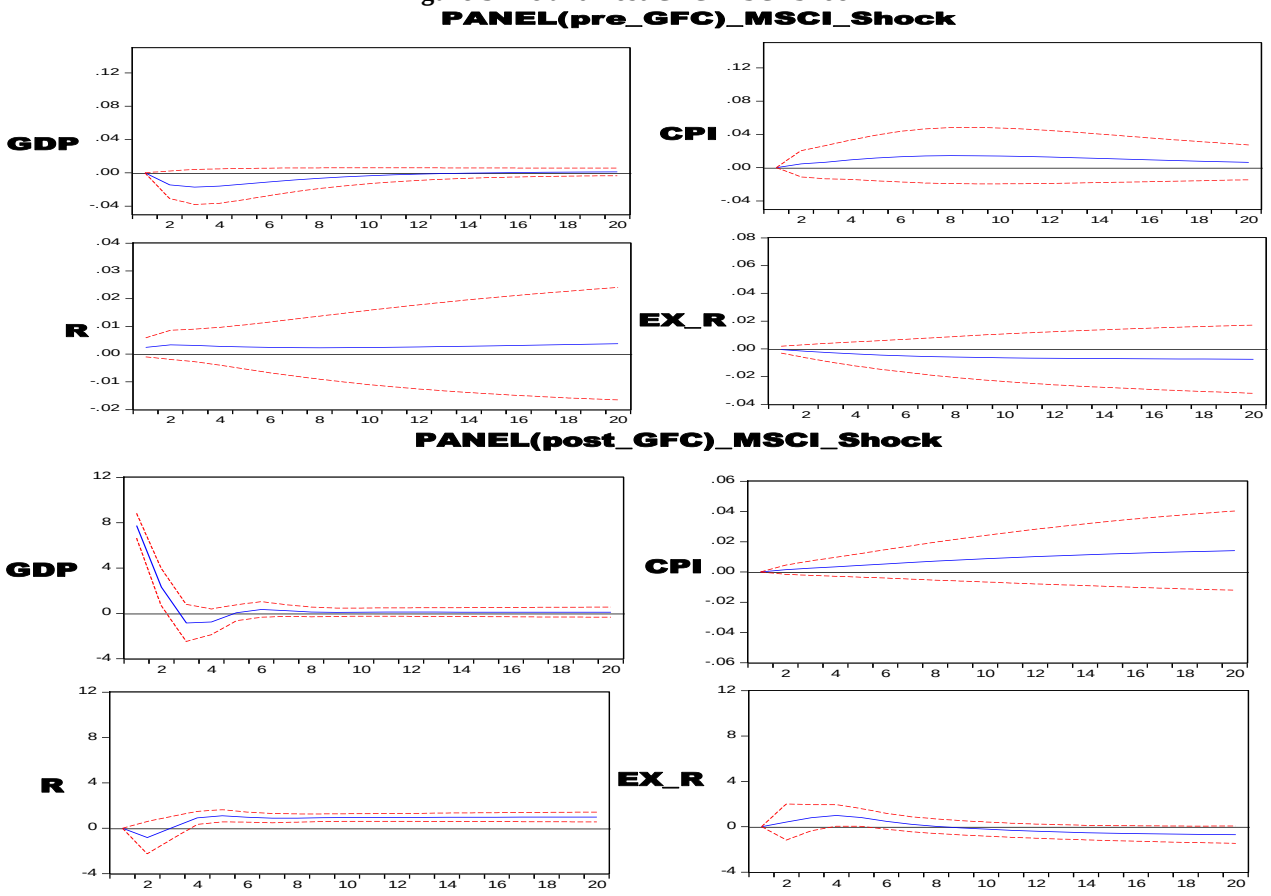



**Figure-3 Pre and Post GFC MSCI Shock**



## V. CONCLUSION AND RECOMMENDATIONS

This paper analyzes the dynamics effects of selected south Asian countries' macroeconomic fundamentals to a set of exogenous shock (Oil price shock, Trade shock, MSCI world index shock) for the time period (1999Q1 -2018Q4). In this time period, South Asian countries had confronted most severe and acute structural shock i.e. Global Financial Crisis (GFC). So, the total time period has been divided in two data sets i.e. pre-GFC period (1999Q1-2008Q2) and post-GFC period (2009Q2-2018Q4). To, estimate the dynamic effects of these external shock this research employed Panel SVAR model with contemporaneous restrictions. Moreover, it also delivers a comparative assessment of the external shock exerts more variation in the macroeconomic fundamentals than the other. The result submits pronounced and negative impacts of external shocks on selected South Asian countries. However, India and Sri Lanka are the most vulnerable and largely explained by external shock because the economies are comparatively more financially open and integrated to the world. In the post-GFC period results presents a meaningful impact of external shocks on macroeconomic variables in all South Asian countries. To the extent that these shocks cover the most important external constraints faced by South Asian countries, this research also suggests that domestic variables are largely influenced by real external shocks than by external financial shocks. Indeed, variance decompositions and impulse-response functions display that South Asian countries appear more sensitive to the trade channel rather than to the financial channel. Finally, in accordance with their financial openness, the concerned economies also seem to be affected by financial shocks though at a smaller scale. Indeed, these shocks propagate into south Asian economies through trade. This research recommends policy makers to promote their trade more in local currencies and should explore other sources of energy than oil.

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