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The Nexus between Fiscal Policy Volatility and Business Cycle Fluctuations: Evidence from South Asian Economies

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Abstract
Volatility in fiscal policy has diverse macroeconomics implications. This study examines the impact of government spending volatility on output volatility in case of South Asian economies. The study utilizes panel data of four South Asian economies over the period of 1980 to 2022 and employs Generalized Method of Moment (GMM) estimation technique. The findings depict that volatility in fiscal spending minimizes volatility in the output, i.e., it mitigates fluctuations in the business cycle and leads to macroeconomic stability. The magnitude of the coefficient associated with government spending volatility suggests that a one standard deviation increase in spending volatility dampens output volatility by 0.53 standard deviation. Although, volatility in fiscal spending stabilizes business cycle fluctuations; however, it is important to prudently exercise such volatility, because if it is exercised independent of business cycle it might be a potential source of macroeconomic instability. For this purpose, a flexible, but fiscal rule-based policies should be designed that help to minimize macroeconomic fluctuations and also to avoid over aggressive utilization of public spending that may undermine economic growth.

JEL Classification: E62, E32, C30, O53

Keywords: Public Spending Volatility, Output Volatility, South Asian Economies, System GMM.

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Introduction

Macroeconomic policy concerned with the adjustment of government spending and taxation to influence the economy is referred as fiscal policy (Kim et al., 2021). Long-term sustainable economic growth and a full employment level accompanied by a controlled rate of inflation are considered some of the primary objectives of the fiscal authorities (Symoom, 2018). Since macroeconomics evolution, the role of fiscal policy in influencing economic activities is debatable among policymakers and academic scholars. There prevail two contrasting views regarding the role of fiscal policy – the Classical and the Keynesian. The Classical economists believe that fiscal measures crowd-out private investment, bring inefficiency in the allocation of resources, lead to a higher social cost (taxes), and consequently retard economic growth (Oner, 2015).While the Keynesian view suggests that the use of fiscal measures by the government is essential to economic growth because it promotes investment, mitigate short-term periodic swings in business cycle, provide sufficient amount of public goods, and determining the socially optimal path for the economy growth (Beckman, 2018; Choi et al., 2022; J. Kim et al., 2021). Finding the mechanism by which macroeconomic policies especially fiscal policy affect economic growth has always been difficult for theory and empirical research due to the wide range of opinions regarding the impact of macroeconomic policies particularly, fiscal policy (Ali et al., 2018; Aziz et al., 2023). This problem exists because there is no clear economic theory that shows the nature of the relationship exists between macroeconomic policies, especially fiscal policy and economic growth (Kassouri et al., 2021).

Every economy passes through and experiences various phases ranging from inflationary pressures to recessionary contraction. These phases are commonly termed as business cycle. Business cycle encompasses alternating periods of expansion and contraction in output within the economy and reflects the inherent volatility and cyclical nature of economic system. Volatility in business cycle depicts the uncertainty regarding the direction of economic activities (output level). A high volatile business cycle denotes sudden and unpredictable changes in economic activities (Kassouri, 2021). In contrast, lower volatility in business cycle evidences a more prudent and predictable patterns of changes in output level. It is the core objective of fiscal authorities to minimizes volatility in output (business cycle) to attain predictable and stable economy because high output volatility is linked with substantial economic and social costs and may negatively affect economic growth (Badinger et al., 2010; Fatás et al., 2012; Turan et al., 2022), while stable and predictable economy offers a better and reliable business environment for decision making and investment (Oz-Yalaman, 2019). Government practices macroeconomic policies especially fiscal policy as a tool aims to reduces volatility in output (business cycle fluctuations). Traditionally, the automatic component of fiscal policy (automatic stabilizers) helped in dampening of output volatility such as in period of economic contraction the automatic increase in unemployment benefits and social programs stimulate aggregate demand and so reduces output volatility, while during boom, reduction in these automatic stabilizers limits the inflationary pressures in the economy resulting

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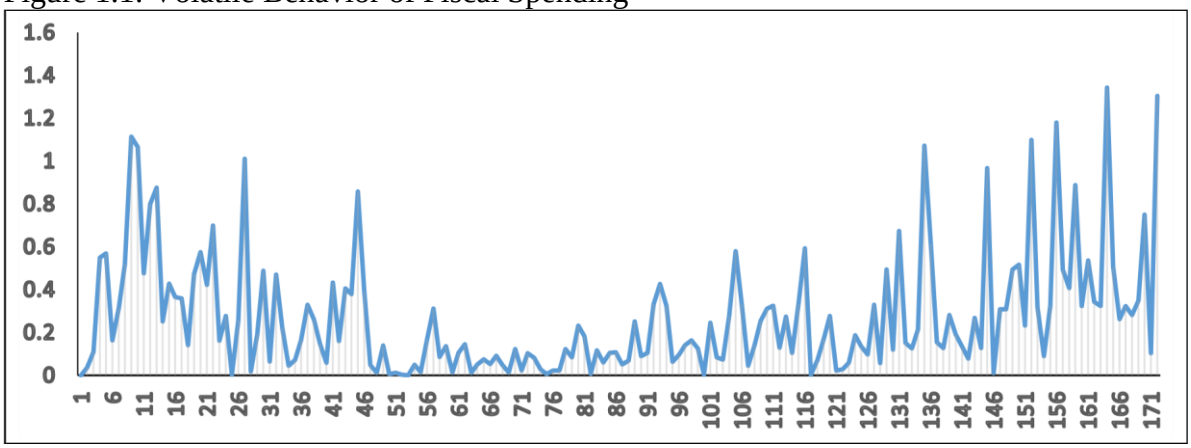
economic stability (Pereira, 2023). However, the magnitude of automatic stabilizers may not enough to or they may not behave counter-cyclically on their own to reduce the aggressiveness of business cycle required for fiscal authority‟s intervention through discretionary fiscal policy (Beyer and Milivojevic, 2021).

Several studies have examined the impact of fiscal policy (government spending and taxation) on output volatility. When examining the relationship between government spending and output volatility, different studies have reported varying results. Few find significant positive relationship between output volatility and public spending (Fatás & Mihov, 2013; Badinger, 2009; Fatás et al., 2003, 2013; Hakura, 2007; Fatas et al., 2001; Rodrik, 1998) while other few portray a negative impact of government expenditure on output volatility (Collard et al, 2017; Surjaningsih et al. 2012; Debrun et al., 2010; Mohanty et al., 2009). Nevertheless, (Virén, 2005) illustrates the insignificant impact of public spending on output volatility. In addition to the contradictory findings in mentioned studies, these studies neglect the stability of fiscal policy. Recent literature argue that the behavior of fiscal instruments particularly fiscal spending is volatile (Ali et al., 2020; Amuka et al., 2016; Collard et al., 2017; Fernández-Villaverde et al., 2015; Furceri, 2007; Kim, 2019). The volatility in public spending can be observes from figure 1.1, where aggressiveness of fiscal spending lies in between 0 and 1.5 standard deviation, indicating that governments do public spending in a more volatile manner rather than in smooth and predictable manner.

Figure 1.1: Volatile Behavior of Fiscal Spending



Source: Author”s own calculation based on fiscal spending volatility.

The volatile nature of fiscal policy cannot be overlooked due to its significance macroeconomic consequences. The volatility in fiscal measures may adversely affect the investment decisions of private investors and economic agents, ultimately reducing economic growth (Ali and Khan, 2020; Rasul et al. 2021; Ali et al. 2018). It is so because, governmentcontrolled factors have a significant impact on economic decisions and private investment. Economic actors and investors have an inverse reaction to the uncertainties about the future behaviors of fiscal instruments (Ali et al. 2018). So, as to attain

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macroeconomic stability and certain future, the predictable behavior of fiscal policy is significant (Bibi et al., 2023). However, some degree of government spending volatility is beneficial if it serves to mitigate business cycle swings (Attinasi et al., 2016; Fatás & Mihov, 2012; Furceri, 2010; Nwosa et al., 2020). In such situation, government expenditure volatility prompts crowding in private investments and positively affect economic growth (Baddi et al., 2013; Cyrus et al., 2015). However, a vast majority of the existing literature appears to agree that volatile character of government spending has a negative impact on economic performance and may be the main trigger of output volatility and consequently of economic instability (Algaeed, 2022; Amuka et al., 2016; Furceri, 2007; Kim, 2019; Oz-Yalaman, 2019; Turan & Varol İyidogan, 2022).While, the study by (Sipho et al., 2020) depicts insignificant nexus between output volatility and government spending volatility.

Driven from the above discussion, this study investigates the impact of volatility in overall government spending on output volatility (business cycle fluctuations). For this purpose, the study estimates the overall government spending volatility and output volatility for a sample of Asian economies. This study contributes to the existing literature on a variety of ways. Firstly, this study considers volatility of fiscal policy, which is ignored by fiscal literature. Secondly, this study considers its impact on output growth volatility instead of economic growth, which implies the macroeconomic (in) stability. Lastly, this study considers the Asian economies due to the reasons that fiscal authorities in these economies are not significantly bound by the fiscal rule and can bring variation in the fiscal measures according to their political well.

Literature Review

In the literature, there are many studies investigating the relationship between economic growth and government spending volatility, but a few attempted have been made in discovering the link between output volatility and spending volatility particularly negligible to the best of author knowledge in South Asian economies. To investigate government spending volatility impact on macroeconomic stability, various researchers have used both raw and volatile form of output and policy variables in their regression analysis. This section discusses both of them thoroughly.

Nwosa et al. (2020) examines the effects of government spending volatility on output volatility in Nigerian economy, while employing ARDL method on time series data (1961-2017), the author finds the significant negative impact of government expenditure volatility on output volatility. However, Amuka et al. (2016) using Vector Autoregressive (VAR) model for the time series data (1971-2010), in similar economy, observes that government expenditures significantly aggravating output volatility. In the same streak, Kim (2019) inquires the consequences of public spending volatility in the US time series data set. The results of Bivariate Vector Autoregressive model confirm that aggressive public spending prompt output volatility, reduces private investment, consumption and economic growth. Similarly, Cavoli et al. (2019) investigates the effects of policy volatility, trade openness and credit availability to the businesses on the volatility in output in the panel of 100 EMDEs from 1995 to 2013. The author confirms that volatility in policy

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magnifies volatility in output. Earlier from Kim (2119); Cavoli et al. (2019), in the analysis from 1965 to 2014 for the panel of 57 middle- and low-income countries. The study utilizes Fixed Effect, Random Effect and GMM techniques, and confirms that volatilities of government consumption expenditure, investment and trade openness are significantly explaining the output volatility and positively linked with it supporting the finding of Kim (2019).

Additionally, the study finds a positive role of government size in economic condition stabilization. Like finding of Turan (2017) and Kim (2019); Algeed (2020), reviews the impact of volatile public spending on output growth in Saudi Arabia (oil-producing country) from 1970 to 2018. The study utilizes OLS and nonlinear ARDL model, the estimation finding reveals the adverse significant impact of aggressive government spending on output growth. While to further explore the channel, the author concludes that aggressive conduct of government spending has both short and long run negative impact on output growth. Fluctuations in trade and credit to private sector have positive impact on output volatility. Opposing Turan (2017), Kim (2019) and Algeed (2020); Oz-Yalaman et al. (2019) uses univariate GARCH model and Granger Causality analysis to enquires the impact of government spending on output volatility covering period from 1960 to 2017. The results confirm that government expenditures significantly amplify output volatility. Furthermore, the results imply the significant effects of lag output volatility.

The study performed by Ali et al. (2018) seek to establish the link between government discretionary expenditure volatility and output growth. In their analysis, they employ GMM methodology for the panel of 55 countries from 1985 to 2014. The study finds the negative significant effects of discretionary spending on economic growth in developing economies while in developed countries, spending is insignificant and negatively related to economic growth. Another study by Ali and Khan (2020) also tries to examine the relationship between discretionary expenditure volatility, overall government spending, economic growth and macroeconomic stability in a panel of 74 developing and developed economies. The authors use various estimation methods like OLS, REM, 2SLS, FEM, and GMM and suggest that volatility in such discretionary fiscal policy significantly reduces output growth, particularly severely in developing countries. However, government size has a positive significant impact on output growth, consistent with the results of Turan (2017). Following Ali et al. (2018) and Ali and Khan (2020) use similar econometric methods Bibi and Alam (2023) covering period from 2000 to 2021 for the panel of 55 middle- and lower-income countries, conclude that government discretionary spending volatility significantly reduces output growth and private investment in both lower- and middle-income developing countries. In policy implication, the authors suggest employment of fiscal rules to restrict the government from the aggressive practice of discretionary public spending.

Furceri (2007) inquires the effects of volatile public expenditure on long-run output growth in 116 economies from 1970-2000. The finding of Fixed Effect Model signifies the adverse impact of government spending volatility on economic growth. Similarly, Afonso and Furceri (2010), follow similar methodology of Furceri (2007) attempt to discover the influence of government spending volatility and revenue volatility on output level in the

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OECD and EU countries. Their estimation findings conclude that size as well as volatility of government revenue and spending significantly retard economic growth. For more empirical evidences Afonso and Jalles (2012), analyze empirically the effect of fiscal volatility and financial crises on growth from 1970 to 2008 in developed and emerging economies. The article utilizes similar Fixed Effect and GMM model, and finds the significant positive effects of fiscal volatility on output growth and support the finding of Afonso and Furceri (2010). Likewise, Tenhofen et al. (2010) examine the outcome of government expenditure shocks in Germany, the empirical outcomes of SVAR method present the positive direct impact of spending shocks on private consumption and output growth. After Tenhofen et al. (2010); Jemec et al. (2011) using the similar SVAR techniques of Tenhofen et al. (2010); find the positive effects of spending shocks on output, consumption and investment, while these GDP components reduce by revenue shocks. However, utilizes the identical SVAR approach, Cyrus and Elias (2014) reveal positive impact of revenue and spending shocks on growth level. Following same trend and utilize a VAR model Fernandez-Villaverde et al. (2015) find empirically the destabilizing effects of government spending and aggressive taxation on economic performances in the US economy. Similar, to, Fernandez-Villaverde et al. (2015); Mumtaz and Surico (2017) investigate the impact of government expenditure, tax variation, public debt and monetary policy uncertainty on output fluctuations in the US economy from 1970 to 2015 and uses VAR model. The authors reveal that uncertainty in spending explains a small portion of output volatility about 25 percent. However, uncertainty in debt and tax has a significant positive role in elevation of output fluctuations. Surprisingly, Pham (2018) argues that in the short run, the volatile fiscal and monetary policy may increase or reduce economic growth however, in the long run, aggressive uses of public spending may shift the influence of government spending volatility on long term growth from positive toward negative particularly in less developed economies. While seeking the determinants of fiscal policy volatility in emerging, developing and commodity exporting economies covering from 1990 to 2021 Francisco et al. (2024) empirically conclude that both developing and emerging suffer more from policy volatility than commodity exporters. Further, flexibility in exchange rate and existence of fiscal rules cause more policy stability.

Carmignani et al. (2011) uses GMM method for the panel of 79 developed and developing economies from 1970 to 2000, and identify that public expenditure and trade significantly increase output volatility. Surjaningsih et al. (2012) analyze the relationship between output growth, output volatility, fiscal policy and inflation in Indonesia. The article applies VECM over quarterly time series data from 1990 to 2009. The findings show that government expenditure shocks enhance growth in the short run while taxes reduce it, however, the negative effect of taxes turn into positive in the long run. Utilize OLS and Instrumental techniques, Fatas and Mihov (2013) seek the effects of expenditure volatility, output volatility, trade openness and inflation on economic growth for the panel of 93 economies (developed and developing) from 1960 to 2007. According to the empirical evidences of the study, growth level is adversely affected by inflation and output and spending volatility while trade openness and primary schooling promote economic growth in these countries. To identify the cause of output volatility in 22 OECD for the time 1961

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to 2104, Martin and Vierke (2019) adopt a Bayesian model and find that government spending and trade openness intensify output volatility, however, rise in primary age workers is associates with lower output volatility. Similarly, Collard et al (2017) utilize the same approach and find the negative effects of government size on output volatility in US time series data ranging from 1960 2007. In further investigation Mujahid et al. (2022) while linking output volatility, institutional quality and government size in 182 countries from 1996 to 2016. The study applies OLS, Fe, RE models, the findings suggest the significant positive impact of output volatility on institutional quality and government size. While trade openness and population significantly increase government size.

The set of control variable employ by this study is trade openness, physical capital, human capital, and population. The empirical results of Tauqer et al. (2017) suggest that population growth reduces output volatility in 141 economies (developed & developing), during 1971 to 2017 while financial development and lag of volatility significantly intensify output volatility. Similarly, Majeed and Noreen (2018) find the negative impact of population and trade on output volatility while financial development intensifies volatility in monetary sector but, weakly induces output volatility in a panel of 79 economies for the period 1961 to 2012. However, Cavoli et al. (2019) enquire the effect of policy volatility, trade openness and credit availability to the businesses on the volatility in output in the panel of 100 EMDEs from 1995 to 2013. Regarding financial development, the study finds that financial development exacerbates output volatility while, openness to international markets reduces the domestic output volatility. Prior, Lin and Kim (2013) employ GMM, through a data collect from 158 economies from 1960-2010, and find the negative effect of spending volatility on growth, moreover, physical capital dampens fluctuations in output while trade and population growth intensify these fluctuations.

To conclude, this section of this study has analyzed and provided an empirical overview of literature on relationship between public spending volatility and output volatility. The majority portion of empirical literature have found a positive relationship between fiscal spending volatility and output volatility. While, few studies have provided evidences regarding a negative nexus between government spending volatility and output volatility. The insignificant impact of spending volatility on output volatility have not confirmed by any of the abovementioned studies. Additionally, these studies have focused especially on developing and developed economies. Few studies have considered the case of South Asian economies. Further in the South Asian economies, these studies have tried to find the impact of public spending volatility on growth rather than on output volatility. Due to the dissimilar findings about the effects of fiscal spending volatility on output volatility and negligible empirical literature, it is necessary to explore this issue further.

Methodology

This section concentrates on the suggested methodology for analyzing the association between output growth volatility and government spending volatility. The main subsections cover in this chapter are theoretical framework followed by model specification, measuring output and fiscal spending volatility, data and sample selection and selection of estimation technique.

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Theoretical Framework

The examination of existing theoretical literature revealed that different school of thoughts have opposing views on the effects of fiscal policy on the economy. The classical economists refused the existence of fiscal policy"s impacts on economic affairs and argue that output is unaffected by fiscal expenditures (Munir and Riaz, 2019). In their view, economies operate through selfregulating mechanism and has natural tendency to move toward equilibrium by eliminating both external and internal shocks through the operation of market forces of supply and demand (Nawaz et al. 2018). The use of fiscal measures by the government disrupt this self-regulating mechanism leads to misallocation of resources, crowding out private investment, negatively influence the decisions of economic agents, and consequently retard the growth of the economy. Therefore, intervention of government in economic affairs through budgetary policy is ineffective in a reduction of GDP gap and so output volatility. Oppositely, the Keynesian views suggest that economies are naturally unstable and experience output volatility that have substantial economic costs. Traditionally, the counter-cyclical operation of automatic stabilizers has reduced the difference between potential and actual output, this reduction in the output gap denotes a drop in the volatility of output. Because of this, government intervention in the economy would improve stability due to the proportionate relationship between the amount of government spending and the automatic stabilizer's impact. Keynes' main thesis is that government size reduces the impact of exogenous shocks to aggregate income, aggregate current consumption, and consequently output volatility by reducing the impact of liquidity constraints encountered by households (Nwosa, 2020).

Measuring Output and Government Spending Volatility

The dependent variable in this study is output volatility (OV_{it}) measured by three-years moving standard deviation of per capita growth of the gross domestic product (GDP). This study follows identical approach followed by (Le, 2020; Malik and Masood, 2020) for measuring output volatility. The standard form equation for measuring output volatility is below.

$$OV_{it} = \sqrt{\frac{(Y_{it} - \bar{Y}_{it})^2}{n-1}}$$

The main explanatory variable employs in this study is government spending volatality(GSV_{it}), which is calculated by taking standard deviation of general government spending as a percentage of GDP. The similar approach is used by (Fatas and Mihov, 2009; Le, 2020; Malik and Masood, 2020 and Ali , 2015), in their analysis to calculate volatility in government spending. The numerical formula is given below

$$GSV_{it} = \sqrt{\frac{(E_{it} - \bar{E}_{it})^2}{n-1}}$$

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Figure 3.1: Country Wise Fiscal Spending Volatility

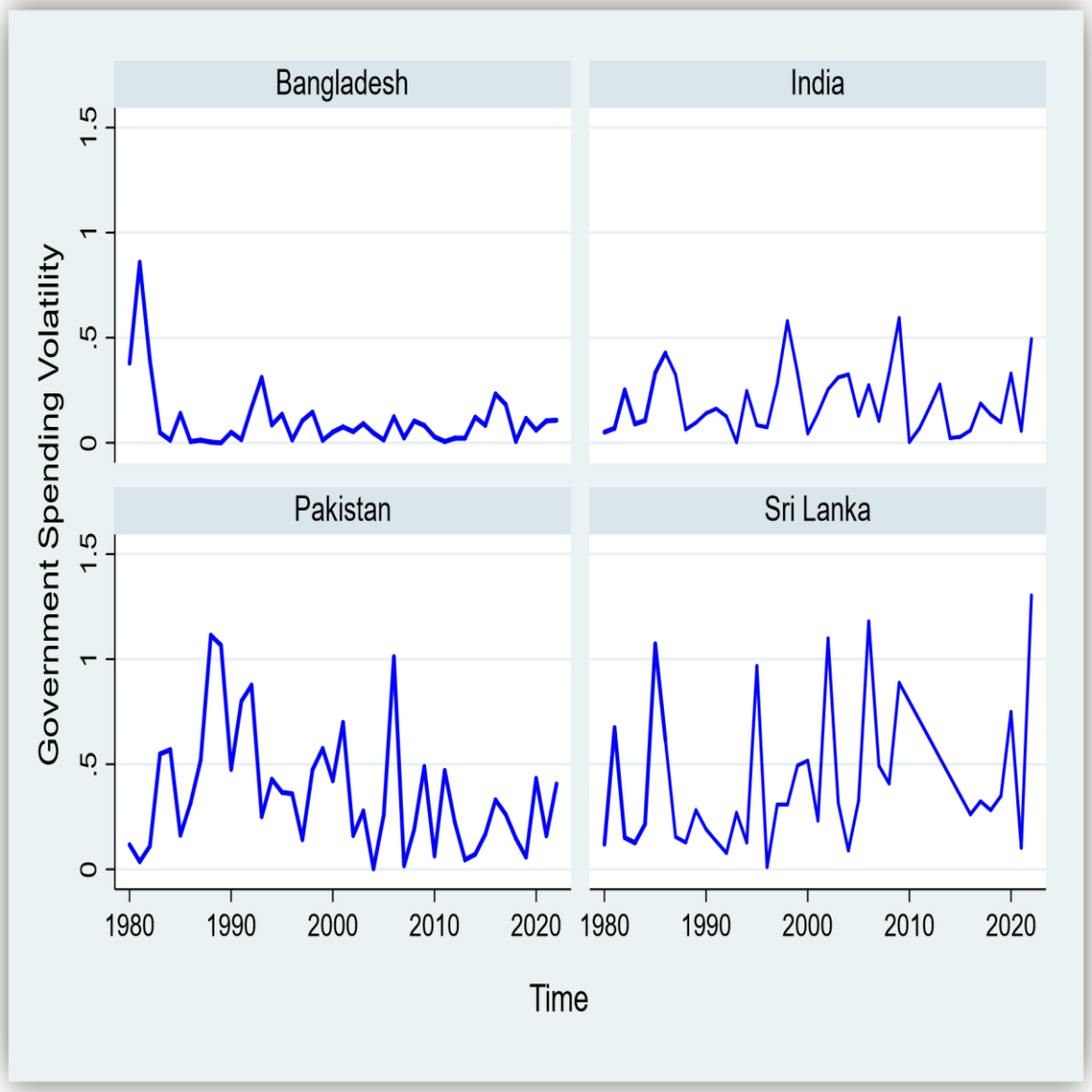

Figure 3.1 presents that Pakistan and Sri Lanka do more volatile use of fiscal spending than India and Bangladesh. The range of volatility in these two countries lies between 0 and 1.5. While the range of volatility in Bangladesh and India lies between 1 and 0. While figure 3.1 depicts that the economies of Bangladesh and Pakistan as compared to India and Sri Lanka are stable, and have less fluctuated business cycle.

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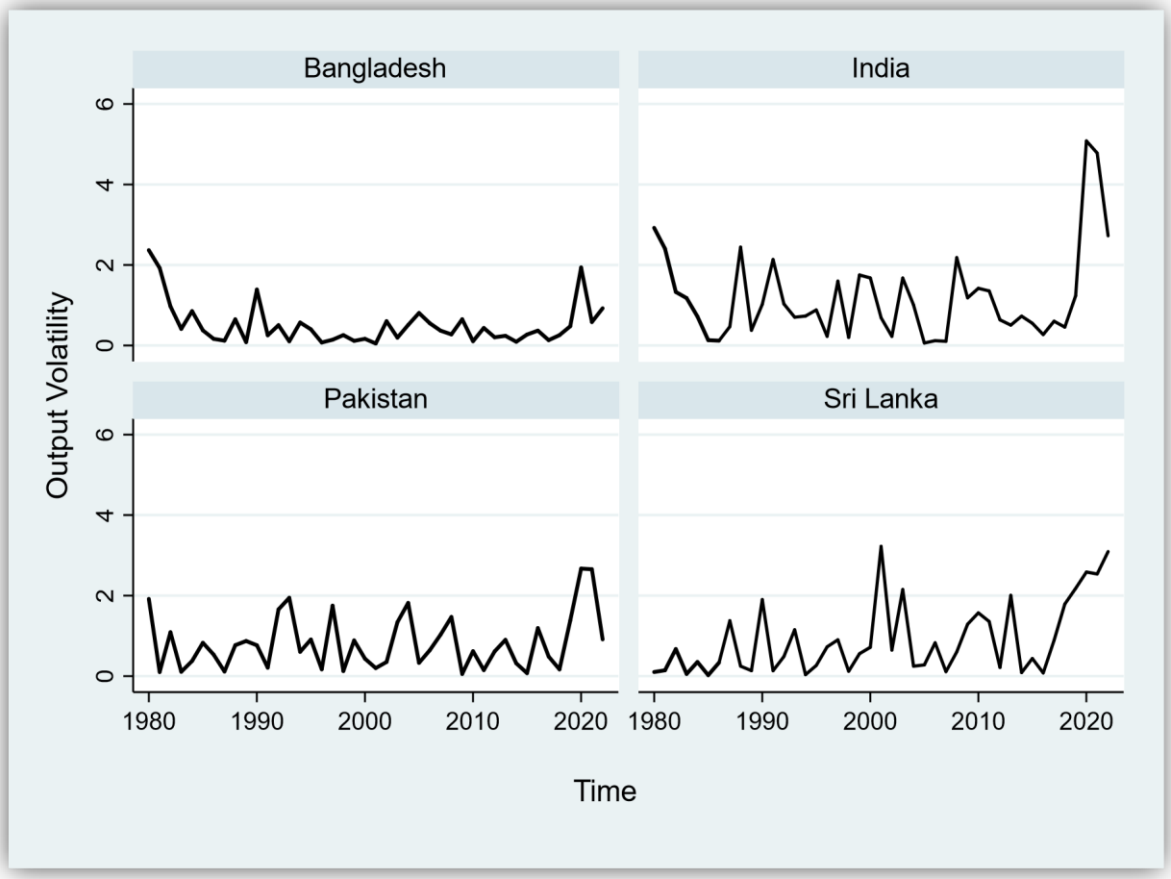
Figure 3.2: Country Wise Output Volatility



Model Specification

To identify the main determinants of output growth, researchers have recently adopted agnostic approach, which means inclusion of all the relevant and potential variables in the growth model and then analyze the robustness of each variable by employing different estimating techniques. In growth regression, the variables presented fiscal policy are redundant however, Investment, initial level of GDP, accumulation of human capital and trade show robust significant effect found by Levine and Renelt (1992) in their analysis. Similarly, Ali 2005, following the Levine and Renelt (1992), growth specification process, finds that fiscal variables, measured in level form, have insignificant explanatory role in growth regression. While Doppelhofer & Miller (2004), by adopting Bayesian approach also confirm the redundant role of policy variables in growth regression. However, the work of (Shih-Ying et al. 2010; Yusuph and Nerima 2012; Komain and Tantatape 2013; Lingxiao et al 2016; Edmund et al 2017; Jalles 2020) found the significant effect of fiscal variables in growth regression. The insignificant role of fiscal variables in growth regression is due to the omission of institutional variables in growth model argue by Easterly (2005) and Acemoglu et al. (2003). However, in the above-mentioned studies

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both policy variables and output growth were employed in their level form. These studies have ignored the volatility associated with output growth and fiscal measures. Onward, Furceri (2007), Afonso and Furceri (2010), Fatas and Mihov (2013), try to examine the effects of public spending volatility on output growth and find the significant nexus between public spending volatility and output growth. Following Furceri (2007), Afonso and Furceri (2010), Fatas and Mihov (2013); Ali and khan (2020) and Bibi and Alam (2023) also find significant impact of fiscal policy on output growth. while Lee (2020), and Munir and Riaz (2018), examine the impact of public expenditure (at level form) on output volatility and reveal significant impact of fiscal policy on output volatility. Recently, Nwosa et al. (2020), and Kim (2019) have attempted to discover the relationship between output volatility and government spending volatility. Following the same stream this study intends to investigate the relationship between output volatility and government spending volatility. For this purpose, this study specifies the below model

.

$$OV_{i,t} = \text{f}\,(GSV_{i,t}) \quad (1)$$

Where $OV_{i,t}$ is the output volatility while $GSV_{i,t}$ is the government spending volatility. Other control variables found significant in growth regression in the literature that can affect output volatility and the link between output volatility and government spending volatility are trade openness indicated as ($TO_{i,t}$), foreign direct investment ($FDI_{i,t}$), gross fixed capital formation ($KF_{i,t}$), credit to private sector ($CR_{i,t}$). After incorporation of mentioned control variables, we build our model as follow.

$$OV_{i,t} = \text{f}\,(GSV_{i,t}, TO_{i,t}, FDI_{i,t}, KF_{i,t}, CR_{i,t}) \quad (2)$$

By linearizing the above functional form relation into the multiple regression model.

$$OV_{i,t} = \alpha_i + \beta_i GSV_{i,t} + \sum_{j=1}^{Q} \theta_j Z_{i,t} + \epsilon_{i,t} \quad (3)$$

Where „i" denotes country index, „t" denotes index of time. $\alpha_i$indicates intercept.$OV_{i,t}$ stands for output volatility (business cycle fluctuations), in period t proxied by standard deviation of per capita GDP growth. $GSV_{i,t}$indicates government spending volatility. $Z_{I,t}$ includes a set of control variables like foreign direct investment ($FDI_{i,t}$), trade openness (sum of import and export as the share of GDP) indicated by ($TO_{i,t}$), credit to private sector ($CR_{i,t}$), and gross fixed capital formation ($KF_{i,t}$).

Model 3 is static in nature and does not includes lag output volatility, however existing literature reveals that lag values of output volatility has Significant impact on current period output volatility (Lee, 2020). To control lagged dependency issue, this study employs Generalized Method of
Moment (GMM) technique. The GMM model is specified as

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$$OV_{i,t} = \alpha_i + \beta_i GSV_{i,t} + \delta_i OV_{i,t-1} + \sum_{j=1}^{Q} \theta_j Z_{i,t} + \mu_{i,t} \text{,,} (4)$$

Where $OV_{i,t}$ indicates output volatility. $GSV_{i,t}$ represents government spending volatility.

$OV_{i,t-1}$denotes lag output volatility. $Z_{I,t}$ includes a set of control variables and $\mu_{i,t}$ is the error
term.

Definition and Source of Variables

Table 3.1 presents a brief definition and source of collection of variables utilized.

Table 3.1: Variables Definitions and Source of Collection

Variable	Difinition	Source
Government Spending Volatility	It is the three year moving standard deviation of general government finale consumption expenditure as a percentage of GDP.	Author"s own calculation
Output Volatility	It is the three year moving standard deviation of gross domestic product per capita.	Author"s own calculation
Gross Domestic Product Growth Rate (GDP)	"GDP is the market value of all goods and services produced by a country in a given time, normally one year, and the GDP growth rate is the percentage change in GDP."	WDI
General Government Finale Consumption Expenditures % of GDP	"General government final consumption expenditure (formerly general government consumption) include all government current expenditures for purchases of services and goods (including compensation of employees). It also includes most expenditures on national defense and security, but excludes government military expenditures that are part of government capital formation. Data are in constant 2005 U.S. dollars".	WDI

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Foreign Direct Investment	"The net inflows of investment to acquire a lasting management interest (10 percent or more of voting stock) in an enterprise operating in an economy other than that of the investor. It is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments".	WDI
Trade Openness as a % of GDP	Trade is the combined share of imports and export of goods and services in GDP.	WDI
Gross Fixed Capital Formation as a % of GDP	It includes investment in land development (drains, fences, ditches and so on); construction of railways, roads, hospitals, school, offices, industrial and commercial buildings; purchase of equipments, plants and machinery.	WDI
Domestic Credit to Private Sector as a % of GDP	It is the provision of Financial resources by the financial corporations to the private sector throgh loans, trade credits and the purchases of nonequity securities and other account recieble, that establish rights for repayment.	WDI

Data and Sample Selection

The variables utilize by this study are per capita GDP growth rate, general government expenditure, gross fixed capital formation, trade openness, credit to the private sector, and foreign direct investment. The data on the mentioned variables for the selected sample are extracted from World Development Indicator (WDI).The time range of data collection is from 1985 to 2022 and the data is panel secondary in nature.This study considers a panel of four South Asian economies namely Bangladesh, Sri Lanka, India, and Pakistan. The limited sample is due to the unavailabaility of data in other four economies in South Asia on the relevent variables. The use of Panel data is preferable over cross sectional and time series data due to the capability of taking into account the heterogeneity and provide crosse-sectional specific effect. Panel data consist of large number of obsvervations and provide adequate number of degree of freedoms consequently alleviate the problems of multicollinearity and other econometric issues such as endogeneity, serial correlation, omitted variables bias. So, the estimates obtianed through the use of panel data are efficient, relaiable and more robust (Ali, 2015; Baltagi, 2013; Wooldridge, 2010).

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Estimation Techniques

Overview of literature discover that traditionally, for panel data analysis, two method; Fixed Effect Methods (FEM) and Random Effect Methds (REM), have been majorly employed by researchers. Both these two models control the country wise heterogeniety problem.However, the growth model is also suffer from the problem of endogeneity causes by reverse causality as from Wagner law GDP affect public expenditure while public expenditure affect GDP (Keynesian theory), (Rasul et al. 2021). In the presence of endogeniety problem, the estimates obtained by using FEM and REM whould be biased and ineffecient because these models lack the capabality of handling this endogeneity issue (Ali et al. 2018). The estimates obtained by employment of Panel Ordinary Least Square (POLS) techniques will also be biased and inconsistant estimators because of existance of problems like cross-sectional heterogeneity, endogeneity and serial autocorrelation due to ommision of lagged dependant variable (Lee and Azali, 2010; Ali et al;. 2018; Rasul et al. 2021).

To get unbiased and reliable estimators, this study employs Generalized Method of Moment (GMM), estimation method, to avoid the issues of endogeneity. Reverse causality, autocorrelation and even the non-stassionarity of variables series (Arellano and Bover, 1995; Ali et al. 2018). This method is improvised version of instrumental variable IV method. This technique like other techniques does not relies on assumption of homoscedasticity and no autocorrelation (Blundell and Bond, 1999). By using GMM techniques, even a heteroscedasticity model will provides efficient estimators (Perera and Lee 2013). Various researchers have employed this method of estimation for their panel analysis (Nwosa et al,. 2020; Ali et al 2018; Ali and Khan, 2020; Rasul et al,. 2021 and Bibi and Alam, 2023).

Estimation Results and Discussion

This study intends to investigate the impact of government spending volatility on output volatility in South Asian economies. To achieve this motive, this study extracts the relevant data from WDI for the four South Asian economies from 1980 to 2022 and employs System GMM on it. The main headings cover in this section are descriptive statistic of variables, correlation matrix of variables and estimation results. **4.1.**

Descriptive Statistics

Table 4.1 presents the descriptive summary of all the included variables in the panel dynamic model. Among all the series, trade openness has high mean value (38.70) followed by the series of credit to private sector (27.29). The government expenditure volatility trend is associated with lowest average value (0.264). Foreign direct investment exhibit second lower mean value (0.832).

The mean value of capital formation and output volatility is 5.899, and 0.859 respectively.

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Table 4.1: Descriptive Statistics

Variable	Obs.	Mean	Std. Dev.	Min.	Max.
Output Volatility	166	0.859	0.868	0.025	5.0833
Government Spending Volatility	172	0.264	0.272	0.0002	1.3042
Trade Openness	167	38.70	18.85	12.219	88.636
Foreign Direct Investment	172	0.832	0.690	-0.02989	3.6205
Credit to Private Sector	168	27.29	11.37	5.7713	54.571
Gross Fixed Capital Formation	165	5.899	6.854	-22.664	22.856

Source: Author‟s own calculation.

Column 4 in Table 3 include the standard deviations of the of each series. Like high mean value, the standard deviation (18.85) of trade openness is also high compared to other series followed by financial development (11.37) and capital formation (6.854). The government spending volatility has the lowest standard deviation (0.272). The standard deviation of output volatility, and foreign direct investments is 0.868, and 0.690. The low standard deviation of government spending volatility indicates the lower dispersion of values from mean value. Both minimum and maximum values in spending volatility series are lower as compared to other series.

Correlation Analysis

Table 4.2 presents the correlation coefficients between the variables. Government spending volatility and foreign direct investment are positively correlated with each other‟s. which means that if foreign direct investment increases spending volatility also tends to increases and vice versa. Magnitude of the correlation coefficient of 0.0892 denotes a weak but positive correlation.

Before further proceeding, it is necessary to clear that correlation shows only the extent of association between variables. It does not imply causation or any causal relationship between variables. Regarding, the correlation between credit to private sector and spending volatility, the coefficient of magnitude -0.0730, imply a weak tendency for spending volatility to decrease as

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Table 4.2: Correlation Matrix

Variables	Government Spending Volatility	Foreign Direct Investment	Credit to Private Sector	Gross Fixed Capital Formation	Trade Openness
Government Spending Volatility	1				
Foreign Direct Investment	0.0892	1			
Credit to Private Sector	-0.0730	0.5606	1		
Gross Fixed Capital Formation	-0.0630	0.0480	0.0887	1	
Trade Openness	0.2344	0.5059	0.2464	-0.0080	1

Source: Author‟s own calculation.

Credit to private sector rises. Capital formation is weakly negatively correlated with public spending volatility, with a correlation coefficient of -0.0630 decrease as credit to private sector rises. Capital formation is weakly negatively correlated with public spending volatility, with a correlation coefficient of -0.0630. This suggests that government spending volatility tends to reduces as capital formation increases. Alternatively, stability in fiscal spending lead to induce private investment in physical capital. Trade openness is strongly negatively correlated with government spending volatility. The correlation coefficient of magnitude 0.2344, indicates that as trade openness increases, government spending volatility also tends to increases and vice versa. Credit to private sector is highly positively correlated with FDI, with coefficient of 0. 5606.It means both FDI and credit to private sector tends to change in same direction. This is strongest positive correlation shown in the table. The correlation coefficient associated with physical capital formation and FDI is positive and suggests that a rise in physical capital investment tends to rise FDI and with decrease in capital formation also tends to decreases FDI. Trade openness and FDI are strongly positively correlated with each other‟s, with a coefficient of 0.5059. This implies that as economies become more open, the inflow of FDI also tends to increases. Credit to private sector is positively correlated with gross fixed capital formation with a correlation coefficient of 0.0887. The positive correlation denotes that as credit to private sector increases, investment in physical capital also tends to increases. Credit to private sector is strongly positively correlated with trade openness. The correlation coefficient of magnitude 0.2464, presents that as trade openness increases credit availability to private sector also tends to increases. Lastly, there is a negative, but very weak correlation between trade openness and capital formation with a correlation coefficient of magnitude -

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0.0080. This denotes that as trade openness increases capital formation tends to decreases. In summary, the table 2, presents different relationship between variables, with strongly positive correlation between FDI and credit to private sector. However, further analysis is needed to determine any causal effect.

Estimation Results

Table A3 in the appendix reported the results of pooled OLS technique, Random Effect model and Fixed Effect model. However, these findings are subject to several issues like endogeneity, crosssectional heterogeneity, and Autocorrelation, as discussed in the methodology section. While table 3 reported the results of the panel dynamic one-step Generalized Method of Moment (GMM). The
GMM model is capable of controlling the lagged dependent variable‟s endogeneity, omitted variables bias, preserve unobserved heterogeneity, and lastly, control the measurement error. Further, to check for adequacy and appropriateness of the suggested panel dynamic model, this study employs Arellano-Bond AR2 test (Arellano and Bond, 1991), and Hansen test (Hansen, 1982), of over-identification restriction. The probability value of AR (2) test (0.544), and Hansen test (1.000), suggest a sufficient evidence of accepting null hypothesis of both tests, confirming that the instruments in the model are exogenous; uncorrelated with stochastic term, valid, and that error terms are uncorrelated. This study uses robust option in regression analysis for homogeneity sake Lastly, output volatility is the dependent variable proxy by 3 year moving standard deviation of per capita GDP growth rate and government spending volatility is the main explanatory variables. Table 4.3 demonstrates that except trade openness and credit to private sector (which is insignificant), all other explanatory variables are significant at less than 5% significance level. Starting from the coefficient associated with the lagged output volatility, which is positive and significant at 1% significance level. The positive value of coefficient (0.308) implies that a one standard deviation rise in preceding year output volatility leads to intensifies current year output volatility by 0.308 standard deviation. This finding shows consistency with the results of (Turan, 2017; Oz-Yalaman, 2019, Lee, 2020; Tauqir et al. 2021), who concluded positive and significant impact of previous year output volatility on current year volatility. The observed positive substantial effect of lagged volatility on current volatility, signifies the effects of phenomena known as inertia in output volatility. It means that output volatility, whether low or high, tends to be steady over time and resist shift in economic conditions. This persistent behavior of output volatility may be due to momentum (self-reinforcing), information rigidity, and adjustment costs and may causes policy ineffectiveness.

The coefficient associated with government spending volatility is significant at 1% significance and specifies that a one standard deviation increase in government spending volatility dampens output volatility (business cycle fluctuations) by 0.539 standard deviation supporting the finding of (Nwosa et al., 2020; Surjaningsih et al., 2012; Tenhofen et al., 2010), who also reached to the same conclusion. It means volatility in government spending stabilizes fluctuations in the economy causes more certainty and predictability in economic activities. This stabilizing effect of fiscal spending supports the

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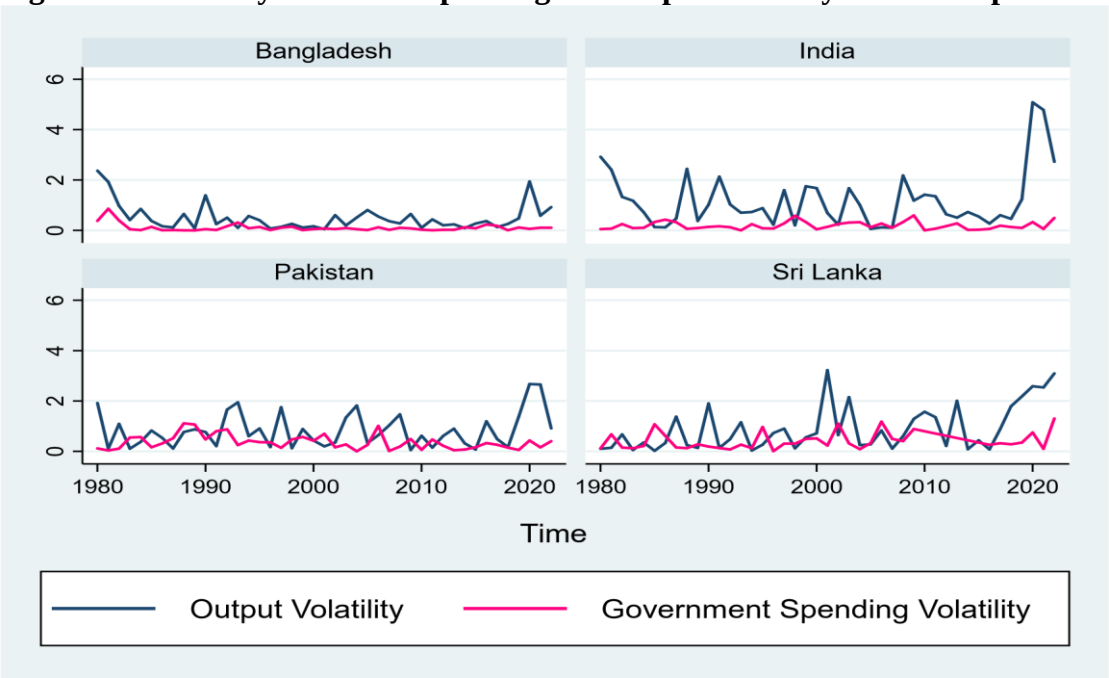
Keynesian view about the effects of fiscal policy in economy. In justification this study contends that volatile use of spending by government in relation to business cycle fluctuations may act like automatic stabilizers and offset volatility in economic activities. That is, when fiscal authorities expand spending during economic contraction to stimulates aggregate demand (when private spending is low) and reduces it during expansionary periods to protect it from overheating (when high private spending), this kind of spending volatility reduces fluctuations in business cycle and leads to macroeconomic stability. In such situation, volatility in government spending leads to crowding in private investment and stimulate economic activities. Similarly, governments may made abrupt and unpredictable variations in fiscal spending in order to absorb external shocks to prevent the adverse effects of these shocks on private business, increases the confidence of private investors, encourage private investment and may leads to high economic growth. The finding of this study regarding impact of government spending volatility on output volatility is opposes by the finding of (Bretscher et al. 2017; Turan, 2017; Cavoli et al. 2019; Kim, 2019), who found significant and positive impact of spending volatility on output volatility.

From figure 2 it is perceiving that in the selected sample economies, especially in Pakistan volatility in public spending and fluctuations in output move in opposite direction indicating that at high degree of volatility in fiscal spending, economies experience lower fluctuations in business cycle pointing out to the counter-cyclical nature of spending volatility and stabilizing role of spending volatility.

Figure 4.1: Country wise fiscal spending and output volatility relationship.



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Trade openness has positive but insignificant impact on output volatility as output volatility increases by 0.539 standard deviation with 1 percentage points rise in trade opennes. This finding shows consistancy with the finding of (Majeed and Noreen, 2018; Martin and Vierke, 2018; and Ghulam and Siddiqui, 2016), who revealed the identical positive impact of trade on output volatility. This demonstrate that more oppenness of economies particularly developing economies to foreign trade make them more vulnerable to outside shocks causing more volatility. Oppositly (Lee, 2020;Algeed, 2022; Haddad et al. 2013), found positive effect of trade in mitigating output volatility and argue that trade opennes dampens output volatility because it promotes the fast flow of knowledge, provide economies of scale, promote technological transfers, provide access to international markets and allows comparative advantage utilization.

Variables	Coefficients	Robust Std. Error	Z-Statistic	Prob.	[95% Conf. Interval]	
Lag Output Volatility	0.308**	0.13192	2.34	0.019	0.0496	0.5667
Government Spending Volatility	-0.539***	0.06428	-8.39	0.000	-0.6651	-0.4131
Gross Fixed Capital Formation	-0.0355***	0.01087	-3.27	0.001	-0.0568	-0.0141
Trade openness	0.00539	0.00492	1.09	0.274	-0.00426	0.0150
Foreign Direct Investment	-0.522**	0.1954	-2.67	0.008	-0.9056	-0.1393
Credit to Private Sector	0.0377	0.0270	1.40	0.162	-0.01520	0.0907
Constant	0.0888	0.4992	0.18	0.859	-0.8896	1.0674
	Number of Countries = 4			Number of Observations = 156		
	Arellano-Bond AR (2) Test Prob.-Value = 0.544			Hansen Over Identification Restriction Test = 1.000		

Table 4.3: System GMM Regression; Dependent Variable Output Volatility

Note: Author‟s owns calculation. The steric (*) on coefficients indicates the significance level, where, ***P<0.01, **P<0.05, *P<0.1.

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In case of credit to private sector (financial development), the estimate obtains is positive but insignificant. The value of coefficient (0.0377),associated with financial development imply that a 1 percentage point expansion in availability of credit to private sector intensifies output volatility by 3.77 standard deviation. This positive finding is compatible with the finding of (Ghulam and Siddiqui, 2016; Silva et al. 2018; and Cavoli et al. 2019) who found a positive insignificant effect of credit to private sector on output volatility and opposite to the study of (Ezekiel and Dada, 2023), which revealed a positive role of financial development in mitigating output volatility. There prevail two perspective about the role of credit to privatye sector in mitigating output volatility; the first one argues that credit to private sector can reduces output volatility by absorbing external shocks, improves risk diversification prospect, lessens financial constraints and informational asymetry, and protect the economy from unanticipated global events (Bardhan et al. 2000; Ezekiel and Dada, 2023). The second one suggest that the shallow financial system subjects economies particularly developing economies to higher volatility and lower economic growth by disconnecting investors and savers due to asymetric information that lead to ineffecient allocation of financial resoureces (Lee, 2020), and so make the credit supply and demand cyclical (Aghion et al. 1999). Our results support the second view, that financial development causes macroeconomic instability.

The associated coefficient with gross fixed capital formation is -0.0355, which is negative and significant at 1%, implies that a 1 percentage point increase in the capital formation leads to the output volatility to go down by more than 3 standard deviation. This result is in line with the study of (Adeniyi et al. 2017). This negative result supports economic theory which advocates that more physical capital accumulation rises capital over labor ratio, ultimately promote output growth and reduce output volatility (Ali et al. 2018).

The negative coefficient (-0.522) associated with foriegn direct investment, which is significant at 1%, reveals that a 1 percentage point increase in FDI (financial openness), leads to reduce standard deviation of output volatility on the average by 52 percentage points and in line with the (Tauqir et al. 2022; Ajide and Osode, 2017) results which shows the negative effects of foreign direct investment on output volatility while, opposing the finding achieves by (Lee, 2020; Bouoiyour et al.2014), who signifies that FDI rises output volatility. This result supports the theory which argues that FDI is a source of international diversification, lead to rise opportunities, spread risk, improve overall economic performances and reduces output volatility through capital market stabalization (Tauqir et al. 2022; Portes, 2007).

Conclusion and Policy Implication

Achievement of macroeconomic stability is the primary objective of fiscal authorities. Theoretical models rely on the fact that a substantial government presence results more macroeconomic stability. However , governments use spending in volatile manners. So, the effects of spending on macroeconomic stabality is unclear Therefore, to get more robust and reliable empirical evidences, this study intends to model the output volatility and analyze the impact of volatile government spending on output

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volatility in four South Asian economies between 1980 through 2022. The study employs robust one-step system GMM technique. The empirical findings depict that volatility in government spending significantly dampens output volatility and brings mcroeconomic stability in the selected sample of South Asian economies. This may be due to the more practical and counter-cyclical use of fiscal spending by governments. Further, the empirical evidences of this study suggest lag output volatility, credit to private sector and trade increases output volatility while, capital foprmation and FDI reduces it.

Policy Recommendation

Although, volatility in fiscal spending stabilizes business cycle fluctuations; however, it is important to prudently exercise such volatility, because if it is exercised independent of business cycle it might be a potential source of macroeconomic instability. For this purpose, a flexible, but fiscal rule-based policies should be designed that help to minimize macroeconomic fluctuations and also to avoid over aggressive utilization of public spending that may undermine economic growth.

Appendix

Table A3: OLS, RE, FE Regressions; Dependent Variable Output Volatility

Output Volatility	Panel OLS	Random Effect	Fixed Effect
Government Spending Volatility	0.0113	0.0113	-0.138
Gross Fixed Capital Formation	−0.0301***	−0.0301***	−0.0264***
Trade Openness	−0.00742**	−0.00742**	-0.0130
Foreign Direct Investment	0.190	0.190	0.167
Domestic Credit to Private Sector	.00910	0.00910	0.00765
Constant	0.864***	0. 864***	1.156***
Number of Observations	161	161	161
R-Squared	0.1019	0.1019	0.0785
	Number of Countries = 4		

Note: Author‟s owns calculation. The steric (*) on coefficients indicates the

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significance level, where, ***P<0.01, **P<0.05, *P<0.1.

Table A1: List of South Asian Countries Included in the Sample

ID	Country Name
1	Bangladesh
2	Sri Lanka
3	Pakistan
4	India

Figure A1: Country wise nexus between output volatility and capital formation

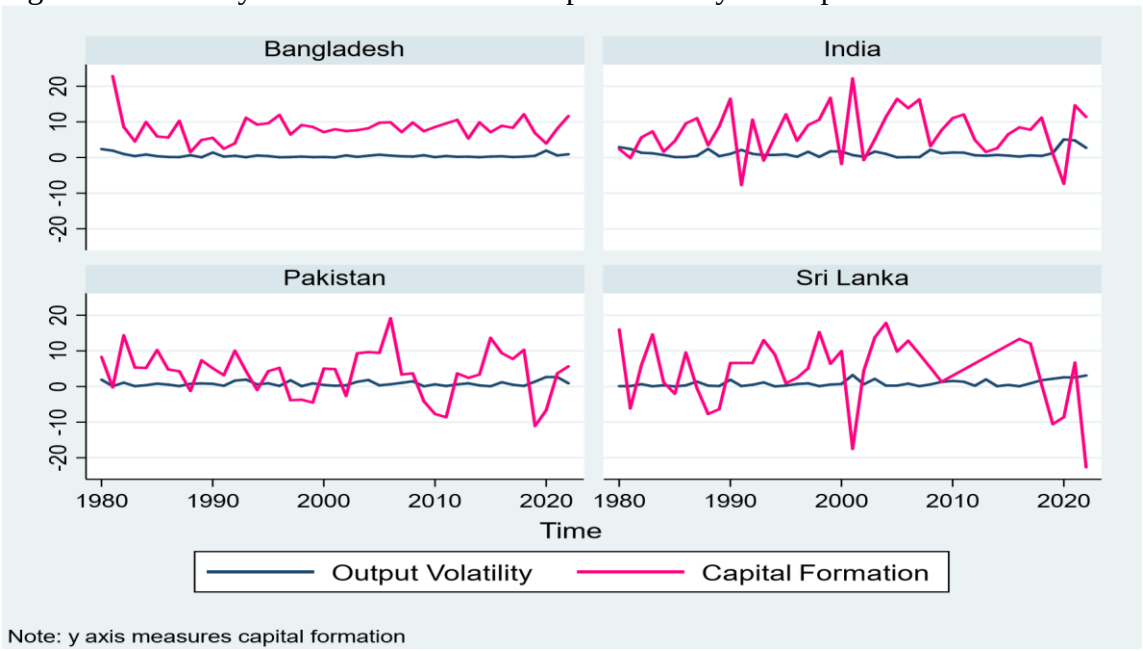

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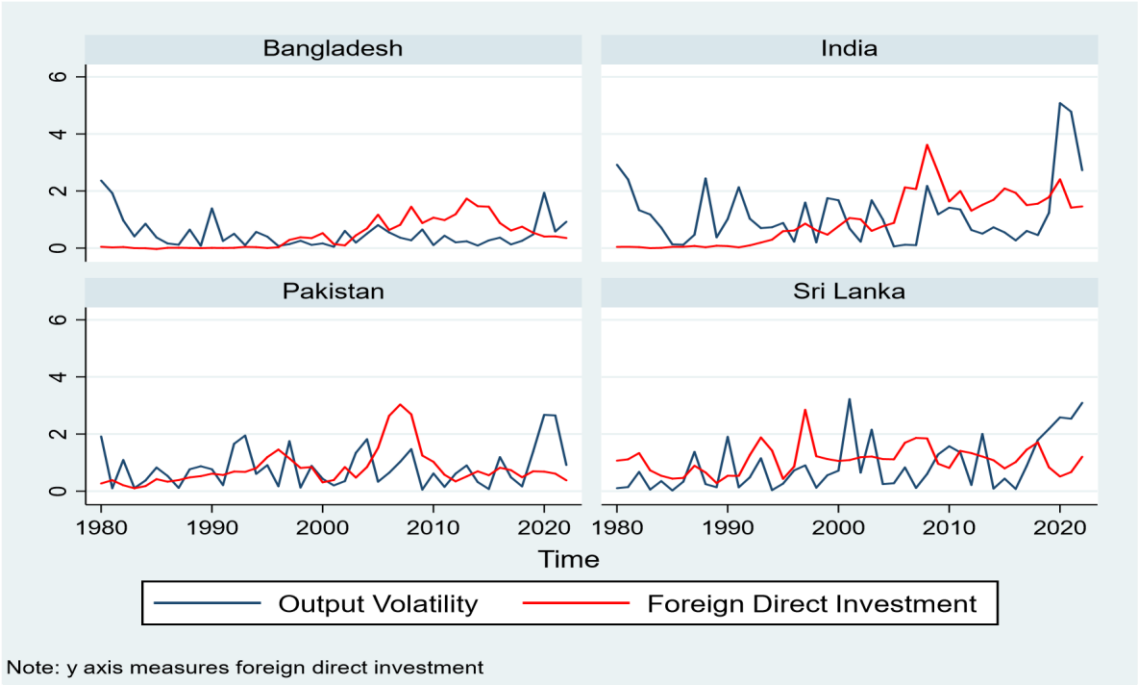
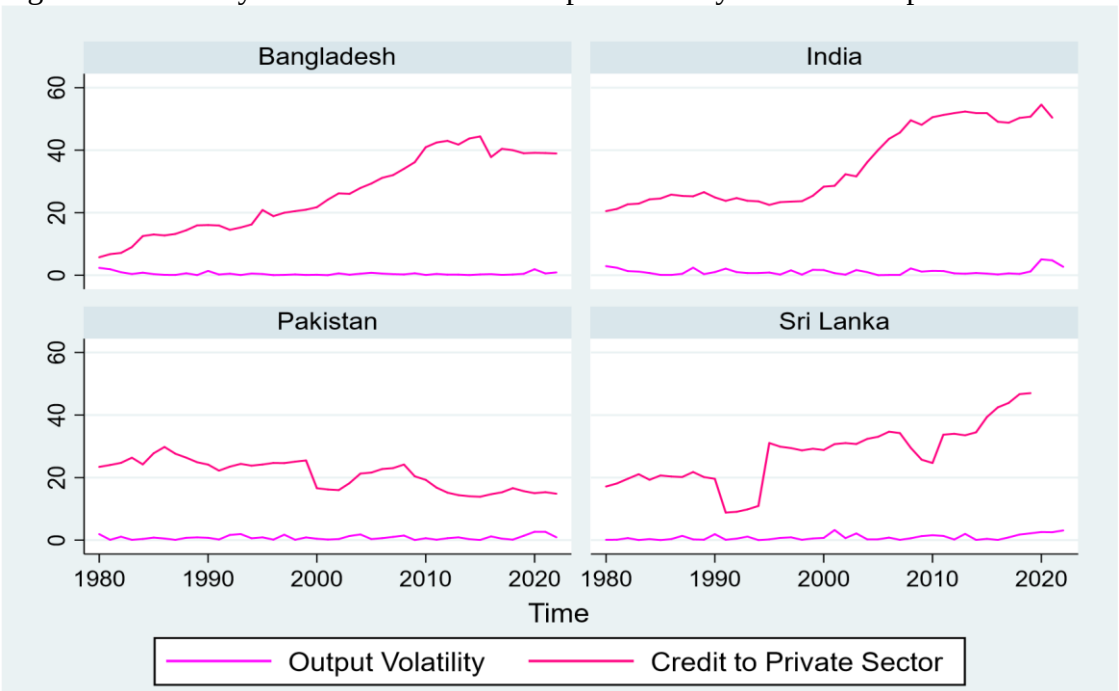
Figure A2: Country wise nexus between output volatility and foreign direct investment



Note: y axis measures foreign direct investment

Figure A3: Country wise nexus between output volatility and credit to private sector



Note: y axis measures credit to private sector

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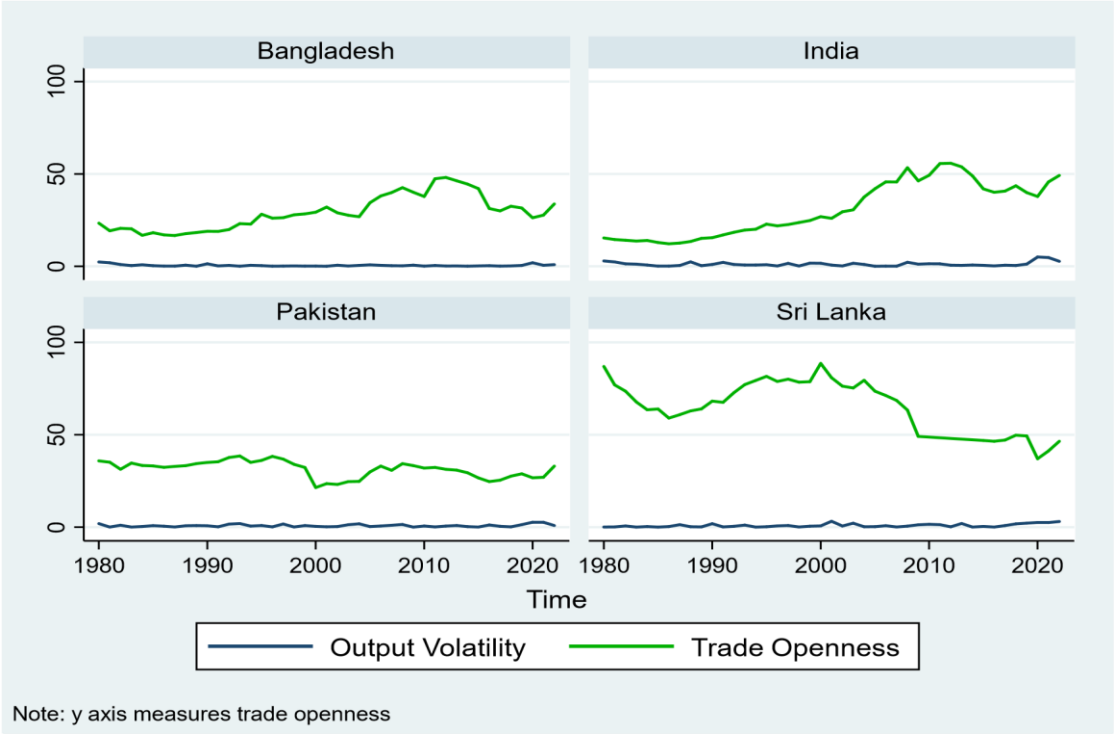
Figure A4: Country wise nexus between output volatility and trade openness



Note: y axis measures trade openness

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