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Volatility in Fiscal Policy and Terms of Trade: An ARDL Analysis of Business Cycle Fluctuations in Pakistan

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Abstract

Volatility in fiscal policy and terms of trade has diverse macroeconomics implications. This study examines the impact of government spending volatility and terms of trade volatility on output volatility in Pakistan by utilizing time-series data from 1980 to 2021. After confirming the mixed order of integration of variables through unit root testing and the existence of a long-run relationship (cointegration) among variables, the long-run and short-run coefficients are estimated using the Autoregressive Distributed Lags (ARDL) estimation technique. The findings depict that volatility in fiscal spending and terms of trade increases volatility in the output, i.e., amplify fluctuations in the business cycle and leads to macroeconomic instability both in the short run and long run. Therefore, stable and flexible fiscal and trade policies should be designed to minimize the cost of output volatility. The long run empirical evidence from the control repressors indicates that trade openness, foreign direct investment, financial development, and capital formation stabilize output volatility.

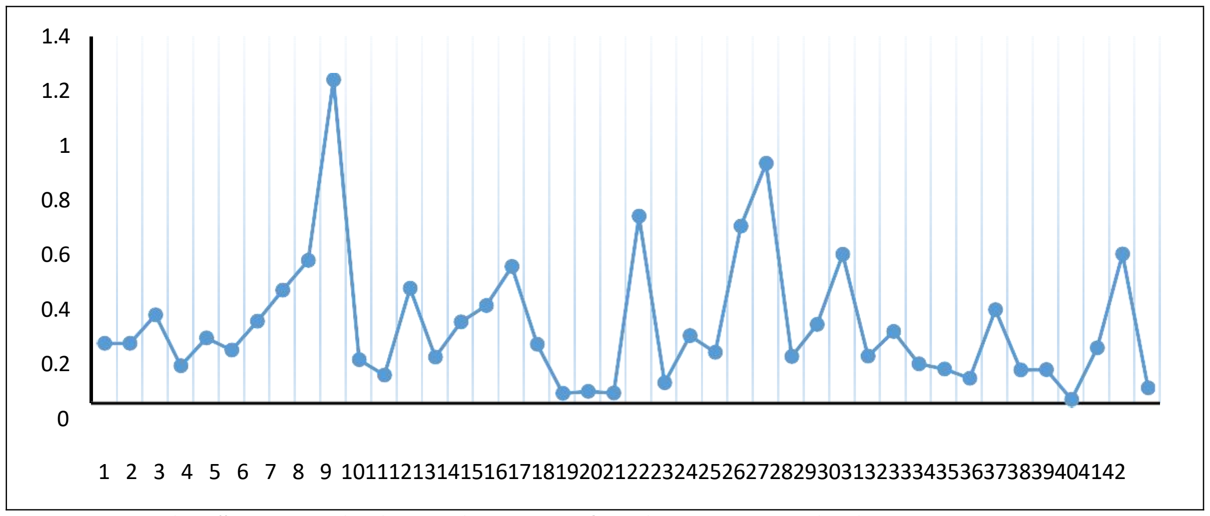
Keywords: Public Spending Volatility, Output Volatility, Terms of Trade Volatility, ARDL Modeling, Pakistan.

1. Introduction

Macroeconomic policy concerned with the adjustment of government spending and taxation to influence the economy is referred as fiscal policy (Antonio et al., 2023). 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 (Mihu & Petricâ, 2023). 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 (Ali & Khan, 2020).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 (Choi et al., 2022; Kim et al., 2021). However, 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 thoughts regarding the impact of macroeconomic policies particularly, fiscal policy (Aziz et al., 2023; Stewart, 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 (Dufrénot, 2023; 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 (Malik et al., 2023; Vianna, 2023). 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 (Turan et al., 2022; Algeed, 2020), 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 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 & 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 (Aghilifar et al., 2023; Haan & Gootjes, 2023; Berger & Dubbert, 2022; Fritsche et al. 2021; Grechyna, 2021; Galeano et al., 2021; Nguyen et al., 2020; Nuru, 2020; Olakojo et al., 2020), while other few portray a negative impact of government spending on output volatility (Heimberger, 2023; Stojanovikj, 2022; Afonso & Carvalho, 2022; Olaoye et al., 2021). Nevertheless, (Bajo-Rubio & Berk, 2023; Aldama & Creel, 2022) 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 (Marioli et al., 2024; Ma & Lv, 2023; Wang et al., 2023; Mumtaz & Qurat-ul-Ain, 2022; Wen et al., 2022; Ali et al., 2020; Kim, 2019). The volatility in public spending can be observes from figure 1.1, where aggressiveness of fiscal spending lies in between 0 and 1.4 standard deviation, indicating that governments do public spending in a more volatile manner rather than in smooth and predictable manner.

Figure 1.0: 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 & Khan, 2020; Kasal and Tosunoglu 2022; Rasul et al. 2021). It is so because, government-controlled 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. 2020). So, as to attain 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 (Kumar et al. 2023; Nwosa et al. 2020; Attinasi et al., 2016). In such situation, government expenditure volatility prompts crowding in private investments and positively affect economic growth (Nwosa et al. 2020; 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 (Dery and Serletis, 2023; Omotayo & Abel, 2023; Algaeed, 2022; Kasal & Tosunoglu, 2022; Turan & İyidogan, 2022; Kim, 2019; Oz-Yalaman, 2019).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 Pakistan economy. 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. Third, this study considers the Pakistan economy due to the reasons that fiscal authorities in this country are not significantly bound by the fiscal rule and can bring variation in the fiscal measures according to their political well. Lastly, this study employs the Autoregressive Distributed Lags (ARDL) technique, a widely employed method for modeling dynamic relationships and addressing endogeneity issues inherent in business cycle models thereby providing a robust framework for analyzing the complex interactions between government spending volatility and output volatility.

2.Theoretical and Empirical Literature Review

Recent economic literature suggests that Government spending is often volatile, negatively impacting economic growth. Yet, its effect on business cycle fluctuations remains uncertain. Theoretically, the Classical economists argue that fiscal policy has minimal impact on economic affairs, as economies operate through self-regulating mechanism and has natural tendency to move toward equilibrium by eliminating both external and internal shocks through the operation of market forces (Munir & Riaz, 2019). The use of fiscal measures by the government disrupts 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 (Nawaz et al. 2018). Therefore, intervention of government in economic affairs through fiscal policy is ineffective in a reduction of GDP gap and so output volatility (Kim et al., 2021). Oppositely, the Keynesian views suggest that economies are naturally unstable and experience output volatility that have substantial economic costs. They suggest that fiscal policy can play a crucial role in stabilizing output and reducing volatility, particularly during times of economic downturn (Nwosa, 2020). Real Business Cycle (RBC) Theory, on the other hand, emphasizes the role of technological shocks in driving business cycle fluctuations. According to this theory, government expenditure volatility can amplify the effects of technological shocks by leading to crowding out of private investment, uncertainty and resource misallocation. An increase in government expenditure can lead to an increase in the demand for resources, which can crowd out private investment and lead to a misallocation of resources. Additionally, government expenditure volatility creates uncertainty among firms and households, making it difficult for them to make investment and consumption decisions, and potentially delaying or foregoing economic activity.

Empirically, there are many studies investigated the relationship between fiscal policy volatility and economic growth, however, very few researchers have attempted to discover the link between output volatility and government expenditure volatility particularly negligible in South Asia. For instance, Dery and Serletis (2023), analyze the impact of fiscal and monetary policy volatility on business cycle fluctuations by using Bayesian Structural Vector Autoregressive model on US time series data. Their findings conclude that volatility in both fiscal and monetary policy amplifies fluctuations in business cycle. However, the destabilizing impact of fiscal volatility on business cycle fluctuations is lower as compared to volatility in monetary policy. Similarly, Omotayo and Abel (2023), investigates the role of fiscal policy volatility in explaining macroeconomic fluctuations and performance in Nigeria from 1981 to 2022. They utilize a dynamic Structural Vectors Autoregression (SVAR) model and find that volatility in public spending significantly increases macroeconomic fluctuations while volatility in revenue weakly mitigates these fluctuations. Though, Omotayo and Abel (2023), find positive impact of spending volatility on output volatility, Nwosa et al. (2020) in the same Nigerian economy but employing ARDL method on time series data (1961-2017), find the significant negative impact of government spending volatility on output volatility. Following Nwosa et al. (2020), Kumar et al. (2023) also identifies the positive relationship between public spending volatility and business cycle fluctuations. They apply Time-Varying Parameter Vector Autoregression method on time series data from 2002 to 2020 in India and according to their findings uncertainty in fiscal spending negatively affect business cycle fluctuations. However, Kasal and Tosunoglu (2022), while analyzing the effects of fiscal policy volatility on the Turkish economic growth and fluctuations by using VAR model reveals that volatility in fiscal policy significantly exacerbates economic fluctuations by reducing private investment, output and consumption. Further, Anzuini et al. (2020) utilize Vector Autoregressive (VAR) model for the time series data (1981-2014), in Italian economy and observe that volatility in public spending significantly aggravating output volatility and therefore undermine economic growth. 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 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).

The study by Amuka et al. (2016) using Vector Autoregressive (VAR) model for the time series data (1971-2010), in Italian economy, observes that volatility in public spending significantly aggravating output volatility. 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.

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 Fixed Effect and GMM model, and finds the significant negative effects of fiscal volatility on output growth. Likewise, Tenhofen et al. (2010) examine the outcome of government expenditure shocks in Germany, the empirical outcomes of SVAR method present the negative 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.

This study employs a set of control variables, including trade openness, physical capital, terms of trade volatility, foreign direct investment, and credit to private sector. Regarding the impact of lag output volatility and financial development on output volatility, Tauqer et al. (2017) find that financial development and lagged volatility significantly increase 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 intensifies these fluctuations. Algeed (2019), while investigating the impact of terms of trade volatility on output volatility finds that terms of trade shocks and trade openness have positive but insignificant impact on output volatility in developing economies.

In conclusion, this section provides a comprehensive review of the empirical literature on the relationship between government expenditure volatility and output volatility. The overwhelming majority of studies reveal a positive relationship between government expenditure volatility and output volatility, primarily based on panel data from developing and developed economies. Notably, the existing literature lacks a specific focus on Pakistan, highlighting a research gap that this study aims to address. Given the inconsistent findings and scarcity of empirical research on this topic, further investigation is warranted to elucidate the impact of fiscal spending volatility on output volatility in the context of Pakistan

3.Methodology

This section outlines the proposed methodology for analyzing the association between output growth volatility and government spending volatility. The methodology is presented in four subsections: (1) Data and Model Specification, (2) Estimation Techniques and Methodology,

(3) Unit Root Testing, and (4) ARDL Cointegration Analysis.

3.1.Data and Model Specification

This study uses annual time-series data for Pakistan from 1980 to 2021. The major source of data collection is World Bank (2018), an online database, which is widely used data source for economic research. A short description of the variables used in this study is given in the table 3.1. Following the existing literature on output volatility (Majeed and Mazhar 2019 & Majeed et al, 2021), the output volatility functions is specified as follows:

$$\text{OV} = f\,(\text{GEV, TOTV, FDI, CRP, TO, GFK}) \cdots\cdots (1)$$

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In order to eliminate or reduce the issues of heteroskedasticity in the residuals of the estimated model, all variables except gross fixed capital formation were converted into log form, as per (Gujarati, 2004). Additionally, the log form transformation also enables percentage interpretations of the variables (Alemu, 2020). Therefore, the econometric form of above general function, after transformation of variables into log form, can be write as:

$$\text{LOVt} = \beta o + \beta 1\text{LGEV}t + \beta 2\text{LTOTVt} + \beta 3\text{LFDIt} + \beta 4\text{LTOt} + \beta 5\ \text{LCRt} + \beta 6\text{GFKt} + \epsilon t \cdots\cdots (2)$$

Where 't' denotes time-period. βO is the intercept term. $\beta 1$, $\beta 2$, $\beta 3$, $\beta 4$, $\beta 5$,and $\beta 6$ are slope coefficients. L OVt indicates log of output volatility measured through the five-year standard deviation of annual GDP growth (Le, 2020; Malik & Masood, 2020). LGEV log of government expenditures volatility measured through five-year standard deviation of general government final consumption expenditures as a % of GDP (Le, 2020; Ali & Khan, 2020). LTOTVt is log of terms of trade volatility calculated through five-year standard deviation of terms of trade (Majeed et al, 2021). LFDIt denotes log of foreign direct investment, net inflows as a % of GDP. LTOt is the log of trade openness as a % of GDP. KFt is gross fixed capital formation as a % of GDP. LCRPt represents log of Domestic credit to private sector as a % of GDP, while ϵt is the residual term. The standard form equation for measuring output volatility, government expenditure volatility, and terms of trade volatility follows;

$$Volatility_t = \frac{\sqrt{(Y_t - Y_t)^2}}{n-1} \cdots\cdots\cdots\cdots\cdots\cdots (3)$$

Table 3.1: Variables Description and Definition

Variable	Difinition
Government Spending Volatility	Five-year standard deviation of general government final consumption expenditure % of GDP
General Government Final Consumption Expendziture % of GDP)	"General government final consumption expenditure includes 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".
Output Volatility	Five-year standard deviation of gross domestic product per (GDP) growth based on Constant 2010 US$).
Gross Domestic Product (GDP) Growth	"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."
Trade as a % of GDP	Trade is the combined share of imports and export of goods and services in GDP.
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 equipment, plants and machinery.
Domestic Credit to Private Sector as a % of GDP	It is the provision of financial resources by the financial corporations to the private sector through loans, trade credits and the purchases of nonequity securities and other account receivable, that establish rights for repayment.
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".
Terms of Trade Volatility (Five-year SD of terms of trade)	"Export/Import values are the current value of exports/imports (f.o.b.) converted to U.S. dollars and expressed as a percentage of the average for the base period (2000)."

Note: Data source: World Development Indicator (WDI)

3.2.Estimation Techniques and Methodology

The present study utilizes the Autoregressive Distributed Lag (ARDL) model to examine both short-run dynamics and long-run relationships. The ARDL approach involves a five-step procedure: (1) checking the order of integration of the variables, (2) testing for cointegration among the variables, (3) conducting diagnostic tests to fulfill residual assumptions and ensure model stability, and (4) estimating the short-run dynamics and (5) obtaining long-run estimates

3.3.Unit Root Tests

A time series is said to be stationary if its mean and variance remain constant over time, and its covariance depends only on the time lag, not the specific time. Conversely, a time series with a time-varying mean, variance, or both is considered as a non-stationary series. When a model includes non-stationary series, using Ordinary Least Squares (OLS) to estimate long- run linear relationships between variables leads to spurious regression. In such cases, R- squared is very high and the misleading t and F-statistics, which appear significant and valid but are actually spurious and invalid (Gujarati, 2004).

To avoid spurious regression, Granger (1969), proposed that a coefficient of determination greater than the Durbin-Watson statistics (2 > d) is a good indicator to detect that the estimated regression is spurious. Once detected a unit root issue, the problem can be solved by transforming the data set through differencing. If the variable remains stationary without undergoing differencing, it is said to be integrated of order zero, I(0). While, a variable is classified as integrated of order one, or I(1), if it remains stationary after a single differencing, and integrated of order two, or I(2), if it achieves stationarity after being differenced twice.

Although a unit root test is not a compulsory prerequisite for applying the ARDL model, this study conducted an Augmented Dickey-Fuller (ADF) unit root test for two reasons. First, to eliminate the possibility of spurious regression. Second, to confirm that none of the variables are integrated of order I(2), as using the ARDL model in such a situation would be unjustified (Pesaran et al., 2001). The Dickey–Fuller test involves fitting the regression model:

$$\Delta Yt = \beta 0 + \gamma Yt{-}1 + \varphi t + \varepsilon t \cdots\cdots\cdots (4)$$

where γ is equal to $(\beta 1 - 1)$. $\beta 0$ denotes intercept term while φ is time trend. To address potential serial correlation, the ADF test extends the Dickey-Fuller equation by including lagged first differences of the dependent variable:

$$\Delta Yt = \ 0 + \gamma Yt{-}1 + \varphi t + \sum_{i=1} \emptyset \Delta Yt{-}i + \varepsilon t \cdots\cdots\cdots (5)$$

Equation (5) is the Augmented dicky Fuller (ADF) test. Where i = 2, 3, 4…. n, denotes the number of lagged differences included to correct for autocorrelation. However, the Phillip- Perron test is also conducted, which uses non-parametric approach to address any serial correlation and heteroskedasticity in the residuals εt by modifying the Dickey-Fuller test statistic as:

$$Yt = \beta 0 + \theta Yt{-}1 + \varphi t + \varepsilon t \cdots\cdots\cdots (6)$$

The Phillips-Perron (PP) test is the modification of the Dickey-Fuller test, designed to accommodate serial correlation in the residuals. By utilizing the Newey-West Heteroskedasticity and Autocorrelation-Consistent (HAC) covariance matrix estimator, the PP test provides robust results in the presence of serial correlation and heteroskedasticity.

Under the null hypothesis of a unit root (= 0), the asymptotic distributions of the Phillips-Perron and statistics coincide with those of the Augmented Dickey-Fuller (ADF) t-statistic and normalized bias statistic.

3.4.ARDL Co-integration (Bound) Test Approach

Co-integration refers to a situation where, even though individual time series are non- stationary, a linear combination of them can result in a stationary series. If such a relationship exists, the variables are said to be cointegrated. To test the existence of cointegration, a number of methods have been utilized in the economic literature. The most common of them are the Johansen's co-integration procedure, Engle-Granger procedure, and Autoregressive Distributed Lag (ARDL) method of co-integration.

This study employs ARDL method, because it is the most common and popular method used in econometric literature. ARDL methodology can be applied regardless of the integration order, accommodating mixed I(0) and I(1) variables, as long as the maximum order is less than two (d(max) < d(2)). Additionally, ARDL provides reliable and unbiased estimates with limited data, unlike Johansen's co-integration technique, which requires large samples. Furthermore, ARDL method yields unbiased estimates of the long-run model, even when endogenous regressors are present. Its simplicity, involving a single-equation setup, enables easy estimation. Moreover, ARDL allows for the inclusion of dummy variables in the co-integration test, which is not possible with Johansen's method. Given these advantages, the following ARDL model is employed in this study to investigate long-run relationships (co-integration) among variables.

$$\Delta LOV_t = \beta_0 + \sum_{i=1}^{n} \beta_1\, \Delta LOV_{t-i} + \sum_{i=1}^{n} \beta_2\, \Delta LGEV_{t-i} + \sum_{i=1}^{n} \beta_3\, \Delta LTOTV_{t-i} + \sum_{i=1}^{n} \beta_4\, \Delta LFDI_{t-i}$$
$$+ \sum_{i=1}^{n} \beta_5\, \Delta LTO_{t-i} + \sum_{i=1}^{n} \beta_6\, \Delta LCR_{t-i} + \sum_{i=1}^{n} \beta_7\, \Delta GFK_{t-i} + \gamma_1 LGEV_t + \gamma_2 LTOTV_t + \gamma_3 LFDI_t$$
$$+ \gamma_4 LKF_t + \gamma_5\, LCR_t + \gamma_6 GFK_t + \varepsilon_t \cdots\cdots\cdots (7)$$

Where all variables have been defined in the preceding section and 0 represent constant term. $\beta1$, $\beta2$, $\beta3$, $\beta4$, $\beta5$,and $\beta6$ are short-run slope coefficients, while $\gamma1$, $\gamma2$, $\gamma3$, $\gamma4$, $\gamma5$, and $\gamma6$ are long-run slope coefficients. εt is the residual term. Δ and n indicate difference operator and optimal number of lags.

The null hypothesis of Bound test states that there is no co-integration that is, H0: $\gamma1 = \gamma2 = \gamma3 = \gamma4 = \gamma5 = \gamma6 = 0$, against the alternative hypothesis of co-integration that is, H1: $\gamma1 \neq \gamma2 \neq \gamma3 \neq \gamma4 \neq \gamma5 \neq \gamma6 \neq 0$. The value of F-statistic, that is calculated automatically and reported after the long run results of the ARDL model, decides the rejection or acceptance of null hypothesis. If the value of F-statistic is greater than the upper bound critical value then we fail to accept the null hypothesis means that co-integration exists. While, if the value of F- statistic is smaller than lower bound of critical value then the test suggest that co-integration does not exist however, if the value of F-statistics lie between upper and lower bound critical values then in such situation the test results will be inconclusive.

Then, a number of diagnostic tests has been conducted to verify that the results of ARDL model are reliable and robust. For this purpose, Breusch Godfrey LM test for serial correlation, Breusch-Pagan Godfrey test for heteroskedasticity, Jarque-Bera test for residuals normal distribution and Ramsey RESET test for model misspecification have employed. The acceptance of the null hypothesis of these tests validates the results of ARDL model. Therefore, if the probability values of these tests are greater than the standard significance level (5%) then the tests accept null hypothesis. Additionally, to check the stability of long run estimates, a cumulative sum of recursive residuals (CUSUM) and cumulative sum of squares of recursive residuals (CUSUMSQ) tests have been utilized. According to these tests, parameters of the model are stable if the plots of CUSUM; and or the CUSUMSQ do not cross the upper and lower boundary of the plots at a given significance level, otherwise the model is dynamically unstable.

Once it has been confirmed that the long run relationship exists among variables, then the following long run ARDL model and error correction model (ECM) from ARDL was estimated:

$$LOV_t = \gamma_0 + \sum_{i=1}^{n} \gamma_1\, LGEV_{t-i} + \sum_{i=1}^{n} \gamma_2\, LTOTV_{t-i} + \sum_{i=1}^{n} \gamma_3\, LFDI_{t-i} + \sum_{i=1}^{n} \gamma_4\, LTO_{t-i}$$
$$+ \sum_{i=1}^{n} \gamma_5\, LCR_{t-i} + \sum_{i=1}^{n} \gamma_6\, GFK_{t-i} + V_t \cdots\cdots\cdots (8)$$

Equation (7) is the estimated long run ARDL model. Where □ is the residual term.

$$\Delta LOV_t = \beta_0 + \sum_{i=1}^{n} \beta_1\, \Delta LOV_{t-i} + \sum_{i=1}^{n} \beta_2\, \Delta LGEV_{t-i} + \sum_{i=1}^{n} \beta_3\, \Delta LTOTV_{t-i} + \sum_{i=1}^{n} \beta_4\, \Delta LFDI_{t-i}$$
$$+ \sum_{i=1}^{n} \beta_5\, \Delta LTO_{t-i} + \sum_{i=1}^{n} \beta_6\, \Delta LCR_{t-i} + \sum_{i=1}^{n} \beta_7\, \Delta GFK_{t-i} + \partial EC(-1) + \mu_t \cdots\cdots (9)$$

Equation (8) is the short run error correction form derived from ARDL model. Where $EC(-1)$ is error correction term lagged by one period. μt denotes error term. The error correction term measures the rate at which the output volatility adjusts to its long-run equilibrium value after a short-term shock. A negative and significant ECT is desirable, indicating convergence to equilibrium. Otherwise, it suggests that output volatility diverges from its equilibrium value in the long run.

4. Estimation Results and Discussion

This study intends to investigate the impact of government spending volatility on output volatility in Pakistan. To achieve this objective, this study collect data from WDI for Pakistan from 1980 to 2022 and employs ARDL estimation approach.

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4.1. Descriptive Statistics

Table 4.1 presents the descriptive statistics for the variables included in the ARDL model. These statistics provide a concise overview of the statistical properties of each variable, summarizing their central tendency, dispersion, and distribution. By examining these statistics, we can gain initial insights into the behavior of each series, including their mean values, variability, and potential outliers. This step is essential before proceeding with econometric estimation, as it enables us to better understand the characteristics of our data and identify potential issues that may impact our analysis.

Table 4.1: Descriptive Statistics

Variables	OV	GEV	TOTV	FDI	TO	CR	GFK
Mean	0.81866	0.30375	5.16291	0.83513	31.2837	20.9979	15.5400
Median	0.64825	0.22082	3.30585	0.68469	32.3626	22.2370	15.8259
Maximum	3.54086	1.22959	28.7615	3.03571	38.4993	29.7860	19.1122
Minimum	0.00029	0.01035	0.07908	0.10266	21.4599	13.8049	12.9216
Std. Dev.	0.72215	0.25686	6.34833	0.65856	4.46903	4.58147	1.71724
Skewness	1.65214	1.64323	2.35361	2.03221	-0.48925	-0.15852	0.11422
Kurtosis	5.50487	5.99457	8.53881	6.79468	2.34383	1.75011	1.83096
Jargue-Bera	37.7168	32.1235	82.6717	50.2436	2.25553	2.70195	2.30559
(P-values)	0.00000	0.00000	0.00000	0.00000	0.32375	0.25898	0.31575
Sum	31.9277	11.8465	201.353	32.5700	1220.06	818.919	606.063
Sum Sq. Dev.	19.8171	2.50716	1531.25	16.4806	758.946	797.616	122.059
Observations	39	39	39	39	39	39	39

Source: Author's own calculation.

4.2.Unit Root Test

This study employs the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests to investigate the order of integration of variables and confirm that all the variables are stationary at first difference. The ADF and PP tests results, presented in Table 4.2 and 4.3, depict that most variables are stationary at the level, with probability values below 0.05 ($p < 0.05$). However, Trade Openness, Gross Fixed Capital Formation, and Domestic Credit to Private Sector are non-stationary, with probability values exceeding 0.05 ($p > 0.05$), indicating the presence of unit root. Nevertheless, these variables become stationary upon first differencing. As the results reveal a mixed order of integration, but all variables achieve stationarity at their first difference, thereby validating the ARDL model an appropriate and suitable choice for estimation.

Table 4.2: Augmented Dicky Fuller (ADF) Unit Root Test Results

ADF test at level

Variables	Without Intercept & Trend		With Intercept		With Intercept & Trend	
	Statistics	Probability	Statistics	Probability	Statistics	Probability
LOV	-3.310	0.005	-6.759	0.000	-6.952	0.000
LGEV	-1.285	0.179	-5.147	0.000	-5.399	0.000
LTOTV	-3.652	0.000	-4.844	0.000	-6.204	0.000
LFDI	-2.089	0.036	-3.942	0.042	-3.707	0.033
LCR	-0.639	0.434	-1.051	0.725	-4.117	0.012
LTO	-0.567	0.465	-2.012	0.280	-2.371	0.388
GFK	-0.885	0.326	-1.193	0.668	-3.643	0.039

ADF Test at First Difference

Variables	Without Intercept & Trend		With Intercept		With Intercept & Trend	
	Statistics	Probability	Statistics	Probability	Statistics	Probability
LOV	-7.023	0.000	-6.933	0.000	-6.895	0.000
LGEV	-9.361	0.000	-5.913	0.000	-5.865	0.000
LTOTV	-6.349	0.000	-6.310	0.000	-6.182	0.000
LFDI	-5.991	0.000	-5.915	0.000	-5.854	0.000
LCR	-5.060	0.000	-5.028	0.000	-5.001	0.000
LTO	-6.504	0.000	-6.455	0.000	-6.370	0.000
GFK	-5.494	0.000	-5.516	0.000	-5.462	0.000

Note: Author's owns calculation. All variables are in log form. Prob.< 0.05 indicates stationarity.

Table 4.3: Phillips-Perron (PP) Unit Root Test Results

Phillips - Perron Test at level

Variables	Without Intercept & Trend		With Intercept		With Intercept & Trend	
	Statistics	Probability	Statistics	Probability	Statistics	Probability
LOV	-5.726	0.000	-6.759	0.000	-6.952	0.000
LGEV	-1.568	0.108	-5.147	0.000	-5.389	0.000
LTOTV	-3.592	0.000	-4.879	0.000	-6.383	0.000
LFDI	-2.114	0.034	-2.359	0.159	-2.369	0.389
LCR	-0.639	0.434	-1.230	0.652	-2.605	0.279
LTO	-0.577	0.461	-2.144	0.229	-2.556	0.301
GFK	-0.866	0.334	-1.325	0.608	-2.592	0.285

Phillips-Perron Test at First Difference

Variables	Without Intercept & Trend		With Intercept		With Intercept & Trend	
	Statistics	Probability	Statistics	Probability	Statistics	Probability
LOV	-23.93	0.000	-23.88	0.000	-23.50	0.000
LGEV	-24.08	0.000	-25.58	0.000	-25.07	0.000
LTOTV	-20.84	0.000	-25.10	0.000	-24.77	0.000
LFDI	-5.997	0.000	-5.923	0.000	-5.862	0.000
LCR	-5.053	0.000	-5.052	0.000	-5.028	0.000
LTO	-6.505	0.000	-6.455	0.000	-6.370	0.000
GFK	-5.567	0.000	-5.583	0.000	-5.521	0.000

Note: Author's owns calculation. All variables are in log form. Prob.< 0.05 indicates stationarity

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4.3. Diagnostic Tests

Table 4.4: Diagnostic Tests Results

Tests	F-Statistics	Probability
A. Breusch-Pagan Godfrey Serial Correlation LM test Null Hypothesis: No Serial Correlation	0.1076	0.8986
B. Heteroskedasticity: Breusch-Pagan Godfrey test	0.4930	0.9287
Null Hypothesis: Homoskedasticity		
C. Functional Form: Ramsey RESET test	1.0160	0.3294
Null Hypothesis: The model is correctly specified		
D. Normality: Jarque-Bera test	4.1080	0.1282
Null Hypothesis: Residuals are normally distributed		
Note: Probabality value > 0.05: Fail to reject null hypothesis.		

To enhance the reliability and credibility of model estimates, this study conducted a number of diagnostic tests. These tests included the Breusch-Godfrey LM test for serial correlation, the Breusch-Pagan-Godfrey test for heteroskedasticity, the Jarque-Bera test for residual normality, and the Ramsey RESET test for model specification (functional form and omitted variables bias). According to the results of these tests presented in Table 4.4, the probability values associated with all test statistics exceed the standard significance level of 0.05, leading to the acceptance of the null hypotheses of no serial correlation, homoskedasticity, normal distribution, and correct model specification.

4.4.Model (Parameter) Stability Tests

The cumulative sum (CUSUM) and cumulative sum of squares (CUSUMSQ) tests were employed to assess parameter stability. These tests indicate significant parameter instability if the cumulative sum diverges beyond the boundaries defined by the critical lines or if the CUSUMSQ plot intersects the upper or lower critical lines.

However, as evident from the graphs, the CUSUM plot remains within the critical limits, and the CUSUMSQ test reveals that the graph does not intersect the upper or lower limits. Therefore, it can be inferred that the long-run estimates are stable, and there is no evidence of structural breaks in the parameters.

Figure 1.2: A Graph of Cumulative Sum of Recursive Residuals

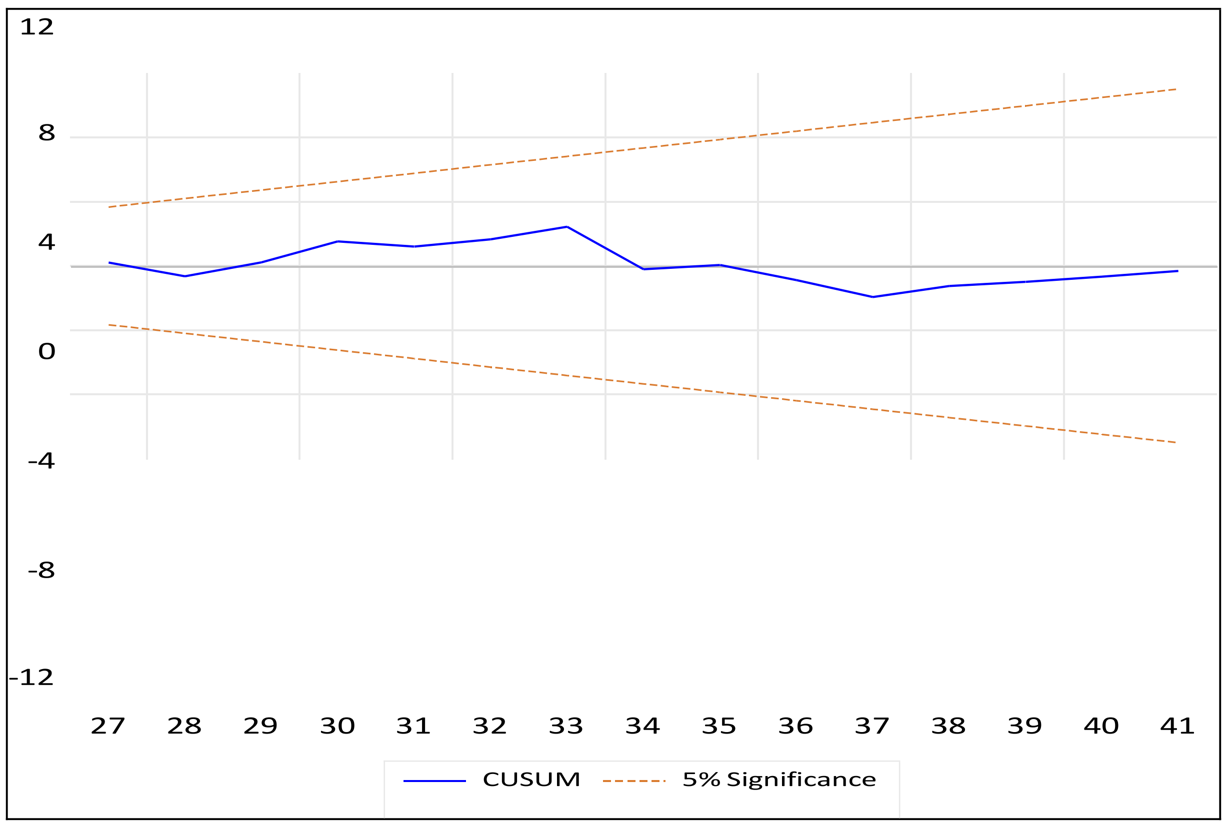
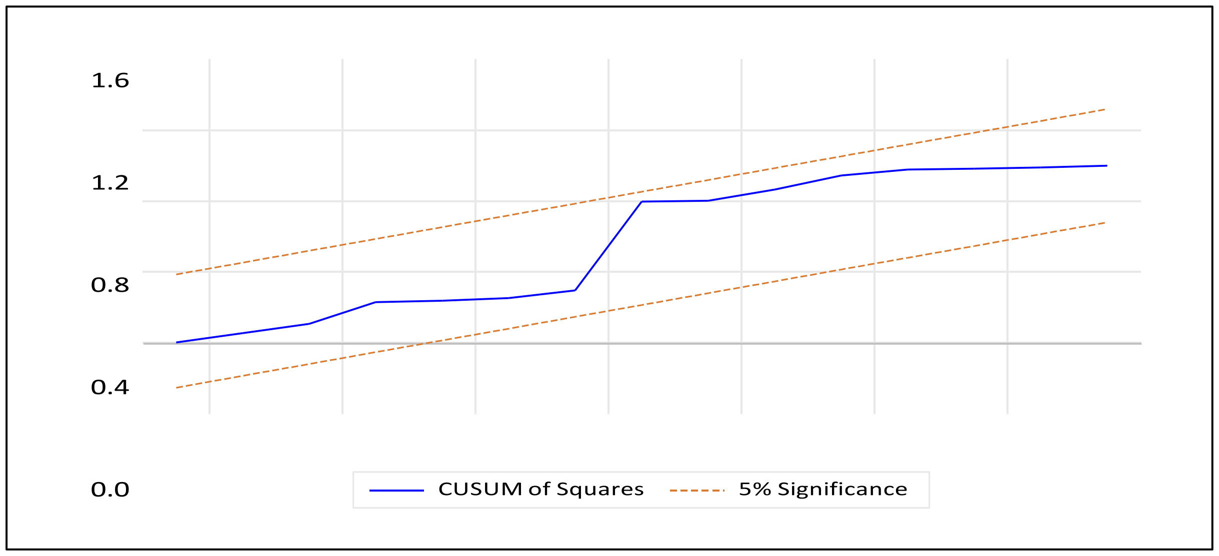


Figure 1.3: A Graph of Cumulative Sum of Square of Recursive Residuals



4.5. Bound Test Results of the Estimated ARDL (3, 3, 3, 1, 0, 1, 2) Model

The Bound test results presented in Table 4.5 reveal that the variables are cointegrated. The calculated F-statistics of 8.410172 for the estimated ARDL model with automatic optimum lag order of ARDL (3, 3, 3, 1, 0, 1, 2) and specified with an intercept and no trend is greater than the critical value of upper bound (5.236) at 1% significance level. Therefore, the null hypothesis of no long run relationship among variables is rejected, which implies that cointegration exists among the variables.

Table 4.5: Bound Test Results: Restricted intercept and no trend

Significance Level	**Lower Bound I(0)**	**Upper Bound I(1)**
1%	3.713	5.236
5%	2.685	3.960
10%	2.254	3.338
Number of Observations = 36	F-Statistic = 8.410172	K = 6

Note: F-Statistic > Upper Bound at 1% significance: Indicates presence of cointegration. Eviews10

4.6. Long Run Results of Estimated ARDL Model

Upon confirming the satisfactory diagnostic checks, including the absence of serial correlation, homoscedasticity, normality of residuals, correct model specification, and presence of cointegration among variables, we proceed to interpret the long-run results of the estimated ARDL model, as presented in Table 4.6.

Table 4.6: Long Run Coefficients of estimated ARDL (3, 3, 3, 1, 0, 1, 2)

Variables	**Coefficients**	**Std. Error**	**t-Statistic**	**Probability**
LGEV	1.1469***	0.2207	5.1967	0.0001
LTOTV	0.2684***	0.2683	0.1602	0.1133
LFDI	-0.5975**	0.1840	-3.2466	0.0051
LCR	-0.1875	0.6468	-0.2898	0.7757
LTO	-1.3675	0.9932	-1.3768	0.1875
GFK	-0.1358***	0.0363	-3.7415	0.0018
Constant	5.3159***	1.3915	3.8202	0.0015

EC = LOV– (1.1469*LGEV + 0.2684*LTOTV – 0.5975*LFDI – 0.1875*LCR – 1.3675*LTO – 0.1358*GFK + 5.3159)

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

Table 4.6 indicates that except trade openness, credit to private sector, and terms of trade volatility (which is insignificant), all other explanatory variables are significant at less than 5% significance level regardless of their signs. The coefficient associated with government spending volatility which is significant at 1% specifies that a one percent increase in government expenditure volatility amplifies output volatility (business cycle fluctuations) by 1.14 percent. This result is consistent with the findings of (Kumar et al. 2023; Dery and Serletis, 2023, and Anzuini et al. 2020), who also find positive and statistically significant impact of fiscal policy volatility on output volatility. The result supports the views of real business cycle (RBC) theory, which states that government expenditure shocks can have significant impact on economic activities by affecting consumption and investment decisions (Kydland and Prescott, 1982). The unpredictable variations in government spending can lead to increased future economic uncertainty while economic agents (Households and firms) naturally have optimizing behaviors regarding their consumption and investment decisions. Theses Economic actors and private investors have an inverse reaction to the uncertainties about the future behaviors of fiscal instruments (Ali et al. 2020). So, high volatility in fiscal spending creates high economic uncertainties which in turn have adverse impact on consumption and investment decisions of economic agents, consequently reduce output and therefore increase output volatility. Therefore, to attain macroeconomic stability and promote consumptions and private investments, the predictable behavior of fiscal policy is significant (Bibi et al., 2023).

Terms of trade volatility has positive but insignificant impact on output volatility. Specifically, the estimated coefficient suggests that a one percent increase in terms of trade volatility is associated with a 0.26 percent increase in output volatility. This is because unpredictable changes in the relative prices of imports and exports significantly affect both domestic and foreign investments as well as trade. As terms of trade volatility rises, the uncertainty surrounding international trade and investment intensifies, leading to fluctuations in output. This instability can have significant implications for businesses, households, and policymakers, as it can influence investment decisions, consumption patterns, and economic growth (Majeed et al., 2021).

The negative coefficient of 0.597, significant at 1%, associated with foriegn direct investment, reveals that a one percent increase in foreign direct investment, leads to reduce output volatility on the average by 0.59 percent. This finding is in line with existing literature (Tauqir et al., 2022; Ajide and Osode, 2017), which suggests that FDI has a stabilizing effect on output volatility. However, our result contradicts the findings of Lee (2020) and Bouoiyour et al. (2014), who argue that FDI exacerbates output volatility. FDI serves as a source of international diversification, leading to improved economic performance and reduced output volatility (Tauqir et al., 2022; Portes, 2007). By transferring advanced technology, providing access to global markets, and facilitating international capital flows, FDI can mitigate the vulnerability of domestic industries to economic shocks. This, in turn, reduces output fluctuations.

The estimated coefficient of -0.1875, although statistically insignificant, suggests that a one percent increase in domestic credit to the private sector (financial development) is associated with a 0.187 percent reduction in output volatility. This finding aligns with Ezekiel and Dada (2023), who reported a negative, yet insignificant, effect of credit to the private sector on output volatility. Theoretically, financial development can mitigate output volatility by improving risk diversification prospects, enabling firms to better absorb external shocks and reduce their exposure to economic fluctuations (Bardhan et al., 2000).

The negative insignificant coefficient associated with trade openness implies that output volatility decreases by 1.367 percent with a one percent rise in trade openness (trade liberalization). This finding aligns with Majeed and Noreen (2018), who reported a similar relationship. Theoretically, trade openness reduces fluctuations in output by reducing sector- specific risk, providing economies of scale, promoting technological transfers, and increasing access to global resources by engaging in global markets. However, the exposure of economies, particularly developing economies, to the global market can expose these economies to external shocks, such as terms of trade fluctuations and exchange rate volatility, which may increase output volatility (Lee, 2020; Algeed, 2022).

The impact of gross fixed capital formation on output volatility is negativ and statistically significant at 1% significance level. The estimated coeficient implies that a one percent increase in the capital formation leads to the output volatility to go down by 0.1358. percent. This result is in line with the result of Adeniyi et al. (2017). Investment in capital goods such as machinery, infrastructure, and technology improves overall productivity and economic stability. These investments helps in improving the efficiency of manufacturing processes, eliminate operational disruptions, and strengthen the economy's ability to resist domestic as well as external shocks. As a result, economies with larger levels of fixed capital formation tend to have lower economic fluctuations as it has capacity to absorb efficiently supply and demand shocks (Datta et al, 2023).

4.7. Short Run Results: The Error Correction Model (ECM)

The error correction term reported in Table 4.7 is both statistically significant and negative, confirming that deviations from long-run equilibrium are corrected over time. The coefficient of -2.16 suggests a relatively high speed of adjustment. Specifically, this implies that approximately 2.16% of the deviation from the long-run equilibrium level of output volatility in the current period is corrected in the subsequent period. The high significance of this term further reinforces the robustness of the error correction mechanism.

Table 4.7: Results of Error Correction Model (ECM)

Variables	Coefficients	Std. Error	t-Statistic	Probability
△ LOV (-1)	0.630***	0.1330	4.7382	0.0002
△ LOV (-2)	0.412***	0.0840	4.9100	0.0002
△ LGEV	0.724***	0.1210	5.9889	0.0000
△ LGEV (-1)	-1.465***	0.1670	-8.7732	0.0000
△ LGEV (-2)	-0.419***	0.1710	-2.4452	0.0254
△ LTOTV	0.267***	0.0975	2.7406	0.0145
△ LTOTV (-1)	0.092	0.0929	0.9997	0.3323
△ LTOTV (-2)	0.287***	0.0867	3.3191	0.0043
△ LCR	3.866***	1.6163	2.3920	0.0294
△ LTO	-6.151***	1.7396	-3.5359	0.0027
△ GFK	-0.039	0.0557	-0.7074	0.4884
△ GFK (-1)	0.306***	0.0630	-4.8623	0.0002
Ɛit−1	-2.1631***	0.2199	-9.8344	0.0000

R^2	0.9249	Durbin-Watsons Statistics	1.7656
Adjusted R^2	0.8858	Observations	36

Note: The steric (*) on coefficients indicates the significance level, where, ***P<0.01, **P<0.05, *P<0.1. △ denotes first difference while (-1) and (-2) are the lag values

The good coefficient of determination ($R2$), which is 0.92, indicates that approximately 92% of the variation in output volatility is explained by the regressors included in the model. The remaining 8% of unexplained variation is accounted for by the error term. Furthermore, the Durbin-Watson statistic (DW = 1.76) falls within the acceptable range, suggesting no evidence of serial correlation in the residuals.

The results from the error correction model indicate that volatility in government spending exerts a strong and statistically significant positive effect on output volatility. More precisely, a one percent rise in the volatility of government spending leads to a 0.72 percent increase in output volatility, ceteris paribus. This relationship holds not only in the short run but also persists in the long run, as evidenced by the stability of the coefficients across both time horizons. The findings highlight the enduring role of fiscal instability in amplifying macroeconomic fluctuations, reinforcing the importance of stable and predictable government expenditure for economic stability.

The short-run coefficients indicate that terms of trade volatility and credit to the private sector have a positive and statistically significant impact on output volatility. In contrast, trade openness and gross fixed capital formation negatively influence output volatility. Furthermore, both the first and second lags of output volatility significantly exacerbate current volatility, a finding consistent with Lee (2020) and Tauqir et al. (2021). The substantial positive effect of lagged volatility suggests the presence of inertia in output volatility, meaning that volatility— whether high or low—tends to persist over time and resists sudden shifts in economic conditions. Additionally, lagged terms of trade volatility and government spending volatility amplifies output volatility and this impact is significant at 1% significance, however lagged gross fixed capital formation reduces fluctuations in output in the short run.

5. Conclusion

Maintaining stable economic conditions represents a fundamental goal for economic policymakers. While governments play a crucial role in modern economies, the theoretical relationship between government intervention and macroeconomic stability remains contested. Compounding this uncertainty, empirical evidence consistently shows that government spending patterns frequently demonstrate substantial instability. This study addresses these issues by analyzing how fluctuations in public expenditure affect economic stability in Pakistan from 1980 to 2021, using an Autoregressive Distributed Lag (ARDL) modeling approach.

The empirical findings indicate that government spending volatility has positive and significant impact on output volatility in both short-run and long-run. In the short run, a one percent increase in government spending volatility increases output volatility by 0.72 percent, indicating immediate destabilizing effects from volatile fiscal policies. More significantly, the long-run impact proves substantially stronger, with the same one percent volatility raise leading to a 1.14 percent rise in output volatility.

Further, the empirical evidences of this study suggest that terms of trade volatility excacerbates output volatility while credit to private sector, trade openness, foreign direct investment, and capital foprmation dampen output volatility in the long run. Only credit to the private sector exhibits contrasting effects across time prospects - while it amplifies volatility in the short run, it plays a mitigating role in the long run, suggesting that the initial destabilizing effects of credit expansion may eventually give way to more efficient financial intermediation that supports economic stability.

5.1. Policy Recommendation

The findings of this study imply that volatility in fiscal policy is a potential source of macroeconomic instability in Pakistan, suggesting the need for prudent and stable fiscal policy. 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.

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