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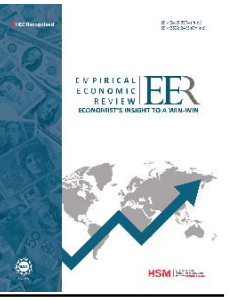

Title:	**Uncertainty in Fiscal and Monetary Policy and its Impact on Economic Growth: An Analysis from Pakistan**
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Uncertainty in Fiscal and Monetary Policy and its Impact on Economic Growth: An Analysis from Pakistan

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Abstract

Uncertainty or shocks in macroeconomic policies have always been a debated issue in all over the economies because these shocks severely influence the growth of economies. To analyze the impacts of these shocks in the context of Pakistan, the present study considers the role of fiscal and monetary policy uncertainty in economic activities by taking the time series data throughout, for 1971 to 2020. In this regard; GARCH and ARDL Cointegration model applied, empirical evidence reveals that in long run, fiscal uncertainty in terms of government expenditure positively affects the economy and monetary uncertainty in terms of money supply negatively affects the economy. While in the short run, uncertainty of both policies have negative influence on economic the growth of Pakistan. The study used other factors, i.e. exchange rate, interest rate and inflation. These factors also positively and significantly sway the growth in the long run. The outcomes suggest that policymakers in Pakistan should pay close attention to reducing uncertainty and shocks in macroeconomic policies. Especially, they should focus on transparency and effective management of monetary policy decisions about liquidity management and interest rate predictability. By providing a more stable and predictable policy environment, policymakers can promote economic growth and stability.

***Keywords*:** fiscal policy uncertainty, monetary policy uncertainty, economic growth, GARCH, ARDL Cointegration

Introduction

Macroeconomic policies (fiscal and monetary) play a crucial role in maintaining economic stability by achieving macroeconomic objectives in both, developed and developing economies (Richard, et al., 2018; El Husseuiny, 2023). These policies determine the direction of an economy by using their tools. For instance, the monetary policy is associated with controlling inflation, quantity of money, and exchange rate. Whereas,

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fiscal policy is linked with government revenue and expenditure. In the economists' vision, grave economic news creates uncertainty regarding future policies in response to which growth declines immediately by the reduction in investment or marginal productivity of capital (Pastor & Veronesi, 2012). Policy uncertainty, related to investment decision, not only distresses future investment strategies but it also significantly affects the economic growth of economies (Bloom, 2009; Fernandez Villaverde, et al., 2015; Mumtaz & Surico, 2018). In another word, the reduction in uncertainty describes a clear picture of fiscal policy and in return, investment and output is raised (Aye et al., 2019).

According to Christiano et al. (2014), growing uncertainty raises the firm's cost of borrowing. Specifically; in a situation of fiscal vagueness, government finances the deficit through borrowing. Such a situation creates a harsh environment for businesses; even, infant industries are unable to stand against the shocks. In this context, monetarists defined that ''expansion of money supply tends to decrease the interest rate to manage the critical level of investment; through this, the prejudicing effects of the rising borrowing costs and a cash crunch would escape at the spell of any shocks and recession in the economy'' (Baker, et al., 2016; Azzimonti, 2018). Therefore, there is a need to abate policy uncertainties. Specifically, in the developing economies, it may be due to the discontinuity of government policies, lack of information, low production, lack of technological progress, and political instability (Wen et al., 2021). This widens the gap between policies' objective and decisions regarding the forecast changes and actual changes in macroeconomic variables.

In the context of Pakistan, research on economic policies is not new and numerous studies stated the effectiveness of fiscal and monetary policies as well (see, e.g., Fatima & Iqbal, 2003 ; Jawaid et al., 2010: Hussain & Siddiqi, 2012). Although, the debate pertaining to comparative analysis of policies remained unsettled. Monetary policy affects the fiscal policy through its direct tools of inflation and interest rate. Inflation and volatility rate of inflation distraught public finance by reducing the present value of debt obligations and raising the tax burden. However, the interest rate and volatility of interest rate directly affects the debt servicing and its sustainability (Jawaid et al., 2010; Chowdhury, et al., 2015). Similarly, fiscal expansion influences the monetary policy inversely. An increase in aggregate government expenditures decreases the economic growth and

entails tight monetary policy (Jawaid et al., 2010). From the above discussion, it can be observed that many studies focused on the transmission, mechanism, and effectiveness of policies. Nevertheless, these studies are important to understand the influence of policies, however, they have ignored the uncertain role of policies. In this regard, few studies contributed to the literature on the basis of the policy uncertainty index presented by Baker et al. (2016)[1]. For instance, Ahmad and Qayyum (2008, 2009), Fatima and Waheed (2014), Farooq and Yasmin (2017), Abbas et al. (2019), Choudhary et al. (2020), and Wen et al. (2021) analyzed the impact of policy uncertainty by applying Vector Autoregressive model (VAR), Generalized Autoregressive Conditional Heteroskedasticity (GARCH) and linear and nonlinear Autoregressive Distributive Lag (ARDL) approaches, respectively. Though, all of these given studies do not reflect the comparative analysis of monetary and fiscal uncertainty. However, the current study perceived from the above discussion that it is a challenge for the researchers to observe that comparatively which policy of uncertainty is more effective on economic activities. In this regard, the current study attempted to fill this gap by investigating the value of both policies under the role of uncertainty through applying GARCH and ARDL model of co-integration.

Uncertainty is becoming a deeper problem throughout the world, especially in Pakistan. The current research intended to measure the uncertainty in macroeconomic policies and its impact on the economy of Pakistan. Uncertainty is not directly observable and its intensity is difficult to be determined. The act of defining and quantifying this unobservable variable is a confusing task which goes beyond the limit of one or two variables. Several indexes have already been used to detect the vehemence of uncertainty. These indicators contained useful information regarding specific levels, however, they suffered from the error of measurement due to the negligence of some important aspects. This was because they were based on the newspaper surveys and did not capture the expectations directly. The simple solution to overcome this problem is that instead of taking these indicators as a proxy, the sum of different variables should be used. Following Aye (2021), the current study was conducted by using

[1] Uncertainty Index is constructed through newspaper data. The authors used three categories of words (i.e. policy, economic, and uncertainty) and counted the number of new papers that comprise these words.

two exogenous variables, that is, fiscal policy uncertainty (p-un) and monetary policy uncertainty (p-un) along with one endogenous variable, the economic activities of Pakistan. The basic aim of this study was to quantify these exogenous and endogenous variables and then investigate their relationship with each other. The rest of the study was arranged as follows; section 2 represents theoretical and empirical literature while, section 3 demonstrates the data and methodological background. Section 4 permits results and interpretation and the last is based on the conclusion.

Statement of Problem

Fiscal and monetary policies delineate the direction of economies in developed and developing countries. Uncertainty or volatility in the tools of these policies badly affects the economic activities in Pakistan. By considering these issues, it is extremely valuable to analyze the nexus between uncertain macroeconomic policies and economic activities. This study attempted to examine the transmission mechanism of uncertain monetary and fiscal policies.

Literature Review

Uncertainty in economic policies has dynamic effects on economic activities and in return, economies face different challenges that appear in terms of tumbling economic development. These effects are evaluated by examining the variation in variables related to policies and economists empirically examine such variations by using different econometric techniques.

Lensink et al. (1999) analyzed the impacts of macroeconomic policy uncertainty (p-un) on developed and developing economies. In this context, macroeconomic uncertainty is measured in terms of government p-un, price uncertainty, and export uncertainty. By using cross-sectional data of 138 countries, an inverse relationship was observed between uncertainty and economic growth. Similarly, Jeong (2002) explored that in the long run, p-un affects investment and output negatively due to high capital cost. Whereas, Cyrus and Elias (2014) observed that the impacts of fiscal and monetary policies' shocks are contradictory. Fiscal policy has significant and positive relationship, while monetary policy has insignificant relationship with real income growth in Kenya. The outcomes of the variance decomposition and impulse response function also support the efficacy of fiscal policy, however, the trustworthiness of

monetary policy is not ruled out. Moreover, these policies should be used with appropriate coordination in order to create economic stability and higher growth. The insignificance of monetary policy was also justified on the basis of the probability of structural weaknesses, such as governing overlays and underprivileged regulatory structure regarding the advancing rates due to corruption in the financial systems of Kenya. Furthermore, the improvement in the financial system was also suggested and for that purpose structural reforms are required in the ministry of finance, institutional governance, and financial regulatory authorities. Fernandez-Villaverde et al. (2015) measured fiscal p-un in terms of government expenditure and tax volatility by using VAR model. It was observed that fiscal uncertainty is negatively related with the US economic growth in short term.

Gulen and Ion (2015) documented a stronger negative relationship between future p-un and corporative investment at firm's level by using news based index for US overall p-un. However, such a relationship was not uniform and the firms which were more dependent on government spending showed higher degree and stronger irreversibility of investment in the presence of uncertain environment created by regulatory institutions and politicians. Baker et al. (2016) also constructed a new index on the basis of newspaper data for the measurement of p-un in the economy of USA and the other eleven well-developed economies of Europe. After quantifying the uncertainty, VAR was used to investigate the influence of p-un on economic growth. The results suggested that p-un in the USA and Europe may harm macroeconomic performance. By conducting VAR and Dynamic Stochastic General Equilibrium model, Kotze (2017) revealed same outcome that output, consumption, investment, and labor markets are negatively affected while, inflation and gross markup also increases due to fiscal volatility shocks in South Africa. Furthermore, Aye (2019) explored that real gross domestic negatively responds to asymmetric and symmetric effects of variation in different fiscal tools. It suggests that government could play a significant role to enhance the confidence of economic agents through overcoming the information gap. While, Beckmann and Czudaj (2021) claimed that fiscal p-un has adverse impact on economic growth of Germany and the adverse effect of uncertainty could be described by a reduction in investment by firms, greater costs of financing due to risk premium and lesser consumption spending due to precautionary savings.

On the other side, Mumtaz and Zanetti (2013) indicated that the output growth falls in the response of high volatility of monetary policy. Moreover, Mumtaz and Surico (2018) examined that about 20 to 30% volatility in output of the US economy is due to monetary and fiscal shocks, while public debt as fiscal shocks have major contribution in it. Similarly, Aye (2021) evaluated from structural equation and partial least square analysis that the existence of monetary and fiscal p-un tends to reduce economic activities due to difficulty in making business decisions. Fatima and Waheed (2014) probed the link between growth performance and economic instability in the context of Pakistan. By conducting macroeconomic model and conditional variance from GARCH model for different factors of monetary, fiscal, and trade p-un, they observed that all factors of policies except monetary factors that deteriorate economic growth. Outcomes from the model indicated that uncertainty negatively affects the future decision of agent regarding the investment which not only deteriorates the economic growth, however, it also puts the country into jeopardy. Furthermore, a study conducted by Farooq and Yasmin (2017) showed that fiscal p-un uncertainty affects the economic growth of Pakistan. Using ARDL and GARCH model, the study indicated that volatility in tax revenue has a negative impact on GDP and financial elements in the form of liquid liabilities and credits to the private sector in order to control the adverse effect of fiscal policy uncertainty. Other side of literature related to Pakistan emphasized on the impacts of overall p-un. Choudhary et al. (2020) developed a monthly economic p-un indices by using the foundation of Baker et al. (2016) p-un index. The outcome of these two indices exhibited that uncertainty existed in the years 2010-2020 due to the flood, terrorist activities, and different upsetting policies. Furthermore, Wen et al. (2021) empirically observed the symmetric and asymmetric effects of p-un by using the economic p-un index for the duration of 2011M1 to 2020M5. The results from both, linear and nonlinear ARDL, revealed that economic growth is negatively and significantly affected by economic p-un in the long term as well as in the short term. Nevertheless, the study considered only the industrial sector as an element of the entire level of output in economy. It neglected the other sectors' contribution in the economic growth.

Based on the above empirical underpinning, it was observed that fiscal and monetary negatively effects the economic growth of both developed and developing economies. Pakistan, a developing economy, in reaction of

unexpected changes in economic policies, political instability, and weak financial condition also faces the same problem of slow economic growth. Very few studies analyzed such effects by using single p-un. While, both monetary and fiscal policies play a significant role in determining the stability of economy. Therefore, there is a need to find out the impacts of both monetary and fiscal policies' uncertainty on macroeconomic stability. In the existing literature, the substantial contribution of the current study would be to find the transmission channel through which uncertainty in macroeconomic policies would affect the economic activities.

Model Specification

Theoretical Background

Theoretical literature discussed that economic policies play an imperative role in economic growth. Moreover, uncertainty or volatility of these policies is explained by the business cycles through variation in macroeconomic variables. Traditionally, the dynamics of economic growth's fluctuation are examined by the Solow Growth model. The model relates to a production function, where output depends on changes in input, such as capital (that is, human and physical), labor, and technology. The relationship between human capital and output is measured in terms of labor productivity. To observe the nexuses empirically between policies' uncertainty and economic growth in terms of labor factor productivity, the aggregate production function is expressed as,

$$Y_t = A_t f(K_t^{\gamma}, L_t^{1-\gamma}) \quad (1)$$

where, Y_t refers to aggregate level output, K_t represents the capital stock, L_t to labor force and A_t to total labor productivity (or Technological Changes), Υ represents the parameters and Υ, and 1-Υ define the share of capital and labor, respectively.

$$y_t = \frac{Y_t}{L_t} = A_t \left(\frac{K_t}{L_t}\right)^{\gamma} \quad (2)$$

Equation 2 specifies that the economic growth of any country depends on both capital accumulation and labor productivity. To determine its systematic analysis along with other main factors according to the present research, objectives are included in it.

Fiscal policy, directly and indirectly, affects the growth through expenditure. It implies that expansionary fiscal policy raises the aggregate demand where demand is negatively related to the interest rate. Therefore, expansionary fiscal policy upturns the interest rate while, an expansionary monetary policy downturns it and raises the output (Cyrus & Elias, 2014). According to the authors, both fiscal and monetary variables (that is, government expenditure, tax revenue, money supply, and exchange rate) are important elements of labor productivity, since these elements directly influence the stability of prices in the economy. The current study followed Cyrus & Elias's (2014) model to incorporate the uncertain effects of policies with economic growth rate. There are two ways to construct the model. Firstly, to estimate equation 2 by taking monetary and fiscal policies' uncertainty variables, but constrain of this way is that before estimation, it requires the total labor productivity series. While, the second is to substitute the variables as to ascertain the relationship of policies' uncertainty with productivity. Following the second way of construction, the model is as,

$$A_t = \varphi_0 + \varphi_1 UF_t + \varphi_2 UM_t + \varphi_3 e_t + \varphi_4 i_t + \varphi_5 inf_t + \epsilon_t \quad (3)$$

Where, UF, UM, e, I, and inf represent fiscal uncertainty, monetary uncertainty, exchange rate, interest rate and inflation, respectively.

Empirical Model

To investigate the impact of policy on growth, an empirical model was derived by substituting the equation three in equation two as,

$$y_t = \delta_0 + +\delta_1 K_t + \delta_2 UF_t + \delta_3 UM_t + \delta_4 e_t + \delta_5 i_t + \delta_6 inf_t + \mu_t \quad (4)$$

Where, y_t signifies GDP, k is capital accumulation which is measured in gross fixed capital formation, UF is fiscal uncertainty which is measured in terms of government expenditure. UM reflects monetary uncertainty in terms of broad money, and e represents the exchange rate.

Methodology

Measuring Policy Uncertainty

Measuring the uncertainty of any variable empirically remained an important task. In this regard, volatile behavior of series was examined to capture the uncertainty, behavior relates to the expectation and not to the actual consequences. Although, different studies employed the GARCH

model to determine the suitability of volatile behavior of variables[2]. The most standard approach, GARCH (1,1), based on conditional variance, is expressed by the equation as

$$Z_t = X_t\,\lambda + \eta_t \tag{5}$$

$$\sigma_t^2 = \alpha + \beta\eta_{t-1}^2 + \tau\sigma_{t-1}^2 \tag{6}$$

Equation 5 follows AR (1) process[3], where, Z_t reflects variables uncertainty (that is, UF and UM), σ_t^2 is conditional variance based on past information, and η_t is the error term.

Estimation Approach for Co-integration (ARDL Model)

Pesaran et al. (2001) identified that if the given series of variables are integrated at different levels (that is, I (1) and I (0)), then ARDL approach is a suitable method to capture the long term association among series. The current study applied the ARDL method since it is relevant if variables are mutually integrated at the order I(1) or I(0), however, not at higher order I(2). Secondly, this method concomitantly evaluates long and short term parameters. Furthermore, the estimated parameters through this process are unbiased and efficient because this technique eradicates the complications connected with endogeneity and autocorrelation (Pesaran et al., 2001). The model is specified below,

$$\Delta y_t = \psi_1 + \psi_2 (y)_{t-1} + \psi_3 (K)_{t-1} + \psi_4 (UF)_{t-1} + \psi_5 (UM)_{t-1} + \psi_6 (e)_{t-1} + \psi_7 (i)_{t-1}$$
$$+ \psi_8 (inf)_{t-1} + \sum_{j=1}^{p} \psi_9 \Delta(y)_{t-j} + \sum_{j=0}^{p} \psi_{10} \Delta(K)_{t-j} + \sum_{j=0}^{p} \psi_{11} \Delta(UF)_{t-j} + \sum_{j=0}^{p} \psi_{12} \Delta(UM)_{t-j} +$$
$$\sum_{j=0}^{p} \psi_{13} \Delta(e)_{t-j} + \sum_{j=0}^{p} \psi_{14} \Delta(i)_{t-j} + \sum_{j=0}^{p} \psi_{15} \Delta(inf)_{t-j} + \mu \tag{7}$$

The first portion of equation 7 with the coefficients ψ_2, ψ_3, ψ_4 ψ_5, ψ_6,ψ_7, and ψ_8 signify the long term relationship. While, the coefficients ψ_9, ψ_{10}, ψ_{11},ψ_{12},ψ_{13}, ψ_{14}; and ψ_{15} signify the short term relationship and p indicates the optimum lags.

Procedure ARDL co-integration model is based on three phases. In the first phase, the existence of long term relationship among the given variables is analyzed by testing a null hypothesis,

[2] see Lensink, *et al.,*(1999), Fatima and Waheed (2014) and Farooq and Yasmin (2017)

[3] Conditional mean equation and second represents conditional variance equation, Asteriou 2nd edition (2006), see pp. 299

H_0: $\psi_2 = \psi_3 = \psi_4 = \psi_{\square} = \square\psi_6 = \square\psi_7 = \square\psi_8 = 0$

The Null hypothesis (H0) reveals no co-integration among the variables with the alternative (H1), at least one parameter of lag variables is not equal to zero. Hypotheses are tested through F-test statistics and the calculated value of F-statistics is equated with critical bound values developed by Pesaran et al. (2001). If the calculated value is greater than the upper critical bound, then H0 is not accepted. It implies that a long span relationship exists among given variables. Similarly, the H0 is accepted if the value of the F-statistic is less than the value of lower critical bound. When the evidence from F-statistics indicates that the co-integration exists among the variables, then in the second phase, coefficients of the long-term relationship are estimated by following these ARDL models.

After verifying the existence of co-integration among the variables in the second phase, coefficients of the long span relationship and in the third short span parameters are estimated by following these ARDL models as,

$$y_t = \psi_1 + \sum_{j=1}^{p} \psi_2 (y)_{t-j} + \sum_{j=0}^{p} \psi_3 (K)_{t-j} + \sum_{j=0}^{p} \psi_4 (UF)_{t-j} + \sum_{j=0}^{p} \psi_5 (UM)_{t-j} + \sum_{j=0}^{p} \psi_6 (e)_{t-j} + \sum_{j=0}^{p} \psi_7 (i)_{t-j} + \sum_{j=0}^{p} \psi_8 (inf)_{t-j} + \vartheta \quad (8)$$

$$\Delta y_t = \psi_1 + \sum_{j=0}^{p} \psi_2 \Delta(CD)_{t-j} + \sum_{j=0}^{p} \psi_3 \Delta(K)_{t-j} + \sum_{j=0}^{p} \psi_4 \Delta(UF)_{t-j} + \sum_{j=0}^{p} \psi_5 \Delta(UM)_{t-j} + \sum_{j=0}^{p} \psi_6 \Delta(e)_{t-j} + \sum_{j=0}^{p} \psi_7 \Delta(i)_{t-j} + \sum_{j=0}^{p} \psi_8 \Delta(inf)_{t-j} + \pi ECM_{t-1} + \vartheta_1 \quad (9)$$

where, ECM is the error correction term, it describes the adjustment in short time period for the long term equilibrium.π is coefficient of error correction term which illustrates the speed of convergence and its negative significant sign also verifies that long run relationship is attained and model is accurate.

Data

To evaluate the empirical relationship between polices' uncertainty and growth, the study employed annual time series data of Pakistan over

the time period of 1971-2020. The data of GDP, government final consumption expenditure, broad money, and gross fixed capital formation was taken as a proxy of economic growth, fiscal uncertainty, monetary uncertainty, and capital accumulation, respectively. At the same time, discount rate was used as interest rate and consumer price index was used as inflation. The data of variables was taken from World Development Indicator (WDI) database, Hand Book of Statistics on Pakistan Economy, and various issues of Economic Survey of Pakistan.

Estimations, Results, and Interpretations

Before starting the estimation, stationarity of data set was checked by two different unit root tests, that is, the Augmented Dickey-Fuller Test (ADF) and Phillip-Perron Test (PP). In general, both tests are interrelated with each other and applied to confirm the validity of unit roots results. The results are stated in the Table 1 below.

Table 1 shows that all series are integrated at the first difference, except y and inf which are integrated at a level. So, before estimating ARDL model, the uncertainty of fiscal and monetary variables is analysed by the GARCH model and results are reported in table 2 and 3, respectively.

The outcome of Table 2 reveals that estimated coefficients of both mean and variance equations are statistically significant. Specially, the sum of values of Resid(-1)^2 (that is, ARCH, represents the shocks) and lag of condition variance (that is, GARCH(-1)) is equal to 0.976, that is less than one and positive It implies that fiscal uncertainty in terms of volatility in government expenditure exists in the model.

Similarly, the results of table 3 reveal that all the coefficients in both mean and variance equations are statistically significant and the sum of values of Resid(-2)^2 and lag of condition variance (that is, GARCH(-2)) is equal to 0.92. It suggests that monetary policy uncertainty in terms of volatility in broad money exists in the model. Therefore, the impact of policies' uncertainty on economic growth was examined by applying the ARDL approach.[4]

[4] GARCH(1) and GARCH(2), conditional variances are used as monetary and fiscal uncertainty.

Table1

Unit Root

Variables ADF test					PP Test			
	Levels		First difference		Levels		First difference	
In LN form	Intercept	Intercept & trend	Intercept	intercept & trend	intercept	intercept & trend	Intercept	Intercept & trend
Y	-2.49	-1.45	-6.08**	-7.00**	-2.83**	-1.34	-6.10**	-6.99**
K	-3.16	-1.89	-5.59**	-6.63*	-1.796	-1.566	-4.029*	-4.399*
UF	-1.45	-2.32	-6.78**	-6.87**	-1.49	-2.36	-6.78**	-6.87**
UM	-0.83	-2.92	-5.60**	-5.58**	-0.819	-2.08	-5.52**	-5.47**
E	1.47	1.81	-4.17**	-5.62**	3.68	1.22	-3.35	-4.04
I	-1.78	-1.38	-4.29**	-5.25**	-2.89	-2.66	-5.64**	-5.67**
Inf	-3.26	-3.24	-6.78**	-6.71**	-3.62**	-3.24	-6.79**	-6.72**

Note. Superscript **and * Represent the significance level at 5% and 10%, respectively

Table 2

Fiscal Policy Uncertainty by GARCH

Dependent Variable: UF				
Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)				
GARCH = C(3) + C(4)*RESID(-1)^2 + C(5)*GARCH(-1)				
Mean Equation				
Variable	Coefficient	*S.E*	*z*	*p*
C	0.2380	0.012437	19.1391	0.0000
UF(-1)	0.9917	0.000250	3959.338	0.0000
Variance Equation				
C	0.00018	0.000349	0.51514	0.6065
RESID(-1)^2	-0.13637	0.047040	-2.89905	0.0037
GARCH(-1)	1.1126	0.055806	19.9365	0.0000
R^2	0.9981273	Mean dependent var		12.31282
Adjusted R^2	0.9981	*S.D.* dependent var		1.934348
S.E. of regression	0.0846	AIC		-2.359547
Sum squared resid	0.3363	S-C		-2.166504
Log likelihood	62.8089	H-Q-C		-2.286307
Durbin-Watson stat = 2.040837				

Table 3

Monetary Policy Uncertainty by GARCH

Dependent Variable: UM				
Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)				
GARCH = C(3) + C(4)*RESID(-2)^2 + C(5)*GARCH(-2)				
Mean Equation				
Variable	Coefficient	*S.E*	*z*	*p*
C	0.195021	0.005554	35.11154	0.0000
UM(-1)	0.995669	0.000142	6999.932	0.0000
Variance Equation				
C	1.01E-05	7.56E-05	0.133826	0.8935
RESID(-2)^2	-0.106554	0.033651	-3.166432	0.0015

Variable	Coefficient	*S.E*	*z*	*p*
GARCH(-2)	1.083510	0.036158	29.96565	0.0000
R^2	0.999166	Mean dependent var		13.73228
Adjusted R^2	0.999148	S.D. dependent var		2.077522
S.E.	0.060635	AIC		-3.026274
Sum squared resid	0.172799	S-C		-2.833231
Log likelihood	79.14371	H-Q-C		-2.953034
Durbin-Watson stat	1.613545			

Results and Discussion of ARDL Co-integration Test

The outcomes of unit root tests suggested that series was integrated at different orders which indicates the application of ARDL test based on three stages. In the first stage, an optimal lag length for the model 7 was designated by using the AIC and SICS criteria through VAR. The results are stated in Table 4.

Table 4

Lag Length Selection

Lag	LogL	LR	FPE	AIC	SC	HQ
0	47.391	NA	3.92e-10	-1.7951	-1.514	-1.6904
1	363.309	519.508	2.84e-15	-13.658	-11.409*	-12.820
2	408.326	60.023	3.97e-15	-13.481	-9.267	-11.909
3	484.628	77.997*	1.86e-15	-14.694	-8.512	-12.389
4	560.435	53.907	1.63e-15*	-15.886*	-7.736	-12.847*

Note. * represents a 5% level of significance.

From the above table, the optimum lag length 4 is determined for equation 7. By using this lag length, the presence of long term nexuses among the given variables is examined through the bound test. Whereas, significance was determined by the *F*- statistics and reported in table 5.

Table 5
Bound Test for Co-integration

Model 7				
k	*F*	Critical value		
		Level of significance	Lower bound	Upper bound
6	9.2258**	1%	3.656	5.331
		5%	2.76	4.057
		10%	2.309	3.507

Note. *k* shows the number of independent variables.** indicates 5% significance level at given critical values

Table 5 shows that the calculated value of F-test is greater than the values of the upper critical bound at the given significance level which infers that a long term relationship exists between the given variables. Hence, long-run coefficients were determined by estimating the equation 8 which provides results in table 6.

Table 6
ARDL (1, 1, 3, 3, 1, 0, 3)

Variable	Coefficient	*S. E*	*t*	*p*
LNY(-1)	0.728	0.077	9.446	0.000
LNK	0.498	0.054	9.159	0.000
LNK(-1)	-0.287	0.061	-4.679	0.000
UF	-0.179	3.949	-0.045	0.964
UF(-1)	6.397	3.902	1.640	0.112
UF (-2)	-5.435	3.230	-1.683	0.104
UF(-3)	10.667	3.792	2.813	0.009
UM	-6.774	11.407	-0.594	0.557
UM(-1)	-0.401	10.006	-0.040	0.968
UM(-2)	-10.664	8.779	-1.215	0.235
UM(-3)	-17.899	8.909	-2.009	0.054
e	-0.0025	0.001	-2.283	0.030
e(-1)	0.005	0.0016	3.290	0.003
inf	0.004	0.0016	2.534	0.017
I	0.0099	0.0037	2.707	0.012
i(-1)	-0.0042	0.003	-1.172	0.252

Variable	Coefficient	*S. E*	*t*	*p*
i(-2)	-0.0079	0.003	-2.304	0.029
i(-3)	0.014	0.003	5.112	0.000
C	1.106322	0.228	4.842	0.000
LNK	0.777	0.071	10.859	0.000
UF	42.107	21.612	1.9483	0.062
UM	-131.417	69.195	-1.899	0.068
e	0.0096	0.0027	3.585	0.0013
inf	0.015	0.007	2.271	0.031
I	0.043	0.013	3.222	0.003
R^2	0.9999	Durbin-Watson stat		2.148
Adjusted R^2	0.9998	*F*-statistic		15031.47
		Prob(*F*-statistic)		0.000

Table 6 shows that all the variables are statistically significant. Fiscal policy uncertainty, in terms of government expenditure, positively affected the economic growth of Pakistan in the long run. While, money supply as a monetary policy uncertainty negatively affected the economy. These findings are in line with the outcomes of Cyrus and Elias (2014), Mumtaz and Surico (2018) and Li et al. (2020) in the case of Kenya, US, and China, respectively. It implies that monetary uncertainty leads to a decrease in real output due to weak financial system of Pakistan which hurts the private sector investment. Moreover, Pakistan also experienced that sudden monetary expansion raises the loan for non-development objective which leads to high credit risk. Therefore, the findings suggested that monetary shocks could have a negative impact on the stability and health of banking sector. Li et al. (2020) also confirmed adverse effects of monetary p-un due to the high credit hazard. However, fiscal shock in terms of government expenditure raises the output and interest rate; it also coexists with the findings of Blanchard and Fisher (1989). It also indicated that high interest rate tends to crowd out the private investment, however, it attracts capital inflow which raises the value of domestic currency and current account deficit (Zahid et al., 2018). Furthermore, capital formation; interest rate, exchange rate, and inflation have a significant positive influence on the economy in the long time period which supported the studies of Jawaid et al. (2010) and Chowdhury et al. (2015). Evidence was also linked by Fatima and Waheed (2014) pertaining to inflation. According to the authors, inflation positively affects the output due to the demand-pull factors.

After estimating the long term relationship, the short run relationship between variables was induced by ECM. The estimated results of ECM specification for ARDL are described in table 7.

Table 7
Error Correction Regression: ARDL(1, 1, 3, 3, 1, 0, 3)

Variable	Coefficient	*S. E*	*t*	*p*
C	1.106	0.115	9.586	0.000
Δ (LNK)	0.498	0.037	13.293	0.000
Δ (UF)	-0.179	2.544	-0.071	0.944
Δ (UF(-1))	-5.233	2.579	-2.028	0.052
Δ (UF(-2))	-10.667	2.467	-4.323	0.000
Δ (UM)	-6.774	7.014	-0.966	0.342
Δ (UM(-1))	28.563	7.485	3.816	0.000
Δ (UM(-2))	17.899	6.775	2.642	0.012
Δ e	-0.0025	0.000	-3.506	0.001
Δ (i)	0.0099	0.002	5.039	0.000
Δ (i(-1))	-0.0059	0.002	-2.540	0.017
Δ (i(-2))	-0.0138	0.002	-5.970	0.000
ECM_{t-1}	-0.2719	0.031	-8.884	0.000
Diagnostic Test				
$R^2 = 0.882939$		$F_{RAMSEY} = 0.144\ (0.707)$		
Adjusted $R^2 = 0.840371$		$F_{NORMAL} = 0.\ 833\ (0.659)$		
$F_{Hetro} = 0.833(0.607)$		$F_{LM} = 0.347\ (0.709)$		
F-statistic = 20.74, $p = 0.00$		Durbin-Watson = 2.147515		

Table 7 indicates that the coefficients of capital formation, interest rate, and exchange rate have expected sign and all are statistically significant. The coefficients of fiscal and monetary policy uncertainty have expected negative sign, however, they are not statistically significant in short term. Coefficient of error correction term (ECM_{t-1}) is significant and has a negative sign which confirms that short and long-term co-integration exists between the given variables in the model. It also suggests that 27% adjustment is required annually for long run convergence. While exchange rate negatively affects the growth rate of Pakistan. These findings were consistent with Jawaid et al. (2010). Furthermore, diagnostic test results revealed that there is no serial correlation and heteroscedasticity between variables. The stability of long

term and short-term parameters was also confirmed by cumulative sum (CUSUM) and cumulative sum squares (CUSUMSQ) tests (See Appendix-1).

Conclusion

The uncertainty related to macroeconomic policies has remained a serious issue in Pakistan since it affects the growth rate of the economy adversely. Different studies used different methods to measure the uncertainty of the policies. Some of them used policy index and some heavily relied on the conditional variance of a series conducted by ARCH or GARCH models and found different results. These studies used different factors of both monetary and fiscal policy separately, however, they did not give attention to a comparative analysis of both policies. Thus, the current study considered the role of both fiscal and monetary uncertainty in economic growth. In this regard, firstly, the uncertainty of these policies was determined by measuring volatility through the GARCH model. After finding the existence of fiscal and monetary uncertainty, their impacts on growth performance were examined by using the ARDL Model. The findings of estimation suggested that both policies significantly affect the economy, however, their direction is different in the long-run. Fiscal uncertainty has a positive impact, while momentary uncertainty has a negative impact on the growth performance of economy. On the contrary, short-term results designated that uncertainty of both policies negatively influences the economy, however, it is not statistically significant.

Future Directions

Future studies may consider the indirect impact of policies in different economies. Such studies may also examine how these policies interact and influence each other, which might provide deeper insights into their combined effects. It is also suggested that policymakers in Pakistan should prioritize to enhance the stability and transparency in both, fiscal and monetary policies. This can be accomplished through clear announcement, predictable decision-making processes, and effective policy implementation regarding government expenditure, interest rate predictability, and quantity of money supply. Additionally, coordination among fiscal and monetary management is necessary for stable and consistent policy framework regarding sustainable economic growth.

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Appendix 1

Figure 1A
Long Run CUSUM and CUSUMQ Tests Results

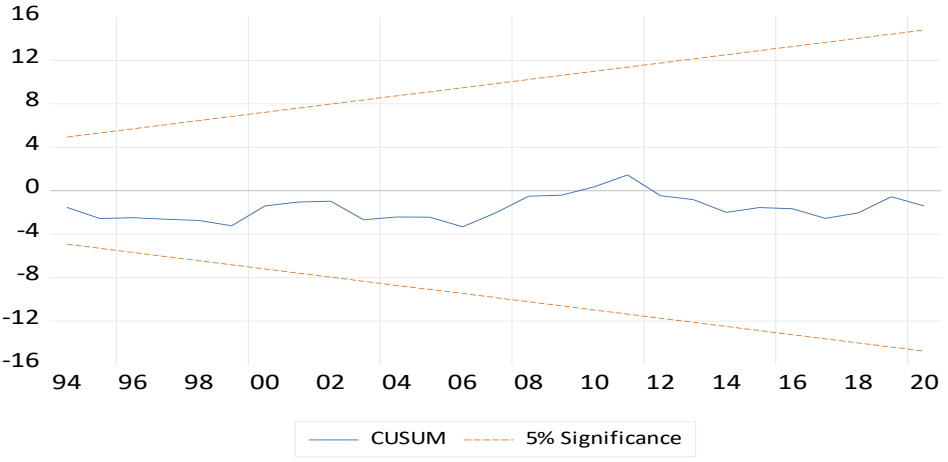

Figure 1A
Long Run CUSUM of Squares