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Fiscal Policy, Macroeconomic Flux and Inflation Volatility in Pakistan

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Abstract

The main objective of this study is to analyze the long run and short run impact of fiscal policy, fiscal policy volatility, discretionary fiscal policy, and volatility of discretionary fiscal policy on inflation volatility in Pakistan. The study follows the IS-LM model, and utilizes the time series data of Pakistan from 1976 to 2019 at annual frequency under ARDL framework to check the long run relationship between fiscal policy and inflation volatility. The results showed that volatility of imports, volatility of exchange rate, and volatility of output gap have positive effect on inflation volatility, while volatility of money supply has negative effect on inflation volatility in the long run. Fiscal policy, fiscal policy volatility, discretionary fiscal policy, and volatility of discretionary fiscal policy have negative and insignificant effect on inflation volatility in the long run. Unidirectional causality exists from fiscal policy and volatility of money supply to inflation volatility, while unidirectional causality exists from inflation volatility to volatility of exchange rate in the short run. Government has to develop efficient markets and institutions with autonomy, as well as an active and efficient role of government is required to maintain stable prices.

Keywords: Fiscal policy, Inflation volatility, ARDL, Pakistan

JEL classification: C22, E31, E62, O53

1. Introduction

Uncertainty and instability about future prices increased the risk and effect distribution of wealth. The economy of any country is badly affected by inflation. Economy faces several dangerous effect due to lack of stability in prices. Negative consequences of inflation volatility are of great concerned (Mara and Dezsi, 2011). Expectation about future prices become more uncertain with continuous variability of inflation. High risk premia for long term causes to increase the hedging

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costs against inflation risks and leads to unanticipated redistribution of wealth. Thus inflation volatility hampered economic growth even if inflation on average remains restrained. Inflation is a persistent and appreciable rise in average prices which results in increase in the cost of living (Ackley, 1978). When inflation goes up, it means that each dollar is effectively worth less. Inflation is constituted by rising price level rather than high prices. Due to which the money become devalued. It is not high prices but rising price level that constitute inflation. It can thus be viewed as the devaluing of the worth of money. There is various school of thought dealing with impact of monetary policy on inflation volatility (Gali and Monacelli, 2005; Leduc et al., 2007). Historically average and high inflation volatility is caused by weak institutions in developing countries.

The primary objective of any country is sustainable economic growth through effective use of policies. Economic development has gained incredible importance from researchers and policy makers because economic prosperity plays a vibrant role in the development of social, economic and political welfare of nations. Fiscal policy plays vibrant role in enhancing the level of economic growth of both developed as well as developing countries. When the price level rises consumer buy fewer goods and services by each unit of currency due to which inflation caused the reduction in purchasing power parity and loss of value in the medium of exchange rate.

When the price level rises each unit of currency buys fewer goods and services, consequently, inflation reflects a reduction in the purchasing power per unit of money a loss of real value in the medium of exchange and unit of account within the economy. Inflation volatility slows down economic growth even inflation remains controlled (Rother, 2004). Fiscal policy plays essential role in the volatility of inflation. Kilindo (1997) found a strong relationship between fiscal operation, money supply and inflation in Tanzania. Javid et al. (2010) argued that public debt leads to fiscal expansion and there is a greater danger of raised inflation which further leads to higher interest rate. Surjaningsih et al. (2012) found that taxation has positive impact on government spending and output in the long run, while increase in government spending decreases inflation and tax leads to higher inflation. Rehman et al. (2016) found that impact of fiscal policy is higher on inflation in Pakistan. Rother (2004) argued that discretionary fiscal policy has contributed to inflation volatility, while Olasunkanmi (2015) determined that discretionary fiscal policy has transitory effect in long run while in short run it has negative impact.

Controlling of inflation has gained predominant aim of government policy in recent time period. This possibly reflects the changing emphasis of economic policy away from direct intervention and maintaining employment and stable economy. There is a lot of work on the relationship between monetary policy and inflation in Pakistan (Javid and Munir, 2010; Munir and Qayyum, 2014; Munir, 2018; Munir, 2020). But there are limited work on the relationship between fiscal policy and inflation volatility in Pakistan. The present study aims at filling this gap and providing empirical analysis on the relationship between fiscal policy and inflation volatility. The main objective of this study is to analyze the long run and short run impact of fiscal policy on inflation volatility in Pakistan. The specific objectives of this study are: firstly, to examine the

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impact of fiscal policy on inflation volatility, secondly, to examine the impact of fiscal policy volatility on inflation volatility, thirdly to examine the impact of discretionary fiscal policy on inflation volatility, and lastly, to examine the impact of volatility of discretionary fiscal policy on inflation volatility. The main significance of this study is to provide the essential evidence, information and better understanding to individual, policy makers and researchers. This paper will help the government and policy makers in evaluating and understanding the policies and problem required to control inflation in Pakistan. This study will help the government officials and central banks for making the desirable decision in macroeconomic policy to maintain stable prices and economic growth.

The remainder of the paper is organized in the following manner. Previous literature is discussed in Section 2. Methodology and data are described in section 3. Results of inflation and inflation uncertainty are analyzed in section 4. Section 5 contains concluding remarks and policy recommendations.

2. Literature Review

Hossain (1987) investigated the relationship between fiscal deficits and inflation in Bangladesh's economy from 1974 to 1983. The results of the study showed that during the inflation government expenditures adjust themselves more rapidly than government revenues and increase the size of fiscal deficit. Kilindo (1997) examined the contribution of government budget deficit and money supply on inflation in Tanzania from 1970 to 1991. The results of the study showed that strong relationship exists between government budget deficit, money supply and inflation in Tanzania. The study concluded that money supply has the major contribution in inflation, while budget deficit is the major cause of higher money supply in Tanzania. Rondan and Chavez (2004) examined the relationship between inflation, inflation volatility, and total factor productivity growth for eighteen Latin American countries from 1960 to 2000. They found that negative relation exists between high inflation level, volatility of inflation and TFP growth, while insignificant relation exists between low inflation level and TFP growth. In long run negative relationship exist between high inflation level and inflation volatility on TFP growth.

Rother (2004) examined the association between fiscal policy and inflation volatility in OECD countries from 1967 to 2001. Results depicted that inflation volatility is contributed by volatility in discretionary policy which is robust with the changes in inflation volatility, the data frequency, the sample period, and econometric methodology. De Castro and De Cos (2008) analyzed the effect of exogenous fiscal shocks in Spain by employing the VAR framework. They found that an increase in government expenditures have positive effects on output, inflation, and public deficit in short term, while lower output in the medium and long term. Saleem (2008) examined the relationship and determinants of inflation and inflation volatility in Pakistan from 1990 to 2005 by using VAR and ARCH-GARCH framework. Results of the study showed that inflation is directly proportional to the inflation volatility due to which uncertainty in economy generated. Inflation volatility significantly creates unanticipated negative shocks in first four months and hampers economic growth in Pakistan, while results of VAR model shows that inflation, money supply and the interest rate move into same direction.

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Javid and Arif (2009) examined the effect of change in government spending on macroeconomic variables in Pakistan from 1971 to 2008. They found that output and consumption shows negative response with an increase in government spending, while interest rate shows positive response. They concluded that Ricardian behavior is present in Pakistan. Khundrakpam and Pattanaik (2010) analyzed the effects of fiscal policy on inflation in India from 1953 to 2009. They found that if there is one percent increase in the level of fiscal deficit then whole sale price index increased about quarter of a percentage point. They concluded that the importance of fiscal space in the Indian specific context needs to be seen in terms of not only the usual output stabilization role of fiscal policy but also the need for use of fiscal measures to contain inflationary pressures. Blake and Kirsanova (2011) investigated the bias in the role of monetary and fiscal policy in stabilizing the economy when more weight is given on inflation stabilization. They found that if the fiscal authority acts strategically under discretion then inflation lead towards the social welfare loses. They concluded that monetary-fiscal interactions depends on the choice of fiscal instrument, the leadership structure, and level of steady state debt.

Mara and Dezsi (2011) analyzed the impact of fiscal policy on inflation volatility in economic crisis in Romania from 2007 to 2010. They found that budget deficit and tax burden have significant and positive effect on inflation volatility. They concluded that limited budget deficit is desirable to maintain an acceptable level of inflation. Surjaningsih et al. (2012) examined the impact of fiscal policy on output and inflation along with discretionary fiscal policy and how it impacts the volatility of output and inflation in Indonesia from 1990 to 2009. The results of the study showed that long run relationship exists between government spending, taxes and output, while government spending decreases economic growth and taxes increases economic growth in the long run. On the other hand, government spending increases economics growth and taxes decrease economic growth in the short run, therefore government spending is more effective to stimulate economic growth in times of recession, compared to taxation policies. An increases in government spending causes a decrease in inflation, while taxes lead to an increases in inflation in the short run. Olasunkanmi (2015) examined the impact of fiscal policy on inflation volatility in Nigeria from 1981 to 2013. The results depicted that in the short and long run discretionary fiscal policy has transitory effect and significant negative effect on inflation volatility respectively. Results also showed that in the long run volatility of oil price and exchange rate have negative and significant effect on inflation volatility. The study concluded that discretionary fiscal policy caused the negative and significant effect on inflation volatility in Nigeria.

Rehman et al. (2016) analyzed the effect of fiscal policy on inflation in Pakistan from 1980 to 2014. They found that growth rate of government expenditure, growth rate of GDP, interest rate, and employment rate have significant effect on inflation, while growth rate of taxes and budget deficit have insignificant effect on inflation in Pakistan. They concluded that fiscal policy have significant effect on inflation in Pakistan. Munir and Riaz (2019a) analyzed the relationship between fiscal policy and macroeconomic stability as well as channel through which macroeconomic stability achieved by fiscal policy in South Asian countries. They found that automatic stabilizers and cyclical policy have destabilizing impact, whereas discretionary policy

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has stabilizing impact in South Asian countries. Munir and Riaz (2019b) analyzed the effects of fiscal policy on macroeconomic variables in Pakistan from 1976:Q1 to 2017:Q4. They found that an increase in government expenditures lead to an increase in private consumption and prices after three quarters, while private investment follows declining trend. Private consumption and interest rate are negatively related with taxes, while, private investment and prices are positively related with taxes.

Munir and Riaz (2020a) explored the exogenous effects of fiscal policy on disaggregated macroeconomic variables in Pakistan from 1976:Q1 to 2018:Q4. They found that fiscal policy is an effective tool to stimulate economic activity and stabilize the economy of Pakistan at the cost of inflation. They concluded that government has to adopt the stringent policy for collection and generation of revenue with strict accountability. Munir and Riaz (2020b) examined the relationship between inflation and volatility of inflation in Pakistan from July 1998 to March 2018. Results of the study showed that previous inflation has significant positive effect on current inflation, while unidirectional causality also exists from inflation to volatility of inflation.

3. Methodology and Data

Keynes (1936) argued that in order to stimulate aggregate demand, government works through taxes and government spending. The IS-LM model developed by Harrods (1937), Hicks (1937), and Meade (1937) illustrate the Keynesian approach to fiscal policy. An increase in government expenditures lead to growth in aggregate demand. In short run, decrease in aggregate demand contributes high level of unemployment, while in long run it stimulates the employment level by shifting the IS cure to rightward direction. Therefore, government intervention through the use of countercyclical fiscal policies encouraged by Keynesians. When economy enters in to boom (increasing taxes and cutting back government outlays to control inflation) and suffers from recession (decrease in aggregate demand causes to increase in unemployment) then the contractionary and expansionary fiscal policy operates (Keynes, 1936).

This study has utilized the following four time series model to measure the relationship between fiscal policy and inflation volatility. The first model measures the impact of fiscal policy and macroeconomic flux on inflation volatility as:

$$INFV = f(IMPV, EXV, OGV, M2V, GS) \quad (1)$$

Where, INFV is inflation volatility, IMPV is volatility of imports, EXV is volatility of exchange rate, OGV is output gap volatility, M2V is volatility of money supply, and GS is government size as percentage of GDP (proxy for fiscal policy).

The second model measures the impact of fiscal policy volatility and macroeconomic flux on inflation volatility as:

$$INFV = f(IMPV, EXV, OGV, M2V, GSV) \quad (2)$$

Where, INFV is inflation volatility, IMPV is volatility of imports, EXV is volatility of exchange rate, OGV is output gap volatility, M2V is volatility of money supply, and GSV is government size volatility (proxy for fiscal policy volatility).

The third model measures the impact of discretionary fiscal policy and macroeconomic flux

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on inflation volatility as:

$$INFV = f(IMPV, EXV, OGV, M2V, DP) \quad (3)$$

Where, INFV is inflation volatility, IMPV is volatility of imports, EXV is volatility of exchange rate, OGV is output gap volatility, M2V is volatility of money supply, and DP is discretionary fiscal policy (measured as primary balance as percentage of GDP) .

The fourth model measures the impact of discretionary fiscal policy volatility and macroeconomic flux on inflation volatility as:

$$INFV = f(IMPV, EXV, OGV, M2V, DPV) \quad (4)$$

Where, INFV is inflation volatility, IMPV is volatility of imports, EXV is volatility of exchange rate, OGV is output gap volatility, M2V is volatility of money supply, and DPV is discretionary fiscal policy volatility.

The study is using time series data which is very sensitive to the problem of stationarity. Stationarity of each series is checked by Augmented Dickey Fuller (ADF) and Phillips-Perron (PP) unit root tests. The only difference between PP and ADF unit root test is their way to encounter the problem of serial correlation. Dickey and Fuller (1981) presented the Dickey-Fuller unit root test in which they assume that the error term are uncorrelated. But in order to address the situation when error terms are correlated, they presented ADF test by adding the lags of the dependent variable on the right hand side. Phillips and Perron (1988) dealt with serial correlation problem by proposing nonparametric statistical methods without adding the lag of the dependent variable.

There are various techniques that are used to check the co-integration between the variables (Engle and Granger, 1987; Johansen and Juselius, 1990) but it is essential for these techniques that the variable should be of same order. However, to avoid these problems, when the variables are mixture of I(0) and I(1) there is another technique of cointegration introduced by Pesaran et al. (2001) which is known as "Autoregressive Distributive Lag (ARDL)". There are two assumptions of ARDL bound testing approach to cointegration i.e. regress and must be of order I(1) and none of the variable is of order I(2). ARDL bound testing approach is better than other techniques due to following reasons: firstly, this technique does not require pre testing of the variables i.e. regressors are purely I(0) or I(1) or mutually integrated, secondly, error correction model (ECM) is obtained from ARDL by a simple linear transformation and error correction term (ECT) integrate short run adjustments with long run.

Specification of ARDL model:

$$\Delta \ln Y_t = C + \sum_{i=1}^{p} \alpha_i \Delta \ln Y_{t-i} + \sum_{i=1}^{p} \beta_i \Delta \ln X_{t-i} + \varphi_1 \ln Y_{t-1} + +\varphi_2 \ln X_{t-1} + \varepsilon_t \quad (5)$$

Where, Δ shows the first difference of the variables, α and β represent the short run dynamics, φ_1 and φ_2 are long run coefficient which shows marginal change in dependent variable due to change in explanatory variables. In order to test the cointegration, the following null hypothesis is tested:

H_0: $\varphi_1 = \varphi_2 = 0$ (There is no co-integration)

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H_1: $\varphi_1 = \varphi_2 \neq 0$

In ARDL bound test the value of F-statistics is compared with upper and lower bounds. If the value is greater than upper bound then it confirms the existence of co-integration among the variables by rejecting the null hypothesis and if the value of F-statistics fall below the lower bound then there is no co-integration but if the value falls between the upper and lower bound then the results are inconclusive. The strength of the model is tested by conducting diagnostics tests. Breusch-Godfrey test is used to check the residuals for serial correlation, Breusch-Pagan test for heteroscedasticity, and Ramsey Reset Test for functional misspecification.

To estimate the short run dynamics, it is necessary to transform the ARDL model into error correction representation. Error correction term (ECT) is the rate of adjustment which indicates that how quickly variables adjust towards equilibrium and its negative sign represents the convergence in the short run. This term should be negative and statistically significant to establish the long run relationship among the variables. The ARDL bound test confirms the existence or absence of the long run relationship among the variables but it does not provide the direction of causality. For this purpose, Granger causality test is used to determine the direction of causality. Granger (1988) stated that within the framework of the ECM, causal relations among variables can be examined. The individual coefficients of the lagged terms captured the short run dynamics, while the error correction term contains the information of long run causality. The short run causality is analyzed with Granger causality test.

This study uses time series data from 1976 to 2019 at annual frequency for Pakistan. The data for GDP, government size, imports, money supply, and exchange rate has been taken from Pakistan economic survey (various issues). Output gap is measured as OG = $[(GDP\text{-}GDP^{hp})/(GDP)]$. However, the volatility of a variable is measured by five year rolling standard deviation.

4. Empirical Results

Augmented Dickey Fuller (ADF) and Phillip-Perron (PP) unit root test are applied and results are reported in table 1. ADF test indicate that all variables are stationary at level except INFV, GS, DP, and DPV which are stationary at first difference. The results of unit root test fulfilled the assumptions of ARDL bound test i.e. dependent variable (INFV) is integrated of order one (I(1)) and none of the variable is I(2). The results of ADF unit root test are confirmed by using PP unit root test. PP unit root test shows that all the variables are integrated of order one except OGV, GSV, and DPV which are stationary at level.

For checking the long run relationship between the variables, the study used ARDL bound test for co-integration. Bound test is applied on four models described above and reported in table 2. The lag length criteria is selected on the basis of Schwarz information criteria (SIC). F-statistics is compared with upper and lower bounds values as proposed by Pesaran et al. (2001). The result of bound test indicates that the F-statistics fall above the upper bounds at 1% significance level which means that null hypothesis of no co-integration is rejected in all the four models.

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Table 1: Results of ADF and PP Unit Root Tests

Variables	Augmented Dickey Fuller (ADF)		Phillips-Perron (PP)		Order of Integration	
	At Level	At 1st	At Level	At 1st	ADF	PP
INFV	-2.3471	-5.6186***	-2.7970	-6.4062***	I(1)	I(1)
IMPV	-3.4128**	-4.8737***	-2.2567	-4.8891***	I(0)	I(1)
ECV	-4.0159**	-5.7181***	-2.0689	-3.9297***	I(0)	I(1)
OGV	-3.5068*	-4.3531***	-2.6440*	-4.1605***	I(0)	I(0)
M2V	-3.3334**	-4.7867**	-2.5893	-4.6687***	I(0)	I(1)
GS	-2.1112	-7.0579***	-2.0497	-7.1228***	I(1)	I(1)
GSV	-4.0579**	-6.0654***	-2.3355	-4.9325***	I(0)	I(0)
DP	-2.5562	-9.1257***	-2.5190	-9.1430***	I(1)	I(1)
DPV	-2.7008	-7.0672***	-2.7964*	-7.9917***	I(1)	I(0)

Note: ***,**, and * shows significance at 1, 5 and 10% level respectively

Table 2: Results of Bound Test

Dependent Variable: VInf	F-Statistics	1 percent critical values Bound Test		Co-integration Exist
Model		**I(0)**	**I(1)**	
Model-I $F_{(INFV\mid IMPV, EXV, OGV, M2V, GS)}$ (1, 0, 0,4, 1, 2)	9.7993	3.06	4.15	**Yes**
Model-II: $F_{(INFV\mid IMPV, EXV, OGV, M2V, GSV)}$ (4,4,3,4,3,4)	7.4038	3.06	4.15	**Yes**
Model-III: $F_{(INFV\mid IMPV, EXV, OGV, M2V, DP)}$ (1, 0, 0, 4, 1, 0)	6.8831	3.06	4.15	**Yes**
Model-IV $F_{(INFV\mid IMPV, EXV, OGV, M2V, DPV)}$ (1, 0 ,3, 4,1, 1)	10.195	3.06	4.15	**Yes**

Before estimating the long run and short run parameters, diagnostic tests are applied for serial correlation (Breusch-Godfrey LM test), heteroscedasticity (Breusch-Pagan-Godfrey test) and model specification error (Ramsey Reset test). These tests are applied to avoid misleading results. The result of these tests (table 3) indicates that ARDL models are not suffering from the problem of serial correlation, heteroscedasticity and model specification error.

After diagnostic tests, the long run and short run parameters are estimated as proposed by Pesaran et al. (2001). The results of long run coefficients are reported in panel A and short run dynamics are presented in panel B of table 4. Results of model-I showed that there is significant and positive relation between volatility of imports and inflation volatility. An increase in fluctuation of imports increases the inflation volatility which eventually hurts economic growth. Volatility of exchange rate, and volatility of output gap have positive and significant effect on inflation volatility, while volatility of money supply negatively and significantly affect inflation

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volatility. Government size (proxy for fiscal policy) has positive and insignificant effect on inflation volatility in the long run. It means that fiscal policy has insignificant influence on inflation volatility in Pakistan as found by Olasunkanmi (2015), Buti et al. (2001) and Rother (2004). The results of model-II showed that volatility of imports and volatility of output gap negatively and significantly affect inflation volatility with inclusion of fiscal policy volatility. Volatility of exports, volatility of money supply, and volatility of government size have negative relation with inflation volatility, while only volatility of money supply has significant effect.

Table 3: Diagnostic Tests

Model	Test	F-statistics (p-value)	Null Hypothesis
Model-I	Serial Correlation: Breusch-Godfrey LM Test:	1.6604 (0.1891)	No Serial Correlation
	Heteroscedasticity: Breusch-Pagan-Godfrey Test	1.8047 (0.1045)	No Heteroscedasticity
	Model Specification: Ramsey Reset Test	0.0079 (0.9296)	Model is Correctly Specified
Model-II	Serial Correlation: Breusch-Godfrey LM Test:	4.0164 (0.1013)	No Serial Correlation
	Heteroscedasticity: Breusch-Pagan-Godfrey Test	0.8350 (0.6636)	No Heteroscedasticity
	Model Specification: Ramsey Reset Test	1.9612 (0.1990)	Model is Correctly Specified
Model-III	Serial Correlation: Breusch-Godfrey LM Test:	0.3293 (0.8892)	No Serial Correlation
	Heteroscedasticity: Breusch-Pagan-Godfrey Test	1.2685 (0.2975)	No Heteroscedasticity
	Model Specification: Ramsey Reset Test	0.0173 (0.8964)	Model is Correctly Specified
Model-IV	Serial Correlation: Breusch-Godfrey LM Test:	0.8798 (0.5166)	No Serial Correlation
	Heteroscedasticity: Breusch-Pagan-Godfrey Test	0.5085 (0.9084)	No Heteroscedasticity
	Model Specification: Ramsey Reset Test	0.0198 (0.8895)	Model is Correctly Specified

Note: P-values are in parenthesis and shows that null hypothesis cannot be rejected.

Results of model-III shows that volatility of imports, volatility of exchange rate, and volatility of output gap have positive and significant relation with inflation volatility when discretionary policy is added in the model. The results showed that discretionary fiscal policy has insignificant and negative effect on inflation volatility as claimed by Olasunkanmi (2015), while volatility of money supply has negative and significant impact on inflation volatility. The results of model-IV with the inclusion of volatility of discretionary fiscal policy are same as model-III. Volatility of discretionary fiscal policy has negative and insignificant effect on inflation volatility. An active fiscal policy can reduce inflationary spiral, however, delays in fiscal policy decisions make it insignificant. To estimate the short run dynamics, it is necessary to transform the ARDL

model into error correction model (ECM). Error correction term (ECT) is the rate of adjustment that indicates how quickly variables adjust towards equilibrium and its negative sign represents the convergence in the short run. The results of short run dynamics are also presented in table 4 panel B. The negative and significant ECT term in all the models shows that convergence exist in the short run.

Table 4: Long Run and Short Run Dynamics

Dependent Variable INFV				
Var	**Model-I**	**Model-II**	**Model-III**	**Model-IV**
Panel A: Long Run				
IMPV	0.5226***	7.5241*	0.7285*	0.2888*
	(0.0979)	(3.42338)	(0.3058)	(0.1522)
EXV	0.1731***	-0.8307	0.162339*	0.1468**
	(0.0574)	(0.4643)	(0.0774)	(0.0614)
OGV	0.8219***	4.1535**	1.2486***	0.8364***
	(0.1788)	(1.5991)	(0.3820)	(0.2457)
M2V	-0.6989***	-7.9321**	-1.2949*	-0.8606**
	(0.2379)	(3.3291)	(0.5323)	(0.3806)
GS	0.0114	----	----	----
	(0.0626)			
GSV	----	-1.9738	----	----
		(1.7453)		
DP	----	----	-0.2486	----
			(0.1557)	
DPV	----	----	----	-0.1008
				(-0.1008)
C	-0.2572	1.7735	-0.7806	0.7915
	(1.8972)	(1.9578)	(1.0403)	(0.5439)
Panel B: Short Run ECM				
ECT(-1)	-0.6716***	-0.4792***	-0.5796***	-0.7384***
	(0.0722)	(0.0515)	(0.0749)	(0.0770)

Note: Standard errors are in parenthesis. ***, **, * shows significance at 1%, 5% and 10% respectively.

Results of the Granger causality are reported in table 5. Result shows that unidirectional causality exists from fiscal policy to inflation volatility in Pakistan in the short run. Moreover, unidirectional causality exists from inflation volatility to volatility of exchange rate as well unidirectional causality exists from volatility of money supply to inflation volatility in the short run in Pakistan.

5. Conclusion

Fiscal policy is one of the main instrument available to government for prosperity and economic growth. Uncertainty about future prices increased the risk and impact distribution of wealth badly. The objective of this study is to analyze the long run and short run impact of fiscal policy, fiscal policy volatility, discretionary fiscal policy, and volatility of discretionary fiscal policy on

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inflation volatility in Pakistan. The study follows the IS-LM model and utilizes the four-time series model to measure the relationship between fiscal policy and inflation volatility. Time series analysis is conducted under ARDL framework to check the long run relationship between fiscal policy and inflation volatility in Pakistan from 1976 to 2019.

Table 5: Results of Causality Test

Model	F-Statistics	Causality
Fiscal Policy ➔ Inflation Volatility	6.6505***	**Yes**
Inflation Volatility ➔ Fiscal Policy	0.1861	**No**
Fiscal Policy Volatility ➔ Inflation Volatility	1.3206	**No**
Inflation Volatility ➔ Fiscal Policy Volatility	0.5338	**No**
Discretionary Fiscal Policy ➔ Inflation Volatility	0.8567	**No**
Inflation Volatility ➔ Discretionary Fiscal Policy	1.2268	**No**
Discretionary Fiscal Policy Volatility ➔ Inflation Volatility	0.6719	**No**
Inflation Volatility ➔ Discretionary Fiscal Policy Volatility	0.5663	**No**
Volatility of Imports ➔ Inflation Volatility	0.4963	**No**
Inflation Volatility ➔ Volatility of Imports	0.6625	**No**
Volatility of Exchange Rate ➔ Inflation Volatility	0.1251	**No**
Inflation Volatility ➔ Volatility of Exchange Rate	5.8981***	**Yes**
Volatility of Output Gap ➔ Inflation Volatility	0.1212	**No**
Inflation Volatility ➔ Volatility of Output Gap	0.1539	**No**
Volatility of Money Supply ➔ Inflation Volatility	6.3097***	**Yes**
Inflation Volatility ➔ Volatility of Money Supply	0.3954	**Yes**

Note: ***, **, * shows significance at 1%, 5% and 10% respectively.

Result showed that volatility of imports, volatility of exchange rate, and volatility of output gap have positive effect on inflation volatility, while volatility of money supply has negative effect on inflation volatility in the long run in Pakistan. Fiscal policy, volatility of fiscal policy, discretionary fiscal policy, and volatility of discretionary fiscal policy have negative and insignificant effect on inflation volatility in Pakistan in the long run. An active fiscal policy can reduce inflationary spiral, however, delays in the implementation of fiscal policy make it insignificant. Results of the Granger causality shows that unidirectional causality exists from fiscal policy to inflation volatility, while unidirectional causality exists from inflation volatility to volatility of exchange rate as well unidirectional causality exists from volatility of money supply to inflation volatility in the short run. As Covid-19 has badly effected world economy in 2020, hence a more active, integrated, and conducive fiscal policy is required for sustainable economic growth with stable price (Karabag, 2020).

In the light of the above findings the study suggests the following policy recommendations: firstly, government has to develop efficient markets and institutions with autonomy, and secondly, active and efficient role of government is required to maintain stable prices.

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