

Monetary Policy and Economic Growth in Pakistan: ARDL Evidence from 1971–2018

¹Abdul Basit

^{*2}Moniba Sana

¹Department of Economics, University of Chakwal, Pakistan. ²Department of Economics, University of Chakwal, Pakistan.

^{*2}Assistant Professor, University of Chakwal, Pakistan

[*2moniba.sana@uoc.edu.pk](mailto:moniba.sana@uoc.edu.pk)

Abstract

This research intends to explore the effect of monetary policy on the economic growth of Pakistan using time series annual data from 1971-2018. The variables of interest for the analysis are the key monetary and macroeconomic indicators such as interest rate, exchange rate, total reserves, gross fixed capital formation, inflation, labour force with gross domestic product as the indicator of economic growth. Before applying the ADF approach to investigate both long and short run relationship between the variables, the augmented Data of the Dickey-Fuller unit root test has been used to determine the stationarity properties of the variables. The ARDL bounds test results show that there is a long-run cointegrating relationship between monetary policy variables and economic growth in Pakistan. Results from the long run analysis reveal that interest rate and exchange rate have a statistically significant negative effect on economic growth suggesting that an increase in borrowing costs or appreciation of exchange rate negatively affects investment expenses, the production costs and macroeconomic stability. It indicates that the growth is positively and significantly influenced by gross fixed capital formation, thus underscoring the role of capital formation in achieving sustainable development in the economy. The long-run effect of total reserves, labour force and inflation are statistically insignificant, but the latter negatively affects growth in the short run. The error correction model corroborates a quick adjustment to the long-run equilibrium. The study advocates for a balanced and growth-oriented monetary policy for the monetary authorities, including controlling inflationary pressures, SAR and exchange rates, reducing overall interest rates and coordinating monetary and fiscal policies to engage in investment and sustainable economic growth in Pakistan.

Keywords: Monetary Policy; Economic Growth; Interest Rate; Exchange Rate; Gross Fixed Capital Formation.

Article Details:

Received on 25 Feb, 2026

Accepted on 27 March, 2026

Published on 28 March, 2026

Corresponding Authors*

Moniba Sana

1. INTRODUCTION

Macroeconomic stability and sustainable economic growth are desired by all policy makers across the world. The progression of business cycles through boom-and-bust phases disrupts business activities and economic performance, as a result of different economic shocks. Economies are extremely vulnerable to domestic and foreign shocks; economic policies are crucial tools for correction, stabilization and growth. Among these policy instruments, monetary policy is the most important that affects the cost and availability of money and credit in the economy. The main functions of monetary authority are to ensure price stability and to prevent inflation. But should the central bank create too much money, inflationary pressure could rise and the effectiveness of monetary policy may be compromised (Omodero, 2019). In contrast to passive monetary policy, it is clear that active monetary policy involves the central bank having independent control over the monetary instruments, such as money supply and interest rate. With this control, monetary authority can regulate the inflation, investment, consumption, exchange rate stability, and economic growth. The purpose of monetary policy in achieving economic growth is a topic of debate among economists. According to monetarists, an unexpected expansion of money supply will lead to economic expansion (Jawaid et al., 2011). Keynesians, on the other hand, argue that the impact of money supply on economic growth is minimal (Twinoburyo and Odhiambo, 2017). Some academics endorse the Keynesian approach (Chipote & Palesa, 2014; Kamaan, 2014; Inam & Ime, 2017), claiming that the money supply has little effect on economic growth. Some scholars, however, have noted a link between money supply and economic development (Nouri & Samimi, 2011; Onyeiwu, 2012; Havi & Enu, 2015; Osasohan, 2014; Prasert et al., 2015; Mohamed Aslam, 2016). Overall, the conflicting evidence implies that the relationship between monetary policy and economic growth remains an empirical topic of interest.

Monetary policy is also important in assessing the effectiveness of policy, along with fiscal policy (Mahmood & Sial, 2018). For instance, the effects on the interest rate have fiscal consequences as it affects the cost of public debt servicing. In economies with a high level of public debt, monetary policy is an important tool for policy. An increase in interest rates to curb inflation can further squeeze the national budget, deter investment and lower the employment prospects. Thus, monetary policy is not just a technical instrument to fight against inflation; it also has broader impacts on investment, public finance and economic growth. The autonomy and independence of the central bank are also linked to monetary policy. Monetarists firmly support the Central Bank's independence, arguing that it must be free of budgetary pressure in order to achieve its goals. However, Sim (1994) states that monetary policy is not enough to achieve a stable price level and that fiscal policy, in concert with public expectations, plays a role as well. In several countries, central banks have adopted a policy of interest rates instead of money supply in the implementation of inflation targeting. The implications of inflation targeting, however, vary depending on the level of public debt in the countries. High debt in a country increases the risk of default, and an appreciating of the domestic currency increases the inflationary pressure and reduces the effectiveness of the money supply.

Monetary policy is being fine-tuned with other policies and fiscal measures to support sustainable growth in Pakistan. Its primary concern is the amount of aggregate demand. The economy can work at various levels of GDP and employment depending upon the level of aggregate demand. High inflation has been correlated with excess aggregate demand and unemployment with its lack in Pakistan. Further, inflation in the economy has been double digit from Financial Year 2008 to Financial Year 2012. Money, credit and aggregate demand are

affected by the policy rate and liquidity ratios and investment and consumption decisions depend on the cost and availability of money. The State Bank of Pakistan Act, 1956, lays down the objectives of State Bank of Pakistan. The supervision of the credit and financial system of Pakistan is at the heart of its monetary policy. The State Bank also strives to utilize the productive resources optimally and build the credit system for the nation's benefit. The State Bank keeps an eye on the inflation rates as set by the government so as to ensure monetary stability. It also plays an important role in the smooth functioning of financial markets and the payment system, which is an essential part for financial stability. Stable monetary conditions and price stability also are important for long-term economic growth, as Mishkin (1996) notes. The policy of a country's monetary authority, which involves the regulation of the quantity of money in circulation, typically to promote economic stability and improve economic growth, by altering interest rates. State Bank of Pakistan can implement expansionary, neutral or restrictive monetary policy. The primary objectives of Monetary policy are: Balanced exchange rate, price stability, balance of payments equilibrium, income redistribution, full employment and credit control. There are two types of monetary policy instruments: Direct and Indirect. Direct instruments: liquidity ratios, interest rate controls and credit measures to control bank lending, interest rates, and supply of funds to commercial banks. Indirect instruments are used more often and are used to affect the liquidity of the economy. These involve open market operations, exchange rate management and reserve requirements. These are used to control money supply, exchange rates, inflation and lending rates. From the literature available, it is evident that there is no consensus on the best policy in one economy for economic growth. Ahmad & Malik (2009), Jawaid et al. (2011) and Hussain & Siddiqi (2012) have revealed in Pakistan, monetary policy has been more effective at stimulating economic growth than fiscal policy. Other studies conducted by Khan and Qayyum (2007) show that monetary policy has a higher impact on economic development, and monetary shocks have a greater impact on long-term growth and financial stability than fiscal policy shocks. They also argue that the exchange rate channel is larger than the interest rate channel. However, there are differing views on the right monetary policy stance for Pakistan, and whether it should be expansionary or contractionary to promote economic growth. As a result, this study will look into how monetary policy affected Pakistan's economic growth from 1971 to 2018. It will examine the effects of interest rates, exchange rates, total reserves, gross fixed capital formation, inflation, and labour force on economic growth. The study also attempts to establish the overall pattern of monetary policy over this time period and proposes monetary policy suggestions for boosting the country's growth rate.

2. LITERATURE REVIEW

Money policy has been a subject of study as a significant tool that can be used to impact economic growth, inflation, exchange rate stability and investment patterns. The available empirical research on this, however, is inconclusive on the effectiveness of the monetary policy among countries. This difference in results can be explained by the economic structure differences, monetary policy regimes, periods of data, estimations methods and character of domestic macroeconomic conditions.

With annual time-series data, Sean (2019) tested the effectiveness of a Bayesian Tobit model examine the impact of monetary policy on Cambodian economic growth. According to the study, the exchange rate, inflation had a positive impact on economic growth whereas money supply and interest rate had negative impact on economic growth. Similarly, the findings of Lut and Moolio (2015) in studying the impacts of monetary policy on economic growth in Cambodia were performed using the time series quarterly (Cambodia) data and

employing a multiple regression modelling. Their results revealed that money supply is influential in economic growth and interest rate is not. In the annual time-series data of Ghana and Nigeria, Omodero (2019) employed the ordinary least squares in order to investigate the relationship between the money supply and economic growth. The findings showed that M2 had a negative effect on real GDP in Nigeria, but a positive effect on real GDP in Ghana. On the other hand, broad money supply (M3) had a positive impact on real GDP in Nigeria and a negative impact on real GDP in Ghana. The study also showed there was a positive correlation between credit of the private sector and real GDP in both the countries. The results provide evidence that the effects of monetary indicators can vary even among developing countries. Some studies that investigated monetary policy on interest rates and inflation and exchange rate channels are also few. Based on annual time-series data and the use of the Johansen cointegration technique, Srithilat and Sun (2017) found that of the variables, money supply and inflation had a negative relationship with real GDP in Lao PDR; interest rate and the real exchange rate had a positive relationship with real GDP; the real exchange rate and the real GDP had no relationship. Nguyen and Trinh (2019) examined the Vietnamese economy along the lines of quarterly data of 2000:1 to 2014:4 and an autoregressive distributed lag model. They found that there was a negative long-run relationship between exchange rate volatility and export volume. Agboluaje et al. (2013) used annual time-series data to the error correction model to analyse the effects of the monetary policy on the economic growth in Nigeria and found out that the inflation rate, exchange rate and foreign reserves enhanced economic growth. On the macroeconomic effects of monetary policy, other studies have concentrated on them. Mumtaz (2017) examined how monetary policy impacts income inequality in the United Kingdom through a structural vector autoregressive (SVAR) model, and found that the tighter the monetary policy the more the income inequality would be on the rise. Anumadu et al. (2016) studied how monetary policy affects the economy of Nigeria using a multiple regression model. The research eventually discovered that monetary policy is a good policy tool to enhance the economic growth and unemployment. In Precious and Palesa (2014) the relationship between monetary policy and economic development in South Africa was analyzed in terms of secondary data and Johansen cointegration technique. They concluded that monetary policy measures like the repo rate, exchange rate, money supply, and inflation all contributed to economic growth.

Empirical studies provide inconsistent evidence on the impact of monetary policy on economic growth in Pakistan. Using quarterly time-series data, 1972 to 2011 and ordinary least squares, Anwar et al. (2016) discovered that tight monetary policy was inappropriate to enhance the economic growth of Pakistan. Now, Gul et al. (2012) conducted a research on monetary policy instruments and economic development of Pakistan based on the annual data during the years 1995 to 2010 and employed the ordinary least squares technique. Their findings indicated that the strict monetary policy was not effective in encouraging economic growth, largely due to the fact that interest rate had a negative impact on economic growth. The research was also able to propose that the loose monetary policy through the money supply channel was positive to the economic growth, whereas the exchange rate channel was negative towards GDP growth. Khan and Qayyum (2007) estimated the monetary policy shocks in Pakistan using the Monetary Condition Index of Bernanke and Mihov (1998). The analysis was founded on the temporary movements of the exchange rates and interest rates in the base year. They discovered that the Monetary Condition Index was a pertinent measure of output and inflation especially in the absence of supply shocks. The analysis also found that the exchange rate regulation played a larger role compared to the interest rate regulation and supply shocks

were still common in Pakistan. The article by Tahir et al. (2015) has explored the relationship between exchange rate fluctuation and inflation in Pakistan. It identified the short and long run relationship between the exchange rate volatility and inflation using monthly data between July 2000 and June 2009 using the Johansen cointegration and Vector Error Correction Model methods. The results showed that hyperinflation and greater volatility of the exchange rate were caused by an increase in the money supply and an increase in interest rates. Ali et al. (2015) also studied the adverse consequences of macroeconomic instability on Pakistan's GDP. Based on the proxy variables of macroeconomic instability, the study contended that Pakistan's macroeconomic environment needs to be stable to reach the desired level of GDP, which can be done by using the indicators of inflation rate, unemployment rate and trade deficit. Through secondary data between 1976 and 2012 and ARDL, Saeed and Ali, (2013) investigated the impact of trade, monetary, and fiscal policies on Pakistan's economic growth. According to the findings, fiscal policy had little impact on economic growth, whereas trade and monetary policies did. Shabbir et al., (2021) conducted a time series analysis of investment and economic growth in Pakistan from 1980 to 2017, using the ARDL model. They established domestic investment positively and significantly affected Pakistan's economy while foreign private investment negatively and insignificantly affected Pakistan's economy. The short run dynamics also implied that the growth rate had strong and positive relationship with both the private domestic and foreign investments.

The general conclusion that can be drawn out of the literature that has been examined is that evidence exists that monetary policy is a significant factor in economic growth but its effectiveness varies by economy and its policy channels. Internationally, there have been divergent evidence in terms of money supply, interest rate, inflation, exchange rate and external reserves. The Pakistan specific studies also yield some results that include the following: monetary policy does have an effect on growth; whether it has to be tight or loose remains a question. Others are studies that are based on the channel of money supply and others on the channel of exchange rate. Therefore, further empirical test is necessary to assess the role of monetary policy tools in the context of economic growth in Pakistan in the long-term. This study fills the gap in the literature as it investigates the effect of interest rate, exchange rate, total reserves, gross fixed capital formation, inflation and labour force on economic growth of Pakistan during 1971-2018 by applying the ARDL approach.

3. THEORETICAL FRAMEWORK AND RESEARCH METHODOLOGY

This section describes the theory, data sources, empirical model, and estimating approach used to explain the impact of monetary policy on economic growth in Pakistan. The study concentrates on the economic determinants of monetary policy, which have a significant impact on economic growth, such as interest rate, exchange rate, total reserves, gross fixed capital formation, inflation and labour force. Empirical research is conducted using annual time series data from 1971 to 2018.

3.1 Theoretical Framework

The macroeconomic level policies are formulated to ensure the attainment of the economic growth, job creation, price stability, financial stability and external balance. One of the most important aspects of this process is the monetary policy since the central bank has a direct or indirect impact on the availability of credit, interest rates and cost of credit through the control of the money supply and other monetary instruments. They are employed to achieve the economic objectives such as: positive current account, sustainable economic growth, Price and exchange rate stability (Friedman, 1968; Matthews & Booth, 2012; Leeper et al., 1996). This research work uses the theoretical approach related to the monetary transmission mechanism.

The monetary policy may be affected in a number of ways on the economic prosperity of a country and the stability of inflation (Taylor, 1995). The economic theory suggests that monetary easing boosts output via interest rate, wealth and income, cost of capital, exchange rate, credit and asset price channels. The channels are expansionist, meaning that they impact on aggregate demand, and hence economic growth (Bernanke & Gertler, 1995; Mishkin, 1996). The interest rate channel is one of the primary channels for monetary transmission. According to Taylor (1995), the interest rates will rise and individuals and businesses will have to pay increased interest rates to borrow money. This brings a downturn in the demand for investment goods and consumer durables. The rise in the interest rates will result in an increase in the consumption of money due to the fact that the more people save, the less they borrow. Reduction in aggregate demand might lead to a reduction in the rate of inflation, but may also lead to a reduction in economic output and economic growth. Therefore, the interest rate policy has an impact on the price stability and growth performance.

The exchange rate channel is another significant channel through which monetary policy affects aggregate demand and output. Monetary policy will have an impact on exchange rates, affecting trade, current account balance, and net exports. The rise in interest rate can perhaps be able to draw the inflows of capital and appreciate the exchange rate. It can lead to a decrease in net exports and aggregate demand, higher export prices and decreased import prices. Therefore, exchange rates volatility is a key element of monetary transmission especially to an open economy such as Pakistan. This study is in support of the monetarist point of view. Monetarists are interested in the changes in output in the short-run and in inflation and the effects of money supply on the short-run changes. The theory that relates the quantity of money, velocity of money, price level and output is known as the quantity theory of money:

$$MV = PY$$

M is the money supply, V is the velocity of money, P is the price level and Y is the national income/output. According to this view, a variation in the money supply can affect the price levels or the level of production. Friedman further explained that inflation is a monetary problem and that changes in money supply in the short-run influence the nominal and real income. Hence, monetary policy instruments are likely to have a significant influence on economic growth.

3.2 Data and Data Sources

This research paper will discuss how monetary policy affects the economic growth in Pakistan. The explanatory variables include interest rate, exchange rate, total reserves, gross fixed capital formation, inflation and labour force and the dependent variable is Gross Domestic Product (GDP). The data were sourced to a wide range of sources such as Economic Survey of Pakistan, Ministry of Finance, State Bank of Pakistan and World Development Indicators and were collected as annual time-series data in the years 1971-2018.

Table 3.1: Variables, Unit and Data Sources

| Variable | Symbol | Source of Data | Unit |
|-------------------------------|--------|---|--------|
| Gross Domestic Product | GDP | World Development Indicators | Ln GDP |
| Gross Fixed Capital Formation | K | World Development Indicators | Ln K |
| Interest Rate | IR | State Bank of Pakistan and World Development Indicators | Ln IR |
| Exchange Rate | ER | State Bank of Pakistan and World Development Indicators | Ln ER |

| | | Development Indicators | |
|----------------|-----|------------------------------|--------|
| Total Reserves | TR | World Development Indicators | Ln TR |
| Inflation | INF | World Development Indicators | Ln INF |
| Labour Force | LF | World Development Indicators | Ln LF |

Source: Author's own compilation.

3.3 Empirical Framework

The study uses a monetary policy model to examine the impact of monetary policy instruments on economic growth. The functional form of the model is specified as:

$$GDP = f(MP)$$

where monetary policy is represented by interest rate, exchange rate, total reserves, gross fixed capital formation, inflation and labour force. Therefore, the model can be written as:

$$MP = IR + ER + TR + K + INF + LF$$

The empirical model is expressed as:

$$GDP_t = f(IR_t + ER_t + TR_t + K_t + INF_t + LF_t)$$

The econometric form of the model is:

$$GDP_t = \beta_0 + \beta_1 IR_t + \beta_2 ER_t + \beta_3 TR_t + \beta_4 K_t + \beta_5 INF_t + \beta_6 LF_t + \mu_t$$

Taking the logarithmic form, the model becomes:

$$\ln GDP_t = \beta_0 + \beta_1 \ln IR_t + \beta_2 \ln ER_t + \beta_3 \ln TR_t + \beta_4 \ln K_t + \beta_5 \ln INF_t + \beta_6 \ln LF_t + \mu_t$$

In this model, β_0 represents the intercept, while $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ and β_6 represent the coefficients of the explanatory variables. The term μ_t represents the error term, and t represents the time period. The suggested model includes monetary-policy variables such as interest rate, exchange rate, total reserves, gross fixed capital creation, inflation, and labour force.

3.4 Estimation Technique

The stationarity characteristics of the variables must be analyzed prior to estimating the model. The non-stationary nature of time-series data can cause spurious regression results. Hence, the Augmented Dickey-Fuller (ADF) unit root test is used to check for the stationarity of variables at level and at first difference.

3.4.1 Unit Root Test

Testing whether a time series follows a unit root process is an important step in time-series econometrics. The Dickey-Fuller test is one of the most frequently used tests for unit root. However, because the error term may not always be random noise, the Augmented Dickey-Fuller test extends the basic Dickey-Fuller approach by adding lagged terms of the dependent variable to address autocorrelation. The appropriate lag length is selected through criteria such as the Akaike Information Criterion, Schwarz Bayesian Criterion or other lag selection procedures.

3.4.2 ARDL Approach to Cointegration

The long-run relationship between the variables is examined after testing the stationarity of the variables using the Autoregressive Distributed Lag approach. Pesaran and Shin (1995) and Pesaran, Shin and Smith (1996) developed the ARDL technique to study the relationship of variables of interest. For this reason this approach is appropriate for the present study in three main respects. One of the first reasons is that the bound testing procedure is relatively easy to implement, compared to other cointegration methods like the Johansen and Juselius methods. Secondly, the ARDL method is applicable to the cases of $I(0)$, $I(1)$ or mixed integration of the variables. Thirdly, the ARDL method is more suitable in small sample or limited sample. The ARDL method is not applicable, though, when any variable is integrated at order $I(2)$. There are two stages to the ARDL procedure. In the first step, the F-statistic is used to determine if

the variables are related in the long run. When calculated F-statistic is greater than the upper critical value, the null hypothesis of no long-run relationship will be rejected. If the calculated f-statistic is less than the lower bound critical value, then the null hypothesis is accepted. If the statistic is within the lower and upper bounds, then the result is inconclusive. Once the long-run relationship is confirmed in the second stage, the long-run coefficients and the short-run error correction model is estimated.

3.4.3 Error Correction Mechanism

The Error Correction Mechanism is used to examine short-run dynamics and the speed of adjustment toward long-run equilibrium. The error correction term shows how quickly disequilibrium in the short run is corrected in the following period. A negative and statistically significant error correction term confirms convergence toward long-run equilibrium. The ECM is useful because it provides meaningful economic interpretation, addresses the problem of spurious regression by using first differences, and allows the researcher to examine both short-run adjustments and long-run relationships. Since the disequilibrium error term is stationary when variables are cointegrated, the ECM becomes an important method for analysing how monetary policy variables adjust toward equilibrium with economic growth.

4. RESULTS AND DISCUSSION

This section shows the empirical evidence that exists on the relationship between the monetary policy and economic growth in the case of Pakistan. Augmented Dickey-Fuller (ADF) test was used to verify the stationarity of the variables since time-series analysis might be invalid in case the variables are non-stationary. ARDL bound testing was then applied to determine the relationship between the variables in the long-run with the order of integration confirmed.

4.1 Unit Root Test Results

The results of the test on the ADF are presented in Table 4.1. The results show that there are variables that are at level stationary, and the rest are at first difference stationary. The rest of the variables are held constant at level, interest rate, exchange rate, total reserves and gross fixed capital formation are held constant at first difference. The ARDL method is appropriate to be further estimated as the variables are combined at both I(0) and I(1).

Table 4.1: Estimated Results of Unit Root Test

| Variable | Level | First Difference |
|----------|---------|------------------|
| LIR | 0.7303 | 0.0006** |
| LER | 0.9070 | 0.0000** |
| LTR | 0.1882 | 0.0000** |
| LK | 0.3009 | 0.0001** |
| LLF | 0.0004* | 0.0000** |
| LINF | 0.0465* | 0.0000** |

Note: * and ** indicate stationarity at level and first difference, respectively.

Source: Author's calculations.

4.2 Lag Length Selection

After identifying the stationarity properties of the variables, the optimum lag length was selected for ARDL estimation and Table 4.2 describes the results. The lag selection criteria indicate that lag 1 is selected by LR, FPE, SC and HQ, while AIC suggests lag 4. On the basis of the relevant selection criteria, the optimum lag structure was used for the ARDL bound test and subsequent estimation.



Table 4.2: Optimum Lag Selection Criteria

| Lag | LagL | LR | FPE | AIC | SC | HQ |
|-----|----------|-----------|-----------|------------|------------|------------|
| 0 | 2.192252 | NA | 2.92e-09 | 0.213678 | 0.494714 | 0.318445 |
| 1 | 327.4331 | 534.8406* | 1.40e-14* | -12.06370 | -9.815404* | -11.22555* |
| 2 | 372.9718 | 60.71815 | 1.91e-14 | -11.90986 | -7.694310 | -10.33834 |
| 3 | 419.8544 | 47.92446 | 3.30e-14 | -11.81575 | -5.632950 | -9.510864 |
| 4 | 488.9243 | 49.11636 | 3.90e-14 | -12.70775* | -4.557690 | -9.669486 |

Note: * indicates optimum lag length selected by the respective criterion.

Source: Author’s calculations.

4.3 ARDL Bound Test Results

The ARDL bound test was used to test the presence of long run relationship between the monetary policy variables and economic growth. The results are presented in Table 4.3. The calculated value of the F-statistic is 11.67154 which exceeds the critical values at 10%, 5%, 2.5% and 1% level of significance. So, the null hypothesis that there is no long run relationship is rejected. The results validate the co-integration of economic growth, interest rate, exchange rate, total reserves, gross fixed capital formation, labour force and inflation in Pakistan in the long run.

Table 4.3: Empirical Results of ARDL Bound Test

| Test Statistic | Value | K |
|----------------|----------|---|
| F-statistic | 11.67154 | 6 |

| Significance Level | I(0) Bound | I(1) Bound |
|--------------------|------------|------------|
| 10% | 2.12 | 3.23 |
| 5% | 2.45 | 3.61 |
| 2.5% | 2.75 | 3.99 |
| 1% | 3.15 | 4.43 |

Source: Author’s calculations.

4.4 Long-Run ARDL Results

The ARDL results of the long run are in Table 4.4. The results reveal that the interest rate negatively and significantly influences economic growth at the 1% level. The coefficient of interest rate is -0.578341 that is, an increase in the interest rate by 1 per cent reduces the economic growth by approximately 0.58 per cent. The conclusion shows that it is true that the higher the rates of interest charged the more costly it becomes to borrow funds and hence result in worse investment and growth. It is in line with the results provided by Sean (2019) and Imoisi (2019), but is not consistent with Falade and Folorunso (2015) and Precious and Palesa (2014). In addition, exchange rate has both a negative and significant impact on economic growth, at 1% level. The exchange rate coefficient stands at -1.092564, that is, when the exchange rate increases by one percent there are chances that the economic growth will decrease by 1.09 percent. This revelation denotes that there are pressures on the imports, costs of production, as well as macroeconomic stability as the exchange rate is devalued. It is supported by Alavinasab (2016) and Agboluaje et al. (2013) but not in line with Precious and Palesa (2014) and Noman and Kundri (2015). Total reserves are negatively correlated with examining the growth of the economy but the correlation is not significant. The coefficient of total reserves = -0.055597 implying that the total reserves do not affect growth in the long run much in this model. This might be attributed to the imbalances in the external sector, foreign borrowing, devaluation of the currency, and contribution of export to GDP. The gross fixed capital formation has a statistically positive investment on the growth of the economy at 5%

level. The coefficient stands at 0.813762 implying that an increase in capital formation by 1% will result in a growth in the economy by 0.81 percent. The result restates the importance of the capital stock and investments in the development of economy. This coincides with Amal and Siham (2017), Idris and Bakar(2017) and Sriyalatha et al. (2019). There is a positive (but statistically insignificant) influence of labour force on the growth of the economy. Long term, also impact of inflation is negative but non-significant. The coefficient of inflation is negative yet not significant to indicate that inflation is a good explanation of long-run growth in the predicted monetary policy model.

Table 4.4: Long-Run ARDL Analysis

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|----------|-------------|------------|-------------|----------|
| LIR | -0.578341 | 0.120843 | -4.785867 | 0.0000* |
| LER | -1.092564 | 0.166303 | -6.569713 | 0.0000* |
| LTR | -0.055597 | 0.067423 | -0.824596 | 0.4153 |
| LK | 0.813762 | 0.251648 | 3.233734 | 0.0027** |
| LLF | 0.226467 | 0.247908 | 0.913511 | 0.3674 |
| LINF | -0.503706 | 0.381768 | -1.319401 | 0.1959 |
| C | -12.706064 | 5.114023 | -2.484554 | 0.0181 |

Note: * and ** indicate significance at 1% and 5% levels, respectively. Explanatory variables are used in logarithmic form.

Source: Author's calculations.

4.5 Short-Run ARDL Results

Short run ARDL results are depicted in Table 4.5. CointEq = -1 is negative, and statistically significant which means that the trend is towards long term equilibrium. The coefficient of CointEq(-1) is Negative (-1.546355) indicating that the short run disequilibrium is corrected rapidly. The equilibrium is being over-corrected as the coefficient is more negative than positive. Short run interest rate has a negative correlation but statistically insignificant with the economic growth. The impact of exchange rate is bad and statistically significant which implies that exchange rate plays a huge impact in terms of short run growth performance when it comes to the case of Pakistan. It similarly has an insignificant adverse impact on total reserves. In the short run the current level of gross fixed capital formation has a positive and significant impact on the economic growth but one-lag level of gross fixed capital formation has a negative and significant impact on the economic growth. This suggests that a capital formation process is a significant dynamic interdependence with growth. The labour force positively (but insignificantly) influences the economy in the short term, whereas the inflation has a negative and statistically significant influence on economic growth in the short term. The implication of this observation can be established as inflationary pressure adversely affects short-run levels of growth.

Table 4.5: Short-Run ARDL Analysis

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|--------------|-------------|------------|-------------|--------|
| D(LGDPG(-1)) | 0.220320 | 0.102496 | 2.149554 | 0.0388 |
| D(LIR) | -0.065942 | 0.445406 | -0.148049 | 0.8832 |
| D(LER) | -1.689492 | 0.374826 | -4.507403 | 0.0001 |
| D(LTR) | -0.085973 | 0.104381 | -0.823646 | 0.4159 |
| D(LK) | 2.809671 | 0.740371 | 3.794952 | 0.0006 |
| D(LK(-1)) | -1.162459 | 0.550564 | -2.111399 | 0.0422 |
| D(LLF) | 0.350198 | 0.379418 | 0.922989 | 0.3625 |
| D(LINF) | -4.966048 | 1.494872 | -3.322055 | 0.0021 |

| | | | | |
|-------------|-----------|----------|-----------|--------|
| CointEq(-1) | -1.546355 | 0.170726 | -9.057523 | 0.0000 |
|-------------|-----------|----------|-----------|--------|

Source: Author's calculations.

4.6 Diagnostic and Stability Tests

Diagnostic tests were applied to examine the reliability of the estimated model. The results are presented in Table 4.6. The heteroskedasticity test has an F-statistic of 1.634533 with a probability value of 0.2181, indicating that the model does not suffer from heteroskedasticity. Similarly, the serial correlation test has an F-statistic of 0.216296 with a probability value of 0.8067, confirming that there is no serial correlation in the model.

Table 4.6: Diagnostic Test Results

| Diagnostic Test | F-Statistic |
|--------------------|-------------------|
| Heteroskedasticity | 1.634533 (0.2181) |
| Serial Correlation | 0.216296 (0.8067) |

Source: Author's calculations.

The stability of the model was then checked by the CUSUM and CUSUMSQ tests. As can be seen from the CUSUM graph, the model is stable as the plotted line does not cross the critical limits. The CUSUMSQ graph also stays within the boundaries of the critical region, further ensuring the stability of the regression equation estimated. The results show that the coefficients are robustly stable during the study period.

5. CONCLUSION AND POLICY RECOMMENDATIONS

The impact of monetary policy on economic growth in Pakistan has been studied using annual data from 1971 to 2018. The empirical results show that the role of monetary policy in Pakistan is important in explaining the economic growth of the country. Interest rate is an important financial tool which negatively and significantly affects economic growth. This finding indicates that a higher interest rate raises the price of borrowing, and therefore slows down investment and consumption, thereby impacting on economic growth. The discovery further supports the monetarist view that monetary policy tools can influence output and economic activity in a variety of ways. The exchange rate also has a negative and significant relationship with economic growth, suggesting that exchange rate volatility can put pressure on production costs, imports, investment decisions and macroeconomic stability in general. Total reserves are negatively related to economic growth., but it is not statistically significant. It suggests that when the external sector is not stable, exports are not improving and there is no control over borrowing and exchange rates, reserves will not be able to expand. The positive and significant correlation of gross fixed capital formation and economic growth, however, again underscores its critical role in promoting long term economic growth, while supporting the idea that investment and capital stock are important in long term economic growth. There is a positive (although not significant) relationship between labour force and economic growth, and There is a negative association between inflation and economic growth, primarily in the short term.

Thus, from the empirical perspective, the study establishes that the influence of monetary policy in Pakistan is mixed. The two salient ways through which the monetary policy affects the growth are interest rate and exchange rate. The findings also suggest that inflationary pressure, the movement of exchange rate and the policy of interest rate must be managed well. By addressing inflation, high borrowing rate and trade imbalance, policy makers can create a holistic policy strategy to achieve sustainable growth in the economy while taking into account the effects of interest rate, exchange rate, total reserves, and capital stock. Monetary policy in Pakistan can pave the way for a more resilient financial future through stability and growth. Based on empirical findings, total reserves, interest rate and exchange rates are important factors determining price instability and the growth performance in

Pakistan, especially in the short run. Thus, financial policies must emphasize on the positive effects on economic growth and monetary authorities should do so. The State Bank of Pakistan should ease the pressure on interest rates and adopt an expansionary monetary policy to encourage borrowings and investments and consumer spending. There also need to be measures in place to ensure financial stability, low interest rates need to be reduced and the risks need to be reduced, and there needs to be a promotion of responsible and beneficial lending practices.

Monetary authorities should stabilize and control exchange rate movements to minimize the negative impact of exchange rate instability on economic growth. This can be done by intervening in the currency markets in time and by using the right monetary policy instruments. It is crucial for investment to take place in a stable and predictable exchange rate environment, for external trade as well as for long-term economic growth. In this respect, cooperation between countries is also essential to solve the economic imbalances prevailing in the world and to lay the foundations for sustainable growth. The short run is the time period in which monetary policy should be expansionary because investment and interest rate have inverse relationship. A decrease in the rate of interest can increase investment and aggregate demand. But this expansionary policy would be pursued with prudence, so as to not exceed the bounds of a reasonable level of inflation. While in the short run, the inflation threshold can be moved around by 8%-9%, in the long run there are limits and monetary policy is to be coordinated and applied in the coordination of the Ministry of Finance. There should be a coordinated strategy, in which the Ministry of Finance and monetary authorities both support the accommodative monetary policy, e.g. lower interest rates, and the fiscal support, e.g. targeted tax relief or capital expenditure. This two-for-one combination can help maintain a healthy interest rate climate for borrowing and investing, and also stimulate consumer spending and the economy. Hence, there is a need for fiscal and monetary authorities to coordinate in order to achieve price stability, investment growth and sustainable economic activity. The central bank should also give importance to a supportive monetary policy that would keep borrowing rates under control, and ensure that inflation and interest rates are kept under efficient control. Fiscal support for strategic infrastructure projects can also make a positive role to the economic growth in the long term by generating capital to key sectors. The integrated monetary and fiscal policies can result in fruitful effects in both short term and long term of the country's economic growth.

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