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The Relative Effectiveness of Fiscal and Monetary Policies on the Core and Headline Inflation: Empirical Evidence from Pakistan

ABSTRACT

The study at hands analyzes the relative effectiveness of fiscal and monetary policies on inflation in Pakistan. We have evaluated data spanning from 1980 to 2020. For empirical analysis, we have classified inflation into two categories; "Headline inflation" and "Core inflation" and the results are examined for both long run and short run time horizon. Our study utilizes total debt service, trade openness as representative of fiscal while money supply, exchange rate and remittance inflows as indicators of monetary policy. The empirical findings suggest that government debt service and money supply, both are affecting headline inflation in the long run. Nevertheless, monetary policy can be claimed to be relatively more successful determinant of long term headline inflation as compared to fiscal policy, as per determined coefficients of significant variables. The exchange rate, on the other hand, significantly influences headline inflation in the short run. The long and short run relative effectiveness of monetary policy is also evident as per our findings in terms of core inflation. The Money supply and remittance inflow emerge as statistically significant representatives of monetary policy influencing core inflation, The overall findings suggests monetary policy to be relatively more effective in terms of its impact on both Headline and Core Inflation in Pakistan.

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1. INTRODUCTION

The acceptance and popularity of any government depends on its performance and the actions taken in the benefit of general public. Individuals and Public often consider inflation rate as a key indicator for assessing policy effectiveness. The prime objective of macroeconomic policy is to attain and sustain both economic growth and price stability. Price stability is a desirable feature for every segment of the economy and constitutes a key objective of stabilization economic policies. The escalation of inflation rate has adverse effects, disrupting economic activities as a whole. Consequently, inflation and the rising price levels have emerged as significant concerns, particularly in the context of Pakistan in recent years. The surge in average price level over recent years has not only gathered the focus of policymakers but has also raised public awareness. Price stability holds a crucial position in influencing output and employment, serving as a fundamental driver of economic activities. Macroeconomic policies are pivotal in shaping the inflation rate and significantly contribute to the allocation and efficient use of scarce resources.

Hence, macroeconomic policies are a powerful tool that can be used to bring changes in resource allocation. Optimal allocation of resources relies heavily on price determination and adjustments, which in turn is crucial from perspective of economic efficiency. Current prices provide basic information regarding economic activity to economic agents while on the other side current prices also influence the economic activities and decisions of economic agents through demand and supply. Being perfectly aware and acknowledged with the role of prices play within the entire economic framework, John Maynard Keynes devoted a complete chapter in "The General Theory of Employment, Interest and Money" to the examination of price theory. Keynes believes "So long as there is unemployment, employment will change in the same proportion as the quantity of money; and when there is full employment, prices will change in the same proportion as the quantity of money" Keynes (1936). "When a further increase in the quantity of effective demand produces no further increase in output and entirely spends itself on an increase in the cost-unit fully proportionate to the increase in effective demand, we have reached a condition which might be appropriately designated as one of true inflation" Keynes (1936).

Debate and discussion on the theoretical issues regarding efficacy of fiscal and monetary policy is not new theme in the economic literature; its origin traces back to the Great Depression of 1929. This historic economic shock profoundly impacted countries globally, prompting discussions on the efficacy of monetary policy, which proved unsuccessful in reigniting economic activities during that critical period. The collapse of monetary policy and classical economy system animated Keynes to develop a doctrine. Keynes (1936) argued that the government should intervene through public investment to achieve full employment level in the long run. However, on the other side, Friedman (1960) claimed that reduction in money supply by Federal Reserve Bank was the key determinant of great depression. He argued that monetary policy remains the most effective approach to generate economic activities. Hence, Keynesians versus monetarist debate on the comparative strengths of the two policies lays a strong foundation to the subject matter of this study.

The relative effectiveness of fiscal and monetary policy for determination of inflation and price level is an ongoing and debatable issue in economic literature. Bulk of empirical studies has been conducted on this theme, but mixed results have been found regarding the relative role played by these policies. Two revolutionary works on the effectiveness of these policies were carried out in this regard, which includes work done by, Friedman and Meiselman (1963) and the second one by Andersen and Jordan (1968). Friedman and Meiselman (1963) asserted that money supply holds considerable importance as a fundamental variable in monetary policy and plays vital role in influencing economic activities. Andersen and Jordan (1968) examined the success of fiscal and monetary policy and argued that monetary policy as compared to fiscal policy is relatively more efficient in escalating economic activities. Bulk of empirical

and theoretical work in 1980's, supported and endorsed the superiority of monetary policy over fiscal policy, however few studies including Darrat (1984) and Latif and Chowdury (1998) claimed the opposite.

This paper attempts to reassess the debate of relative effectiveness of fiscal and monetary policy for inflation particularly focusing on Pakistan's economy. Earlier work on the similar themes has approached the subject matter by considering the overall inflation. Our study instead categorizes inflation into two dimensions: Headline and Core Inflation to get a more in-depth insight of the issue. Each type of inflation offers a distinct and unique aspect for policy analysis, as policies often objectively aims at achieving different things. For example; it is essential to consider headline inflation to evaluate purchasing power across different time frames. This applies to various aspects such as wages, wealth, rate of return, government transfers etc; as these factors are influenced by an aggregate measure of inflation. Hence, considering core inflation in the policy framework to adjust household income, for instance, would not be practical, given that about one-quarter of average household expenditures is attributed to food and energy consumption. Similarly, government programs are typically based on headline inflation.

However, policymakers often favor and prefer to use core inflation as a measure because it provides valuable insights into the future direction of general inflation. Consequently, current core inflation data can offer better information about future headline inflation than the current headline data itself. Headline inflation, influenced by the volatility of foods and energy prices, tends to lack robust predictive power over short periods. Additionally, their concern extends to inflationary expectations, where a rising core rate might be a more reliable indicator than a rising headline rates that inflation expectations are on the rise. This classification is also important because monetary policy and fiscal policy may have its own distinct objectives as per nature of inflation. In this contest, this paper categorizes inflation into two main types: headline and core inflation.

The primary objective of this paper is to investigate the relatively effectiveness of macroeconomic policies, specifically fiscal and monetary policies, on inflation. The approach we have followed to meet this objective involves several key aspects. Firstly, the dependent variable, inflation, is classified into headline inflation and core inflation. Secondly, the paper explores the relative effectiveness of monetary and fiscal policies over both the long run and short run. Thirdly, the analysis incorporates and specifies various representative variables on the monetary side, such as money supply, exchange rate and remittance inflow, as well as on the fiscal side, including total debt service, trade openness. Therefore, the segmented approach taken to analyze the comparative effectiveness of monetary and fiscal policies on inflation level in the case of Pakistan is a meaningful contribution to the existing literature.

1.2 Fiscal policy in Pakistan

Pakistan is grappling with political instability, a high fiscal deficit, rapid population growth, and low levels of direct investment. The government heavily relies on domestic and external borrowing to meet its budget requirements, exacerbating the country's debt burden. Economic mismanagement has led to a decline in productivity and economic growth in recent years. In response, the government passed the Fiscal Responsibility and Debt Limitations (FRDL) Act in 2005 to ensure prudent fiscal resource utilization. Efforts to increase tax collection and reduce the fiscal deficit have impacted long-term economic growth. Fiscal performance has varied over the decades, with improvement seen in the early 1990s, followed by a downturn from 1996 to 1998. Subsequently, there was significant improvement until 2004, when the budget deficit reached its lowest level at 2.3% of GDP. However, poor fiscal management led to a rise in the deficit to 7.6% of GDP in 2008. In Pakistan, reducing inflation necessitates addressing structural deficiencies in fiscal policy. Given the country's substantial debt and deficits, a robust fiscal-monetary policy approach is essential to curb inflation, especially as the recent spike is linked to the significant fiscal expansion during the Covid-19 recession. Thus, correcting fiscal policy is crucial for

inflation control, with Pakistan requiring a recalibration due to the complex nature of both conventional and unconventional inflation it faces.

1.3 Monetary policy in Pakistan

The State Bank of Pakistan plays central role in managing inflation through managing money supply growth, considering its impact on economic growth. Money supply, influenced by components like net domestic assets and net foreign assets, affects price dynamics including output and input prices. Net domestic assets reflect bank credit to the government and private sector, while net foreign assets indicate the balance of payments trend. Declining net foreign assets negatively impact the balance of payments and exchange rate, but money supply growth can be sustained through net domestic assets. Pakistan has a history of high inflation and interest rates, emphasizing the need for stable monetary policy to enhance economic development. Such policy should foster an environment of certainty to attract both domestic and foreign investors, promoting economic growth. Encouraging efficient monetary policy measures for inflation stability and attractive interest rates can contribute to economic growth. Favorable interest rates are also essential in the currency market for both international and domestic investments, thereby enhancing economic growth.

2. EMPIRICAL INSIGHTS

The role of macroeconomic policy in influencing inflation rate has been a subject of extensive debate in economic literature. Monetarists emphasize the active role of monetary policy, whereas Keynesians advocate for the efficacy of fiscal policy. Classical economists describe inflation as the uncontrolled and excessive growth in the supply of money. The classical theory of inflation states the determination of aggregate inflation level through money demand and money supply; therefore, this is also called the quantity theory of money, (Ireland, 2014). Monetarist “only money matters”, believe that inflation is primarily a result of monetary factors in all circumstances Friedman & Meiselman (1963).

Smith (1956) analyzes the comparative strengths of fiscal and monetary policies and finds that the major supremacy of monetary policy over fiscal policy lies in administrative flexibility. Monetary policy can be reversed on a moment notice while fiscal policy, much more unmanageable to bring into use and implement immediately. During periods of high inflation, fiscal policy can be more effective. Governments can address inflationary pressures by enacting fiscal contraction measures such as raising taxes or reducing public expenditure. When interest rates are already low, monetary policy may struggle to rein in inflation. Hence, fiscal measures have power effects, once initiated and direct impact on the economy while, the monetary policy have indirect, relatively slow and weak impact at times of high inflation. The exploration of exact reasons and explicit causes for variations in the inflation is a dynamic research theme, which discloses disagreements prevailing in policy debates regarding determinants of inflation rate. In policy perspective, some studies have confirmed a strong association between inflation and money supply and favored monetary policy for inflation control and price stability for different countries. (Bozkurt, 2014; Raji et al., 2014; Nikolaos & Constantinos, 2013; Gali, 2018). Whereas, some others studies found the significant and strong consequences of fiscal policy variables, especially government spending and budget deficit on inflation (Fakher, 2016; Bukhari & Yusof, 2014; Darrat, 1984).

Ahmed et al. (2015) analyze the influence and impact of macroeconomic policies on price level in Bangladesh. The policies which are investigated include fiscal, monetary and trade policies. Utilizing the data spanning from 1981 to 2011 and employing autoregressive distributed lag model, the research finds that fiscal policy exerts a notable impact on both short-term and long-term price levels. The monetary policy affects the price level only in the short-term while in the long-term monetary policy seems ineffective.

Ahmed et al. (2014) analyze the factors affecting inflation in Pakistan in short-run and long-run. They have used time-series data from 1973 to 2013 and used the Johansen Co-integration technique for the empirical result. The result of this research shows that exchange rate, government borrowing, growth of money supply, indirect taxes are the important determinants of inflation rate. Furthermore, the result shows that government borrowing, indirect taxes have a direct relationship with the consumer price index, whereas exchange rate and import price index are also positively related with the consumer price index. The result settles in favor of both policies (fiscal and monetary) having their due relevance for affecting inflation. In a recent study, Asandului et al. (2021) evaluate the asymmetric effect of fiscal policy on inflation and economic activity and report that fiscal policy influences inflation and economic activity negatively in the short run. Similar results have been found in a study by Jørgensen and Ravn (2022), which reports indirect response of prices against positive shock in government spending.

Akram et al. (2011) investigated the relative influence of monetary and fiscal policies on price level determination in Pakistan. They examined domestic debt, fiscal deficit, money supply, and exchange rate variables using granger causality, VAR, and impulse response function techniques. Their findings indicated that both policies exert a significant impact on the price level, with fiscal policy demonstrating stronger direct and indirect effects. This conclusion aligns with the findings of a previous study by Javid et al. (2008). Utilizing annual data from 1973 to 2012 sourced from the Pakistan Economic Survey and the State Bank of Pakistan, the analysis revealed that 15.2% of price variation is explained by money supply, 14.62% by exchange rate, 14.3% by fiscal deficit, and 15.6% by domestic debt, while the remaining 40.2% is attributed to inflationary expectation.

Bashir et al. (2011) examine the determinants of consumer price index using Johansen Co-integration and Vector Error Correction estimates for both the long-run and short-run results. The study concludes that the consumer price index have positively association with money supply, GDP and government expenditure while government revenue have negatively correlated with the consumer price index.

Jongwanich & Park (2008) analyze the relative significance and importance of various sources of inflation and also examine the role of external price shock in inflation determination in developing Asia. Results of the study reveal that inflationary expectations and excess aggregate demand are two crucial determinants of inflation accounting for about 60% of Asia's inflation. Whereas, external prices shock have been found as insignificant and explained less than 30% inflation in Asia. Moreover, monetary policy has been found dominant and influential tool against inflation in developing Asia. However, monetary policy has been reported as less successful against cost-push inflation while found effective against demand-pull inflation. Exchange rate is nevertheless less important and has been explored as significant determinant of inflation.

Lima and Dash (2021) investigated macroeconomic policy impacts on inflation in Cambodia. They discovered several key findings. They observed a negative relationship between exchange rates and public spending with consumer prices, while money supply has a positive effect on consumer prices over the long term. Furthermore, they noted that public spending growth significantly influenced inflation rates in the short term, whereas, broad money has no short term impact on inflation rates. Their findings highlighted the importance of exchange rates, public spending expenditure and broad money in shaping inflation in Cambodia. The researchers concluded that fiscal policy demonstrated greater effectiveness and played a significant role in affecting short term inflation rates, while monetary policy was more effective and impactful on long term inflation rates.

Naikoo et al. (2021) analyzed the impact of monetary policy on housing prices in India. Monthly data was used covering period from January 2009 to December 2018 and Autoregressive Distributive Lag (ARDL) techniques was employed for estimation. The results showed that monetary policy has limited impact on

housing sector prices. Henceforth, the researchers concluded that monetary policy is insignificant to control real estate prices. Lim and Papi (1997) utilized time series data covering period from 1970 to 1995. The empirical results point out that money supply, wages, price of imports and exports are positively associated with inflation, whereas, exchange rate is inversely affect inflation rate in Turkey.

Schnabel (2022) signified that monetary and fiscal policies may diverge, leading to a less than ideal policy combination. Fiscal measures such as subsidies may lead to exacerbate medium term inflation, prompting monetary policy to raise interest rate. Henceforth, the researcher suggests that long term impact of government actions on inflation should be considered. The findings of the study highlight that monetary policy can contribute most effectively to macroeconomic stability through safeguarding people's purchasing power and promoting investment by reducing uncertainty.

Astuti and Udjianto (2022) assess the impact of monetary and trade policies on inflation and economic growth across four ASEAN countries. The findings of the study demonstrate that monetary policy may leading to dampen economic growth initially in short term, nevertheless, yields strong positive effects in the long term. Furthermore, the study findings emphasize the successfulness and significance of monetary policy and underscore its robust impact, particularly when aligned with trade policy coordination.

Raza et al. (2023) evaluate the various channels through which monetary, fiscal and income policies impact inflation and output in a small open economy, using Denmark as a case study. They employed a stock flow consistent model based on sectoral data. Henceforth, the research replicates the post Covid-19 inflationary environment faced by Denmark and other nations. With monetary tightening as a forced policy response due to a fixed exchange rate regime, the study explores several policy options within existing framework to mitigate inflationary effects. The findings suggest that close coordination between fiscal and income policies can alleviate income shocks without exacerbating inflation. Additionally, the study highlights that among the policies analyzed, monetary policy has the most significant impact on public debt sustainability.

The study conducted by Adim (2021) demonstrates a long-term association between Money Supply and Inflation in Nigeria, the research data spanning from 1980 to 2011. Additionally, the findings indicate that both money supply and interest rates positively influence inflation, along with government expenditure and the exchange rate showing a positive correlation with inflation

According to the study conducted by Istinganah and Hartiyah (2021), their research findings, based on data spanning from 1978 to 2017, suggest that foreign debt has a lasting impact on inflation. The results imply that over the long term, inflation tends to rise concurrently with increases in external debt, and vice versa. Consequently, they advise against Indonesia, as a developing nation, relying on foreign debt, as it does not enhance domestic economic conditions. However, despite this recommendation, Indonesia's foreign debt continued to rise during the period from 2010 to 2019.

Olasunkanmi and Oladipo (2020) examine the factors, both domestic and external, influencing inflation in Nigeria utilizing the Seasonal Autoregressive Integrated Moving Average with Additional Explanatory Variables (SARIMA-X) method. Given the predictability of past inflation series and the inherent seasonal patterns in Nigerian inflation, the SARIMA-X approach is employed. The research estimates and assesses three models for different types of inflation (headline, food, and core), revealing the interplay between domestic and external factors impacting inflation in Nigeria. The study highlights that the average prices of premium motor spirits (PMS), total rainfall, and any shocks affecting either food or core inflation, or both, have an immediate effect on headline inflation. Particularly, the external factor of fuel prices emerges as a significant determinant.

Kuma and Gata (2023) explored the determinants of food price inflation in Ethiopia, data covering period from 1990 to 2021. The researchers employed the Autoregressive Distributed Lag Approach (ARDLA). The results signified that several variables, including money supply, exchange rate, and interest rate, real GDP, world food prices, rainfall, and population are co-integrated in the long run. Specifically, in the long run, real GDP and lagged world food prices have a negative and significant impact on food price inflation, while domestic food prices, annual rainfall, interest rates, and money supply have a positive and significant effect on food price inflation.

3. METHODOLOGY AND DATA

3.1 Theoretical Framework

The classical economist Fisher (1911) argues that velocity and transaction are constant and price level and inflation are only determined in proportion to money. Later on, after the development of this theory by Cambridge economists like Pigou (1917) and Marshall (1923), they assumed that velocity and circulation are not constant and the purchasing power is inversely correlated with price level. Classical claims that excess money in circulation growth as believed by Fisher, is the essential factor for the inflation determination. Keynesian has introduced a new monetary theory which is different from Classical. According to Keynesian approach, when full employment level is not achieved and there is unemployment then the price levels are not affected by the growth of supply of money. Hence, Keynesian economists believe that inflation is primarily determined by demand factors, excess aggregate demand, cost of production and production level. Monetarist "only money matters", believe that monetary factors are the major determinants of inflation. Friedman and Meiselman (1963). "I don't think monetary policy has to be backed up by fiscal policy at all. I think monetary policy can curb inflation" (Friedman, 1981). Friedman (1987) observed that the link between inflation and fiscal policy hinges on the method of financing government spending. Specifically, he recommended that government spending can lead to inflation if it is financed and funded through money creation.

3.2 Empirical Models

In order to achieve the objectives of our study and to test the proposed hypothesis, the following empirical models have been formulated.

$$LNHINF_t = \alpha_t + \beta_1 LNM2_t + \beta_2 LNER_t + \beta_3 LNGDP_t + \beta_4 LNTDS_t + \beta_5 LNOILP_t + \beta_6 LNTO_t + \varepsilon_t \quad (1)$$

Equation 1 presents an empirical model which is designed to assess the comparative effectiveness of fiscal and monetary policies on headline inflation, whereas LNHINF represents the natural log of CPI.

$$LNCINF_t = \alpha_t + \beta_1 LNM2_t + \beta_2 LNER_t + \beta_3 LNTDS_t + \beta_4 LNGDP_t + \beta_5 LNRM_t + \varepsilon_t \quad (2)$$

Equation 2 presents is empirical model which aims to analyze the relative effectiveness of fiscal policy and monetary policy on core inflation.

3.3 Data and Variable Description

3.3.1 Variables Description

This paper attempts to analyze the impact of monetary and fiscal policy on inflation level dynamics in Pakistan. Hence, to obtain robust results, inflation is categorized into headline and core inflation. Therefore, the selection of variables in this paper is not an adhoc, arbitrary and based on some rationale, keeping in view the paper objectives. This paper used all variables in log form.

Headline Inflation (LNHINF): One of the empirical models (Equation 1) is formulated to evaluate the relative impact of fiscal and monetary policy on headline inflation. Headline inflation gauges the fluctuation in the cost of goods and services. It is used for capturing an aggregative and consolidated outlook of inflation within the economy. Headline inflation includes high volatile goods like energy and food items. Therefore, the prices of these items make headline inflation more unstable and volatile. Consumer price index (CPI) is commonly utilized as an indicator of headline inflation.

Core Inflation (LNCINF): Our second empirical model (Equation 2) is formulated to evaluate the relative successfulness and influence of fiscal and monetary policy on core inflation. Core inflation calculates the fluctuations in the prices of goods and services while excluding high volatile items like food and energy and usually this providing a measure of the economy's underlying long-term inflation trend.

***Money Supply (M2)*:** Classical economists and monetarists believe that inflation rate is solely determined by supply of money in the long run and is positively related. However, Keynesian literature rejects this view and claim that aggregate demand is the only determinant of inflation rate dynamics. This study will use M2 broad money. M2 or broad money encompasses a wider spectrum of the money supply, incorporating liquid assets that are readily convertible into Cash; therefore, it provides a more comprehensive measurement of the money supply. Past studies show that this variable is positively related to inflation level dynamics and inflation.

Exchange Rate (LNER): The **e**xchange rate is negatively and indirectly related with the inflation rate in the long-run and short-run. This study uses the real effective exchange rate. It assesses a country's currency value by comparing it to a weighted average of its major trading partners' currencies. Hence, it reflects a nation's international competitiveness relative to its trading partners. Economists and policymakers prioritize the real effective exchange rate for evaluating a currency's overall alignment. This variable is taken in natural log form. This variable was used by (Nguyen, 2019), and (Qurbanalieva, 2013).

Remittance Inflow (LNRM): Remittance inflow significantly influences the dynamics in price level positively in the long-term and short-term. The rise in remittance raises domestic demand and resultantly, prices moves upward. (Qurbanalieva, 2013) and (Ahmed, 2014). This variable will be taken in percentage.

***Total Debt Service (LNTDS)*:** Research shows that domestic debt influences inflation rate directly and indirectly through the supply of money. Moreover, high and large debt levels and their slow adjustment process strongly influence the inflation rate negatively. This study taken total debt services as percentage of GNI as used as government debt. This variable was also utilized by (Akram et al., 2011; Woodford, 1998) in their research studies.

***Trade Openness (LNTO)*:** Past studies found that trade openness exhibits negative association and significantly affects the inflation level dynamics in the long-run. This present study will use trade intensity (TI) for trade openness as employed by Ahmed *et al*. (2015). Trade intensity is defined as the ratio of import plus export divided by GDP.

***GDP (LNGDP)*:** The inflation rate shows greater sensitivity to changes in income and GDP over both short and long timeframes. As a result, GDP is seen as the more pivotal factor, with a negative relationship to inflation rate dynamics. This study will use real GDP in national currency. This variable was employed by (Ahmed, 2014; Ahmed *et al*., 2015) in their studies.

Oil Price ((LNOILP): Oil price is directly correlated with price of energy items and negatively related with productivity. Oil price also affects wages, profits, inflation, investment and employment through productivity. Oil is the 2nd largest source after natural gas of energy. This variable was used by (Qurbanalieva, 2013). Hence, average annual crude oil price per barrel is used in this study.

3.3.2 Data and Data Sources

This paper utilized the latest available time series annual data of Pakistan from 1980 to 2020 which are taken from both official national and international secondary sources. Inflation data (CPI) have been collected from Price Section, Pakistan Bureau of Statistics (PBS). Moreover, core inflation data are taken from FRED Graph Observations, Federal Reserve Economic Data. However, other variables used in this paper as independent variables including money supply (Broad Money, M2), exchange rate, total debt service, trade openness, GDP and crude oil price are taken from World Development Indicators; (WDI), World Bank and International Financial Statistics (IFS), International Monetary Fund, respectively.

Results and Discussions

Prior to formal analysis of Vector Error Correction Estimates (VECM), Johansen Co-integration Test and ARDL, first we need to examine the integration order of variables under consideration. Therefore, we utilized two tests for unit root namely; Augmented Dickey-Fuller Test and Phillips-Perron test. All variables have been transformed into logarithmic form and intercept are incorporated in each specification at both the level and at first difference. We do not reject the null hypothesis at level; however, we reject the null hypothesis and accept the alternative hypothesis at the first difference. Conclusively, the results provided by the ADF and PP test of stationarity demonstrate that all variables employed by this paper are integrated of order one, I (1), except core inflation which stationary at level and series is free of order two or above. Therefore, we proceed with the Vector Error Correction Estimates (VECM), Johansen Co-integration test and ARDL.

Table 1: Unit Root Tests Results

	Augmented Dickey-Fuller Statistic		Phillips-Perron Statistic	
Variable	Level	First Difference	Level	First Difference
	t-Statistic	t-Statistic	t-Statistic	t-Statistic
LNM2	-1.7092	-5.5772***	-1.7207	-6.9258***
LNSR	-1.6767	-7.2423***	-1.6767	-7.3568***
LNGDP	-2.0754*	-3.0997**	-2.9867*	-3.0878**
LNER	-1.9559	-5.1651***	-1.9559	-5.1650***
LNTO	-1.9762	-6.7270***	-1.9683	-6.7406***
LNTDS	-2.0367	-8.6264***	-1.8372	-8.8052***
LNOILP	-1.2610	-4.7723***	-1.3082	-5.5919***
LNHINF	-2.7296*	-6.5232***	-2.9303*	-6.5247***
LNCINF	-3.9704**	-8.6321***	-4.0213***	-5.632***

Note: ***p-values < .01, **p-value < .05, and *p-value < .1.

This paper employs two techniques, namely the Johansen Co-integration Test and VECM model to estimate equation 1 (empirical model 1), the relative effectiveness of monetary and fiscal policy on headline inflation. Result of Johansen Co-integration Test with headline inflation as dependent variable is displayed in Table 2.

Results based on Trace method that suggest two co-integrating relationships among the variables under consideration. Furthermore, the empirical results based on VECM regarding the relative effectiveness of monetary and fiscal policies on headline inflation are displayed in Table 3.

Table 2: Johansen Co-integration Test Results: Empirical Model 1 (Response of Headline Inflation)

Unrestricted Cointegration Rank Test (Trace)			
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value
None *	0.7706	164.7350	125.6154
At most 1 *	0.6748	107.3058	95.7536
At most 2	0.5306	63.4854	69.8189
At most 3	0.3484	33.9833	47.8561
At most 4	0.2465	17.2776	29.7970
At most 5	0.0999	6.2403	15.4947
At most 6	0.0533	2.1352	3.8414

Note:* represent existing of cointegrating equation

Table 3: Vector Error Correction Estimates

Panel A: Long-run Estimates: Empirical Model 1 (Response of Headline Inflation)		
Variable	Coefficient estimates	t-Statistic
LNM2	-4.3822	-4.5248***
LNER	0.9972	1.9446*
LNGDP	0.9706	2.1432**
LNTDS	0.9092	3.0815***
LNOILP	0.6482	3.9349***
LNTO	-2.8159	-3.0968***
Panel B: Short-run Estimates: Empirical Model 1 (Response of Headline Inflation)		
Error Corrections	Coefficient estimates	t-Statistic
ECM	-0.3742	-2.8657***
D(LNHINF)	0.0048	0.0278
D(LNM2)	0.0115	0.0100
D(LNER)	-2.0964	-2.0760**
D(LNGDP)	3.2684	1.0458
D(LNTDS)	0.2771	`1.1287
D(LNOILP)	0.4664	1.8971*
D(LNTO)	-0.2596	-0.2805
CONST.	-0.2040	-1.3451

Note: ***p-values < .01, **p-value < .05, and *p-value < .1.

Panel A: The result of the Vector Error Correction Estimates (VECM) in panel A of Table 3 shows that the dependent variable headline inflation has long run relationship with macroeconomic policy variables. The findings suggest that both monetary and fiscal policy variables hold significance and affect the dependent variable headline inflation in long run. Moreover, the results suggest that money supply and trade openness are positively associated with headline inflation whereas, government debt service, GDP and oil prices are negatively affect the target variable, headline inflation. For example, GDP is significant variable and affect the inflation negatively, one percent change in GDP would result 0.97 percent decrease in inflation. However, the results concluded that monetary policy is relatively more efficient and effective to handle headline inflation over the long term. This same result was documented by Nguyen (2019); Awan & Imran (2015) and that money supply and monetary policy have significant role in affecting inflation level. This empirical result supported the monetarist doctrine.

Panel B: The VECM results based on where LNHINF, LNM2, LNER, LNGDP, LNTDS, LNOILP and LNTO correspond respectively to headline inflation (CPI used as headline inflation), exchange rate, money supply, gross domestic product, total debt service, oil price and trade openness. VECM results suggest that error correction coefficient is negative and statistically highly significant showing the ability to converge back towards long equilibrium in case of disequilibrium. The probability value of result reveals that exchange rate is statistically significant and affects the headline inflation in short run. A one percent rise in the exchange rate would leads to decease 2.09 percent headline inflation in short run. Moreover, oil price is significant at 10%, however, all others variables are not significant and do not play role to affect headline inflation in short run. The result indicates that monetary policy is more successful and effective to handle headline inflation in short term. The identical result reported by; and Qurbanalieva (2013). This paper also examines the responses of headline inflation to one unit change in other policy variables. The Response of headline inflation is presented in figure 1.

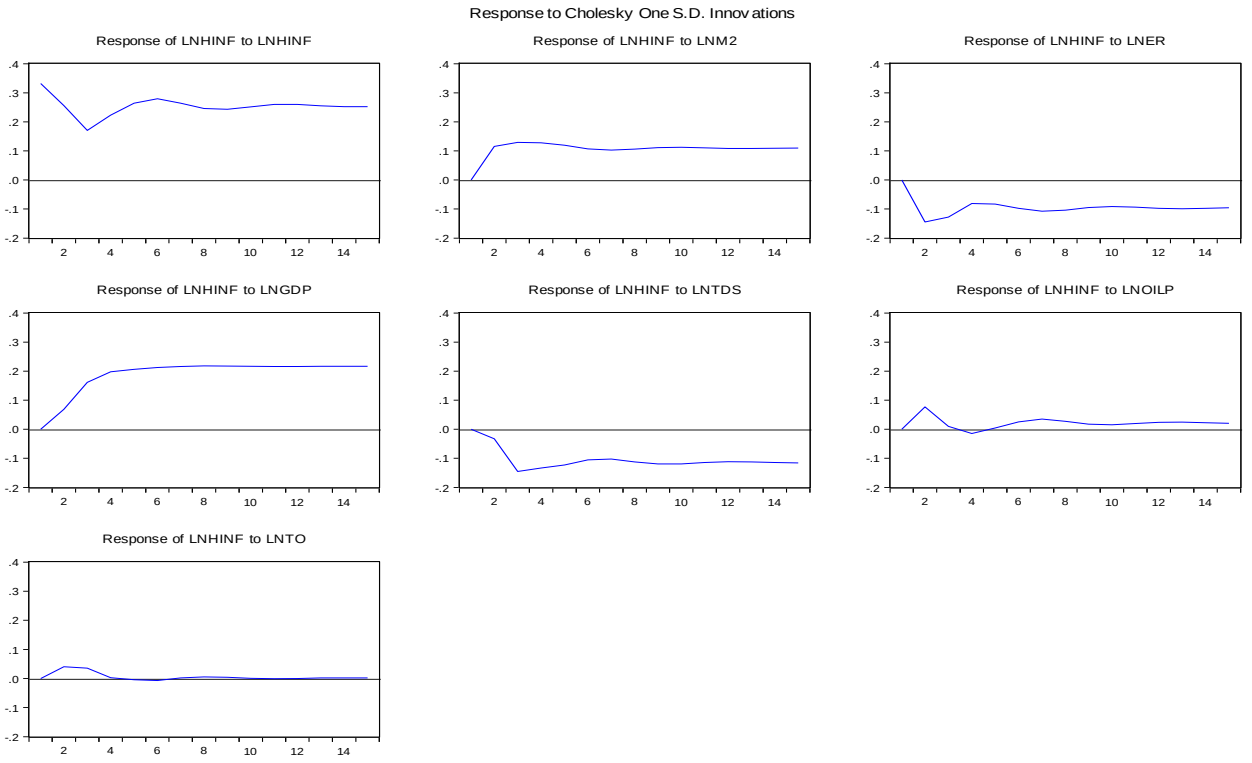

Figure 1: Response of headline inflation to one-unit change in other policy variables

Estimation of impulse response functions based on VECM for headline inflation equation is shown in figure 1, where LNHINF, LNM2, LNER, LNGDP, LNTDS, LNOILP and LNTO correspond respectively to headline inflation (CPI used as headline inflation), money supply, exchange rate, gross domestic product, total debt service, oil price and trade openness. The duration of the shock or time horizon is measured on x-axis while the intensity and direction of the shock is measured on y-axis. The graphs in the first line indicate the response of the headline inflation (CPI) to a unit change in headline inflation (CPI) itself and to one standard deviation shock in exchange rate, gross domestic product, money supply, and oil price and total debt service. Here we are interested in the interpretation of the reaction of headline inflation (CPI) to a unit change in other variables included in the VECM equation.

The graph in the top left corner of figure 1 shows that in response to unit shock in headline inflation (CPI) in first period, headline inflation decrease until period 3 and so the effect of the unit shock never die out thereafter. This means that a unit shock to headline inflation increases headline inflation throughout the

sample period. Similarly, headline inflation remains negative throughout the sample period as a response to a unit shock in exchange rate. This means that headline inflation and exchange rate are inversely related after a unit shock to exchange rate. An uptick in the supply of money leads to raise headline inflation throughout the sample. This finding aligns with theoretical framework, as higher money supply is always associated with higher inflation. However, as the results shows the response of headline inflation to a unit change in log of oil is ambiguous and seems irrelevant. This is not supported by the results of other studies where the two are positively related. The intuition is that higher inflation leads to higher oil prices where the results are true for both developed and developing economies (Choi et al., 2018). Lastly, the response of headline inflation to one unit change in total debt service remains significant but negative through the sample period.

Core Inflation: Core inflation provides a stable measure of long-term inflation trends, representing the general price movement in the economy. This paper aims to analyze the influence of monetary and fiscal policy on core inflation. The variables included in our model 2 offers a mix of I(1) and I(0) variables, therefore, ARDL model is being used . ARDL Bounds test outcome is given in Table 4.

Table 4: ARDL Bounds Test Results: Empirical Model 2 (Response of Core Inflation)

Test Statistic	Value	K
F-statistic	5.7334	5
Critical Value Bounds		
Significance	Lower Bound	Upper Bound
10%	2.26	3.35
5%	2.62	3.79
2.5%	2.96	4.18
1%	3.41	4.68

The F-statistic value is 5.7334 which is greater than the critical value of upper bound that is 3.79 at 5% level, so, we can concluded that co-integration exists between the variables of interest. The empirical findings derived from the ARDL analysis are reported in Table 5.

Table 5: ARDL Test Result: Empirical Model 2: (Response of Core Inflation)

Panel A: Long Run Coefficients		
Variable	Coefficient estimates	t-Statistic
LNM2	-2.3430	-0.8858
LNER	-9.1725	-2.5374**
LNTDS	-1.0764	-1.1603
LNGDP	3.8190	1.3207
LNRM	-0.7882	-0.8623
Panel B: Co-integrating Form		
Variable	Coefficient estimates	t-Statistic
D(LNM2)	-6.2847	-3.0008***
D(LNER)	-1.1645	-0.3676
D(LNTDS)	-0.2769	-0.4452
D(LNGDP)	3.3536	1.4386
D(LNRM)	-2.0601	-2.2638**
ECM	-0.8781	-3.3403***

Note: ***p-values < .01, **p-value < .05, and *p-value < .1.

Long run analysis: Panel A shows long run analysis where LNM2, LNER, LNTDS, LNGDP, and LNRM correspond respectively to money supply, exchange rate, total debt service, gross domestic product and remittance inflow respectively. The probability value suggests that exchange rate is the sole monetary instrument that holds statistical significance at 5% level and affects the core inflation in the long term. Remaining others factors are insignificant in long run and do not play any role to influence the core inflation in the long run. Insignificance of money supply supports the Keynesian claim. As Keynesians argue that when full employment hasn't been achieved, employment will fluctuate in line with changes in the quantity of money. The empirical findings of this paper are supported and matching findings have been reported by Nguyen (2019), and Qurbanalieva (2013).

Short run analysis: Panel B shows that error correction coefficient is negative and statistically highly significant showing the ability to bounce back towards long equilibrium in case of disequilibrium situation. The ARDL results suggest that money supply and remittance inflow, both variables are significant at 5% level in affecting the core inflation in short term in Pakistan. All others variables are insignificant to affect core inflation in short term in Pakistan. The same findings have been reported by Awan and Imran (2015), Ahmed et al. (2014), and these findings favor a supported the monetarist claim that inflation is a monetary phenomena. Require coordination of policies, however, monetary policy is less important.

4. CONCLUSION

Empirical findings signified that in the long term, headline inflation in Pakistan is primarily affected by changes in money supply, government debt, trade openness, oil price and GDP. The empirical results suggest that both fiscal and monetary policies are important to affect headline inflation in long run. Moreover, with monetary policy playing an essential role, as evidenced by the higher coefficient value of money supply compared to government debt service. This empirical result suggests that coordination of monetary and fiscal policy is successful in stabilizing prices; however, this also indicates that fiscal is less important and have minimal role in inflation control. Additionally, exchange rate exerts a notable influence on headline inflation in the short term. Regarding core inflation, the exchange rate emerges as the sole significant factor in the long run, while short-term effects are predominantly driven by money supply and remittance inflows. Hence, the empirical results suggest that monetary policy playing significant role in affecting core inflation and support monetarists claim. Overall, the results underscore the stronger power of monetary policy to affect both headline and core inflation, persisting in both short and long-term contexts in Pakistan. Ahmed et al. (2014) and Nguyen et al. (2019). Schnabel (2022), Astuti and Udjianto (2022) and Raza et al. (2023), all documented identical results in their respective studies and suggested that monetary policy have stronger role and relative more successful and effective in affecting inflation and stabilizing prices.

High inflation is a signal of macroeconomic instability. So, price stability is an essential instrument for bringing stability in financial sector. Stable financial sector is essential for economic growth. Subsequently, policy recommendations are required for curtailing the magnitude of government consumption expenditure and debt indicators and enhancing the economic productivity as these three fiscal policy instruments are high significant and plays important role in affecting price level dynamics. Similarly, measures should be taken to enhance the remittance inflow, for the stability of exchange rate, to maintain the maximum level of saving rate and excess money supply for debt should be avoided. Henceforth, in summary, pursuance of prudent of monetary and fiscal policy is mandatory for maintaining the optimum level of inflation level. For this, Pakistan require to:

(i) Maintain the minimum level of government debt and financing the debt through non-debt sources like exports, foreign aid and foreign direct investment as results show that debt is basic cause for inflation.
(ii) It is necessary to take steps to minimize the government consumption and non-developmental spending as these divert resources from productive channels to non-productive areas.
(iii) Results findings suggest that stable currency leads to stable exchange rate, plays central role while handling the higher inflation and price level fluctuations. Therefore, government may adopt policy and measures to maintain the exchange rate stability and avoid the devaluation and depreciation without proper study and research.
(iv) Results suggested that money supply is an essential monetary policy instrument and badly impact the price level, therefore, government should make sure to avoid the seigniorage practice.

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