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# *An Empirical Analysis of Fiscal Imbalances and Inflation in Pakistan*

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*This paper investigates the long-run relationship between inflation and fiscal indicators in Pakistan using annual data from Fiscal Year (FY) 1973 through FY 2003. The empirical results, using Johansen cointegration analysis, suggest that in the long-run inflation is not only related to fiscal imbalances but also to the sources of financing fiscal deficit, assuming the impact of real GDP and exchange rate as exogenous. In VECM model, inflation has significant error correction coefficients that implicitly conclude that inflation is affected by government's bank borrowing for budgetary support as well as fiscal deficits. Therefore, in Pakistan, fiscal sector is dominant in explaining price movements.*

*JEL Codes: E31, E63*
*Key Words: Fiscal Imbalances, Bank Borrowing, Inflation, Pakistan*

## 1. Introduction

Inflation is generally associated with monetary expansion. Pakistan's experience is not different from other countries. As a matter of fact, rise in general price level can be mapped on growth of money supply. Although immediate cause of inflation is associated with money growth, developments in monetary stance are indicative of other sectors of the economy. In Pakistan, it is generally argued that fiscal imbalances might have played an important role in explaining price fluctuation.

During the 90s, critical task faced by the State Bank of Pakistan (SBP) was to contain inflation within the targeted level and ensure macroeconomic stability. During the years FY98 to FY03, the overall inflation averaged 4.6 percent, which is indicative of relative price stability in the country. Earlier, during FY73-FY80,

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rate of inflation remained high at an average of 14.3 percent. During 1980s the economy experienced a comparatively moderate rate of inflation averaged at 7.2 percent per annum. But in the 90s it increased again having an average of around 10 percent per annum. In fact, fiscal sector indicators also moved in the same direction during the sub-periods mentioned earlier. Intuitively, fluctuation in price is attributable to real sector developments, money creation, and fiscal and external sector. In Pakistan, it is argued that main causes behind high rate of inflation could be large monetary expansion, fiscal imbalances, sources of financing deficits, economic growth and exchange rate depreciation.

This paper is an attempt to identify the role of fiscal sector in explaining inflation in Pakistan. The study will primarily check the long-run relationship between fiscal sector and inflation using annual data from FY73 through FY03 and evaluate the way of causation between the fiscal imbalances and inflation. This paper suggests that a positive relationship between deficits and inflation can be found even outside a regime in which fiscal policy is dominant and strengthens the case for a careful examination of the direction of causality.

The paper is organized as follows. Section 2 discusses theoretical aspects of inflation. Section 3 reviews the empirical literature on the fiscal determinants of inflation. Section 4 presents some stylized facts of the Pakistan's economy. Empirical estimation of the main hypothesis is given in Section 5. Final remarks and policy recommendations are presented in Section 6.

## 2. Inflation: A Theoretical Perspective

In Classical theory, inflation is driven by money growth (Quantity Theory of Money). It suggests that the determination of price level is associated with high rates of money growth. Suppose the government wants to replace every rupee with two new rupees, the prices in terms of new rupees would be twice as high. In short, changes in money supply executed in this way will be associated with proportionate changes in prices having no effect on output or employment. If money growth does not influence output, higher money growth leads to higher inflation. According to famous Friedman dictum "Inflation is always and everywhere a monetary phenomenon." However, the world is more complicated than this and monetary policy consists of more than just currency exchanges. An interconnected issue arises that how governments get money from the system. One way is to print money to finance government deficits.

$$P_t(G_t - T_t) = dM_t = M_t - M_{t-1} \quad (1)$$

Where $P_t$ represents prices in period $t$, $G_t - T_t$ is the government resource gap in period $t$ while $M_t - M_{t-1}$ represents changes in money stock. Equation (1) says that each amount of deficit is financed through printing new rupee bills $dM_t$. Literally, the government pays its bills with currency. In another way, the government gets currency into the economy by changing the composition of its balance sheet, which is changing the proportion of interest-bearing debt with non-interest bearing debt.

In the last decade, a large number of Latin and Central American countries experienced very high inflation rates. These countries also witnessed high money growth during the same period. An important question that needs to be answered is, if the relation between money growth and inflation is so clear, why did these countries simply not print less money? The real problem for most of these countries was a large fiscal deficit. If a government is running a deficit, it may issue money or interest-bearing debt. Or we can rewrite Equation (1) as:

$$\mathrm{P}_t(G_t - T_t) = dM_t + dB_t \quad (2)$$

or

$$G_t - T_t = dM_t / P_t + dB_t / P_t \quad (3)$$

The two terms on the right hand side of Equation (3) are issues of new money, $dM_t$, and new interest-bearing debt, $dB_t$, respectively. The equations note that what government does not pay for with tax revenues, it must finance by issuing some sort of debt. If the government can neither reduce deficit nor issue debt, the only alternative left is to print more money. Whenever a central bank prints "fresh money" it obtains goods and services in exchange for these new pieces of paper, the “seignorage.” In real terms, seignorage can be expressed as the ratio of new currency printed during the period to price level during the period. Alternatively, it can also be expressed as: $Seignorage_t = dM_t / P_t$.

The monetary aggregate that the central banks control directly is the "monetary base," consisting of currency in the hands of the public and reserves of the commercial banks deposited in the central bank. It gives a twist to Friedman's quote: *inflation might be a monetary phenomenon, but the money is a reflection of fiscal policy and not of monetary policy.* An imperative question arises that why inflation is a fiscal phenomenon? If inflation was purely a monetary phenomenon caused *in the first place* by an *exogenous* excessive rate of growth of money, economies could have reduced inflation quite fast by printing less money and thus reducing the growth rate of the money supply. Instead, all these countries had a

really hard time in reducing their inflation rates. Sergent and Wallace (1981) in their seminal work argue that if monetary policy is interpreted as Open Market Operations (OMO) then monetary policy cannot control inflation even if all the monetarist assumptions are fulfilled. They show that if monetarist assumptions of strong correlation of monetary base with the price level and the power of monetary authority to raise seignorage are fulfilled even then monetary authority cannot control inflation. In their approach seignorage assumes the central role for deficit finance. It views the relation basically as a game between the fiscal and monetary authorities. The fiscal authority independently sets its budget deficits and thus determines the revenue generation through taxes, bonds sales, and seignorage. Under these conditions the fiscal authority is the first to make a move (increasing fiscal deficit), the monetary authority is left with a difficult choice in order to balance the inter-temporal budget.

Different countries' experience also suggests that the main problem is large budget deficits and printing of money to finance it. In this sense, excessive growth rate of money that leads to seignorage and cause inflation is not exogenous but rather endogenous and *cause* itself by the need of these governments to finance their budget deficits. Therefore, while the near proximate cause of high inflation is always *monetary* as inflation is associated with high rates of growth of money, the true structural cause of persistent high inflation is a *fiscal* deficit that is not eliminated with cuts in spending and/or increases in (non-seignorage) taxes.

**Sources of Financing Fiscal Deficit**

In the face of public deficits, governments are confronted with the choice between different sources of financing its deficit. From Equation (3), it may be added that government can finance the deficit through domestic and external sources. Domestic source of financing fiscal deficit can be divided into two sub-components, that is printing new money (government borrowings from the central bank) or issuance of interest bearing debt to both bank and non-bank institutions. Externally, governments borrow money from international financial markets. In view of the above, Equation (3) can be re-written as:

$$\mathrm{P}_t (G_t - T_t) = dM_t + dB_t + dE_t \tag{4}$$

Where, $dB_t$ comprises bank borrowing ( $dBb_t$ ) and non-bank borrowing ( $dBn_t$ ):

$$\mathrm{P}_t (G_t - T_t) = dM_t + dBb_t + dBn_t + dE_t \tag{5}$$

or

$$G_t - T_t = dM_t / P_t + dBb_t / P_t + dBn_t / P_t + dE_t / P_t \quad (6)$$

Equation (6) simply states that if $G_t > T_t$, then the deficit is financed through a positive change in both the external and internal sources and in real money balances. Depending on the magnitude of government's borrowing requirement, financing of its deficit would have significant impact on the economy, which includes inflation.

## 3. Review of Empirical Literature

There has been a general agreement that government expenditure that is not financed by tax or non-tax revenue contributes to excess demand in the economy and thus inflation. Theoretically, it is established that fiscally dominant governments running persistent deficits have to, sooner or later, finance those deficits with money creation thus producing inflation [ Sergent and Wallace (1981)]. However, evidence from the empirical literature may be an unsettled one.

In recent years, numerous models have been developed to analyze the long-run relationship between fiscal deficit and inflation. An empirical research carried out by Catao and Terrones (2003) shows that there is a strong positive relationship between fiscal deficits and inflation among high-inflation and developing country groups, but not among low-inflation advanced economies. The authors also provide estimates in another study (2003) for a panel of 23 emerging market countries during FY70-FY00. They found that 1 percentage point reduction in the ratio of fiscal deficit to GDP typically lowers long-run inflation by 1.5 to 6.0 percentage points, depending on the size of the inflation tax base.

An empirical study by Cevdet et al. (2001) determines long-run relationship between inflation rate, budget deficit, and real output growth and suggests two important results. First, changes in the consolidated budget deficit have no permanent long run effect on the inflation rate. Second, Public Sector Borrowing Requirement (PSBR) from banks does have a long-run relationship with inflation rate.

Vieira (2000) investigates the fiscal deficit and inflation relationship for six major European countries. The results obtained by the author provide little support for the proposition that budget deficit has been an important contributing factor to inflation in these economies over the last 45 years. On the contrary, where

evidence exists of a long-run relationship between inflation and deficits, this evidence is more consistent with the view that it was inflation that contributed to deficits, rather than the reverse.

In Pakistan various studies have been conducted to carry out the role of fiscal deficit as a major determinant of inflation. The findings of Chaudhary and Ahmad (1995) suggest that domestic financing of the budget deficit, particularly from the banking system, is inflationary in the long run. The results provide a positive relationship between budget deficit and inflation during acute inflation periods of the seventies. They also find that money supply is not exogenous; rather, it depends on the position of international reserves and fiscal deficit and it has emerged as an endogenous variable. The general conclusion is that the execution of monetary policy is heavily dependent on the fiscal decisions made by the government. In order to control inflationary pressure, government needs to cut the size of budget deficit. Similarly, Shabbir and Ahmed (1994) conclude that budget deficits have a positive and significant direct effect on inflation, independent of its indirect effect via money supply that in this case turns out to be minor or negligible. In fact, a 1 percent increase in budget deficit leads to 6-7 percent increase in general price level. Furthermore, a preliminary investigation into the nature of this large and significant direct effect shows that budget deficits may be influencing formation of price expectations, which is a viable channel of transmission. In fact, different studies analyze the role of fiscal deficit by using different indicators of fiscal deficit like fiscal deficit as a percentage of GDP, primary deficit, or conventional fiscal deficit. The consolidated fiscal deficit, which takes care of all expenditure and revenue, is nonetheless a better indicator for this analysis.

It is an established fact that external borrowing for financing fiscal deficits affects general price level through the changes in relative prices of domestic and foreign currencies. In order to empirically evaluate the relationship between exchange rate and inflation in Pakistan several studies have been conducted. A study by Choudhry and Khan (2002) empirically examine whether inflation is systemically related to changes in the exchange rate in the case of Pakistan during FY82-FY01. Their empirical analysis finds no association between rupee devaluation and inflation. On the contrary, Khan and Qasim (1996) reveals that the expansionary fiscal policy stance has been reflected in a deteriorating balance of payments position and has necessitated repeated downward adjustment in the rupee, which has caused price level to increase.

Empirical studies also suggest the existence of positive and negative relationship between output and prices. In this regard, Thirlwall and Barton (1971), in one of

the earliest cross-country studies of inflation and growth, report a positive relationship between low inflation and growth in a cross section of industrial countries during 1958-67 and a negative relationship in a cross section of 7 developing countries over the same period. Alexander (1997) finds a strong negative influence of inflation on growth rate of per capita GDP using panel of OECD countries. Bruno and Easterly (1996) find no evidence of any relationship between inflation and growth at annual inflation rates less than 40 percent and there was negative shorter to medium relationship between high inflation and growth. Ghosh and Phillips (1998), using large panel dataset, covering IMF member countries over 1960 to 1996 find that at very low inflation rates (less than 2-3 per cent), inflation and growth are positively correlated; however, they are negatively correlated at high level of inflation.

According to Friedman (1977), output growth of about three percent, on average, would lead to average inflation of about 1 percent a year. This may vary from country to country. Economists refer to this in terms of the existence of a high threshold rate of inflation; economic growth is affected only when the economy's inflation rate is above the threshold. That threshold level of inflation calculated for Pakistan was around 9 to 11 percent [Khan and Senhadji (2000), Mubarik (2005)].

In Pakistan, a number of studies have been conducted for the determination of relationship between real GDP growth and inflation. Naqvi et al. (1994) suggest that the policy of reducing inflation should shift from reducing fiscal deficit to the increase in the growth rate of GDP above 8 percent annually. Khan and Qasim (1996) suggest that a 10 percent increase in real GDP would reduce general price level by 4.6 percent after establishing their cointegration. The paper concludes that an improvement in the availability of goods and services (growth in real GDP) will put downward pressure on price level. Empirical findings of Nasim (1995) suggest that the rate of growth of output has a substantial dampening effect on prices. This is also evident from one of the definitions of inflation, which is 'too much money chasing too few goods', which also means that if we take other things constant and increase the output then there will be low inflation. Simple quantity theory of money and Philips curve relationship conform with above findings.

## 4. Stylized Facts from Pakistan

### 4.1. Inflation and Fiscal Deficits

Pakistan has witnessed large fiscal deficits over the last three decades and budgetary imbalance remained one of the major macro economic problems.

Repeated attempts by the government in the past, including the implementation of structural adjustment program with assistance from the International Monetary Fund (IMF), only achieved partial success.

The consolidated fiscal deficit during FY81-FY90 averaged around 7.0 per cent of GDP. During FY91-FY00, budget deficit averaged 6.9 percent of GDP. However, during the last three fiscal years (FY01, FY02, and FY03) annual average of the deficit has come down to 5.5 percent of gross domestic product. Traditionally, in developing countries fiscal deficit has a direct bearing on inflation as the government expenditure constitute a large part of the aggregate expenditure that might lead to demand-pull inflation. Whereas, fiscal deficits can impact level of inflation either through monetary expansion or directly by adding to the aggregate demand.

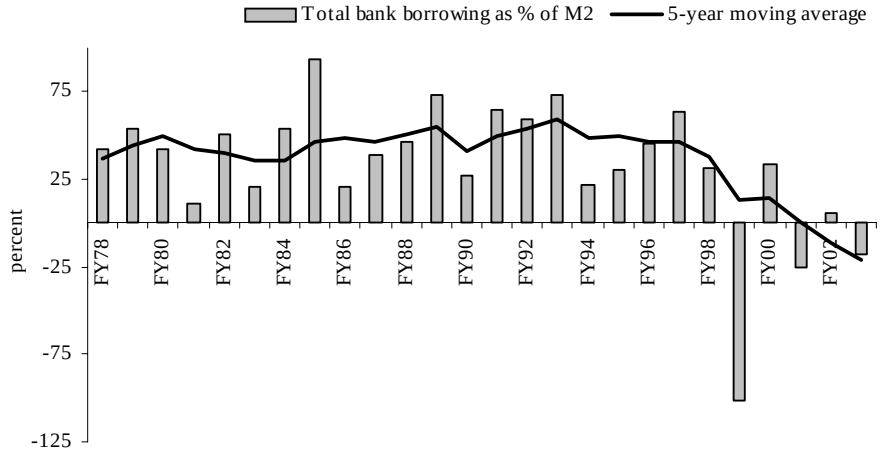
In Pakistan, during FY73-FY80, 51.2 percent of the deficit was financed through external sources while the remaining was financed through domestic sources. Domestically, government mainly relied on financing through the central bank and non-bank by National Saving Schemes (administered by Central Directorate of National Savings) and other government papers (administered by SBP). Despite the fact that financing through the central bank declined to 16 percent in the 80s, government had diverted deficit financing towards non-bank borrowings from external sources. As a result, there is a substantial increase in government's non-bank borrowing as its share in total financing soared up to 46 percent, while the external borrowing reduced to 27 percent. During 1990-98 the government started to borrow more from commercial banks to finance its deficit (26 percent to total deficit during 1990-98 from a meager 11 percent in the 80s on average); however, financing through non-bank borrowing reduced to 35 percent of total deficit.

During the last five years, the composition of deficit financing has undergone a paradigm shift. Government retired around Rs 49,767 million per annum on average to the State Bank from FY99 to FY03. While, government borrowed mainly from non-bank and external sources having a share of 60.3 percent and 52.7 percent, respectively.

### 4.2. Borrowing from the Banking System for Budgetary Support and Inflation

Government can finance deficit through its borrowings from the central bank and commercial bank. Financing through central bank is the creation of new money in the system while borrowing through commercial banks is associated with the creation of interest bearing debt, which is reflected in the growth of money. In

**Fiqure 1. Total Bank Borrowing as Percent of M2**




Source: State Bank of Pakistan, Annual Report (various issues)

Pakistan, the main indicator of money supply is M2, which is the broader definition of money supply. The main heads of causative factors of changes in the monetary assets (M2) in Pakistan are credit to government sector, credit to non-government sector and Other Items Net (OIN). Credit to government sector is further subdivided into: (a) Net budgetary borrowing; (b) borrowing for commodity operations; and (c) net effect of Zakat fund/Privatization proceeds etc. In addition to this, credit to non-government sector is subdivided into: (a) credit to private sector; (b) credit to Public Sector Enterprises (PSEs); and (c) SBP credit to Non Bank Financial Institutions (NBFI). Historically, the bulk of domestic credit goes to the government sector for budgetary support.

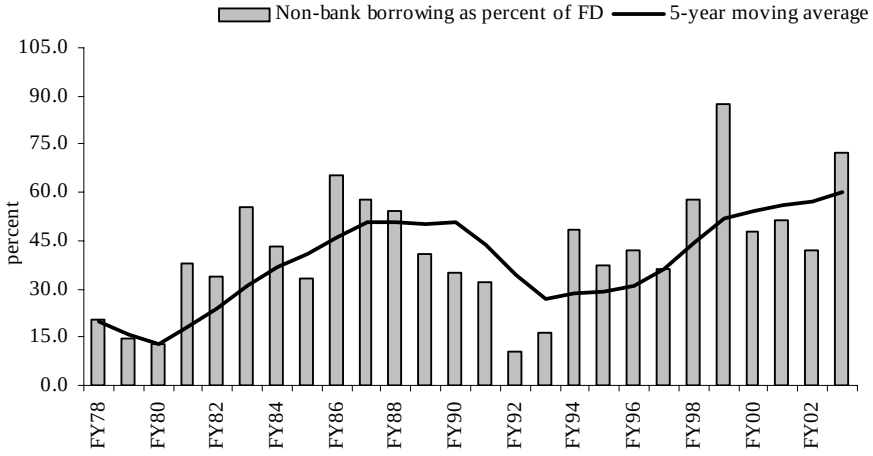
The data from FY91- FY98, when the inflation rate was in double digit, reveal that the share of total bank borrowing for budgetary support in the money supply (M2) was 48.5 percent on average (Figure 1). The pattern of credit to the government for budgetary support in total money supply (M2) shows an erratic trend ranging from 3.6 percent in FY73 to almost 94.0 percent in FY85. Excluding the last five years, which shows an average decline of 21.2 percent in ratio of Total Bank Borrowing (TBB) to M2, the average share of government credit in M2 from FY73 till FY98 was 42.7 percent. This behavior of the components of M2 shows the fiscal dominance in money growth in Pakistan, as is the case with most of the developing countries.

In Pakistan, government's Total Bank Borrowing (TBB) for budgetary support was around 31 percent of the total deficit during FY73-FY80 while inflation during the same period was 14.3 percent. As the TBB share in FD declined to 27 percent in the 80s, there was a marked decline in inflation rate (7.2 percent). During FY91-FY98, TBB increased to 42.5 percent of FD and inflation also depicted an increasing trend of 11 percent on average. During the last five years the relationship seemed to be in the same direction as reflected in the aforementioned periods. Despite rapid increase in money supply, the government retired around Rs. 21,837 million to the banking system while inflation declined to 4.0 percent, on average.

### 4.3. Non-bank Borrowing and Inflation

In Pakistan, non-bank borrowing is raised through National Savings Schemes (NSS) and other government bonds through SBP to the individuals and other non-bank institutions. Theoretically non-bank borrowing is less inflationary than bank borrowing. This is an important source for financing the deficit in Pakistan, as during FY73-FY80 it was around 16.4 percent of total fiscal deficit while the inflation was 14.3 percent on average (Figure 2). In the 80s, the share of non-bank borrowing increased substantially to 45.7 percent and at the same time there was a marked decline in inflation. During FY91-FY98, its share declined to 35.0 percent of FD but inflation depicted an increase of 11 percent per annum on average.

**Figure 2. Non-Bank Borrowing as Percent of FD**




Source: State Bank of Pakistan, Annual Report (various issues)

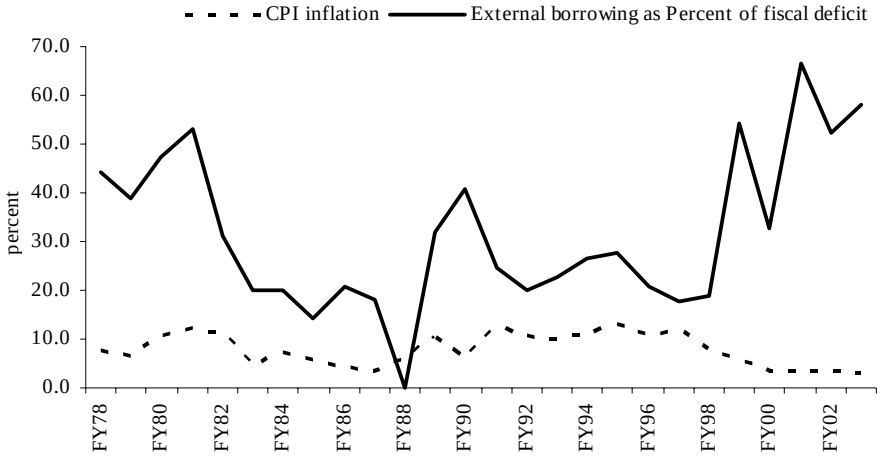
During the last five years ending FY03, inflation declined to a historic 3.9 percent but the non-bank borrowing was the largest source of financing FD (60.3 percent). From this perspective, it is notable to mention that there is no such long-run relationship between the non-bank borrowing for the budgetary support and increase in the general price level.

It is conventionally agreed that, other than bank borrowing, all other sources of borrowings are less inflationary. However, it might carry adverse implications for domestic debt sustainability. In Pakistan, the high cost of borrowing through NSS led to an unsustainable level of non-bank debt coupled with high servicing on it (to the tune of 18 percent). This not only led to the deterioration of the banking sector but also added to the high debt servicing obligations. This costly borrowing led to increase in fiscal deficits and hence to more money creation that exerted an upward pressure on inflation.

### 4.4. External Borrowing, Exchange Rate, and Inflation

In Pakistan, external borrowings were one of the main sources of financing budget deficit. During FY73-FY80 on average 56 percent of the budget deficit was financed through external borrowing whereas inflation remained at 14.3 percent on average (Figure 3). The higher inflation during that period was the legacy of Indo-Pak war and two international oil price shocks in 1973 and 1976. During the

**Figure 3. External Borrowing to FD & Inflation**




Source: State Bank of Pakistan, Annual Report (various issues)

80s, the share of external borrowings declined to 27.2 percent of fiscal deficit and government relied heavily on domestic sources. The same period also witnessed a decline in inflation as it was around 7.2 percent. However, inflation rose to 11 percent during FY91-FY98 while the external borrowing declined to 22.4 percent on average.

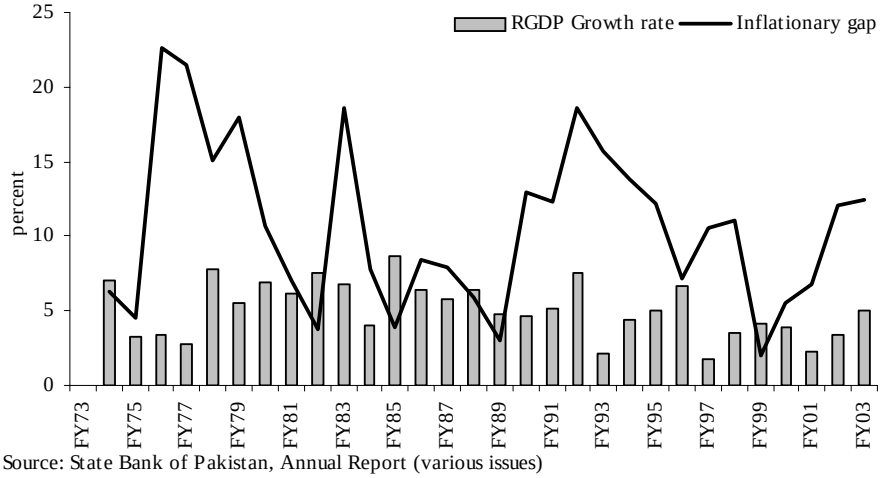
During the last 5 years from FY99 to FY03, more than half (52.8 percent on average) of the budget deficit was financed through external borrowing while in the same period the general price level remained stable at moderate level of 3.9 percent on average. This may be attributable to the accumulation of foreign exchange reserves in the period, which acted as shock absorber to insulate domestic prices from the effects of external influences.

**4.5. Role of GDP in Explaining Inflation**

There has been a great deal of discussion in the macroeconomic literature about the effects that a country's rate of long-run economic growth may have on inflation and vice versa. One can say on the basis of the famous Philips Curve relationship that countries that on average have higher rates of economic growth or lower unemployment have higher rates of inflation. A first look at the data suggests that it may be very difficult to find empirical evidence that growth does impact inflation. On this basis, it would be difficult to argue that there exists any systematic relationship between inflation and growth, either positive or negative. However, if we divide the data into 4-sub periods, we can infer some relationship. The inflation between FY73-FY80 was mainly because of so many exogenous factors like two oil price shocks, exchange rate depreciation and the after-effects of 1971 war that a true relationship between inflation and GDP growth rate cannot be established. However, a relatively high average annual growth rate of GDP (6.3 percent) from FY82-FY88 was accompanied by a relatively moderate average annual inflation rate of 5.3 percent (Figure 4). Moreover, the average annual inflation during the period of FY89-FY98 was in double digit (10.4) accompanied by relatively lower growth rate of GDP of 4.6 percent per annum. This shows that somehow higher growth rate has a significant lowering impact on inflation and vice versa. However, it is strange enough that inflation in 1999 and onward is low despite the fact that GDP growth rate was also at lower side.

On the contrary, there are a number of reasons that simple data analysis might be misleading. First, we cannot control for all the other factors that may also be affecting economic growth. It is possible, for example, that there is a negative relation between inflation and growth. But, we were unable to establish the relationship because economic growth is simultaneously affected by other factors.

**Figure 4. GDP Growth & Inflationary Gap**




Source: State Bank of Pakistan, Annual Report (various issues)

If we were able to somehow set the effects of other factors to zero, then a negative inflation-growth relation may be possible. Second, we have not corrected for reverse causation. Growth may itself affect the inflation rate and without taking this possibility into account, it becomes very difficult to unravel from the data exactly how inflation affects growth.

## 5. Empirical Estimation

### 5.1. Choice of Variables

The Consumer Price Index (CPI), Wholesale Price Index (WPI) and GDP Deflator can be used to measure inflation. Despite the fact that CPI has limited coverage, it is the most reliable measure of inflation as it is commonly used in empirical studies. The data of CPI has been collected from the Federal Bureau of Statistics of Pakistan and represented by 'P'.

In order to measure the relationship between the fiscal sector and inflation, consolidated budget deficit has been used in this study. Before engaging in our analysis of Pakistan's fiscal deficit and its impact on inflation, it is perhaps helpful to first clarify exactly how we define the deficit and what it measures. Fiscal deficits may be measured in a number of ways. The most common measure is usually referred to as the conventional deficit (or surplus), which represents the gap between total revenue receipts and total expenditure. Alternatively, primary

deficit measures the difference between total revenue and non-interest total expenditure; while, the revenue deficit is calculated by subtracting current expenditure from revenues. Our study uses Pakistan's overall fiscal deficit (represented by FD), which, in essence is the conventional deficit of the consolidated federal and provincial governments because of the fact that this is the most standard budgetary measure used and serves as a key target variable. The data have been collected from the Ministry of Finance, Government of Pakistan.

For measuring the relation between money and inflation, total bank borrowing for budgetary support has been used and represented by TBB. TBB for budgetary support consists of government borrowings from the banking system including both the central bank and commercial bank. The data compiled by the SBP has been used. Control variables including real GDP (RGDP) and exchange rate (ER) have also been used for determining the relationship among the variables.

### 5.2. Determination of the Stationarity of Data

We use the Augmented Dickey Fuller (ADF) unit root test, to establish the stationarity status of all the variables. The results of the Stationarity Test applied on the data sets are presented in Table 1. The ADF test for stationarity shows that all the variables are integrated of order (1)[3] and they become stationary at first differences after including the distributed lags of one period.

### 5.3. Cointegration Analysis

In order to determine the long-run relationship between $P$, $FD$, and $TBB$, we have

**Table 1. ADF test Statistics**

| Variables | At level | At First Difference | Order of Integration |
|---|---|---|---|
| P | -2.600723 | -6.173571 | I(1) |
| FD | 1.366504 | -2.154097* | I(1) |
| TBB | -1.77325** | -4.992731 | I(1) |
| RGDP | 3.72826 | -2.643275** | I(1) |
| ER | 2.453882 | -3.24586 | I(1) |

* indicates stationarity at 5%

** indicates stationarity at 10%

[3] The order of integration is the number of unit roots contained in the series, or the number of differencing operations it takes to make the series stationary. A stationary series is I(0).

used the cointegration technique. A number of methods testing cointegration analysis have been proposed in the literature. In order to evaluate the long-run relationship among non-stationary series we have used the Johansen Test for Cointegration. After determining the appropriate form of the VAR and the optimal lag length for the system. The estimated cointegrating vector is given below.

$$P = \underset{(0.00015)}{0.000215}\, FD + \underset{(8.1E-05)}{4.85E-05}\, TBB \tag{7}$$

Equation (7) transpire that FD and TBB have a positive impact on inflation, that is an increase in FD and TBB lead to hike in general price level. The cointegrating vector suggests that Rs. 1 billion increases in TBB by the government would increase 0.0048 percentage points in P in two years. Similarly, an expansion of Rs.1 billion in FD increases P by 0.0215 percentage points.

### 5.4. Vector Error Correction Mechanism

The second step in the cointegration involves constructing an error correction model. Since there are three variables in the cointegrating system, a valid error correction model can be constructed, which is given by the following equations

$$\Delta P_t = \alpha_0 + \sum \alpha_i \Delta P_{t-i} + \sum \beta_i \Delta FD_{t-i} + \sum \beta_i \Delta TBB_{t-i} + \varphi_1 \mu_{t-1} + \upsilon_{t1} \tag{8}$$

$$\Delta FD_t = \alpha_0 + \sum \alpha_i \Delta FD_{t-i} + \sum \beta_i \Delta P_{t-i} + \sum \beta_i \Delta TBB_{t-i} + \varphi_2 \mu_{t-1} + \upsilon_{t2} \tag{9}$$

$$\Delta TBB_t = \alpha_0 + \sum \alpha_i \Delta TBB_{t-i} + \sum \beta_i \Delta P_{t-i} + \sum \beta_i \Delta FD_{t-i} + \varphi_3 \mu_{t-1} + \upsilon_{t3} \tag{10}$$

Such that $\varphi_k \neq 0$ for a valid error correction representation of the underlying variables as well as for cointegration to exist between the underlying variables. The coefficient on the lagged value of the errors (representing the long run relationship) determines the speed of adjustment or size of correction towards the long run relationship in the short run. Since there is long-run relationship among the variables, the short-run corrections in the equilibrium are presented in Table 2. The VECM suggest that we may exclude the other two equations. This is done by applying the Wald test through imposing restrictions, which concluded that we might exclude the VECM model for TBB and FD.

It is established that inflation is affected by fiscal deficits and government borrowings from commercial bank and central bank. As a matter of fact, fiscal deficit and money growth has depicted a strong relationship which can be

**Table 2. Vector Error Correction (VEC) Model**

| | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C(1) | -0.4809829 | 0.075170 | -6.39860 | 3.05E-06 |
| C(2) | -0.2968473 | 0.117427 | -2.52794 | 0.020002 |
| C(3) | -0.1287839 | 0.085900 | -1.49922 | 0.149435 |
| C(4) | -0.0001286 | 3.50E-05 | -3.67724 | 0.001494 |
| C(5) | -0.0001241 | 4.29E-05 | -2.89530 | 0.008947 |
| C(7) | 2.88E-05 | 1.59E-05 | 1.81383 | 0.084737 |
| C(8) | 3.54E-05 | 6.73E-06 | 5.25673 | 3.82E-05 |
| C(9) | -0.7141977 | 0.123332 | -5.79087 | 1.15E-05 |
| Determinant residual covariance | | 4.0010274 | | |
| *Equation: D (INFLATION) = C (1)*( INFLATION(-1) - 0.0002136302074 *FD (-1) - 4.850392585E-05*TBB (-1) ) + C(2)*D(INFLATION(-1)) + C(3)*D(INFLATION(-2)) + C(4)*D(FD(-1)) + C(5)*D(FD(-2)) + C(7) *D(TBB(-2)) + C(8)*RGDP + C(9)*ERMA* | | | | |
| R-squared | 0.737606514 | Mean dependent var | -0.84464 | |
| Adjusted R-squared | 0.645768794 | S.D. dependent var | 3.976549 | |
| S.E. of regression | 2.366735796 | Sum squared resid | 112.0288 | |
| Durbin-Watson stat | 2.004971428 | | | |

analyzed with caution in case of fiscal dominance. During the 70s, fiscal deficit as percentage of GDP was 8 percent while money grew by 19 percent. In the 80s, reduction in money growth (-14 percent) coincided with the reduction in deficits. The same trend was followed afterwards as well.

A sufficient condition for fiscal dominance should be a one-way relationship between fiscal deficit and seignorage. The measure of seignorage used in this study is money creation during the period divided by the general price level (M/P). Data of fiscal deficits and seignorage transpire that there is a strong correlation between the two variables which is around 0.87. However, the correlation coefficient may be misleading because of non-stationarity of both of the series at level. At first difference the correlation coefficient is 0.27 which reflects a positive association between fiscal deficits and seignorage.

**Fiscal Deficits and Seignorage**

Johensen cointegration technique is used to determine the long-run relationship between seignorage and fiscal deficit because of the presence of inertia in both of the variables. Results are presented in Table 3 which concludes presence of long-run relationship with the optimal lag length of 1. VECM suggests that there is a

**Table 3. Coinegration Test**

**Unrestricted Cointegration Rank Test (Trace)**

| Hypothesized No. of CE(s) | Eigenvalue | Trace Statistic | 0.05 Critical Value | Prob.** |
|---|---|---|---|---|
| None * | 0.4381 | 25.0990 | 20.2618 | 0.0099 |
| At most 1 | 0.2739 | 8.9613 | 9.1645 | 0.0546 |

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

**Unrestricted Cointegration Rank Test (Maximum Eigenvalue)**

| Hypothesized No. of CE(s) | Eigenvalue | Max-Eigen Statistic | 0.05 Critical Value | Prob.** |
|---|---|---|---|---|
| None * | 0.4381 | 16.1376 | 15.8921 | 0.0458 |
| At most 1 | 0.2739 | 8.9613 | 9.1645 | 0.0546 |

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

one way relationship between the two which flows from fiscal deficits to seignorage (Table 4). The following equations are estimated for VECM.

$$\Delta \log(SG)_t = \alpha_0 + \sum \alpha_i \Delta \log(SG)_{t-i} + \sum \beta_i \Delta \log(FD)_{t-i} + \varphi_1 \mu_{t-1} + \upsilon_{t1}$$

$$\Delta \log(FD)_t = \alpha_0 + \sum \alpha_i \Delta \log(FD)_{t-i} + \sum \beta_i \Delta \log(SG)_{t-i} + \varphi_2 \mu_{t-1} + \upsilon_{t2}$$

### 5.6. Summary of the Findings

All of the variables are non-stationary at level, which represents that they have time trend. Estimation of appropriate VAR model represents that the model has optimally two lags. It means that a variable in period t is affected by other variableof period t-1 and t-2 at maximum. Cointegration analysis represents that there is a long-run relationship among inflation, fiscal deficit, and total bank borrowing by the government, while the impact of Real GDP and Exchange Rate have been taken as exogenous. Since the cointegration analysis do not explicitly assume the dependant and independent relationship at the outset, the VECM model suggests that in Equation (9) and (10), the error correction coefficients are not significant and Wald coefficient restriction reinforce that only Equation (8) has

**Table 4. Vector Error Correction Estimates**

| *Error Correction:* | *D(LOG(FD))* | *D(LOG(SG))* |
|---|---|---|
| CointEq1 | 0.0142 | 0.7218 |
| t-statistics | [ 0.12641] | [ 3.33069] |
| D(LOG(FD(-1))) | -0.3285 | -0.1627 |
| t-statistics | [-1.65695] | [-0.42537] |
| D(LOG(SG(-1))) | -0.0403 | -0.0978 |
| t-statistics | [-0.43836] | [-0.55182] |
| C | 0.1475 | 0.2179 |
| t-statistics | [ 3.48555] | [ 2.66893] |
| R-squared | 0.1409 | 0.4602 |
| Adj. R-squared | 0.0335 | 0.3927 |
| Akaike AIC | -0.4646 | 0.8497 |
| Schwarz SC | -0.2742 | 1.0400 |

significant error correction coefficients which implicitly conclude that inflation is affected by the total bank borrowing as well as fiscal deficit. Both fiscal deficit and total bank borrowing by the government sector are causing inflation. As a sufficient condition for fiscal dominance in Pakistan, fiscal deficits affect changes in seignorage rather than the other way round. Therefore, it is concluded that inflation is a fiscal phenomenon in Pakistan.

## 6. Final Remarks and Policy Recommendations

The paper establishes that, within sample, inflation in Pakistan is mainly attributable to unsustainable fiscal deficit. Financing of deficit through the banking system from printing of new money and creating interest-bearing debt affects the general price level. This fact has a number of implications for the conduct of monetary as well as fiscal policy.

As the situation of fiscal dominance persists, fiscal issues would generally complicate the conduct of monetary policy because there will always be a pressure on the central bank to finance government deficits. A discretionary policy of financing deficit creates problems for the implementation of monetary policy. Therefore, rule based policy should be defined for government financing of its fiscal deficit.

It is evident that higher output growth is positively related to the increase in general price level. Since, the first and the foremost objective of monetary policy is to achieve price stability, there is potential for conflict between the monetary

and fiscal policy. Whereas, current fiscal policy stance has been explicitly tilted towards achieving higher economic growth, therefore, it is expected that expansionary fiscal policy stance would result in higher interest rates, crowding out of private investment, which would likely promote inflationary pressures. Inflationary financing of the deficit is likely to pose a threat in conducting monetary policy. In this scenario, a better management of fiscal sector would be helpful in achieving apparently divergent objectives.

The objective of government financing of fiscal deficit takes into account elements of cost and risk. Typically, government debt management aims primarily at minimizing the financial burden. However, choosing between various options to meet the government's borrowing requirements, it is suggested that macroeconomic and monetary implications should also be considered and close coordination between fiscal and monetary authorities is required to achieve their objectives.

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