Inflation Targeting in a Small Emerging Market Economy: The Case of Pakistan

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The success of inflation targeting monetary policy in established market economies has generated interest among monetary policy-makers in smaller emerging market economies to explore the adoption of the same, in order to overcome their current inflationary trends. In recent years, Pakistan has adopted several structural reforms that have enhanced the role of markets in its economy. Fiscal consolidation has also cleared the way for its central bank, the State Bank of Pakistan (SBP), to adopt independent monetary instruments to conduct its monetary policy. Steps towards greater liberalization of foreign exchange rates, greater accountability of commercial bank executives, and towards increased transparency of SBP's operations are good reasons to explore the feasibility of a market-based monetary policy aimed at achieving its intermediate targets.

The present study explores the feasibility of an inflation targeting monetary policy for Pakistan. Based on our econometric analysis and experiences of other emerging market countries, we raise a few issues that deserve policy-makers' attention while considering the adoption of an inflation targeting monetary policy. These issues include: the weak impact of monetary policy on domestic prices, the impact of import prices on domestic prices, possible wide fluctuations in output growth resulting from frequent and abrupt adjustment of monetary growth rates when the inflation target is missed, and the lagged adjustment of domestic prices. Some light is also shed on the role of governance structure in determining the monetary and fiscal trends in the country.

1. Introduction

The present study aims to explore the feasibility of an inflation rate targeting monetary policy for Pakistan. For this purpose, we broadly analyze the current economic trends in the country with respect to their suitability for adoption of an inflation targeting monetary policy. We also shed some light on the political

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context of the evolution of macroeconomic policies of the country as this information will be useful in understanding the role of governance in successful achievement of macroeconomic objectives. Finally, we also estimate some basic econometric models to assess the impact of monetary policy on inflation rates in Pakistan and also to obtain broad estimates of the output costs of an inflation targeting monetary policy.

The study is timely and important for several reasons. First, the recent increases in the annual rates of inflation in emerging market economies have become of great concern to their monetary policy-makers. In Pakistan, inflation rate exceeded 9 percent in 2004-2005. The SBP has come under public criticism for adopting an expansionary monetary policy which may have been a contributing factor.[1] Second, budgetary consolidation has made Pakistan's fiscal policy less expansionary in recent years, thereby increasing the country's reliance on private sector for economic growth. On the one hand, these trends indicate greater independence for SBP to adopt its monetary policy. On the other hand, these trends also suggest that SBP will become increasingly vulnerable to public criticisms in the event of a price instability and inflation. Hence, it is important to determine the extent to which monetary policy is able to influence inflation rates in Pakistan through the changes in money supply. Third, using Pakistan as an example, the results of the present study can also contribute to the ongoing debate on choice of inflation rate as an appropriate intermediate target of monetary policy in small emerging market economies.[2] The choice of inflation rate target requires an enhanced role of market-based monetary policy and a high degree of independence of central banks. The recent monetary sector reforms and diminishing role of fiscal policy suggest that the time has come to carefully examine the feasibility of adopting inflation rate as an intermediate target of monetary policy in Pakistan.

The paper is organized as follows: Section 2 discusses the requirements for an inflation targeting monetary policy and broadly assesses if some of those requirements are present in Pakistan's case. Section 3 develops an econometric model of general price level and discusses the results of its estimation. A model for estimating the output cost of inflation targeting monetary for Pakistan is developed and its results are discussed in section 4. Section 5 presents the main conclusions of the study and also summarizes important issues resulting from our

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[1] For example, see Akhtar (2004).

[2] The debate over choice of intermediate monetary targets also involves choice of exchange rate as an alternative intermediate target. However that discussion is beyond the scope of this paper. Petursson (2000) provides a good review of the issues involved with the two monetary policy regimes, i.e. inflation rate targeting and exchange rate targeting.

analysis that deserve policy-makers' attention before embarking on the mission of inflation targeting in Pakistan.

2. Requirements for an Inflation Targeting Monetary Policy

The requirements for an inflation targeting monetary policy have been discussed in Petturson (2000) and in Roger and Stone (2005). The major requirements include: market based financial institutions, an independent central bank, a transparent monetary policy, and a freely flexible exchange rate regime. In the present section, we broadly review the presence or absence of these requirements in Pakistan.

2.1. Presence of Market-based Financial Institutions

Since the early ninetees, Pakistan's financial sector has been going through major reforms. The State Bank of Pakistan has been given greater autonomy under legislations passed first in 1994 and then in 1997 [Arby (2004)]. Privatization of public sector banks is also an important component of these reforms. Regulatory capacity of the State Bank of Pakistan has been enhanced which has introduced greater accountability of commercial bank executives. The banking regulations and supervisions are now more compliant with international standards. The reforms have also focused on consolidation of the various aspects of the financial services including risk identification as well as risk assessment, measurement, monitoring, and control. There is a greater liberalization of interest rates and a greater strengthening of transmission mechanism of monetary policy [Ahmed and Shah (2005)].

As reported by the Government of Pakistan (2005), the above reforms have "brought marked improvement in the financial health of commercial banks in terms of capital adequacy, profitability and asset quality and also greater attention to risk management." (p. 69).

2.2. An Independent Central Bank

Several indicators of the economic and political independence of central banks are used in literature. Jacome and Vazquez (2005) provide a detailed review of these measures. These authors also show a negative relationship between a central bank's independence and inflation.

The economic independence of a central bank refers to the restrictions on its ability to finance the government's budget deficits and to the role it plays in

banking supervision. Political independence refers to the extent to which the central bank is free from the influence of the political regime of the country. Indicators of political independence include central bank responsibilities, the procedures for appointing its governing bodies, the degree of government control over monetary instruments and the procedure for appointment and removal of the head of the central bank.

Due to time constraint and restrictions on the space allotted to this paper, we shed some light on the economic and political independence of the State Bank of Pakistan by concentrating only on one indicator of each category of independence.[3] To assess its economic independence, we review the trends in the fiscal budget of the country during the period 1973–2005. Being the government's bank, the central bank has to provide liquidity to the government to finance any budget deficit. Hence, rising budget deficits could indicate the central bank's pre-occupation with satisfying the government's demand for liquidity.

An indicator of political independence that we will use in this paper is the procedure for appointment and removal of the governor of the State Bank.

Practical experiences of many countries show that the political context has been a significant determinant of the changes and outcomes of macroeconomic policies. The political uncertainties in particular have caused greater volatility in emerging market economies than in established market economies. Calvo and Mishkin's (2003) analysis suggests that the resulting lack of credible fiscal and monetary institutions has rendered the macroeconomic policies irrelevant in many such economies.

Over the past three decades, Pakistan has experienced five civilian and two military governments. The first civilian government of the Pakistan Peoples Party (PPP) took office in 1972 and continued until 1977. The military takeover that took place in 1977 continued up to 1988. Between 1988 and 1999, the country experienced four changes in its civilian rule: 1988–90, PPP; 1990–93, Pakistan Muslim League (PML); 1993–97, PPP; 1997–99, PML. Each of these civilian governments was removed by the office of the President of Pakistan on charges of corruption. The present military government took over from the PML government in 1999. Any single military government stayed longer in power than any single civilian government. Hence, one may characterize a military government rule as one of political continuity / stability which has strong influence on the functioning

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[3] We wish to provide a detailed investigation of the independence of the State Bank of Pakistan in a separate paper.

of economic institutions as well as on the economy. The military governments and the PML governments have generally favored a market- based economic system while the PPP governments have favored greater government involvement in the economy.

To capture the influence of the political environment, our review of Pakistan's fiscal and monetary policy record will be provided within the context of the political regime in place. The review period, 1973–2005, will be divided into two broad political regimes, the military regimes and the civilian regime.

Trends in the budget deficits of the Government of Pakistan (1973–2005)

A summary of Pakistan's fiscal budget balance is provided in Figure 1 for the period 1973–2005.[4]

The figure shows how the levels of government revenues and expenditures and the budget balance as percentages of GDP have changed over time during the period under study. Persistent budget deficits indicate that fiscal policy played a dominant role in achieving macroeconomic objectives of the country during most of the period.

During the rein of the first civilian government that ended in 1977, the country experienced significant political and economic instability. It had just broken up, and was experiencing difficulties of political re-organization in a time when the OPEC oil embargo was already hurting the global economy. The decrease in economic growth rate from about 7 percent to just over 4 percent during this period may have been partially responsible for the decline in government revenues. However, government expenditures remained stable during this period in relation to the GDP. Budget deficit reached a peak of about 10 percent of GDP at one point.

Government expenditures rose during the military regime of the period 1977 to 1988, with a higher pace in the eighties. Revenues also rose during this period but at a slower pace so that the deficits never fell below 5 percent of the GDP. In fact at two times during that military regime, deficits rose to about 10 percent of the GDP. Economic growth was high during this period, remaining close to 7 percent most of the time, but was unstable (Figure 3). Fiscal policy was expansionary.

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[4] Figures 1 and 2 are similar to the graphs in Parkin and Bade (2004), presented for Canada.

Figure 1. A Summary of Fiscal Policy Record of Pakistan, 1973 to 2005
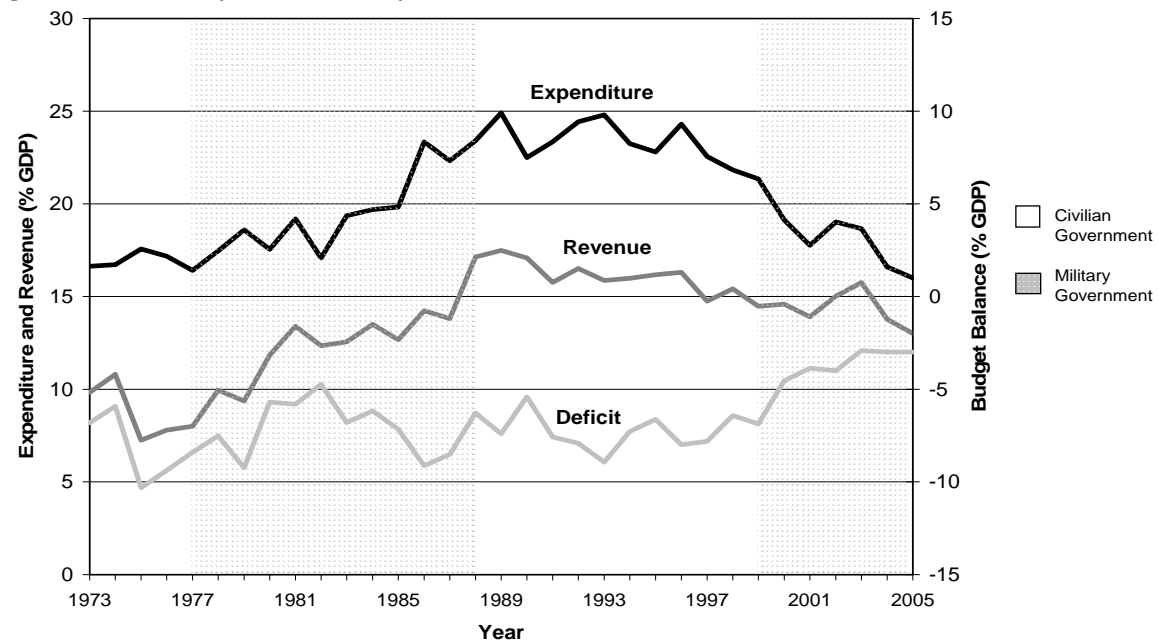
Source: For the period 1973-2004, International Financial Statistics (electronic database); for the year 2005, Government of Pakistan (2005).

During the period from1988 to 1999, the country experienced four changes in civilian governments. Until 1993, when the country had the first PPP government (1988 to 1990) and the first PML government (1990–1993), government expenditures remained high, at about 10 percent of the GDP. Revenues also fell slightly but fiscal policy continued to be expansionary. Since 1993, we observe a declining trend in government expenditures as well as in revenues. The budget deficit had started to shrink even before the present military government took over. This decline in government budget deficit perhaps also reflects the macroeconomic adjustments that the country undertook under the IMF restructuring program. Fiscal policy became relatively less expansionary during this period.

The decline in government expenditures became sharper after the present military government took office of the chief executive of the country. Since then, revenues also declined at a faster rate but the decline in revenues was not as sharp as it was in expenditures so that the budget deficit as a percentage of GDP declined sharply from about 7 percent in 1999 to about 3 percent in 2005. Fiscal policy has clearly become less expansionary.

On the basis of the trends that we observed above, it appears that deliberate attempts to control fiscal deficit in Pakistan started only from 1993 when expenditures were cut. Until 1999, fiscal deficit remained above 5 percent of the GDP, but declined more rapidly over the six years of the present government. This reflects the government's resolve to reduce fiscal deficit to zero by the year 2007 and maintain a surplus thereafter. Fiscal policy is expected to remain less dominant in the near future.

Based on the government's budgetary trends over the period 1973–2005, one could imply that a major role of the SBP has been to provide support for the government's fiscal objectives. However, the decline in budget deficits since 1993 has diminished this role. Hence, the Bank has achieved greater economic independence in recent years, a trend that is expected to continue in near future. The above trends also emphasize the importance of governance structure in determining the role of fiscal policy. Consistency in the trends of fiscal variables is observed only under the present military regime which has ruled longer than any of the civilian governments. The previous military government also had a longer rule than any of the civilian governments but was not able to control expenditures due to various international and domestic factors that prevailed at its time. Market reforms were also not followed as extensively under that regime.

Monetary policy of the State Bank of Pakistan and its political context (1973-2005)

Trends in monetary growth rates are displayed in Figure 2 which, in addition to the political regimes, also identifies the SBP governors to provide some broad idea of the political independence of SBP which is essential for successful operation of its monetary policy. A broad measure of monetary policy, i.e., the growth rate of M2 is assessed.[5]

The SBP governor is appointed by the President of Pakistan for a three-year term and may be re-appointed for another three years. As shown, the SBP governors have changed nine times during the period under review. However, the appointment of a governor did not always coincide with the start of a new military or civilian government. In fact, there is also an example whereby one governor, Mr. Hanfi, appointed during the PPP government, left office for one year when that government was dissolved but returned to office during the new PML government within one year. Mr. Yaqub was appointed as the new governor in 1994 when a PPP government was ruling the country. He continued to be the governor during the second PML government. The present governor, Dr. Hussain, was appointed at the start of the present military government. However, his appointment appears to be a coincidence since Mr. Yaqub had finished his two terms. One may thus conclude that on the basis of the criterion for appointment and removal of its governor, the SBP appears to be politically independent during the period under review. However, as we will see below, the SBP may not have met another criterion for political independence, i.e. the government's control over monetary instrument until 1999.

The trends shown in Figure 2 show five distinct phases of monetary policy. In the first phase, between 1973 and 1977, there was a civilian government. Monetary growth was largely rapid.[6] The monetary expansion of this stage is mainly attributed to internal events such as decline in aid flows and crop failures, as well

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[5] Data on M2 are obtained as the total of "Money" and "Quasi Money", from the IFS sheet on Pakistan (lines 34 and 35). These data differ from the data on M2 reported in State Bank's *Statistical Bulletin* as IMF treats the following items separately: 1) deposits of international non-monetary organizations at the State Bank and the deposits of non-resident non-banks at scheduled banks, 2) counterpart funds, 3) government deposits at scheduled banks, and 4) postal savings deposits. To date, the IFS data are available only until 2004 while the State Bank has recently published provisional figures for 2005 (these run only upto May instead of June). We note that over the past four years, the total of "Money" and "Quasi Money" data exceeded the State Bank's M2 data by an average of about 9 percent. We therefore obtained the 2005 figures by adding about 9 percent to the State Bank's M2 data.

[6] The negative monetary growth of 1974 coincides with the issuance of new currency notes.

Figure 2. A Summary of Monetary Policy Record of Pakistan, 1973 to 2005
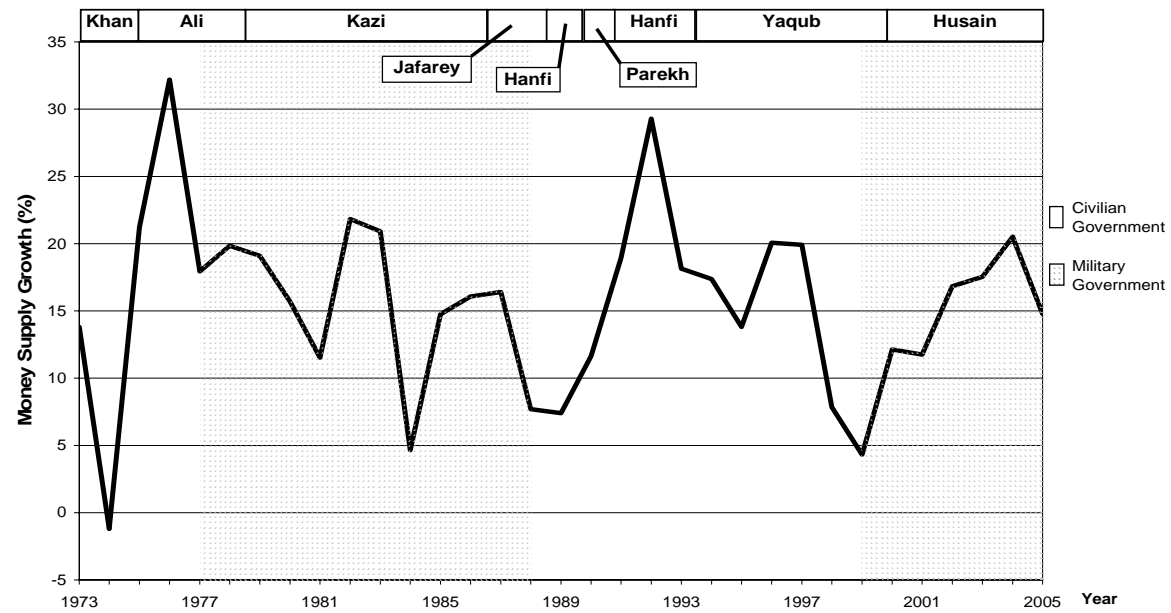
Source: For the period 1973-2004, International Financial Statistics (electronic database); for the year 2005, Government of Pakistan (2005); for the tenure of each governor, Arby (2004).

as external events such as the first oil embargo of 1970s. These events forced the government to resort to deficit financing to correct the fiscal imbalance as reported in Figure 1.

The second phase which started with the new military government in 1977 continued until it was terminated in 1989. During that phase, the monetary policy was largely contractionary, however, money supply growth was unstable. The monetary expansion of the early eighties was the result of deficit financing for which the government relied heavily on the SBP and on external borrowing. The resultant high inflation rate (about 12.5 percent during 1981 and 1982) and heavy external indebtedness caused the government to start borrowing from non-bank sources during 1983 to 1990. Monetary growth shrunk as a result, bringing inflation under control (6 percent on average). The high fiscal deficit, however, kept SBP vulnerable to political influence.

The third phase of monetary policy began in 1989 with the election of the PPP government. Monetary policy became expansionary until 1991 with monetary growth reaching as high as 30 percent in 1991. This monetary growth was essential to support the high level of government expenditure faced with declining revenues (Figure 1) arising from a lack of domestic resource mobilization and the shortage of foreign loans.

In its fourth phase, beginning in 1991, the monetary policy became contractionary with a civilian government still in power (the PML government). This change may be viewed as a consequence of the IMF stabilization programs that had started to have their impact on the country's fiscal deficits. However, stability of monetary growth remained a challenge, probably again due to disruptions in the availability of foreign funds, time and again, forcing the government to use SBP for financing its budget deficit.

The contractionary tendency of monetary policy that began in 1991 continued until 1999 when the current military government took office. Since then, monetary policy, now in its fifth phase, has been expansionary. However, this last expansionary phase of monetary policy is distinct from the previous two expansionary phases in three respects: 1) it is steady, 2) it has been gradual, and most important 3) this is the first time in Pakistan that an expansionary monetary policy has been adopted not to finance the fiscal deficit but to provide greater liquidity to the private sector.[7]

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[7] As noted earlier, fiscal deficits have been on decline since late 1990s.

Finally, it is worth-noting that any of the five phases of monetary policy described above can not be associated with the appointment of a new governor. These phases are more related with the change of political regimes in the country. Hence, while the State Bank meets the criterion of political independence on the basis of the appointment and removal of its governors it does not appear to be politically independent when one views its monetary policy record.

2.3. Transparency of Monetary Policy

Since the turn of the present century, SBP has adopted several measures to increase the transparency of its operations in order to enhance the confidence of the private sector. For example, the Bank publishes a quarterly report and a bi-annual monetary policy statement, one in January and one in July, that describe the state of the economy, the monetary policy targets and the tools to be used to achieve those targets during the next period. The Bank also publishes data on its website that provides updated information on the state of the economy. The positions of its assets, liabilities, and an annual review of the economy are presented in the Annual Report. Very recently, a new monthly publication, *Inflation Monitor* has been added to the list of its publications. The SBP Governor makes frequent speeches before the financial community to provide an informal review of the economy and the directions the Bank wants to take.[8] The Bank's Board of Directors consists of members from business and government sectors as well as from academic community who come from all four provinces [Arby (2004]. The Bank also plans to form a Monetary Policy Committee comprising of independent external members that will meet on specified dates to decide the course of the SBP 3-day discount rate. All of these reforms at the SBP suggest its commitment to raise its credibility in money and foreign exchange markets.

2.4. Flexible Exchange Rate

Arby (2004) discusses the evolution of the present exchange rate system in Pakistan. Under the 1947 Foreign Exchange Regulation Act, the State Bank of Pakistan has been provided the responsibility for management and administration of the foreign exchange system of the country. Pakistan has undergone several foreign exchange rate systems since 1947. The country's currency remained linked to the Pound Sterling up to September 1971 and then to the US dollar up to 1982. The collapse of Bretton-Woods arrangements in early 1970s and adoption of floating exchange rate regime by major trading countries of the world caused many countries to move to a floating exchange rate regime. However, Pakistan

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[8] These speeches are also posted on the Bank's web site [www.sbp.org.pk].

moved to a managed floating exchange rate system in 1982. Under this system, the value of the rupee was determined on daily basis, with respect to a basket of currencies of Pakistan's major trading partners. Frequent adjustments were made in the value of the country when circumstances so warranted.

A two-tier exchange rate system was introduced temporarily soon after the nuclear detonation of 1998. Its purpose was to provide some insulation to the country's economy from the adverse effects of the international sanctions imposed due to the nuclear explosion. The official exchange rate was fixed at Rupees 46 per US dollar. A certain percentage of an economic agent's demand for foreign exchange was to be met at this official rate and the rest was to be met from inter-bank market at marker rate. The exchange rate was unified on 19 May 1999 with the introduction of market-based floating exchange rate system. However, there still remained an unofficial ceiling on the Rupee / Dollar parity which was abolished in July 2000 after which the Pakistani rupee is mostly under a free float although monetary policy is still used to smooth out its volatility.

At present, Pakistan has a more flexible exchange rate system than in the past, although the State Bank intervenes in the foreign exchange market to avoid large fluctuations in the external value of the rupee. Such interventions may be viewed as a violation of a major requirement for an inflation targeting regime.

3. Effectiveness of Monetary Policy in Determining the Inflation Rate

The effectiveness of monetary policy in influencing economic growth and price level in a developing country, where markets have not yet completely developed, has been a contentious issue. Based on empirical research many economists have argued that the presence of unorganized financial institutions, lack of direct relationship between interest rates and investments, and poor governance render monetary policy ineffective in influencing economic growth and price level in a developing country [World Bank (1991); Fry (1988); Jones and Khilji (1988); Pasha et al. (1995)].[9] Despite their limitations, these unorganized financial institutions remain an integral component of the general economic system in such a country. Hence, they represent a key element in the overall stabilization programs of the International Monetary Fund (IMF) and the World Bank.[10]

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[9] For a review of literature on monetary policy issues relevant to Pakistan, see Zaidi (1999).
[10] Financial systems provide a variety of needed services including mobilization of savings, risk limitations, credit allocation, foreign exchange trading, etc.

3.1. An Econometric Model for Price Level Determination in Pakistan and Its Estimation

In this section, a model of general price level is developed to analyze the impact of domestic and foreign economic variables on the domestic price level growth. The model is given below.

$$P_t = f(P^m_t, MS_t, Y_t) \tag{1}$$

$$P^m_t = ER_t * PF_t \tag{2}$$

$$P_t = f(ER_t * PF_t, MS_t, Y_t) \tag{3}$$

This model relates the general price level (P_t), to the domestic price level of imports, domestic money supply (MS_t), and domestic output level (Y_t). The imports price level is the product of the foreign exchange rate (ER_t) measured as Pakistan rupees per US dollar, and foreign price level (PF_t). The subscript t refers to time period. The log-linear formulation of the model is:

$$Ln\ P_t = d_0 + d_1 Ln\ (ER_t * PF_t) + d_2 Ln\ MS_t + d_3\ Ln\ Y_t + u_t \tag{4}$$

Where we expect $d_1, d_2 > 0$, and $d_3 < 0$.

Pakistan is a small open economy which operates below full employment and relies on imports for meeting the domestic demand for not only intermediate and capital goods but also for certain consumer goods. The annual share of capital goods and raw materials required for capital and consumer goods rose from about 84 percent in 1990–91 to about 91 percent in 2003–04 (Appendix 2). It is generally believed that imported inflation has been an important factor in Pakistan's inflation record, in particular, since the early 1970s. The changes in domestic prices of imports due to changes in exchange rate and world market prices (foreign prices) can be expected to influence the domestic price level significantly. However, some researchers [Hyder and Shah (2004)] have recently argued that the "exchange rate pass-through" effect in Pakistan is insignificant suggesting that exchange rate changes do not significantly affect the general price level. The model given by Equation (2) restricts the coefficients of the exchange rate and foreign price variables to be equal in sign and magnitude. Therefore, we have modified the model to include the exchange rate and foreign price level variables separately so that their effects can be evaluated separately. The resulting model is given by Equation (5) below:

$$\text{Ln } P_t = a_0 + a_1 \text{Ln } ER_t + a_2 \text{Ln } PF_t + a_3 \text{Ln } MS_t + a_4 \text{Ln } Y_t + u_t \qquad (5)$$

Where, we expect $a_1, a_2, a_3 > 0$, and $a_4 < 0$.

The preceding model assumes that price level adjusts instantaneously to its equilibrium level (P^*_t) in the current period in response to the changes in the explanatory variables (i.e. $P_t = P^*_t$). However, in a typical developing country it is reasonable (for various reasons) to assume that prices do not adjust instantaneously. Under the assumption that prices do not fully adjust in the current period, the following partial adjustment mechanism is introduced into the model.

$$\text{Ln } P_t - \text{Ln } P_{t-1} = w [\text{Ln } P^*_t - \text{Ln } P_{t-1}] \qquad (6)$$

Where $0 \leq w \leq 1$

Substitution of Equation (6) in Equation (5) yields the following partial adjustment (or disequilibrium) formulation of the model.

$$\text{Ln } P_t = b_0 + b_1 \text{Ln } ER_t + b_2 \text{Ln } PF_t + b_3 \text{Ln } MS_t$$
$$+ b_4 \text{Ln } Y_t + b_5 \text{Ln } P_{t-1} + u_t \qquad (7)$$

Where, $b_0 = wa_0$, $b_1 = wa_1$, $b_2 = wa_2$, $b_3 = wa_3$, $b_4 = wa_4$, and $b_5 = 1 - w$.

If b_5 is statistically significant, the long run elasticities would be given as follows:

$a_1 = b_1/(1 - b_5)$, $a_2 = b_2/(1 - b_5)$, $a_3 = b_3/(1 - b_5)$, and $a_4 = b_4/(1 - b_5)$.

The model given by Equation (7) was estimated by the method of Ordinary Least Squares (OLS) using quarterly data for the period 1982–2004.[11] Two versions of the model were estimated using consumer price index (CPI) and wholesale price index (WPI) as alternative measures of domestic price level. The exchange rate is measured as Pakistan rupees per US dollar and the US wholesale price index is used as a proxy for foreign price level.[12] Broad money supply (money plus quasi money) measured in nominal terms is used as the domestic money supply variable. The quantum index of manufacturing production is used as a proxy for domestic output level, due to the unavailability of quarterly data on aggregate output. All of the data used been obtained from the electronic version of the

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[11] We conduct our analysis for the post-1981 period because the country moved to a fluctuating exchange rate regime since 1982.
[12] According to Government of Pakistan (2005), about half of the Pakistani imports originate from the USA, Japan, Kuwait, Saudi Arabia, Germany, the UK and Malaysia.

International Financial Statistics (IFS) that are produced by the IMF.[13] The electronic files provide consistent series on index numbers.[14]

Several events that took place at or very close to the turn of the millennium may have generated structural breaks in the model. Theses events include the 1990s adoption of monetary sector reforms and greater fiscal consolidation, change of government as well as the change of SBP governor in 1999, unification of foreign exchange rate and the adoption of a greater floating (flexible) exchange rate system in May 1999. The model was modified to accommodate for possible structural instabilities using dummy variable techniques as follows:

$$\text{Ln } P_t = c_0 + c_1 \text{Ln } ER_t + c_2 \text{Ln } PF_t + c_3 \text{Ln } M_t + c_4 \text{ Ln } Y_t + c_5 \text{ Ln } P_{t-1}$$
$$+ c_6 D_t + c_7 D^* \text{Ln } ER_t + c_8 D^* \text{Ln } PF_t + c_9 D^* \text{Ln } MS_t + c_{10} \text{ Ln } Y_t$$
$$+ c_{11} D^* \text{Ln } P_{t-1} + v_t \tag{8}$$

where, D=1 for the period 1982-1999, and 0 otherwise.

In the process of estimating Equation (8), only the statistically significant dummy variables were retained in the estimated equations. The estimated results from those final equations, after correcting for first order serial correlation by the Cochran-Orcutt method, were used to estimate the short-run and long-run elasticities of consumer and wholesale prices with respect to each independent variables included in Equation 8. Those elasticities are reported in Table 1.[15]

3.2. Discussion of Results of the Price Model

The structural instability in 2000 resulted in a decrease in both the short-run and long-run elasticities of CPI with respect to PF_t, but left all of the other CPI elasticities unaffected (Table 1). Hence, the effect of import prices on the CPI inflation has fallen in the post-1999 period, which is identified by a new government, new SBP governor, and greater liberalization of foreign exchange rates. However, in the case of WPI model, the post-1999 period is characterized by an increase in the estimated coefficient of money supply in addition to a decrease in the coefficient of the lagged price level. The decrease in the coefficient of the lagged price level indicates a substantial increase in the coefficient of partial adjustment (w) in the model from 0.14615 to 0.75627. This increase in the speed

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[13] Unit root tests were applied to verify stationarity of the series prior to estimation of the model.
[14] Saint Mary's University subscribes to the electronic database of the IFS.
[15] The authors can provide results of regression estimates upon request.

Table 1. Estimated Short-Run and Long-run Elasticities Based on Price Model

Variable	Short run 1982-99	Short run 2000-04	Long run 1982-99	Long run 2000-04
CPI elasticiteis				
Exchange rate	0.00419	0.00419	0.02597	0.02597
Foreign Price	0.25639	0.04794	1.58883	0.29708
Money Supply	0.07856	0.07856	0.48683	0.48683
Output	-0.035	-0.035	-0.21671	-0.21671
WPI elasticities				
Exchange rate	0.01766	0.01766	0.12083	0.02335
Foreign Price	0.24893	0.24893	1.70325	0.32915
Money Supply	0.06645	0.26311	0.45467	0.3479
Output	-0.028	-0.028	-0.19152	-0.03701

of adjustments may have been a direct result of the policies of economic liberalization and deregulation. The structural break also resulted in an increase in the short-run elasticity of WPI with respect to money supply. However, all of the long-run elasticities of WPI, including money supply elasticity, decreased after 1999 as a consequence of the increased coefficient of partial adjustment. The estimated short-run and long-run elasticities are all less than unity for the most recent period 2000-2004, indicating that Pakistan's general price level is inelastic with respect to all of the variables in the model. However, as expected, the long-run elasticities are greater than their respective short-run elasticities in magnitude.

For the sub-period 1982−1999, the estimated elasticity with respect to foreign price level has been the largest of all in the short-run and long-run, in both the CPI and WPI models. This clearly indicates a greater degree of sensitivity of domestic prices to foreign prices during the pre-2000 period. The effect of foreign prices on domestic prices appears to have diminished since 2000. However, the elasticity with respect to money supply turned out to be the largest of all among the short-run and long-run elasticities for the sub-period 2000−2004, in both the CPI and WPI models. This indicates that in the post-1999 period, monetary policy has had a greater influence on domestic prices than previously and now dominates over the effect of all other variables. The elasticities with respect to ER and PF are significantly different and show that the domestic price level is more sensitive to changes in PF than in ER. The fact that estimated elasticity with respect to ER is statistically insignificant and nearly zero supports the view that the exchange rate pass-through is not strong in the case of Pakistan.[16]

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[16] A similar result has been reported by Hyder and Shah (2005).

4. Output Cost of Inflation Targeting Monetary Policy

One important consideration in the adoption of inflation targeting monetary policy is its cumulative effect on the output gap.[17] During the process of adjusting money supply to arrive at the target rate of inflation, output losses are inevitable. The 'sacrifice ratio' provides an estimate of this loss of output. This ratio is a measure of the cumulative percentage decline in output below the potential level, resulting from a one percentage decline in inflation that is caused by a contractionary monetary policy. Following a study of Kapur and Patra (2004) for India, econometric estimates of a simple output-inflation trade-off model were obtained for Pakistan using annual data for the period 1982–2004. Space limitations prevent us from presenting detailed results of the econometric model but we can provide those results to the reader upon request.[18]

Based on econometric estimates of the output-inflation trade-off model, when the CPI inflation is considered, the sacrifice ratio is 0.87.[19] This result indicates that a one percent decline in inflation rate caused by a permanent reduction in monetary growth rate would result in a cumulative output (GDP) decline of 0.87 percent below its potential level.[20] Inflation in Pakistan was about 7.4 percent in 2003–04 and 9.3 percent in 2004-05. For the three-year period 2000–03, the average annual inflation rate in Pakistan was about 3.4 percent. Hence, if monetary policy were to target the inflation rate of 3.4 percent, the resulting cumulative decline in output below its potential level (trend) would be about 5.1 percent. A simple trend line of GDP growth fitted using the data since 1982 shows that the actual GDP was above its predicted (trend) level by about 6.6 percent in 2005. Hence, if the monetary policy were to target a rate of inflation equal to that of 2000–03, a negative output growth would be inevitable.

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[17] An output gap is defined as the difference between the actual and potential outputs (say GDP), both measured in real terms. In empirical literature, potential output in developing countries is measured as the trend output which is obtained as the predicted value of output from an equation that regresses real GDP on the time trend. For an example, please see Kapur and Patra (2004).

[18] Ordinary Least Squares estimates of the following output-inflation trade-off model were obtained. $\Pi_t = \Pi^e + a\,(Y_t - Y_t^*)$. Where Π_t, Π^e, Y_t, and Y_t^* denote current inflation, expected inflation, current actual output and current potential output, respectively. The sacrifice ratio is given by $1/a$. The model is based on an expectations-augmented Philips curve.

[19] CPI inflation is a usual target of monetary policy.

[20] It is important to note that estimations of sacrifice ratio focus on reducing inflation on a permanent basis as a deliberate strategy by monetary policy. Temporary reductions in inflation that generate due to other reasons, such as a favorable supply shock, are not incorporated. For India, Kapur and Patra (2004) used several modifications of the output-inflation trade-off model which we used for our study (described in Appendix 3) and provided a range of sacrifice ratios varying from 0.7 to 2.1.

5. Concluding Remarks

Pakistan's monetary sector has undergone many market-based reforms since the early 1990s. The 1997 State Bank of Pakistan Act has strengthened the autonomy of its central bank. At the same time, declining budget deficits should result in greater economic independence of the central bank. The process of appointment and removal of the Bank's governor meets the criteria of political independence as laid out in literature. Finally, several measures have also been adopted by the State Bank to increase the transparency of its operations in order to enhance private sector confidence.

Econometric results of our price model show that the effect of monetary policy on domestic price level in Pakistan has increased in the post-1999 period. Given this result and the new monetary environment of the country, issues regarding the choice of an inflation-targeting monetary policy can be discussed. Some of these issues are discussed below in the light of our econometric analyses.[21]

Exchange rate pass-through

A flexible exchange rate system is considered an important component of an inflation targeting regime. The experience of many developing countries including Pakistan has been one of sharply depreciating domestic currencies under flexible exchange rates regimes. Such depreciations can lead to substantial increases in the rate of inflation undermining the credibility of the inflation-targeting regime in a country where the exchange rate pass-through is very strong. The results of the present study show that the exchange rate elasticity of the domestic price level is nearly zero suggesting that the exchange rate pass-through is not strong in Pakistan. Therefore, one could argue on the basis of these results that the depreciation of Pakistan rupee may not pose a serious difficulty for an inflation-targeting regime. However, a certain degree of caution must be exercised in making such an argument as the weak pass-through is not observed under a completely flexible exchange rate regime.

Imported inflation

Inflation resulting from increases in foreign prices of imports (imported inflation) has been a salient feature of inflation experience in many developing countries,

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[21] The observed increase in the rate of inflation over the last two years is another important reason for a careful investigation of the feasibility of adopting inflation targeting monetary policy.

Table 2. Composition of Imports, Pakistan (percentage share)

Year	Capital goods	Raw material for		Consumer goods	Total
		Capital goods	Consumer goods		
1990-91	33	7	44	16	100
1992-93	42	6	38	14	100
1994-95	35	5	46	14	100
1996-97	37	5	43	15	100
1998-99	31	6	47	16	100
1999-00	26	6	54	14	100
2000-01	25	6	55	14	100
2001-02	28	6	55	14	100
2002-03	31	6	53	10	100
2003-04	35	7	49	9	100

Source: Government of Pakistan (2005).

particularly under trade liberalizations, in the recent past. Imported inflation can pose serious difficulties in forecasting and achieving inflation targets in countries which depend heavily on imports. The import to GDP ratio in Pakistan is about 15 percent. The present study has shown that import prices have a statistically significant impact on domestic prices. This should be of concern for the authorities if Pakistan were to adopt inflation targeting even though the foreign price elasticity of general price level is less than unity. As shown in Table 2, most of the imports in Pakistan comprise of capital goods and of raw materials needed for the production of consumer goods. The demands for these imports tend to be inelastic with respect to their prices. Hence, the country may not be able to turn the balance of trade and terms of trade in its favor if it were to switch completely to a floating exchange rate regime, as is required under an inflation-targeting monetary policy. Stability of exchange rate partially offsets such effect.

Effectiveness of monetary policy

The results of this study show that money supply is one of the statistically significant variables affecting the general price level and therefore, monetary policy can affect domestic inflation. In fact, the elasticities with respect to money supply are the highest of all the estimated elasticities. However, both CPI and WPI remain inelastic with respect to money supply both in the short-run and in the long run. Hence, a small change in inflation rate would require a substantial change in money supply growth rate. Roger and Stone (2005) have shown that countries which have adopted inflation rate targeting policy tend to miss their targets about

40 percent of the time and often by substantial amounts for prolonged periods.[22] As a consequence, countries have to keep adjusting their monetary growth rate off and on. If the same experience is repeated in Pakistan and the monetary policy has to keep adjusting money supply growth rate, a large fluctuation in money supply and economic growth could occur for a prolonged period. This would lead to economic instability and uncertainty defeating the major purpose of an inflation targeting policy.

Effect of output growth

The interest among authorities in inflation targeting in Pakistan, like in many other developing countries, is partly driven by their interest in bringing down higher rates of inflation in addition to minimizing fluctuations in the rate. The estimates of the present study indicate that domestic output growth can help reduce inflation further in addition to monetary policy, if the authorities were successful in promoting economic growth while at the same time, following a restrictive monetary policy. During a period when fiscal policy also runs in the direction of a contractionary stance this may be a challenging task. The likelihood that inflation targeting has a negative impact on output growth in the initial stages makes it more difficult.

Output cost of inflation reduction

An important issue with respect to the use of monetary policy for controlling inflation rate is the generation of recessionary trends. Using a basic econometric model of output-inflation trade-off, we estimated the sacrifice ratio to be 0.87. This means that to reduce current inflation rate to its pre-2004 level, Pakistan's economy should be prepared to sacrifice the output (GDP) by about 5.1 percent. This sacrifice should be compared with the benefits of controlling inflation rate which can be the subject of a separate paper.[23]

Lags in adjustments

The large and statistically significant magnitude of the lagged price elasticity in both CPI and WPI versions of our model highlights the importance of taking lag adjustments into account in forecasting future inflation rate for the purpose of

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[22] This outcome is attributed to the flexibility of the framework and its high standards of transparency and accountability.

[23] Such a paper may also consider which segments of Pakistani society are more likely to enjoy the benefits of inflation reduction and which sections are to be hurt by any recessionary trends that may develop due to monetary contraction.

setting realistic targets and achieving them. The lags in adjustments may be due to various factors including market imperfections which have to be fully investigated and understood before an inflation targeting policy is launched. (Many researchers have included lagged price level as a measure of expectations in the models of price level. If one views the model estimated in this model as an equilibrium model of price level incorporating expectations, the coefficient of lagged price variable can be interpreted as indicating the important role of expectations on price level and inflation in Pakistan. Inflationary expectations are affected by economic instability and uncertainty. A credible central bank is also necessary for formation of price expectations in the desired direction.)

Among the findings of the present study the lack of exchange rate pass-through stands in favor of inflation targeting. However, the other findings including the significance of imported inflation, relatively low impact of monetary policy on inflation, possibility of significant output fluctuations, lag adjustments in price level, and the strong likelihood of considerable loss of output at the initial phase raise concerns about the feasibility and effectiveness of inflation targeting.

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