Exchange Rate Flexibility and the Monetary Policy Framework in Pakistan

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I. Introduction

The main purpose of this paper is to discuss the choice of exchange rate regime and the implications of alternative monetary policy frameworks for Pakistan. A number of important policy questions emerge from the paper's anlayis: What is the appropriate exchange rate regime for Pakistan? What is the link between exchange rate developments and competitiveness? Apart from the exchange rate regime, what can Pakistan do to increase competitiveness and to reduce its vulnerabilities to external shocks (for example, export diversification and financial deepening)? What are the implications or options for monetary policy? This paper discusses these issues, focusing, in particular, on the tension between the two key exchange rate policy objectives of maintaining a low inflation rate, which is supported by exchange rate stability, and promoting external competitiveness, which sometimes could require exchange rate adjustments to take account of inflation differentials with trading partners or productivity shocks.

Since a flexible exchange rate regime can facilitate the pursuit of domestic stabilization objectives with open capital markets, the paper focuses on several types of monetary policy frameworks that are consistent with the central objective of maintaining low inflation under a flexible exchange rate regime. Each of these options focuses on a different long-term nominal anchor, which is implied in the names attached to these frameworks:

monetary targeting, nominal income targeting, and inflation targeting. The paper discusses in some detail the issue of nominal anchor, and in particular, the pros and cons of monetary, nominal income, and inflation targeting in the context of the Pakistan economy. Before turning to inflation targeting and the conditions that would need to be addressed in the successful transition to that regime in Pakistan, the paper provides a brief discussion about monetary and nominal income targeting.[1]

The paper starts with a brief discussion of Pakistan's exchange rate arrangement, its evolution, the factors underlying the decisions behind the adjustments to the exchange rate regime, and the impact of recent exchange rate developments on external competitiveness. The analysis emphasizes that the impact of external shocks on domestic economic activity depends in part on the nature of the exchange rate regime, and this issue becomes all the more important in economies with a narrow export base. It then turns to the core issue of the trade-off between price stabilization and competitiveness of exports. This discussion points to the important role of policy credibility in the choice of exchange rate regime, which leads to the analysis in the bulk of the paper on the complications arising from nominal anchors that are based on the exchange rate, and the choice between monetary, nominal income, and inflation targeting. At the risk of oversimplification, the paper concludes that the State Bank of Pakistan could move towards direct inflation targeting, which has been adopted in many emerging market countries, but as with any other monetary framework, there are a number of

[1] In recent years, a growing number of emerging market economies have adopted inflation targeting, because during the mid-to-late 1990s, monetary aggregates became increasingly difficult to gauge—reflecting the instability in money demand—while financial crises contributed to the several episodes of collapsing exchange rate pegs.

issues that would need to be addressed, including meeting certain preconditions to effect a successful transition to inflation targeting. However, these preconditions are not a sine qua non in that the success of a new monetary regime depends more on the authorities' commitment to drive institutional change after the adoption of an inflation targeting framework than in ensuring that all of the "preconditions" are met at the outset.

II. Choice of the Exchange Rate Regime

Pakistan has made adjustments to its exchange rate regime over the last two decades, including currency depreciation, mainly with the objective to maintain inflation at reasonable levels, to restore external competitiveness, and to cope with external shocks. In particular, the exchange rate has played an important role in terms of the flexibility in Pakistan's macroeconomic framework to deal with changes in the external terms of trade because of the narrow export base. On some occasions, the Pakistan rupee was depreciated in discrete steps against the US dollar in high single-digit levels, as the authorities became increasingly concerned about the adverse impact of the real appreciation on external competitiveness.

The State Bank of Pakistan (SBP) has accorded a high priority to achieving a low rate of inflation, but the monetary policy also aims to support the national objectives of economic diversification and export competitiveness.[2] By attempting to keep the real effective

[2]The last dozen or so years have been the sunshine days for Pakistan's monetary policy, as the two maestros—former Governor Muhammad Yaqub and the present Governor Ishrat Hussain—steadily navigated the turbulent waters of fiscal dominance, terms of trade shocks, banking crises, and much more to bring the ship to the safe anchor of price stability. Relatedly, there was the successful transition from direct credit controls to indirect instruments for monetary control, and a seachange in prudential regulations, bank supervsion and the health of the banking system. All in all, it is fair to say that SBP is at the forefront of international best practice in several areas of central banking amongst emerging market countries.

exchange rate (REER) of the Pakistan rupee stable, the authorities aim to avoid erosion in external competitiveness.[3] However, developments in the external sector, such as the sharp fluctuations in the terms of trade, have impinged on the conduct of monetary policy, which has been geared towards the task of reconciling inflation control with external competitiveness. The nominal effective exchange rate (NEER) and the real effective exchange rae (REER) have, on occasions, not moved in tandem because the inflation rate has differed from the rates in major trading partners. Recent work by the IMF staff has shown that based on the Reinhart and Rogoff (2002) approach to classifying de facto exchange rate regimes, the Pakistan rupee appears to be de facto pegged to the U.S. dollar.[4] Recently, the de facto peg has led to a modest appreciation of the REER because of the higher domestic inflation relative to partner countries, but the real exchange rate level still appears to be broadly appropriate. This conclusion is supported by robust export growth, the small variation of the real effective exchange rate, and a small current account deficit.

As mentioned earlier, the authorities have adopted various exchange rate options during the past decades and, more recently, they have been refining the monetary policy framework to focus on inflation modeling and control, which has implications for the exchange rate regime. The rest of this section discusses some the exchange rate options that

[3]The State Bank of Pakistan is able to have a de facto peg against the US dollar and and retain some monetary independence, because financial markets are not adequately integrated with international capital markets to permit full arbitrage.

[4]Reinhart and Rogoff (2002) make their de facto exchange rate regime classifications as follows: if the probability is over 80 percent that the month-on-month exchange rate movements will be less than +/- 1 percent over a 24-month moving window, the regime is classified as a de facto peg. If the probability is over 80 percent that the month-on-month exchange rate movements will be less than +/- 2 percent over a 24-month moving window, the regime is classified as a de facto band.

have been adopted by other countries, with a view to point out both the advantages and disadvantages that are particularly relevant in the context of the Pakistan economy.

Economists generally group the available options of a country in determining the monetary linkage between its economy and the rest of the world around three polar regimes: (i) flexible regime where the country lets its currency float in the exchange markets against other currencies; (ii) fixed regimes where the country fixes the price of its currency against a specific foreign currency or a basket of foreign currencies; and (iii) intermediate regimes where the country lets its currency float to some extent, but intervening to limit those fluctuations according to some pre-determined parameters, such as in the case of target zones, crawling bands, etc.. Other finer categories of exchange rate regimes may be derived from various combinations of these three main categories, ranging from the most flexible (pure floating regime with no foreign exchange market intervention by the central bank) to the most fixed-rate commitment (dollarization or monetary union).

One of the intermediate exchange regimes is the fixed-but-adjustable exchange rate regime, which has been recently much criticized in the literature because it has the problem of being particularly vulnerable to speculative attack. In the wake of the Asian financial crisis, there was a growing consensus that the intermediate exchange regimes were not sustainable because of large scale capital flows, which had limited the options to either having free-floating or firm-fixing.[5] This proposition was also referred to as the impossible trinity in international monetary economics, which states that an open economy cannot

[5] See, for example, Fischer (2001), Frankel (1999), Mussa et. al. (2000), Obstfeld and Rogoff (1995), and Williamson (2000).

achieve all three goals of exchange rate stability, monetary independence, and financial market integration simultaneously. It can only achieve two of the three goals at a given time: for example, the two goals of exchange-rate stability and monetary independence can be attained by giving up capital mobility. Alternatively, the two goals of exchange rate stability and capital mobility can be achieved at the expense of giving up the autonomy of monetary policy. The third approach would be to have monetary independence and free capital mobility, at the expense of exchange rate volatility.

In the context of the impossible trinity in an open economy, some economists would argue that the increasing globalization of financial markets—Pakistan is no exception to the trend of a high degree of cross-border capital movements—has pushed countries toward the region where the choice should be narrowed down to choosing either free-floating or firm-fixing. More specifically, Pakistan's external capital account is expected to register larger gross transactions, attributed both to increasing foreign direct and portfolio investment due to the diversification and growth of the domestic market, and also to increasing portfolio investment abroad, as domestic residents are given new opportunities to invest abroad. However, while recognizing that greater financial integration imposes constraints on monetary policy, it is still the case that even small open economies, such as Pakistan, can choose an intermediate solution between floating and fixed rates under perfect capital mobility so long as there is a credible nominal anchor for the conduct of monetary policy.

III. Nominal Anchors, Exchange Rate Rules, and External Competitiveness

The importance of nominal anchor is brought out most clearly in those situations where exchange rate policy is designed to maintain external competitiveness at a level

consistent with a sustainable balance of payments position. Like the SBP, central banks in many emerging markets have focused on the critical role of the real exchange rate in maintaining external competitiveness, and various approaches have been followed to ensure that the exchange rate does not deviate far from its equilibrium level. Some central banks have even gone to the extent of adopting a real exchange rate rule, under which the nominal exchange rate is automatically adjusted in response to a differential between domestic and foreign price levels, that seemingly provides a monetary framework that can prevent the emergence of large and sustained misalignments of relative prices and, thereby, avoid an external imbalance. By allowing the nominal exchange rate to adjust frequently and by relatively small amounts, the real exchange rate can be kept at an appropriate level without imposing undue adjustment costs on the economy, thus removing the issue of devaluation from the political arena. Furthermore, a real exchange rate rule will provide market participants with useful information on the likely evolution of relative prices, and thus avoids production decisions based on incorrect expectations. However, real exchange rate rules may bring with them major disquieting implications for macroeconomic stability, even if they help to address the issue of external competitiveness. In particular, the adoption of a real exchange rate target, which means pursuing a real target with a nominal instrument, might leave a small open economy without a nominal anchor for the domestic price level, and shocks to domestic inflation might acquire a permanent character under some circumstances. This is particularly the case if the target real exchange rate is set at an overly depreciated level. Needless to say, there is often a lot of uncertainty on what is the equilibrium exchange rate, and different models could predict different rates. It would be desirable, nonetheless, to preserve some of the advantages of real exchange rate rules—specifically, the assurance

provided by such rules to potential investors in the traded goods sector that the real exchange rate will not be allowed to get too far out of line—without sacrificing domestic price stability.

The issue of a competitive exchange rate versus domestic price stability bears special emphasis in Pakistan because, notwithstanding the significant progress made in a number of areas, risks to the economic outlook remain, not least of which is the lack of export diversification. Reflecting Pakistan's reliance on a narrow range of export products, the external terms of trade have shown significant fluctuations. Furthermore, the trade balance has exhibited considerable variations not only because of the movements in export prices in major industrial country markets, but also because of the changes in the prices of key imported goods. Many risks are beyond control, for example, oil prices might rise further, as in the recent past, and there is also the problem of weather-related production shocks. In such circumstances, external competitiveness and the need for export diversification continue to be the major tasks to which the authorities have given a great deal of attention.

Since the economy is highly vulnerable to shocks, the authorities have taken measures to improve the diversification of the economy by enhancing infrastructure, improving labor skills and productivity, but more remains to be done in this area. The quality of the transportation and communications infrastructure, which has been cited as a constraint by private investors, should be upgraded expeditiously.[6]

[6] There are good prospects for a further opening of Pakistan's export markets. The recent trade agreements should have a positive impact on export diversification over the next few years, both through better access of Pakistan's exports to foreign markets and the added incentives for foreign direct investment.

To be sure, the Pakistan authorities recognize that they face many challenges in attracting private investment, including the intense competition from other countries in the region, limited financial development, and high costs of transportation. The authorities' diversification strategy focuses on developing infrastructure, as well as promoting textile, leather, agroprocessing, light manufactures, and other industries in which Pakistan has a comparative advantage.

Regarding the exchange rate regime and export diversification, there are some key linkages between monetary policy, labor productivity and external competitiveness that have become increasingly important in the macroeconomic policy formulation. One of these linkages is shortcomings in the business environment to attain the high level of investment needed to maintain growth at the high and sustainable level.[7] In this regard, as the authorities contemplate the transition to alternative monetary frameworks (e.g., the strict or full-fledged inflation targeting regime), this would entail that foreign exchange market interventions would be confined to smoothing the effects of temporary shocks, and the exchange rate objectives would be subordinated to the inflation target. This could lead to large swings in the real exchange rate for the rupee, which highlights the point that the ongoing structural reform efforts would need to ensure that there would be sufficient flexibility in the labor and product markets to dampen any adverse effects on external competitiveness.

[7] In a highly open economy, the exchange rate is not only an important instrument for maintaining external competitiveness, but there are important feedback effects from the monetary policy stance, inflation, and the exchange rate, which have to be taken into account to ensure consistency with the central objective of monetary policy of maintaining low inflation.

In addition to the issue of external competitiveness, the exchange rate has a role to play in terms of the need for flexibility in the macroeconomic policy framework to cope with changes in Pakistan's external terms of trade. Under a fixed exchange rate system, the value of the rupee is pegged to the value of another currency—the de facto peg to the US dollar—while under a flexible exchange rate regime, the value of the rupee is allowed to adjust in response to supply and demand conditions in the foreign exchange market. When the exchange rate is flexible and Pakistan's export prices decline, the rupee will depreciate in the foreign exchange market, which will help to increase exports and economic activity, thereby partly offsetting the initial impact on output of the negative terms of trade shock. In contrast, the fixed exchange rate regime will require intervention in the foreign exchange market to keep the value of the rupee from declining; however, when the SBP purchases foreign exchange to support the exchange rate peg, this reduces the amount of domestic credit available for businesses and consumers, which is equivalent to a tightening of monetary policy in terms of its effects on output. In this regard, the policy response under the fixed exchange rate adds to the negative terms of trade shock that caused the initial contraction in output. Since exchange rate flexibility allows the economy to adjust to exogenous terms-of-trade shocks with lower costs in terms of output fluctuations, this would appear to be an important consideration in the case of Pakistan.

However, the point that a country with a fixed exchange rate regime will adjust to a negative terms-of-trade shock through a contraction in output, while another with a flexible exchange rate will adjust through a currency depreciation that significantly offsets the shock's negative effects on output, does not necessarily mean that a flexible exchange rate is unambiguously the best choice. As mentioned earlier, the effectiveness of the flexible

exchange rate in responding to the terms-of-trade shocks is only one of several considerations that need to be weighed when choosing an exchange rate regime. The optimum currency area (OCA) literature has demonstrated that the case for flexible exchange rates depends, among other things, on evaluation of the microeconomic benefits to be gained from a fixed exchange rate in comparison to the costs of loosing monetary policy as a tool for economic stabilization.[8] OCA identifies a number of key factors that influence the choice of the exchange rate regime: the degree of labor mobility between countries; openness or the degree of trade integration; the degree of wage and price flexibility; and the degree to which the two countries have similar economic structures and symmetric shocks. According to these criteria, Pakistan is a highly open economy, with wage and price flexibility, and its trade is not confined to just one country or currency area. If there were to be a peg to the US dollar, the main problem would be that the economic structures of the two countries are not similar, and in particular, Pakistan's export base is very different from that of the United States, which means that the countries would be subjected to asymmetric external shocks. The asymmetric shocks mean that Pakistan would have to bear significant costs from the loss of monetary independence if it were to maintain a relatively fixed rate for the rupee against the dollar.

In addition to the considerations raised in the OCA literature, the financial crises that hit Mexico, Russia, and several Asian developing countries in the 1990s, and Argentina more recently, have reinforced what already appeared to be a growing consensus against fixed exchange rates. The experiences of these countries showed that fixed exchange rates not

[8] See Mundell (1961) and Frankel and Rose (1998).

only limited the ability of real exchange rates to adjust in reaction to external shocks, but that they also restricted the monetary authorities' ability to correct excessive growth of credit or to act as lender of last resort. Fixed rates also tended to encourage excessive borrowing of foreign currency, by reducing concerns about exchange rate risk, and worsened the abrupt and disruptive reversals of investor confidence, once exchange rate pegs were broken. Some countries, particularly those in which monetary policy has had low credibility, have felt that the adoption of a fixed exchange rate was necessary to reduce inflationary expectations. However, Pakistan has brought inflation down and has been blessed with good macroeconomic management in recent years, which suggests that this argument for fixed exchange rates in not applicable in the present context.

IV. Alternative Monetary Policy Frameworks

The previous discussion has emphasized that when there are large-scale capital flows or significant terms-of-trade shocks, a conflict can arise between the objective of maintaining a stable nominal exchange rate and promoting domestic economic stability. In this connection, since a more flexible exchange rate regime in Pakistan can facilitate the pursuit of domestic stabilization objectives with open capital markets, the remainder of this paper presents several types of monetary policy frameworks that are consistent with the central objective of maintaining low inflation under a flexible exchange rate regime. Each of these options focuses on a different long-term nominal anchor, which is implied in the names attached to these frameworks: monetary targeting, nominal income targeting, and inflation targeting.

Monetary targeting

Many central banks, including the SBP, have used monetary aggregates as indicators in their policy frameworks, but some banks, though their numbers have declined, have used monetary aggregates as intermediate targets. To serve the role of an intermediate target variable, a monetary aggregate should meet a number of conditions, and major among these would be the following: (a) there is a predictable relationship between money and nominal income growth because otherwise even if the central bank hits the monetary target, there is no assurance that the ultimate target will be observed; (b) the relationship between adjustments in the monetary policy instruments, say, a short-term interest rate and the money supply should be stable because otherwise it would be difficult to hit the intermediate target; and (c) monetary growth should lead nominal income growth because if the reverse were the case, other targets would give lower variability of nominal income than using money as an intermediate variable. The experience from a number of countries has been that while some monetary aggregate, such as monetary base or narrow money, may be sufficiently stable to use as an indicator variable for monetary policy, these aggregates are frequently not suitable in the more demanding role of an intermediate target variable; this appears to be the case in Pakistan. In particular, the relationship between money and nominal income is not easy to predict on account of the recent and prospective changes in the financial sector. Also, the links from monetary policy instruments to inflation are not always easy to capture in the monetary targeting framework, not least because of instability in the demand for money.

Nominal income targeting

An important difference between nominal GNP targeting and inflation targeting is that the former is an instrument rule, while the latter is a targeting rule. An instrument rule is a formula for setting the central bank's instrument rate as a given function of observable variables, such as the nominal GNP rule. The best-known example of a simple instrument rule is the Taylor rule, where the instrument rate is a linear function of the inflation gap (between inflation and an inflation target) and the output gap (between output and potential output). McCallum and Nelson (2005) present arguments for the superiority of the instrument rule over the targeting rule, noting in particular that "an attractive approach to policy design...is to search for an instrument rule that performs at least moderately well-avoiding disasters-in a variety of plausible models" (p. 599). In contrast, Svensson (2003b) presents a cogent case for targeting rules. Svensson points out that the optimal targeting rule is basically a restatement of the standard efficiency condition of equality between the marginal rates of substitution and transformation between the target variables. The target variables that enter into the loss function are the inflation and the output gap (and possibly the exchange rate in the case of highly open economies). The marginal rate of substitution between inflation and the output gap follows from the form of the loss function, including the relative weight.

However, even if a targeting rule is, by definition, optimal given the central bank's loss function, there is still the problem that a targeting rule may be less transparent then an instrument rule or an intermediate targeting rule. It is quite likely that the public will find it more difficult understand a loss function for a central bank than an exchange rate, monetary or other instrument rule. Morevoer, the instrument rule might be better from the point of view of accountability if deviations from an instrument rule rule are easier to determine, which would allow the public to monitor the central bank's actions more closely. To be sure,

these problems with targeting rules can be addressed or at least mitigated, if, for example, the central bank were to announce its loss function, complete with the weights attached to each objective, as suggested by Svensson.

Before turning to inflation targeting and the conditions that need to be addressed in the successful transition to that regime in Pakistan, a few words about nominal income targeting would be appropriate insofar as they relate to the question of projecting potential output. The main point to stress in this context is that the authorities are striving to diversify the economy so as to reduce the heavy reliance a few export products, which, together with the ongoing structural reforms in the financial and other sectors, could render it difficult to project potential output that is needed for inflation forecast targeting. In inflation targeting, monetary policy is adjusted in response to deviations of the forecast of inflation from the target, but the inflation forecast requires in turn an estimate of the level of potential output in order to measure excess demand pressures. However, when there is considerable uncertainty regarding the level of potential output, nominal income targeting has the advantage over inflation targeting in that it is more robust, i.e., serious estimation errors are less likely because nominal income targeting requires only an estimate of the trend growth rate of potential output. If experience were to indicate that estimates of potential output are very uncertain, it might be better to adopt nominal income targeting as an interim monetary policy framework until such time when potential output can be estimated with greater confidence.[9]

[9] It should be mentioned that nominal income targeting has a number of additional challenges, i.e., communication to the public, measurement errors in GDP, and lags in data availability.

Frankel and Chinn (1995) use the time-consistency approach to monetary policy in an open economy with various sources of disturbances, and evaluate the nominal GNP regime in comparison to alternative monetary regimes in which the money supply, or the exchange rate, iter alia, are chosen to be the nominal anchor. Their analysis shows that the nominal GNP target dominates the money supply or exchange rate rules, in the sense of minimizing a quadratic loss function, if certain plausible restrictions are placed on the parameters of the model. In particular, the loss function must not have an extraordinarily high weight on the objective of stabilizing the exchange rate. Zaidi (2005) has applied the Frankel-Chinn framework to Pakistan data, which is discussed in the Appendix to this paper.

Inflation targeting

Instead of using an intermediate target variable, the SBP could move towards direct inflation targeting, which has been adopted in many emerging market countries.[10] As with other monetary frameworks, there are a number of issues that would need to be addressed, including meeting certain preconditions to effect a successful transition to inflation targeting. Masson et al. (1997) identify several potential obstacles in the transition to inflation targeting, three of which, at least, should be noted here. First, there should not be fiscal dominance in which monetary authorities are unable to pursue the objective of achieving a low inflation rate, because the fiscal authorities interfere in terms of their reliance on

[10] Although there has been some ambiguity about the precise definition of an inflation targeting policy regime, in part because certain institutional arrangements have differed from one inflation targeting country to another, it is frequently described as an operational framework for monetary policy decisions in which the central bank makes an explicit commitment to conduct policy to meet a publicly announced numerical inflation target within a particular time frame. This framework focuses on "policy rules," that is, specific formulas for adjusting the policy instrument in response to inflation (or more appropriately to forecasts of inflation because monetary policy affects inflation with a considerable lag). The forecasts of inflation are frequently modeled to depend on the state of the economy as measured by the gap between GDP and potential.

seigniorage revenues. Second, the banking system should be strong in that the monetary authorities should be able to pursue their inflation objectives without having to worry about the balance sheets or solvency of the commercial banks. Third, capital markets should not be too shallow lest they become a constraint in the implementation of monetary policy.

A first glance would indicate that Pakistan would appear to meet the first two of these preconditions. The fiscal authorities have not relied on seigniorage revenues in recent years, and the inflation rate has been low. With regard to the question of fragility of the banking system, the banks have shown significant improvements in recent years and do not have large nonperforming assets, and in general, they measure up well in terms of various indicators of performance. With regard to shallow capital markets, it should be noted that Pakistan's markets are not as large as those in many other countries, but they are growing rapidly, and the recent changes are expected to give an added boost to their development. Furthermore, shallow capital markets would be a problem in the implementation of other monetary frameworks as well, and this concern is not confined to inflation targeting per se, but needs to be addressed more generally in terms of financial development and diversification of the economy (these issues regarding preconditions for inflation targeting are discussed in detail in the next section).

Explicit inflation targeting has been adopted by a number of central banks in both industrial and emerging market countries. The inflation targets for the central bank helps to provide an anchor for inflation expectations in the economy, and the announcement of a clear path for the medium-term inflation outlook reduces the size of inflation "surprises" and their associated costs in terms of output fluctuations. Inflation targeting regime can accommodate a goal of output stabilization by having wide inflation target bands, long inflation target

horizons, and explicit exemptions for supply shocks. By focusing attention on an explicit goal, inflation targeting can help to render monetary policy more transparent and increase the public understanding of the central bank's strategy to deliver the inflation target. Inflation targeting regimes have emphasized creating institutions that foster good policy and improving accountability, which is good in its own right and would be appropriate for any monetary framework. Although inflation targeting is a relatively new framework and the time series for evaluating its performance are not very long, the available evidence suggests that inflation targeting performs well in achieving a balance between output variability and inflation variability.

V. Preconditions Prior to Adopting an Inflation Targeting Regime

Several papers on inflation targeting (IT) in emerging market economies have aimed at identifying the prerequisites for successful adoption of this monetary regime based on the experience of industrial countries. Subsequently, as more and more emerging market countries have adopted IT, the analysis has focused on the special characteristics of emerging market economies, including supply shocks, fiscal dominance, central bank independence, dollarization, and the role of exchange rates.[11] Recently, based on the experience of several

[11] For example, Mexico and Brazil were the first Latin American countries to introduce an IT regime. In Mexico, after floating the peso in December 1994, the Bank of Mexico pursued its monetary targeting regime for a few years, but then came to the realization that the relationship between the monetary base and inflation was not stable, which made it difficult to assess the stance of monetary policy. Accordingly, the Bank of Mexico decided to experiment with IT as way of overcoming the problem of the instability in the demand for money, thereby providing an alternative nominal anchor to guide inflationary expectations; IT was introduced gradually and adopted in 1999. South Africa faced a similar set of circumstances in that the financial liberalization of the 1990s changed the relationship between money supply, output, and prices, with the result that explicit monetary growth targets became less and less useful. The central bank decided to provide informal

(continued)

emerging market economies that have adopted IT, a number of studies have analyzed the initial effects of IT for emerging market economies in Eastern Europe and Latin America. For countries that have not yet adopted inflation targeting, a major debate has been that, in designing and implementing the IT regime, a number of technical and institutional issues need to be addressed, and several preconditions should be met if the regime is to succeed.

Turning to this debate, it would be useful to switch gears somewhat from the approach adopted for the bulk of the paper that has focused on balancing theoretical considerations and analyzed hypothetical situations, and move to a recent IMF empirical study on whether preconditions need to be met before IT adoption.[12] The IMF staff have assessed the role of "preconditions" for the adoption of IT by means of a special survey that was conducted through a questionnaire completed by 21 IT central banks and 10 non-IT emerging market central banks. For the inflation-targeting central banks, the survey focused on how the policy was formulated and implemented, both during and prior to the adoption of IT. Survey responses were cross-checked with independent primary and secondary sources and, in many cases augmented with "hard" economic data (see Appendix 4.1 in IMF (2005)). Overall, the evidence indicates that no ITer had these "preconditions" in place prior to IT adoption, although industrial-economy ITers were generally in better shape than emerging market ITers at least in some dimension (Table 1).

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targets for inflation as well as M3 growth guidelines starting in 1998, which was replaced by a formal IT framework in 2000.

[12] IMF (2005).

Table 1. Initial Condition Prior to Adopting Inflation Targeting

	Institutional independence	Technical infrastructure	Economic structure	Financial system health
EMERGING MARKETS				
Philippines	0.5	0.3	0.1	0.3
Israel	0.3	0.4	0.5	0.2
Czech Republic	0.6	0.3	0.3	0.2
Peru	0.8	0.1	0.3	0.2
Hungary	0.2	0.3	0.5	0.5
Korea	0.3	0.4	0.3	0.4
Brazil	0.6	0.3	0.3	0.5
Chile	0.7	0.3	0.3	0.4
Thailand	0.6	0.1	0.4	0.6
Poland	0.7	0.3	0.3	0.4
Colombia	0.6	0.3	0.4	0.4
South Africa	0.6	0.3	0.5	0.6
Mexico	0.7	0.6	0.5	0.4
Average	**0.5**	**0.3**	**0.4**	**0.4**
INDUSTRIAL COUNTRIES				
Iceland	0.3	0.6	0.4	0.4
Australia	0.6	0.7	0.5	0.5
Norway	0.6	0.6	0.5	0.6
Canada	0.5	1.0	0.5	0.4
Sweden	0.6	0.9	0.4	0.6
United Kingdom	0.4	0.9	0.5	0.6
Switzerland	0.8	0.6	0.6	0.7
Average	**0.5**	**0.8**	**0.5**	**0.5**
Pakistan	**0.0**	**0.5**	**0.6**	**0.5**

Source: IMF staff calculations.

Table 1 presents some data that were presented in Chapter IV of the World Economic Outlook, published in October 2005. The data are from Figure 4.3, which had provided a bar chart for each of the emerging market and industrial countries according to their scores on initial conditions prior to adopting inflation targeting. In Table 1, we are interested in comparing the indicators for Pakistan with those for the emerging market countries that have adopted inflation targeting. The "preconditions" can be divided into four broad categories: institutional independence, technical infrastructure, economic structure, and financial system health.

Institutional independence

First and foremost amongst the preconditions is that there be institutional independence, that is, the central bank should have legal autonomy, and be free from fiscal and/or political pressure that would create conflicts with the inflation objective. Specifically, the central bank should have the legal autonomy and mandate to pursue the inflation target; sufficient discretion to set its monetary instruments in accordance with the inflation objective; and legal provisions that shield the central bank from pressures to monetize the fiscal deficits. There should be a high degree of job security for the central bank governor (e.g., a fixed term and provisions that allow dismissal only with cause).

The survey results demonstrate that Pakistan fared very badly in terms of this criterion and, in fact, the score was simply zero. However, it seems rather odd that the institutional independence for Pakistan was placed at zero because there is a very high degree of job security for the SBP Governor, as well as instrument independence, so at least on these two counts SBP should get some high marks. Also, regarding freedom from obligation of SBP to purchase government debt and inflation focused mandate, even if there is

considerable scope for further improvement, it would seem that SBP should get at least some points, thereby avoiding being at the rock bottom with a zero. Needless to say, this is a surprising entry, but the explanation seems to be that the responses from the country authorities were cross-checked and in many cases augmented by hard data by the IMF staff at the IMF. In particular, the way in which they interpreted the survey—taking into account the hard data whenever it was used as corroborative of self-reported facts—is that all conditions of central bank independence should hold simultaneously to obtain a value different from zero. In other words, the interpretation was done in such a way that the condition for a country to not be classified as a zero was rather stringent. Thus, in the case of Pakistan, although the SBP has de jure instrument independence and provides a high level of job security for the Governor, the IMF staff took the view that in this case, as indeed in some other emerging market countries, there was the possibility that there could be de facto dependence in that there was an obligation to purchase government debt—which would interfere with the setting of monetary conditions and/or when the mandate of the central bank did not have a pure inflation focus (e.g., dual mandate) which restrained its freedom to pursue the inflation target in a lexicographic sense. Needless to say, the distinction between de jure and de facto independence is important for the assessment of preconditions for inflation targeting, but it does rely on quite a bit of judgment on the part of the compilers of the survey, and they have opted for a conservative interpretation.[13] Be that as it may, it seems

[13] It should be noted that whereas most of the central banks enjoyed at least de jure instrument independence at the time of IT adoption, survey responses also indicated that only one-fifth of the emerging market ITers contemporaneously satisfied other key indicators of independence at adoption, and this was *not* an area in which ITers generally scored high marks.

reasonable to say that Pakistan has more work to do in this precondition relative to the other three preconditions, but the picture may not be nearly as gloomy as painted in this survey.

Technical infrastructure

The second set of preconditions relate to the need for a well-developed technical infrastructure, which would include a proper set of tools for implementing monetary policy in support of the inflation target. In particular, inflation forecasting and modeling capabilities, and the data required for their implementation should be available at the central bank. For IT to be the preferred monetary policy framework, the central bank's inflation forecast should outperform a money rule as an intermediate target for monetary policy.

The results from the central bank survey responses indicate that the majority of industrial and emerging market ITers started with little or no forecasting capability and no forecasting model at all. Even when a small model was available, most central banks stated that it was not suitable to make forecasts conditional on different assumptions for the monetary policy instrument. In fact, the SBP does rather well on this score, as its score of 0.5 is higher than the average of 0.3 for the emerging market countries, and only one emerging market IT country scored higher than the SBP.

Economic structure

The third set of preconditions relate to the economic structure, which requires that prices should be fully deregulated, the economy should not be overly sensitive to commodity prices and exchange rates, and dollarization should be minimal. In other words, a country's economic structure should be such as to enable monetary policy to focus on pursuing the inflation target without being sidetracked by concerns relating to rising dollarization and exchange rate fluctuations, or to have the inflation rate greatly influenced by commodity

prices and administered prices. Also, any exchange rate objective should be subordinated to the inflation target.

The results from the survey indicate that none of the ITers did well in this criterion at the time of IT adoption. In particular, all countries were sensitive to exchange rate and commodity price fluctuations at the time of IT adoption, and, although dollarization was not a problem for industrial country ITers, there were varying degrees of dollarization across emerging market country ITers, including some highly dollarized ITers. Most IT countries also had consumer price indexes with a significant share of administered prices. Not surprisingly, Pakistan does very well on this score because most administered prices have been liberalized, reliance on commodity exports has declined, and, above all, dollarization has been brought down sharply after the freezing of the foreign currency deposits in May 1998 following the nuclear tests.[14] In fact, Pakistan's score of 0.6 is not only higher than that for the average of emerging market countries (0.4) but also that of the industrial countries (0.5), and one suspects that this probably reflects some of the judgmental problems alluded to in the earlier discussion.

Financial system health

The final set of preconditions is that the financial system should be healthy, which minimizes potential conflicts with financial stabilization objectives and permits effective monetary policy transmission. The banking system should be sound, and capital markets well-developed, which would allow monetary policy to pursue the inflation targets and not be

[14] See Mirakhor and Zaidi (2004) for a discussion of how the large volume and the specific institutional characteristics of those deposits had made the Pakistan economy highly vulnerable to exogenous shocks.

sidetracked by concerns about the health of the financial sector. The central bank should not be overly constrained whenever there is a need to increase interest rates to tighten monetary conditions, i.e., higher interest rates should not become a major concern with regard to the health of systemically important financial institutions (e.g., exposed balance sheets).

The survey results show that most ITers scored poorly with respect to this criterion, which had focused on indicators such as the risk-weighted capital adequacy ratio, measures of financial market depth (ratios of stock-market-capitalization-to-GDP, private-bond-issuance-to-GDP, and stock market turnover, or the maximum maturity of actively-traded nominal bonds, and the extent of banks' foreign currency open positions. It is heartening to note that Pakistan does well and its score of 0.5 is equal to the average for the industrial countries, but above the average for emerging market countries. An important factor behind this favorable result is no doubt the impressive financial sector reforms, which have resulted in a healthier and more competitive banking system.[15]

The IMF staff have concluded that the fact that none of today's ITers—either individually or on average—had strong "preconditions" suggests that the absence of these "preconditions" is not by itself an impediment to the adoption and success of IT. This conclusion would appear to carry over to the case of Pakistan. Indeed in terms of technical

[15] Financial sector reforms during the past decade have resulted in an overhaul of Pakistan's banking system. Before the implementation of these reforms, the system was dominated by chronically loss-making public sector commercial banks, which had very large nonperforming loans (NPLs). However, in the aftermath of the sustained restructuring, recapitalization, and privatization of these banks, the core of the system is made up of local private banks, and assets are growing rapidly. Moreover, overall NPLs are falling even in nominal terms, while profitability is hitting new records. The decline in the NPL ratio is attributed to recovery drives, promulgation of a foreclosure law, restructuring of loans, issuance of write-off guidelines, and the takeover of some large NPLs by an asset management company (Corporate and Industrial Restructuring Corporation). It should also be noted that there has been a sharp decline in the flow of new NPLs.

infrastructure, financial system health, and economic structure, Pakistan stands out amongst the emerging market ITers (to be sure, the comparison is not as of today, but at the time of adoption of IT by those countries), and even the gap between industrial country ITers and Pakistan as a potential IT adopter, is relatively small. These considerations would suggest that the question—do "preconditions" need to be met before IT adoption?—should not stand in the way, or at least not have veto power, in the discussions regarding the adoption of IT in Pakistan. While recognizing that the results derived from the above analysis should be interpreted with caution, not least because of small sample and the role of judgment in analyzing the data, a tentative conclusion would be that it does not seem that there are several *sine qua non* or "preconditions" for the successful adoption of IT that Pakistan is sorely lacking. Furthermore, the IMF staff had rightly emphasized in their study that the feasibility and success of IT appears to depend more on the authorities' commitment and ability to plan and drive institutional change after the introduction of IT than in ensuring that all of the "preconditions" are met at the outset.

The survey results just discussed and the recent experience suggest that monetary policy in Pakistan is well-positioned to respond to shocks and to maintain the credibility of low inflation. The increases in interest rates this year are expected to effectively control demand pressures, and the monetary policy stance appears appropriate. However, some observers—mainly in the context of discussions regarding a move toward an IT framework—have suggested that to further help financial markets better understand the conduct of monetary policy, the SBP could publish numerical projections for real GDP, CPI, and other key macroeconomic variables. However, we are of the view that, notwithstanding the significant benefits to be derived from announcing inflation targets and forecasts for the

central bank, there is merit in the point stressed by some others that because the SBP forecasts represented the collective judgment of Monetary Policy Committee members, it would be very time consuming to secure agreement on quantitative projections for a wide range of variables. In particular, on the question of publishing an illustrative path for interest rates consistent with the inflation target, the announcement of an illustrative path could be misinterpreted as an SBP commitment to follow the path. There is the risk that market participants would not be viewing this as a path conditional on the information available at a given point in time, and, as such, they may end up having destabilizing expectations whenever there were significant divergences between the interest rate forecast and outturn. These divergences are almost guaranteed because the number of contingencies to which monetary policy has to respond is very large, and some of them are unforeseeable.

Furthermore, it is worth mentioning that market analysts and policymakers can analyze the surveys of interest rate forecasts to estimate the degree of uncertainty that market participants have about monetary policy at different horizons. If the interest rate forecasts were to diverge significantly, say, from the baseline scenario of the SBP, the authorities would have at their disposal an effective communication toolkit to convey messages to the market. Since monetary policy is conducted in a complex setting, and full information about forecasts is not a sufficient condition for guaranteeing stabilization of market expectations, a transparent policy framework and effective communication by the SBP are also necessary to improve the ability of financial markets to predict monetary policy actions. The SBP should focus on demonstrating its ability to carry out a monetary policy based on a few basic principles, which would be easy for the public to understand and thereby predict the bank's behavior under different scenarios, which could mean an inflation targeting framework, but

some of the specific proposals, such as publishing interest rate forecasts by the SBP for further fine-tuning the monetary framework, do not appear to be required even in an inflation targeting regime.

That said, it should be emphasized that a look beneath the surface suggests some question marks that will need to be addressed in the choice of an inflation targeting regime. In particular, in a full-fledged inflation targeting (FFIT) framework, the inflation target prevails over any other monetary policy objective, and this makes the criteria for the pre-conditions for a successful FFIT more stringent.[16] In this connection, it is not clear that monetary policy can control inflation perfectly, and is it feasible to say that inflation rates outside a specified tolerance interval will be ruled out, even in the event of unforeseen exogenous shocks, such as terms-of-trade and weather-related shocks, which can be quite important in the case of Pakistan. A closer look at the requirements of the FFIT regime and the specific characteristics of the economy seems to indicate that Pakistan meets only some of these preconditions, and even those should not be taken for granted.

Inflation targeting requires a good understanding of the monetary transmission mechanism, which is the connection between changes in the monetary stance and their effect on the operating target, and ultimately, inflation. The stronger the transmission links, and the better they are understood, the more effective will be changes in monetary instruments aimed at attaining the inflation target. However, inflation forecasting will be challenging, because Pakistan has a high degree of vulnerability to exogenous shocks; there are ongoing structural changes in the economy, not least in financial innovations and increased integration with

[16] See, for example, Carare, Alina, and Mark R. Stone (2003).

international financial markets; the links from monetary policy instruments to inflation are not always stable; and there are data issues insofar as some requisite data are not available or there are questions with regards coverage and timeliness. Furthermore, a relatively well-developed financial system is necessary for the effective transmission of monetary policy in FFIT. In this connection, it should be noted that interest rates in Pakistan do not reflect appropriately the market liquidity conditions, which can be attributed, in part, to the low volume of transactions in the interbank market, as banks prefer to transact in repos, or reverse repos with the central bank to meet their daily liquidity requirements. There is no price incentive for banks to look first to the interbank market to place or borrow funds overnight because the central bank credit is offered at the same rate as the interbank rate.

As mentioned earlier, a strong fiscal position is needed to support the credibility of the FFIT framework. In this regard, it should be stressed that Pakistan had been running budget deficits for a prolonged period, but in the last few years, deficits have been brought down to manageable levels. Now the country faces the daunting challenges of reconstruction and rehabilitation in the wake of the earthquake calamity. These developments suggest that going forward, the authorities would need to ensure that monetary policy is not dominated by fiscal concerns. The government should be able to meet the bulk of its financing requirements from financial markets, and government recourse to central bank credit should be limited to occasional and temporary financing of liquidity shortfalls.

In what has been called “inflation targeting lite” (ITL), a country announces an inflation objective, but it does not fully subordinate all other objectives of monetary policy to inflation. These countries do not adopt FFIT because they do not meet all of the preconditions, particularly as regards conflict between inflation and other objectives, a weak

relationship between monetary instruments and inflation, and the institutional framework might not be sufficient for a credible full commitment to an inflation target. In ITL, the SBP would aim for an inflation target, broadly defined, but it would also give weight to other objectives in the loss function. In other words, although there would be an inflation target, but it would still be appropriate in the context of an open economy to also specify other objectives, including exchange rate or international reserve holdings.

In a forward-looking perspective, one weighs prospects for overall inflation by assessing the likely path of underlying inflation, which has indeed been brought down in Pakistan. This path hinges in good part on growth prospects and the balance of shocks (oil prices, export prices, droughts, floods, and so on) likely to hit the headline inflation rate, as well as their potential reverberations. The exchange rate would be taken into account in the inflation targeting framework not only to the extent that the inflation forecast—which is the intermediate target of monetary policy in this regime—is affected by the exchange rate, but also insofar as the SBP may need to adjust the monetary policy instruments to limit the impact of exchange rate changes on other objectives, say, external competitiveness. This is not to say that, in inflation targeting lite, the SBP should aim for an inflation target and at times switch to other objectives, but rather that a large enough target range would be specified for the inflation target, which should leave some room for maneuver, or equivalently, the authorities' loss function would give weight to other objectives. Nonetheless, inflation targeting lite could help the authorities to package many features of an eclectic approach to monetary management into a more formalized, disciplined and transparent structure that bolsters accountability. In particular, it is important that the information is conveyed in a consistent manner, and presented in a way that makes it easy to

understand by the public, which could entail, inter alia, regular media releases, press conferences, publications of research by the staff, and speeches by the central bank management.

VI. Concluding Remarks

This paper has focused on the choice of exchange rate regime and the implications of alternative monetary policy frameworks for Pakistan. To this end, a number of considerations that have a bearing on the exchange rate regime and monetary policy framework will be examined. Most of the recent research in this field for emerging market economies, and especially that based on the experience of the last fifteen years, has suggested that, in the context of rapid international capital mobility, sustaining a fixed exchange rate in the face of terms-of-trade or international financial market shocks is very difficult. Furthermore, a forced abandonment of a fixed exchange rate has proved to be quite disruptive for some countries. Since Pakistan still has a relatively narrow export base, the paper's analysis provided some support for a flexible exchange rate regime, because it can function as a kind of automatic stabilizer, absorbing the fluctuations in the terms-of-trade by means of its own movements. On the other hand, commitment to nominal exchange rate stability could constrain monetary policy, and even induce an element of procyclical monetary policy responses to exogenous shocks.

While there might be a great deal of merit in adopting an alternative monetary policy framework, particularly one which puts more emphasis on inflation outcomes directly, the Pakistan authorities would need to take some steps to improve the central bank's capacity to conduct such a policy. As mentioned earlier, the SBP had encountered difficulties with

targeting broad money in reaching the inflation objective. Moreover, in light of the discretionary nature of the existing policy, there may be a case—especially in the context of a flexible exchange rate policy—for pursuing an inflation objective more directly. Going forward, the focus should be on further developing the technical skills at the SBP, including the following areas: (a) develop a greater understanding of channels of transmission of monetary policy; (b) improve its capacity to forecast liquidity conditions and actively preempt inflationary pressures; and (c) have an increasingly transparent policy framework.

The paper has emphasized that inflation targets for the SBP will help to provide an anchor for inflation expectations in the economy, and the announcement of a clear path for the medium-term inflation outlook will reduce the size of inflation "surprises" and their associated costs in terms of terms of output fluctuations. Inflation targeting regime can accommodate a goal of output stabilization by having wide inflation target bands, long inflation target horizons, and explicit exemptions for supply shocks. By focusing attention on an explicit goal, inflation targeting can help to make monetary policy more transparent and increase the public's understanding of the central bank's strategy to deliver the inflation target. Inflation targeting regimes have emphasized creating institutions that foster good policy, and improve accountability, which is good in its own right, and would be appropriate for any monetary framework. Although inflation targeting is a relatively new framework and the time series for evaluating its performance are not very long, the available evidence suggests that inflation targeting performs well in achieving a balance between output variability and inflation variability, and it deserves consideration for adoption in Pakistan, particularly if done in the form of what has been called "inflation targeting lite."

APPENDIX

The Stabilizing Properties of a Nominal GNP Rule

Frankel-Chinn (1995) make a strong case in favor of a commitment to a nominal GNP target on the part of the monetary authorities, as compared to the money supply and the exchange rate rule. Their framework incorporates the inflation-reducing gain that comes from imposing a precommitment or rule on monetary policy, which helps to convince workers, businesses, and other market participants that, because the central bank will not be able to inflate even if it wants to, they should expect a low inflation rate. However, the commitment must be dynamically consistent to be credible.[17]

Following Frankel and Chinn, an aggregate supply relationship is assumed as follows:

$$y = y^* + b(p - p^e) + u, \;\; b > 0 \qquad (1)$$

where y represents output, y^* is potential output, p is the price level, p^e is the expected price level (or they could be the actual and expected inflation rates, respectively), and u is a supply disturbance, with all variables expressed as logs.

To consider alternative monetary regimes, the money market equilibrium condition is the quantity theory of money equation as follows:

[17] A time-consistent or dynamically consistent regime is one that "ties the hands" of the monetary authorities in that they are unable to breaking their commitment to monetary discipline even when they might have an incentive to do so based on new information. For surveys of the rules versus discretion debate, see Barro (1986), and Fischer (1991).

$$m = p + y - v \tag{2}$$

where v represents velocity shocks, which is assumed to be uncorrelated with u.

The exchange rate equation has the spot exchange rate measured relative to some equilibrium target rate, which includes the money supply to allow the authorities to have some leeway for affecting the exchange rate:

$$s = m - y + e \tag{3}$$

It is assumed that e is uncorrelated with the supply disturbance u, but it could be correlated with the velocity v.

Frankel and Chinn (FC) provide both closed-economy and an open-economy versions of the policymakers' objective functions in their paper, but the following analysis is confined to the open-economy objective function that is more pertinent for the present discussion. The objective function is assumed to be quadratic in real output, the price level and the exchange rate. The loss function is specified as follows:

$$L = ap^2 + (y - ky^*)^2 + cs^2, a > 0, c > 0, k > 1 \tag{4}$$

where a is the weight assigned to the inflation objective, and it is assumed that the lagged or expected price level relative to which p is measured can be normalized to zero. By imposing the condition that $k > 1$, the model allows for an expansionary bias to discretionary policy-making. The loss function has the policymakers attempting to minimize long-term swings of the exchange rate around its average value, rather than short-term uncertainty in the exchange

rate. In the loss function, c is the weight placed on exchange-rate stability and s is the spot exchange rate measured relative to some equilibrium or target value.

FC derive the expected values of the loss function under various policy rules, including a Money Rule, a Nominal GNP Rule, and an Exchange Rate Rule. The expected loss under these three rules are as follows[18]:

Money Rule

The Money Rule is derived under the condition that the authorities set m to keep $p^e = 0$.

$$EL\big|_m = \left[y^*(1-k) \right]^2 + \left[(1+a+c)/(1+b)^2 \right] Var(u) + \left[(a+b^2+cb^2)/(1+b)^2 \right] Var(v) + [c] Var(e) \tag{5}$$

Nominal GNP Rule

Under the Nominal GNP Rule, the authorities set m to keep $y + p$ constant, which entails varying the money supply to offset the shocks to velocity. Although a Nominal GNP Rule will use the money supply to offset changes in velocity, but since the velocity shocks also affect the exchange rate, the variance of v will have an influence on expected loss.

$$EL\big|_y = \left[y^*(1-k) \right]^2 + \left[(1+a+c)/(1+b)^2 \right] Var(u) + [c] Var(e) + [c] Var(v) - 2[c] Cov(v,e) \tag{6}$$

[18] The loss functions for the three rules are derived in Frankel and Chinn (1995) and Ratti (1997).

Exchange Rate Rule

Under the Exchange Rate Rule, the spot exchange rate, s , is kept fixed.

$$EL\big|_s = \left[y^*(1-k) \right]^2 + \left[a + b^2 \right] Var(v-e) + Var(u) \tag{7}$$

FC use the time-consistency approach to monetary policy in an open economy with three sources of disturbances (supply shocks, money or goods demand shocks, and exchange rate shocks) and evaluate the nominal GNP regime in comparison to alternative regimes in which the money supply, or the exchange rate, inter alia, is chosen for nominal anchor. The Frankel-Chinn model allows for correlation among the various kinds of disturbances: supply shocks, money demand or goods demand shocks, and exchange rate shocks. However, to keep the analysis manageable, it is assumed that the supply shocks are uncorrelated with the other shocks. To be sure, supply shocks could have either a positive or negative correlation with exchange rate shocks, or with velocity shocks, but Frankel and Chinn are correct to point out that one has no a priori sense about even the sign for this correlation, much less whether it would be strong. In contrast, it is assumed that velocity shocks *v* and exchange rate shocks *e* are positively correlated. There are several possible channels for this correlation, but one important example would be that an upward shift in the demand for money will cause an appreciation of the domestic currency (even in the absence of changes in the money supply or real income).[19]

[19] In practice, the *e* shocks in the exchange rate equation are very large relative to the *u* shocks in the aggregate supply equation. For countries with a flexible or even a managed float regime, the exchange rate often moves 10

(continued)

Relative Expected Losses under the Different Rules

The expected loss under a Money Rule can be compared to that under a Nominal GNP Rule by subtracting equation (6) from equation (5), and rearranging terms to yield:

$$EL\big|_m - EL\big|_y = \left\{\left[(a-c)+b(b-2c)\right]Var(v) + 2c(1+b)Cov\left[v,e\right]\right\}/(1+b^2) \qquad (8)$$

Which rule has the bigger loss depends on the relative magnitudes of $Var(v)$, $Cov\left[v,e\right]$, and the weight assigned to exchange rate deviations in the loss function. Estimates presented in Zaidi (2005) for Pakistan suggest that a nominal GNP Rules dominates a Money Rule for a wide range of parameter values for *a* and *b*.

The expected loss under an Exchange Rate Rule can be compared to that under a Nominal GNP Rule by subtracting equation (7) from equation (5), and rearranging terms to yield:

$$EL\big|_s - EL\big|_y = \left[\left(1+b\right)^2 - \left(1+a+c\right)\right]Var(u)/(1+b)^2 + \left[a+b^2-c\right]Var\left(v-e\right) \qquad (9)$$

Comparing the relative losses from the exchange rate and nominal GNP rules in equation (9) shows that as the variance of the velocity and exchange rate shocks increases, it becomes more likely that the Nominal GNP Rule will dominate the Exchange Rate Rule. Given a range of reasonable values for the parameters that are estimated in the model, and as long as the weight given to the exchange rate objective does not simply overwhelm the other weights

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percent or more in a year, but the money supply or other macroeconomic variables, and above all, real output, do not exhibit corresponding movements.

in the loss function, it appears that the Nominal GNP Rule would be preferred to the Exchange Rate Rule.

The above analysis has made a number of simplifying assumptions, and a desirable extension would be to develop a more sophisticated model of the economy that allows for the difficulty of hitting targets precisely. Such a framework would take into account the existence of lags between the realization of nominal GNP and its measurement, as well as lags between changes in monetary policy and their effects on realized nominal GNP. The inclusion of lags into the model, as well as allowing the difficulty of hitting the targets precisely, could be supplemented with an analysis of a more practical form of the nominal GNP targeting, namely, the authorities precommit to a target band of a specified width.

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