The Reserve Equation and The Analytics of Pakistan's Monetary Policy

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THE RESERVE EQUATION AND THE ANALYTICS OF PAKISTAN'S MONETARY POLICY[☆]

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ABSTRACT

This paper deals with the computation and analysis of some fundamental reserve aggregates and associated monetary statistics which impart important information regarding the design and conduct of monetary policy at the State Bank of Pakistan. Specifically, we compute the data series for borrowed, unborrowed, free and drainable reserves using balance sheet data published by the State Bank of Pakistan for the period 1985-2009. Results show that Pakistan's monetary policy revolves around managing the exchange rate while using the *t*-bill rate as the key policy instrument. However, the value of the *t*-bill rate is both incorrectly and sub-optimally related to macroeconomic fundamentals rendering monetary policy time inconsistent. This hinges on the finding that since 2000-01, State Bank of Pakistan is targeting net free reserves of the banking system at 4% of total private deposits. Among other observations, we find that the scope of open market operations as a tool of monetary policy remains but limited and that this limited role of open market defenses derives from an indiscreet concern of the central bank to sterilize its own foreign exchange reserves. Furthermore, the growth rate of unborrowed plus drainable reserves bears a strong negative correlation with the annual average rate of inflation, which, on account of the former being consistently negative since 2005, implies that the government and the State Bank of Pakistan both have absolutely no concern for controlling inflation.

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I. INTRODUCTION

This paper deals with the computation, presentation and analysis of some fundamental reserve aggregates and associated monetary statistics for Pakistan that the State Bank of Pakistan does not explicitly publish (or even make any reference to in policy discussions) but which, nevertheless, impart important information regarding the design and conduct of monetary policy at the State Bank of Pakistan.

Our analysis originates in the fundamental question as to what drives monetary policy at the State Bank of Pakistan (hereafter referred as SBP). The SBP describes its policy as a set of discretionary measures that it implements as and when it deems necessary and which derive from a detailed review of the state of the economy, the practices of the banking system and the statement of objectives of monetary policy (See e.g. State Bank of Pakistan, 2009a, 2009b). In stark contrast to the claims of the SBP, we find that changes in *t*-bill rate are systematically related to the rate of growth of national output; the rate of inflation and the currency depreciation rate (Hassan and Shahzad, 2010)[1]. This implies that the SBP is implicitly subscribing to a Taylor type rule (see Taylor, 1993, 1998) which, *quite unusually*, dictates it to **(i)** *raise* the *t*-bill rate when output growth *declines* (Malik and Ahmad, 2007 also observe the same) and to **(ii)** raise the *t*-bill rate when inflation increases (*only in the long run*) *but by less than* the amount of increase in inflation. This situation is further riddled by the SBP's claim that changes in *t*-bill rate do not necessarily reflect changes in monetary policy and that the key monetary policy instrument at the SBP is the discount rate (State Bank of Pakistan, 2009b).

The design and conduct of monetary policy, apart from the standard procedure of determining objectives, setting quantitative targets, choosing instruments and ascertaining the

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[1] The policy rule equation referred to here states that:

$$TBR = 4.60 + 0.66 * TBR_{-1} - 0.18 * INFL - 0.48 * \left[\frac{YN_R - (YN_R)_{-1}}{(YN_R)_{-1}} \right] + 0.26 * INFL_{-1} - 0.15 * DEPRIC_{-1} - 6.72 * D04$$

TBR, *INFL DEPRIC* and *YN_R* and *D04* indicate the t-bill rate, inflation rate, currency depreciation rate, real national output and the 2004 dummy respectively. Hassan and Shahzad (2010) estimates this equation consistently (as all right hand variables are stationary) using OLS with actual data from 1991-2007. The equation has an adjusted 95% fit with no signs of autocorrelation, heteroscedasticity, parameter instability or structural shift and tracks the policy rate with precision. It typifies the Taylor rule when we assume that expected inflation and potential output respectively equal their last period values.

way changes in instruments will help attain the objectives, requires the central bank to choose an operational target of monetary policy. This operational target is "*an economic variable, which the central bank wants to control, and indeed can control, to a very large extent on a day-by-day basis through the use of its monetary policy instruments*" (Bindseil, 2004). The SBP has never explicitly stated its operational target in any of its publications except for the recent *Monetary Policy Statement* (State Bank of Pakistan, 2009b) which states that the SBP targets the rate of monetary expansion consistent with *(i)* estimates of net foreign assets, *(ii)* estimates of government's budgetary borrowing, and *(iii)* aggregate demand pressure reflected in the saving-investment gap. The *Statement* outlines a complete operational procedure for monetary policy in terms of a target range set for the Reverse Repo Rate that is consistent with the *fundamental equation of monetary policy* (see Bindseil (2004) for a detailed rationale and description of the policy equation).

The question as to whether the operational target of monetary policy should be a reserve variable (as suggested by the *Reserve Position Doctrine*) or an interest rate variable (that constitutes recent practice at many central banks) happened to be the subject of a long standing debate in monetary policy making until the recent past (see Bindseil, 2004). Since SBP has never officially subscribed to either of these positions, and since it actively denies subscribing to a *Taylor*-type rule, therefore, we construct the reserve aggregates for Pakistan to ascertain the operational basis of its monetary policy. Specifically, we use the balance sheet data of the SBP and the banking system to construct the various reserve variables like free reserves, borrowed reserves and unborrowed reserves in conjunction with the reserve equation to determine the operational targets of monetary policy that have been used by the SBP over the past. Since, from a purely technical viewpoint, operational targets specified in terms of interest rates may be translated in terms of reserve targets and vice-versa by making use of the *fundamental equation of monetary policy* (see Bindseil, 2004; Mayes and Toporowski, 2007), therefore this exercise is expected to reveal the cornerstones of SBP's monetary policy. The analysis is also important in that it provides for the core element of any econometric model that incorporates banking sector behavior while analyzing monetary policy.

The rest of the paper is organized in three sections. In section II, we explain the theoretical linkages that lead to the empirical determination of the reserve equation for Pakistan. The reserve equation is then used to derive some useful monetary statistics for Pakistan over the period 1975-2007. Statistical calculation of the various components of reserve money, reserve equation and monetary statistics is reported in section III along with a discussion of their behaviour and insights about monetary policy. The paper concludes in section IV.

II.   RESERVE EQUATION AND THE ANALYSIS OF MONETARY POLICY

The analysis of monetary policy in terms of the reserve equation had been the central idea of the '*Reserve Position Doctrine*' (**RPD**) that remained the popular monetary policy paradigm at the Federal Reserve Bank from the 1920's until the late 1980's when the Federal Reserve first switched to inflation targeting and then to interest rate management as a guide to monetary policy[2]. The central idea of the reserve position doctrine is that by managing one or the other reserve aggregate, the central bank can easily keep money supply on its desired path[3]. The formal analysis of money supply in terms of the reserve aggregates originated in the works of Meigs (1962) and has been described in many standard monetary economics texts (see for example, Teigen, 1978; Branson, 1989). Although central banks and academic economists no longer rely on the reserve concepts when describing or setting monetary policy, the informational content of these concepts can seldom be denied (see e.g. Toporowski, 2006).

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[2]   The Federal Reserve has never adopted explicit inflation targeting. However, this is a debatable issue. Bindseil (2004) argues that the Federal Reserve under Alan Greenspan was following an implicit inflation targeting regime. Clarida, Gali and Gertler, (2000) argue that active stance against inflation proved decisive in controlling inflation during the Volcker-Greenspan era. They write: "*it is not the target but the attitude to inflation which matters*". Similarly, Favero and Rovelli (2001) try to determine the preferences of a central bank by calibrating first order conditions on minimization of an appropriate quadratic loss function. They also find a slight shift (although statistically insignificant) in FED behavior during the Volcker-Greenspan era towards inflation. Bernanke (2004), argues how the FED has emerged as a strong inflation fighter without explicitly subscribing to an inflation targeting regime, While Rudebusch and Svensson (1998) describe a large number of policy rules which are consistent with an inflation targeting (explicit or implicit regime).

[3]   Borrowed reserves, unborrowed reserves, total reserves and excess reserves have all been proposed and used as potential operational targets of monetary policy over the seventy years life span of the doctrine. A discussion of when and how a certain reserve aggregate was being used by the Fed as a target and why it was abandoned may be found in Bindseil, 2004.

Below, we show, both theoretically and empirically, how the monetary data published by the State Bank of Pakistan can be used to determine the quantity of reserve money and the reserve equation for Pakistan and then explain some essential facts about monetary operations and monetary policy that the State Bank of Pakistan has never explicitly published or used but which, spontaneously, constitute the core of its monetary operations and monetary policy.

II (A) *Derivation of the Reserve Equation*

Reserve money may be defined in three alternative ways: first, it is the sum total of the liabilities of the central bank; secondly, since assets and liabilities balance out[4], reserve money is also the aggregate of the asset side of the central bank's balance sheets; and finally, reserve money may be determined by accounting for the sources and uses of reserves. The first definition is a purely theoretical definition of reserve money. Empirical determination of reserve money essentially originates in the second definition. (Another version of the second definition states that reserve money equals the sum of net domestic and foreign assets of the central bank). Finally, while commercial banks use reserves for maintaining required and excess reserves (including vault cash), they obtain the same either through acquiring government debt (unborrowed reserves) or loans from the central bank (borrowed reserves). The reserve equation categorizes monetary data in accordance with each of these definitions so that they all yield the same aggregate quantity.

The Monetary Survey of the State Bank of Pakistan, while missing on elaborating the reserve related concepts and the reserve equation, defines reserve money in two equivalent ways (see State Bank of Pakistan 2002, 2005) as**:**

$$R = NDA_{SBP} + NFA_{SBP}$$ **E-01**

$$R = CC + OD + RR_D + RR_T + RR_{NBFI} + RE + VC$$ **E-02**

Tables 1 and 2 (see annexure) show the schematic balance sheets of the State Bank of Pakistan, issue and banking departments (see State Bank of Pakistan, 2002, 2005).

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4   The standard balance sheet equation states that 'Assets = Liabilities + Equity'. However, we seldom make such classification when dealing with the analytics of monetary policy in terms of central bank balance sheets; see Bindseil (2004) and Toporowski (2006). This type of classification is usually made for a central bank when dealing with the issue of central bank autonomy (e.g. Ernhagen *et. al.*, 2002).

Aggregating the respective sides of these two balance sheets to form a consolidated balance sheet and then writing the result in the form of an equation, we get:

$$C + C_{Banking} + CRF + D_F + D_P + D_B + D_O + SDR_{Allocation} + BPay + Reval + Liab_{other} =$$
$$G + F + SDR_{Issue} + C_{Issue} + S_{Issue} + G_{RBI} + A_{RBI} + C_{Banking} + BoE_{Internal} + S_{Banking} + BoPak \quad \textbf{E-03}$$
$$+ SDR_{Banking} + GDB + A_G + A_{Banks} + A_{NBFI} + I_{Banks} + I_{NBFI} + I_G + I_{Other} + Asst_{Other}$$

This equation may be manipulated (see Hassan and Shahzad, 2009 for details) to read:

$$R = (G + G_{RBI}) + (F + SDR + A_{RBI} + BoPak) + (Coins_{1plus} + Coins_{Subs} + OD)$$
$$+ (S_{Issue} + S_{Banking} + I_G) + (BoE_{Internal} + GDB + A_G + A_{Banks} + A_{NBFI} - D_F - D_P - D_O) \quad \textbf{E-04}$$
$$+ (I_{Banks} + I_{NBFI} + I_{Other}) + (Asst_{Other} - CRF - BPay - Reval - Liab_{other}) - C_{Banking}$$

where the bracketed terms may be identified respectively as the Gold Stock, Foreign Exchange Holdings of SBP, Treasury Currency, SBP's Portfolio of Government Securities, SBP Credit (net of government deposits), SBP Investments and Other Balancing Items [See e.g. Mishkin, 2006; Federal Reserve Bank, 2002; Jordan, 1971][5]. Equation **E-04** provides a direct way of computing the quantity of reserve money using the balance sheets of the central bank. It tells us as to what assets denominate the outstanding quantity of reserve money in the economy and may thus, very adequately, be called the supply of reserve money[6]. The demand for reserve money arises out of its various uses by the non-bank private sector and the banking sector (hence called the *uses* of reserves), and can be determined as per equation **E-02**[7].

The reserve equation is defined as the equation showing the sources and uses of reserve money. Equation **E-02** describes the uses of reserve money. Standard definition of the sources of reserve money states that reserve money equals the sum of treasury currency (C_T),

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5   The IMF's *Monetary and Financial Statistics Manual* maintains that "*Central bank or central government holdings of unissued or demonetized currency are not financial assets and should not be recorded in sectoral balance sheets*" (International Monetary Fund, 2005). The last term in equation **E-04** thus represents nothing else but a confusion of the State Bank of Pakistan regarding whether to include currency held in banking department as an asset of the issue department or not (see Hassan and Shahzad (2009) for a detailed discussion of this issue). In what follows, we construct different definitions of reserve money and accompanying data while assuming that this confusion does not exist.

6   Since the sum of the first and second bracketed terms in **E-04** represents SBP's net foreign assets, therefore equation **E-01** implies that the sum total of the remaining components must be SBP's net domestic assets.

7   The demand and supply of reserve money become equal only when we drop the last term (i.e. currency held in SBP's Banking Department) from equation **E-04**. This proves the inaccuracy of SBP's balance sheet data.

borrowed reserves (RB), unborrowed reserves (RU) and other balancing reserves (A) (see Toporowski, 2006; Bindseil, 2004; Federal Reserve Bank, 2002; Teigen, 1978; Jordan, 1971)**:**

$$R = C_T + RU + RB + A \qquad\qquad \textbf{E-05}$$

Treasury currency is defined as currency issued by the federal government in the form of coins and other deposits. Unborrowed reserves equal the central bank's portfolio of government securities plus total discounts and advances made by SBP less the borrowings of scheduled banks from SBP (Teigen, 1978); while borrowed reserves are defined as the total borrowings of scheduled banks from the central bank. The last term A represents all other sources less all other uses and represents the maximum amount of resources that can be drained from the economy through *defensive* open market operations (see Teigen, 1978; Jordan, 1971). Defining net free reserves of the banking system as excess reserves (including vault cash) less borrowed reserves (see Teigen, 1978; Jordan, 1971), we can rewrite equation **E-05** as**:**

$$\begin{aligned} R &= C_T + RU + RB + A \\ &= C_T + RU + RE + VC - RE - VC + RB + A \qquad\qquad \textbf{E-06} \\ &= C_T + (RU - RF) + RE + VC + A \end{aligned}$$

In order to determine these variables empirically, we need to look at the consolidated balance sheets of the SBP and the commercial banks. Table 3 shows a schematic representation of the balance sheet of the scheduled banks in Pakistan. The balance sheet may be written in equation form as**:**

$$D + T + RB = RR_D + RR_T + BC + BSI + RE + VC + x \qquad\qquad \textbf{E-07}$$

The banking system's balance sheet identity states that the sum total of demand and time liabilities (D and T) plus the discount liabilities of the banking system (RB) equal required reserves against demand and time liabilities (RR_D and RR_T), bank credit (BC), banking sector investments (BSI), excess reserves ($RE + VC$) and a balancing factor (x; all other assets less all other liabilities). The banking system's balance sheet provides data on borrowed reserves[8]. The definition of treasury currency may be read directly from equation **E-04** above. We are thus left to determine the quantity of unborrowed reserves and the factor A. In line with the definitions used by Federal Reserve Bank (2002), Teigen (1978) and

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[8]   The category Loans and Advances to Banks and NBFI's in the balance sheet of the State Bank of Pakistan somehow does not match the discount borrowings form SBP.

Jordan (1971), we define unborrowed reserves as the portfolio of government securities held at SBP, plus total discounts and advances made by State Bank of Pakistan (net of government deposits) less the borrowings of scheduled banks from SBP. Thus, adding together the fourth and fifth bracketed terms from equation **E-04**, and subtracting the amount of borrowed reserves from this total gives us an estimate of the amount of unborrowed reserves.

$$RU = \left(S_{Issue} + S_{Banking} + I_G\right) + \left(\begin{array}{c} BoE_{Internal} + GDB + A_G + A_{Banks} + A_{NBFI} \\ - D_F - D_P - D_O \end{array}\right) - RB \qquad \textbf{E-08}^9$$

Finally, subtracting treasury currency, unborrowed reserves and borrowed reserves from the total quantity of reserve money (equation **E-05**), we get data on the factor A that represents all other sources less all other uses of reserves[10]. The reserve equation hence gets empirically determined. Combining the above results, we can write the complete reserve equation as**:**

$$CC + OD + \left(RR_D + RR_T + RR_{NBFI}\right) + \left(RE + VC\right) \equiv R \equiv C_T + \left(RU - RF\right) + \left(RE + VC\right) + A \quad \textbf{E-09}$$

Canceling out excess reserves and vault cash on both sides, we get**:**

$$\left(CC + OD - C_T\right) + \left(RR_D + RR_T + RR_{NBFI}\right) = \left(RU - RF\right) + A \qquad \textbf{E-10}$$

Equation **E-10** is the reserve equation. It provides an important link between currency in circulation, required reserves, unborrowed reserves and net free reserves of the banking system. The reserve equation is important because all of its variables are directly linked with monetary policy instruments. Required reserves are linked to the reserve requirement ratios and the volume of demand deposits. Changes in unborrowed reserves take place through open market operations and are therefore related to the *t*-bill rate. Finally, net free reserves of the banking system have a very close relationship with the interest rate differential (money market rate less the discount rate) and deposits of the banking system. Monetary policy,

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[9]   The State Bank of Pakistan publishes data on borrowed reserves (advances from State Bank of Pakistan), excess reserves, vault cash (cash in tills of banks), one rupee and above coins, subsidiary coins and other deposits. The volume of treasury currency, borrowed reserves and free reserves is therefore known with certainty. However, the data on unborrowed reserves is not published in readily usable format. We derive it using the definition in **E-08**. To the extent that unborrowed reserves are over/under estimated (because of non-availability of further disaggregated data that may need a re-categorization), the factor A will need to be counter adjusted. However, we expect that this adjustment would be of a much smaller magnitude to make any significant analytical differences for our analysis.

[10]   Using **E-04**, **E-06** and **E-08,** we get:

$$A = \left(\begin{array}{c} G + \\ G_{RBI} \end{array}\right) + \left(\begin{array}{c} F + SDR + \\ A_{RBI} + BoPak \end{array}\right) + \left(\begin{array}{c} I_{Banks} + I_{NBFI's} + I_{Other} + Asst_{Other} \\ - CRF - BPay - Reval - Liab_{Other} \end{array}\right).$$ This clearly shows that the term A

represents net foreign assets of the central bank plus its investments (net of capital gains, other liabilities etc.) and, therefore, is the maximum amount of resources that can be drained out of the monetary system through defensive open market (sterilization) operations.

whether it works through open market or discount operations (in the short run) or through reserve requirement setting (in the long run) can therefore be directly evaluated by making use of this identity.

II (B) *Reserve Equation and the Analytics of Monetary Policy*

The various definitions of money supply used by the State Bank of Pakistan read**:**

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\begin{aligned}
M_2 &= (CC + OD) + (DD + TD + RFCD) = (CC + OD) + D_p \\
&= (NCGS + NCPS + NCO) + NFA \qquad\qquad\qquad\qquad \textbf{E-11} \\
&= NDA + NFA
\end{aligned}
$$

The reserve equation (**E-10**) and the demand definition of money supply (first part of **E-11**) together with the assumptions that **(i)** the ratio of currency (including other deposits) to money supply is stable and predictable and that **(ii)** required reserves are linked to deposits via the reserve requirement ratio, generate the definition of the reserve multiplier. Defining $\eta = (CC + OD)/M_2$, and $RR = \varphi \cdot D_P = \varphi(1-\eta)M_2$, we can write this relationship as**:**

$$
M_2 = \left(\frac{1}{\eta + \varphi(1-\eta)} \right) \cdot (RU + C_T + A - RF) = \mu \cdot (RU + C_T + A) - \mu \cdot RF
$$

E-12

The money supply model in equation **E-12**, links money supply (M_2) to the reserve multiplier (μ) and the reserve components, and simultaneously breaks money supply into its endogenous and exogenous components. Since the quantity of unborrowed reserves and treasury currency is directly under the control of the system and since *A* can always be effectively drained out of the system through defensive open market operations, therefore the first term represents the purely exogenous part of money supply. The second component is the net free reserves of the banking system and represents the endogenous part of money supply (Teigen, 1978; Branson, 1989). The central bank usually controls free reserves through its discount and standing facilities operations. Proponents of the reserve approach to money supply believe that once the quantity of unborrowed and free reserves is determined, the level of private deposits can be determined residually by making use of the expression:

$\Delta RR = \Delta RU - \Delta RF + \Delta A$ [11]. The ratio of unborrowed reserves and free reserves to total private deposits, therefore, describes nothing else but monetary policy.

Finally, using equations **E-01** and the last component of **E-11**, and defining $m_D = NDA/NDA_{SBP}$ and $m_F = NFA/NFA_{SBP}$ as the domestic and foreign asset money multipliers, we can write the overall money multiplier $(m = M_2/R)$ as $m = m_D \cdot \delta_D + m_F \cdot \delta_F$, where the δ's reflect the respective shares of domestic and foreign assets in reserve money. Since the numerator on the right hand side of equation **E-12** equals reserve money *less* excess reserves, therefore, we expect the reserve multiplier (μ) to be larger than the simple money multiplier (m) and the true descriptor of how much credit can the banking system generate from a given volume of reserve money.

III.   STATISTICAL COMPUTATIONS & ANALYSIS

Drawing upon the data on the balance sheets of the State Bank of Pakistan, the consolidated balance sheet of the commercial banks, monetary statistics and monetary survey, we construct data on the various components of the sources and uses of reserve money for the Pakistan economy using the above definitions over the period 1975-2009. All data has been taken from the *Handbook of Statistics on Pakistan Economy 2005* and the *Annual Reports* (*2006, 2007 and 2008*) of State Bank of Pakistan, and counter-checked from the *Monthly Bulletins* of State Bank of Pakistan and the various *Economic Surveys*. Results of the statistical computations are provided in Table No.5. The computed data series are then used to construct the time profile of a number of reserve indicators (derived in section II above), the graphs of which are plotted in the figures following the data tables.

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[11]   This identity is the total differential of equation **E-10** while holding currency in circulation constant. The differentials appearing in the expression are behaviorally related to the bank deposits and the various interest rates, thereby also getting cross linked to one another. Thus, e.g., when free reserves or unborrowed reserves change, they also cause a change in bank deposits exerting a second round indirect influence on required reserves (see Meigs, 1962) for a detailed discussion of these concepts). Casting out all of these differentials in terms of their relationship with bank deposits and then inverting this functional relationship, we get the result that bank deposits are residually determined through this identity. Clark and Kwack (1976) also derive the same result in a slightly different context.

Table nos. 5**(a)** and 5**(b)** illustrate our computed data series showing, respectively, the supply and demand components of reserve money. While table **5(a)** corresponds to our categorization of the SBP's balance sheet data in accordance with equation **E-04**, table **5(b)** is simply a reprint of different data series from the sources listed above. Table 5**(c)** illustrates data on the sources of reserve money constructed in concordance with equation **E-06**. This completes one part of the tasks that we set ourselves in this paper. This data set is then used to construct the time profile of the unborrowed, free and drainable reserve ratios, the ratio of broad money to unborrowed reserves, the endogenous and exogenous components of reserve money, the total volume of discretionary open market operation instruments along with its growth rate, the difference between the unborrowed and drainable reserve ratios in comparison with the t-bill rate, the reserve multiplier in comparison with the simple money multiplier, the breakup of the simple money multiplier into its domestic and foreign components, and the growth rate of unborrowed reserves alongside the rate of inflation. The graphs are sufficient evidence to the fact that the SBP is doing much that is unneeded and neglecting a lot while making monetary policy.

First and foremost, the unborrowed and drainable reserve ratios are mirror images of each other. This means that the State Bank of Pakistan carries out open market operations only to counter-balance changes in the factor A. Since A consists of foreign assets of the SBP and its investments in banks and NBFI's (net of factors that reflect its profitability), therefore the essential conclusion is that the SBP carries out open market operations to balance these changes and its own business initiatives. The volume of open market operations thus becomes endogenous to the system. It therefore appears to be a historical fact, and essentially in this *accounting* context only, that changes in *t*-bill rate are not reflective of SBP's monetary policy.

The SBP's motivation for carrying out open market operations also seems quite unconvincing. The SBP defines its *net* foreign assets as the sum total of first and second bracketed terms in equation **E-04** *less* some components of *Other Deposits* (see State Bank of Pakistan, 2005). The definition makes it clear that the SBP's foreign assets are *earned* reserves and not *borrowed* collateral (see Dooley and Garber, 2005 for details of these

concepts). In a subsequent paper, we show that the control over domestic asset expansion requires the central bank to offset changes *not* in its own net foreign assets (which are *earned* reserves) but the net foreign assets of commercial banks *including deposits of other government's, the country's net position at the IMF etc.* but *excluding their foreign bills*[12]. Since the strategy of SBP's open market operations reclines in counter balancing its own net foreign assets, therefore it becomes obvious that the SBP is deeply concerned with managing the exchange rate, quite in contrast with its publicly held opinion that it is not doing so.

To demonstrate the flaw of this strategy, we compare the simple money multiplier with the reserve multiplier. We find that the difference between the two multipliers averaged at 0.3 before 1991 and at approximately 0.7 since then. One is thus forced to believe that the foreign currency denominated private deposit accounts allowed in 1991 have something to do with this difference. Mirakhor and Zaidi (2004) observe that as per SBP policy requirement, commercial banks are required to sell the foreign exchange deposited with them to SBP at a *premium* at the end of each working day. This implies that the SBP supplies extra short term excess reserves for the banking system, thereby enabling them to disburse more credit if and when required than would otherwise be possible for the banking system. Thus, while the SBP continues to believe that the banking system can transform every rupee of reserve money into (about) three rupees of broad money, the banking system actually translates it into four rupees[13]. The open market operations strategy of the SBP lends further *support* to this endogenous credit expansion. Comparing the domestic and the foreign asset components of the money multiplier, we find that the former is much larger in magnitude as compared to the latter. Still, the SBP is more concerned with draining away these foreign assets (as discussed above) rather than mopping away domestic liquidity. The domestic asset multiplier averaged at a value of 4 between 1991 and 2002. The same increased to an average value of 17

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[12] This idea has been fully elucidated in the author's dissertation. The historical origins of the same can be traced back to the concept of the *liquidity* definition of balance of payments. Some useful discussions of the same can be found in McKinnon (1969) and Knoester (1979).

[13] The primary factor underlying this difference happens to be the way excess reserves are accounted for by the monetary authority and the monetary system. While the monetary authority needs to add excess reserves to form the reserve money aggregate (equation **E-02**), the monetary system treats excess reserves (net of discount borrowings) as a crunch on its reserve base (equations **E-09** and **E-10**). Thus reserve money increases in volume as excess reserves increase, but the reserve base of the banking system shrinks and hence a quantitatively larger multiplier value is obtained (the close association between the difference of the two multipliers and the free reserve to deposit ratio supports this intuition).

(peaking at a value of 30 in 2003) between 2003 and 2007. On the other hand, the foreign asset multiplier remained a fractional value averaging at 0.80 (peaking at a value of 1.06 in 2007) during the entire 2003-07 period. The open market operations of the SBP, thus, encourage long run rent seeking by the commercial banking sector thereby providing endogenous support to inflation.

Next, the total volume of discretionary open market instruments (sum total of unborrowed plus drainable reserves) as a ratio of total private deposits shows a declining trend ever since financial liberalization in 1991. The monetary system thus appears to have some historical preoccupation with not making open market operation instruments the primary tool of monetary policy. The growth rate of the same variable happens to be strongly negatively correlated with the rate of inflation (the correlation coefficient between the two is -0.6 over the period 1999-2000 to 2006-07). The recent inflation episode that took pace at the end of 2005 can therefore be entirely attributed as a failure of monetary policy. To add substance to this argument, we note that the level of unborrowed reserves (as percent of total private deposits) started declining in 1999-2000 and became negative in 2002-03, stayed negative until 2004-05, became positive again in 2005-06 only to continue declining again (in fact, the difference between unborrowed and drainable reserves is negative since 1999-2000). This indicates that the monetary system was providing excessive liquidity in the form of discount loans to the commercial banks. This event corresponds to a similar situation that the US economy has recently witnessed when the financial turmoil led to unborrowed reserves going negative marking the beginning of an inflation episode. The SBP has always asserted that Pakistan has *no signs* of being hit by financial turmoil like the USA and Euro zone did in 2007-08. The data, however, speak contrary to all that.

That the SBP's open market operations strategy derives from some ill-founded concerns becomes evident when we look at the graph that shows the difference between the unborrowed and drainable reserve ratios along side the *t*-bill rate. The difference between the unborrowed and drainable reserve ratios indicates nothing else but optimal open market operations (see Toporowski, 2006). Hence, we expect the *t*-bill rate to be the replica of this graph. However, we find that at the SBP, the two become same only when we plot the lagged value of the *t*-bill rate (which is an *annual average*) alongside the reserve difference. The

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monetary policy strategy at the SBP is thus seen to be lagging behind in time, indicating again that the bank takes about *six month's* time to know what is happening in the economy and the money market. Viewed from another perspective, since the *t*-bill rate does not match the difference between the unborrowed and drainable reserve ratios in the current time period, therefore, monetary policy may well be identified as time inconsistent (this may be one interpretation of why the output coefficient in our estimated *Taylor* rule equation is negative).

The unabated conclusions that this discussion points to, is that the SBP is **(i)** speciously using open market operations to balance changes in *earned* foreign exchange assets and its own business initiatives, thereby trivializing the *t*-bill rate, **(ii)** fabricating a time-inconsistent monetary policy owing to a one year lag in taking the *t*-bill rate to its optimal level, **(iii)** preoccupied with not using open market operations as the core monetary policy instrument, **(iii)** has no clear conception as to how this links to the formation of inflation expectations, hence, **(iv)** disowns inflation and its control[14].

As to the answer to what the State Bank of Pakistan's monetary policy is about, we find that prior to 1999-2000 the ratio of broad money to unborrowed reserves fluctuated around 4.6% of total private deposits, while since 2000-01 onwards, the State Bank is managing to keep the net free reserves of the banking system closely fluctuating around 4% of total private deposits. Both these strategies of monetary policy have been demonstrated to be inconsistent a long time ago even by the proponents of the reserve position doctrine. Free reserves were known to be an improper target of monetary policy ever since the 1960's. Unborrowed reserves were demonstrated to be improper target of policy both on account of the implementation complexities involved in the process and because of the wide swings in

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[14] The ultimate control over inflation and currency depreciation comes from the answer as to how costly it is for the system to increase any (or both) of them. These costs are leveraged by the levels of domestic public debt holdings and external reserves. Thus, for example, if the government holds a large volume of outstanding public debt, inflation would be very costly in that it will eventually increase the service cost of this debt to the government. Similarly, a large volume of external indebtedness (or foreign reserve holdings) will make currency depreciation difficult for the central bank, because it would then increase its service costs (or reduce the value of reserves) over and above the expected gains from increased exports. It follows that a strategy of increasing the exogenous component of money supply and accumulating foreign exchange reserves is sufficient to induce control over inflation and the currency exchange rate. The falling level of the sum of unborrowed and drainable reserves (which constitute the exogenous component of money supply) is therefore evidence to the fact that the State Bank of Pakistan and the government both are absolutely hesitant to control inflation.

interest rates produced by it (see Bindseil, 2004 for a review of when a certain reserve aggregate was used as a policy guide by the Fed and how and why it failed). Recounting upon Meigs' arguments about free reserves to be false indicators of the reserve pressure and on the practical failure of the 1979 Fed policy move[15] (see Meigs, 1962; Poole, 1982), we find that the SBP's *spontaneous* strategy of monetary policy is quiet disoriented[16]. In fact, since the SBP has never explicitly stated that it is engaged with targeting free reserves of the banking system, we can well infer (in the light of the arguments of Brunner and Meltzer (1964), Poole (1968), Bindseil (2004), Bindseil and Würtz (2007) and Gavin (2007)) that SBP is actually using the discount rate as an anchor for conducting monetary policy[17]. The steady state value of this anchor does not derive from any known estimates of the productivity of the domestic capital stock. Rather, its value is kept close to the *t*-bill rate, *and not contrariwise* (because announcements regarding the discount rate are always accommodative and have lagged behind changes in the inter-bank money market rate, only to allow more room for its variability; see SBP's various monetary policy statements at http://www.sbp.org.pk), which itself derives from some concern with managing the nominal exchange rate. This implies that the true descriptor of SBP's monetary policy is the *t*-bill rate, which is but incorrectly related with inflation and output levels.

IV. CONCLUSION

This paper dealt with the computation and analysis of some fundamental reserve aggregates and associated monetary statistics that the SBP does not publish or take into account but which impart important information regarding the design and conduct of monetary policy at the SBP. Specifically, we computed the data series for borrowed, unborrowed, free and

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[15] Meigs argued that **(i)** a given level of free reserves may be associated with different levels of money growth and deposit expansion, **(ii)** equal volumes of free reserves in different periods do not imply same bank behavior, **(iii)** changes in free reserve levels are inappropriate indicators of tight/easy monetary policy, and **(iv)** free reserves targets are self defeating (see Meigs, 1962 for details)

[16] We call this strategy *spontaneous* because the State Bank of Pakistan has never explained as to whether any of these reserves, unborrowed or free, are inelastic or contrariwise (as suggested by Gordon and Leeper (1997)) to the corresponding rate of interest. In fact, since the *t*-bill rate was constant during the 1980's and only a white noise averaging at 12.5 percent during 1990's therefore unborrowed reserve were perfectly elastic to the rate of interest. Similarly, the net free reserves ratio appears to be positively correlated with the discount rate since 2001.

[17] The recent monetary policy statement (State Bank of Pakistan, 2009b) thus, did not announce anything new about monetary policy. It only made explicit whatever the State Bank of Pakistan was previously doing without announcing it.

drainable reserves using balance sheet data published by the State Bank of Pakistan for the period 1985-2009 with a view towards the empirical determination of the reserve equation for Pakistan. These data series were then used to analyze the strategy of monetary policy at the SBP.

We find that **(a)** the operational target for carrying out monetary operations at the State Bank of Pakistan happens to be a free reserves target since 2000-01, which, interpreted in the light of the *fundamental equation of monetary policy* and the various monetary policy statements of the SBP, is equivalent to using the discount rate as the policy anchor, whose value, in turn, derives from the *t*-bill rate, **(b)** the scope of open market operations as a tool of monetary policy remains but limited, owing to the declining trend in the sum total of drainable and unborrowed reserves (which equals the volume of discretionary open market instruments and also represents the exogenous component of broad money supply) held at the SBP, **(c)** even this limited role of open market *defenses* derives from the indiscreet concern of the SBP to sterilize its own earned foreign exchange reserves rather than the unearned foreign exchange assets of the banking system. This reflects in the unborrowed and drainable reserves being mirror images of each other. Since this observation also implies that the source of open market operations lies in SBP's foreign asset accumulation (*inter-alia*), one may conclude (and as the *Governor* recently did) that the *t*-bill rate is endogenous to the monetary system. In fact, this is a mere restatement of the fact that open market operations derive from the concern with managing the exchange rate. Furthermore, **(d)** the limited scope and indiscreet concern regarding the conduct of open market operations is sub-optimally distributed in time whereby the *t*-bill rate lags behind its optimal value by about six months to one year and renders monetary policy time inconsistent, **(e)** the growth rate of unborrowed plus drainable reserves bears a strong negative correlation with the annual average rate of inflation, which, on account of the former being consistently negative since 2005, implies that the government and the State Bank of Pakistan *both* have absolutely no concern for controlling inflation.

The conclusions recounted above imply that the State Bank of Pakistan's monetary policy revolves around managing the exchange rate. The key policy instrument for implementing this strategy happens to be the *t*-bill rate, which also guides the State Bank of Pakistan in

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setting the discount rate. Two independent observations; the policy rule equation and the difference between unborrowed and drainable reserve ratios, suggest that value of this instrument is but incorrectly set. This finding, combined with the presence of a significant Laursen-Meltzer effect in face of the fact that the exogenous component of broad money is continuously declining, implies that the State Bank of Pakistan is responsible for the ongoing inflation episode.

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SCHEMATIC BALANCE SHEETS OF STATE BANK OF PAKISTAN

TABLE NO.1   **SCHEMATIC BALANCE SHEET OF SBP (ISSUE DEPARTMENT)**

LIABILITIES	ASSETS	
	Gold Coins and Bullion	
Currency Held in SBP (Banking Department)	**Approved Foreign Exchange**	Sterling Securities
		Government of India Securities
		India Notes
Notes in Circulation (Five Rupee & Above bills Issued)	**Unutilized Allocation of SDR 's**	
	Domestic Assets	Rupee Coin/ Notes
		Govt. of Pakistan Securities
		Internal Bills of Exchange and Commercial Papers
	Assets with RBI Pending Transfer to Pakistan	Gold Coins and Bullion
		Sterling Securities
		Government of India Securities
		Rupee Coins

SOURCE: State Bank of Pakistan (2005)

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SCHEMATIC BALANCE SHEETS OF STATE BANK OF PAKISTAN

TABLE NO. 2   **SCHEMATIC BALANCE SHEET OF SBP (BANKING DEPARTMENT)**

LIABILITIES		ASSETS	
Capital and Reserves	Paid-up Capital	**Notes and Coins Held in SBP (Banking Department)**	
	Reserve Fund	**Bills Purchased and Discounted**	Internal Bills of Exchange
Deposits	Deposits of Federal Government		Government Treasury Bills
	Deposits of Provincial Government	**Foreign Exchange**	Balances Held outside Pakistan
	Deposits of Banks		SDR Held with IMF
	Other Deposits at SBP	**Advances to Government**	Government Debtor Balance
Allocation of SDR 's by IMF			Loans and Advances to Government
Bills Payable		**Loans and Advances to Scheduled Banks**	
Revaluation Account		**Loans & Advances to NBFI 's**	
Other Liabilities		**Investments of SBP in**	Scheduled Banks
			NBFI 's
			Government Securities
			Other Assets
		Other Fixed Assets	

SOURCE: State Bank of Pakistan (2005)

SCHEMATIC BALANCE SHEETS OF BANKING SECTOR

TABLE NO. 3　　　　　　　**SCHEMATIC BALANCE SHEET OF BANKING SECTOR**

LIABILITIES			ASSETS		
Capital Paid-up and Reserves			**Statutory Reserves**	On Demand Liabilities	
Demand Liabilities in Pakistan	Inter-Bank	*Borrowing*		On Time Liabilities	
		Deposits	**Balances In Pakistan**	Cash in Pakistan	
	Others	*Deposits General*		Balances with SBP	
		Deposits Other		Other Balances	
Time Liabilities in Pakistan	Inter-Bank	Borrowings		Money at Call & Short Notice in Pakistan	
		Deposits	**Foreign Currency**	Held in Pakistan	
	Others	Deposits General		Balances with Banks Abroad	
		Other Deposits			
Borrowings from State Bank of Pakistan			**Bank Credit**	Advances	To Banks
Borrowings from Banks Abroad					To Others
Money at Call and Short notice in Pakistan				Bills Purchased & Discounted	
Other Liabilities			**Investment In Securities & Shares**	Federal Govt. Securities	
				Provincial Govt. Securities	
				Treasury Bills	
				Others	
			Other Assets		
			Advance Tax Paid		
			Fixed Assets		

SOURCE: State Bank of Pakistan (2005)

LIST OF ACRONYMS

TABLE NO. 4 — LIST OF ACRONYMS USED IN PAPER

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
C	Notes in Circulation (Currency Issued)	$BoE_{Internal}$	Internal Bills of Exchange and Commercial Papers
$C_{Banking}$	Currency Held in SBP (Banking Department)	G_{RBI}	Gold Coin & Bullion with RBI
CRF	Capital and Reserves	A_{RBI}	Other Assets with RBI
D_F	Deposits of Federal Government	$S_{Banking}$	Bills Purchased & Discounted (Internal Bills of Exchange and Government T Bills)
D_P	Deposits of Provincial Government		
DoB	Deposits of Banks	$BoPak$	Balances Held outside Pakistan
D_O	Other Deposits at SBP	$SDR_{Banking}$	SDR Held with IMF
$SDR_{Allocation}$	Allocation of SDR 's by IMF	GDB	Government Debtor Balance
$BPay$	Bills Payable	A_G	Loans and Advances to Government
$Reval$	Revaluation Account	A_{Banks}	Loans and Advances to Scheduled Banks
$Liab_{other}$	Other Liabilities	A_{NBFI}	Loans & Advances NBFI 's
G	Gold Coins and Bullion	I_{Banks}	Investment in Scheduled Banks
F	Approved Foreign Exchange	I_{NBFI}	Investment in NBFI 's
SDR_{Issue}	Unutilized Allocation of SDR 's	I_G	Investment in Government Securities
C_{Issue}	Rupee Coin/ Notes	I_{Other}	Other Investments
S_{Issue}	Govt. of Pakistan Securities	$Asst_{Other}$	Other Fixed Assets

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RESERVE MONEY AND ITS COMPONENTS

TABLE NO. 5(A)   RESERVE MONEY AND ITS COMPONENTS (SUPPLY)

	Gold Stock	Foreign Exchange of SBP	Treasury Currency	SBP's Portfolio of Government Securities	SBP Credit	Government Deposits at SBP	Other Balancing Items	Reserve Money
1985	9,661.60	6,558.10	2,937.00	66,879.70	29,543.10	29,645.50	(15,684.20)	70,249.80
1986	11,276.80	12,008.10	3,110.00	68,552.50	37,238.20	34,573.70	(19,412.40)	78,199.70
1987	15,052.40	11,218.40	3,359.00	76,342.80	45,308.30	31,557.50	(19,504.10)	100,219.50
1988	15,286.50	4,367.40	3,520.00	82,114.80	53,005.70	30,209.20	(19,924.90)	108,160.70
1989	15,342.20	5,729.60	5,877.00	90,110.60	58,919.20	35,475.50	(18,544.90)	121,958.80
1990	14,960.30	9,175.90	4,968.00	110,990.40	65,449.40	46,809.40	(18,081.30)	140,655.20
1991	17,448.70	8,951.20	5,892.00	119,695.20	84,499.20	45,222.50	(21,384.10)	169,879.90
1992	17,443.10	20,401.80	6,517.00	173,778.50	77,460.80	65,101.50	(22,206.40)	208,293.50
1993	20,841.80	6,647.30	7,663.00	198,513.10	93,975.10	71,345.90	(32,436.60)	223,858.10
1994	24,296.50	63,164.60	8,987.00	188,715.60	95,957.10	89,418.80	(32,905.30)	258,797.10
1995	24,663.20	77,697.30	8,331.00	212,563.20	111,539.20	79,872.00	(48,931.90)	305,989.40
1996	27,566.90	63,989.40	10,079.00	240,450.00	90,013.90	81,487.40	(40,531.70)	310,080.70
1997	27,970.50	37,201.30	10,360.00	288,496.20	112,921.20	89,869.80	(40,033.60)	347,046.20
1998	28,291.20	32,997.80	9,677.00	253,189.90	148,589.80	99,394.30	(3,872.90)	369,478.80
1999	28,067.00	78,408.60	9,428.00	381,913.50	197,865.80	227,441.10	(70,258.10)	397,983.80
2000	31,508.10	59,715.90	11,217.00	573,371.20	220,666.50	323,991.60	(74,679.70)	497,807.60
2001	36,199.20	132,612.20	14,726.00	618,890.50	201,292.70	498,613.10	28,094.20	533,201.40
2002	40,020.30	287,586.10	17,567.00	328,592.80	179,238.00	327,154.70	58,749.40	584,599.00
2003	41,918.20	576,935.30	8,165.00	110,390.80	157,971.30	355,360.00	129,459.80	669,480.50
2004	48,305.20	645,544.70	7,721.00	133,274.90	188,703.00	310,451.70	59,771.70	772,868.90
2005	54,746.20	625,039.10	10,115.00	331,273.10	208,092.30	366,468.30	46,378.60	909,176.20
2006	77,557.70	689,674.80	12,529.00	516,661.20	224,235.50	410,494.60	(108,689.30)	1,001,473.70
2007	82,598.00	850,521.10	15,120.00	460,752.70	278,350.30	408,415.90	(68,357.20)	1,210,569.10
2008	124,607.70	612,461.00	12,595.00	1,042,646.20	240,270.30	428,693.30	(215,431.40)	1,388,455.70
2009	166,246.60	755,208.70	13,012.00	1,199,879.70	379,973.20	747,727.50	(258,791.50)	1,507,801.10

RESERVE MONEY AND ITS COMPONENTS

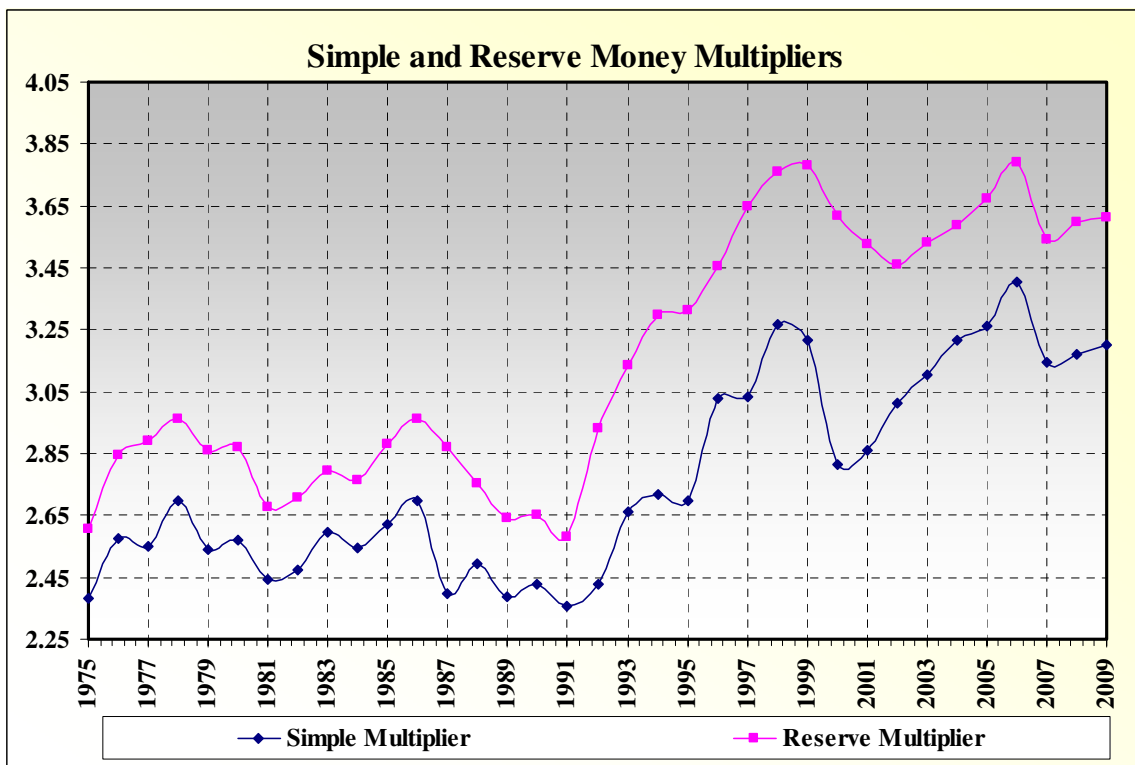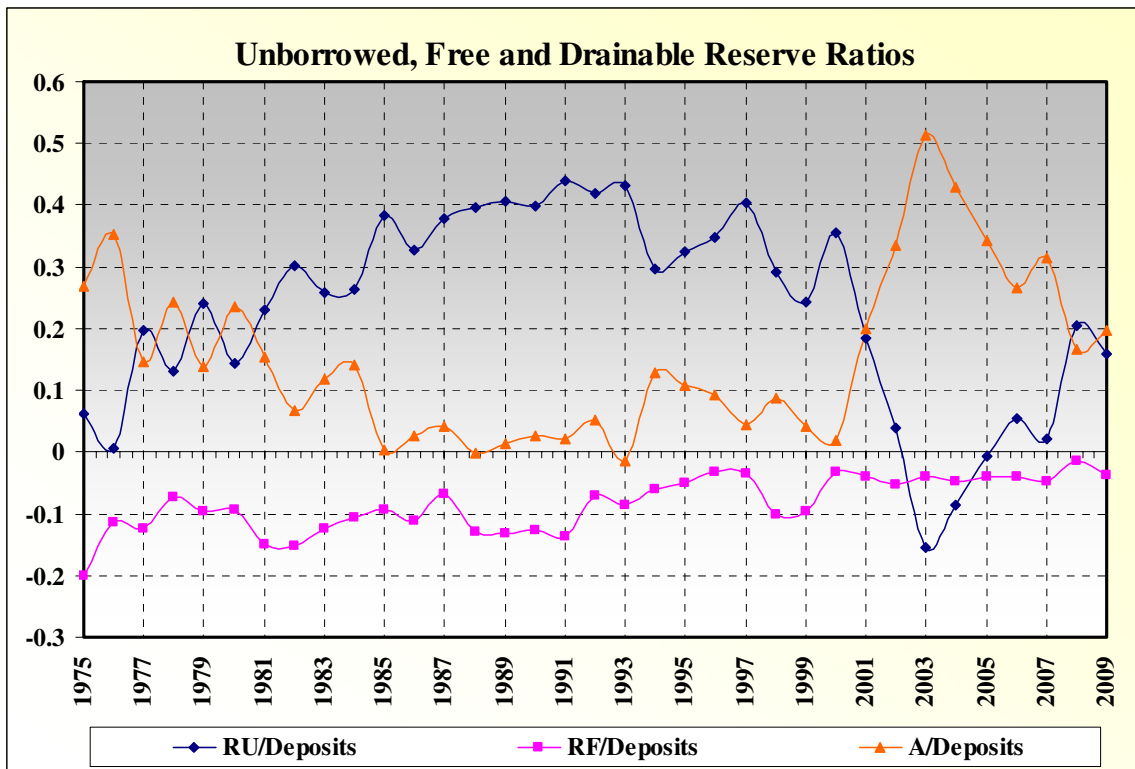## TABLE NO. 5(B)   RESERVE MONEY AND ITS COMPONENTS (DEMAND / USES)

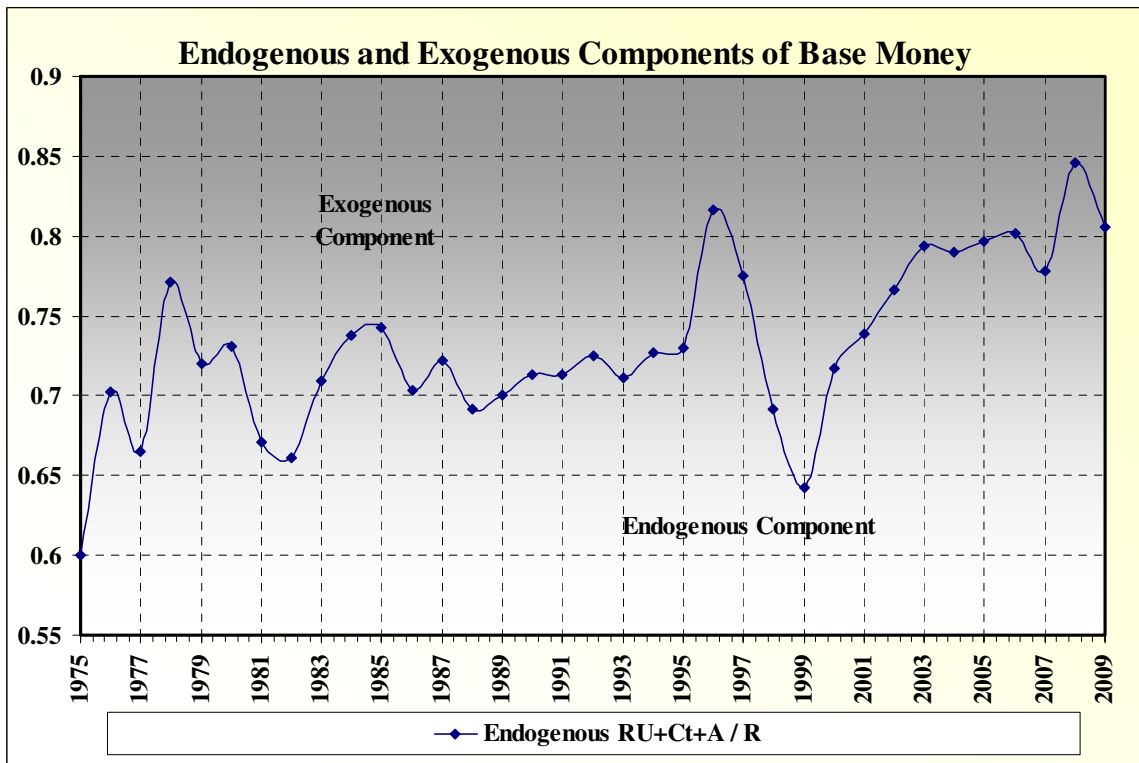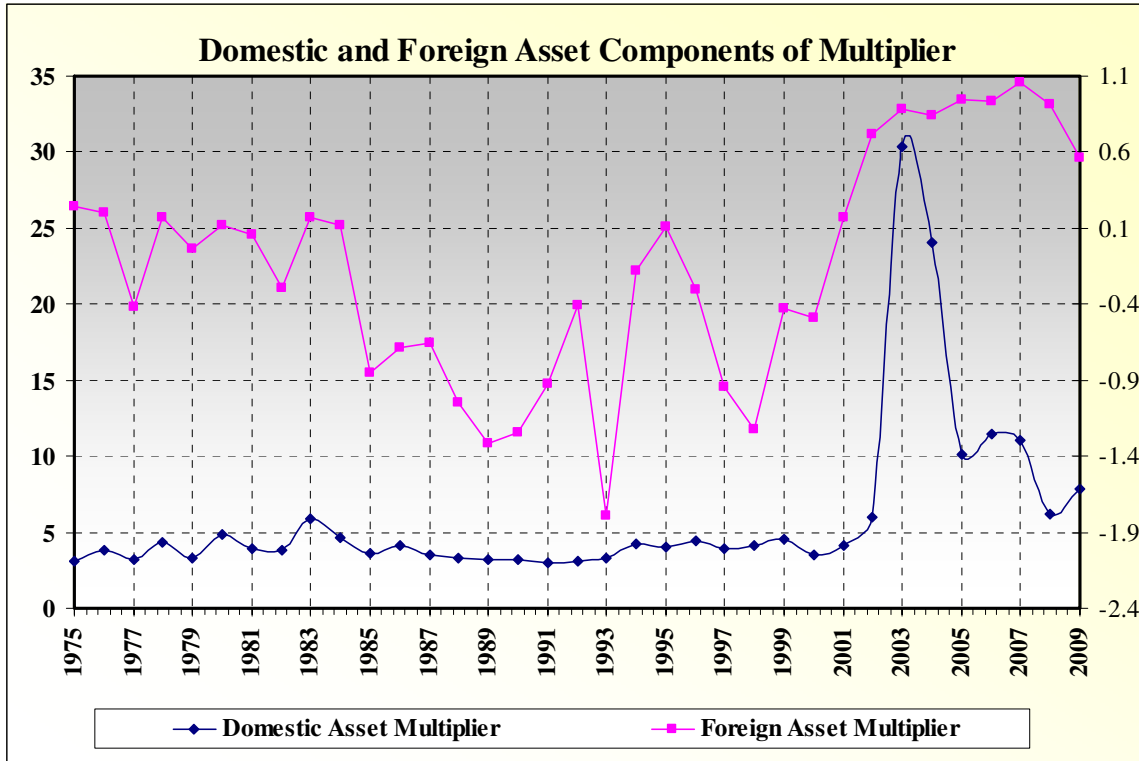|	Currency in Circulation	Other Deposits	Required Reserves (DD)	Required Reserves (TD)	Deposits of NBFI's	Excess Reserves	Vault Cash	Reserve Money
1985	56,701.70	742.00	3,674.26	3,691.65	(825.80)	2,178.89	4,087.10	70,249.80
1986	63,293.90	878.00	4,269.63	4,721.71	(1,922.80)	2,811.36	4,147.90	78,199.70
1987	74,765.50	1,102.00	4,722.42	5,370.64	(2,348.40)	11,984.15	4,623.20	100,219.50
1988	87,856.40	1,218.00	5,492.49	5,762.18	(2,419.60)	5,116.43	5,134.80	108,160.70
1989	97,996.80	3,132.00	6,035.63	6,171.27	(3,110.50)	6,749.91	4,983.70	121,958.80
1990	115,523.30	2,209.00	7,275.60	7,396.30	(3,574.10)	6,474.10	5,351.00	140,655.20
1991	136,999.40	3,114.00	8,533.25	9,196.25	(2,582.50)	7,280.50	7,339.00	169,879.90
1992	152,236.40	3,322.00	10,693.15	11,469.35	(5,053.90)	26,664.50	8,962.00	208,293.50
1993	166,864.90	4,449.00	12,311.45	13,960.00	(7,501.80)	22,473.55	11,301.00	223,858.10
1994	184,928.10	5,506.00	14,500.95	17,718.05	(9,342.00)	31,527.00	13,959.00	258,797.10
1995	215,579.60	5,055.00	16,918.80	20,916.45	(9,511.20)	40,667.75	16,363.00	305,989.40
1996	234,110.10	6,791.00	18,999.15	25,296.15	(13,650.40)	19,206.70	19,328.00	310,080.70
1997	244,140.90	7,135.00	19,960.15	29,118.25	(11,806.70)	40,677.60	17,821.00	347,046.20
1998	272,922.90	6,412.00	22,762.00	32,293.75	(13,365.10)	29,684.25	18,769.00	369,478.80
1999	287,716.90	6,212.00	25,902.95	33,918.15	(15,150.10)	40,513.90	18,870.00	397,983.80
2000	355,677.80	7,959.00	28,687.50	33,466.90	(38,668.20)	91,216.60	19,468.00	497,807.60
2001	375,465.80	11,292.00	30,655.85	36,358.85	(20,696.40)	80,947.30	19,178.00	533,201.40
2002	433,815.90	13,847.00	35,106.40	40,933.05	(14,360.90)	48,843.55	26,414.00	584,599.00
2003	494,576.80	3,499.00	43,858.65	46,158.20	912.70	50,060.15	30,415.00	669,480.50
2004	578,116.70	2,116.00	55,985.65	52,621.40	4,798.20	42,798.95	36,432.00	772,868.90
2005	666,056.90	3,355.00	66,350.85	63,489.45	8,210.30	58,251.70	43,462.00	909,176.20
2006	740,529.40	4,931.00	72,363.85	76,220.90	5,073.30	53,916.25	48,439.00	1,001,473.70
2007	848,773.50	7,012.00	211,867.46	17,470.53	(2,264.40)	78,095.01	58,072.00	1,210,569.10
2008	986,793.70	4,261.00	316,878.48	0.00	(85,662.70)	97,219.52	68,966.00	1,388,455.70
2009	1,160,536.20	4,662.00	184,586.15	0.00	(12,835.10)	93,845.85	77,006.00	1,507,801.10

RESERVE MONEY AND ITS COMPONENTS

TABLE NO. 5(C)   RESERVE MONEY AND ITS COMPONENTS (SOURCES)

	Treasury Currency	Borrowed Reserves	Discretionary Open Market Instruments		Excess Reserves	Vault Cash	Net Free Reserves	Reserve Money
			Unborrowed Reserves	Drainable Reserves				
1985	2,937.00	18,065.30	48,712.00	535.50	2,178.89	4,087.10	(11,799.31)	70,249.80
1986	3,110.00	23,159.40	48,057.60	3,872.70	2,811.36	4,147.90	(16,200.14)	78,199.70
1987	3,359.00	27,811.20	62,282.40	6,766.90	11,984.15	4,623.20	(11,203.85)	100,219.50
1988	3,520.00	33,340.10	71,571.20	(270.60)	5,116.43	5,134.80	(23,088.87)	108,160.70
1989	5,877.00	36,547.70	77,006.60	2,527.50	6,749.91	4,983.70	(24,814.10)	121,958.80
1990	4,968.00	40,285.00	89,345.40	6,056.80	6,474.10	5,351.00	(28,459.90)	140,655.20
1991	5,892.00	48,785.00	110,186.90	5,016.00	7,280.50	7,339.00	(34,165.50)	169,879.90
1992	6,517.00	57,267.00	128,870.80	15,638.70	26,664.50	8,962.00	(21,640.50)	208,293.50
1993	7,663.00	64,577.00	156,565.30	(4,947.20)	22,473.55	11,301.00	(30,802.45)	223,858.10
1994	8,987.00	70,583.00	124,670.90	54,556.20	31,527.00	13,959.00	(25,097.00)	258,797.10
1995	8,331.00	82,668.00	161,562.40	53,428.00	40,667.75	16,363.00	(25,637.25)	305,989.40
1996	10,079.00	56,914.00	192,062.50	51,025.20	19,206.70	19,328.00	(18,379.30)	310,080.70
1997	10,360.00	77,999.00	233,548.60	25,138.60	40,677.60	17,821.00	(19,500.40)	347,046.20
1998	9,677.00	113,919.00	188,466.40	57,416.40	29,684.25	18,769.00	(65,465.75)	369,478.80
1999	9,428.00	142,147.00	210,191.20	36,217.60	40,513.90	18,870.00	(82,763.10)	397,983.80
2000	11,217.00	141,016.00	329,030.10	16,544.50	91,216.60	19,468.00	(30,331.40)	497,807.60
2001	14,726.00	139,367.00	182,203.10	196,905.30	80,947.30	19,178.00	(39,241.70)	533,201.40
2002	17,567.00	136,556.00	44,120.10	386,355.90	48,843.55	26,414.00	(61,298.45)	584,599.00
2003	8,165.00	137,882.00	(224,879.90)	748,313.40	50,060.15	30,415.00	(57,406.85)	669,480.50
2004	7,721.00	162,335.00	(150,808.80)	753,621.70	42,798.95	36,432.00	(83,104.05)	772,868.90
2005	10,115.00	185,068.00	(12,170.90)	726,164.10	58,251.70	43,462.00	(83,354.30)	909,176.20
2006	12,529.00	198,725.00	131,677.10	658,542.60	53,916.25	48,439.00	(96,369.75)	1,001,473.70
2007	15,120.00	269,109.00	61,578.10	864,762.00	78,095.01	58,072.00	(132,941.99)	1,210,569.10
2008	12,595.00	213,293.00	640,930.20	521,637.50	97,219.52	68,966.00	(47,107.48)	1,388,455.70
2009	13,012.00	293,641.00	538,484.40	662,663.70	93,845.85	77,006.00	(122,789.15)	1,507,801.10

GRAPHS OF SELECTED MONETARY POLICY INDICATORS

Unborrowed, Free and Drainable Reserve Ratios

RU/Deposits   RF/Deposits   A/Deposits

Simple and Reserve Money Multipliers

Simple Multiplier   Reserve Multiplier

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Domestic and Foreign Asset Components of Multiplier

Legend: ◆ Domestic Asset Multiplier   ■ Foreign Asset Multiplier

Endogenous and Exogenous Components of Base Money

Exogenous Component

Endogenous Component

Legend: ◆ Endogenous RU+Ct+A / R

GRAPHS OF SELECTED MONETARY POLICY INDICATORS

Discretionary Open Market Instruments (RU+A / Deposits)

Legend: RU+A/Deposits

Inflation and the Growth in [(RU+A) / Deposits]

Legend: G(RU+A)   INFL

Optimal OMO's and the T-Bill Rate

Legend: RU-A / Deposits · TBR

Policy Targets and Shifts at the State Bank of Pakistan

Money Supply / Unborrowed Reserves

(-) Free Reserves / Deposits

Legend: (-) RF / Deposits · M2/RU

GRAPHS OF SELECTED MONETARY POLICY INDICATORS

Policy Targets and Shifts at the State Bank of Pakistan

Consolidated Budget Deficit As % of GNP

Liquidity Effect of Government's Borrowing

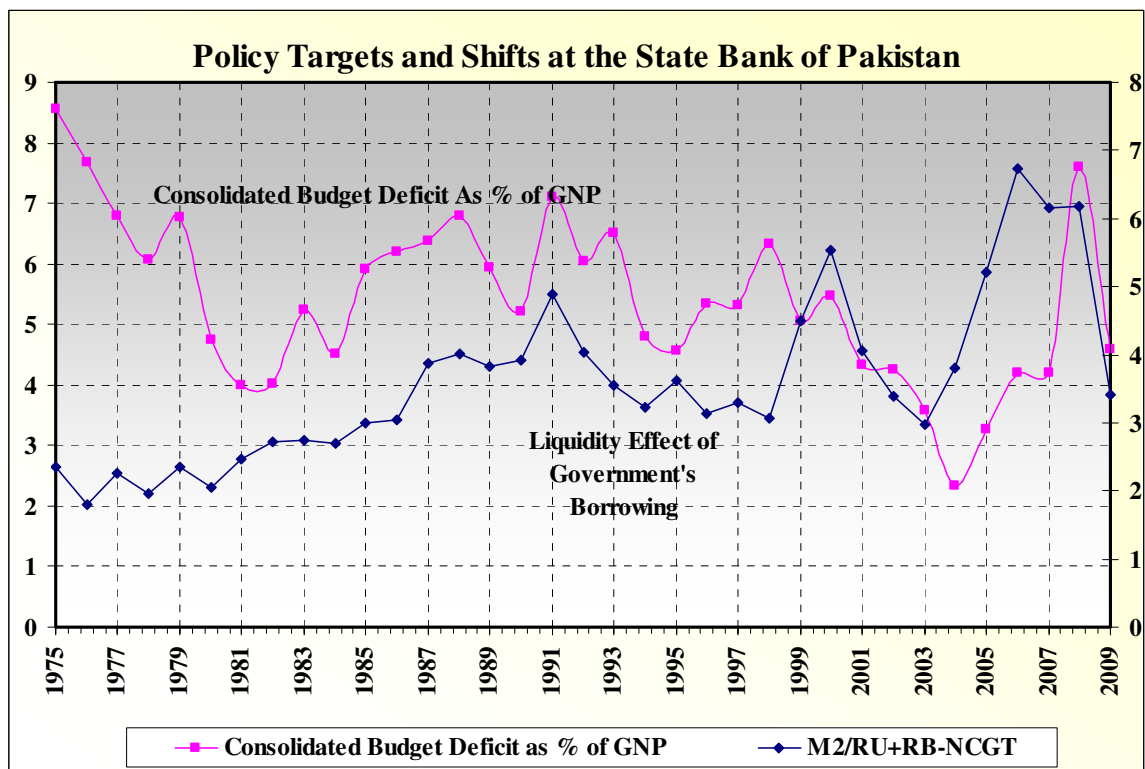Legend: —■— Consolidated Budget Deficit as % of GNP   —◆— M2/RU+RB-NCGT

TABLE NO. 6 **RESERVE RATIOS INDICATING THE HISTORICAL TARGETS OF PAKISTAN'S MONETARY POLICY**

Year	M2 / RU	Criteria	Year	(-) RF / Deposits	Governor of SBP
1979	6.00		1979	0.0960	8.A G N Kazi
1980	10.08		1980	0.0934	8.A G N Kazi
1981	6.55		1981	0.1494	8.A G N Kazi
1982	4.95		1982	0.1522	8.A G N Kazi
1983	5.68		1983	0.1240	8.A G N Kazi
1984	5.63		1984	0.1067	8.A G N Kazi
1985	3.78		1985	0.0931	8.A G N Kazi
1986	4.39		1986	0.1102	8.A G N Kazi
1987	3.85	When a Central Bank Targets Unborrowed Reserves, the ratio of money supply to unborrowed reserves remains constant	1987	0.0682	9.V.A. Jaffrey
1988	3.77		1988	0.1279	10.I.A. Hanfi
1989	3.78		1989	0.1307	11.Kassim Parekh
1990	3.82		1990	0.1271	11.Kassim Parekh
1991	3.64		1991	0.1361	10.I.A. Hanfi
1992	3.93		1992	0.0704	10.I.A. Hanfi
1993	3.80		1993	0.0849	10.I.A. Hanfi
1994	5.64		1994	0.0596	12.Mohammad Yaqub
1995	5.10		1995	0.0514	12.Mohammad Yaqub
1996	4.89		1996	0.0333	12.Mohammad Yaqub
1997	4.51		1997	0.0337	12.Mohammad Yaqub
1998	6.40		1998	0.1010	12.Mohammad Yaqub
1999	6.09		1999	0.0956	12.Mohammad Yaqub
2000	4.26		2000	0.0328	13.Ishrat Husain
2001	8.38	The switch to free reserve targeting disturbed the unborrowed reserve ratio erratically	2001	0.0398	13.Ishrat Husain
2002	39.92		2002	0.0530	13.Ishrat Husain
2003	(9.24)		2003	0.0395	13.Ishrat Husain
2004	(16.49)		2004	0.0472	13.Ishrat Husain
2005	(243.74)		2005	0.0394	13.Ishrat Husain
2006	25.87		2006	0.0391	14.Shamshad Akhtar
2007	61.83		2007	0.0483	14.Shamshad Akhtar
2008	6.86	Settling down of Policy Environment	2008	0.0150	14.Shamshad Akhtar
2009	8.97		2009	0.0363	14.Shamshad Akhtar