OPINION

Monetary Overhang in Pakistan

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The term monetary overhang is used frequently in economic reports, speeches of policymakers and media. Despite its widespread use as an important indicator of inflationary pressures, little empirical work has been done so far in case of Pakistan to explore its dynamics. This note is an attempt to estimate the extent of overhang in Pakistan and its implications for inflation and monetary policy.

Generally, the term monetary overhang refers to a situation of excess money supply relative to nominal GDP. The term monetary overhang has also been used to describe the situation where people have money holding but unable to spend it due to price controls or/and quantity rationing; this was the case in former centrally planned economies. According to d'Arvisenet (2005) each economy has a trend growth of monetary assets (reference path), and any rise in monetary assets higher than this trend growth is known as monetary overhang. This trend growth rate could be worked out on the basis of targeted nominal GDP growth (average growth in output and targeted inflation rate), adjusted for the drift in velocity of money and some indicator of financial deepening (e.g. money to GDP ratio). Polleit and Gerdesmeir (2005) define monetary overhang as "the difference between the actual nominal stock of money and the equilibrium stock of money calculated on the basis of actual values of output and interest rate by using long-run money demand equation.

The phenomenon of excess liquidity has also been noticed and studied by classical economists like Mackay (1841) who documented historical episodes of excess credit and money creation, formation of bubbles and crises in different western economies during 1630 to 1720. In a recent study, Chancellor (2005) reported more than a dozen historical and recent monetary and credit booms including speculative mania of 1920s, Japanese asset price bubble in late 1980s and dot.com bubble during 1990s in USA.

For the purpose of this note, we use three methods to assess the extent of monetary overhang in Pakistan: (a) the difference between growth rates of broad money and nominal GDP, (b) d'Arvisenet's (2005) approach of taking the difference between actual money growth and some reference money growth, (c) difference between the actual and projected money growth on the basis of a univariate AR model.

The first method is based on the assumption that economy requires additional money supply according to the increase in the size of the economy (with an implicit assumption of unit income elasticity of money.). This is a strong assumption for both developed and developing economies. While income elasticity of money tends to be much smaller than one in developed economies, it is greater than unit due to a large informal sector and increasing monetization.

Alternatively, d'Arvisenet's (2005) technique seems suitable to estimate monetary overhang. For this, we will estimate the reference or trend monetary growth (M2*), and compute monetary overhang (MOH) by subtracting this reference monetary expansion from the actual monetary growth.

The reference money growth is based on traditional equation of exchange, that is $m = p + y - v$, with m showing growth in money supply, p inflation, y real GDP growth and v growth in velocity of money. The reference growth rate of money supply (m^*) is computed from the above relationship by using target of inflation and potential real GDP growth and long-run velocity growth. We have used average real GDP growth of 5.3 percent during the sample period as long-term potential output growth and 6 percent inflation target (most common inflation target in annual plans) and -1.8 percent growth in velocity (average of actual velocities during FY76-06) as input to work out reference growth rate of money supply that is 13.2 percent. The monetary overhang is thus the deviation of actual money growth from 13.2 percent.

In the third approach, a parsimonious autoregressive model for money supply has been identified, estimated and residuals are derived as monetary overhang. As mentioned above that monetary overhang can also be computed by using money demand function (Polleit and Gerdesmeir, 2005). However, a number of studies concluded that money demand function is unstable due to financial innovation, changes in the financial structure amidst advancement in the technology as well as transformation in the economy (Moinuddin, 2009). In the presence of structural break(s), estimated money demand is likely to be underestimated, which would lead to overestimation of the monetary overhang. In this background, instead of using a money demand function, monetary overhang is computed by using a univariate autoregressive model.

We have used broad money (M2) definition for money supply and consumer price index (CPI) as measure of price level. The sample size is from 1976 to 2006. All data is obtained from various issues of SBP Annual Reports.

Figure 1. Monetary Overhang (MOH)
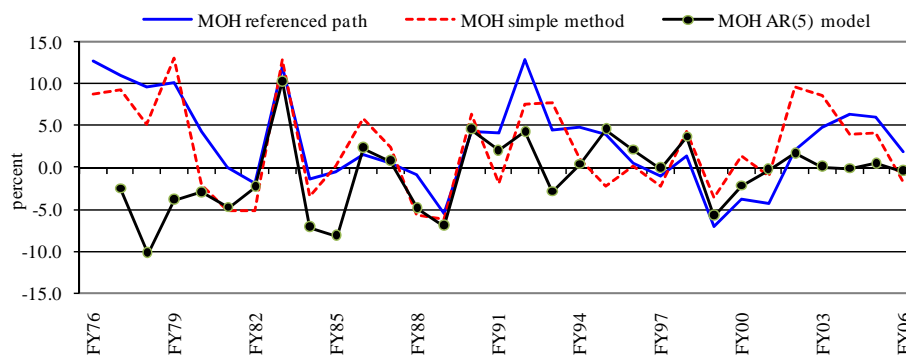
The time series of monetary overhang as computed through all the three approaches are depicted in the Figure 1. While monetary overhang computed by simple method and relative to reference path exhibited a similar trend, the same obtained through AR model shows a less volatile trend during the more recent years. In absolute terms, while a three years sum of monetary overhang by both simple method and reference path technique suggests that a liquidity of about Rs. 100 billion is in excess in the economy, the AR model suggests that excess liquidity of the recent past has almost been absorbed in the economy.

At a glance, panels of Figure 2 show various episodes of monetary overhang as well as adjustments of monetary gaps after some times. The long-term trend of monetary overhang depicts that excess money supply is resulted in monetary overhang for few years in a row; however, some correction/adjustment took place in the subsequent years. Two important relationships could be identified with the estimated trend of monetary overhang (a) sustained monetary overhang creates inflationary pressures, and (b) negative overhang (i.e. monetary shortfall) is linked to recessionary trend in the economy (Figure 3). Interestingly, relationship between monetary overhang and inflation is meaningful with one-year time lag, implying that the impact of monetary overhang is translated into inflation after one year.

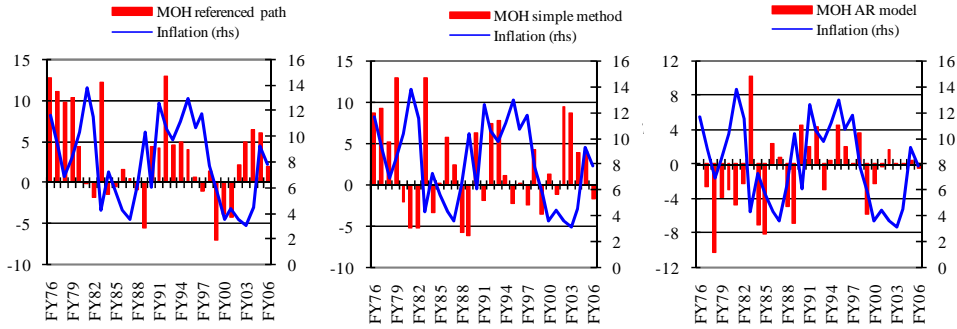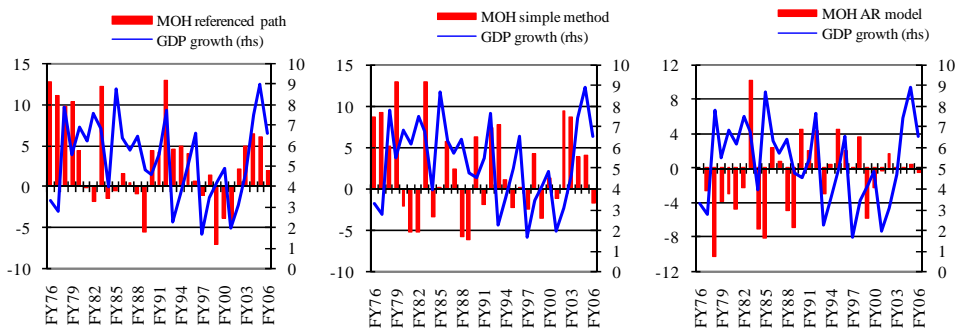**Figure 2. Monetary Overhang and Inflation (percent)**

Figure 3. Monetary Overhang and Growth (percent)

In order to explore which measure of monetary overhang is more relevant for inflation, we have estimated a simple equation of inflation with monetary overhang and past inflation as its determinants. The results, as reported in Table 1 show that while monetary overhang computed by using reference growth path is a significant determinant of inflation in Pakistan, the same computed by using simple method and autoregressive model are not statistically significant. It suggests that a rule based monetary policy with money supply being kept around the reference path of money growth computed on the basis of target inflation and average real GDP growth could better perform in affecting inflation.

However, it should also be kept in mind that the quantity theory of money was valid in regulated and less developed financial sector (Ali, 1986) where monetary aggregates are less sensitive to movements in interest rates. These results of the role of monetary overhang are not surprising given that the financial sector was heavily regulated in Pakistan during the dominating part of the sample period. In recent years, however, Pakistan's financial sector witnessed rapid development and monetary policy transmission mechanism seems working well through credit channel (Ahmed et al., 2005). Moreover, increasing role of consumer financing as well as popularity of digital money are also likely to strengthen the monetary policy transmission mechanism going forward. Therefore, relationship established in this note could weaken in years ahead.

Table 1. Determinants of Inflation

OLS results: dependent variable: CPI Inflation

Sample period: 1976-2006

1. Monetary overhang with simple method

	Coefficient	t-stat	Adj. R^2	DW	Inflation forecast for FY07
Constant	2.41	1.66	0.34	1.94	7.30%
MH_{t-1}	0.12	1.35			
$\pi_{1-\tau}$	0.65	4.11			
2. Monetary overhang with reference path					
Constant	3.08	2.54	0.42	1.81	7.60%
MH_{t-1}	0.20	2.39			
$\pi_{1-\tau}$	0.52	3.75			
3. Monetary overhang with AR(5) model					
Constant	3.31	3.31	0.32	1.88	7.90%
MH_{t-1}	0.12	0.12			
$\pi_{1-\tau}$	0.59	0.59			

MH = monetary overhang; π = inflation

Note: Actual inflation for FY07 is 7.8 percent.

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