Measures of Monetary Policy Stance: a case of Pakistan

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The stance of monetary policy is defined as quantitative measure of whether policy is too tight, Neutral or too loose relative to objectives (stable prices and output growth) of monetary policy.

measures of policy stance is important for at least two reasons.

- Firstly it helps the authority (central Bank) determine the course of monetary policy needed to keep the objective (goals) with in the target range.

- Secondly, a quantitative measure of stance is important for empirical study of the transmission of monetary policy actions through the economy.

Different measures

- Traditionally a single variable (such as monetary aggregate or discount rate) was used as policy measure.

- Friedman and Schwartz (1963) advocate the innovations in the monetary aggregates as a good approximate measure of monetary policy shocks.

- Bernanke (1992) and Sims (1992) use innovation in interest rate as a measure of monetary policy change.

Other measures in literature

- Non-borrowed reserves(Christians and Eichanbaum, 1992)
- Innovation in overnight rate (Armour et al. 1996)
- Term spread(Laurent, 1988, Good friend, 1991, and Oliner and Rudebusch, 1996)
- “Narrative Approach” (Romer and Romer 1989)

Composite measures

Due to the disagreement about the use of single variable as a policy indicator, the composite measures have been developed and used as a policy indicator.

- The Bank of Canada uses monetary condition index (MCI), which is weighted sum of changes in interest rate and exchange rate from given base period, as measure of policy stance.

- Bernanke and Mihov (1998) suggested a VAR methodology that can include all the policy variables previously proposed for the United States as particular specifications of general model.

- There is only one study for Pakistan by Qayyum (2002) that measures Monetary Condition Index.

- This study is different in that

  – we construct two composite measures i.e. Monetary Condition Index (MCI) and an over all measure developed by Bernanke and Mihov (1998).

  – We then compare both measures on the basis of performance criteria i.e.
    - the consistency of estimated weights with economic theory
    - visual inspection vis-à-vis output growth as well as changes in inflation (Graphical inspection of turning points).
    - its dynamic correlation with output growth and inflation.

Methodology

- **Monetary Condition Index (MCI):**

$$Y_t = \alpha 1 + \sum_{t=1}^{n} \sum_{j=1}^{ni} \lambda_{i,j} x_{t-j} + \sum_{k=1}^{p} \gamma_k y_{t-k} + \varepsilon_{yt}$$

$$\pi_t = \alpha_2 + \sum_{i=1}^{m1} \beta_{1i} \pi_{t-i} + \sum_{j=1}^{m2} \beta_{2j} y_{t-j} + \varepsilon_{\pi t}$$

Bernanke and Mihov Measure

- Bernanke and Mihov (1998) use a semi structural VAR-based methodology to construct a composite measure of policy stance

$$Y_t = \sum_{i=0}^{K} B_i Y_{t-i} + \sum_{i=0}^{K} C_i P_{t-i} + A^y V_t^y \qquad (3)$$

$$P_t = \sum_{i=0}^{K} D_i Y_{t-i} + \sum_{i=0}^{K} G_i P_{t-i} + A^p V_t^p \qquad (4)$$

$$Y_t = \sum_{i=0}^{K} H^y Y_{t-i} + \sum_{i=0}^{K} H^p P_{t-i} + U_t^y \qquad (5)$$

$$P_t = \sum_{i=0}^{K} J^y Y_{t-i} + \sum_{i=0}^{K} J^p P_{t-i} + \left[(I - G_0)^{-1} D_0 U_t^y + U_t^p \right] \qquad (6.)$$

$$U_t^y = (I - B_0)^{-1} A^y V_t^y \; and \; U_t^p = (I - G_0)^{-1} A^p V_t^p$$

or

$$U_t^p = G_0 U_t^p + A^p V_t^p \qquad (7)$$

$$\begin{bmatrix} 1 & \beta & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ \gamma_1 & \gamma_2 & \gamma_3 & 1 \end{bmatrix} \begin{bmatrix} U_m \\ U_{ts} \\ U_i \\ U_{er} \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 & 0 \\ \alpha^d & 1 & \alpha^s & \alpha^x \\ \phi^d & \phi^b & 1 & \phi^x \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} V^d \\ V^b \\ V^s \\ V^x \end{bmatrix} \qquad (10)$$

$$V^s = \omega_m U_m + \omega_{ts} U_{ts} + \omega_i U_i + \omega_{er} U_{er} \qquad (11)$$

$$\omega_m = \frac{\left[\left(\phi^{b}\alpha^{d}\right)\right]}{\left(1-\phi^{b}\alpha^{s}\right)}$$

,

$$\omega_{ts} = \frac{\left[\left(\phi^{b}\alpha^{d}\right)B-\phi^{b}\right]}{\left(1-\phi^{b}\alpha^{s}\right)}$$

,

$$\omega_{i} = \frac{1}{\left(1-\phi^{b}\alpha^{s}\right)}$$

,and

$$\omega_{er} = \frac{\left(\phi^{b}\alpha^{x}-\phi^{x}\right)}{\left(1-\phi^{b}\alpha^{s}\right)}$$

Empirical results

$$\omega_e = \frac{w1}{w1 + w2} = \frac{40.07}{40.08} = 0.999$$

$$\omega_i = \frac{w2}{w1 + w2} = \frac{0.006}{40.08} = 0.001$$

,

$\omega_{1,t}$	$\omega_{1,t-2}$	$\omega_{1,t-5}$	$\omega_{1,t-14}$	$\omega_{2,t-1}$	$\omega_{2,t-10}$	$\omega_{2,t-12}$
0.19	0.26	0.28	0.27	0.00004	0.00004	0.00005

ω_m	ω_{ts}	ω_i	ω_{er}
-0.20	0.02	0.02	-0.75

Table 4: Dynamic Correlations between Output-Growth/ Inflation and different measures.

	Different measures					
Leads months	**MCI (IS-individual coefficients)**		**MCI (IS-summarized coefficients)**		**Over-all measure**	
	Output growth	**changes in Inflation**	**Output growth**	**changes in Inflation**	**Output growth**	**changes in Inflation**
0	-0.08	0.03	-0.13	-0.02	0.02	0.01
1	-0.14	0.05	-0.01	0.04	-0.06	0.03
2	-0.07	0.02	-0.08	-0.02	0.03	-0.01
3	-0.07	-0.05	-0.07	-0.01	0.04	-0.10
4	-0.10	0.08	-0.04	-0.05	-0.02	0.09
5	-0.10	-0.01	-0.03	-0.05	-0.03	-0.03
6	-0.13	0.04	-0.002	0.03	-0.04	0.03
7	-0.06	0.08	-0.07	-0.04	0.04	0.08
8	-0.11	-0.01	-0.001	-0.10	-0.01	-0.02
9	-0.07	-0.01	0.04	0.03	0.02	-0.06
10	-0.11	0.09	-0.08	-0.01	-0.003	0.08
11	-0.07	0.04	-0.12	-0.07	0.03	0.02
12	-0.13	-0.02	0.07	-0.07	-0.05	-0.05

Figure 1(a) output and mci (individual coefficient)

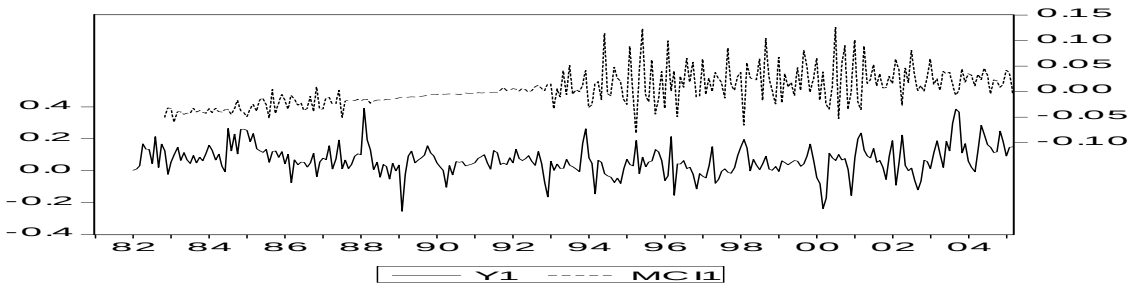

Figure 1(b) output and mci (summarized coefficient)

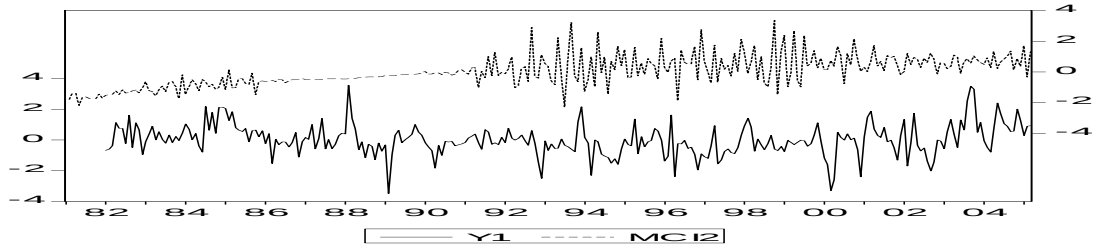

Figure 1(c) output and overall measure

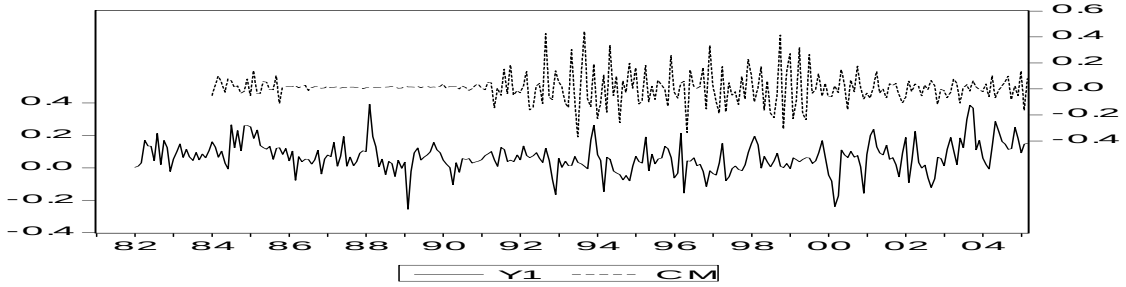

Figure 2(a) inflation and mci(individual coefficient)

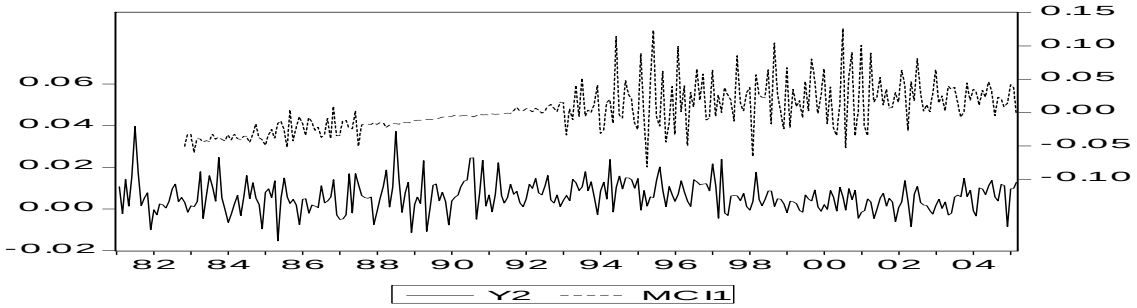

Figure 2(b) inflation and mci (summarized coefficient)

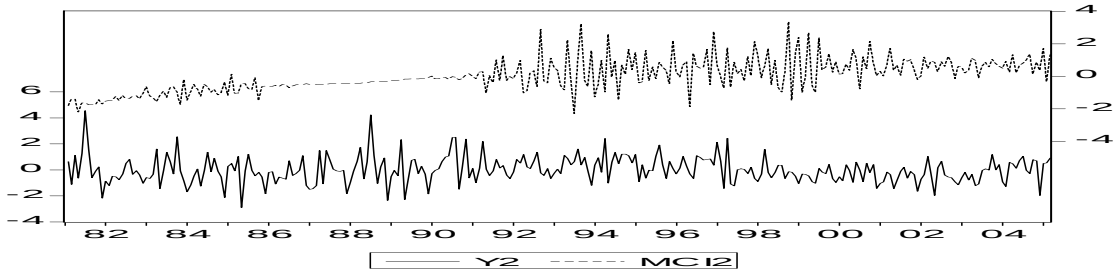

Figure2(c) inflation and over all measure

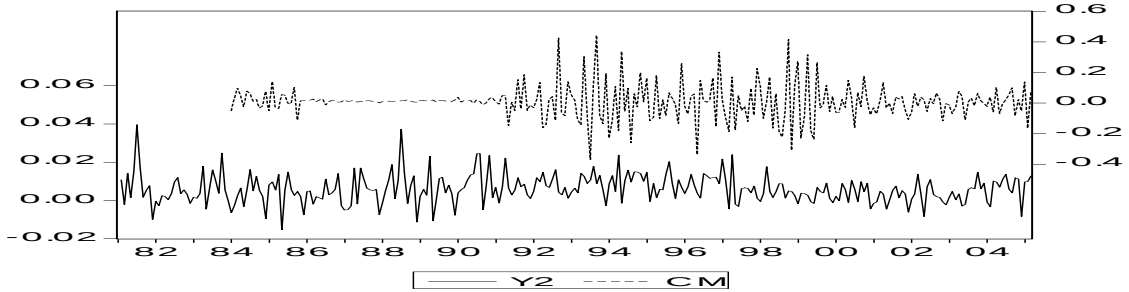

Table5: Numerical presentation of policy stance, 1984 to 2004

YEAR	π Y_t-Y_{t-12}	$\bar{\pi}_{t-}$	MS(MCI1)	MS (CM)	MS(MCI2)	D or S
1984	0.100396	-0.00316	2	-2	-1	+s
1985	-0.13393	-0.01552	0	-2	-1	-d
1986	0.011812	-0.00746	1	-1	0	+s
1987	0.026458	-0.00243	0	-1	0	+s
1988	-0.10167	-0.01009	0	-1	0	-d
1989	0.057374	-0.00985	1	-1	0	+s
1990	-0.0072	-0.00251	1	0	0	-d
1991	0.03038	-0.00575	0	0	0	+s
1992	-0.21404	-0.00367	0	0	0	-d
1993	0.203708	-0.00691	1	0	0	+s
1994	-0.0683	0.001217	1	0	0	-s
1995	-0.00823	-0.00794	-1	0	0	-d
1996	0.043372	0.005055	1	1	0	+d
1997	0.130508	-0.02054	-2	1	0	+s
1998	-0.12201	0.003003	-2	1	1	-s
1999	0.064699	0.000671	1	1	1	+d
2000	-0.11179	-0.00653	0	1	1	-d
2001	0.010272	-0.00445	-1	1	1	+s
2002	-0.17505	0.000907	-1	1	1	-s
2003	0.00848	-0.00493	-1	1	1	+s

Conclusions

- The results show that supply shocks are dominant in case of Pakistan.

- In such a situation, monetary policy is less likely to be effective. For example, the contractionary policy in response of negative supply shock will further accelerate the inflation (due to increase in financial cost) rather than reducing it.

- Furthermore, empirical findings suggest that exchange rate channel has dominating role over the interest rate channel in Pakistan. So exchange rate could be a better policy instrument for monetary management.

- However, the limitations of exchange rate policy are:

  - volatility in exchange rate may result into inflation's uncertainty making the monetary management more complicated.

  - Sufficiently high level of foreign reserves are required to implement the policy (intervene in the Forex market)

Thank you