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Pass-through of Change in Policy Interest Rate to Market Rates

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1. INTRODUCTION

Monetary policy has been aggressively used by the central Bank of Pakistan, in this decade, first to bolster growth and then to contain rampant inflation. Despite the sufficiently tight monetary policy that has remained in vogue in recent times, the inflation is still around 20 percent. This has raised questions about the effectiveness of monetary policy. One possible reason for the lesser effectiveness, if not failure, of monetary policy in taming inflation could be that in recent times, inflation was primarily supply driven and that the monetary tightening was in part offset by fiscal expansion, on the back of heavy bank borrowing by the government. However one cannot rule out the possibility that market imperfections might have also impeded the effectiveness of monetary policy in taming inflation to the desired extent. Incomplete and slow pass through of changes in policy interest rate to deposit rate and lending rate is a kind of imperfection that constrains the effectiveness of monetary policy. This study examines the pass through of policy interest rate to different market rates.

Monetary theory predicts that the change in policy interest rate influences the cost capital which in turn influences consumption, savings, investments, and hence output. However if the impact of the change in policy rate on the cost of capital is less than one for one or if the change in policy rate fails to influence the cost capital immediately then the impact on output would become visible only with a certain lag and the impact would be less than one for one. This implies that if for example only 70 percent of the change in policy rate is passed on to cost of capital, then to manage an increase of 100 basis points in cost capital the policy rate should be raised by 143 basis points. This example serves to emphasise that for effective monetary management knowledge of the magnitude of pass-through of policy rate and the lag structure with which the policy rate influences cost of capital is important. Substantive empirical evidence confirms that changes in policy interest rate are transmitted to the output with a certain lag and that the pass-through of changes in policy rate to output or to other elements of the transmission channel may be less than one for one. Given the policy implications of the information, on the magnitude of pass through and the lag structure with which the policy rate influences different market rates, this Paper seeks to measure the pass-through of the changes in six month Treasury bill rate to six month KIBOR, six month weighted average deposit rate and weighted average lending rate. The study is focused on Pakistan.

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Our results, obtained using transfer function approach, show that the pass through of changes in Treasury bill rate to KIBOR is very quick. Eighty seven percent of the change is passed on to KIBOR during one month. However the pass-through to the weighted average lending and six month deposit rate is only 43 percent and 16 percent respectively. The changes in policy rate are transmitted to the lending rate with a lag of one to one and half year while the pass through to six month deposit rate occurs with a lag of one year.

Our results also show that the pass through to lending and deposit rate is asymmetric, with the pass through for the lending rate being greater than that for the deposit rate. One reason for the greater pass-through to lending rate is that some type of loans, including corporate loans and loans to the public sector for commodity operations are linked to KIBOR since the past few years. The pegging of lending rate to KIBOR (quoting the rate as KIBOR plus) implies that if the KIBOR increases by say 100 basis point then lending rate would follow suit by similar magnitude. However deposit rates are mostly not pegged to any rate. This explains the asymmetric pass-through.

Moreover it is beneficial for banks to pass on the changes in interest rate to the lending when the policy interest rate is on the rise and to the deposit rate when the policy rate is on the decline. More episodes of increase in policy interest rate, in terms of number as well as magnitude, relative to decrease, explains the greater pass through to the lending rate. Lastly little sensitivity of the depositors to interest rate changes has enabled the banks to get away with the lower pass through to the lending rate. Finally we have also shown that slow pass-through further dampens the possibility of applying Taylor rule in Pakistan.

A word of caution is in order here. Loans and deposits are contracted in such a manner that the change in lending and deposit rates mostly applies only to the fresh loans and deposits and not the outstanding ones. We have calculated the pass through to the outstanding loans and deposits which include the loans and deposits contracted in the past at rates prevalent before the change in policy interest rate. This has been done for want of long enough time series on rates for fresh lending and deposit mobilisation. This aspect serves to emphasise the point that loans and deposits need to be contracted on floating terms, that is linked to some rate which changes almost immediately with the change treasury bill rate. One such rate is KIBOR.

Rest of the paper is organised as follows: Section 2 is devoted to review of literature on the subject of interest rate pass through. Section 3 is about the methodology and describes the data as well. Section 4 presents and interprets the empirical results. Section 5 discusses the slow pass through in the context of application of the Taylor rule and Section 6 concludes the paper.

2. LITERATURE REVIEW

The literature on interest rate pass-through has two strands. One that examines just the magnitude of pass-through i.e. whether pass-through of changes in policy rate to market or deposit and lending rate is complete or incomplete and the determinants of pass-through. The second strand of literature, examines the macroeconomic implication of incomplete/sluggish pass-through. We discuss all the three strands in this section.

There is near-consensus in literature on pass through that pass-through in short-term is less than complete while for pass-through in long-term the evidence is mixed. The

studies that report less tha complete pass-through include [Cottarelli and Kourelis (1994); Hanan and Berger (1991); Mojon (2000) and Bondt (2002)]. Bondt, Mojon, and Valla (2005) report, that pass-through in the short-run (monthly) ranges between 0.25 [Sander and Kleimeier (2002); Hofmann (2006) to 0.76 Heinemann and Sch¨uler (2002)]. For long-run Gropp, Kok Sørensen, and Lichtenberger (2007), report an incomplete pass-through in euro area, even after controlling for differences in bank soundness, credit risk, and the slope of the yield curve. The studies that report a complete pass-through of market rates to short-term interest rates, in the long-run include, Mojon (2000), Heinemann and Sch¨uler (2002), Hofmann (2003), and Sander and Kleimeier (2002). However Donnay and Degryse (2001) and Toolsema, Sturm, and de Haan (2001) report an incomplete pass-through even in the long-run.

2.1. Determinants of Pass-through

The sources of incomplete pass-through that emerge from review of a number of studies include, menu costs involved in altering the contract, Implicit contract between banker and customer for protection against rate volatility, competitiveness of the banking structure, moral hazards involved in negotiating new loan contracts, capital mobility and private ownership of banks. These sources are briefly discussed below.

The bank would change the rate only when the expected gain from the revision is greater than the menu costs involved in altering the rate [e.g. Hannan and Berger (1991); Hofmann and Mizen (2004)]. Banks that seek to earn by fostering a long term relationship with their customers have an implicit contract with their customers to protect them from interest rate volatility. The response of these banks to changes in policy rate is likely to be sluggish [Berger and Udell (1992); Allen and Gale (2000)]. Weyth (2002) provides empirical evidence that banks that rely on long term stable relationship with their customers are slow to adjust their lending rates. Specifically they show that small banks that generate funds from deposits (i.e. rely on relationship with customers) are slow to adjust their rates while the larger banks that generate funds from the market are relatively quick to adjust their rates (of course due the adjustment in the market rate).

Kwapil and Scharler (2006) argue that given asymmetric information, moral hazards may arise if the lending rate increases, i.e. the borrower who borrows at a higher rate may undertake risky ventures thereby endangering bank's money. In this situation the bank may prefer to rely on changing other terms, like collateral requirement rather than increasing the rate. The pass-through again would remain incomplete. Other sources of sluggish pass through that have been identified empirically include competitiveness of the financial markets [Gropp, Sørensen, and Lichtenberger (2007)], differences in financial structure of the banks [Schwarzbauer (2006), Cottarelli and Kourelis (1994)]. Cottarelli and Kourelis argue features of the financial structure that speed up the pass-through include capital mobility, private ownership of banks and stability of money market rates. Another reason for slow pass-through put forth by de Bondt, Mojon, and Valla (2005) is that at times the short term rates of banks are linked to long term market rates. Anticipated changes in monetary policy is another source of slow-pass through identified by Sander and Kleimeier (2006).

Hanan and Berger (1991) find that pass-through to deposit rate is asymmetric for upward and downward revision of policy rate. To explain the result the authors argue that

typically the customers respond with a lag to change in prices. If the deposit rates are changed today then the full expected response in the shape of more deposits will be realised after sometime, say, a month. During this lag period the banks pay more interest to depositors without realising the corresponding benefits in the shape of larger deposit volume. Similarly when the interest rate on deposits is reduced, even the interest sensitive customers, will take time to withdraw their deposits. During this lag-period the bank would pay lesser interest without incurring corresponding penalty in the shape of reduced deposit volume. Given the foregoing HB argues that increasing interest rate on deposits is harmful for banks in while decreasing interest rate is likely to prove fruitful, at least in the short run. This makes the pass through asymmetric.

A problem that arises in empirical estimation of pass-through from policy rate to deposit and lending rates is of maturity mismatch. The issue has been raised by Mojon (2000) and Bondt (2005). The problem is that the instrument which reflects the policy rate policy rate and the money market rate are of short term maturity while the deposit and lending rates could be of longer maturity as well. Bondt (2002) avoids the maturity mismatch problem by examining money market rates of comparable maturity.

3. EMPIRICAL FRAMEWORK

To estimate our model we use transfer function approach developed by Box, Jenkins, and Reinsel (1994). The transfer function model in essence shows how a movement in the independent variable influences the changes in dependent variable. The model allows identification of the lag structure with which the independent variable influences the dependent variable and also measure the magnitude of influence. The model is one of the most widely used in linear times series estimation. The methodology is explained below.

Let us assume that an independent variable x_t and dependent variable y_t are jointly stationary. Now y_t can be written as:

$$y_t = z_t + N_t$$

Where z_t contains that part of y_t which can be explained in term of x_t, and N_t is an error or noise term which is auto-correlated but is independent of the input series x_t. Here, both y_t and x_t are observable, while z_t is not observable. Suppose the dynamic relationship between z_t and x_t is represented as:

$$z_t = \left(\frac{\omega_0 - \omega_1 B - \ldots - \omega_s B^s}{1 - \delta_1 B - \ldots - B_r B^r} \right) x_{t-b}$$

Let us call $\nu(B) = \left[\frac{\omega(B)}{\delta(B)} \right] B^b$ "the transfer function" where b represents the lag period. The above equation can be written as:

$$y_t = \nu(B) x_t + N_t$$

Mostly the term N_t is non-stationary and it can be represented as $N_t = c + \left[\frac{\theta(B)}{\phi(B)} \right] a_t$.

Now the model may be written as:

$$y_t = c + \nu(B)\, x_t + \left[\frac{\theta(B)}{\phi(B)}\right] a_t$$

In practice, we normally do not know the form of *v* (B) and the structure of N_t i.e. the parameters *r*, *s*, *b*, *p*, and *q* and have to identify them through the analyses of data on variables x_t and y_t.

The identification consists of pre-whitening the independent as well as dependent variable on the basis of ARMA (p, q) of independent variable. Using correlogram, autocorrelation functions, and partial correlation functions of the pre-whitened variables, the best fitted model is selected for estimation.[1]

Using the methodology discussed above we have estimated the pass through of the six month treasury bill rate to six month KIBOR, Six month deposit rate and weighted average lending rate. For the pass through to KIBOR the data span September 2001-February 2009 and the data frequency is monthly. The reason for the shorter data span is that the KIBOR rate was introduced in 2001. For the lending and deposit rates we have used the span June 1991—June 2008 and the data frequency is biannual. The reason for the choice of frequency in this case is dictated by data availability. Over the recent years the State Bank has used discount rate as an instrument of the policy and it would have been more appropriate to estimate the pass through from the discount rate rather than the treasury bill rate. However following two reasons do not allow the construction of a long enough time series of change in discount rate. First, the changes in discount rate have been occurring at irregular intervals besides the State bank's active use of the discount the rate as an instrument of monetary policy is not too old.

4. RESULTS AND DISCUSSION

4.1. Pass Through from TBR to KIBOR Rate

We estimate the pass through from the 6-month Treasury bill rate to 6-month KIBOR rate using data with monthly frequency. The data span is September 2001-February 2009. The State Bank of Pakistan is now using discount rate as a policy instrument however since the changes in discount rate occurs only at discreet interval we have used 6-month Treasury bill rate as proxy for policy rate.

The first step under the Box Jenkins, transfer function approach is to fit an ARIMA model to the {ΔTBR} series. We obtain the Autocorrelation Function (ACF), Partial Autocorrelation Function (PACF) and the respective correlograms for ΔTBR. These are respectively presented below in Tables 1(a and b) and Figures 1(a and b).

Table 1(a)

Auto Correlation Function (ACF) of ΔTBR

	ρ (1)	ρ (2)	ρ (3)	ρ (4)	ρ (5)	ρ (6)	ρ (7)	ρ (8)	ρ (9)
Q-Stat.	0.468	0.474	0.302	0.170	0.144	0.091	0.096	0.055	0.040
	ρ (10)	ρ (11)	ρ (12)	ρ (13)	ρ (14)	ρ (15)	ρ (16)	ρ (17)	ρ (18)
Q-Stat.	0.099	0.142	0.145	0.225	0.176	0.1270	0.063	0.120	0.039

[1] For detail see Box and Jenkins (1994).

Table 1(b)

Partial Auto Correlation Function (PACF) of ΔTBR

	ρ (1)	ρ (2)	ρ (3)	ρ (4)	ρ (5)	ρ (6)	ρ (7)	ρ (8)	ρ (9)
Q-Stat.	0.468	0.327	–0.001	–0.114	0.026	0.031	–0.027	–0.023	
	ρ (10)	ρ (11)	ρ (12)	ρ (13)	ρ (14)	ρ (15)	ρ (16)	ρ (17)	ρ (18)
Q-Stat.	0.107	0.129	0.011	0.095	0.002	0.072	0.061	–0.062	0.026

Fig. 1(a).

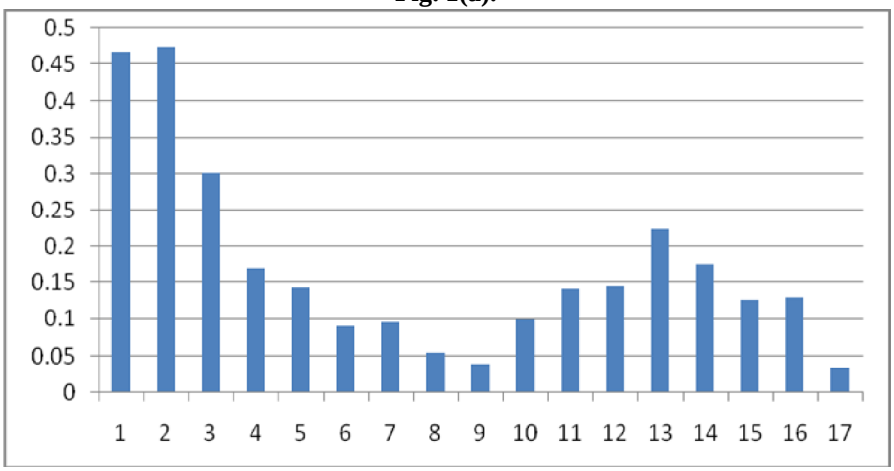
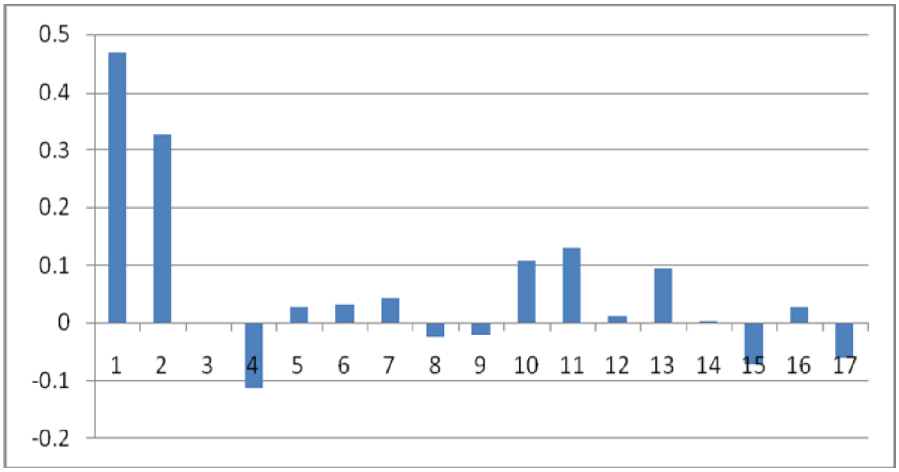


Fig. 1(b).



Tables 1(a and b), and Figures 1(a and b) show that ACF and PACF are respectively significant up to 3rd and 2nd lag. This suggests ARMA (2, 3) for ΔTBR. The most plausible models for ΔTBR then is:

$$\Delta TBR = ß1\Delta TBRt - 1 + ß2\Delta TBRt - 2 + ezt \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (2)$$

The next step is to obtain pre-whitened series for our dependent variable (ΔTBR) and Independent variable ($\Delta KIBOR$)

Filtered (pre-whitened) series for ΔTBR is:

$$at = \Delta TBR - 0.32\Delta TBRt - 1 - 0.31\Delta TBRt - 2 \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (3)$$

Pre-whitened series for ΔKIBOR is:

$$ßt = \Delta KIBOR - 0.32\Delta KIBOR\, t - 1 - 0.31\, \Delta KIBORt - 2 \quad \ldots \quad \ldots \quad (4)$$

Next we obtain cross-correlation and cross-correlogram between our two pre-whitened series: a*t* and ß*t*. These are presented below respectively in Table 2 and Figure 2.

Table 2

Cross Correlation between a*t and* ß*t*

	ρ(0)	ρ(1)	ρ(2)	ρ(3)	ρ(4)	ρ(5)	ρ(6)	ρ(7)	ρ(8)	ρ(9)
	0.637	0.327	–0.257	0.048	–0.019	–0.073	0.100	0.020	–0.05	–0.094
S.Dev.	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014
	ρ(10)	ρ(11)	ρ(12)	ρ(13)	ρ(14)	ρ(15)	ρ(16)	ρ(17)	ρ(18)	ρ(19)
	–0.023	0.012	–0.011	0.037	0.010	–0.055	–0.024	–0.067	0.002	0.094
S.Dev.	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014

Fig. 2.

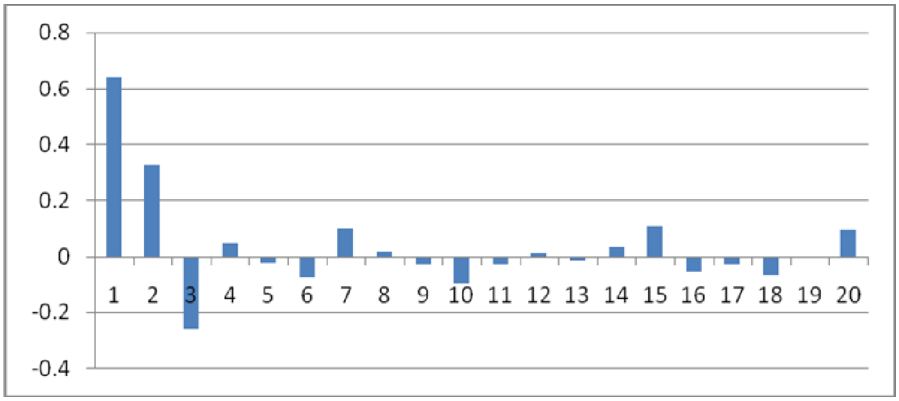


Table 2 and Figure 2 show that ρ(0), ρ(1) and ρ(2) are statistically significant. Next based on cross-correlation between pre-whitened series a*t* and ß*t*, we select the following model:

$$ßt = a1ßt\text{-}1 + b1at + b2at\text{-}1 + b3at\text{-}2 + et \ldots \ldots\ldots (4)$$

Estimation of (4) yields:

$$ßt = 0.09ßt\text{-}1 + 0.83at + 0.46at\text{-}1 - 0.22at\text{-}2 + et \ldots \ldots (5)$$

Then we obtain *et* as:

$$e_t = \beta_t - \frac{(0.83 + 0.46L - 0.22L^2)}{[1 - 0.09]}\alpha_t$$

The ACF, PACF of the error term *et* and the relevant correlograms are presented below in Tables 3(a and b) and Figures 3 (a and b) respectively.

Table 3(a)

Auto Correlation Function (ACF) of et

	ρ (1)	ρ (2)	ρ (3)	ρ (4)	ρ (5)	ρ (6)	ρ (7)	ρ (8)	ρ (9)
Q-Stat.	–0.022	–0.360	–0.060	–0.120	–0.019	0.200	0.026	–0.014	–0.095
	ρ (10)	ρ (11)	ρ (12)	ρ (13)	ρ (14)	ρ (15)	ρ (16)	ρ (17)	ρ (18)
Q-Stat.	–0.140	0.014	0.113	0.039	0.003	–0.089	–0.113	0.028	0.103

Table 3(b)

Partial Auto Correlation Function (PACF) of et

	ρ (1)	ρ (2)	ρ (3)	ρ (4)	ρ (5)	ρ (6)	ρ (7)	ρ (8)	ρ (9)
Q-Stat.	–0.022	–0.361	–0.090	–0.297	–0.132	0.019	–0.055	0.051	–0.113
	ρ (10)	ρ (11)	ρ (12)	ρ (13)	ρ (14)	ρ (15)	ρ (16)	ρ (17)	ρ (18)
Q-Stat.	–0.117	–0.093	0.041	–0.044	–0.040	–0.105	–0.136	–0.087	–0.051

Fig. 3(a).

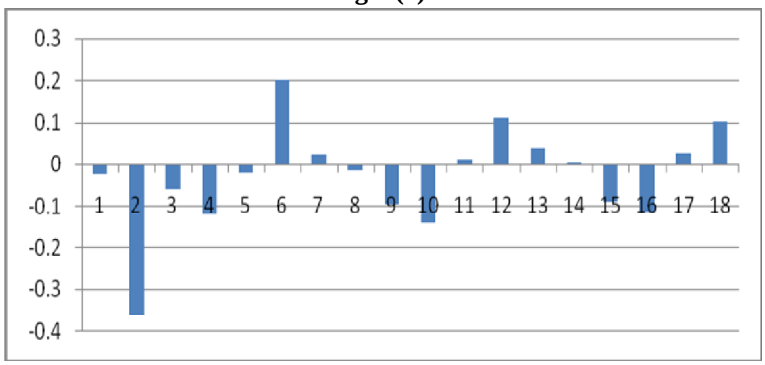
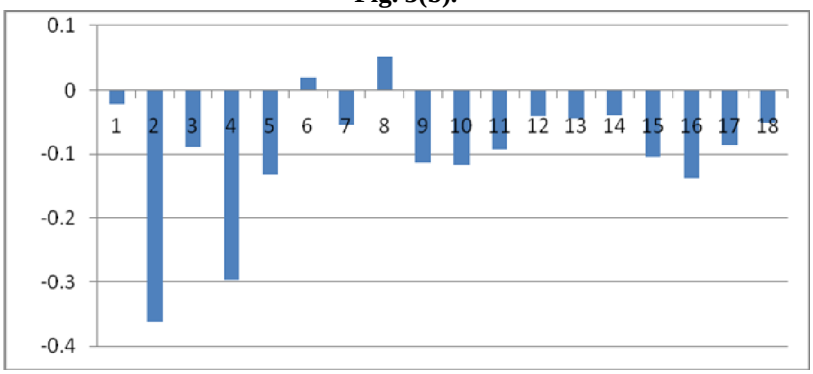


Fig. 3(b).



On the basis of ACF and PACF of *et* the preliminary model for *et* is:

$$et = -0.93et\text{-}2 - 0.39\ et\text{-}4 - 0.32\ et\text{-}6 + (0.52L^2 + 0.43L^6)\ et \quad \ldots \quad \ldots \quad (6)$$

Therefore our tentative Transfer Function is:

$$\Delta KIBOR_t = \frac{(0.83 + 0.46L^4 - 0.22L^6)}{[1 - 0.08L]} \alpha_t \Delta KIBOR + \frac{(0.52L^2 + 0.43L^4)}{[1 + 0.93L^2 + 0.39L^4 + 0.32L^6]} et \quad (7)$$

Then we expand the first term in Equation 6 using binomial expansion. This yields:

$$\Delta KIBOR_t = [1 - 0.08L]^{-1}[[0.83 + 0.46L^4 - 0.22L^6]\Delta TBR + \frac{(0.52L^2 + 0.43L^4)}{[1 + 0.93L^2 + 0.39L^4 + 0.32L^6]} \text{et}$$

Or

$$\Delta KIBOR_t = [0.83 + 0.07L + 0.46L^4 + 0.04L^5 - 0.22L^6 - 0.02L^7]\Delta TRBR + \frac{(0.52L^2 + 0.43L^4)}{[1 + 0.93L^2 + 0.39L^4 + 0.32L^6]} et \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (8)$$

It is evident from the Equation 8 that 83 percent of the change in 6-month treasury bill rate is passed on to the 6-month KIBOR during the first month. Slight overshooting is observed in the following months, which is corrected later on.

We employ similar procedure to estimate the pass through for the weighted average six month deposit rate and weighted average lending rate. The final equations for the two are indicated and discussed below.[2]

4.2. Pass-through from Treasury Bill Rate to Lending Rate

The pass of the 6-month Treasury bill rate to the weighted average lending rate has been estimated for the period June 1991 to June 2008. The data frequency is bi-annual. The transfer function developed for the weighted average rate of return on loans using procedure similar to the one used for KIBOR is:

$$\Delta WARRA_t = (0.16L^2 + 0.27L^3)\Delta TBR + \frac{(0.55L + 0.43L^2)}{[1 + 0.71L + 0.75L^2]} et \quad \ldots \quad \ldots \quad (9)$$

The equation shows that a total of 43 percent the change in six Treasury bill rate is passed is passed on to the lending rate (16 percent with a lag of two periods and 27 percent with a lag of three periods, each period being of six months) with a lag of one to one and a half year. The total pass-through to the lending rate being only 43 percent we can say that the lending rate exhibit rigidity.

[2]Detailed results for weighted average six months deposit rate and weighted average lending rate are available from the authors upon request.

4.3. Pass-through from Treasury Bill Rate to Six-month Deposit Rate

The pass through of changes in 6-month Treasury bill rate to the 6-month weighted average deposit rate has been estimated for the Period June 1991 to June 2008. The frequency used is bi-annual. The transfer function developed for six-month weighted average rate of return on deposits, using procedure described earlier for KIBOR is:

$$\Delta WARRD_t = (0.16L^2)\Delta TBR - \left[\frac{(0.86L^4)}{1+0.47L^2}\right]et \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (10)$$

The transfer function described above shows that that only 16 percent of the change in treasury bill rate is passed on to the weighted average rate of deposits and that too with a lag of two periods, that is, after one year.

4.4. Reasons for Slow and Asymmetric Pass Through

While the pass through for the lending rate is 43 percent the pass through for the deposit rate is only 16 percent. This implies that banks are slow to change deposit rates relative to lending rates. The question is who benefits from asymmetric in pass through between lending and deposit rates. The answer is; it depends whether the asymmetry occurs in an environment of increasing interest rate or when the interest rate are on the decline. If the policy rate is on the rise, greater pass through to the lending rate relative to deposit rate would increase the interest margin of the banks therefore the banks seek to benefit from asymmetry while the converse holds true when the interest rates are on the decline. The greater pass through observed for lending rate relative to deposit rate leads one to suspect that, by and large, the asymmetry has occurred in an environment of increasing interest rates. Our data span covers a period of 17 years (June 1990-June 2008). During this period there have three major episodes of change in interest Treasury bill rate (Table 4).

Table 4

Episodes of Changes in Treasury Bill Rate

Time Period	Number of Years	Direction of Change in Treasury Bill rate	Change (Basis points)
June 90-June 98	8	Upward	641
Dec 98 - Dec 03	5	Downward	1411
June 04 - June 08	4	Upward	1232

It is evident from Table 4 that out of the 17 years data span, the treasury bill rate has followed an upward course for a period of twelve years while the downward trend has been observed for only five years. Moreover the magnitude of increase has also been greater than the decline. This explains why the pass through to the lending rate is greater than pass through to deposit rate: because in an environment of increasing interest rates greater pass through to lending rate increases the interest income of the banks but the cost of funds does not increase by corresponding magnitude. Therefore the greater pass through to lending rates suits the banks.

Pegging of the lending rate to KIBOR is another important reason that explains the relatively greater pass through to the lending rate. The State Bank of Pakistan (SBP) has instructed all the banks to link their corporate lending rate to KIBOR. Moreover loans for commodity operations to government departments have also been linked with KIBOR of appropriate tenor since 2006. Loans against export refinance facility, the subsidised credit to exporters, have also been pegged to the Treasury bill rate. Pegging of lending rate to these reference rate quickens the pass through, because as soon as the reference rate (KIBOR or Treasury bill rate) the change in lending rate (for fresh loans) invariably fallows.

One reason for the slow pass through observed for weighted average lending rate and 6 month deposit rate is that these rates are for outstanding loans and deposits, which includes loans extended and deposits mobilised at the rates prevailing before the change in treasury bill rate. It is note worthy here that the volume of loans extended and deposit mobilised at previous rates is understandably much higher than the fresh loans extended and deposits mobilised after the change in the treasury bill rate.

This brings us to the question: What manner of quoting interest/return on loans and deposits would speed up the transmission mechanism of monetary policy? The answer is that the floating rate,[3] that is, the rate specified with reference to some other interest rate, for example KIBOR will facilitate pass-through of interest rate from policy rate to lending and deposit rates. We have observed that the pass through to the KIBOR is very fast, therefore if all lending rates of banks are quoted in terms of KIBOR plus and deposits rates are quoted as KIBOR minus then the lending and deposit rates will change as soon as the KIBOR changes.

4.5. Slow Pass through to Deposit Rate

One reason for the slow pass-through to the deposit rate could be that behaviour of the depositors is not sufficiently interest sensitive. This is evident from the overtime composition of the total deposits, shown in Table 5.

Table 5

Trend in Composition of Deposits

Year (June)	Type of Deposits				T. Bill Rate
	Current	Savings	Non Fixed	Fixed	
1998	16	46	66	34	15.75
1998	15	47	68	32	10.6
2000	15	51	71	29	7.14
2001	18	51	73	27	12.88
2002	20	53	76	24	6.33
2003	21	57	81	19	3.84
2004	24	56	84	16	2.08
2005	26	52	81	19	7.92
2006	26	47	76	24	8.45
2008	25	43	70	30	9.02

[3]Floating rate implies that rate for the entire term is not quoted when the loans or deposits are contracted, rather the rate changes (after a specified interval) with the change in reference rate to which the deposit or lending rate is pegged.

If the depositors are not too sensitive to interest rate changes then one may expect that the banks can get away with incomplete pass through and delayed pass through. It is evident from table that majority of the deposits are held either in current account or savings account. The current account earns no interest while very little interest is paid to the holders of savings account. Given the failure of the banks to raise the rate on their own the SBP mandated only about a year ago to pay a minimum of 5 percent interest on savings account. This speaks volumes about the gravity of the situation regarding the low pass through to the deposit rate. It is clear from the composition of the deposits shown in Table 5 that the behaviour of the depositors holding a sizable deposit volume is not interest sensitive. Given the less sensitivity of the depositors to interest rate changes the banks in Pakistan have been able to get away with incomplete pass through, and delayed pass through on deposit rates. Hence the slow pass through to deposit rates. To quicken the pass through to deposit rates it is important that like the lending rate the deposit may also be linked KIBOR. However to implement such a regime effectively requires greater ability on the part of potential borrowers and depositors to forecast interest rate changes and mental preparedness that change in policy rate at times may adversely influence the depositors or the borrowers.

5. MACROECONOMIC IMPLICATION OF LIMITED PASS-THROUGH

Pass-through and Taylor Principle

Incomplete pass-through has macroeconomic implications. One consequence is that this alters the popular Taylor rule [Kwapil and Scharler (2006)]. The rule, in essence implies that to maintain equilibrium, for every one percentage point increase in inflation, the interest rate should rise by more than one percentage point. The rule also implies that if the nominal interest rate does not rise, as suggested by Taylor, a rise in expected inflation causes the real interest rate to decline. The resultant stimulus to aggregate demand causes the inflation to rise further and thus initial expectations are fulfilled. Kwapil and Scharler contend that that an economy subject this type of shock will be highly unstable. To understand how the incomplete pass-through alters the Taylor rule let us very briefly examine the Taylor rule. The rule can be written as:

$$i_t = \pi_t + r_t^* + a_\pi(\pi_t - \pi_t^*) + a_y(y_t - y_t^*)$$

Where i_t is the targeted short term interest rate, p_t and π_t^* are the actual and targeted inflation rate respectively, r_t^* is the assumed equilibrium interest rate $(y_t - y_t^*)$ is the output gap. To satisfy Taylor rule $a_p > 0$. If this does not hold the real interest rate would decline with the change in policy rate. Kwapil and Scharler (2006) argue that limited pass-through alters the Taylor rule—because even if the nominal interest rate rises by 1 percentage point, still in the face of incomplete pass through, the pass-through to market rates rate will be less than 1 percentage point. The Taylor rule, according to Kawpil and Scharler (2006) under an environment of incomplete pass-through, will be satisfied if $a_p \lambda > 0$, where λ is the long-run pass-through to retail rates. Kwapil and Scharler (2006) citing various studies suggests that since the value a_p is sufficiently greater than one (in the rage 1.8-2.15) for US and euro area therefore even in the face of incomplete pass

through the monetary policy rules will most probably satisfy the conditions for determinate equilibrium in US and euro area. For Pakistan only one study [Malik and Ahmad (2007)] has estimated the Taylor rule. The value of a_p according to this study is 0.51. If we take the pass through to the lending rate as 0.43, as worked out in this study, then the value of $a_p \lambda$ comes to only 0.22. Clearly Pakistan's economy is far from satisfying the modified Taylor rule. Irrespective of the fact that whether the SBP is following the Taylor principle for monetary management, the low value a_p coupled with limited pass-through has made the monetary management more difficult for the authorities.

6. CONCLUSIONS

We have estimated the pass through from six month treasury bill rate to different market rates including KIBOR, six month deposit rate and weighted average lending rate. While the pass through of the 6-month Treasury bill rate to 6-month KIBOR is almost complete and immediate the pass through to the 6-month deposit rate and weighted average lending rate takes from a year to year and a half. Moreover the pass through to lending rate is much greater than the one observed for the deposit rate. Less interest sensitive behaviour of the depositors has enabled the banks to get away with slow pass through to deposits. On the other hand pegging of the rate on corporate loans and rate on loans for commodity operation to KIBOR has increased the pace of pass through to lending rate. This implies pegging can enhance the pass through, and therefore the effectiveness of the interest rate channel of monetary policy transmission. Moreover if the deposit rates, like lending rates for certain types of loans, are also pegged to KIBOR the pass through to the deposit rate would also increase and the asymmetry issue will be taken care off. However such pegging requires greater ability of the bank's customers to forecast interest rate changes and be prepared for the worst as well. Finally we also showed that less than one for one pass through to the lending rate makes it more difficult to apply even if one attempts to apply the Taylor rule in Pakistan.

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