Analyzing the Maturity wise Interest Rate Pass Through in Pakistan

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ARTICLE DETAILS

ABSTRACT
This paper examines the degree of pass through and adjustment speed of maturity wise deposit rates in response to changes in the discount rate in Pakistan during the time period from 1978 to 2019. The study finds evidence of a long run relationship among maturity wise deposit rates and discount rate. However, the estimates of long run model proposed by Philips & Loretan (1990) and short run Error Correction Model indicate that pass through is incomplete and slow. This study confirms asymmetric adjustment of pass through and upward rigidity in deposit rates. Overall, the finding of less than complete and asymmetric pass through suggests limited efficiency of monetary policy in Pakistan.

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1. Introduction
Monetary policy is the main instrument of macroeconomic management. Monetary decisions influence aggregate demand, interest rates, the amount of money and credit to affect the overall economic performance. The nature of monetary policy-the tight or loose, increases or decreases the policy rate, and in response, the other financial institutions increase or decrease the deposit and lending rates. The efficiency of monetary policy depends on the reaction of financial institutions, that is, how fast and how much policy changes are transmitted.1 The transmission mechanism of policy rate to retail rates differs amongst countries due to different type of monetary policy and extent of...
control.

The process of transmission of changes in monetary policy to retail rate, for instance, bank lending and deposit rates is termed interest rate pass through. Interest rate Pass through has generally three types, complete interest rate pass through, less than complete pass through and over pass through. When any change in policy rate is passed on to retail bank rates immediately, then interest rate pass through is termed complete pass through (Bernanke and Blinder, 1992; Romer and Romer, 1989). If transmission of the policy rate to retail rates takes time, it is theorized the incomplete pass through (Hannan & Berger, 1991; Cottarelli and Kourelis, 1994; Mojon, 2000; Bondt, 2002). There is also possibility of over pass through, which arises due to possibility of monopoly power of commercial banks, by transferring more than their total cost to their consumers.

The Nature of the pass through gives indication of the degree of competiveness and soundness of banking sector. Symmetric and complete pass through signals well-functioning financial system. Asymmetric and incomplete interest rate- pass through leads to the contradicting scenario.

Complete and incomplete nature of pass through remains an active discoursed in literature. Previous studies in large supported that pass through is incomplete in short run (Hannan and Berger, 1991; Cottarelli and Kourelis, 1994; Mojon, 2000). However, in the long-run analysis, the studies documented mixed finding (Bondt, 2002; Mojon, 2000; Hofmann, 2003; Sander and Kleimeier, 2002, Toolsema et al., 2002). The completeness and incompleteness of pass through usually depends on the transmission process and financial market structure of a country. Part of literature focus on the differences between upward and downward responsiveness of retail rates to official rate. It is observed in literature that loan rates are rigid upward and deposit rates are rigid downward. The speed of adjustment of pass through is influenced by several factors. The asymmetric adjustment of pass through exists due to menu cost (Hannan and Berger, 1991), type of monetary policy (Egert et al., 2007), asymmetric information (Stiglitz and Weiss, 1998), bank-concentration that is the monopoly power of banking sector and political pressure (Cottarelli and Kourelis, 1994), and existence of switching cost (Hafferman, 1997). Asymmetric and incomplete pass through give signal of lag in monetary policy implementation and less-developed financial system of economy. Depositors should be protected against the exploitation of banks (Aziakpono and Wilson, 2010).

Although in case of Pakistan many attempts have been made to find pass through from policy rate to retail rates. For instance, Qayyum et al. (2004), Khawja et al. (2008), Mohsin (2011), Hanif and Khan (2012), Mirza (2014), Hussain and Khan (2016), and Qayyum et al. (2005) examined pass through process of the changes in policy rate (Treasury bill rate) to Call money rate and retail rates. These studies used Six-month Treasury bill rate, Call money rate, Saving Deposit rate, Six-Month deposit rate and Lending rate and covered the time span from March 1991 to December 2004 and applied TFA and find incomplete interest rate pass through to retail rates.

Monetary policy in Pakistan is formulated with an aim to boost the growth and avoid the

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2 Toolsema et al. (2002) confirmed incomplete pass through in long run, while the remaining studies observed the complete pass through.
undesirable price hike. Various changes in financial system of Pakistan have been made. The financial system transmitted from regulated economy to market based economy in the 1990s. The system is also witnessed of regime shift, for instance, monetary regime remained from 1945 to 1995, which is followed by transitory regime of 1995 to 2009 and then from 2009 to 2015 interest rate regime started. Recently, after May 2015, State Bank of Pakistan (SBP) is using interest rate targeting instead of monetary targeting. Discount rate is considered an important instrument of monetary policy and SBP is implying discount rate as a policy instrument due to high level of public debt in Pakistan.

There are numerous studies on monetary policy transmission, while the maturity wise interest rate pass through is relatively underexplored in case of Pakistan. This study is an attempt to provide estimates of interest rate pass through from discount rate to various maturity wise un-weighted deposit rates (up to 6 months fixed rates, over 6 months to 1-year fixed rates, over 1-year to 2 years fixed rates, over 2 years to 3 years and over 3 years fixed rates) using annual data from December, 1978 to December, 2019. This study will help domestic and international investors to estimate the cost and revenue of deposits due to change in monetary policy in Pakistan and will help to understand maturity specific behavior of interest rate pass through. The rest of paper is organized in three sections. In section 2, we provide methodology, section 3 provides empirical results of study and section 4 concludes the paper.

2. Methodology

The study uses time series data technique by applying ADF and PP unit root tests to check for stationarity of data, followed by Engle and Granger (1987) to check for cointegration between discount rate and maturity wise deposit rates (up to 6 months fixed rates, over 6 months to 1-year fixed rates, over 1-year to 2 years fixed rates, over 2 years to 3 years and over 3 years fixed rates).

The study also applies Philips and Loretan (1990) methodology to check long run nature of pass through and Error Correction Methodology to check short-run transmission process. In last step, the study introduces dummy variable to ECM to capture asymmetry in pass-through process.

2.1. Stationarity Tests

First we checks the stationarity properties of all concerned variables, for this purpose, we apply (ADF) augmented dickey fuller (Dickey and Fuller, 1979 and 1981) and Philips–Perron (PP) unit root tests. Dickey and Fuller test assume that errors are statistically independent and contain a constant variance. Phillips & Perron (1988) modified the assumptions about the distribution of the errors. Peron (1988) customized the ADF test and allowed structural break in the estimation of unit root process.

2.2 Engle and Granger (1987) Technique

To check cointegration among maturity wise deposit rates and policy rate the study uses the Engle and Granger (1987) as an alternative methodology. The EG technique indicates that series hold long-run relationship in the case when series are non-stationary and contain same order of integration.

\[ y_t = a_0 + \beta_1 x_t + \varepsilon_t \]  

\[ \ldots \ldots (1) \]

Where, \( y_t \) represents Maturity wise deposit rates, \( x_t \) is the Discount rate, \( a_0 \) is Mark up, \( \beta_1 \) is Slope of pass through, that measures degree of pass through, and \( \varepsilon_t \) is Error term.

For the application of EG Model, it is necessary that order of integration of non-stationary series should be same and after that verifying the stationary of the error term. If Residual series estimated through this process, follow the stationary process then the long-run relationship hold among series.

### 2.3 Philips and Loretan (1990) Methodology

We also apply the Philips & Loretan (PL) technique to estimate the long run relationship among integrated series. PL is an extension of Engle & Granger (1987). This method is best to estimate long-run relationship among series that include integrated variables in the model. Dynamics have important role in data generation process (DGP) in PL method.

Philips & Loretan suggest to include in the model the leads and lags of first difference series in \( x_t \), independent variable and in \( \Delta x_t \).

Liu et al. (2008) examined the following equation to model the long run relationship between policy rate and market rate:

\[ y_t = a + \beta' x_t + \sum_{k=1}^{k} d1_k (y_{t-k} - \beta' x_{t-k}) + \sum_{l=-1}^{L} d2_l \Delta x_{t-l} + \nu_{1t} \ldots \ldots (2) \]

Two sided lag differences inthe equation end the endogeneity problem and parameters estimated through this method are approximately same to maximum likelihood estimates and are efficient. Further, the parameters are normally distributed and asymptotically unbiased. The PL method considers structural changes, it tackles past policy surprise, and expected future policy setting with regard deposit rate and policy rate e.g. discount rate.

### 2.4 Error Correction Methodology

To examine the short-term dynamics of maturity wise deposit rates due to changes in discount rate, the study applies error correction methodology. The ECM used in the study is the same as general ARDL (p,q) model.

\[ \Delta y_t = \beta_o \Delta x_t + \delta(y_{t-1} - a_o - \beta_1 x_{t-1}) + \sum_{i=1}^{q} \beta_i \Delta x_{t-i} + \sum_{i=1}^{p} \Gamma_i \Delta y_{t-i} + \nu_{t} \ldots \ldots (3) \]

Where; \( \Delta \) is the first difference, \( \epsilon^{\Delta}_{t-1} = (y_{t-1} - a_o - \beta_1 x_{t-1}) \) is the disequilibrium at time \( (t - 1) \), \( \beta_o \) is the impact pass through, \( \beta_i \) is the dynamic adjustment coefficient, \( \Gamma_i \) is also the dynamic adjustment coefficient, \( \delta \) is the error correction adjustment speed, and \( \nu_{t} = \text{Error term.} \)

The equation as a result includes the dynamics of adjustment in discount rate (\( \Delta x_t \)). How much time rates take to adjust towards equilibrium can be estimated through Mean Adjustment Lag  

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4 While, the OLS estimator of equation one are super consistent are not asymptotically unbiased or normally distributed and in its finite sample bias may be large and persistent.

5 The sign of \( \delta \) should be negative, which indicates mean reversion behavior of rates.
(MAL) of a complete pass through of ECM parameterization by applying the formula of MAL given in Hendry (1995).

For the simple case of ARDL (1, 1):

\[ \text{MAL} = (\beta_o - 1)/\delta \] \hspace{1cm} (4)

Whether adjustment speed is asymmetric or not, a large number of studies specified that short term adjustment might be asymmetric that is it can differ in upward and downward adjustment of rates (See for instance, Chong et al. (2006) and Scholnick (1996)).

To check the presence of asymmetric adjustment in deposit rates in Pakistan, this study includes a dummy variable \( \lambda \) to equation of asymmetric ECM.

\[ \Delta y_t = \beta_0 \Delta x_t + \delta_2 \lambda \varepsilon_{t-1} + \delta_3(1 - \lambda)\varepsilon_{t-1} + \sum_{i=1}^{q} \beta_i \Delta x_{t-i} + \sum_{i=1}^{p} \gamma_i \Delta y_{t-i} + \eta_t \] \hspace{1cm} (5)

Where; \( \delta_2 \) is Error correction adjustment speed when rates are above equilibrium value and \( \delta_3 = \) Error correction adjustment speed when rates are below the equilibrium value.

The asymmetric mean adjustment case is as following:

\[ MAL^+ = (\beta_o - 1)/\delta_2 \] \hspace{1cm} (6)
\[ MAL^- = (\beta_o - 1)/\delta_3 \] \hspace{1cm} (7)

Where,

\( MAL^+ \) = Mean adjustment lag when rates are above their equilibrium value.

\( MAL^- \) = Mean adjustment lag when rates are below their equilibrium value.

3. Results and Discussion

3.1 Stationarity Tests: Augmented Dickey- Fuller (ADF) and Phillips-Perron (PP)

This section provides information about the unit process of the variables. To check the stationarity of the concerned variables, we apply Augmented Dickey- Fuller (ADF) and Phillips-Perron (PP) unit root tests. The results of ADF and PP are reported in table 1 and 2 respectively. All variables spectacle trend pattern, thus we incorporate trend in all unit root tests, additionally, we do add the constant term in both unit root tests. The ADF as well as the PP test results suggest that discount rate and all fixed rates are stationary at their first difference at 5% level of significance.

**Table 1: Augmented Dickey-Fuller (ADF) Test**

<table>
<thead>
<tr>
<th>Level Series</th>
<th>First Difference Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>Series</td>
<td>Constant and Trend</td>
</tr>
<tr>
<td>FD-Up to 6M</td>
<td>C,T</td>
</tr>
<tr>
<td>FD- over 6M</td>
<td>C,T</td>
</tr>
</tbody>
</table>

6 MAL, take weighted average of all lags in the model and it computes speed of adjustment of deposit rates due to changes in policy rate
Table 2. Phillips-Perron (PP) Test

<table>
<thead>
<tr>
<th>Series</th>
<th>Constant and Trend</th>
<th>ADF Statistics</th>
<th>Decision</th>
<th>Constant and Trend</th>
<th>ADF Statistics</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>FD- Up to 6M</td>
<td>C,T</td>
<td>-2.903</td>
<td>I(1) C</td>
<td>-5.348*</td>
<td>I(0)</td>
<td></td>
</tr>
<tr>
<td>FD- over 6M</td>
<td>C,T</td>
<td>-2.678</td>
<td>I(1) C</td>
<td>-5.626*</td>
<td>I(0)</td>
<td></td>
</tr>
<tr>
<td>FD- Over 1Y</td>
<td>C,T</td>
<td>-2.959</td>
<td>I(1) C</td>
<td>-5.505*</td>
<td>I(0)</td>
<td></td>
</tr>
<tr>
<td>FD- Over 2Y</td>
<td>C,T</td>
<td>-2.772</td>
<td>I(1) C</td>
<td>-6.531*</td>
<td>I(0)</td>
<td></td>
</tr>
<tr>
<td>FD- Over 3Y</td>
<td>C,T</td>
<td>-2.548</td>
<td>I(1) C</td>
<td>-6.278*</td>
<td>I(0)</td>
<td></td>
</tr>
<tr>
<td>Discount Rate</td>
<td>C,T</td>
<td>-2.103</td>
<td>I(1) C</td>
<td>-5.579*</td>
<td>I(0)</td>
<td></td>
</tr>
</tbody>
</table>

Notes: The null hypothesis is the presence of unit root. * indicates significance at 5 percent level. C and T indicate constant and trend respectively.

3.2 Cointegration Test: Engle-Granger (1987) Cointegration Test

After applying unit root tests, we apply Engle and Granger (1987) methodology to assess the presence of cointegration among the discount rate and various maturity wise deposit rates. The variables are integrated of order one, I (1) and residual series of regressing discount rate on various maturity fixed deposit rates are I (0), indicating that series hold long run relationship. The residual series are stationary using ADF.7 Table 3 Indicates long-run equilibrium relationship between discount rate and fixed rates.

Table 3: Estimates of Engle-Granger (1987)

<table>
<thead>
<tr>
<th>Series</th>
<th>A (t-stat)</th>
<th>β (t-stat)</th>
<th>ADF t-test on residuals</th>
<th>Null of unit root</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>FD- Up to 6M</td>
<td>5.70 (5.43)*</td>
<td>0.20 (1.98)**</td>
<td>-2.09</td>
<td>rejected</td>
<td>Co-integration exist</td>
</tr>
<tr>
<td>FD- over 6M</td>
<td>5.23 (4.93)*</td>
<td>0.16 (1.82)**</td>
<td>-2.07</td>
<td>rejected</td>
<td>Co-integration exist</td>
</tr>
<tr>
<td>FD- Over 1Y</td>
<td>6.01 (5.34)*</td>
<td>0.20 (2.02)*</td>
<td>-2.14</td>
<td>rejected</td>
<td>Co-integration exist</td>
</tr>
<tr>
<td>FD- Over 2Y</td>
<td>5.80 (4.26)*</td>
<td>0.31 (2.58)*</td>
<td>-2.42</td>
<td>rejected</td>
<td>Co-integration exist</td>
</tr>
<tr>
<td>FD- Over 3Y</td>
<td>5.96</td>
<td>0.37</td>
<td>-2.40</td>
<td>rejected</td>
<td>Co-integration exist</td>
</tr>
</tbody>
</table>

7 The stationarity of error term suggests that there is long run relationship between the variables.
Notes: Null hypothesis is presence of unit root. * indicates significance at 5 percent level. ** indicates significance at 10 percent level. T-statistics are reported in parenthesis.

3.3 Philips and Loretan (1990) Methodology

After establishing the cointegration among variables, we estimate long-run parameters by applying Philips and Loretan (1990) methodology. Table 4 shows long-run parameters of fixed deposit rate model of pass through.

**Table 4: Philips and Loretan (1991) Estimates**

<table>
<thead>
<tr>
<th>Series</th>
<th>Constant</th>
<th>Pass through</th>
<th>R2</th>
<th>D.W</th>
<th>F-stat</th>
<th>Prob (F-stat.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed-1Y</td>
<td>5.61</td>
<td>2.68*</td>
<td>0.22</td>
<td>1.94**</td>
<td>0.76</td>
<td>1.93</td>
</tr>
<tr>
<td>Fixed-2Y</td>
<td>6.29</td>
<td>2.71*</td>
<td>0.23</td>
<td>1.93**</td>
<td>0.78</td>
<td>1.92</td>
</tr>
<tr>
<td>Fixed-3Y</td>
<td>7.36</td>
<td>2.37*</td>
<td>0.26</td>
<td>1.92**</td>
<td>0.77</td>
<td>1.92</td>
</tr>
<tr>
<td>Fixed-6M</td>
<td>3.80</td>
<td>2.63*</td>
<td>0.30</td>
<td>2.63*</td>
<td>0.76</td>
<td>1.93</td>
</tr>
<tr>
<td>Fixed-over6m</td>
<td>5.55</td>
<td>2.70*</td>
<td>0.22</td>
<td>1.92**</td>
<td>0.77</td>
<td>1.97</td>
</tr>
</tbody>
</table>

Notes: * indicates significance at 5 percent level. ** indicates significance at 10 percent level.

As indicated in the table 4, $\alpha$ is intercept term that indicates margin of interest rate pass through, while $\beta$ (slope term) indicates the impact pass through. In all cases, there is markup effect and it is statistically significant. The slope coefficients that indicate pass through are statistically significant and are in the range of 22 percent to 30 percent. That is, banks pass only 22 percent of the impact of the change in discount rate to 1 year fixed rate immediately (within one month). Similarly, Bank pass only 26 percent of impact of change in discount rate to 3 years fixed rate in the first month. The estimates of pass through indicate maturity wise deposit rates’ variations. The estimate of 3 year rate reveals that, Although pass through is slow, longer maturity deposit rate of 3 years fixed rate indicate slightly higher adjustment than other long-run rates. The up to six month deposit rate also indicate slightly higher pass through. Pass through process differs even in same bank among different maturity wise deposit rates due to some degree of pricing power of banks. Table 5.6 shows that estimated long run pass through is incomplete and slow. Therefore, there is incomplete and delayed interest rate pass through in Pakistan.

3.4 Short-Term Pass-Through and Adjustment Speed: Error Correction Mechanism

After finding out the Nature of maturity wise pass through in Long run we apply bivariate specification of ECM to estimate dynamics of fixed deposits rate of different maturities in short run. The result of ECM is reported in table 5. The estimates of $\beta$1 show impact pass through and all estimates are positive and are statistically significant. The parameters of ECM model have expected sign and are statistically significant. The impact pass through to fixed deposit over one year is 27%, to fixed deposits over two years is 28%, to fixed deposit rate over three year is 29%, to fixed

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8 Qayyum et al. (2005) and Khawja & Khan (2008) also reported incomplete pass through in long run.
deposits over six month is 22% and to fixed deposit rate up to six month maturity is 24%. Estimated pass through ranges from 22% for fixed deposits over month rate to 29% for 3 year fixed rate.

The parameter \( \delta \) indicates speed of adjustment. The estimates of \( \delta \) have negative sign and are statistically significant. The result of speed of adjustment reveals that deposit rates are significantly mean reverting to long run equilibrium. The short-term pass through is incomplete and it takes about three months for one year maturity deposit rate to adjust to the long run equilibrium, four months for over three years maturity deposit rates and five months for fixed deposit rates over six months to adjust to the long run equilibrium. The estimated pass through to different maturity wise deposit rates is incomplete in short run. Our finding of incomplete pass through is consistent with finding of Qayyum et al. (2005), Mohsin (2011), and Hanif and Khan (2012). The result suggest that when SBP changes the policy rate, commercial banks not fully transform the cost to their customers.

Table: 5. Short Term Pass Through and Adjustment Speed (EC estimates)

<table>
<thead>
<tr>
<th>Series</th>
<th>( \alpha )</th>
<th>( \beta )</th>
<th>( \delta )</th>
<th>MAL</th>
<th>R2</th>
<th>D.W</th>
<th>F-stat.</th>
<th>Prob (F-stat)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed-1Y</td>
<td>-0.10 (0.52)</td>
<td>0.27 (2.44)*</td>
<td>-0.20 (2.34)*</td>
<td>3.65</td>
<td>0.28</td>
<td>1.88</td>
<td>2.75</td>
<td>0.04</td>
</tr>
<tr>
<td>Fixed-2Y</td>
<td>-0.11 (0.48)</td>
<td>0.28 (2.18)*</td>
<td>-0.17 (1.89)**</td>
<td>4.23</td>
<td>0.27</td>
<td>2.07</td>
<td>2.71</td>
<td>0.04</td>
</tr>
<tr>
<td>Fixed-3y</td>
<td>-0.15 (0.56)</td>
<td>0.29 (1.87)**</td>
<td>-0.17 (1.82)**</td>
<td>4.45</td>
<td>0.30</td>
<td>2.23</td>
<td>2.94</td>
<td>0.03</td>
</tr>
<tr>
<td>Fixed-6M</td>
<td>-0.06 (0.03)</td>
<td>0.24 (2.71)*</td>
<td>-0.16 (2.15)*</td>
<td>4.75</td>
<td>0.28</td>
<td>1.93</td>
<td>3.00</td>
<td>0.03</td>
</tr>
<tr>
<td>Fixed-O6M</td>
<td>-0.12 (0.67)</td>
<td>0.22 (2.25)*</td>
<td>-0.14 (2.17)*</td>
<td>5.57</td>
<td>0.28</td>
<td>1.85</td>
<td>2.82</td>
<td>0.04</td>
</tr>
</tbody>
</table>

Notes: t values are reported in parenthesis. * indicates significance at 5% level. The mean adjustment lag \( (MAL) = (\beta_{o-1})/\delta \).

3.5 Asymmetric Adjustment Model

The section provides estimates of asymmetric Error Correction Methodology. When deposit rates are away from their equilibrium value banks adjust these rates. \( \delta_1 \), shows the coefficient of asymmetric downward adjustment in maturity wise deposit rates when rates are upwards their equilibrium value. Similarly \( \delta_2 \) is coefficient of upward adjustment in maturity wise deposit rates. The estimates of \( \delta_1 \) indicate significant and asymmetric downward adjustment of maturity wise deposit rates. While the estimates of \( \delta_2 \) show insignificant upward adjustment of deposit rates. MAL (mean adjustment lag) is applied to check the lags in adjustment process. The result of MAL indicates that mean adjustment of rates is shorter in case of downward adjustment as compare to upward adjustment of deposit rates. MAL for downward adjustment of deposit rates on average is about 3 months. The result reveals that banks on the average take about 3 months to decrease deposit rate and about 5 months to increase deposit rates. Thus, adjustment speed reveals more delayed process
in upward adjustment of deposit rates.9

Table 6: Estimates of Asymmetric Adjustment Model

<table>
<thead>
<tr>
<th>Series</th>
<th>β</th>
<th>δ1</th>
<th>δ2</th>
<th>MAL+</th>
<th>MAL-</th>
<th>R2</th>
<th>D.W</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed-1Y</td>
<td>0.24</td>
<td>-0.32</td>
<td>-0.12</td>
<td>2.42</td>
<td>6.58</td>
<td>0.30</td>
<td>1.97</td>
</tr>
<tr>
<td></td>
<td>(2.10)*</td>
<td>(2.41)*</td>
<td>(1.09)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fixed-2Y</td>
<td>0.25</td>
<td>0.23</td>
<td>-0.08</td>
<td>3.26</td>
<td>9.37</td>
<td>0.25</td>
<td>1.98</td>
</tr>
<tr>
<td></td>
<td>(1.98)**</td>
<td>(2.00)*</td>
<td>(0.58)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fixed-3y</td>
<td>0.28</td>
<td>-0.25</td>
<td>-0.14</td>
<td>2.88</td>
<td>5.14</td>
<td>0.23</td>
<td>2.23</td>
</tr>
<tr>
<td></td>
<td>(2.12)*</td>
<td>(2.11)*</td>
<td>(1.04)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fixed-6M</td>
<td>0.20</td>
<td>-0.32</td>
<td>-0.10</td>
<td>2.50</td>
<td>8.00</td>
<td>0.30</td>
<td>1.89</td>
</tr>
<tr>
<td></td>
<td>(2.19)*</td>
<td>(2.05)*</td>
<td>(1.06)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fixed-6M</td>
<td>0.21</td>
<td>-0.23</td>
<td>-0.11</td>
<td>3.43</td>
<td>7.18</td>
<td>0.26</td>
<td>1.97</td>
</tr>
<tr>
<td></td>
<td>(2.29)*</td>
<td>(-2.07)*</td>
<td>(1.07)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: * indicates significance at 5% level. ** Significance at 10 percent level. MAL+ Indicates the mean adjustment lags when deposit rates are above their equilibrium value. MAL- mean adjustment lag when rates are below their equilibrium values.

That is, banks decrease their deposit rates more quickly than increasing the deposit rates. The result of asymmetric pass through indicate that pass through estimate is slightly high when we move towards longer maturity pattern. The results indicate Pass through over time increases as maturity increases. The long maturity fixed deposit rates are more sensitive to change in deposit rates because these are held for investment purpose, the result indicate asymmetry in adjustment of deposit rates.

The present finding suggests upward rigidity in deposit rates. Our finding of the asymmetric model is in favor of switching cost and imperfect competition hypothesis.10 The deposits are subject

9 In developing countries, saving rate is low which can be further lowered by decreasing the deposit rate. Depositors should be protected against the exploitation of banks (Aziakpono and Wilson, 2010).

10 Under switching cost hypothesis bank impose higher switching costs to keep their customers within the bank (Hefferman, 1997). In case of higher switching cost, only a small percentage of bank customers switch bank and their financial position. Higher switching costs make a group of bank customer that is highly static within the bank. Such behavior of bank customers to keep customers within the bank even in presence of best possible choice for customers creates the rigidity in interest rate. Banks may exploit the bank customers’ stagnation in this process. The selective pricing of banks create upward rigidity of deposits rates and downward rigidity of loan rates and thus asymmetry in interest rate adjustment.
to some switching cost. Banks have some power of pricing, consequently banks may exploit depositors by being quicker in reducing deposit rates in case of upward movement in deposit rates and the opposite is true for downward adjustment in deposit rates. Due to imperfect competition in the banking sector, banks may reduce deposit rates more rapidly than increasing the rates. Hannan and Berger (1991) found upward rigidity in deposit rates in United States and Scholnick (1996) discovered similar result in Malaysia.

4. Conclusion

The study has estimated the impact of discount rate on various maturity wise deposit rates. We have used time series annual data from December 1978 to December 2019. The study has found all variables are non-stationary at levels and stationary at first differences. The Engle and Granger (1987) cointegration technique is applied to estimate long run relationship and result reveals that discount rate is cointegrated to all maturity wise deposit rates used under study. Further, Philips and Loretan (1990) method is applied and result suggests slow and less than complete pass through in long run. The longer maturity fixed deposit rates are more sensitive to change in deposit rates as they are mostly held for investment purpose. Our finding suggest that although pass through is slow but longer maturity deposit rates are adjusted slightly more than other rates.

The ECM is applied to check mean reverting behavior of pass through and result suggests incomplete pass through in short-run. The dummy variable is introduced to asymmetric ECM to capture speed of adjustment of pass through and result indicates asymmetric pass through to deposit rates. The issue of asymmetric adjustment speed is checked through MAL. The result of MAL suggests upward rigidity of interest rate pass through in case of all maturity wise deposit rates. The asymmetric and incomplete pass through in Pakistan may be due to existence of imperfect competition, adjustment costs, less developed financial markets and political pressure. The findings of our study indicate that time lag is involved in transmission process that reveals limited effectiveness of monetary policy in Pakistan.

References

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