PASS THROUGH EFFECT OF MONETARY POLICY RATE AND EFFECTIVENESS OF INTREST RATE CORRIDOR (IRC) IN PAKISTAN

Munib Badar, Asia E University

ABSTRACT

This study explores long and short-run relationships between monetary policy rate and retail interest rates i.e. lending and deposit rates of commercial banks of Pakistan by using quarterly data from 1998 to 2018. The variables include proxy of central bank monetary policy rate, market retail interest rates. Data are collected from the official websites of the State Bank of Pakistan and tested by econometric techniques. This study convers both the pre and post era of Interest rate Corridor (IRC) implementation. Outcomes of this study confirms that monetary shocks have a significant positive impact on market lending and deposit rates, implying that interest rate pass-through is active in Pakistan. However, the pass-through of monetary policy shocks into market retail rates (lending and deposit rate) is incomplete in the both short and long run. This study incorporated the impact of the interest rate corridor that enhances the pass-through effect of interest rate for both lending and deposit rate in terms of magnitude and speed of adjustment.

Keywords: Three Month Treasury Bill Rate, Weighted Average Lending Rate, Weighted Average Deposit Rate, Auto Regressive Distributed Lag, Vector Auto Regression, Impulse Response Function.

INTRODUCTION

The process of interest rate pass-through comes into the debate once the central bank changes its policy stance and uses interest rate to change as a monetary policy tool. This rate is usually called the policy rate based on the presumption as it will change the money market rates prescribed by commercial banks on their retail products like saving accounts and various financings (Bernanke & Blinder, 1988).

Market retail rates can stimulate macroeconomic variables such as household consumption, wage rate and investment level of firms. However, the effectiveness of monetary policy largely depends on how actively commercial banks adjust their retail market rates, i.e. lending and deposit rates, after a change in the policy rate. The speed and magnitude of adjustment in lending and deposit rates determine whether the interest rate as a tool of monetary policy is effective or not (Bernanke & Blinder, 1988).

Various theories also support the phenomena of price adjustment of policy rate at the retail level, e.g. liquidity preference theory states that demand for money is induced by either transactional, precautionary or speculative motives of money, which further determines the level of interest rate (Keynes, 1937). These motives affect the decision making of all the participants in a real activity to borrow or lend money from financial institutions. Moreover, their objectives influence the banks' interest rate on their liabilities or assets' earnings. Therefore quicker and full pass completion of policy rate into retail market rates strengthens the overall process of monetary transmission (G. J. De Bondt, 2005).

Similarly, the expectation hypothesis, liquidity premium and marginal cost pricing theories advocate price adjustment of policy rate into retail market rates. The term structure of interest rate in the expectation hypothesis supports that long-term interest rates are

Citation Information: Badar, M. (2024). Pass through effect of monetary policy rate and effectiveness of intrest rate corridor (irc) in pakistan. *Academy of Strategic Management Journal, 23 S*(4), 1-17.

determined by current and future anticipated short-term interest rates (Della Corte, Sarno, & Thornton, 2008). This theory further offshoots liquidity premium theory, which asserts that long term interest rates incorporate the inherited risk of binding money for a more extended period and is compensated by a premium that to the value of the long term interest rate (Engsted, 1993). Likewise, marginal cost pricing theory supports the idea of setting prices at least equal to the additional cost of producing extra units to avoid recessionary pressure.The prime objective of commercial banks is to achieve profitability targets. Therefore, rates are determined based on the financing opportunity cost of funds. Opportunity cost is widely indicated by money market rates requiring that lending rates incorporate maximum changes of the opportunity cost of funding. Therefore, in a competitive environment, lending rates are closely associated with the opportunity cost of funding (Borio & Fritz, 1995).

The above theoretical underpinnings provide that change in policy rate changes retail market rates where the effectiveness of monetary transmission critically depends on the pass-through of policy rate into retail market rates. This study will further unfold how changes in policy rates enforced by SBP are effectively passed through in market lending and deposit rates. The speed and magnitude of this adjustment also entail essential information. Likewise, the effectiveness of implementing the interest rate corridor (IRC) introduced in Pakistan in 2009 will be studied, whether enhancing the pass-through effect for further churning out important information.

In Pakistan, the monetary transmission starts with a change in the central bank's monetary stance, i.e. policy rate, so that it may be passed through to the retail market rate. In 2009 SBP in Pakistan introduced IRC as a reform to strengthen the pass-through effect of interest rate has never been taken into account as being a successful reform in delivering desired results. In addition to IRC, this study also incorporate provisions of both magnitude and direction of pass-through. This study also unveil if policy shocks are absorbed in banking portfolios (i.e. bank deposits, bank loans and bank investments) with the help of effective pass through. The question arsis what is the impact of policy rate on market lending and deposit rate?. Hence, the research objectives of this study is to examine the impact of policy rate on market lending and the deposit rate. We state our research hypotheses as

H1: An increase in monetary policy rate leads to a rise in market retail rates (Positive)
HI: The lending rate is positively associated with the treasury bill rate
HII: The deposit rate is positively associated with the treasury bill rate

REVIEW OF LITERATURE

The historical perspective of various interest rates influenced by monetary policy rates and market forces must be understood to understand the dynamics of the interest rate mechanism in Pakistan. The State Bank of Pakistan (SBP), as a monetary authority, controls inflation and aggregate demand through adjustment in short term interest rates or policy rates. The direction and magnitude of the change in policy rate are based on the overall macroeconomic conditions prevailing under the inflation rate vis-a-vis the desirable inflation being predicted and assessed. By the end of June 2017, the policy rate set by the SBP was 5.75 %, which was diminished from 14 % in 2010. The SBP policy rate generally acquaints changes in the policy stance.

Through the policy rate, SBP targets the overnight money market repo rate. However, the policy rate is kept within the interest rate corridor (IRC) adopted in Aug 2009 as a new step in monetary decisions by introducing a 300 basis points corridor. The purpose of adopting the IRC is to bring effectiveness to monetary shocks. Therefore, the short-term interest rate in the money market may be adjusted rapidly and avoid volatility by keeping the

Citation Information: Badar, M. (2024). Pass through effect of monetary policy rate and effectiveness of intrest rate corridor (irc) in pakistan. *Academy of Strategic Management Journal, 23 S*(4), 1-17.

money market interest rate within the band of IRC. With time, the band of 300 basis points (bps) was reduced to 250 basis points in Feb 2013 and reduced to 200 bps in May 2015. In this framework, the SBP reverse repo rate serves as the ceiling, and the overnight repo rate serves as the corridor's floor.

The financial institutions use SBP reverse rate to acquire funds for one day against approved securities with a promise to repurchase the same securities on the next day. At the same time, the SBP repo rate allows the financial institutions to place their excessive funds overnight with SBP and receive treasury bills in return. In May 2015, SBP announced changes in the existing monetary policy framework and introduced thresholds of SBP reverse repo rate (Ceiling) and repo rate (Floor) as +50 bps and -150 bps, respectively, from the policy rate. For example, if the policy rate is prevailing at 5.75 %, then the Repo rate and reverse repo rate will be 4.25 % and 6.25 %, respectively. SBP conducts open market operations OMO mainly to ensure the availability of sufficient funds for the settlement of interbank transactions and keep the overnight interbank repo rate near the policy rate (Sources State bank of Pakistan web www.sbp.org.pk).

Figure 1 shows a brief history of the movements between reverse repo rate (RREPO) and other market retail rates, i.e. Lending Rate (LR) and Deposit rate (DR), from 1998 to 2016. The gap between the lending rate and reverse repo rate was reduced after 2008, which demonstrates the effectiveness of IRC. Wherein policy rate, which is in our study represented by three month Treasury bill rate (TB3), is closely moved with the lending rate (LR) after 2008 also signifies the enforcement of IRC.

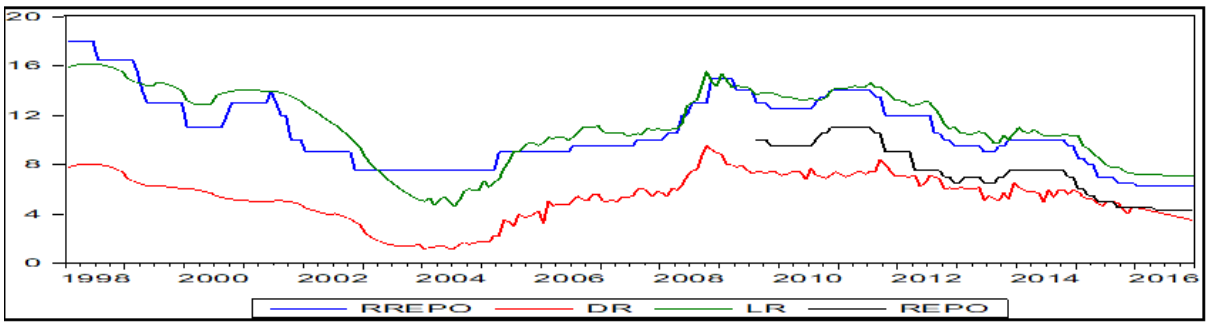
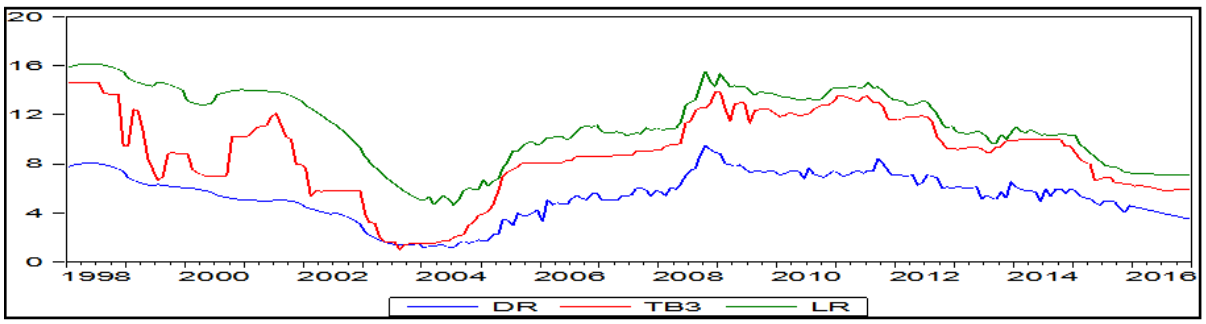


FIGURE1
MOVEMENTS BETWEEN REVERSE REPO RATE (RREPO) AND OTHER MARKET RETAIL RATES

The effect of the monetary policy rate is incorporated in the Treasury bill rate rapidly once auctioned, which is twice or thrice in a month in different tenures. Therefore, taking a three-month Treasury bill rate is appropriate as a proxy of monetary policy because the policy rate remains unchanged over a more extended period. At the same time, the weighted average deposit and lending rate represents the money market rate.



Citation Information: Badar, M. (2024). Pass through effect of monetary policy rate and effectiveness of intrest rate corridor (irc) in pakistan. *Academy of Strategic Management Journal, 23 S*(4), 1-17.

FIGURE 2
MOVEMENT OF HISTORICAL RETAIL RATES VS POLICY RATE

Currently, the policy rate is being issued bi-monthly in Pakistan. Likewise, the above Figure 2 shows the historical performance of various interest rates. Figure 2 confirms that the implementation of IRC brings a discipline to the movement of retail market rates, i.e. lending and deposit rate.

The word pass-through in the monetary transmission is used to denote the degree and speed of adjustment of monetary shock in the form of change in the policy rate to penetrate the market's prevailing retail rates. A high pass-through represents a competitive, developed and efficient financial system and vice versa. The duration of the pass-through can be either long or short. Sluggishness in adjusting interest rates impedes smooth monetary transmission, which further impulses real activity.

Internationally, various studies verify the degree of completion of pass-through in multiple economies, which is found sluggish in the long and short run. Many researchers endorsed short and long-run sluggishness of policy rate passing through to lending rates (Borio & Fritz, 1995) (Sander & Kleimeier, 2000) (Toolsema et al., 2002).

In the European financial market, pass-through is investigated as incomplete in the short run; however, relatively less incomplete pass-through is found in the long run by using the Error correction model on data extracted based on marginal cost pricing (G. De Bondt, 2002). However, the level of sluggishness may vary in the various markets. For example, results revealed in a comparative analysis of US and Euro areas over long-run pass-through of lending and deposits rates are lower in the Euro area than in the US. The level of development in various countries also affected the pass-through of interest rates. It investigated the pass-through of 118 countries in which developing countries have found incomplete pass-through. Central Asian countries contribute less significantly than the rest of the countries as they account for up to 30 per cent. In contrast, industrial countries demonstrated a relatively higher pass-through on better prevailing exchange rate regimes, better-maintained asset quality, liquidity ratios, or better developed financial systems. This study used the panel VAR framework to compile results (Weber, 2013).

The effectiveness of monetary policy largely depends on interest rate changes if transmitted to retail rates quickly. Similarly, the magnitude of monetary policy decisions should be sufficient to influence investment, consumption, and aggregate demand in the economy (Aziakpono & Wilson, 2010). Likewise the ARDL model, some researchers used the error corrections model (ECM) to measure the pass-through of interest rate in Romania for a monthly data spread over 1995 to 2004; a complete pass-through is observed to be strengthened over time in the transitional economy of Romania (Tieman, 2004).

Another aspect is unfolded as asymmetric behavior in policy stance, whether expansionary or contractionary, causes variance in pass-through speed. The relevant study used Autoregressive Distributed Lag (ARDL) to compile (Crespo-Cuaresma, Egert, & Reininger, 2004). Asymmetric information in credit rationing also caused sluggish adjustment of retail rates, undermining the effectiveness of monetary transmission by and large (Stiglitz & Weiss, 1981). Further, asymmetric information is explored on the same line as Stiglitz and Weiss by other researchers as sources of asymmetric distortions, i.e. adverse customers reactions and collusive pricing arrangements cause pass-through to remain sluggish in the US financial market (Neumark & Sharpe, 1992) (Hannan, 1991).

A study conducted in the developing economy of Barbados utilized counteraction analysis and error correction model for data range from 1980 to 2007 endorsed the idea of reinforcing pass through. Pass-through is found sluggish in the short run; however, complete in the long run, that took two quarters to bring a full effect. This study estimated that if the

Citation Information: Badar, M. (2024). Pass through effect of monetary policy rate and effectiveness of intrest rate corridor (irc) in pakistan. *Academy of Strategic Management Journal, 23 S*(4), 1-17.

policy rate should be changed on either side by approximately 300 basis points will bring a change of 100 basis points in the lending rate (Mamingi, Boamah, & Jackman, 2008).

In Pakistan, a few studies are conducted for assessing the pass-through effect, such as a study that examined this relationship so that incomplete pass through exists for both lending and deposit channels. The lending channel is influenced by policy rate better than the deposit channel in both the short and long run. The adjustment speed for the ending channel is more significant than for the deposit channel. This study compiled monthly data from 2005 to 2011 using weighted average lending and deposit rate as a lending and deposit channel proxy. In contrast, the six-month Treasury bill rate is used to proxy the policy rate. The error correction model detects short and long-run associations, while impulse responses are derived from measuring the speed of adjustments (Fazal & Salam, 2013). In another study, co-integration is found between the policy rate and lending rate; however, the deposit rate has no long-run association with the policy rate. This study used panel data every month from 2001 to 2011 for all the commercial banks in Pakistan (Mohsin, 2011).

A comprehensive understanding of interest rate pass-through entails greater significance for policymakers to manage effective monetary transmission and maintain an adequate level of competition and soundness of the financial system (Aydin, 2007) (Aziakpono & Wilson, 2010). The above review of literature focuses effectiveness of the interest rate channel through a complete pass-through effect of interest rate into retail market rates from various aspects. It will assist us in finding the reasons for the particular behavior of the money market.

METHODOLOGY

This study aims to find whether changes in policy rates enforced by the central bank effectively pass through market-oriented lending and deposit rates. The first variable of our study is to use an appropriate proxy of monetary shocks. Most of the studies used the federal funds rate as a proxy for the monetary stance in the USA (Bernanke, 1990). Likewise, six month treasury bill rate is used as a proxy for the policy rate for studies conducted in Pakistan (Fazal & Salam, 2013) because monetary policy was being issued on a half-yearly basis till 2010; therefore, the six-monthly treasury bill rate is used as a proxy of monetary shocks for the studies conducted in the relevant period. Our study prefers the three-month Treasury bill rate because monetary policy started to be issued bi-monthly after 2010. It is auctioned on a fortnightly basis and absorbs all the related information and variations of the policy rate. Although the policy rate can also be taken as a proxy of monetary shock, it is neither priced directly nor incorporates any variation of prices charged on the Treasury bill auction market. It remains unchanged until monetary authorities change their monetary stance.

Other variables of our study are retail market rates, i.e. lending rate and deposit rate, which are changed after a change if witnessed in the policy rate. On the lending side, banks used Karachi Interbank Offer Rate (KIBOR) as a benchmark for pricing loans that varies from weekly to yearly (Circular No.1 of 21st January 2004 and BPD Circular Letter No. 04 of 2006). KIBOR as a continuous variable as it attracts variation daily. Therefore, we prefer weighted average outstanding lending rates derived from KIBOR as a proxy of lending rate and weighted average outstanding deposit rates as a proxy of deposit rate because it absorbs outstanding portfolios.

The introduction of the Interest Rate Corridor (IRC) as a reform to keep the lending and deposit rate within the appropriate band is taken place in 2009, allowing banks to benefit from fulfilling liquidity shortages from the central bank. Our study incorporated both the pre and post era periods of IRC implementation. Quarterly data ranging from 1998 to 2018 is used to determine the pass-through effect of policy rates on retail rates.

Citation Information: Badar, M. (2024). Pass through effect of monetary policy rate and effectiveness of intrest rate corridor (irc) in pakistan. *Academy of Strategic Management Journal, 23 S*(4), 1-17.

The data for this research is collected from the published sources of the State Bank of Pakistan (www.sbp.org.pk); therefore, no permissions will be required to collect data other than the respondents' informed consent.

The Cumulative sum control chart CUSUM test is employed to check data stability or seasonal effects of the data, which improves the ability to detect small shifts by incorporating values derived from current and previous data. It plots the cumulative sum of the deviation of the sample values that will vary randomly around a zero mean. This test checks the structural break or model stability (Brown, Durbin, & Evans, 1975). Unit root tests are employed whether a variable is not stationary and possesses a unit root where the null hypothesis identifies the presence of a unit root and the alternative hypothesis shows stationarity. The Augmented Dickey-Fuller (ADF) test will be employed to check Unit roots. The T statistics of ADF results are more significant than the values at a 5 or 10 % significance level at the first difference. The lag length determination test is beneficial to avoid autocorrelation (Fuller, 2009).

Out of various techniques analyzing dynamics of policy rate on retail market rates, Autoregressive distributed lag (ARDL) is preferred in this study because this technique has an advantage over other techniques such as Vector Autoregressive VAR unrestricted or structural and other single equation approaches of co integration. Additionally, it allows estimation of short or long run association even if the underlying variables have a small sample size and if not integrated in the same order.

'F' statistics are computed under lower and upper bounds of critical values so that the Null Hypothesis may be accepted or rejected (Pesaran, Shin, & Smith, 2001). If co-integration is found, the ARDL will be employed to obtain a long-run equation by assuming that all derivatives have zero value.

We employ the Vector Autoregression VAR methodology developed by Sims, 1980, which assumed that all variables in the model are endogenous therefore called a non-theoretical model. In simple words, VAR is a stochastic process used to detect the linear interdependencies among multiple time series. All variable in VAR is included altogether so that each variable acquire an equation explaining its evolution that is derived from its own lagged value. (Sims et al., 1990).

ECM and VECM techniques will be employed to detect short term dynamics and speed of adjustment (Sims, 1980). To clarify the results, Impulse response functions (IRF) will be derived from Vector Error Correction Model (VECM) to determine the short-run pass through the response of policy rate on deposit rate and lending rate. An impulse response function has paramount importance to elaborate multivariate linear models by presenting measures of statistical reliability. All the models are classified on two bases. Firstly according to the magnitude of the responses with less than 1 per cent decline in deposit or lending rate (relative to the baseline) to one standard deviation shock of policy rate and similarly with greater than 1 per cent. Secondly, according to the duration of the responses wherein decline in deposit and lending rate bottoms out within a specified period and those wherein deposit and lending rate decline bottoms out after that period.

After going through the Impulse response dynamics, the subsequent analysis that can further assess our study objectives is variance decomposition. It indicates how much information is contributed by each variable to other variables in an autoregression and how much the exogenous shock of other variables can elaborate forecast error variance of each variable Table 1.

Citation Information: Badar, M. (2024). Pass through effect of monetary policy rate and effectiveness of intrest rate corridor (irc) in pakistan. *Academy of Strategic Management Journal, 23 S*(4), 1-17.

Table 1
CONCEPTUAL/THEORETICAL FRAMEWORK

Pass through Effect of Policy Rate into Market Retail Rates	Dependent Variables	Relationship	Code	Independent Variables	Sources	Econometric Model used by various Authors
		+	**TBR**	Treasury Bill Rate	(Borio & Fritz, 1995) (Sander & Kleimeier, 2000), (Toolsema et al., 2002), (Kwapil & Scharler, 2006), (Aziakpono & Wilson, 2010), (Stiglitz & Weiss, 1981), (Neumark & Sharpe, 1992) (Hannan, 1991), (Wang & Lee, 2009), (Mohsin, 2011), (Aydin, 2007) (Aziakpono & Wilson, 2010)	ECM (G. De Bondt, 2002), VAR (Weber, 2013), ARDL and ECM (Tieman, 2004). ARDL (Crespo-Cuaresma et al., 2004) counteraction analysis and ECM (Mamingi et al., 2008) . ECM (Fazal & Salam, 2013)
	Lending Rate	+	**LR**			
	Deposit Rate	+	**DR**			

In our study, the conditional ARDL model is used to measure the impact of the policy rate, i.e. Treasury bill rate (TBR), upon the market lending rate and deposit rate (Pesaran et al., 2001).

$$\Delta LR_t = \beta_o + \beta_1 TBR_{t-1} + \beta_2 LR_{t-1} + \beta_3 \Delta LR_{t-1} + \beta_4 \Delta TBR_t + \beta_5 \Delta TBR_{t-1} + u_t \quad \text{..... (1)}$$

$$\Delta DR_t = \beta_0 + \beta_1 TBR_{t-1} + \beta_2 DR_{t-1} + \beta_3 \Delta DR_{t-1} + \beta_4 \Delta TBR_t + \beta_5 \Delta TBR_{t-1} + u_t \quad \text{..... (2)}$$

The above equation shows that the lending rate (LR) is obtained in weighted average form, Treasury bill rate TBR is used as a proxy of the policy rate, Δ representing the change whereas u_t is the error term, and t represents the time period.

ESTIMATION AND INFERENCES

CUSUM plots are shown in Figure 3 provide structural stability of data within critical bounds of 5 per cent level of significance. Both figures, including Figure 4, wherein the inner line remains under the critical bounds between the time series of Deposit rate and Treasury bill rate likewise between lending and Treasury bill rate. It provides that the data is free from any structural break and stable.

Citation Information: Badar, M. (2024). Pass through effect of monetary policy rate and effectiveness of intrest rate corridor (irc) in pakistan. *Academy of Strategic Management Journal, 23 S*(4), 1-17.

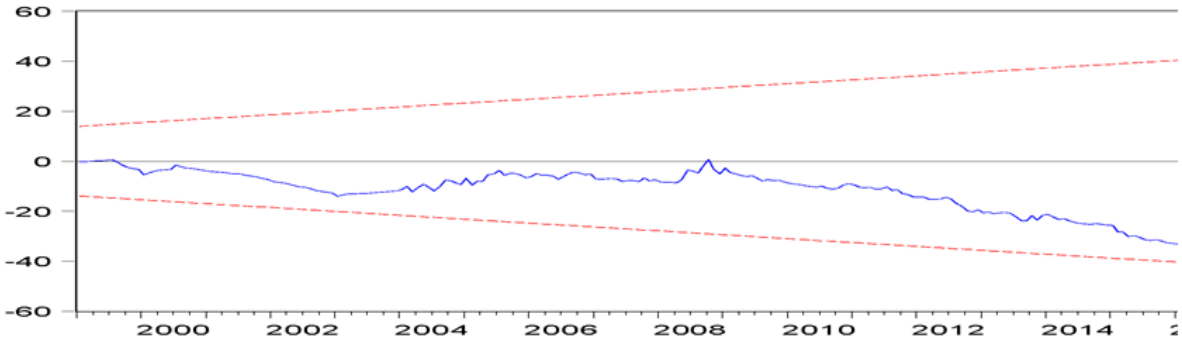


FIGURE 3
CUSUM DEPOSIT RATE AND TREASURY BILL RATE

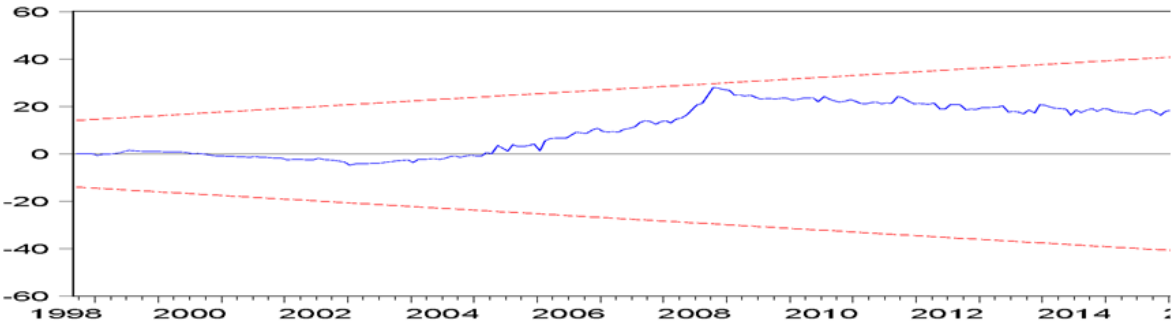


FIGURE 4
CUSUM LENDING RATE AND TREASURY BILL RATE

To check Unit Root, Augmented Dickey-Fuller (ADF)) the test is employed. The "T" statistics of ADF results are bigger than the values at a 5 or 10 % level of significance at first difference. The lag length determination test is instrumental in avoiding autocorrelation in the ARDL system. After the deployment of lag optimum during processing results from ARDL and ECM models, it is considered that there would not be any further autocorrelation issue.

The results derived in Table 2 show that the equation model has a lag optimum at various ARDL models represented in the above equations. Table 2 also provides that all the variables, i.e. Deposit rate, Treasury bill rate and Lending rate, are found stationary at first difference; however, no variable is found stationary at a level.

Table 2
"T" STATISTICS AND LAG LENGTH CRITERIA

Augmented Dickey-Fuller test statistic	**Level**	**First Difference**
	t-Statistic	**t-Statistic**
Deposit Rate (DR)	-1.370603	-18.52627
Treasury Bill Rate (TBR)	-2.123353	-12.75575
Lending Rate (LR)	-2.242467	-4.117603
Test critical values: 1% level of Confidence	-3.99974	-3.99974
5 % level of Confidence	-3.430104	-3.430104
10 % level of Confidence	-3.138608	-3.138608

The long-run association is checked by using the "bound test," i.e. Wald test reported in the Table 3 provides a magnitude of long-run association between interest rate and retail

Citation Information: Badar, M. (2024). Pass through effect of monetary policy rate and effectiveness of intrest rate corridor (irc) in pakistan. *Academy of Strategic Management Journal, 23 S*(4), 1-17.

market rates with the help of F statistics. Greater 'F' statistics than the critical value of the upper bound represents a long-run association between the policy rate and retail rate.

Deposit rates show a long-run association or co-integration with the policy rate, indicated by the three-month Treasury bill rate. Association between deposit rate and policy rate got strengthened with the advent of IRC in 2009. However, an association between the Lending rate and policy rate after the promulgation of IRC is not as strong as the deposit rate.

Table 3
ARDL STATISTICS OF PASS-THROUGH RATES

ARDL Bound Test (Deposit Rate and Treasury Bill rate) For the period From 1998 to 2016		
Test Statistic	**Value**	**k**
F-statistic	9.804162	1
ARDL Bound Test (Deposit Rate and Treasury Bill rate) For the Period From 1998 to 2008		
F-statistic	2.782713	1
ARDL Bound Test (Deposit Rate and Treasury Bill rate) For the Period From 2009 to 2016 after enforcement of Intersect Rate Corridor (IRC)		
F-statistic	14.38573	1
ARDL Bound Test (Lending Rate and Treasury Bill rate) For the period From 1998 to 2016		
F-statistic	3.168009	1
ARDL Bound Test (Lending Rate and Treasury Bill rate) For the Period From 1998 to 2008		
F-statistic	6.11299	1
ARDL Bound Test (Lending Rate and Treasury Bill rate) For the Period From 2009 to 2016 after enforcement of Intersect Rate Corridor (IRC)		
F-statistic	5.536825	1
Critical Value Bounds		
Significance	**I0 Bound**	**I1 Bound**
10%	4.04	4.78
5%	4.94	5.73
2.50%	5.77	6.68
1%	6.84	7.84

Citation Information: Badar, M. (2024). Pass through effect of monetary policy rate and effectiveness of intrest rate corridor (irc) in pakistan. *Academy of Strategic Management Journal, 23 S*(4), 1-17.

Overall data length encompasses a period from 1998 to 2016, as shown in Table 3, which provides deposit rates are associated in the long run with the policy rate, whereas the lending rate is appeared to be less significantly related to the policy rate.

In the next step, the long and short-run association is determined by using AIC criteria in Table 4. Finally, coefficients are determined for variables using AIC criteria, also known as the parsimonious model that uses the smallest possible lag length to minimise the loss of a degree of freedom.

The long-run association is represented in Table 4, which estimates coefficients whether statistically significant and have correct signs supported by theory. Results show that a 1 % increase in policy rate brought an increase of 0.56 % in the deposit rate. After enforcement of IRC, pass-through did not show a significant impact of policy rate on deposit rate in the long run. The lending rate increased up to 0.23 % at a 1 % level of significance which was considerably improved after the enforcement of IRC with almost 100 %. The value of the 'T' ratios for both lending and deposit rates confirms the long-run association with the policy rate. Enforcement of IRC brought a considerable change in the speed of adjustment of lending rate.

Short-run dynamics are explored by error correction term presented in Table 4 extracted through ARDL short-run analysis by using AIC criteria. For example, coefficients of the deposit rate represent a ten per cent increase in policy rate brought approximately 2 % increase in deposit rate in the short run, which is improved up to 4 % after enforcement of IRC. Likewise, the coefficient of lending rate represents that a ten per cent increase in policy rate brought a 3 % increase in lending rate improved to 22 % in the short-run after enforcement of IRC.

The coefficient of error correction term -0.16 denotes a short term association between the policy rate and deposit rate. Similarly, -0.033 represents a short-term association between lending and policy rates. The negative sign of the error correction term emphasize the possibility of a long-run relationship among the variables. Further, the speed of adjustment in deposit rate from the previous year's disequilibrium to the current year's equilibrium is only 16 per cent, and the speed of adjustment for lending rate is around 3 per cent.

Table 4
ARDL CO-INTEGRATING AND LONG RUN FORM

ARDL Co-integrating And Long Run Form				
Dependent Variable: DR Vs TBR for the period From 1998 to 2016				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
Coint Eq(-1)	-0.167036	0.029158	-5.728748	0
Long Run Coefficients				
DR	0.561957	0.039922	14.076307	0
Dependent Variable: DR Vs TBR for the period From 1998 to 2008				
Coint Eq(-1)	-0.09568	0.031698	-3.01861	0.0031
Long Run Coefficients				
DR	0.558902	0.088973	6.281732	0

Citation Information: Badar, M. (2024). Pass through effect of monetary policy rate and effectiveness of intrest rate corridor (irc) in pakistan. *Academy of Strategic Management Journal, 23 S*(4), 1-17.

Dependent Variable: DR Vs TBR For the Period From 2009 to 2016 after enforcement of Intersect Rate Corridor (IRC)				
Coint Eq(-1)	-0.40335	0.072593	-5.55632	0
Long Run Coefficients				
DR	0.511696	0.03337	15.33387	0
Dependent Variable: LR Vs TBR for the period From 1998 to 2016				
Coint Eq(-1)	-0.033133	0.013164	-2.517034	0.0126
Long Run Coefficients				
LR	0.238506	0.064522	3.696485	0.0003
Dependent Variable: LR Vs TBR for the period From 1998 to 2008				
Coint Eq(-1)	-0.13089	0.044819	-2.92044	0.0042
Long Run Coefficients				
LR	0.647997	0.181323	3.573719	0.0005
Dependent Variable: LR Vs TBR For the Period From 2009 to 2016 after enforcement of Intersect Rate Corridor (IRC)				
Coint Eq(-1)	-0.22358	0.067313	-3.32152	0.0013
Long Run Coefficients				
LR	1.025597	0.03693	27.77147	0

Results of Impulse Responses

It is analyzed as shown in Figure 4 deposit rate is increased above the baseline after a 1 standard deviation or 100 basis points of the positive shock of the policy rate, i.e. three-month Treasury bill rate, which we used as a proxy of the policy rate. The deposit rate moved upward by 20 basis points until the fifth month and remained on an increasing trend until the eighth month. However, no significant difference is seen in the speed of adjustment while going through Figure 5, 6 & 7 after enforcement of IRC.

The lending rate is increased above the baseline, similar to the pattern of deposit rate after receiving a shock of 1 per cent standard deviation of the policy rate, i.e. Treasury bill rate. The increasing response is detected right after the shock is deployed and reached up to 20 basis points within three months and increased up to 28 basis points till the end of the 10th month and after that remained stable. Speed of adjustment in case of lending rate is found stagnant before 2009; however, enforcement of IRC added 20 basis points till the ninth month; however, it is considerably improved up to 2.8 per cent within five months.

Citation Information: Badar, M. (2024). Pass through effect of monetary policy rate and effectiveness of intrest rate corridor (irc) in pakistan. *Academy of Strategic Management Journal, 23 S*(4), 1-17.

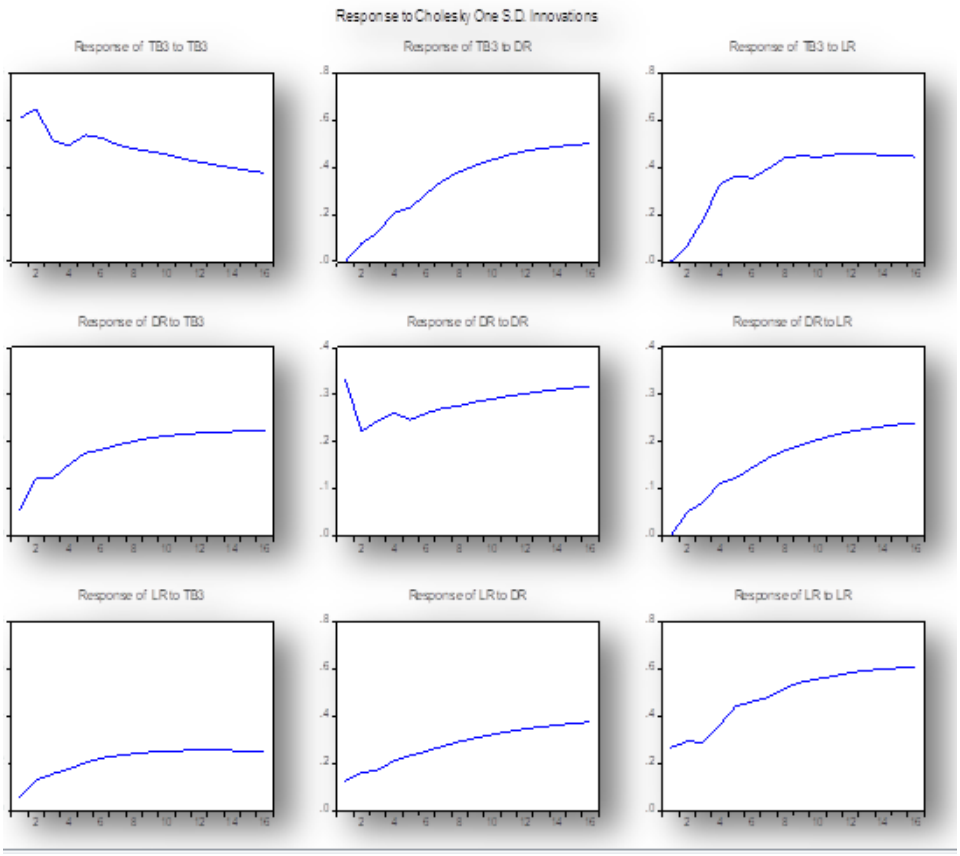


FIGURE 5
IMPULSE RESPONSE FUNCTIONS OF PASS-THROUGH EFFECT COVERING PERIOD 1998 TO 2016

Citation Information: Badar, M. (2024). Pass through effect of monetary policy rate and effectiveness of intrest rate corridor (irc) in pakistan. *Academy of Strategic Management Journal, 23 S*(4), 1-17.

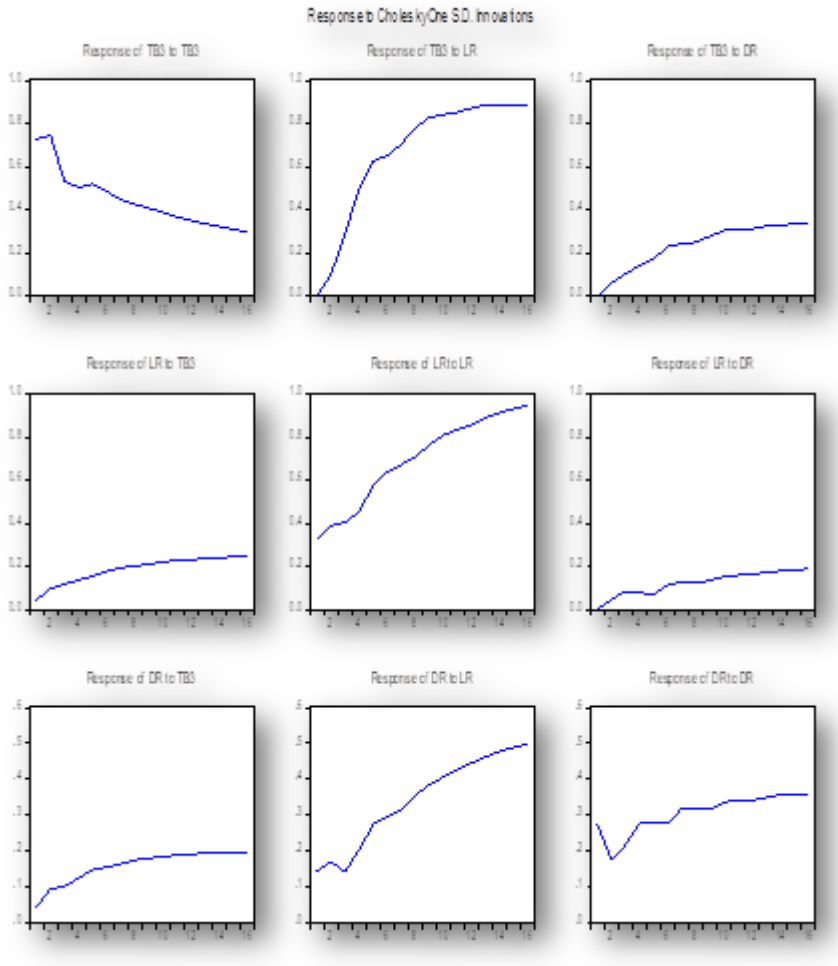


FIGURE 6
IMPULSE RESPONSE FUNCTIONS OF PASS-THROUGH EFFECT COVERING A PERIOD FROM 1998 TO 2008

Citation Information: Badar, M. (2024). Pass through effect of monetary policy rate and effectiveness of intrest rate corridor (irc) in pakistan. *Academy of Strategic Management Journal, 23 S*(4), 1-17.

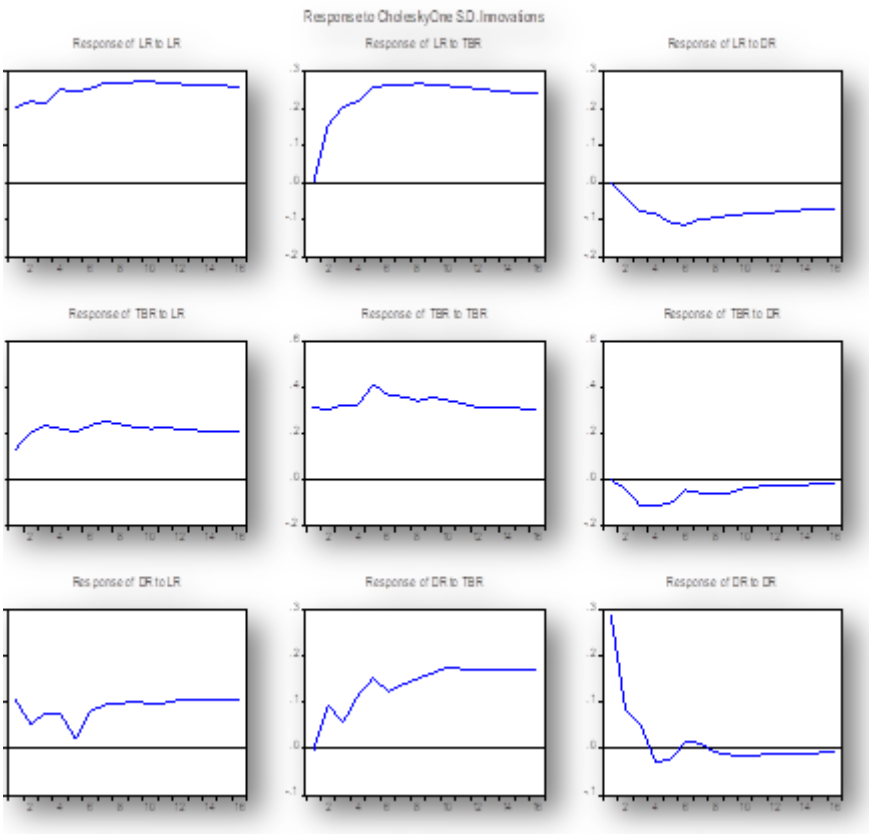


FIGURE 7
IMPULSE RESPONSE FUNCTIONS OF PASS-THROUGH EFFECT COVERING PERIOD FROM 2008 TO 2016 AFTER ENFORCEMENT OF IRC

Variance Decomposition Analysis

Results of variance decomposition as shown in Table 5 where interest rate or policy rate contributes more effectively for deposit rate almost double in the magnitude of lending rate. It contributed almost 22 per cent till the end of the eighth period whereas for lending rate it contributed less significantly than deposit rate as 14 per cent after the eighth period. After enforcement of IRC, interest rate contributed up to 42 per cent for deposit rate and lending rate both signifies the importance of IRC.

Table 5
VARIANCE DECOMPOSITION ANALYSIS OF VARIOUS PERIODS

For the Period from 1998-to 2016					**For the Period from 1998-to 2008**					**For the Period from 2009-to 2016**				
Variance Decomposition of TB3:					**Variance Decomposition of TB3:**					**Variance Decomposition of LR:**				
Period	**S.E.**	**TB3**	**DR**	**LR**	**Period**	**S.E.**	**TB3**	**LR**	**DR**	**Period**	**S.E.**	**LR**	**TBR**	**DR**
1	0.61	100.00	0.00	0.00	1.00	0.73	100.00	0.00	0.00	1.00	0.21	100.00	0.00	0.00
2	0.89	98.68	0.75	0.57	2.00	1.05	98.80	0.89	0.30	2.00	0.34	77.75	21.03	1.22
3	1.06	94.74	1.92	3.34	3.00	1.21	92.79	6.26	0.95	3.00	0.46	64.91	31.60	3.49
4	1.23	86.17	4.28	9.55	4.00	1.41	81.07	17.21	1.72	4.00	0.58	60.74	34.93	4.34
5	1.41	80.12	5.91	13.97	5.00	1.64	70.24	27.37	2.39	5.00	0.69	55.67	38.77	5.55

Citation Information: Badar, M. (2024). Pass through effect of monetary policy rate and effectiveness of intrest rate corridor (irc) in pakistan. *Academy of Strategic Management Journal, 23 S*(4), 1-17.

6	1.57	75.51	8.19	16.30	6.00	1.85	62.44	34.14	3.42	6.00	0.79	52.87	40.81	6.33
7	1.73	70.53	10.76	18.71	7.00	2.04	55.89	39.87	4.24	7.00	0.88	52.01	41.65	6.34
8	1.88	65.66	13.13	21.21	8.00	2.24	49.97	45.28	4.75	8.00	0.96	51.21	42.53	6.26
Variance Decomposition of DR:					**Variance Decomposition of LR:**					**Variance Decomposition of TBR:**				
Period	**S.E.**	**TB3**	**DR**	**LR**	**Period**	**S.E.**	**TB3**	**LR**	**DR**	**Period**	**S.E.**	**LR**	**TBR**	**DR**
1	0.34	2.58	97.42	0.00	1.00	0.33	1.75	98.25	0.00	1.00	0.34	15.31	84.69	0.00
2	0.42	9.97	88.57	1.46	2.00	0.52	4.14	95.09	0.77	2.00	0.50	23.37	75.96	0.68
3	0.51	12.65	84.33	3.02	3.00	0.67	5.56	92.42	2.01	3.00	0.65	26.71	69.80	3.50
4	0.60	15.33	79.06	5.60	4.00	0.83	6.37	91.44	2.20	4.00	0.77	27.40	67.88	4.72
5	0.69	18.44	73.98	7.58	5.00	1.02	6.49	91.62	1.89	5.00	0.90	25.03	70.24	4.73
6	0.77	20.29	70.14	9.57	6.00	1.22	6.65	91.19	2.16	6.00	1.00	25.71	70.24	4.04
7	0.86	21.54	66.92	11.54	7.00	1.42	6.83	90.73	2.43	7.00	1.10	26.83	69.50	3.67
8	0.94	22.47	64.18	13.34	8.00	1.60	6.92	90.58	2.50	8.00	1.17	27.53	69.02	3.46
Variance Decomposition of LR:					**Variance Decomposition of DR:**					**Variance Decomposition of DR:**				
Period	**S.E.**	**TB3**	**DR**	**LR**	**Period**	**S.E.**	**TB3**	**LR**	**DR**	**Period**	**S.E.**	**LR**	**TBR**	**DR**
1	0.30	3.42	17.69	78.89	1.00	0.31	2.01	21.17	76.82	1.00	0.31	11.47	0.02	88.51
2	0.47	9.19	19.10	71.71	2.00	0.41	6.64	29.85	63.51	2.00	0.34	12.11	7.87	80.02
3	0.60	12.44	20.02	67.54	3.00	0.49	8.66	28.65	62.69	3.00	0.35	15.62	9.72	74.66
4	0.75	13.39	20.62	66.00	4.00	0.62	9.69	29.49	60.82	4.00	0.38	17.48	17.50	65.02
5	0.93	13.63	19.94	66.43	5.00	0.74	10.59	33.77	55.64	5.00	0.41	15.23	28.80	55.97
6	1.09	14.05	19.84	66.11	6.00	0.86	11.17	36.98	51.85	6.00	0.44	16.86	33.53	49.61
7	1.25	14.29	20.04	65.67	7.00	0.98	11.33	38.49	50.19	7.00	0.47	18.84	37.92	43.23
8	1.40	14.25	20.18	65.57	8.00	1.11	11.45	40.71	47.84	8.00	0.50	20.20	42.14	37.67

CONCLUSION

Based on the above estimations, that covers both policy phases, i.e. expansionary and contractionary that policy rate or interest rate shocks have a significant positive impact on market lending and deposit rates, implying that interest rate pass-through is active in Pakistan. However, the pass-through of policy shock into market retail rates (lending and deposit rate) is incomplete in the short and long run.

Our results show that the impact of policy rates brings a significant change in market lending and deposit rate, which is witnessed higher in magnitude for deposit rates than lending rates in the long run. However, in the short run magnitude and speed of adjustment of the pass-

Citation Information: Badar, M. (2024). Pass through effect of monetary policy rate and effectiveness of intrest rate corridor (irc) in pakistan. *Academy of Strategic Management Journal, 23 S*(4), 1-17.

through effect of the interest rate is higher for the lending rate than the deposit rate. It means that banks are actively pursuing pricing strategies on the lending side.

This study also incorporated the impact of the interest rate corridor by segregating the data into two different time horizons. Firstly, before the enforcement of the Interest rate corridor was marked by slow pass-through, the second phase after the enforcement of the interest rate corridor witnessed by relatively fast pass-through. After enforcement of the interest rate corridor, the pass-through effect of interest rate is considerably improved for both lending and deposit rate in terms of magnitude and speed of adjustment. However, it brings more vitality to the lending rate than the deposit rate.

The difference in magnitude and speed of adjustment of pass-through of interest rate into lending and deposit rate brings a higher spread for the banking industry to earn a better profit; however, this spread reduces the effectiveness of policy shocks at the same time. Therefore, banking spread, which is the difference between lending and deposit rate, is controlled by the government through various steps.

Structural shocks could not be taken into account while conducting this study; e.g. State Bank of Pakistan issued a circular (No 7 of 2008) for a limited period through the Banking Policy and Regulations Department (BPRD) to provide a minimum return of 5 per cent on saving accounts that may have affected pass-through process up to a certain extent.

A few measures may be taken to curtail banking spread into an appropriate band to strengthen the pass-through effect of the policy rate in addition to ratios being maintained in adherence to BASEL III, e.g. Repo rate can be attached as a minimum interest rate for depositors. Our study observed that the cumulative outstanding deposit rate remained below the repo rate, which provides an opportunity to borrow from the public at a lower rate and lend it to other financial institutions at a better rate, e.g. KIBOR.

It is also observed that speed of adjustment depends on previous gaps narrowing or widening in compliance with the monetary stance, e.g. converting from expansionary to contractionary or in another way around may expose banks to interest rate risk, mainly when the monetary stance is converted from contractionary to expansionary phase because banks offered their loan at a fixed price for usually six months to one year. In contrast, the interest rate offered by banks on saving deposits is being adjusted every month.

It is observed that during the contractionary phase, banks do not increase their deposit rates by the increase in the policy rate to cover or absorb lending price shocks and to prevent the same benefit of pass-through on the deposit side. Whereas during expansionary monetary stance, banks tried to pass changes in policy rate immediately to deposit rates to earn a high profit, which implies that the direction of pass-through is another aspect that may affect the magnitude and speed of adjustment that needs to be unfolded. Some regulatory binding introduces the pricing mechanism on both sides to strengthen the pass-through effect of interest rate.

Those banks have been maintaining those characteristics such as good portfolios of non-remunerative accounts, brand equity, and size, which may hinder a complete pass-through of policy rates into deposit rates. Similarly, some banks offer less competitive lending rates following the policy changes due to better liquidity positions and preferences to invest in risk-free government securities. Hence studying the pass-through of interest rates based on bank characteristics may bring important information to future studies.

REFERENCES

Aydin, H. I. (2007). *Interest rate pass-through in Turkey* (No. 0705).

Aziakpono, M. J., & Wilson, M. K. (2013). *Interest rate pass-through and monetary policy regimes in South Africa*. AERC.

Citation Information: Badar, M. (2024). Pass through effect of monetary policy rate and effectiveness of intrest rate corridor (irc) in pakistan. *Academy of Strategic Management Journal, 23 S*(4), 1-17.

Bernanke, B. S. (1990). The federal funds rate and the channels of monetary transnission.
Bernanke, B. S., & Blinder, A. S. (1988). Credit, money, and aggregate demand.
Borio, C. E., & Fritz, W. (1995). The response of short-term bank lending rates to policy rates: a cross-country perspective.
Brown, R. L., Durbin, J., & Evans, J. M. (1975). Techniques for testing the constancy of regression relationships over time. *Journal of the Royal Statistical Society Series B: Statistical Methodology*, *37*(2), 149-163.
Crespo-Cuaresma, J., Égert, B., & Reininger, T. (2004). Interest rate pass-through in New EU member states: The case of the Czech Republic, Hungary and Poland.
De Bondt, G. (2002). Retail bank interest rate pass-through: new evidence at the euro area level. *Available at SSRN 357380*.
De Bondt, G. J. (2005). Interest rate pass-through: empirical results for the Euro Area. *German Economic Review*, *6*(1), 37-78.
Della Corte, P., Sarno, L., & Thornton, D. L. (2008). The expectation hypothesis of the term structure of very short-term rates: Statistical tests and economic value. *Journal of Financial Economics*, *89*(1), 158-174.
Engsted, T. (1993). The Term Structure of Interest Rates in Denmark 1982–89: Testing the Rational Expectations/Constant Liquidity Premium Theory. *Bulletin of Economic Research*, *45*(1), 19-37.
Fazal, S. K., & Salam, M. A. (2013). Interest rate pass-through: Empirical evidence from Pakistan. *The Lahore Journal of Economics*, *18*(1), 39.
Fuller, W. A. (2009). *Introduction to statistical time series*. John Wiley & Sons.
Hannan, T. H. (1991). Bank commercial loan markets and the role of market structure: Evidence from surveys of commercial lending. *Journal of Banking & Finance*, *15*(1), 133-149.
Keynes, J. M. (1937). The general theory of employment. *The quarterly journal of economics*, *51*(2), 209-223.
Kwapil, C., & Scharler, J. (2006). Limited pass-through from policy to retail interest rates: empirical evidence and macroeconomic implications. *Monetary policy and the Economy Q*, *4*, 26-36.
Mamingi, N., Boamah, D., & Jackman, M. (2008, July). Interest rate pass-through: empirical evidence for Barbados. In *A Paper Presented at the Central Bank of Barbados Review Seminar*.
Mohsin, H. M. (2011). Impact of monetary policy on lending and deposit rates in Pakistan: Panel data analysis.
Neumark, D., & Sharpe, S. A. (1992). Market structure and the nature of price rigidity: evidence from the market for consumer deposits. *The Quarterly Journal of Economics*, *107*(2), 657-680.
Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of applied econometrics*, *16*(3), 289-326.
Sander, H., & Kleimeier, S. (2000, October). Asymmetric adjustment of commercial bank interest rates in the euro area: implications for monetary policy. In *University of Groningen's Conference on "Financial Structure, Bank Behaviour, and Monetary Policy in the EMU", Groningen*.
Sims, C. A. (1980). Macroeconomics and reality. *Econometrica: journal of the Econometric Society*, 1-48.
Sims, C. A., Stock, J. H., & Watson, M. W. (1990). Inference in linear time series models with some unit roots. *Econometrica: Journal of the Econometric Society*, 113-144.
Stiglitz, J. E., & Weiss, A. (1981). Credit rationing in markets with imperfect information. *The American economic review*, *71*(3), 393-410.
Tieman, A. F. (2004). Interest rate pass-through in Romania and other Central European economies.
Toolsema-Veldman, L., Sturm, J. E., & de Haan, J. (2002). Convergence of pass-through from money market to lending rates in EMU countries: New evidence.
Wang, K. M., & Lee, Y. M. (2009). Market volatility and retail interest rate pass-through. *Economic Modelling*, *26*(6), 1270-1282.

Received: 02-Apr-2024, Manuscript No. ASMJ-23-14392; **Editor assigned:** 04-Apr-2024, PreQC No. ASMJ-23-14392(PQ); **Reviewed:** 17-Apr-2024, QC No. ASMJ-23-14392; **Revised:** 22-Apr-2024, Manuscript No. ASMJ-23-14392(R); **Published:** 28-Apr-2024

Citation Information: Badar, M. (2024). Pass through effect of monetary policy rate and effectiveness of intrest rate corridor (irc) in pakistan. *Academy of Strategic Management Journal, 23 S*(4), 1-17.