Interest rate pass through in India:
Bank Lending Channel

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Abstract

This paper presents the latest evidence for monetary policy transmission in the form of interest rate pass through, from the perspective of the bank lending channel. With the help of the co-integration and error correction mechanism, it has been observed that there is partial pass through to commercial bank lending rates in the Indian Economy. Even the appointment of the Monetary Policy Committee has not yielded any significant results.

Keywords: *Monetary Policy, Interest rate transmission, Interest rate pass-through, bank rate, base rate, REPO rate.*

Introduction

The upward and downward movement of the country's gross domestic product along its long term growth trend is known as business cycle. This conventionally involves two basic types of trends, one of rapid growth, which are called booms, and the other characterised by relatively slow economic growth called recessions. Keeping control over the economy by monitoring and influencing the movements in the business cycle is as essential as it gets. The government can do the same with the help of two tools at its disposal: fiscal and monetary policy. Through the fiscal policy, the government can affect the economy by utilising its taxing and spending powers. And on the other end of the spectrum, it's the central bank that indulges in creating easy and tight money situations, by using various monetary tools, one example of which is the policy rate.

Since both types of policy show results in different time horizons, mostly a combination of both is used by the central authorities to manage output. In the long run, since fiscal policy is observed to have lagged effects, its use goes on. In India, even though fiscal policy has started to explain some major variation in output post the 1991 reforms, but still the effects come with a lag. In the short run though, monetary policy is more effective and hence, widely used.

One of the most important tools of monetary policy is the policy rate set by the central bank, especially in the developed nations; this is also considered to be one of the most effective tools. On the contrary however, for developing economies, it is a common perception that the pass through rate of the policy rate is comparatively scantier. This study aims to analyse the pass through rate to the commercial banks' lending rate in India.

This study takes the literature on interest rate pass through in India forward by presenting the latest evidence available. Also, the effects of the appointment of the Monetary Policy Committee in 2016 as the chief body in charge of formulating the monetary policy are factored in. And lastly, any idiosyncratic effects of the Demonetisation announced in 2016 can be observed and interpreted through the analyses done in the subsequent section. It also suggests the direction needed for subsequent development of the monetary system, and what other nations, which are similar in many ways, can learn from the Indian experience and policies they can adopt in order to replicate the positive results, if any.

Theoretical Background

The conventional channels of monetary policy transmission mechanism are the interest rate channel, other asset price channel and the credit channel. This study solely focuses on the credit channel.

The credit channel of monetary policy transmission entails the theory behind how the changes in a central bank's monetary policy affects the amount of financial loans the commercial banks can extend to businesses or consumers; and how this, in turn, affects the real economy.

This view postulates that the adjustments in the monetary policy that cause shifts in the short term interest rates are amplified with endogenous changes in the external finance premium. This premium is simply the discrepancy between cost of capital of internal financing, say in the form of retained earnings, and cost incurred by raising capital from external sources such as the equity or the debt market. The cost of external financing is more than that of its counterpart, and the external finance premium will be some positive number till the point external financing is not fully collateralised. 'Fully collateralised' means that even in the worst case scenario, the payoff expected from a given project will be ample to make the complete loan repayment. So for instance, an expansionary monetary policy is expected to decrease the external finance premium, and subsequently through the working of the credit channel, lead to an increase in availability of credit in the economy. The very existence of the external finance premium is owed to the presence of frictions in an economy. And one classic example is that of asymmetric information in financial markets. And as a result of imperfect information, the problem of adverse selection also comes into being. And these frictions lead to the banks incurring different forms of dead-weight cost. This cost leads to the presence of an external finance premium.

The credit channel works through two ducts, the balance sheet channel, and the bank lending channel. The balance sheet channel is based on the framework on how the changes in the interest rate can affect the borrowers' final accounts which constitute of the income statement and the balance sheet. But since we are only looking at the pass through of the policy rate, we shall only be considering the bank lending channel. The bank lending channel theorizes how the changes in the monetary policy can affect the supply of loans, especially the credit imparted by commercial banks. Variations in the monetary policy certainly affect the supply of loanable funds to banks, which are their liabilities; this, in turn, can lead to changes in the total amount of loans they can extend, which are their assets. Where banks play the most important role is minimising the information asymmetry problem. Mostly banks invest in activities that can determine the credit worthiness of a candidate. Consequently, many participants in the economy are dependent on the banking system to access credit. So if the monetary policy changes affect the supply of loanable funds to the banks, it should also do the same for these borrowers. This way monetary policy changes can influence the external finance premium and the real economy, subsequently.

Through the observation in many advanced economies, we can see how and to what extent the credit channel works in real life. Tsatsaronis, carried out a comparative analysis of four developed countries in order to ascertain which monetary transmission mechanism is predominant in which country. For the results, except for Germany, all the three economies, the UK, the USA and Japan, show some level of evidence in support of the credit channel playing an important role in the transmission mechanism. The strongest evidence was obtained in favour of the bank lending channel in case of Japan.

Review of Literature

There is a plethora of literature in the area of interest rate pass through study predominantly pertaining to the developed world as the issue is one of the most crucial in the field of macroeconomics. Sorensen and Werner (2006) attempt to analyse the level of pass through of the market interest rates to bank interest rates in the Euro area. It claims that the study provides more robust and accurate results as the data used is the latest and more harmonised as compared to previous related studies. The study uses the co-integration method along with various tests to test the relationship. As for the results, the study says that there is observed to be a high degree of heterogeneity in the speed and the level of adjustment in different European countries studied. This suggests some level of lack of integration between markets, but not complete. Among many, they say that the factor that explains this heterogeneity the most is different degrees of competition in the markets. Even though there is evidence for strong heterogeneity in the speed of adjustment among the developed countries, it is a popular opinion that on an average, they score much better in terms of efficiency. Mishra and Montiel (2013) study the effectiveness of monetary transmission with respect to developing countries. They find that the level of monetary transmission is anaemic in developing countries, hence, fostering the widespread stereotypical views. They also endorse that the credit channel in the developing economies play a major role, and hence, taking that approach becomes crucial. The reasons that are attributed to the same can be that since these economies are not integrated with the world economy, the strength of the exchange rate channel is limited. This automatically means that the major chunk of the monetary transmission has to come from the bank lending channel.

In light of the above argument, it becomes a little more important to look for evidence of monetary policy transmission in the developing world, which is done through a cross sectional study. Tai et al (2012) attempt to examine the level of pass through

from monetary policy rates to commercial bank lending rates. They conduct the study for a bunch of Asian countries, consisting of both developed and emerging market economies. They find that in general, the interest rate pass through is slow and quite miniscule, which further endorses the argument presented above. The exceptions for this study's results are Malaysia, Singapore and Hong Kong. It is important to note that two of these nations are more developed than most of the rest of the lot, which might help explain the uncommon behaviour of lending rates in these countries. The case of Malaysia is peculiar though. It is still in the group of emerging market economies and unlike common observation, still has comparatively a higher rate of pass through. The key factors explaining this are - a spurt in the efficiency of the banking system in general, the increase in availability of alternate sources of finance for both, households and enterprises, and most importantly, the adequate level of financial openness to the rest of the world.

Now since there is a disparity observed between the developed and the developing world, and since there exists a lot of work in the field with respect to advanced economies, it makes sense to look at an emerging market economy like India. Ansari (2013) empirically analyses the level of optimal loan pricing under a regulatory framework, which is under the central bank, in India. The key finding was that policy rate alone cannot cause the desired reflection on the lending rates of commercial banks. Other important factors like the interest elasticity of loans, the deposit rate, government securities' yield, defaults on loans and regulatory and prudential norms such as capital requirement and provisioning also come into play. So the determinants of lending rate were classified into various different categories, one of which was policy variables. The main finding in this context was that the lending rate reacted positively to the policy variables. Das (2015) looks at the Indian economy and its credit channel, which tells us the level of translation that takes place from the Central Bank's monetary policy to the commercial banks' lending interest as well as deposit rates in the economy. And the error correction model for the analysis is used. The study reveals that there is a significant, though slow, adjustment of bank rates as triggered by the monetary policy. The degree of pass through is greater for deposit rates than for the lending rates; also they adjust quicker and not just more. Like most studies, this study also says that the level of adjustment, though significant, is highly asymmetric. Lastly, the paper shows that this degree of asymmetric adjustment has been going down slowly over the recent years. Mishra et al. (2016), in the same context, reveal that though the pass through takes place in the correct direction, the magnitude is not sufficient, hence, making it incomplete. Further, this study adds that this weak pass through has some serious repercussions. Firstly, the low level of integration that is prevalent in the case of India with the global financial market has led to a highly non-existent exchange rate channel. And this together with the small size of the formal banking sector in India, can most logically be responsible for the lower degree of pass through which implies a very weak influence of monetary policy on aggregate demand.

Bhaumik et al. (2011) examine the level of pass through of monetary policy with respect to bank ownership. The mean prime lending rate is used as a proxy for monetary policy rate. They find that banks, during a tight monetary policy stance, decrease the loan supply more effectively than what happens in the counter scenario. Therefore, the results suggest that the bank lending channel is more effective in periods of contractionary monetary stance than in those of expansionary monetary stance.

Lastly, it will be interesting to look at something that paves the way for the scope of further research in the domain of interest rate pass through in India, especially after the changes that took place in 2016 concerning the Monetary power structure of the nation, and the elephant in the room, Demonetisation. In his article, Sivramkrishna (2016) discusses how Raghuram Rajan brought various groundbreaking policy initiatives with him as the Governor of the RBI, and how even after his term was not renewed, his policies were still at the very heart of the bank's functioning; and that he can be remembered as 'the architect of inflation targeting in India'. The article concludes by saying that the appointment of the new Governor, Urjit Patel and the MPC suggest that India is pushing for non-liberal policies. But the results on the economy as a whole are still ambiguous, so waiting and watching is the best strategy.

Research Objective

Recent times have seen the policy rate set by the RBI going down significantly, and the most probable cause of such expansionary behaviour is the demonetisation of the old Rs.500 and Rs.1,000 notes. One can explain that, as demonetisation potentially slowed economic activity and hence growth, reducing the policy rate would provide the economy with the appropriate environment (boost) to maintain itself on the growth path it had been following. Checking for the pass through rate in this period would be particularly interesting. It is also important to check for the potency of the common notion that monetary policy is more effective in periods of contraction.

Another change that can invoke a question is whether the appointment of the Monetary Policy Committee to set the benchmark interest rate has affected the pass through rate. This committee not only comprises of experts in the RBI, but also

external members who are nominated by the government. The ideology has shifted towards focusing on inflation targeting, something that the RBI has not exactly followed before. The present mandate of the committee is to keep the annual inflation in the tolerance range of 2%-6%, with a target rate of 4%. Point to note here is that this is a step towards making the RBI more autonomous and increasing the transparency, and hence, the pass through rate is expected to be higher than before.

Question

Due to some exogenous shock and a change in policy, has the monetary policy pass through rate to commercial bank lending rate changed substantially in the last 2 years?

DATA

The time period that has been considered for this study ranges from December 2012 to March 2018, and exhibits monthly frequency. The data set includes repo rate, bank rate and base rate data. Repo rate is the interest rate at which the RBI lends against government securities. Bank rate is the interest rate that is charged for loans that are disbursed to the banking system, by the RBI. Base rate is the minimum interest rate set by RBI, below which commercial banks are not allowed to lend to its customers. An expansionary monetary stance has required the RBI to cut the policy rates to lower than median levels (in the last 5 years), in order to boost economic growth, when there is expectation of sluggishness as a result of demonetisation.

For this study, repo rate and bank rate is used to represent the policy stance of the monetary authority. And base rate is used as a proxy for commercial bank lending rates. This is because, due to the presence of various types of commercial banks and lending rate parameters, getting one single lending rate becomes highly difficult. But base rate is something that acts as a standard for all commercial banks, and at the same time, affects the decision making of banks regarding the setting of the lending rate directly.

Table 1: Descriptive Statistics

VARIABLE	MEAN	S.D.
REPO RATE	7.05%	.74%
BANK RATE	7.88%	1.11%
BASE RATE	9.52%	.4%
NO. OF OBSERVATIONS	64%	-

Methodology

Since this is a time series data, for further analysis, a check for stationarity is a must at this junction. And for that, the augmented Dickey-Fuller Test is used, where alternative hypothesis is stationarity. Table 2 provides the ADF test scores for each variable considered.

The next step is to check whether there is a long run relationship between two variables. This is done by running a simple regression and checking if the estimates obtained are significant or not.

For this analysis, first we check whether there is a relationship between base rate and bank rate; we also check whether there is a relationship between the base rate and the repo rate, as a robustness check. First, a simple linear regression of base rate on bank rate is run. And then, the same is done for base rate and repo rate, accordingly. The results for both of them are tabulated in Table 3, in the next section.

When and if at all, it would have been established that there exists a relationship between the variables in the long run, it becomes important to explore what the short run adjustment process looks like. And for that, the error correction mechanism can be used.

For the same, firstly the error correction term is defined, which is basically the error term in the equilibrium relation from the previous period, which for this analysis we will name $e1_{t-1}$, and $e2_{t-1}$ for the two regressions concerning bank rate and repo rate, respectively. For testing if the appointment of MPC and/or demonetisation has affected the pass through rate or not, a time dummy which takes the value 1 for all observations after November 2016 (and 0 otherwise), has also been created, and then an interaction with the error correction term is inserted into the regression. Now the following four models are • run:

$\Delta BaseRate_t = a_0 + a_1*\Delta BankRate_t + a_2*e1_{t-1} + a_3*td*e1_{t-1} + u11_t \ldots(1)$

$\Delta BankRate_t = b_0 + b_1*\Delta BaseRate_t + b_2*e1_{t-1} + b_3*td*e1_{t-1} + u12_t \ldots(2)$

$\Delta BaseRate_t = p_0 + p_1*\Delta RepoRate_t + p_2*e2_{t-1} + p_3*td*e2_{t-1} + u21_t \ldots(3)$

$\Delta RepoRate_t = q_0 + q_1*\Delta BaseRate_t + q_2*e2_{t-1} + q_3*td*e2_{t-1} + u22_t \ldots(4)$

Δ = First difference; td = Demonetisation and appointment of MPC dummy.

The results of these four regressions are summarised in Table 4, in the next section.

Analysis

Following are the results for the test of stationarity of the three variables.

Table 2: Test for Stationarity, using ADF test

VARIABLE	LEVEL	1ST DIFFERENCE
REPO RATE	-1.95	-3.58***
BANK RATE	-2.57	-6.26***
BASE RATE	-1.86	-4.05***

(***:significant at 1% l.o.s.)

The results indicate that all the three rates turn out to be non-stationary, but the first difference of each of them is stationary. Therefore, it can be said that all the three variables are integrated of order one, or are I(1). Since they are integrated of the same order, the co-integration method can be used that can trace a short run and long run relationship between two variables which have the same order of integration. The next step would be to test if the linear combination of the variables is stationary or not, the results of which are presented next.

Table 3: Co-integration

	BANK RATE	REPO RATE
SLOPE COEFFICIENT	0.33(.02)***	0.52(.02)***
INTERCEPT	6.90(.16)***	5.81(.15)***
ADF(RESIDUALS)	-3.94***	-2.47**
NO. OF OBSERVATIONS	64	64
R SQUARE	0.81	0.90

(***:significant at 1% l.o.s.; **: significant at 5% l.o.s.)

From the first set of results, it can be concluded that since the slope coefficient of bank rate is significant and the resultant error term is stationary, there exists a long run relationship between base rate and bank rate. And the same can be said for base rate and repo rate, as the slope coefficient is significant in this case too. The argument can be further validated by the fact the residuals are stationary for both the models.

Next we analyse the results of the Error Correction mechanism carried out.

Table 4: Error Correction Mechanism

((1) BASE RATE~BANK RATE; (2) BANK RATE~BASE RATE; (3) BASE RATE~REPO RATE; (4) REPO RATE ~BASE RATE)

	(1)	(2)	(3)	(4)
BANK RATE	0.039(.03)	-	-	-
REPO RATE	-	-	0.32(.07)***	-
BASE RATE	-	0.68(.53)	-	0.71(.16)***
E.C. TERM	-0.19(.06)**	0.95(.27)**	-0.19(.10)*	0.49(.15)**
E.C.*DUMMY	0.13(.15)	-1.02(.62)	0.14(.17)	-0.50(.24)**
NO. OF OBS.	63	63	63	63
MULTIPLE R SQUARE	0.12	0.17	0.23	0.32

(***:significant at 1% l.o.s.; **: significant at 5% l.o.s; *:significant at 10% l.o.s.)

For the first regression (1), the coefficient of the error correction term is negative and significant, which means that base rate is expected to adjust downwards in the short term in order to equilibrate in the long run. In the second regression (2), it is seen that the coefficient of the error correction term is positive and significant, which means that the bank rate should adjust upwards in order to equilibrate in the long run.

The results of the other two models also narrate a similar story. From the third and the fourth regression (3 & 4), it has been found that base rate will need downward adjustment. But there is an interesting finding here. The coefficient of the dummy interaction in the fourth regression is negative and significant. This means that post November 2016, the short run upward adjustment in repo rate is slightly more than nullified. One possible reason for this can be that, since the MPC brought with it a whole lot of changes in the ideology of the monetary policy conduct in India, this has created a window where the repo rate has not and will just not vary as much. This can be verified by looking at the data as well; in the time period considered, the repo rate changes only twice.

All in all, by looking at the direction and magnitude of all these coefficients, we can conclude that the interest rate pass through, pertaining to the bank lending channel, is partial, and not satisfactory, as it diminishes the influence of the RBI on various macro aggregates, the most important being GDP. This is one of the key areas where a breakthrough in the Indian Economy is highly awaited. Even reputed personalities like Dr. Raghuram Rajan, who played a very integral part in the whole system up until very recently, have pointed out that the variation in the policy rates should sufficiently reflect in the bank lending scene. And only then will the necessary monetary manipulations by the authorities be able to efficiently affect output and other important aggregates in the economy.

Conclusion

Interest rate pass through, especially through the bank lending channel can truly change the shape of an economy if it works efficiently. If the monetary authority has the required amount of control over the money disbursement process, it can with minimal lags, manipulate and adjust the macro aggregates in their favour.

The literature available in this domain has argued that the pass through rate in India has been below satisfactory levels whereas that in developed economies is much more, comparatively. And then it leads us to believe that both the pass through efficiency and development go hand in hand. Empirically, it is indeed so.

In this study, the co-integration and error correction mechanism was used to check for the level of pass through, for the bank lending channel. And it was found that there exists an incomplete pass through from bank rate and repo rate; this is reflected in the bank lending rates. The paradigm shift to inflation targeting seems to have reaped only minor benefits. Even though the MPC was appointed to increase the transparency in the conduct of monetary policy, at least up until now, there has not been seen a significant effect, as highlighted by the results obtained.

Applicability And Generalizability

The presence of a body that has maximum authority over the monetary dynamic, is essential for the effective functioning of the economy. The evidence that has been found in this study and several other studies in similar domains indicate towards a preponderance of developed nations having such monetary efficiency. Of course, in India's case, the shift to a more aggressive and focused monetary strategy has only happened very recently. And the results, even though giving very little encouragement, do at least give some.

Basically factors such as increased financial markets integration, high inflationary environment, capital mobility, enhanced efficiency of the money market, etc. (these are important but not exhaustive) can improve the interest rate pass through and the level of overall effectiveness and efficiency of the monetary policy transmission mechanism. Working towards it and finally achieving greater levels of it, is what makes a developing nation, developed. Such a strategy though does not guarantee hundred per cent results, but definitely can take a nation far ahead from the starting point.

The data that has been used in this analysis is till 2018 only. A similar or a more advanced study in the subsequent years might lead to more exciting results since the steps taken by the monetary authority in the nation will show enhanced efficacy, and the ambiguity will be curtailed. And if that is seen, then there can be lot to learn from the Indian story, especially for other developing nations in the region such as Pakistan, Myanmar, etc.

Further Scope of Work

One possible increment in the level of this study can be to use the test for co-integration using the Johansen methodology, which is expected to provide a more robust and intricate result. Also the time period considered can be a bit longer. Firstly, it will help tease in the effect of any structural break that has been observed in the last 20 years or so. Secondly, it will help in observing the increase in the pass through rate over the years, better, if any. And finally, conducting such a study after some more time has passed could make the results obtained for the structural break (demonetisation and the appointment of the MPC) that was included here, more meaningful. Lastly, assessing the efficiency of the monetary policy transmission through analysing different channels such as the balance sheet channel, would also add to the work in this domain.

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