

EXAMINING THE RELATIONSHIP BETWEEN HIGHER INTEREST RATES AND NON PERFORMING ASSETS OF BANKS-EVIDENCE FROM INDIAN BANKING SYSTEM

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INTRODUCTION

In October 2011, Moody's one of the global rating agencies downgraded the rating of SBI from C- to D+. One of the reasons attributed by Mr Beatrice Woo, Vice President and Senior Credit officer at Moody's to this downgrade is higher interest rates. "The rating action considers SBI's capital situation and deteriorating asset quality. Our expectations that Non-Performing Assets (NPA) are likely to continue rising in the near term — due to higher interest rates and a slower economy — have caused us to adopt a negative view on SBI's creditworthiness"¹. It has also been reported in a section of the press that some senior bankers have pleaded with RBI to hit the pause button on interest rate hikes fearing higher NPA's.

There is also a contrary view that Interest cost is a very small percentage of the total cost of operations of an organization and that interest rates may not significantly impact the debt servicing obligations. Organizations borrow with the hope that they would be able to generate a higher return on deployment of borrowed funds. Hence, as per this argument, interest rate increase or decrease does not affect the debt servicing ability of the borrowers. This is also borne out by the fact that even in countries like Japan, U S, where the interest rates are next to nothing, banks are making provisions for NPA's to the tune of billions of dollars.

This paper tries to verify the claim of these contradictory position on interest rates, statistically, to check if there is any association between higher interest rates and increase in the NPA's in the light of statement made by Moody's quoted above.

Keywords: NPA, Repo rates, Moody's rating, t-statistic.

Background

Central Banks of a country, have a few policy tools which they usually use to moderate growth and thus control inflation. One of the tools is the repo rates. Repo rate is the rate at which the central bank provides short term finance to commercial banks. Whenever the repo rates are increased, it is a signal to the commercial banks to increase the lending rates. An increase in the repo rates will make the borrowings more costly and thus attempts to decrease the aggregate demand. Rising lending rates will also make the existing loans costly and thus adds to the pressure on the borrowers' ability to service the debt. When a debt is not serviced on time, it is classified as Non Performing Asset by the commercial bank as per the guidelines set by the

Central Bank. The NPA's pose serious problems for the banking sector as huge funds are tied up in non productive use. This slowly leads to systemic problems in the banking sector and has a contagion effect on other sectors of the economy.

The Reserve Bank of India (RBI) has traditionally been in an unenviable position with achieving two contradictory objectives. On one hand, it has the mandate for price stability within an acceptable band and on the other hand, it has to focus on growth. Of late a third focus area is financial stability. " The central bank, until a decade ago, was focusing on growth and price stability and the trade-off between growth and price stability. A more recent addition reflecting the developments in the financial markets has been the third objective, viz., financial stability. The monetary policy looks at this third objective also and there are certain trade-offs involved between the three objectives, particularly in the short run. There are also complementarities between the three, more so over the longer run"².

In addition to the repo rates, Reserve Bank of India has taken other policy measures like varying Cash Reserve Ratio /Statutory Liquidity Ratio, change the risk weight of a class of assets, cautioning banks etc. These measures are also used as a signal to banks to either curtail lending in general or to a particular segment or to spur growth.

In the last few years, RBI has done the tight rope walking between increasing interest rates to contain inflation and reducing interest rates to add impetus to growth. The changes in repo rates have made several industry associations, bankers and economists to take contrary positions regarding economic growth and inflation.

The study is organized into 5 sections. After briefly reviewing the interest rate scenario in Section I, section II deals with the datasets, section III deals with methodological issues, section IV deals with data analysis and section V deals with conclusions.

Section II

Data for the study

The data for the study has been collected for the period March 2007 to March 2012. This period has witnessed a full cycle of decline and increase in repo rates. The data has been collected on half yearly basis starting from March 2007 upto March 2012. The data required for the study viz. Repo rates, advances, NPA's have been sourced from RBI and State bank of India publications. Repo rates as announced by RBI have been considered as a proxy to the interest rates prevailing in India.

Sample

There are several banks operating in India with varying degrees of exposure to various sectors. Public sector banks have lion's share of the banking market in India due to a variety of reasons. Even among the public sector banks, the operational dynamics of State bank group is such that it is in an advantageous position compared to nationalized banks. State bank of India (SBI) is the largest commercial bank in India in terms of branches, assets and business. Hence, it is the market leader for the banking sector in India. Further, being a public sector bank, it carries out the signals emanating from RBI in letter and spirit for changes in the interest rates almost immediately, most of the times. Therefore, SBI has been selected as a sample bank for the purpose of this study.

Limitations

- 1 The study considers only the data pertaining to SBI .
- 2 This study considers only the effect of repo rate on NPA's but does not consider effect of other monetary measures like change in CRR/SLR, change in risk weight of a particular kind of advance and other measures adopted by RBI to achieve its objectives.
- 3 The repo rates applicable as on 30th September and 31st March of the respective years only has been considered. This is because these are the dates set for auditing purposes of the balance sheet of the banks and the position of NPA's pertain to that date.

Section III

Methodological Issues

Hypothesis

Following Ken Black³, a "*hypothesis is a statement of what the researcher believes will be the outcome of an experiment or a study*". To test the hypothesis, a structured approach is adopted. Statistical hypotheses involves two phases – the null hypothesis and the alternative hypothesis. The null hypothesis is constructed to reflect no changes while the alternative hypothesis professes that *there is a change*.

There are four stages in hypothesis testing

Stage 1 : Framing the hypotheses

Stage 2 : Selecting a level of significance

Stage 3: Compute the standard error of the sample statistic and use the standard error to convert the observed value to standardized value

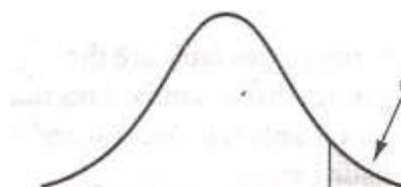
Stage 4: Compare the computed value and the critical value (tabled value) and interpret for rejection or acceptance of the hypotheses.

Statisticians generally use Z test or t-test for hypothesis testing. The choice of test depends on sample size, knowledge of population standard deviation and assumption of normal distribution.

Based on these parameters, this paper uses t- distribution.

t- distribution

This is a hypothesis testing technique generally used for small samples (sample size less than 30) and assuming a normal distribution.



Using the level of significance and the degrees of freedom, the critical values can be determined. These are standard values and are available in the form of tables. These values are used to either accept the null hypothesis or reject the null hypothesis.

The calculated value of the t-static is compared with the critical values to determine if the value is in the acceptance region or rejection region. The acceptance region is where the calculated t-static is less than the critical values. If the calculated t-static is more than the critical value, then it falls in the rejection region.

In this study, a comparison is made about the effect of two factors, NPA's and repo rates. These factors are independent. The computation procedure for the t-static for independent samples with population variances unknown and assumed to be normally distributed is:

$$t = \frac{(\bar{x}_1 - \bar{x}_2) - (\mu_1 - \mu_2)}{\sqrt{\frac{s_1^2(n_1 - 1) + s_2^2(n_2 - 1)}{n_1 + n_2 - 2}} \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$

Hypothesis

For the purpose of this study, the hypothesis framed are:

H₀: There is no change in the NPA's due to higher interest rates.

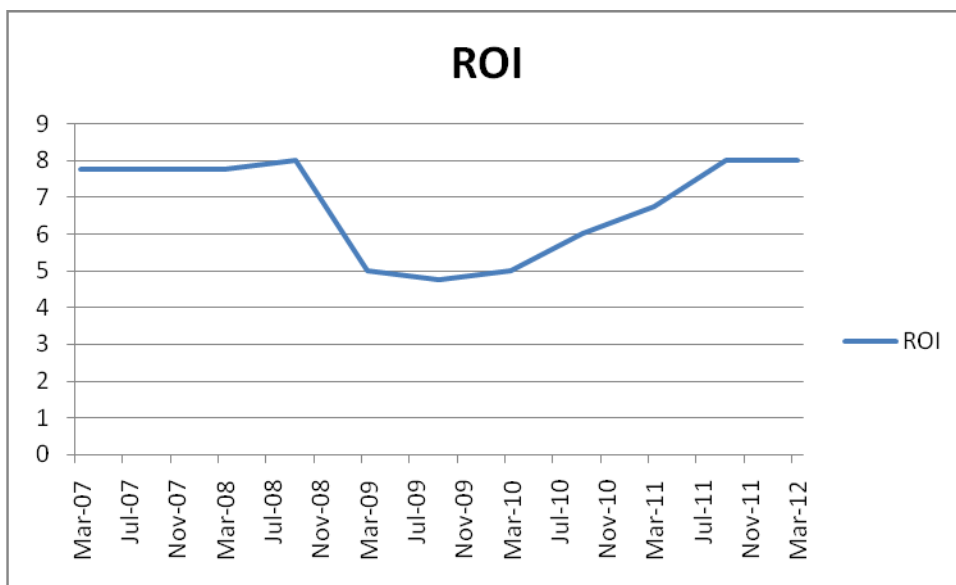
H_a: Higher interest rates contribute to rising NPA's.

The study will be done at 99% significant level to either accept or reject the null hypothesis.

Since the study is hypothesizing that there is no change in the NPA's, this is a two tailed test.

Section IV

Repo Rates



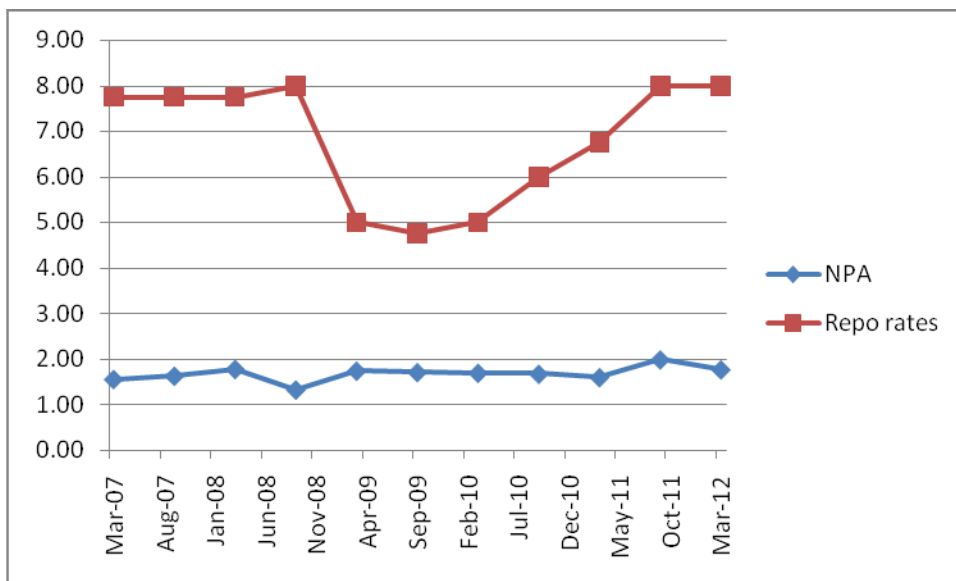
Source: RBI

The repo rates have been changed on several occasions during the period 2007 to 2012. There has been a marginal increase in the repo rates between Mar 2007 and Nov 2008. Subsequently, the rates had a steep fall from about 8% to Mar 2010. Then the trend of increasing interest rates was observed increasing the rates from about 5% to 8% during the period July 2010 to November 2012. The repo rates have been increased or decreased depending on the objectives of the RBI at that particular point of time.

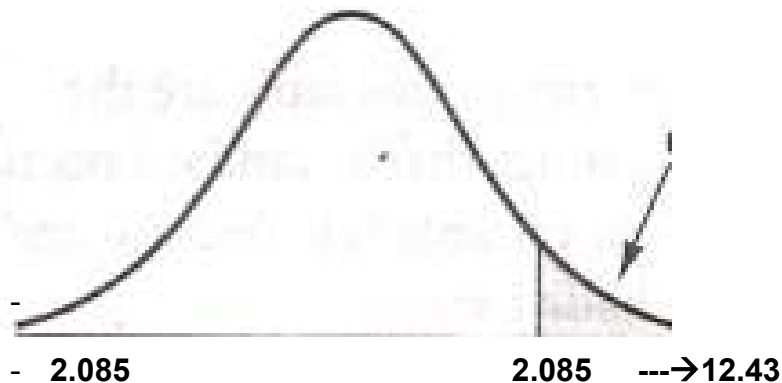
Panel Data

Period	NPA's as % of Repo	
	Advances	Rates(%)
Mar-07	1.56	7.75
Sep-07	1.63	7.75
Mar-08	1.78	7.75
Sep-08	1.33	8
Mar-09	1.74	5
Sep-09	1.71	4.75
Mar-10	1.69	5
Sep-10	1.67	6
Mar-11	1.60	6.75
Sep-11	1.99	8
Mar-12	1.77	8
Mean	1.68	6.80
Variance	0.03	1.86

Source: Reports of SBI and RBI



The computed value of t is 12.43. The critical value of t at 99% confidence level and 20 dF is 2.085. This implies that the computed value falls beyond the critical value and hence in the rejection region.



Section V

Conclusions

This study has been conducted to study if there is any relation between rising interest rates and rising NPA's in the banking sector. A null hypothesis was formed stating that there is no relation between rising interest rates and NPA's. A t-test was run to check the same statistically.

The result of the t-test was that the computed value of t-statistic was higher than the critical value of t-statistic in the standard t tables.

Hence the null hypothesis is rejected i.e there is no evidence, statistically, to accept that there is no relation between interest rates and NPA's. In other words there is strong statistical reasons to believe that there is a relation between NPA's and rising interest rates.

This is borne out by factual position also in that it becomes a huge burden to service the debt beyond a certain level of investments as the basic assumptions of the debt would have gone wrong.

There could be other reasons for rising NPA's also. Rising NPA's could also be due to not so sanguine business climate, willful defaults, not so strong legal systems, weak repayment culture among other reasons.

Implications of the study

The RBI has recently introduced Credit default Swap as an instrument to be traded in the specified exchanges. Analysis of this nature tend to give warning signs to the prospective traders about the ill effects or the nil effects of interest rates on NPA's. Hence from the policy maker's point of view this study would provide insights into the trading positions that can be taken in the light of changes in the interest rate regime.

A detailed study of NPA's across the banking spectrum in India and interest rates based on the type and segment of advances and investments of the banks would be a matter of interest in further research.

References:

- 1 Moody's Investor Services (2011), report available at: http://www.moodys.com/research/Moodys-downgrades-stand-alone-rating-of-State-Bank-of-India--PR_227402 [Accessed 22nd May 2012]
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- 4 Levin, I. Richard and Rubin, S David, 2007. Statistics for Management. 5th ed. Pearson Education.