



Impact of Interest Rate Risk In Banking System

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Interest Rate Risk, Risk exposure, Risk Management, Gap Analysis, Duration.

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ABSTRACT *'Managing risk' is significant to individuals and institutions. Risk refers to how much the price of a security changes for a given change in some factor. The fundamental aspect in this concept of managing risk is the risk return trade off. There states a saying "what gets measured gets managed". In contrast, what cannot be measured cannot be managed. Hence a measure for risk to estimate the returns in evaluation of its impact on target measures is essential in risk management. This paper reviews earlier studies to understand the interest rate risk, different types of interest rate risk, management of interest rate risk and areas exposed to this risk in banks. The paper first gives the theoretical background to the concept of interest rate risk and the different types of interest rate risk. The paper then discusses the measurement and management of interest rate risk by banks. The study concludes with the areas exposed to interest rate risk, to be considered by the bank management in making decisions about the appropriate amount of interest rate risk.*

Introduction and Background of the Study

Managing risk and managing performance are inseparable in many ways. Managing interest rate risk and simultaneously maintaining a profitable balance sheet, becomes one of the most important challenges for banks in the present competitive environment. The interest rate risk is the risk to earnings or capital arising from movements of interest rates.

Changes in banks competitive environment, products and services have increased the need for prudent interest rate risk management. Historically, interest rates environment for banks has been stable. More recently, interest rates have become more volatile and banks become more exposed to such volatility. For example non-maturity deposits have lost importance.

The nature and complexity of a bank's business activities and overall levels of risk determine how sophisticated its management of interest rate must be. Thus, every well managed bank will have effective interest rate risk management system implemented. This system will have a process that enables the bank management to identify, measure, monitor and control interest rate risk.

Interest Rate Risk

Financial risk is inherent to the business of banking and banks role as financial intermediaries. To achieve the targets set and to meet the demands of the customers, banks make loans, purchase securities and take deposits with different maturities and interest rates. These activities make the bank's earnings and capital exposed to the movements of interest rates. This exposure is interest rate risk.

Types of Interest Rate Risk

The Interest Rate Risk exposures of the banks are categorized into four broad categories¹

- Re-pricing or Maturity Mismatch Risk
- Basis Risk
- Yield Curve Risk
- Option Risk

Repricing Risk

Repricing risk is presented by assets and liabilities that reprice at different times and rates. The changes in interest rate either impacts on the asset returns or the liability costs. Repricing risk is often gauged by comparing the volume of assets that mature or re-price with the volume of liabilities that also mature or re-price in the same time frame.

Banks with longer re-pricing asset maturities than their re-pricing liability maturities are known as "Liability Sensitive". These banks earnings increase when interest rate falls. For example, a long term fixed rate loan (asset) funded by a short term deposit (liability), this portfolio value increases with a fall in interest rates. As the bank gets more interest on loan, that re-prices at a longer tenure and needs to pay higher interest on deposit for the shorter tenure.

In contrast, asset sensitive banks with longer repricing liability maturities than repricing asset maturities benefit from an increase in interest rates.

Basis Risk

Basis risk arises from a shift in the relationship of the rates in different financial markets or on different financial instruments. Basis risk is related to the lack of perfect correlation between rates received and paid on different instruments. Basis risk can also include changes in the relationship between managed rates, or rates established by bank and external rates. For example, consumer deposit rate tend to lag behind increase in market interest rates. Thus initially banks interest rate margins improve as rates are rising. As rates stabilize, this benefit turns to offset re-pricing imbalances.

Yield Curve Risk

The Yield curve is a curve showing several yields or interest rates across different contract lengths for a similar debt contract. The curve shows the relationship between the interest rate and the time of maturity of the debt for a given borrower in a given currency. The risk of experiencing an adverse shift in market interest rates associated with investing in a fixed income instrument is known as Yield curve risk. Yield curve variations can heighten the risk of a Banks positions by intensifying the effect of maturity or repricing mismatches. For example, a sharper rise in short term rates than in long term rates may compromise the profitability of funding long term loans with short term deposit.

Banks can limit this risk with strategies, designed to cope with the uncertainty of changing interest rates based on the slope of the yield curve as positive, flat or negative.

Option Risk

An option gives the option holder the right to buy or sell a financial instrument at a specified price over a specified period of time. The choice of exercising an option results from the option embedded in balance sheet or off balance sheet instruments. Mostly, options are exercised as a response to changes in interest rate that impact on the amount of interest

rate risk to which the bank is exposed. For example, debtors initiating significant early liquidation of fixed rate long term mortgage credit in the context of significant reductions in interest rates. In these situations there is a divergence between the financial flows expected up to contract maturity and the financial flows effectively received by the banks.

Banks and Interest Rate Risk

Banks are the entities which are highly vulnerable to the interest rate risk as compared to others. The movements in interest rates affects banks reported earnings and book capital by changing net interest income, referred as earnings or accounting perspective. Banks underlying economic value also get affected to changes in interest rates referred to as economic or capital perspective.

Earnings Perspective

The earnings perspective focuses on risk to earnings in the short term. This perspective considers how the changes in the interest rates affect a banks reported earnings, that net interest income. The net interest income will vary because of difference in the timing of accrual changes, changing rates and yield curve relationships and option positions. Changes in interest rates also affect a banks underlying economic value.

Economic Perspective

The economic perspective provides a measure for the underlying value of the banks current position. This evaluates the sensitivity of that value to changes in interest rate. This checks how the economic value of all banks assets, liabilities and interest related off balance instruments change with movements in interest rates. The economic value of these instruments equals the present value of their future cash flows. Thus, evaluation of the changes in the present value of contract for a given change in interest rates, results as the economic value of equity.

In contrast to the earnings perspective, the economic perspective identifies risk arising from long term pricing. By capturing the impact of interest rate changes on the value of future cash flows, the economic perspective provides a more comprehensive measurement of interest rate risk than earnings perspective.

Measures for Interest Rate Risk

There are various measurement techniques used by banks to measure the exposure of earnings and economic value to interest rate changes. The simplest techniques to measure banks interest rate risk exposure is a maturity/repricing schedule. This pinpoints the risks arising from maturity and repricing gaps. The maturity or repricing schedules are used to generate simple indicators of the interest rate risk sensitivity of both earnings and economic value. Through this approach, gap analysis is used to assess the interest rate risk of banks current earnings and duration for economic value.

Gap Analysis

Gap Analysis results from the calculation of repricing gap. This repricing gap can be multiplied by a change in the interest rate to obtain an estimate of change in net interest income in each time band for a change in the interest rate. A negative gap occurs when liabilities exceed assets in a given time band. This means that an increase in market interest rate could cause a decline in net interest income. Conversely, a positive gap implies that the banks net interest income could decline as a result of a decrease in interest rates.

Duration

A maturity or repricing schedule can be used to evaluate the effects of changing interest rates on a banks economic value by applying sensitivity weights to each time band. In General, these weights are based on estimates of the duration of assets and liabilities that fall into each time band. This measure is known as Duration.

Duration reflects the timings and size of cash flows that occur before the instruments contractual maturity. In absolute terms, the longer the maturity and the smaller the payments that occur before maturity, the higher is duration. A higher duration is associated to a significant impact in the economic value as a result of an interest rate change.

The relation between market value and maturity becomes clear if we evaluate the sensitivity of this value to changes in the interest rate. It is easy to prove that a higher duration is associated with a higher sensitivity of the value to a change in the interest rate.

Management of Interest Rate Risk

The legal framework of interest rate risk at international level are based on the 'Principles for the Management and Supervision of Interest Rate Risk' issued by the Basel Committee on Banking Supervision (BCBS).

The RBI guidelines given to banks for interest rate risk measurement, initially was to use Traditional Gap Analysis (TGA). This method was considered suitable initially, to begin with the measurement and management of interest rate risk. Later RBI also indicated its intention to move over to modern techniques for measurement like Duration Gap Analysis (DGA).

The salient features of the guidelines furnished in the Annexure² are:

- Banks shall adopt the DGA in addition to TGA followed presently.
- Banks should compute their interest rate risk position in each currency applying TGA and DGA to the rate sensitive assets/liability/off balance sheet items.
- The proposed guidelines to adopt both TGA and DGA are formulated to serve as a benchmark for banks as supervisory reporting or disclosure framework.
- Banks should adopt the modified duration gap approach to measure interest rate risk in their balance sheet from economic value perspective.
- Each bank should have set appropriate internal limits for interest rate risk based on its risk bearing and risk management capacity, with prior approval of its Risk Management committee of the board.
- Banks should compute the potential decrease in earnings and fall in market value of equity (MVE) under various interest rate scenarios.
- Framework prescribed in the circular was aimed at determining the impact on the MVE of the bank arising from changes in the value of interest rate sensitive positions across the whole bank.
- After gaining sufficient experience in the methodology, banks may consider switching over to this methodology for management of interest rate risk in the banking book.

Areas Exposed to Interest Rate Risk

There is a large body of literature that deals with the question of, how to identify and estimate a banks exposure to interest rate risk. A review of such studies is summarized are below:

Yourougan (1990) understands the banks interest rate exposure from the banks stock returns. However, this is only applicable to the listed banks.

David M Wright and James V Houpt (1996) states that interest margins are exposed to this risk. This study states that the interest margins offer only a partial view of interest rate risk and may not reveal longer term exposures that could cause losses to a bank if the volatility of rates is increased.

Frazer D.R, J Madura and R A Weigand (2002) have investigated the determinants of the banks exposure to interest rate risk. This study reveals the bank size, their earnings and balance composition, and the banks application of derivatives have a significant impact on the exposure to interest

rate risk.

Entrop O, C Memmel, M Wickens and A Zeisler (2008) uses time series of balance sheet data to explain cross sectional variation in the actual interest rate exposure.

Eitan Gurel and David Pyle (1984), describes that tax shield effects are likely to be a part of the explanation of banks behavior with respect to interest rate risk management. The existence of tax shields and the circumstances in which these tax shields may not be fully utilizable by a bank can lead to decisions to restrict the maturity gap between loans and deposits.

Conclusion

The knowledge about the impact of interest rate movements in banks constitutes as crucial information not only for bank managers but also for investors, fund managers, equity advisor and even academicians to design appropriate risk management strategies. In this paper, the interest rate risk exposures of banks, its measurement and management are studied. In line with most of the papers in the literature, there is a strong heterogeneity across the banks in their interest rate risk exposures. This paper assesses the measurement and management of interest rate risk by banks as a key risk for the banking system. Thus banks have to establish interest rate risk management system for monitoring and reporting risk exposures, determining risk limits and controls.

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