

# Gap Analysis: Asset and Liability Management at a Bank



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Dr. Anju Garg<sup>1</sup>

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<sup>1</sup>Head and Associate Professor,  
Department of Economics, DAV College,  
Bulandshahr (UP), India.

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## ABSTRACT

Market risk-the risk that a sudden change in market prices could affect earnings or capital-can be difficult to measure, but that doesn't make it any less important. One way of capturing a bank's exposure to changing interest rates is Gap Analysis. Gap analysis has largely fallen out of use. Today, gap analysis is most useful as a theoretical tool for communicating issues related to interest rate and liquidity risk. This paper seeks to know about the 'Gap Analysis' and to assess and examine the asset and liability management in a hypothetical bank. The study is entirely based on the availability and utilization of secondary data and literature. The secondary data have been collected from the various published sources such as articles published in distinguished Journals, leading Newspapers, published Financial Reports of RBI and other Banks, Five Year Plans and other reputed books related to Financial Management.

## 1. INTRODUCTION

Market risk-the risk that a sudden change in market prices could affect earnings or capital-can be difficult to measure, but that doesn't make it any less important. One way of capturing a bank's exposure to changing interest rates is Gap Analysis. Although not as sophisticated as some other tools for measuring interest rate risk, Gap allows you get a quick and intuitive sense of how a bank is positioned by comparing the values of the assets and liabilities that roll over- or reprice-at various time period in the future. Gap analysis provides the bank with the option of monitoring and controlling the interest rate change risks from the business items. This enables us to make strategic decisions with regard to future gap items for defined points in time. The liquidity analysis and

the cash flow evaluation enable operational control of the liquidity requirements and the bank's net present value (NPV) risks. In contrast to NPV analysis, where risks are depicted using NPVs and future values, in gap analysis, position and outflow volumes as well as cash flows and liquidities are analyzed on key dates or in periods. The gap items, interest rate risk, currency risk and liquidity risk that are disclosed in this way are then displayed.

Although the simplicity of the Gap methodology makes it an attractive tool for measuring interest rate risk, users of Gap need to be aware of its weaknesses and limitations. While Gap is good measure of repricing risk, it is not able to measure interest rate risk stemming from option risk, basis risk or yield curve risk. As discussed next, earnings at risk and economic

value of equity are interest rate risk methodologies that are able to measure these sources of risk.

## 2. GAP

A tool used to judge a bank's earnings exposure to interest rate movements is called a gap report. A bank's gap over a given time period is the difference between the value of its assets that mature or reprice during that period and the value of its liabilities that mature or reprice during that period. If this difference is large (in either a positive or negative direction), then interest rate changes will have large effects on net interest income. A Gap Analysis measures timing differences in the repricing (interest rate changes) of assets and liabilities to identify the exposure of net interest income. The greater these timing differences, the greater the bank's risk of loss from interest rate changes. We can use knowledge about a bank's Gap position to determine how its net interest income and, hence, its net income may be influenced by changes in interest rates.

**a) Positively Gapped-** If a bank is positively gapped (Rate-Sensitive Assets [RSA] are greater than Rate-Sensitivity Liabilities [RSL], its net interest income will move in the same direction as the change in interest rates. If interest rates increase, net interest income will increase; if interest rates fall, so will net interest income. In essence, the description of a bank as being positively gapped over a certain period of time, normally one year is the same thing as saying that interest rate and net interest income move in the same direction.

**b) Negatively Gapped-** If a bank is negatively gapped (RSLs exceed RSAs), then its net interest income will move in the opposite direction of interest rate changes. If rates increase, net interest income will fall; if rates fall, net interest income will rise. Because most banks use short-maturity deposits to fund long- maturity loans, most banks have negative short-run gaps. In essence, the description of a bank as being negatively gapped over a certain period of time,

normally one year is the same thing as saying that interest rate and net interest income move in opposite directions.

## 3. GAP ANALYSIS WORKSHEET

The Gap analysis worksheet shows the maturity and repricing schedules for all of the earning assets and interest-bearing liabilities at the bank. Comparing the value of assets that mature or reprice at each point in time with the value of the liabilities that mature or reprice reveals the exposure of earnings to changes in interest rates and constitutes the heart of Gap analysis. Gap measures are constructed by summing the dollar value of assets that come due in a given time interval and subtracting the liabilities that come due during the same interval. In the worksheet shown here, the first interval is zero to one month, but in some banks it might be as long as three months. Federal funds and transaction deposits almost always reprice within this amount of time, and some short-term loans, securities and time deposits can be expected to rollover as well. Because of the way most banks are structured, it is not unusual to see the majority of their liabilities slotted in the most immediate repricing interval. On the other hand, assets tend to be more spread out, leading to short-run imbalances.

As a result, if rates rise as expected, the bank's net interest income would decline more than if the notes had not been purchased. The recommendation to buy the notes is not a good one. It is clear from the above Gap analysis worksheet that a gap report shows the maturity and repricing schedules for all of the earning assets and interest-bearing liabilities at a bank. Comparing the value of assets that mature or reprice at each point in time with the value of the liabilities that mature or reprice reveals the exposure of earnings to change in interest rates and constitutes the heart of gap analysis

- If assets are repricing faster than liabilities, for example, an increase in interest rates will affect interest income before it affects interest expense, leading to a short-term rise in earnings.

Table 1 : Expected Gap Report for a Hypothetical Bank

| (Dollar values in millions) | 0-1 month   | 1-3 month   | 3-6 month   | 6-12 month  |
|-----------------------------|-------------|-------------|-------------|-------------|
| <b>Assets</b>               |             |             |             |             |
| Federal funds sold          | 0           | 0           | 0           | 0           |
| Due from banks              | 0           | 0           | 0           | 0           |
| U.S. Govt. securities       | 1581        | 0           | 1500        | 3000        |
| Municipals                  | 92          | 0           | 0           | 0           |
| Other securities            | 0           | 0           | 0           | 0           |
| Loans-fixed                 | 200         | 200         | 1845        | 2697        |
| Loans floating              | 3445        | 550         | 1155        | 2419        |
| <b>Total RSA</b>            | <b>5318</b> | <b>750</b>  | <b>4500</b> | <b>8116</b> |
| <b>Liabilities</b>          |             |             |             |             |
| NOW accounts                | 200         | 300         | 500         | 1000        |
| Money market deposits       | 3928        | 0           | 0           | 0           |
| Savings accounts            | 100         | 100         | 100         | 200         |
| CDs < \$100M                | 783         | 704         | 1508        | 1056        |
| CDs > \$100M                | 1163        | 1046        | 3488        | 1860        |
| Federal funds purchased     | 2500        | 0           | 0           | 0           |
| Other borrowed money        | 0           | 0           | 0           | 0           |
| <b>Total RSL</b>            | <b>8674</b> | <b>2150</b> | <b>5696</b> | <b>4116</b> |
| <b>Gap Measures</b>         |             |             |             |             |
| Interval Gap (RSA-RSL)      | (3356)      | (1400)      | (1196)      | 4000        |
| Cumulative Gap              | (3356)      | (4756)      | (5952)      | (1952)      |
| RSA/RSL                     | 0.61        | 0.56        | 0.64        | 0.91        |
| Gap/earning assets %        | (7.99)      | (11.32)     | (14.17)     | (4.65)      |

Source: Online

- If liabilities are repricing faster (which is usually the case at most banks), the same interest-rate rise will cause earnings to fall.

#### 4. ASSET AND LIABILITY MANAGEMENT AT A BANK

Gap Analysis is a technique of asset-liability management that can be used to assess interest rate risk or liquidity risk. Implementations for those two applications differ in minor ways, so people distinguish between interest rate gaps and liquidity gaps. This article discusses both. Gap analysis was widely adopted by financial institutions during the 1980s. When used to manage interest rate risk, it was used in tandem with duration analysis. Both techniques have their own

strengths and weaknesses. Duration is appealing because it summarizes, with a single number, exposure to parallel shifts in the term structure of interest rates. It does not address exposure to other term structure movements, such as tilts or bends. Gap analysis is more cumbersome and less widely applicable, but it assesses exposure to a greater variety of term structure movements.

The developments of the regulatory requirements on financial risks and organization processes affecting the banking industry have increased the need for clear and timely information on the ability to create value in every business line. To this purpose, we developed Asset & Liability Management (ALM), a collection of methods, techniques and

processes designed for the measurement, control and integrated management of all the bank's financial flows, a strategic tool useful to improve the bank's performances.

As a market leader with more than fifteen years' experience in projects for performances control and financial risks management, Prometeia supports the bank in monitoring and managing its ALM positions, offering an effective management summary of Banking Finance. This is something frequently difficult to achieve with the necessary accuracy because of the lack of a formal framework linking the operational views of front office systems with back office accounting systems.

Our solution supports all the departments involved in the ALM process:

- a) The Treasury department - introducing operative ALM processes, effective in the management of interest and liquidity risk as well as in identifying the optimal funding policies for the bank;
- b) The Risk Management department - designing management reports, overseeing the revisions of regulations and limits, defining methods to calculate the capital requirements and procedures for validating internal models;
- c) The Finance department - developing systems for the control of risk adjusted performances;
- d) The Planning and Budgeting department - using simulation models to support the definition of the budget/industrial plan, the

capital management and the target results of the Treasury/Finance departments;

- e) The Management Control department - using models to account for from the revenues of the Finance department and defining the Fund Transfer Price for Commercial Network operations.

## 5. CONCLUSION

So far, we have discussed the use of gap analysis for assessing interest rate risk. It can also be used to assess liquidity risk. The only difference is that cash flows from floaters are bucketed according to their maturity. The actual values of floating rate cash flows will not be known, but estimated values may be used. The idea of liquidity gap analysis is to anticipate periods when a portfolio will have large cash out-flow. Such buckets are called liquidity gaps.

A shortcoming of gap analysis—both interest rate and liquidity gap analysis—is the fact that it does not identify mismatches within buckets. An even more significant shortcoming is the fact that it cannot handle options in a meaningful way. In today's markets, options proliferate. Fixed income portfolios routinely hold caps, floors, swaptions, mortgage-backed securities, callable bonds, etc. Options have cash flows whose magnitudes—and sometimes timing—is highly uncertain. Those uncertain cash flows cannot be bucketed. For this reason, gap analysis has largely fallen out of use. Today, gap analysis is most useful as a theoretical tool for communicating issues related to interest rate and liquidity risk.

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