Interest Rate Risk

Net Interest Income (NII) = Interest Income ($) – Interest Expense ($)
Net Interest Margin (NIM %) = Net Interest Income / Earning Assets

- The Net Interest Income is dependent on three Factors (Rates, Volumes and Mix);
  - Interest rates earned on assets and paid for funds
  - Dollar amount of the various earnings and liabilities
  - Mix (proportions) of those funds.

Interest rates are determined in the market and generate interest rate risk – a bank can attempt to manipulate volume and mix in order to manage interest rate risk.

- Level and movement of interest rates – a relative degree of interest rate volatility is linked to the monetary policy of the RBA, a change in the approach from targeting interest rate goals towards monetary targets.

Interest Rate Risk comprises:

- **Repricing Risk** – assets and liabilities of different maturities (interest rates change at different times).
- **Yield Curve Risk** – slope of the yield curve may change, therefore interest rate spreads may change.
- **Options Risk** – embedded options i.e. if interest rates rise depositors may shift funds from low interest rate deposits to higher yield deposits thereby changing the mix of liabilities.

Asset-Liability Management (Interest Rate is Part of ALM) – refers to decisions about the composition of assets and liabilities and their risk assessment (ALM is generally viewed as short-term in nature).

- Traditionally aimed to control Net interest income (NII) – relates to the repricing gap (**focus),** as ALM considers the effects of changes in the interest rates on the value of the balance sheet items (duration of the gap).

Repricing Gap –when a bank's assets and liabilities do not reprice at the same time, this will change the net interest income (considers the impact of changing interest rates on the bank's net interest income).

- **GAP ($) = Rate Sensitive Assets (RSA$) – Rate Sensitive Liabilities (RSL$)**

  RSA – mature within the chosen time horizon or have variable (floating) interest rates, which may be adjusted according to a market reference rate (within chosen time horizon).

  RSL – mature within a chosen time horizon or have variable (floating) interest rates, which may be adjusted according to a market reference rate (within a chosen time horizon).

All asset and liabilities can be classified as = RSA, RSL or NRS (Non-rate sensitive).

- The repricing gap allows a bank to measure its exposure to interest rate risk, therefore the bigger the gap the more exposed the bank is to interest rate risk.

To calculate the effect of changing interest rates on a bank's NII:

- **ΔNII = RSA$ x (Δi) – RSL$ x (Δi)**
- **ΔNII = [RSA$ – RSL$] x (Δi)**
- **ΔNII = Gap$ x (Δi)**

Calculations to compare gap positions (Common Size):

$$\text{Relative gap ratio} = \frac{\text{Gap\$}}{\text{Total assets}}$$

Positive value = asset sensitive
Negative value = liability sensitive

$$\text{Interest} - \text{sensitivity ratio} = \frac{\text{RSA\$}}{\text{RSL\$}}$$

Ratio>1 asset sensitive
Ratio<1 liability sensitive

A bank may be asset sensitive or liability sensitive:

- **Asset Sensitive = RSA > RSL (Positive Gap)**
- **Liability Sensitive = RSL > RSA (Negative Gap)**

Repricing Model – assumes there is a parallel shift in the yield curve (rare). If the interest rates do not change by the same amount and at the same time, then net interest income may change by more or less. **Change in NII:**

$$\Delta NII = (RSA \times \Delta R_{RSA}) - (RSL \times \Delta R_{RSL})$$

Managing Interest Rate Risk – having measured exposure to interest rate risk, a bank may choose actions aimed to

a. Reduce the Interest Rate Risk = **Defensive Strategy**
b. Increasing the Interest Rate Risk to take Advantage of expected movements in the interest Rate = **Aggressive Strategy**

Alternatives (Managing)= (1) balance sheet adjustments involves changing the portfolio of assets and liabilities (2) Synthetic adjustments involve a bank altering its interest rate risk position by using derivatives.

a. **Defensive Strategy** (attempts to insulate NII from changes in Interest Rates and reduce volatility) = attempts to keep the dollar amount of RSAs in balance with the amount of RSLs over a given period, in order to keep the repricing gap near zero.
    a. Not necessarily a passive strategy – many adjustments in order to maintain a zero gap position.
        i. A bank with a positive gap will need to reduce its RSAs and/or increase its RSLs.

ii. A bank with a negative gap will need to increase its RSAs and/or reduce its RSLs

b. **Aggressive Strategy** = aims to increase NII through taking on a greater exposure (success of aggressive ALM depends on the ability to forecast future interest rate changes before the rest of the market).
    a. Policy will be different depending on the expectation of interest rates rising or falling to market expectations.

Note = In practice banks generally do not try to manipulate loans and deposits against customer preferences, instead they use money market instruments to adjust their asset liability portfolios (e.g. Repos, CDs, Short-term government securities).

Acceptable Level of Risk

- Risk-Return Trade off = taking on too little interest rate risk means inadequate profits, however, too much interest rate risk exposes the bank to larger losses.
- A policy of eliminating interest-rate risk on the balance sheet may not meet customer demand – in reality most banks take some, but very limited interest rate risk.

Repricing Model

Advantages	Disadvantages
• Information Value • Simplicity	• Ignores Market value effects • Over-aggregation • Fails to deal with the problem of Runoffs (Runoff component is Rate Sensitive) • Ignores Off-balance sheet affects (Assets & Liabilities).