IRRBB

Interest rate risk in the banking book (IRRBB) is a step taken to quantify and manage the interest rate risk exposures in the banking book of a financial institution. According to this approach short term and long-term view of the IRRBB is formed by calculating measures like net interest income (NII) and economic value of equity (EVE).

Both measures are reporting standards prescribed by the Basel. Regulators following Basel guidelines can customize according to their jurisdiction and mandate to domestic institutions.

Basel committee guidelines:

1. Eight shock scenarios are prescribed by the Basel according to each currency
    a. Parallel up
    b. Parallel down
    c. Short rate up
    d. Short rate down
    e. Long rate up
    f. Long rate down
    g. Steepener
    h. Flattener
2. Under EVE all are considered, but in NII only first two are taken into account
3. A standardized check is also provided
    a. If ΔEVE% > 15% of tier-1 capital
        i. Considered as outlier
        ii. Corrective actions to be taken
4. Measures in case of outliers
    a. Hedging using interest rate swaps
    b. Raising additional capital
    c. Improve risk management framework

Model development steps

1. **Data collection & cleaning:**
    a. Get the balance sheet of an institution
    b. Bifurcate b/w trading book and banking book exposures
    c. Check for rate sensitive asset and liabilities in banking book
2. **Bucketing:**
    a. Bucket all the cash flows in specified time bucket ranging from overnight to 20yrs+
    b. While bucketing make sure of floating and fixed rates balance sheet items

i. Floating rate: the whole principle and interest portion get reset at every reset date. So, bucket them according to the first reset date. E.g. Treasury bonds
ii. Fixed rate: under this the payment portion included both principle and interest portion which is get amortized at each rollover date. So accordingly map them to each rollover date with the amount received/paid on that date. E.g. Home loan (EMIs)

3. **Gap analysis:**
    a. After all the items get bucketed, its time to perform a gap analysis
    b. The total of rate sensitive assets and liabilities can be derived from the sum total of each bucket for both
    c. Difference of RSA and RSL gives the gap. If the gap is positive the institution is exposed to more rate sensitive assets and vice-versa
4. **NII calculation:**
    a. Net interest income (NII) comes under earnings approach according to Basel guidelines
    b. Only two scenarios are considered according to Basel which are Parallel up and Parallel down
    c. According to Basel the earnings impact is short time that's why we consider buckets up to 12 months (1yr)
    d. From the bucketing part get the short-term RSA and RSL
    e. Shock the RSA and RSL at each maturity bucket and calculate the change in assets and liabilities
    f. The difference of asset and liabilities will give the Δ NII
    g. The duration of RSA and RSL is calculated to get idea of the reinvestment horizon and refinance horizon.
5. **EVE calculation:**
    a. Under economic value of equity (EVE) all eight shock scenarios are considered as prescribed by the BCBS
    b. EVE is a long-term phenomenon and we are considering all maturity buckets up to 20yrs+
    c. Get the present value of all cash flows at each maturity bucket using spot rate
    d. Get the present value of all cash flows at each maturity bucket using spot rates shocked according to each scenario rates
    e. Summarize the actual and scenario-based market values of both RSA and RSL
    f. Get the difference of both to reach at ΔEVE
    g. The ΔEVE% is calculated according to tier-1 capital
6. **Conclusions:**

a. Get all the ΔEVE% in each shock scenario and take the worst of them as the key risk indicator (KRI)
b. Get ΔNII% in parallel up & down scenarios
c. Conclude the analysis with checking if the ΔEVE% > 15% of tier-1 capital
d. Further measures can be taken to decrease the ΔEVE% like hedging.

7. **Model extensions:** certain upgrades can be added to model
    a. Treatment of non-maturity deposits (NMDs)
    b. Prepayment and early redemption risk