

Management of Interest Rate Risk

Framework for Management of Interest Rate Risk

- **Specify the risk environment**
- **Model cash flows**
- **Capture accounting complexity**
- **Specify the objective function**
- **Evaluate solutions vs. reality/practical considerations**

Specify the Risk Environment

1. Define the market and economic variables of interest

- Rate markets
 - Yield curve
 - Spreads: (mortgage, swap, funds, etc.)

- Economic variables
 - Housing
 - GDP
 - Inflation
 - Unemployment

Specify the Risk Environment-Continued

2. What's the appropriate horizon for analysis

- Short enough for assumptions to be reasonable and to capture near term risks/volatility
- Long enough:
 - For market moves to be significant
 - For substantive planning and policy decisions

3. Construct a set of scenarios for evaluation

- Base (forward vs. spot)
- Shocks around baseline:
 - Instantaneous
 - Gradual

Model Cash Flows

Consider a simple balance sheet:

<u>Asset</u>	<u>Liability</u>
Mortgage products	Deposits
Consumer loans	Market funding
Commercial loans	Debt
Corporate loans	Equity

Even with this construct we need:

- **Behavioral models**
 - Prepayments
 - Credit behavior
 - Deposit balances (elasticity?)
- **Competitive spread behavior**
 - Assets
 - Liabilities (deposits, debt, etc.)
- **Assumptions on evolution of balance sheet**
 - Reinvestment
 - Refinancing

Balance the Accounting and Capital Impacts

Investment decisions must give careful consideration to the risk adjusted returns on capital, the symmetry of those returns, and the income statement geography

- **Understand impact to income statement line items**
- **Determine potential capital implications**

Specify the Objective Function

What are we trying to accomplish?

- **Not a simple 1 period problem:**
 - Much more complicated than a simple efficient frontier
 - Often conflicting goals
 - But want to retain the idea of risk/return trade-off
- **Some of the relevant variables:**
 - NII
 - Earnings
 - OCI
 - Capital ratios
- **What concept of risk is employed?**
 - Earning sensitivity
 - DV01
 - CVAR
 - Equity duration

Specify the Objective Function-Continued

Potential example using a total return concept:

Max : NII+OCI

Subject to:

Combined risk \leq Specified amt

Capital \geq Required amt

- What are the levers in the problem?
 - Debt maturity
 - Deposit mix
 - Asset mix
 - Reinvestment/Refinancing strategy

- What will the results look like?

Practical Considerations

- **Timeliness and granularity of data**
- **Optimizations are only as good as the inputs, assumptions, and constraints**
- **Test the robustness of your results!**
- **Constrain the model to reflect practicalities of market depth, liquidity, and costs of adjustments**
- **Execute strategy!**