Interest Rate Risk at Banks: An Economist’s Perspective

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Interest Rate Risk at Banks

• What would you look at to gauge banks’ exposure to interest rate risk?

• Metrics:
  – Net interest margins/income
  – Net Income
  – Regulatory capital
  – Market value of equity
    • Most forward-looking
    • Counterparties pay attention
Net Interest Margin, All Banks

Quarterly, SAAR
Unadjusted
Adjusted for FAS 167

Source: Federal Reserve, Call Reports
Determinants of exposure

• What some of the key determinants of banks’ exposure to interest rate risk?
Duration/Maturity Mismatch

1. Duration or maturity mismatch
   – Conventional wisdom: Banks benefit from a steep yield curve because they engage in maturity transformation.
   – But rising longer-term rates can cause immediate capital losses on longer-term assets.
     • AFS securities are 17% of U.S. bank assets
   – Banks may hedge interest rate risk.
   – Noninterest income/expense may change in response to changes in interest rates.
Maturity Gap at All Banks

Note: Maturity gap is the approximate weighted-average time to maturity or next repricing date of interest-bearing assets less the approximate weighted-average time to maturity or next repricing date of liabilities. The approximations are based on the midpoint of the ranges available on the Call Report. Liquid deposits are assumed to have a maturity of 1 year.

Source: Call Report.
Core Deposits

2. Core deposits:
   - Core (demand, transactions, and savings) deposits are “special”
     - Evidence of sticky rates and quantities (Hannan & Berger [1991]; Neumark & Sharpe [1992]; Driscoll and Judson [2013]).
     - Interest rates on core deposits are typically below short-term market rates, which can be a source of profits (‘deposit franchise value’).
     - Thus, banks with a strong deposit franchise can benefit from an increase in market rates. (Samuelson [1945])
     - But if deposit withdrawals are sufficiently interest-sensitive, the deposit franchise value could also decline.
Core deposit rates and market interest rates

Core deposit rate = Market rate line

Core deposit rate

Market rate
Core-deposit volumes and market rates

- Many factors account for the current high share of core deposits
  - Current low rates – historically related to core-deposit share
  - Shifts in investor risk preference
  - Change in the FDIC insurance assessment base in 2011
3. Embedded options in assets

- Importance of mortgage-related assets (pre-payment)
- Duration of ‘callable’ assets shortens as rates fall
Off-balance sheet

4. Interest rate derivatives
   – For hedging, or trading purposes
   – Activity highly concentrated among large dealer banks.

Source: English et al. (2012)
Interest rate derivatives by purpose

Trading purposes

Non-trading purposes

Source: English et al. (2012)
Other considerations

• What interest rate shocks to consider?
  – Level of the yield curve
  – Slope of the yield curve

• What is the macroeconomic environment?
  – Higher rates in the context of a strengthening recovery?
  – Or do higher rates lead to an economic slowdown, diminished lending opportunities and higher loan losses?
Illustration: Interest rate changes and profitability metrics of U.S. banks

<table>
<thead>
<tr>
<th>Variable × Interest Rate</th>
<th>NII</th>
<th>NNI</th>
<th>ROA</th>
<th>Δ log A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level effect (median)</td>
<td>0.088***</td>
<td>-0.015</td>
<td>0.051***</td>
<td>-2.139**</td>
</tr>
<tr>
<td></td>
<td>(0.014)</td>
<td>(0.011)</td>
<td>(0.010)</td>
<td>(0.879)</td>
</tr>
<tr>
<td>Slope effect (median)</td>
<td>0.071***</td>
<td>-0.005</td>
<td>0.037***</td>
<td>-1.830***</td>
</tr>
<tr>
<td></td>
<td>(0.011)</td>
<td>(0.008)</td>
<td>(0.008)</td>
<td>(0.618)</td>
</tr>
</tbody>
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- Based on a panel of 4,776 of U.S. commercial banks, using merger-adjusted Call Report data (from English, Van den Heuvel and Zakrajsek [2012]).
- Positive effect of a rise in the level of interest rates on NII is more pronounced when core deposits are high.
  - But balance sheet growth decelerates more in that case.
- Positive effect of a steepening of the yield curve on NII is stronger when the maturity gap is larger.
Illustration: Interest rate surprises and market value of equity

- Reaction of bank stock valuations to interest rate surprises following FOMC announcements.
  - Uses intraday data on fed funds futures, Treasury yields and bank stock prices.
  - Uncorrelated with other macroeconomic news.

<table>
<thead>
<tr>
<th>Interest rate surprise</th>
<th>Effect on bank equity values (in percent, for a 100 bps. surprise)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Level</strong> of the yield curve</td>
<td>- 8.6 %</td>
</tr>
<tr>
<td><strong>Slope</strong> of the yield curve</td>
<td>- 4.8 %</td>
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