

Stress Test Modeling Symposium
Federal Reserve Bank of Boston, June 25-26, 2014

Interest Rate Risk at Banks: An Economist's Perspective

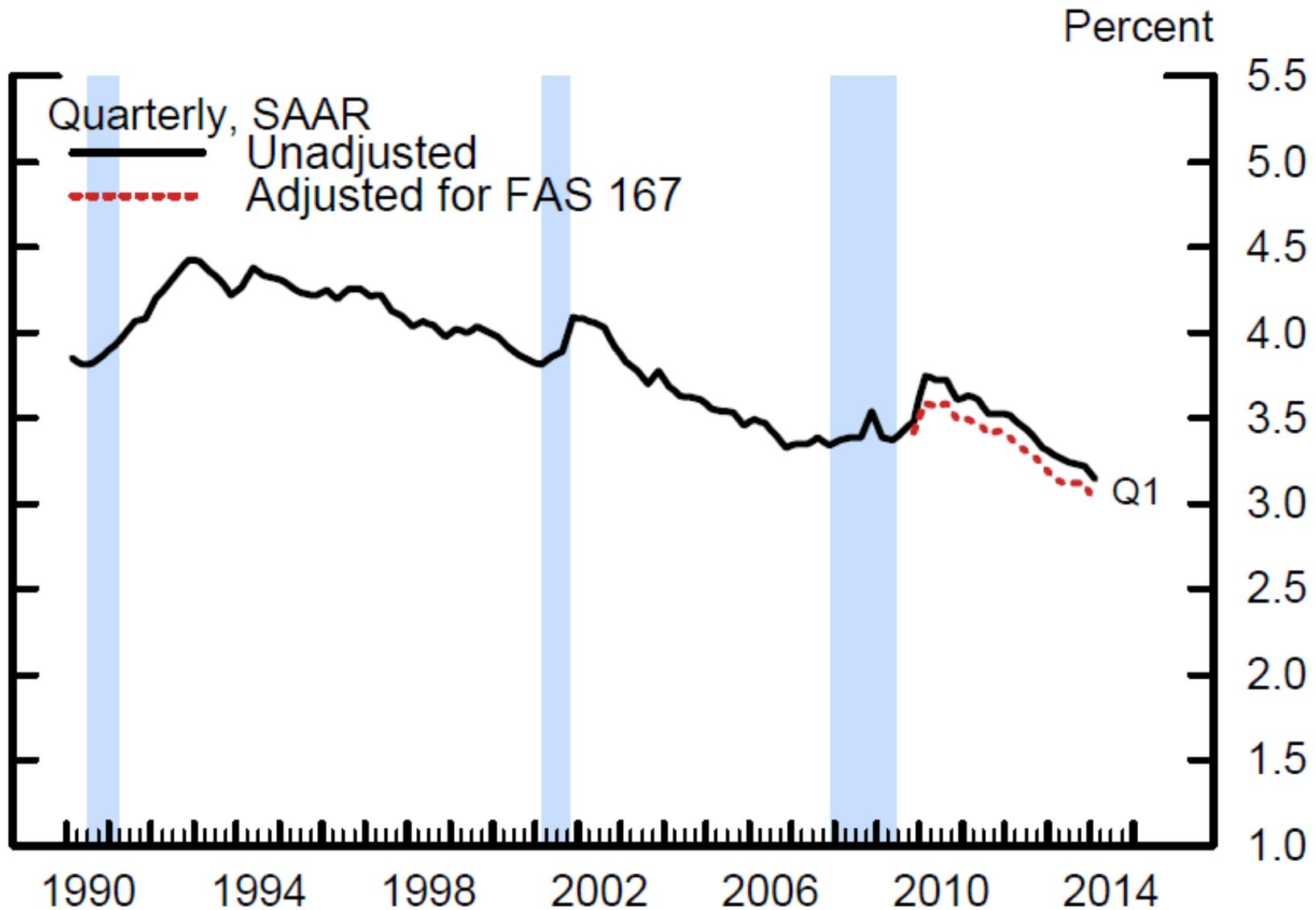
Skander Van den Heuvel
Office of Financial Stability
Federal Reserve Board

The views expressed here are solely the responsibility of the author and should not be interpreted as reflecting the views of the Board of Governors of the Federal Reserve System or of anyone else associated with the Federal Reserve System.

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



Source: Federal Reserve, Call Reports

Determinants of exposure

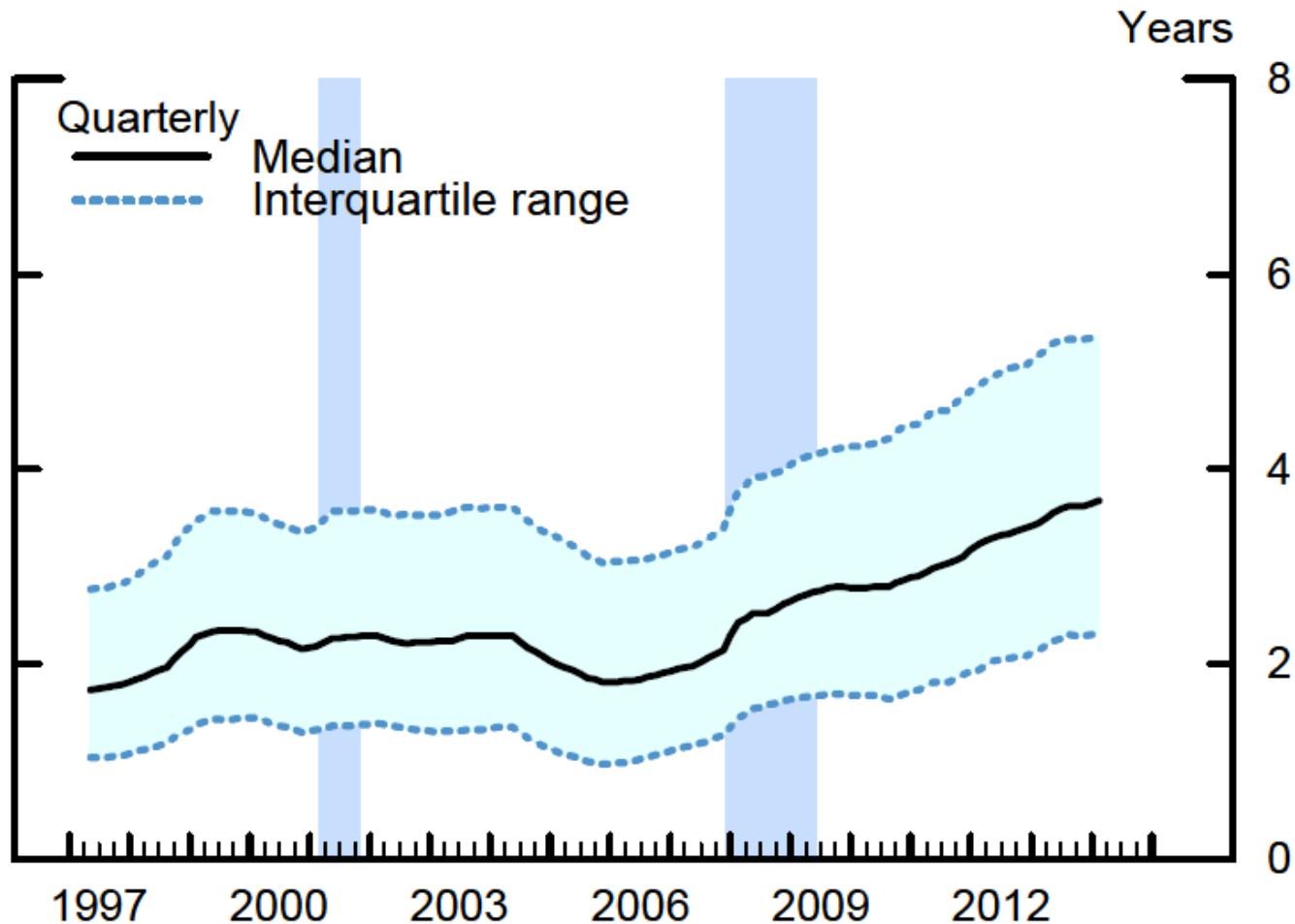
- What some of the key determinants of banks' exposure to interest rate risk?

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.

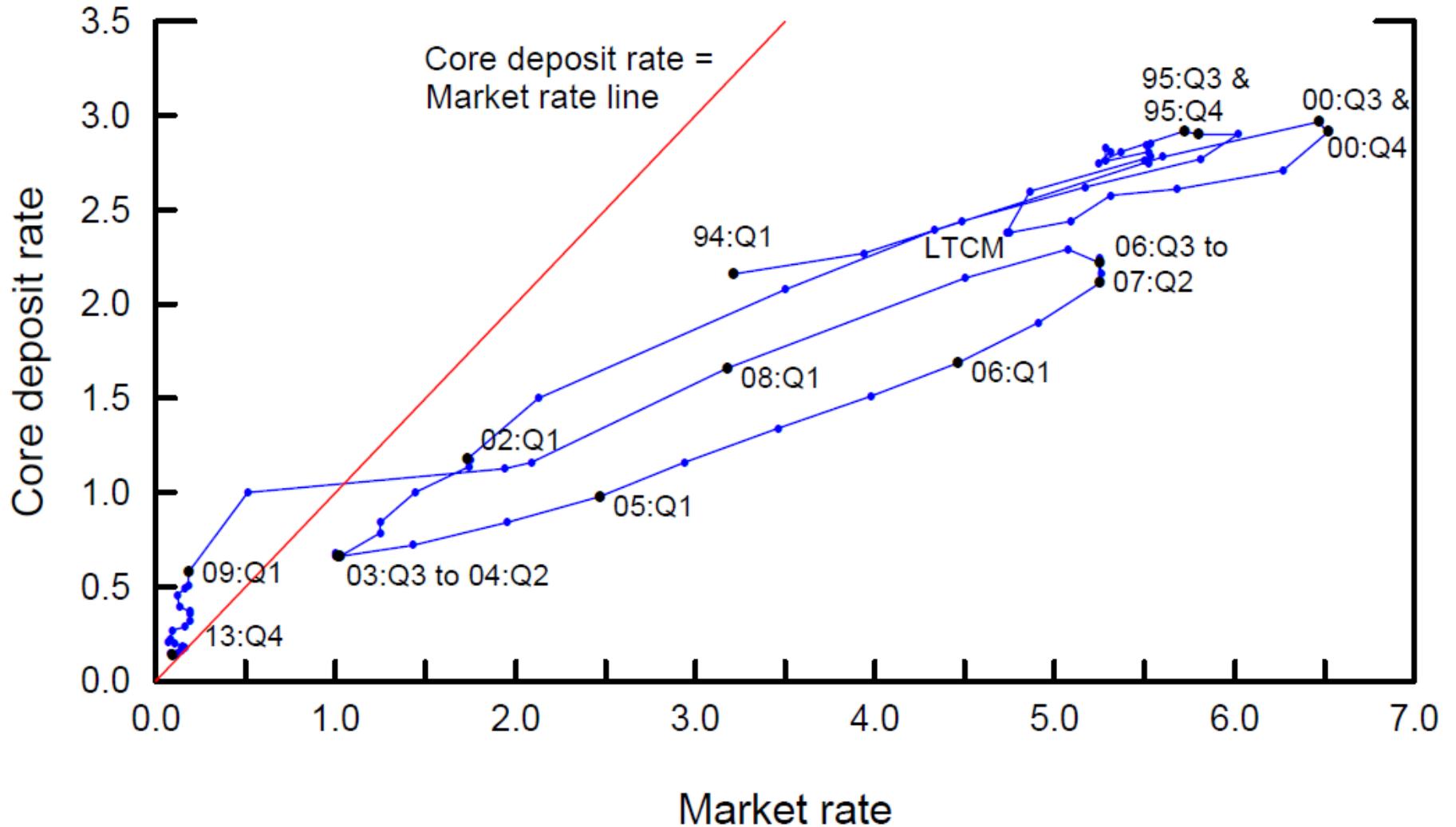
Source: Call Report.

Core Deposits

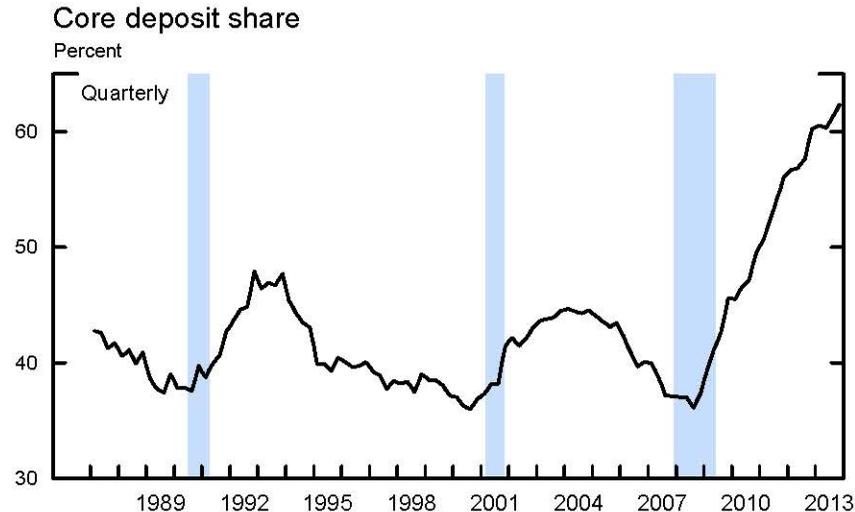
2. Core deposits:

- 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.

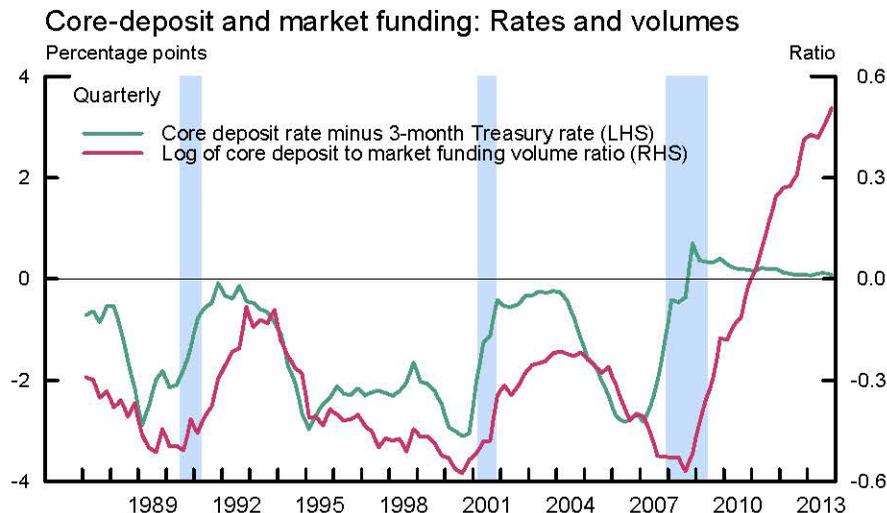
Core deposit rates and market interest rates



Core-deposit volumes and market rates



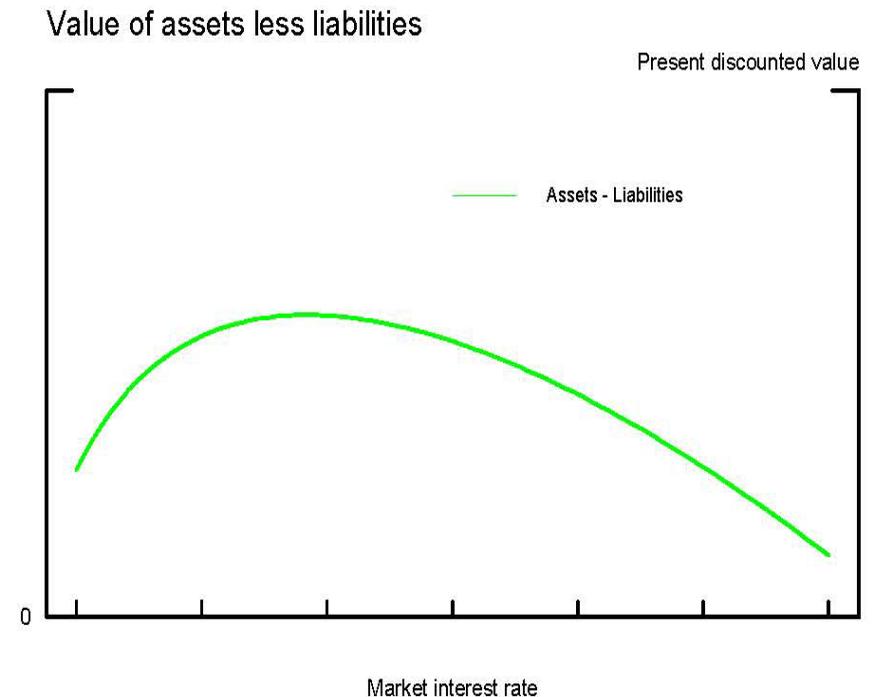
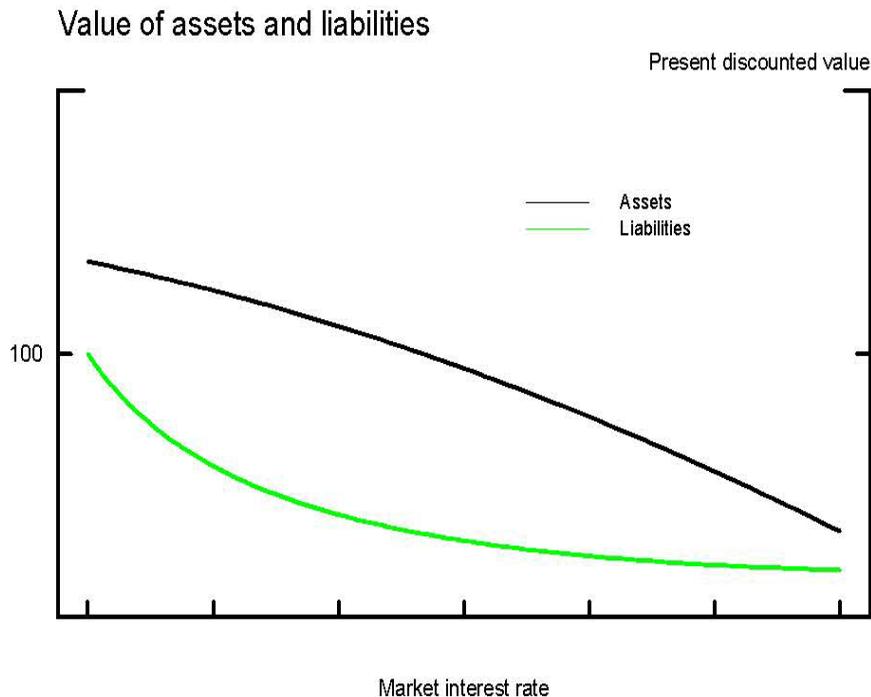
- Many factors account for the current high share of core deposits
 - Current low rates – historically related to core-deposit share
 - Shifts in investor risk preference
 - Change in the FDIC insurance assessment base in 2011



Embedded options in assets

3. Embedded options in assets

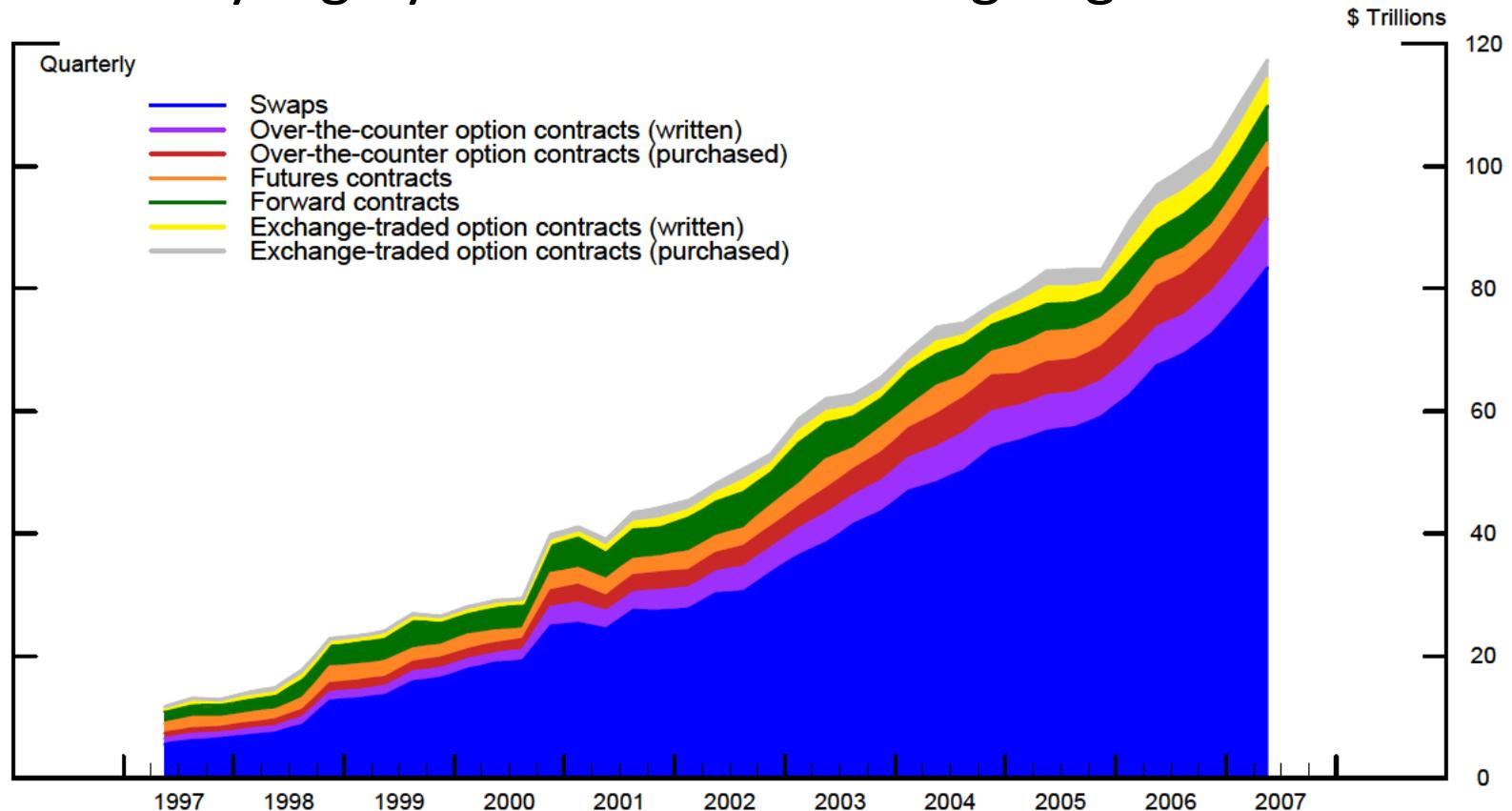
- Importance of mortgage-related assets (pre-payment)
- Duration of 'callable' assets shortens as rates fall



Off-balance sheet

4. Interest rate derivatives

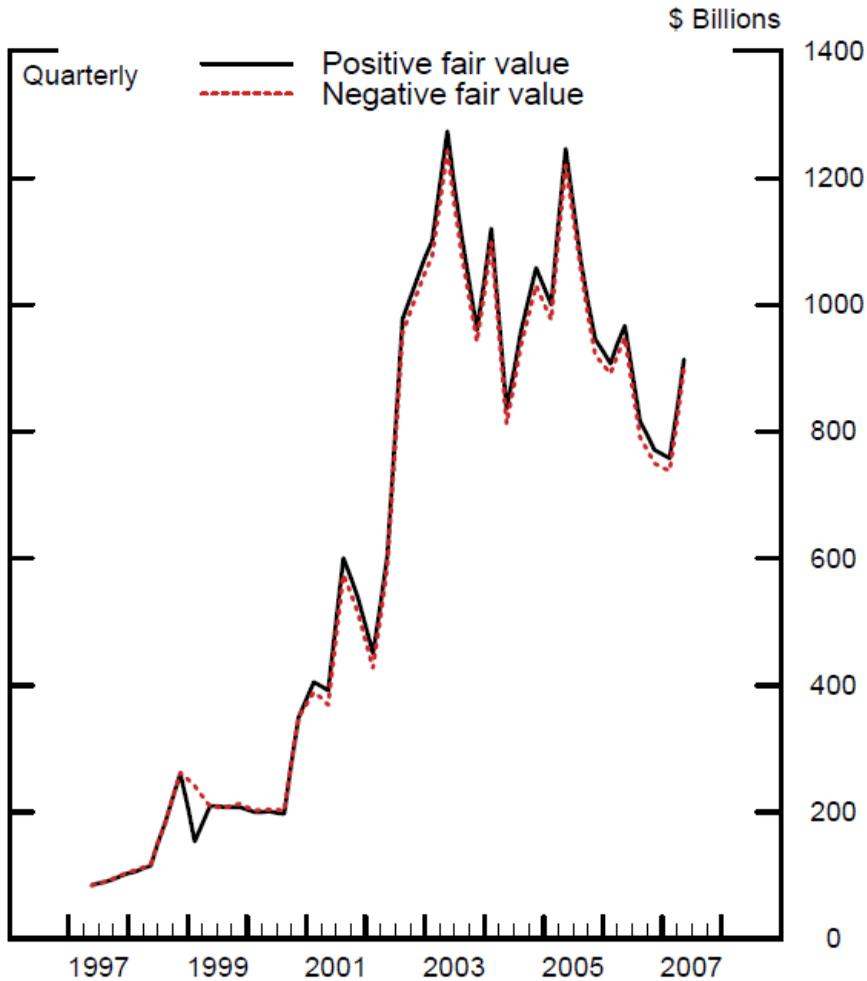
- For hedging, or trading purposes
- Activity highly concentrated among large dealer banks.



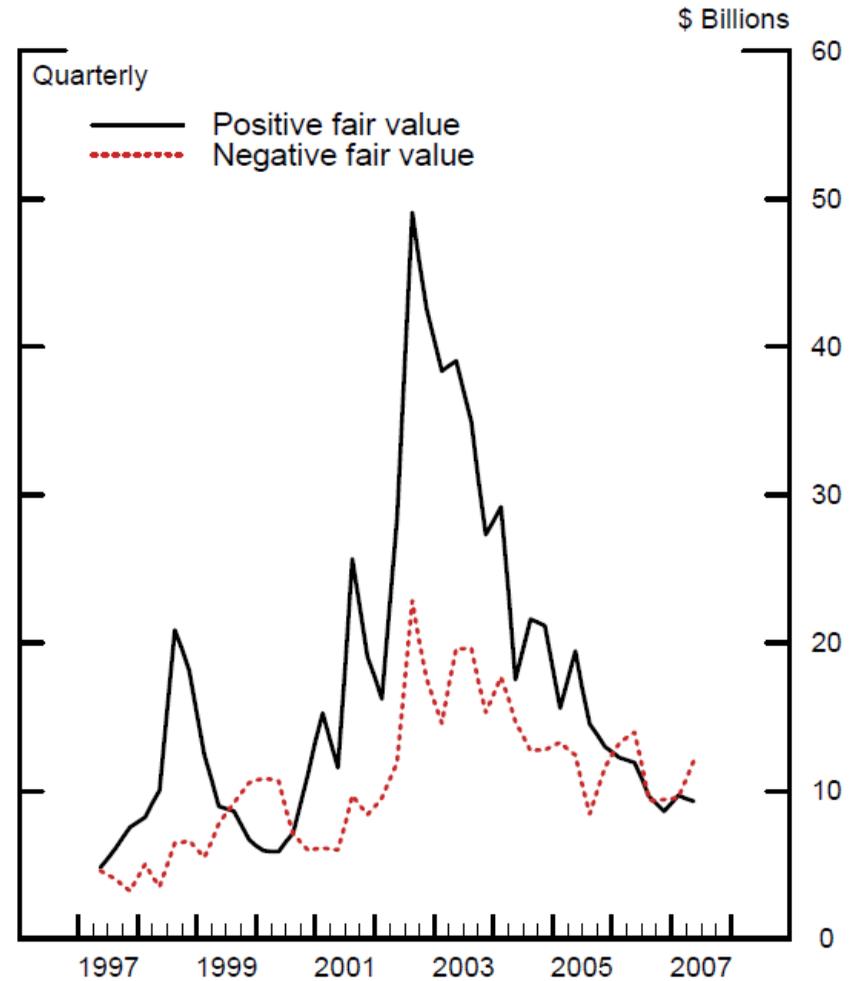
Source: English et al. (2012)

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

Variable × Interest Rate	<i>NII</i>	<i>NNI</i>	<i>ROA</i>	$\Delta \log A$
Level effect (median)	0.088*** (0.014)	-0.015 (0.011)	0.051*** (0.010)	-2.139** (0.879)
Slope effect (median)	0.071*** (0.011)	-0.005 (0.008)	0.037*** (0.008)	-1.830*** (0.618)

- 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.

Interest rate surprise	Effect on bank equity values (in percent, for a 100 bps. surprise)
Level of the yield curve	- 8.6 %
Slope of the yield curve (5-year)	- 4.8 %

Source: English, Van den Heuvel and Zakrajsek [2012]