Interest Rate Risk and Deposits

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Challenges with Modeling Deposits

It is a unique challenge to model deposits across different economic or interest rate environments

All Deposits

- Innovation
  - New products within the banking industry; within our own organizations
  - Technology
  - Competing products outside the traditional banking industry
- Regulation
  - We are subject to dramatic regulatory changes (Reg Q, FDIC charges, LCR, etc.)

Non-maturity Deposits

- Indeterminate maturities
- Administered interest rates

That is a lot of optionality

The deposit business (strategy and more) and therefore risk profile is different for each company

What Matters Most to Interest Rate Risk?

- Growth in aggregate deposits is probably not very impacted by market interest rate levels alone, though relative rates matter…

- Thus we need to understand (and predict) how we price in different rate environments

- And we need to understand (and predict) how our mix changes in different rate environments

- Pricing and mix expectations across scenarios will be unique to each firm based on each firm's customers and strategic choices
  - Results may or may not mirror the past
  - As a modeling and risk management team, we need to stay connected to our lines of business

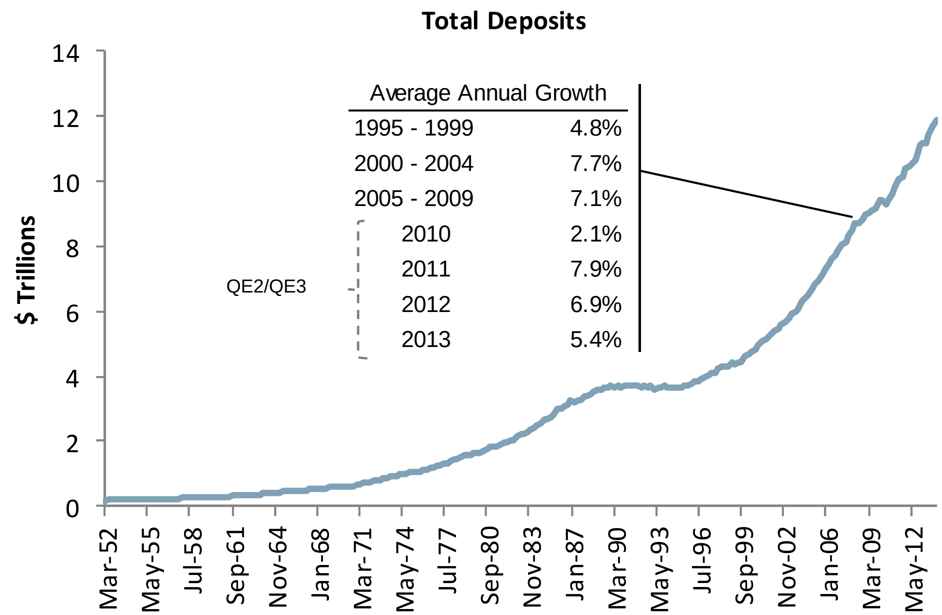
- Assumption sensitivity is important. There is not a single answer, but a range of possible outcomes

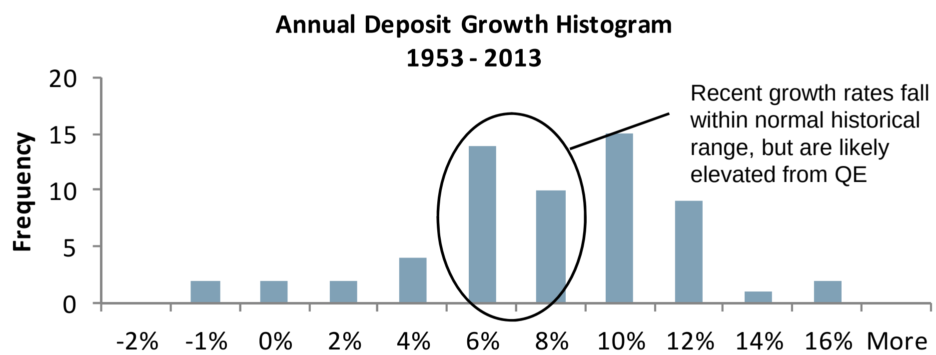
Historical Perspective – National Deposit Growth

There are very few periods in history when total deposit balances have actually declined

National Growth

- Relationship to interest rates?
  - Over 60 years, interest rate levels or changes are not well correlated to *total deposit* growth rates which are almost always positive
- Stock Market Returns? Other asset transfers?
  - The majority of trading transactions do not generate flows into/out of the deposit system (for a buyer, there is a seller resulting in zero net flow)
  - System neutral flows do impact individual banks
  - FRB as counterparty will result in flows into/out of system

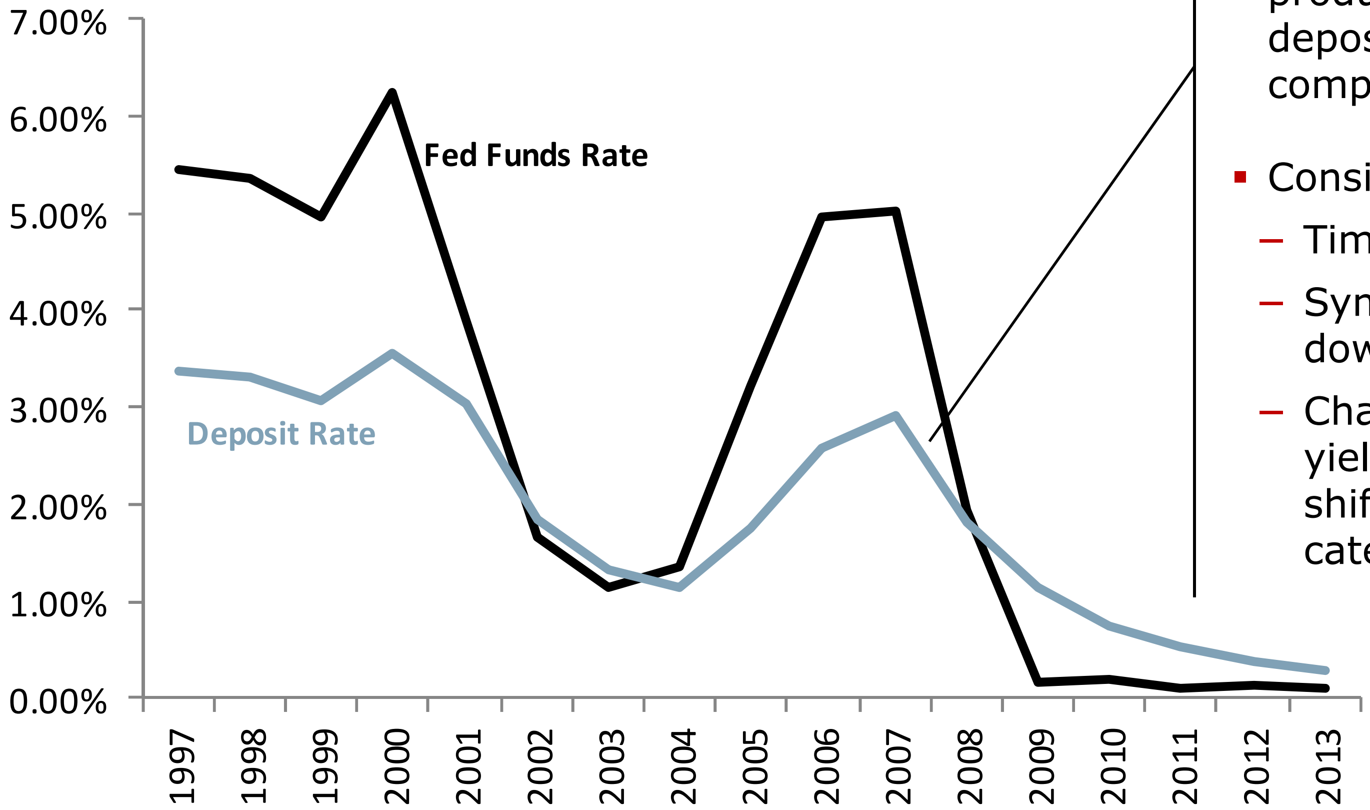




Source for Total Deposits: Federal Reserve Financial Accounts of the United States, table L.109

Historical Perspective – Deposit Rates

However, deposit rates change with underlying market interest rates…

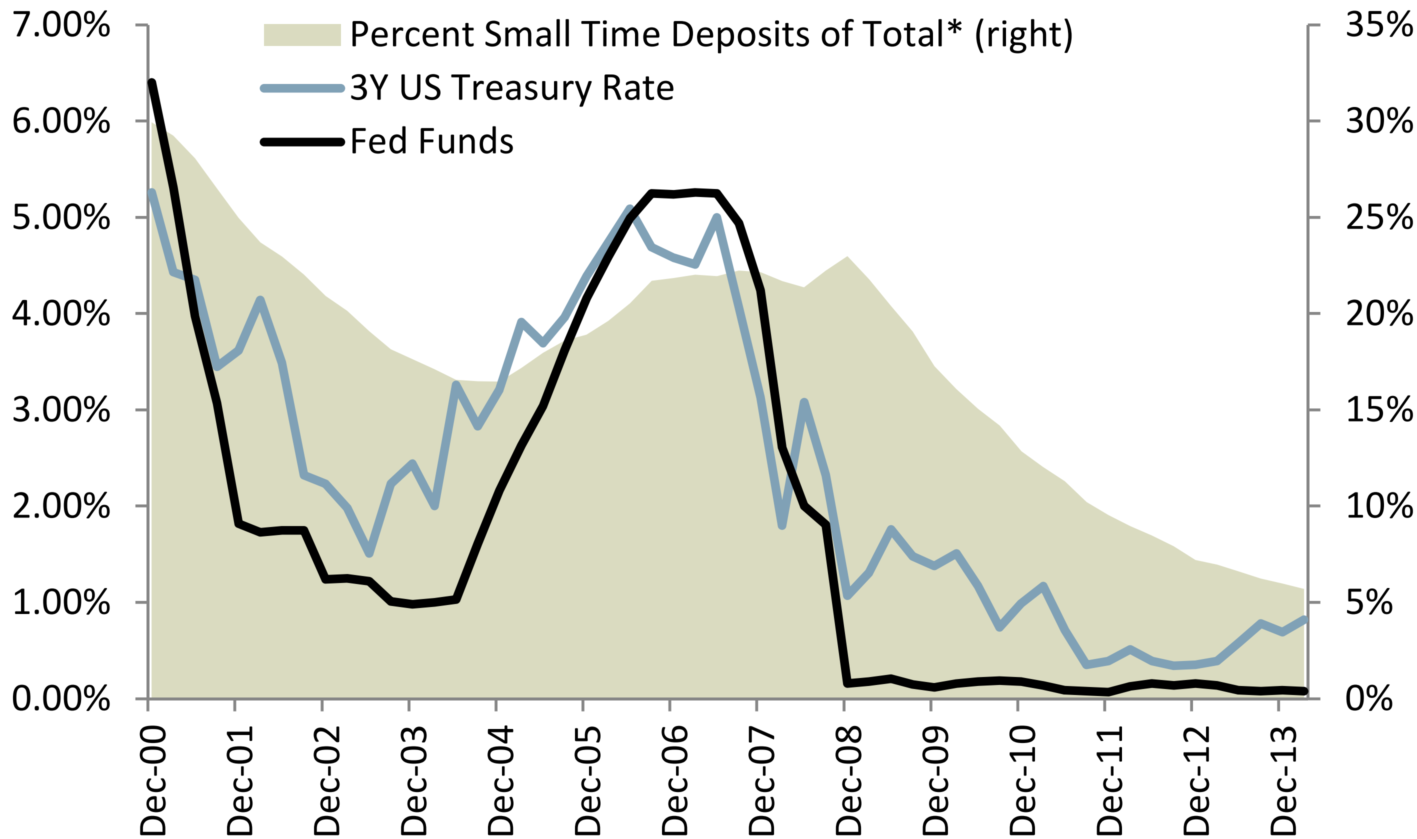


- We observe and model at a product level the "beta", or deposit pricing response compared to market rates
- Considerations:
  - Timing (is there a lag?)
  - Symmetry (up rate vs. down rate beta)
  - Changes in total deposit yields also include mix shifts between product categories

Source for Deposit Rate: FDIC; all domestic depository institutions expense vs. average of FY balances

Historical Perspective – Deposit Mix

And changes in deposit rates incorporate significant deposit mix shifts. For example, in higher rate environments more deposits shift to higher cost categories, both within liquid products and from liquid products to CDs



Source: Federal Reserve H.6: * composite of Demand, Other Checkable, Savings Deposits and Small Time = Total

How Do We Model Deposits in Stress Tests?

Asset-Liability Model

- For PPNR balance sheet and net interest income modeling at Wells Fargo, we use our ALM Framework (QRM implementation)
  - Granularity: 7 major business lines, ~1000 product dimensions
- Business lines own assumptions and models or quantitative tools that produce growth and mix inputs to QRM. Corporate ALM owns the QRM model and control environment and provides effective challenge to business line assumptions (ultimately the challenge process goes beyond Corporate ALM)
- Deposit balances map to >100 deposit product dimensions with different behaviors and/or organizational rollup
- Growth projections generally start with national growth expectations
  - National growth model linked to scenario
  - Where do we stand relative to national?
  - Specific strategies considered
  - Some portfolios or businesses do not follow national trends

How Do We Model Deposits in Stress Tests?

- Pricing of interest bearing indeterminate maturity deposits responsive to short-rates (primarily fed funds or LIBOR)
  - Special consideration if scenario includes market disruptions that could cause normal pricing relationships to break

- Mix is dynamic across scenarios and influenced by market rates across the curve. Higher rates drive deposits into higher costs products, including higher cost liquid deposits and CDs

- Targeted scenarios

- Liquidity stresses

Issues We are Facing

- Will the future look like the past? What is different now?
  - Unprecedented low rate environment has lasted for years
  - Quantitative Easing (QE) has likely led to larger deposit growth in system than would have occurred otherwise – much is held in reserves
  - New regulations (e.g., LCR)
  - Technology

- What are we working on?
  - Corporate deposit customers have a lot of cash. In an improved economy, what happens to these deposits? A shift from one commercial customer to another (e.g., one firm buys equipment from another), and/or do these deposits shift to consumers (e.g., wages)
  - Will there be increased or decreased pricing pressure from:
    - Traditional banking peers? Internet banks? Money Market Mutual Funds?
  - FRB balance sheet strategy and implications
    - Wind-down of QE
    - Reduction of balance sheet? When?
    - Reduction of bank reserves?