Consistent projections of balance sheet, risk-weighted assets, and income

Model Symposium

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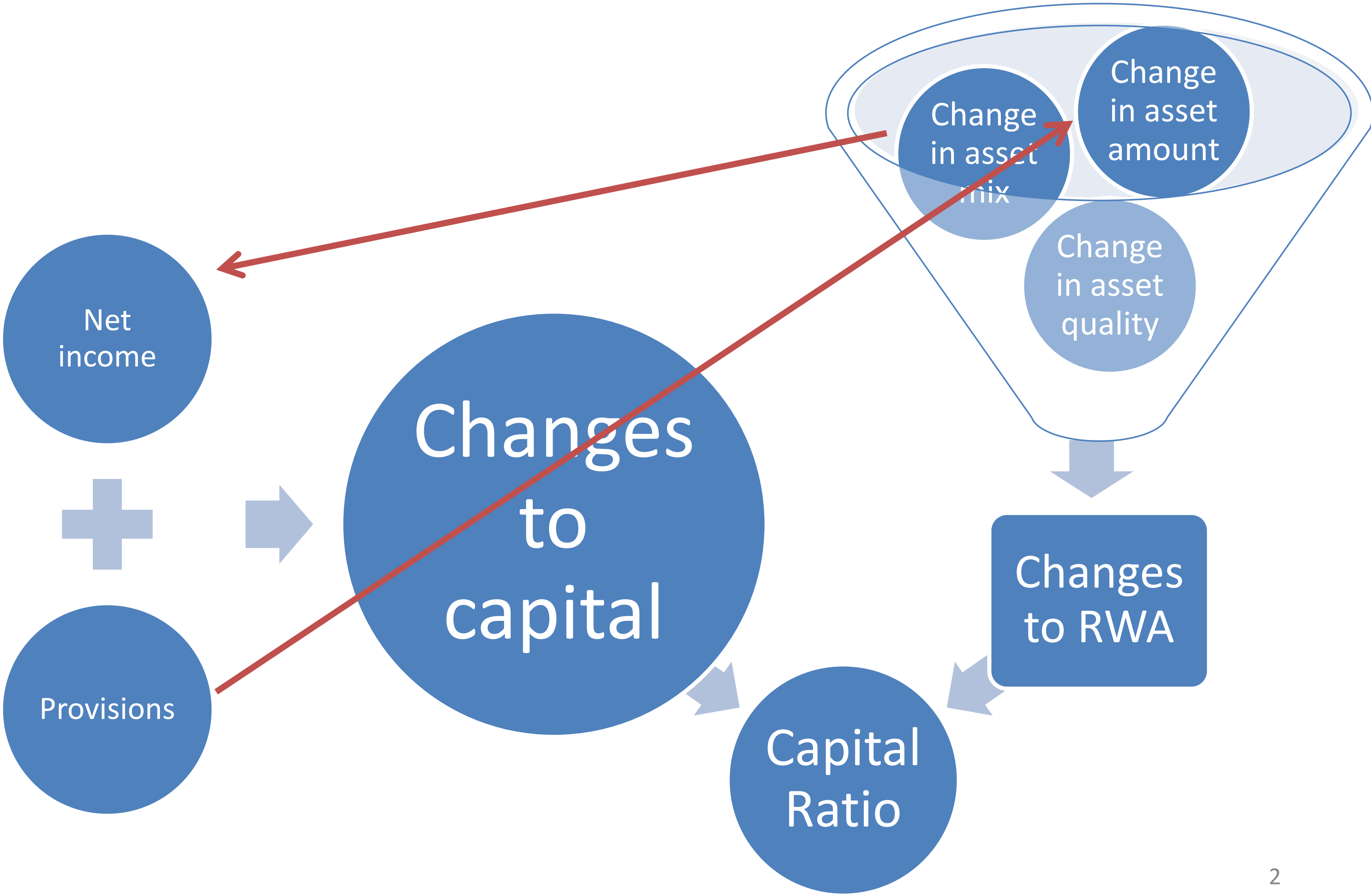
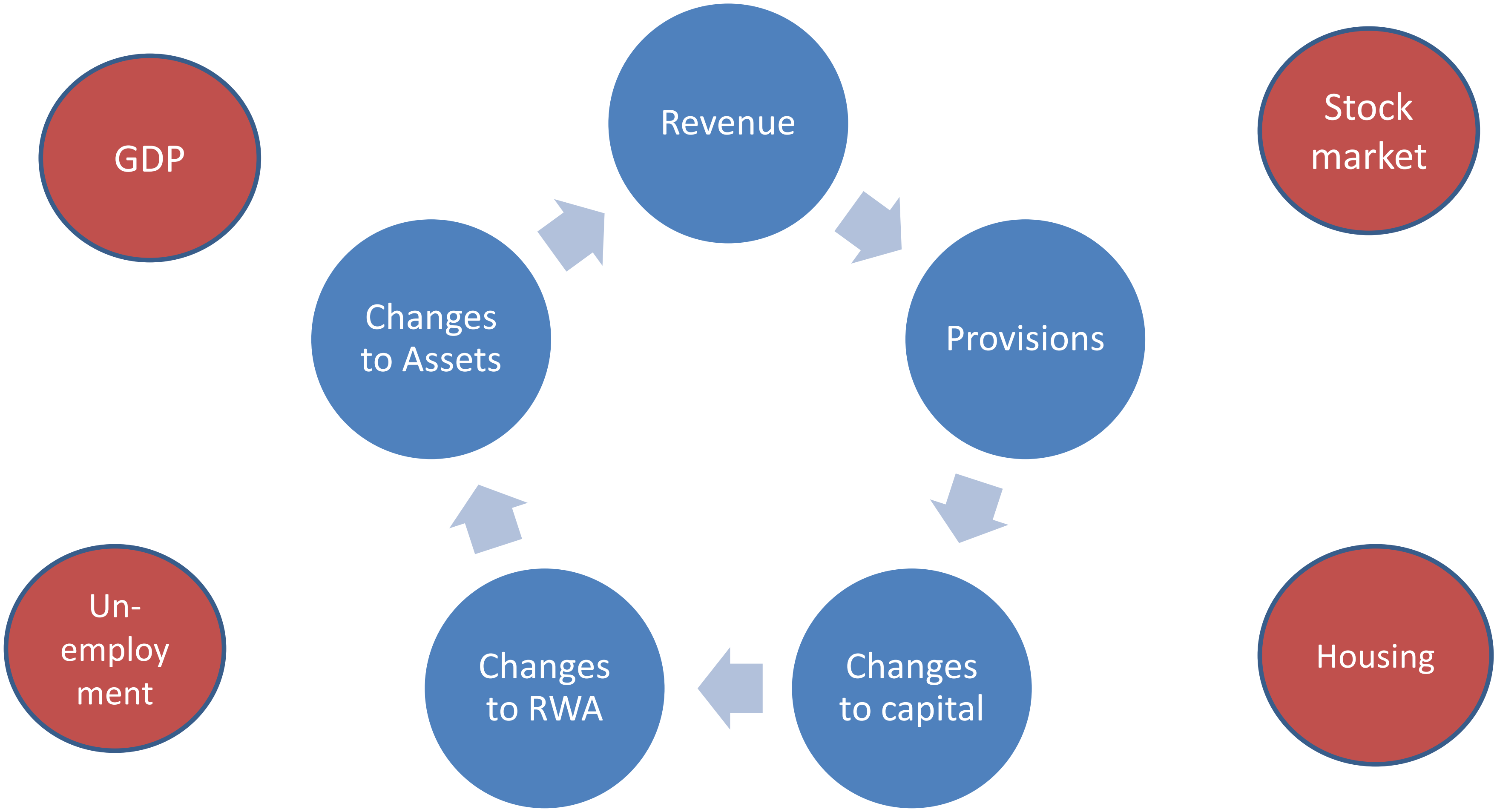
Consistency is hard to achieve



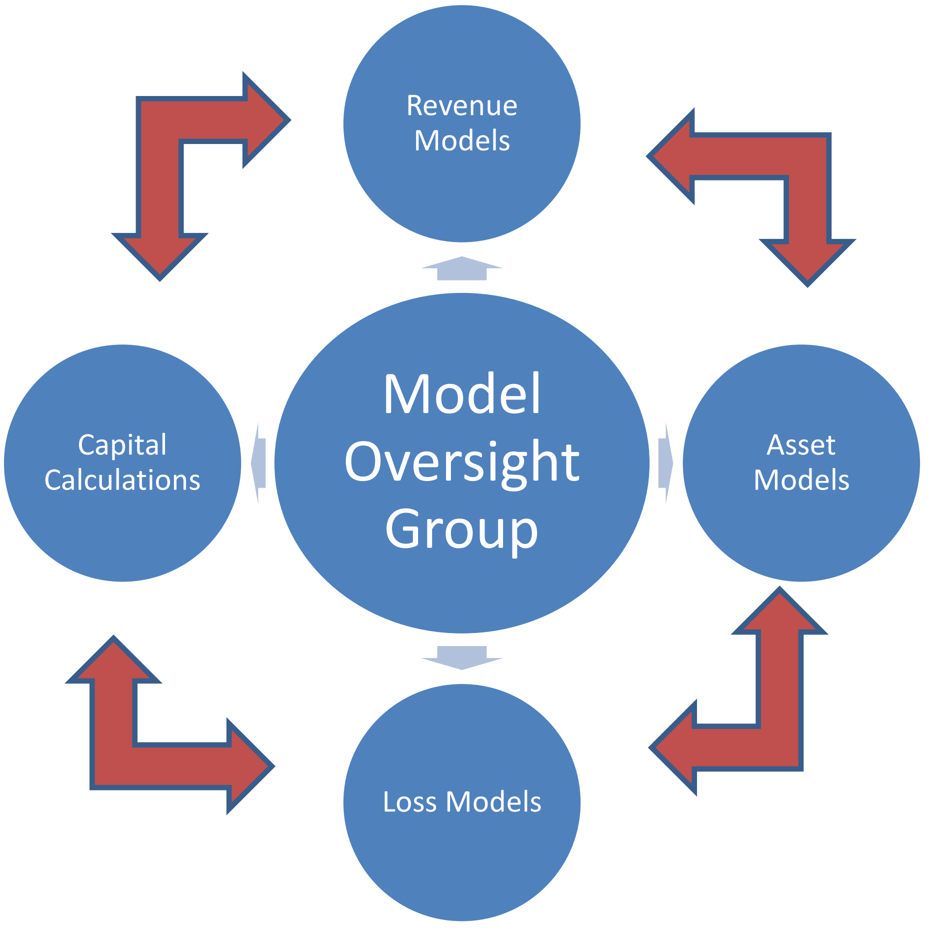
Even before projections need to vary with changes in macroeconomic conditions



But consistency is critical

- If there is no consistency across models, the sum of the parts may be very different from what would occur in an adverse macroeconomic environment
  - Do riskiest borrowers refinance? Are credit standards tightening?
  - Does reducing risk of trading assets impair market making revenues?
  - Is the expectation for interest income in the AFS/Securities portfolio similar to the expectation for interest income when the same assets are directly held?
- If model errors are correlated, the capital forecast will be biased

Federal Reserve Approach I



Federal Reserve Approach II

Model Oversight Group
- Single group reviews all models
- Encourages consistency
- Eg. Connects modeling of MBS exposures in securities book to on balance real estate exposures

Modeling team
- Content experts

Model Validation Unit
- Encourages robust processes

Benchmark Models
- Alternate approaches to same question (eg. top down vs. bottom up, different specifications) can reveal inconsistencies

External Model Validation Council
- Insight from outside of Federal Reserve System on modeling approaches

Consistent, robust models of capital

Consistency across multiple dimensions

Consistent data:

- 18 CCAR BHCs, next including the CAPR firms
- Pro forma for acquisitions where practical

Consistent principles:

- Flight to quality is not consistent with the spirit of a stress test
- Revenues, expenses, assets, and risk weighted assets are linked
  - higher revenues come at a cost; expense cuts may not materialize as planned; growth strategies may not be deployed as planned
- Unexpected negative events may occur

Adapting a budgeting methodology to forecasting a stress case can be difficult

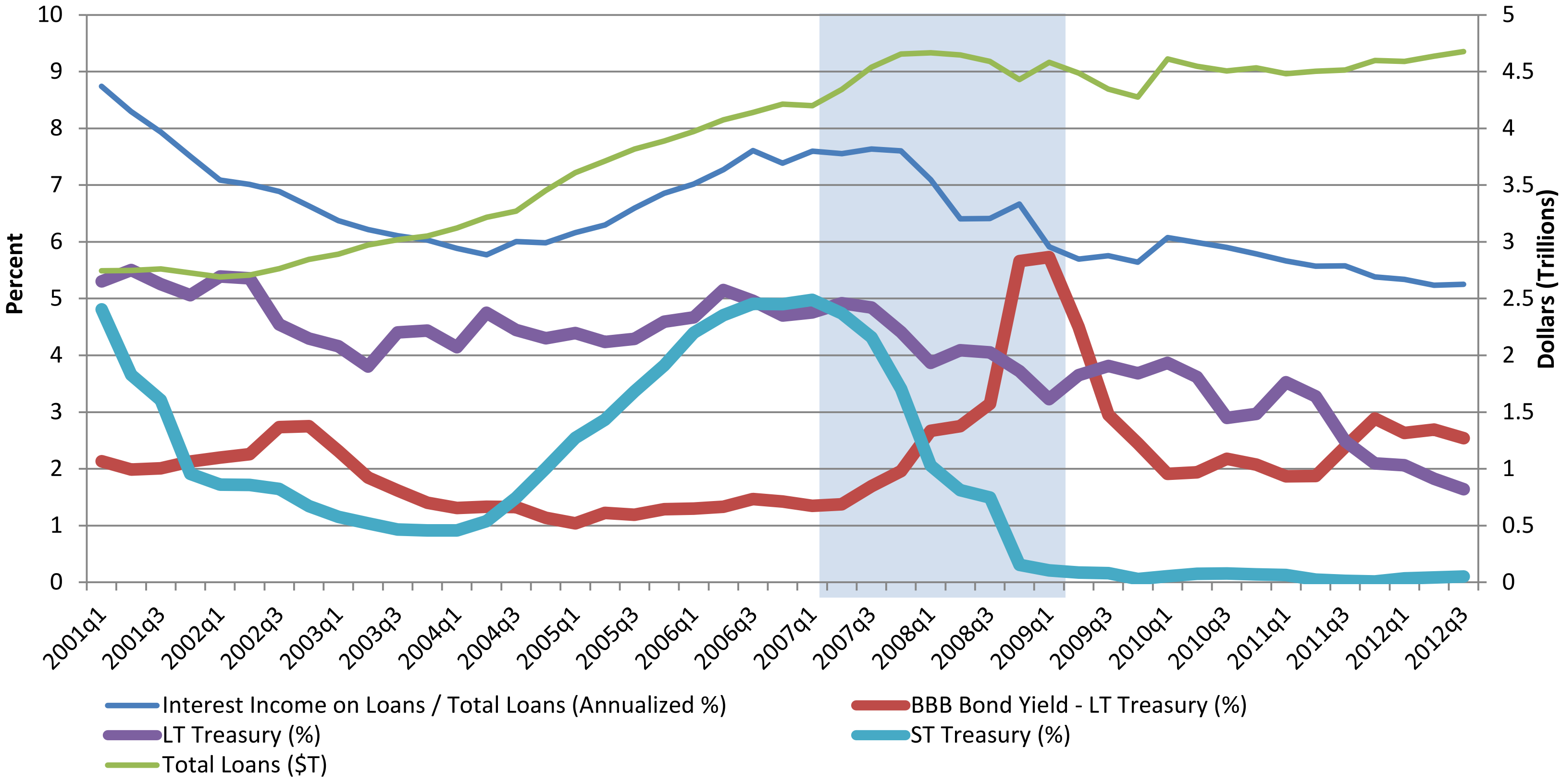
	A	B	C	D	
	Balance	Reference rate	Spread	Rate	Interest income
Borrower B	125			900	A X D
Borrower C	100	LIBOR	75	B+C	A X D
Borrower D	500	PRIME	50	B+C	A X D
Borrower E	300			800	A X D
Borrower F	100	PRIME	50	B+C	A X D
Borrower H	30	PRIME	50	B+C	A X D
Borrower I	100			800	A X D
Total	175				

Balances / Revenues / Provisions

- Severely adverse scenario: Increase in price of risk (BBB spreads), Decrease in LT treasury rates, ST rates remain at lower bound
- What might happen to loans?
  - Interest income:
    - Constant / lower interest income from OLD floating rate loans
    - Assuming constant portfolio risk (including new originations and existing borrower renegotiations) → Higher interest income
    - Assuming risk decreases → Higher or lower interest income
  - Loan balances:
    - Are same borrowers more or less risky? (given adverse macro environment)
    - How are maturing and defaulting loans replaced? (if at all)
    - How do new originations compare to the existing portfolio?
- While next slides show what happened historically, just because we see it 2007-8, doesn't mean it is in the spirit of a stress test

Balances / Revenues / Provisions

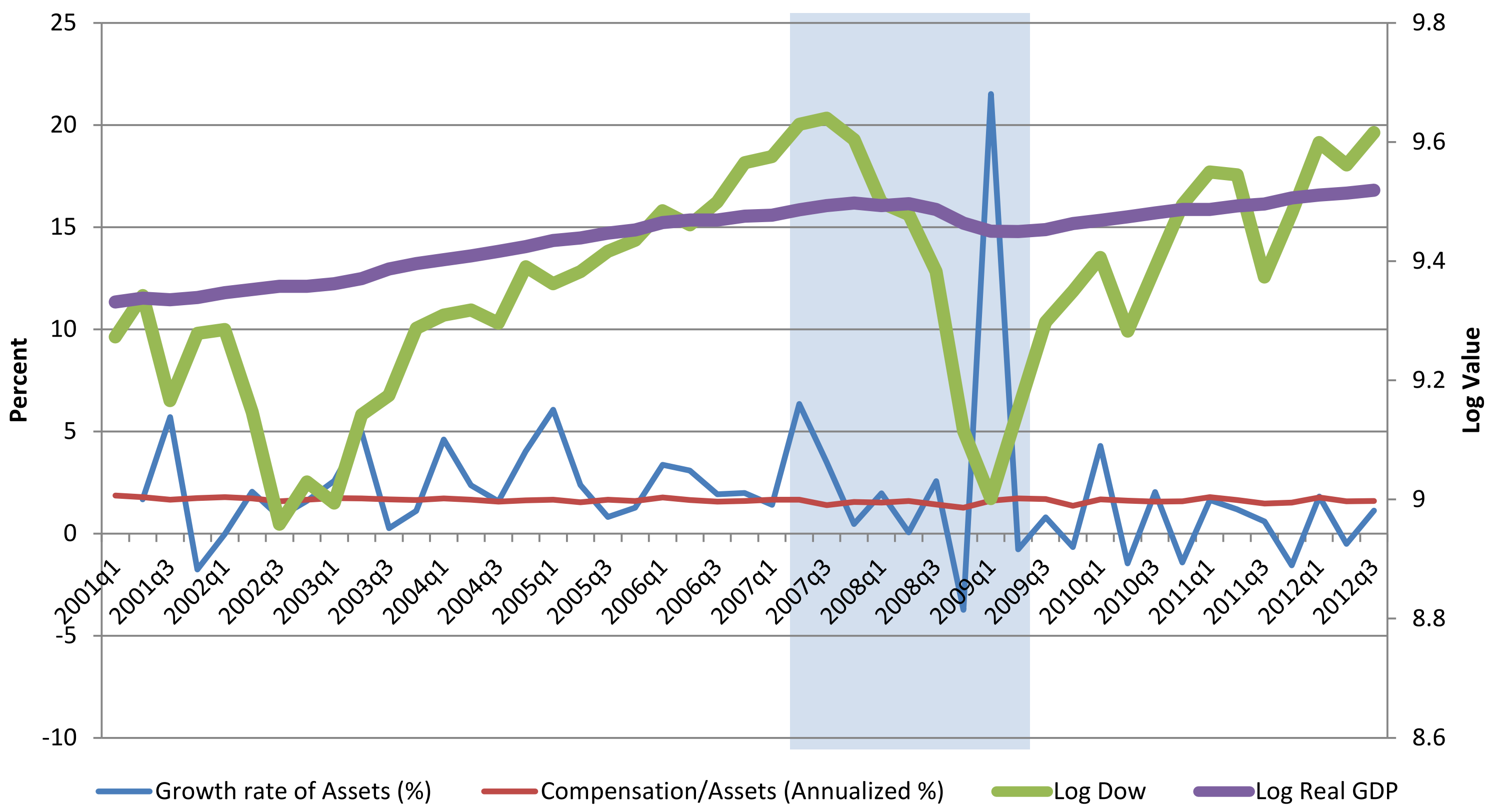
- In aggregate, when price of risk increases, loan balances stop growing and change in price of risk of loan portfolio dominates de-risking in the loan portfolio (coefficient on BBB spread is positive for interest income)



Source: Pro forma adjusted Y-9C data for sum of 18 CCAR firms. Includes firms only as they become Y-9C filers.

Compensation

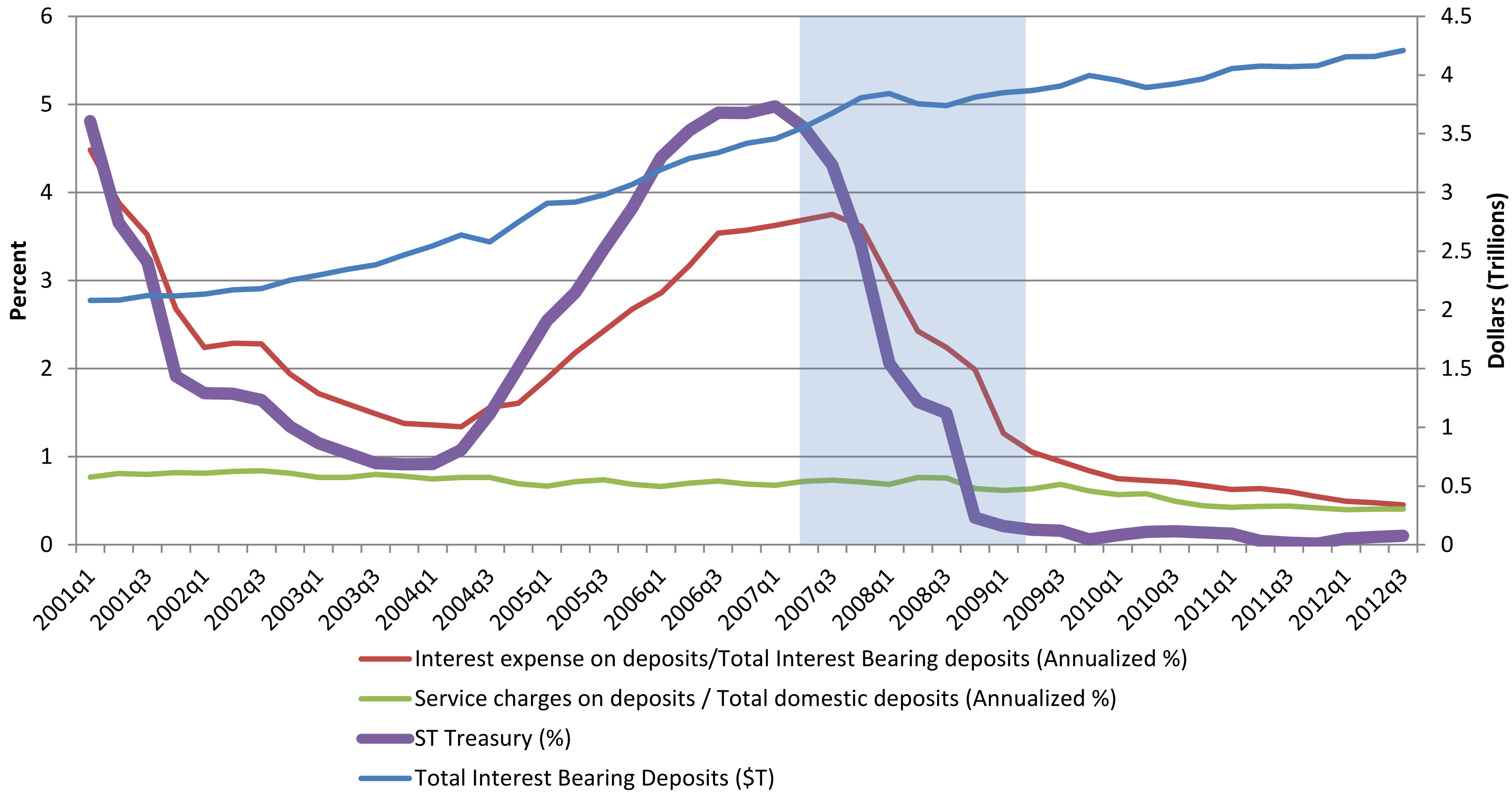
- Compensation to assets has been trending down, but is not nearly as variable as the stock market



Source: Pro forma adjusted Y-9C data for sum of 18 CCAR firms. Includes firms only as they become Y-9C filers.

Deposits

- Deposit rates vary negatively with balances – even after controlling for the fall in ST rates and even in crisis period



Models vs. Expert Judgment

- Hard to evaluate if expert judgment is consistent across models (even if the same expert is doing everything)
- But, unvalidated models may be no better than expert judgment
  - Would we rather be right or consistently, replicably wrong?

BUT

- Experts can be wrong and have been
- Understand how and when different methods produce different answers

Challenges and trade-offs

- Consistency requires additional reviews of all models

Pros

- Deeper understanding of implicit and explicit assumptions
- Challenges and testing of assumptions across models

Cons

- Benefits of expert judgment likely diminished
- Hard to translate some implicit assumptions
- Time and resource intensive

A foolish consistency is the hobgoblin of little minds, adored by little statesmen and philosophers and divines.

Ralph Waldo Emerson