Financial Stability Monitoring

Fernando Duarte
Federal Reserve Bank of New York
March 2015

Lessons from the Crisis about Systemic Risk

1. **Microprudential supervision may not suffice to prevent systemic events**
2. **Systemic risks can emerge during benign periods**
   - Systemic risk built up during the period of low volatility
   - Accounting and risk measurement problems can obscure risk taking
3. **Systemic risk externalities have first order, aggregate effects**
   - Fire sales and effects on the real economy
   - Interconnections transmit distress
4. **Shadow banking system affects core financial institutions**
   - Vulnerability to runs
   - Implicit and explicit guarantees from core institutions to shadow institutions
5. **Aggregate leverage and maturity transformation matter**
   - Financial innovation might increase aggregate risk

Implications of Crisis for Monitoring Financial Stability

Pre-emptive assessment process:

1. Identify possible shocks from scenarios (with caveats)

2. Assess amplification mechanisms:

   – Transmission channels and vulnerabilities in the financial system (structural or cyclical) that could transmit and amplify possible shocks

3. Evaluate how these vulnerabilities could amplify shocks, disrupting financial intermediation and impairing real economic activity

Broad Monitoring Framework

1. **Asset Markets**

   The risk of abrupt reversals in asset values tends to increase when the pricing of risk is compressed

2. **Banking Sector**

   Firms are considered systemically important because their distress or failure could disrupt the functioning of the broader financial system and inflict harm on the real economy

3. **Shadow Banking**

   Shadow banks (and chains) provide maturity and credit transformation without public sources of backstops and represent systemic risks due to their connections to other financial institutions

4. **Non-financial Sector**

   Linkage of financial sector to real economy is via the provision of credit

Monitoring Vulnerabilities in Different Sectors

	A. Price of risk	B. Leverage	C. Maturity and liquidity transformation	D. Interconnections and complexity
(1) Asset markets	Asset valuations	Investor leverage	Carry trades Mutual funds & ETFs Broker-dealers	Derivatives and counterparties
(2) Banking sector	Risk taking in credit Underwriting standards	Bank capital ratios Market measures of risk Stress tests	Bank liabilities	Systemic risk Intra-financial assets & liabilities
(3) Shadow banks, Financial markets	Securities issuance Underwriting standards	Broker-dealer capital Securitization New products Capital arbitrage Hedge funds	Broker-dealer liabilities Agency REITs ABCP conduits Repo markets Sec sending MMFs, STIFs	CCPs
(4) Non-financial sector	Underwriting standards	Debt-to-GDP Leverage	Reliance on ST debt	

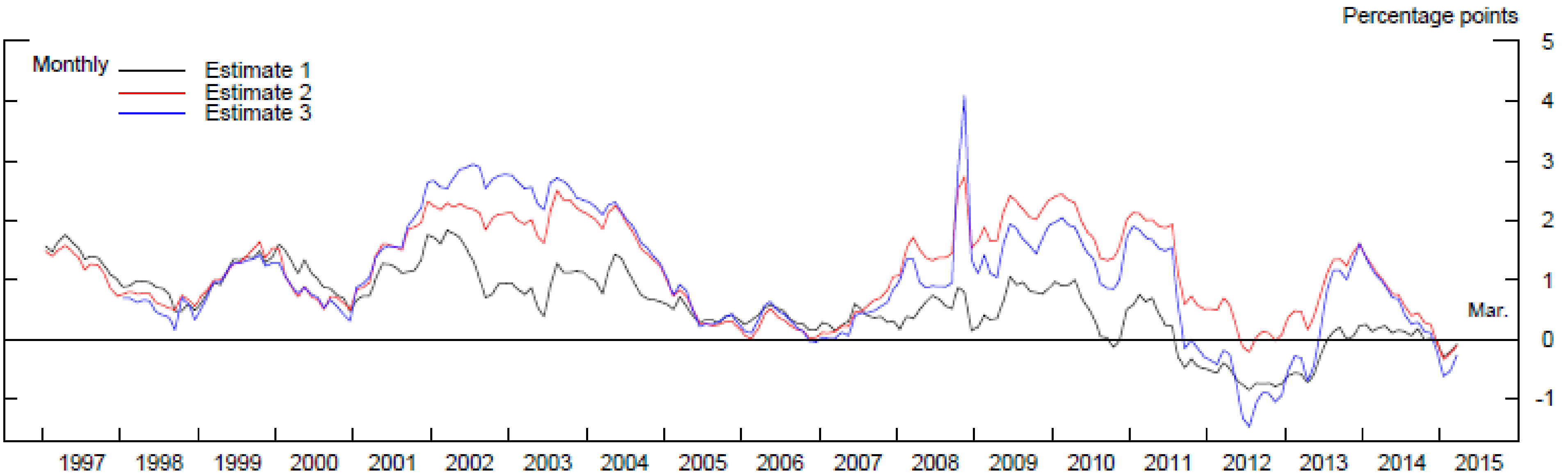
1. Monitoring Asset Markets

Potential for Destabilizing Drops in Asset Prices

- Inflated asset valuations in booms increase the risk of asset price crashes in busts
- Price and non-price measures of potential bubbles, extremely low volatility

Monitoring Asset Markets: Treasury Term Premia

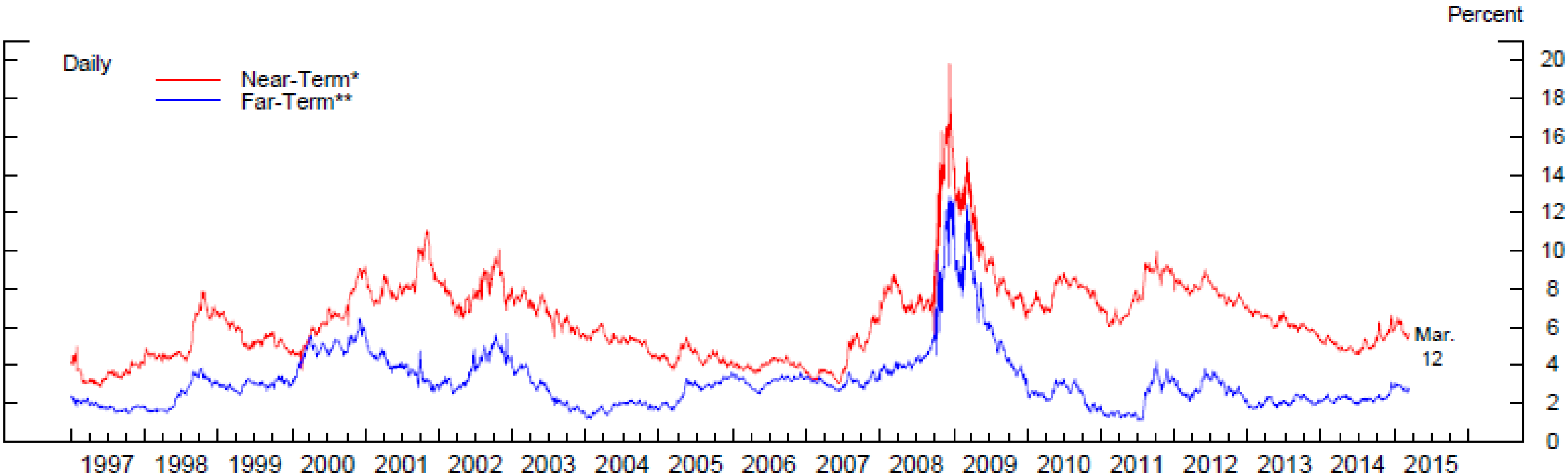
Ten-Year Nominal Yields and Term Premium Estimates



Note: For estimate 1, term premiums are estimated by a three-factor term structure model combining Treasury yields with interest rate forecasts from the Survey of Professional Forecasters (Kim and Wright 2005); for estimate 2, the premiums are estimated by a four-factor term structure model using Treasury yields only (Adrian, Crump, and Moench 2008, revised 2013); for estimate 3, the premiums are estimated by a three-factor model using Treasury yields only (Christensen, Diebold, and Rudebusch 2009).

Monitoring Asset Markets: Forward Credit Spreads

High-Yield Near- and Far-Term Corporate Bond Spreads

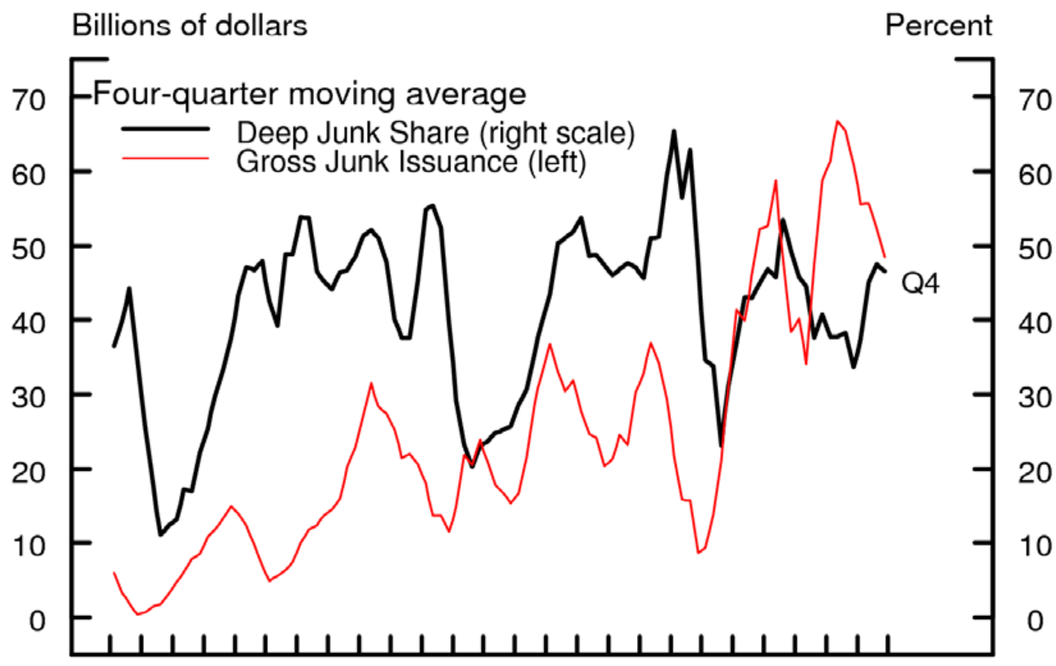


* Near-term spread between years two and three.

** Far-term spread between years nine and ten.

Source: Federal Reserve staff estimates based on a curve fit to bond-yield data from Bank of America Merrill Lynch Global Research, Bank of America Merrill Lynch Bond Indices via MarkitHub.

Monitoring Asset Markets: Junk Bond Issuance



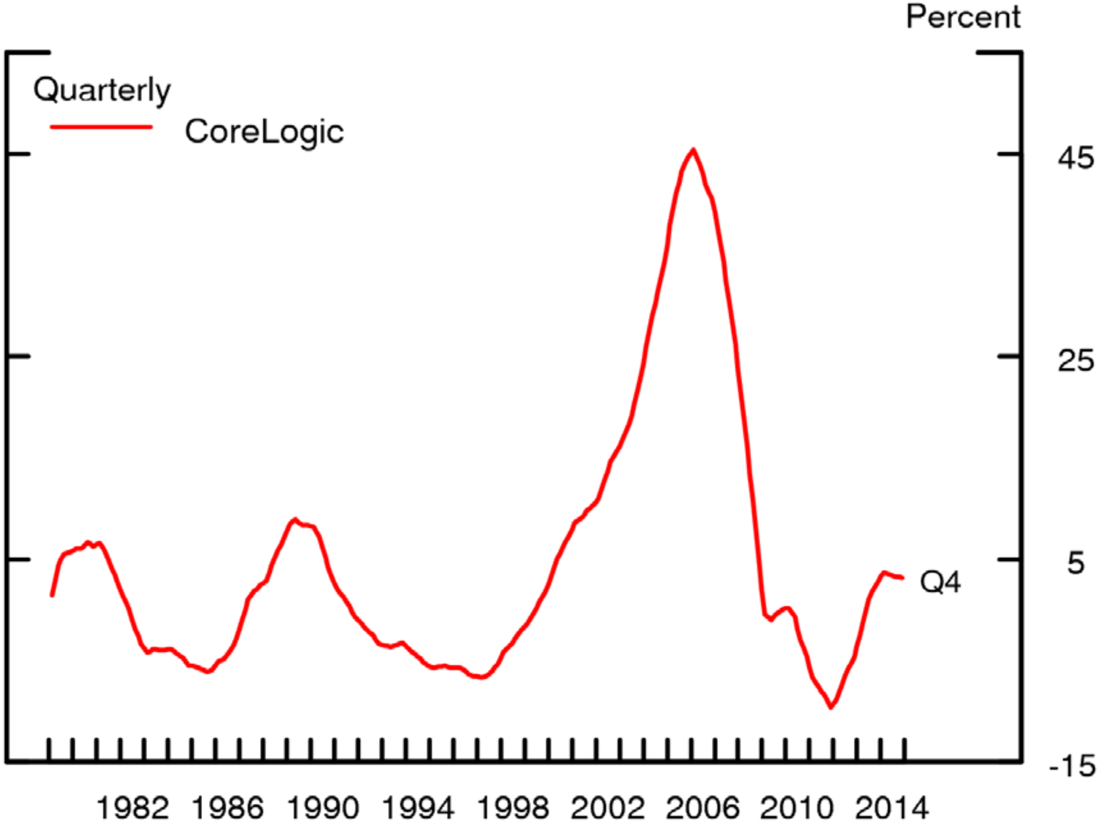
Note: Deep Junk Share is the fraction of bonds rated B- or lower over total nonfinancial junk issuance. Gross Junk Issuance includes public, 144a, euro, and MTN issues.

Source: Thomson Reuters SDC Platinum (downloaded on Jan. 31.

Source: Thomson-Reuters

Monitoring Asset Markets: House Price Valuations

House Price Overvaluation Measures

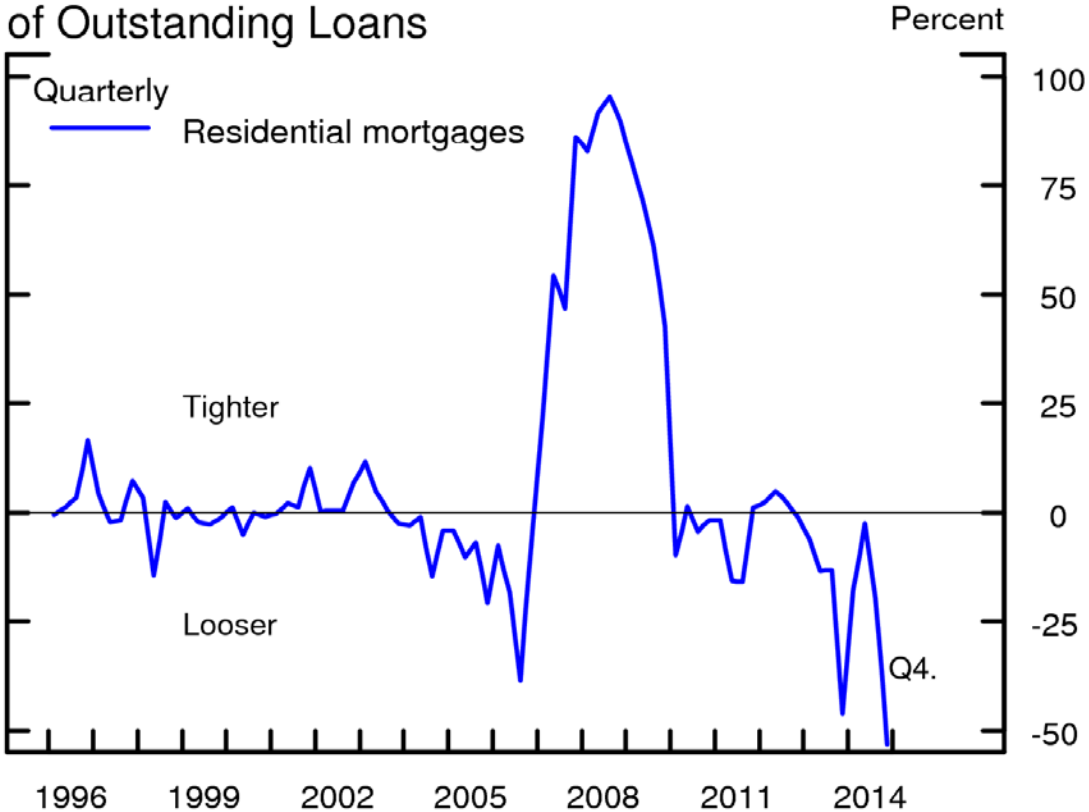


Note. Overvaluation measured as deviation from long-run relationship between house prices and rents.

Source: Staff calculations based on data provided by CoreLogic.

Monitoring Asset Markets: Lending Standards

Loan Standards, Weighted by Value of Outstanding Loans



Note: Net percent of banks reporting tightening standards.
Source: Senior Loan Officer Opinion Survey on Bank Lending Practices.

2. Banking Sector Monitoring

Measures of default risk

- Capital and leverage ratios; off-balance sheet commitments
- Stress test results (CCAR) – best forward-looking measure
- Market-based measures
  - CDS, sub-debt bond spreads
  - Stock prices, price to book, market equity capitalization, market betas

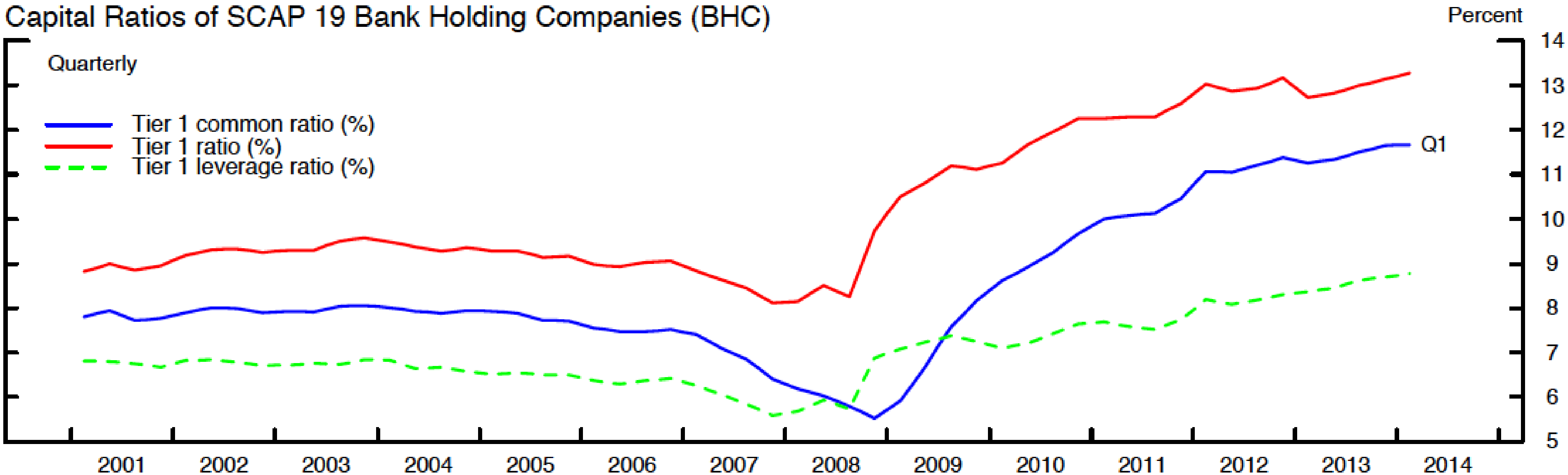
Measures of liability risk: runs and funding squeezes, cross border

Measures of systemic importance

- Size, interconnectedness, complexity, and critical services
  - Interconnectedness: Intra-financial assets and liabilities, counterparty credit exposures
  - Complexity – business lines; number of legal entities; countries of operation
- Market-based measures of systemic risk – CoVaR, SES, DIP
  - Adrian and Brunnermeier (2008), Huang, Zhou, Zhu (2009), Acharya et al (2010)

Monitoring Banks: Capital Ratios

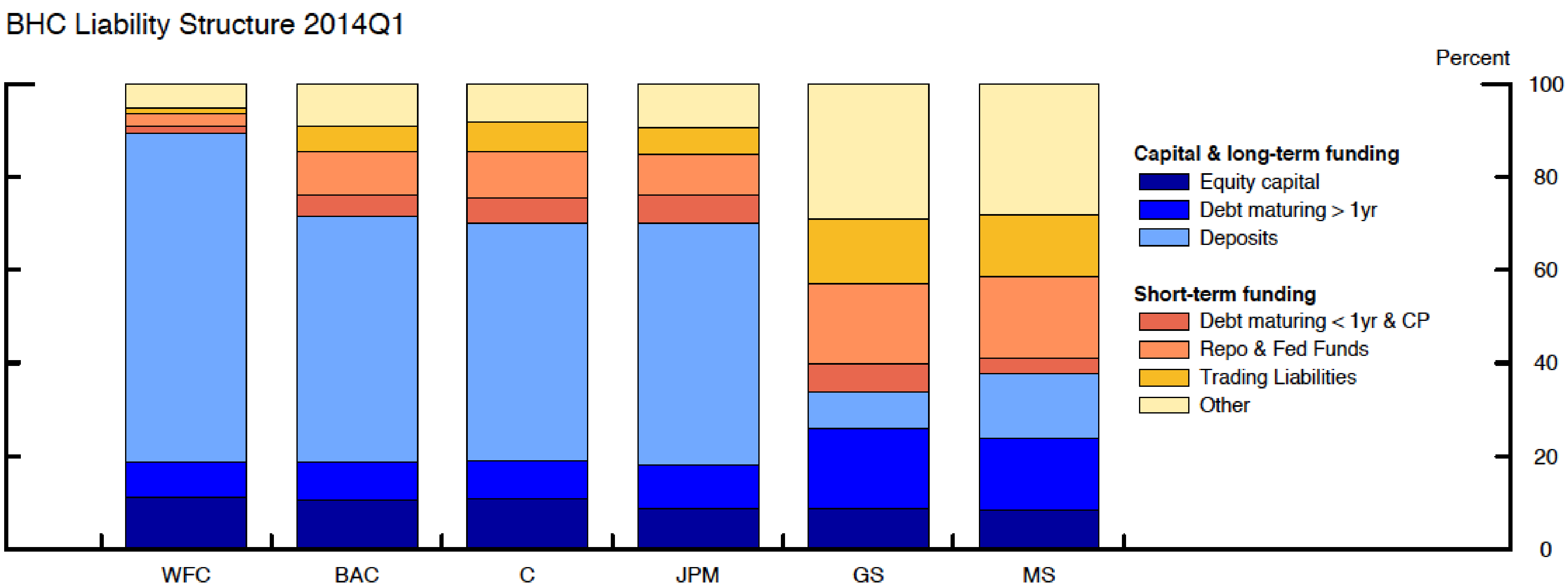
Capital Ratios of SCAP 19 Bank Holding Companies (BHC)



Note: In May 2009, 19 BHCs were assessed in the Supervisory Capital Assessment Program (SCAP). In this chart, GS, MS, Ally, and Amex are excluded prior to 2009, as they were not yet bank holding companies. MetLife is no longer a BHC and is excluded from 2012Q4 and 2013Q1 calculations.

Source: FR Y9-C.

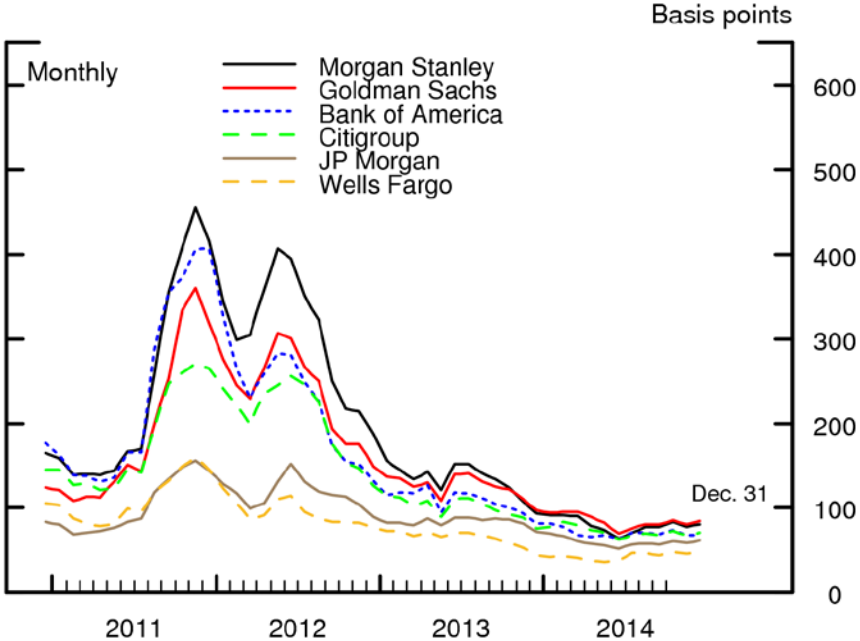
Monitoring Banks:
BHC Liability Structure



Source: FR Y-9C.

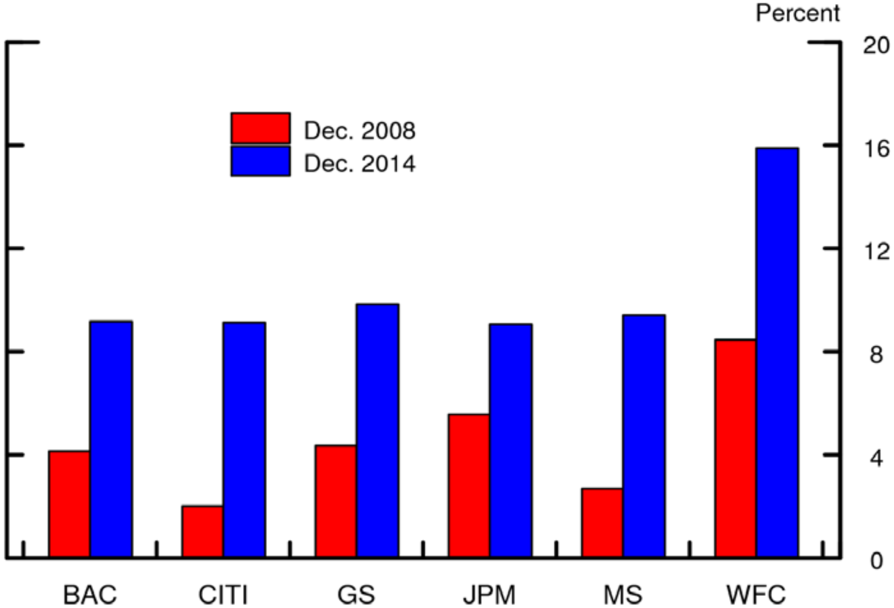
Monitoring Banks:
CDS Premiums and Market-based Capital Ratios

5-Year CDS Premiums for Select U.S. Banks



Source: Markit Group Limited: Markit CDS.

Market Capital Ratios for BHCs

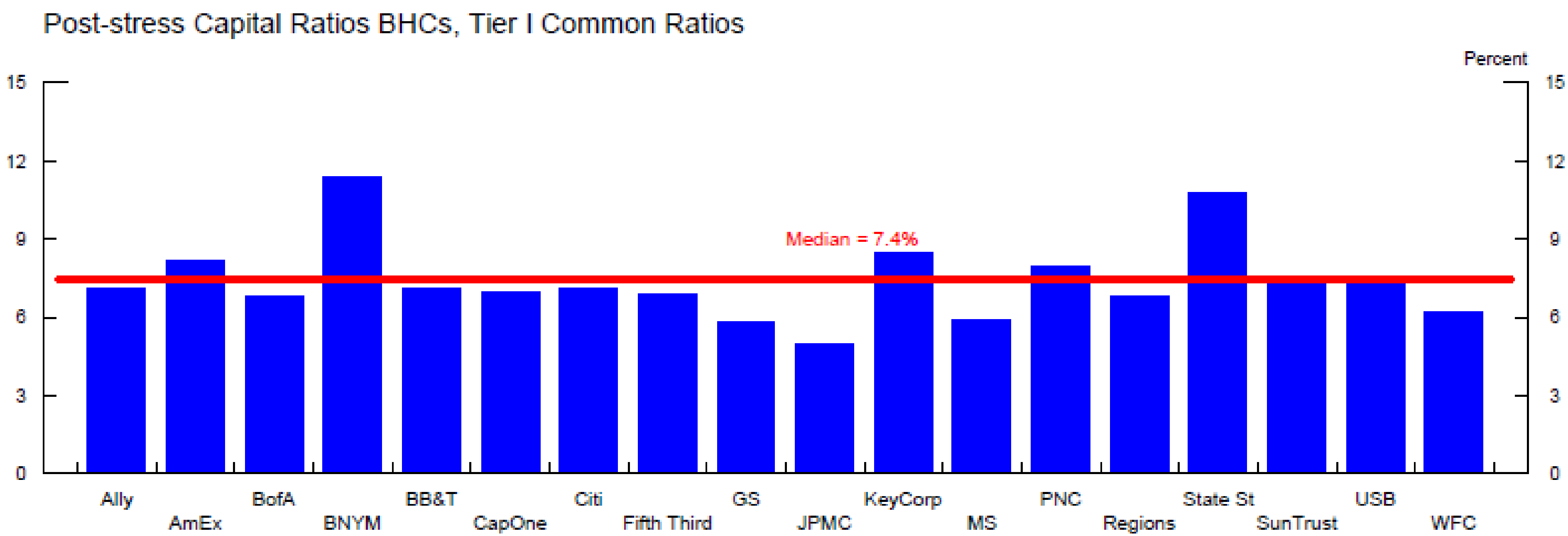


Note: Ratios are market value of common equity to estimated market value of assets.

Source: Staff calculations from Bloomberg data.

Monitoring Banks:

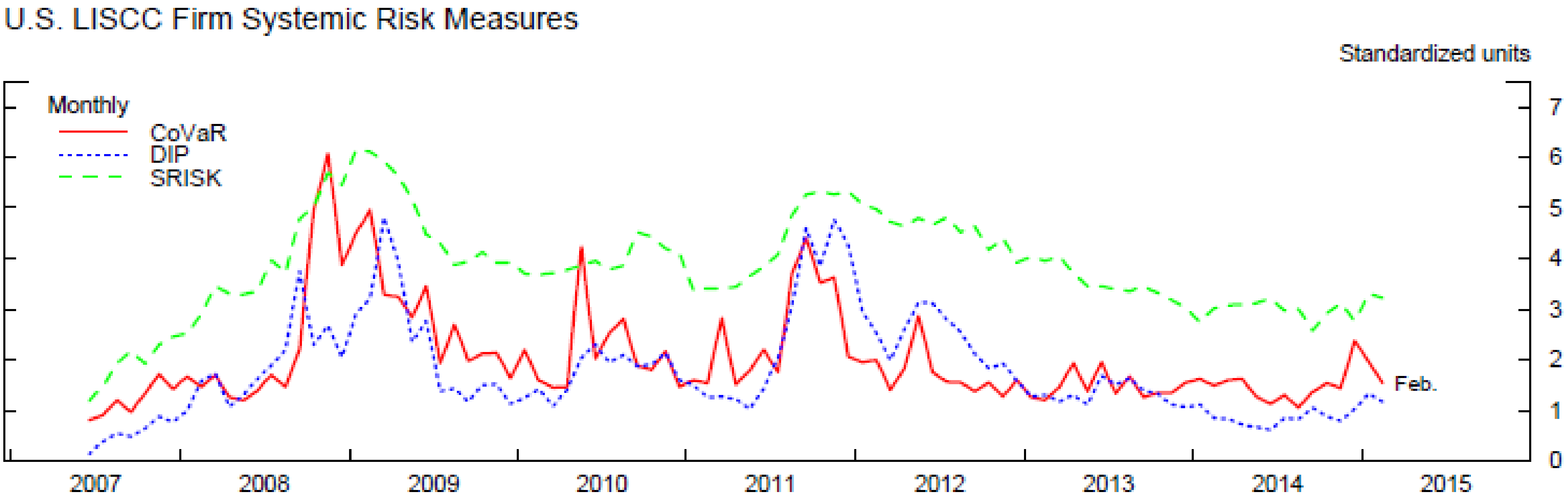
Minimum Tier 1 Common Ratio in the Supervisory Stress Scenario (%)



Note: Data represent minimum stressed ratios with original planned capital actions for severely adverse scenarios. The chart and its median line represent 18 firms that are among the largest banks in the stress test.

Source: Federal Reserve estimates from the 2014 Comprehensive Capital Assessment Review (CCAR).

Monitoring Banks:
Market Based Systemic Risk Measures



Note: Each risk measure is averaged across the six largest LISCC BHCs (Bank of America, Citigroup, Goldman Sachs, JP Morgan, Morgan Stanley, and Wells Fargo). Each resulting time-series is then re-scaled by its standard deviation.

Source: Data used in the calculations of the measures are from Bloomberg, Moody's Investors Service, Markit, and Compustat.

3. Shadow Bank Monitoring

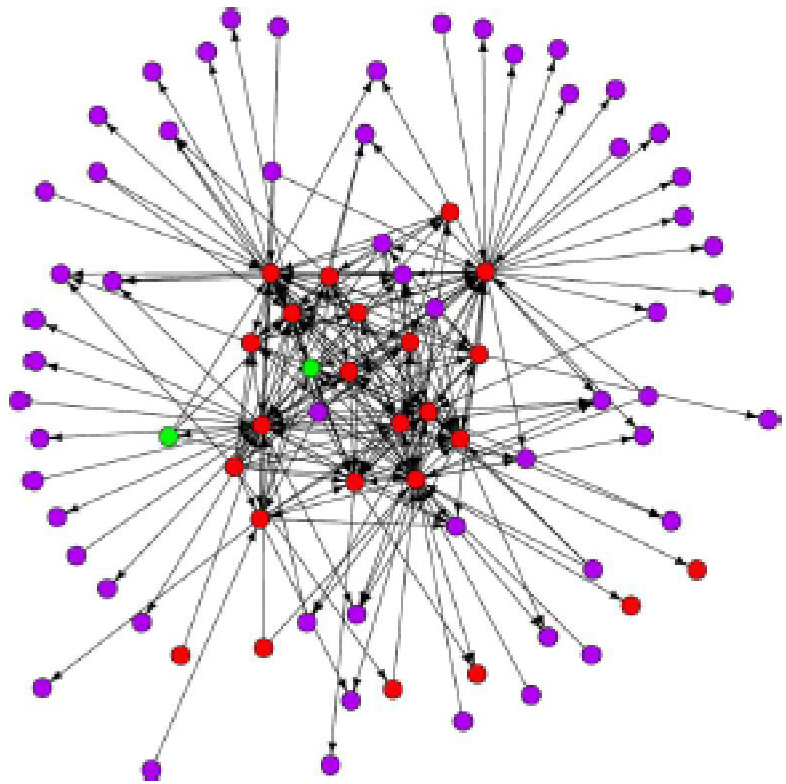
Leverage Cycle, Maturity Mismatch, and Run Risk

- Measures of leverage in financial system (including on and off balance sheet exposures)
- Measures of maturity mismatch and vulnerability
- Hedge funds, insurers, pension funds, and other financial firms that are not SIFIS
- Activities not backed by government backstops: MMFs, cash pools, securities lending / repo activities, velocity of collateral, securitization

New Products

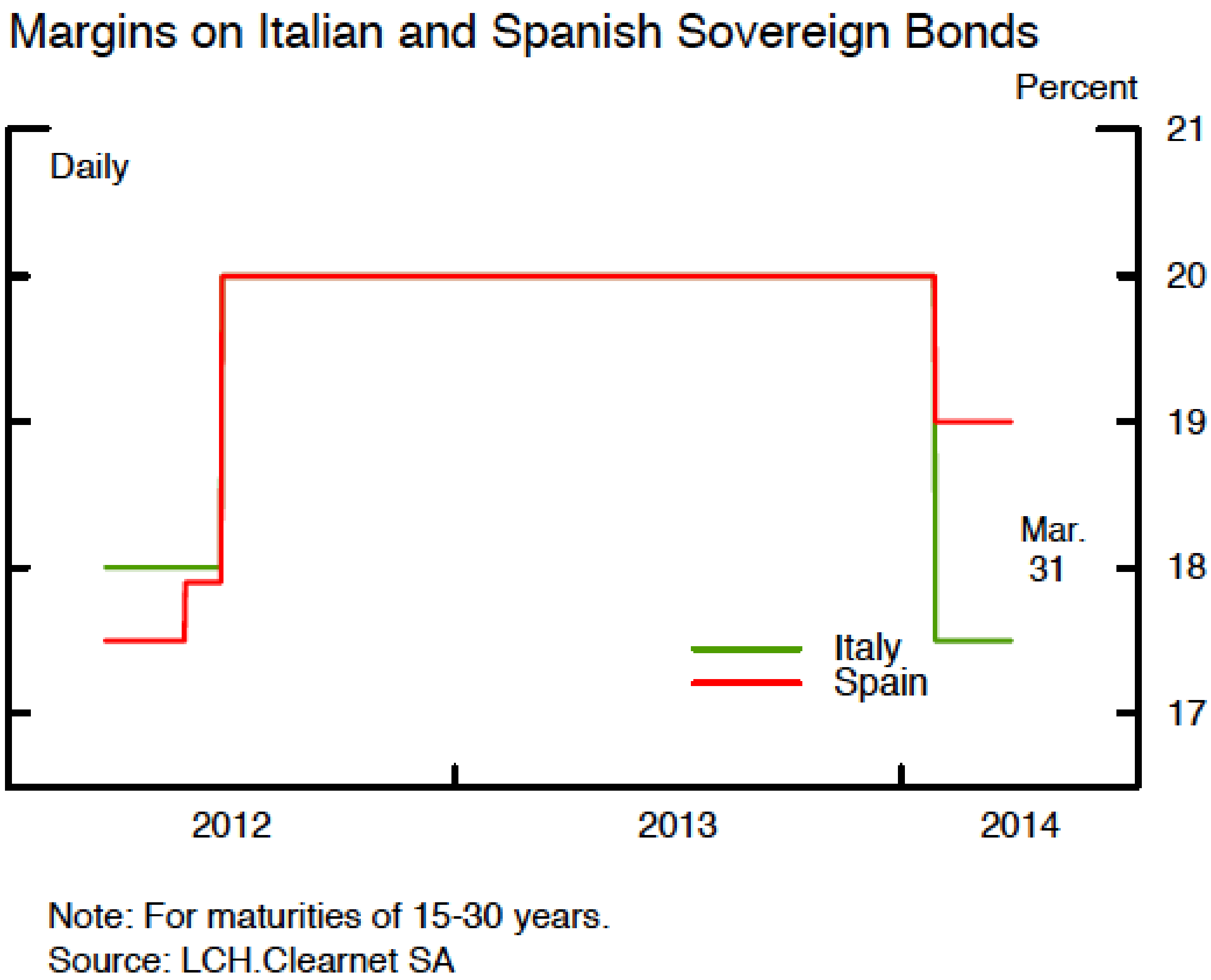
Monitoring Shadow Banking: Interconnectedness

Interconnectedness of CCPs, Dealers, and Non-dealers in CDS



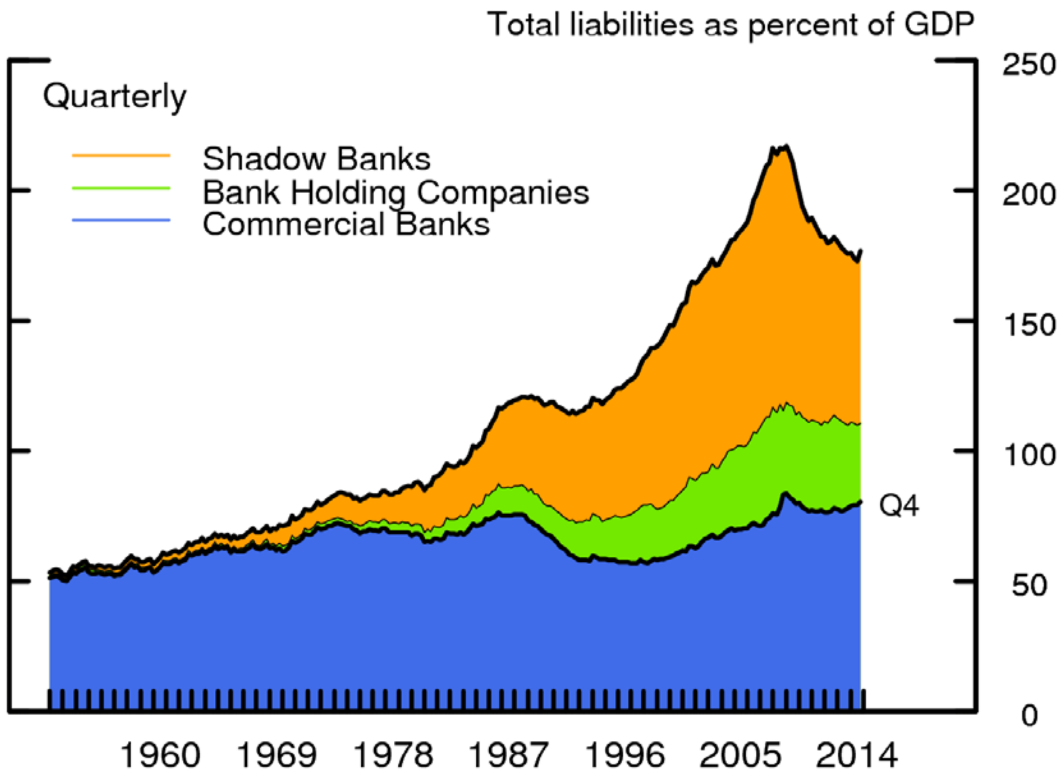
Source: Chelso Brunetti and Michael Gordy, June 2012.

Monitoring Shadow Banking: Margins



Monitoring Shadow Banking: Shadow Banking

Financial Sector Liabilities

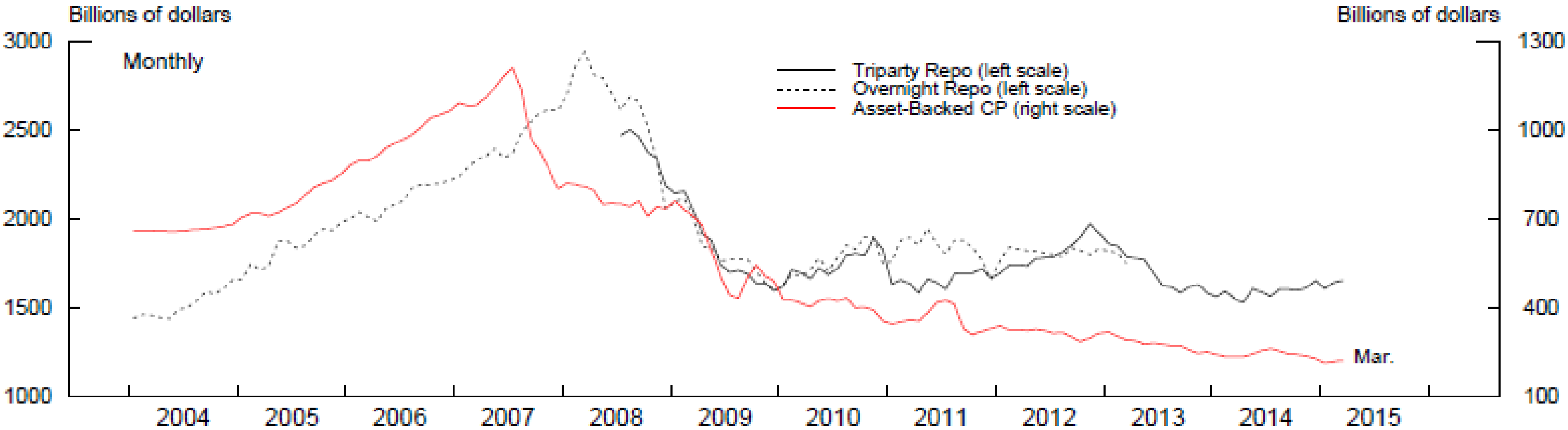


Note: Bank Holding Company liabilities include the liabilities of Broker Dealers.

Source: Federal Reserve Flow of Funds.

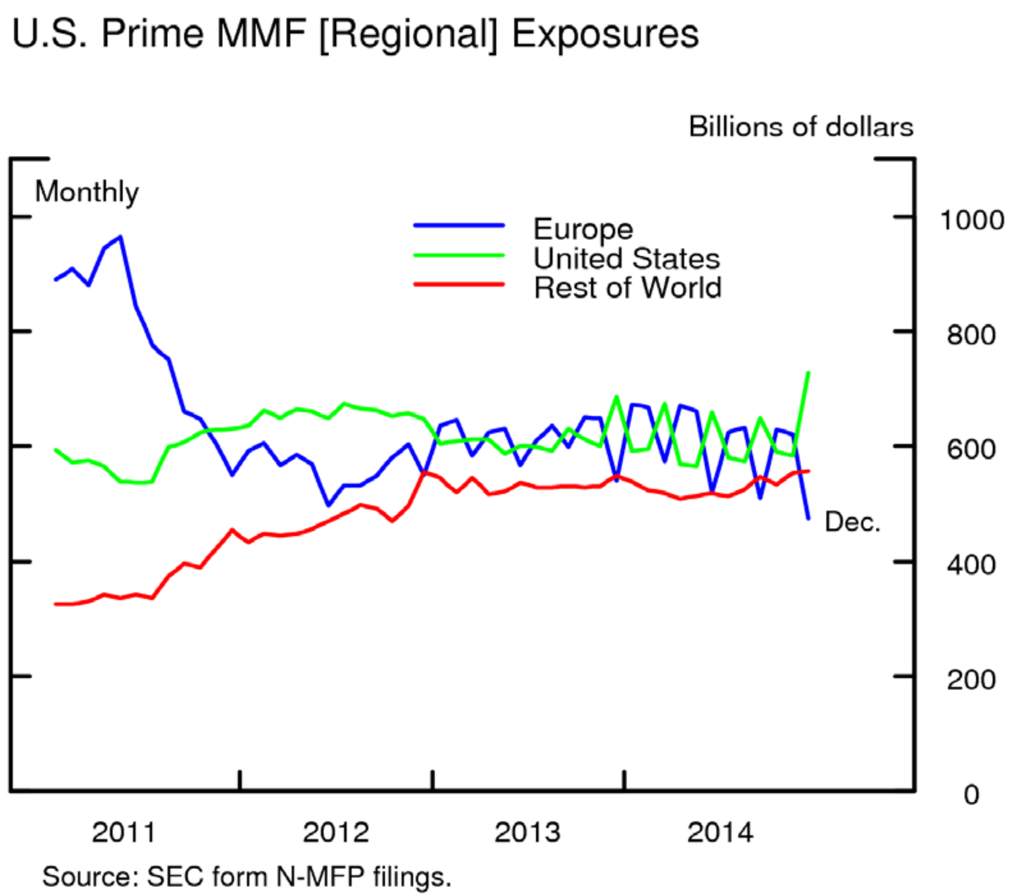
Monitoring Shadow Banking: Wholesale Money Market Funding

Commercial Paper and Repo Financing



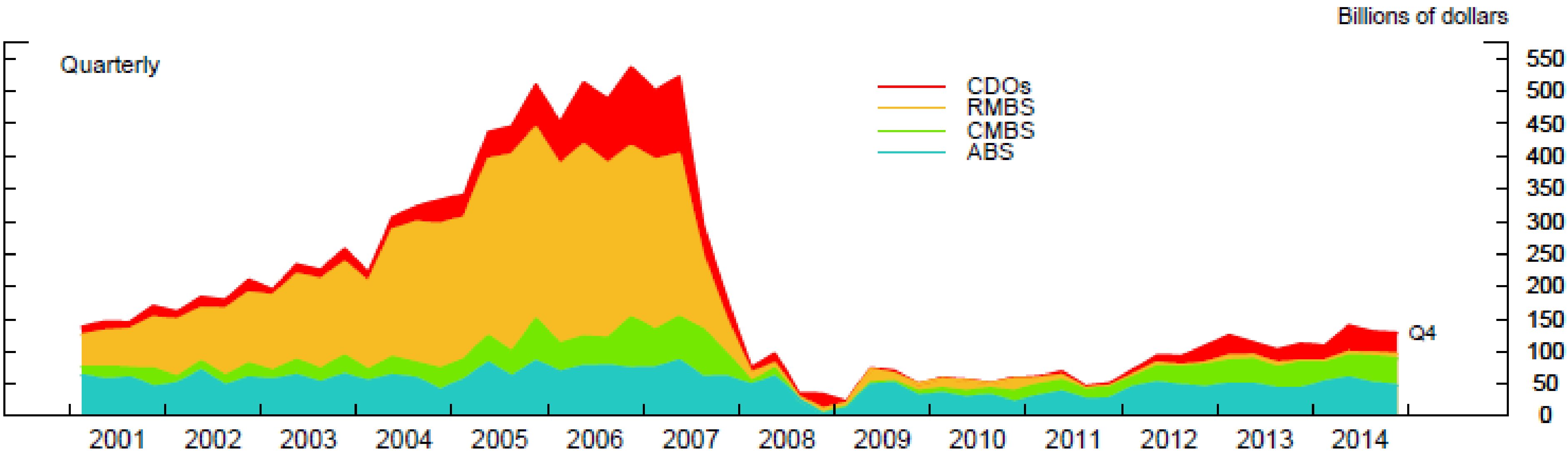
Source: FR2004 primary dealer statistics and the Depository Trust Company. For more information see the About page on the FRB's public commercial paper release website.

Monitoring Shadow Banking: Prime Money Market Fund Exposures



Monitoring Shadow Banking: Securitization Issuance

U.S. Securitization Issuance



Note: CMBS and RMBS refer respectively to securities backed by commercial and residential mortgages. ABS refers to securities backed by consumer loans. CDO refers to collateralized debt obligations, which are defined as including securities backed by commercial loans, resecuritizations of portfolios of securitization bonds, securitizations of trust preferred securities, and securitizations of corporate bonds.

Source: Asset-backed Alert, Commercial Mortgage Alert from Harrison Scott Publications, Inc. (downloaded May 8, 2013).

4. Non-Financial Sector Monitoring

Nonfinancial sector risk

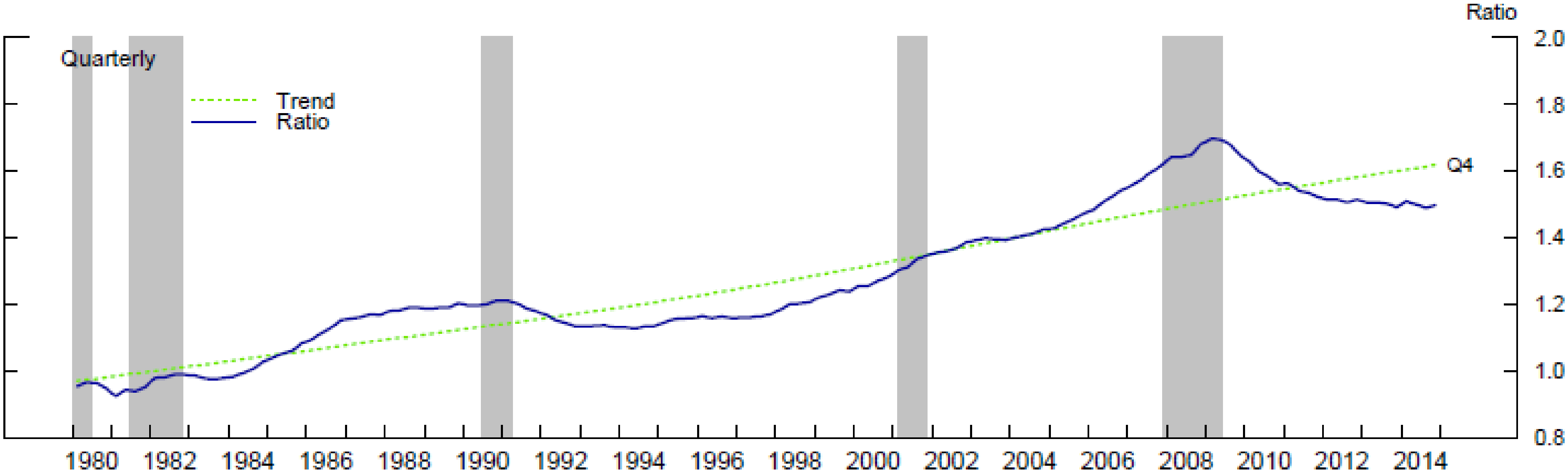
- Leverage of nonfinancial sector—households, businesses, governments
- Nonfinancial credit that is ultimately funded with short-term debt

Effect of financial sector on economic activity

- Underwriting standards, risk appetite, and balance sheet capacity of financial institutions
- Indicators of macro-economy vulnerability to financial risks

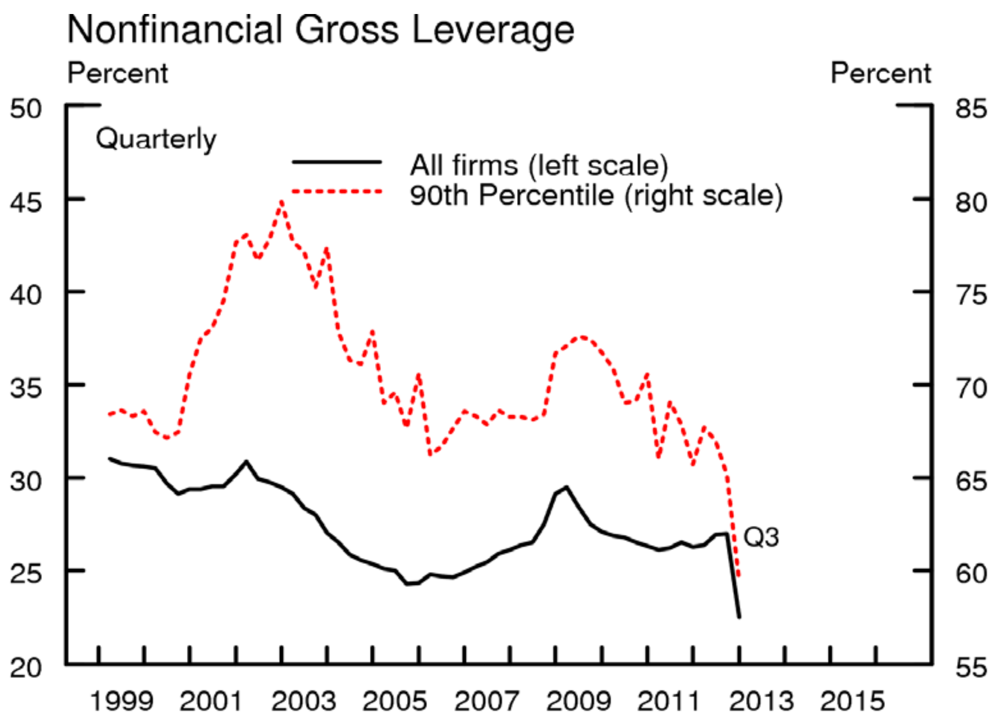
Non-Financial Sector Monitoring: Nonfinancial Sector Credit-to-GDP Ratio

Private Nonfinancial Sector Credit-to-GDP Ratio



Note: Calculated using an HP filter. Shaded areas denote NBER recessions.
Source: Financial Accounts of the United States, NIPA, and staff calculations.

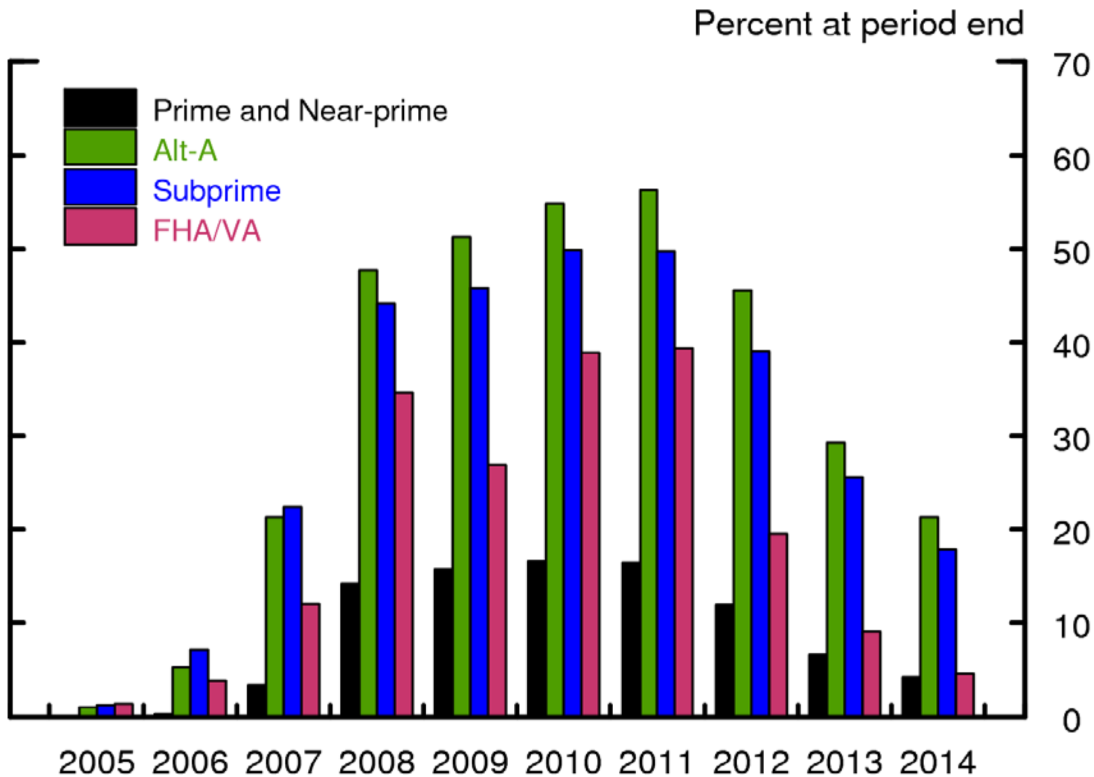
Non-Financial Sector Monitoring: Debt-to-asset Ratios of Non-financial Firms



Note: Ratio of the book value of total debt to total assets.
Source: Compustat.

Non-Financial Sector Monitoring: Underwater Mortgages

Percent of Mortgages Underwater



Note: Prime and Near-prime also includes Alt-A.

Source: Staff calculations based on data provided by CoreLogic, and LPS (Lender Processing Services) Applied Analytics.