Financial Stability Monitoring

Tobias Adrian, Daniel Covitz, Nellie Liang

Federal Reserve Bank of New York and Federal Reserve Board

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. **SIFIS (bank and nonbank) and FMUs**

   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

2. **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

3. **Asset Values**

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

4. **Real Economy**

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

1. SIFI and FMU 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

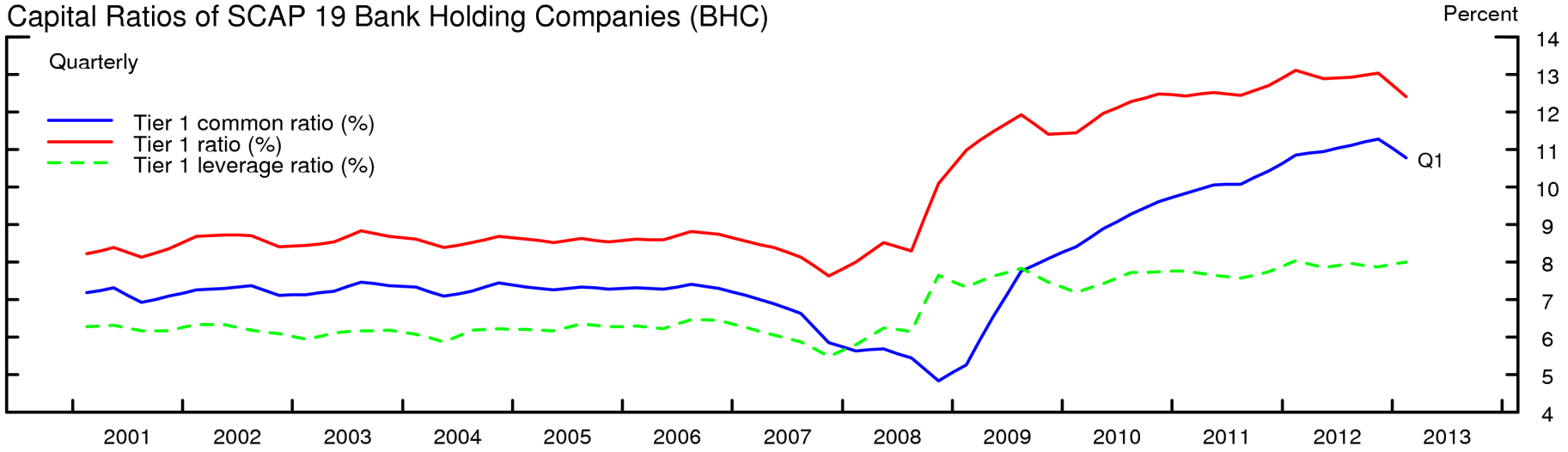
Measures of liability risk: runs and funding squeezes, cross border

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 SIFIs: Capital Ratios

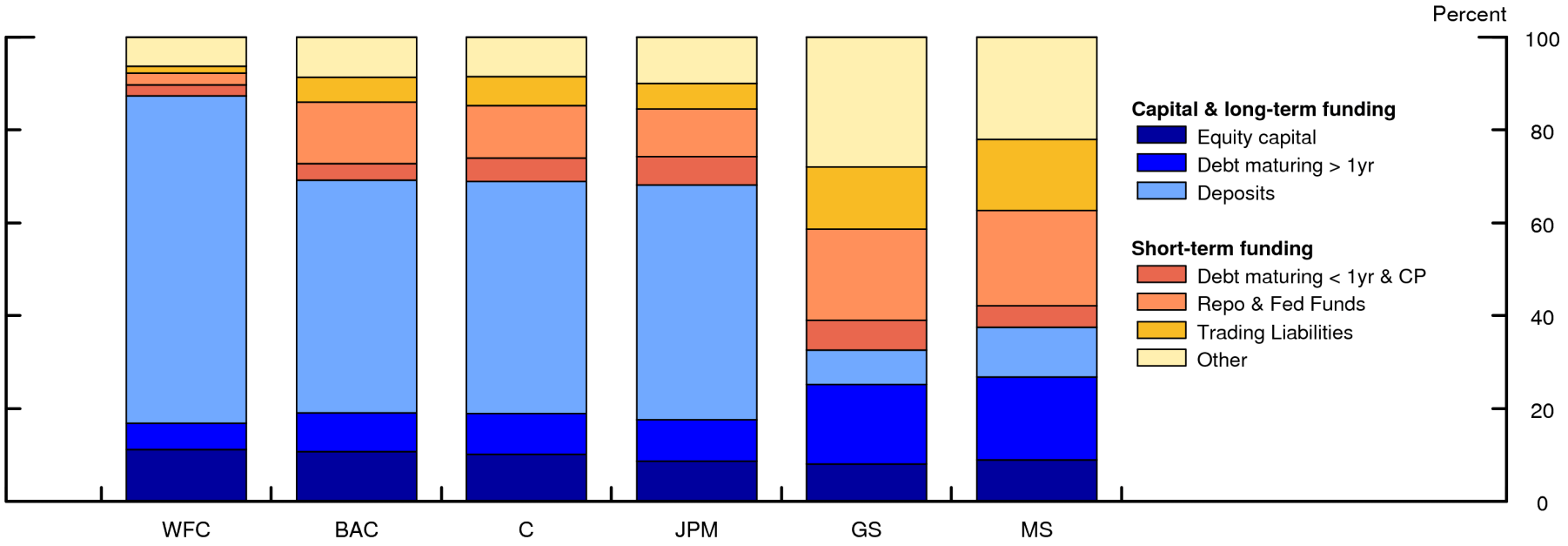
Chart 1
Capital Ratios of SCAP 19 Bank Holding Companies (BHC)



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 SIFIs: BHC Liability Structure

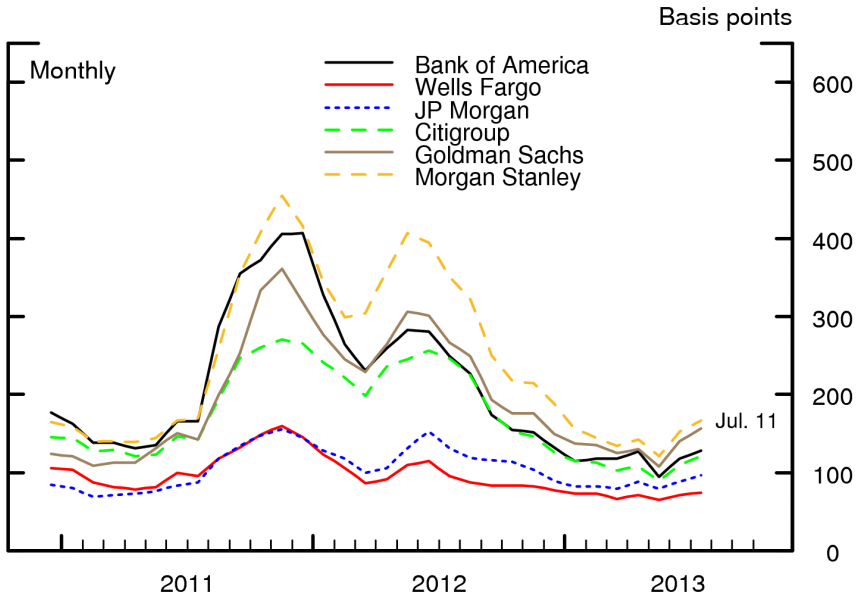
Chart 2
BHC Liability Structure 2012Q4



Source: FR Y-9C.

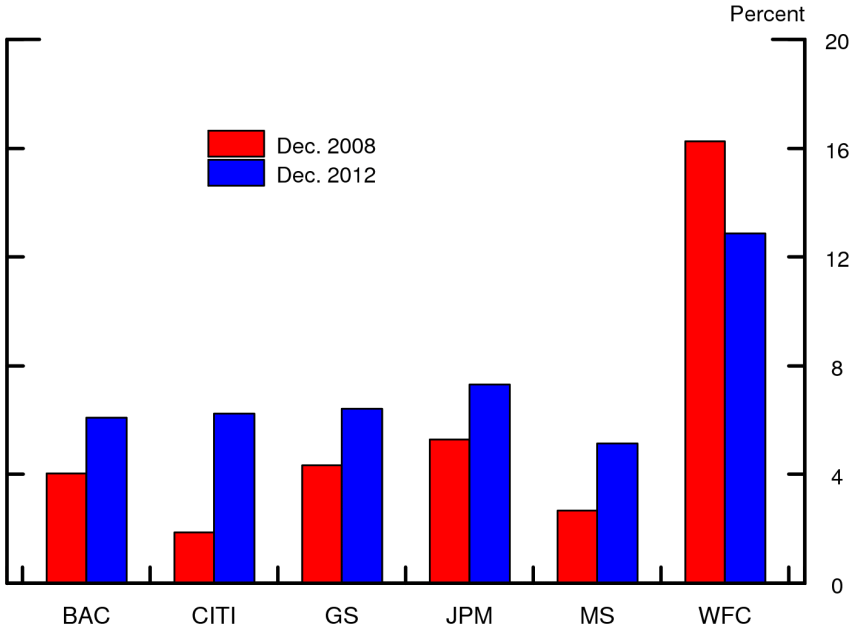
Monitoring SIFIs:
CDS Premiums and Market-based Capital Ratios

Chart 3
5-Year CDS Premiums for Select U.S. BHCs



Source: Markit Credit Default Swaps (CDS).

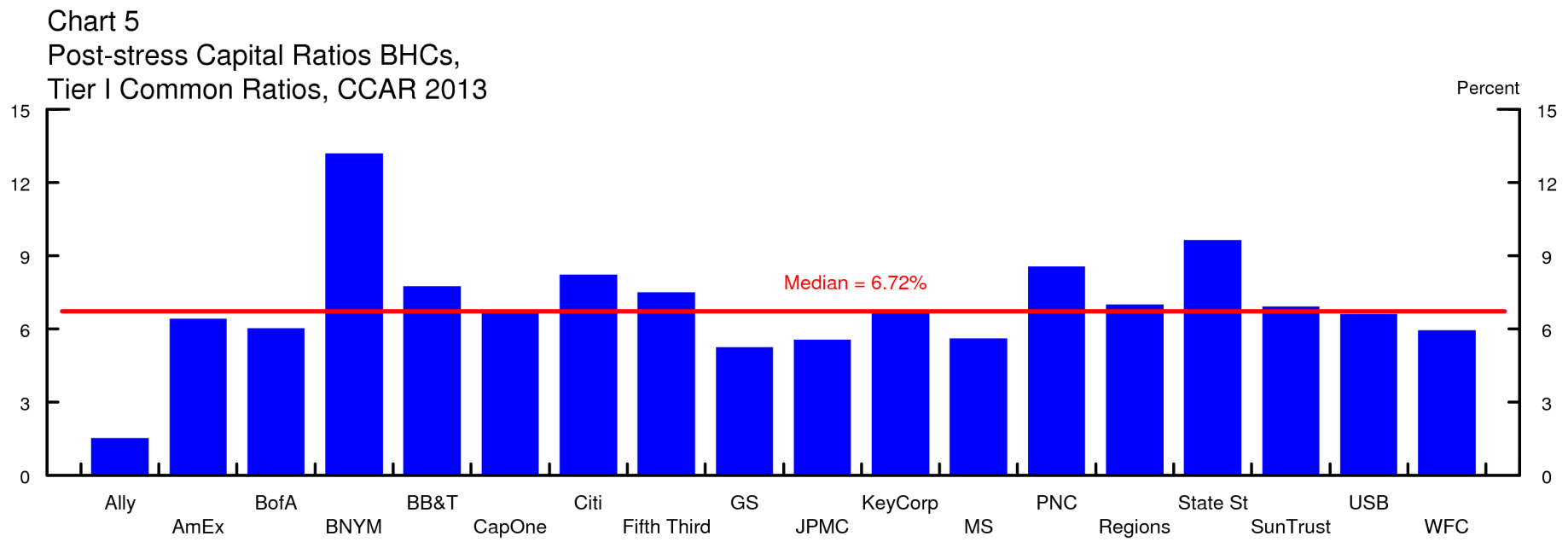
Chart 4
Market-based Capital Ratios for BHCs



Note: Ratios are market value of common equity to estimated market value of assets.
Source: Staff calculations from Bloomberg data.

Monitoring SIFIs:

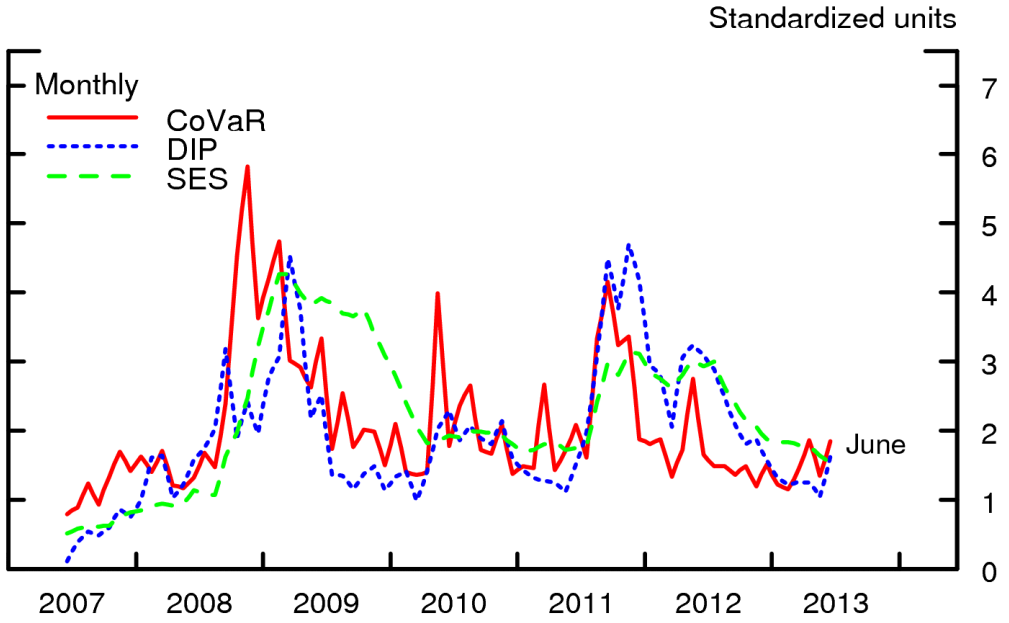
Minimum Tier 1 Common Ratio in the Supervisory Stress Scenario (%)



Source: Federal Reserve estimates from the 2013 Comprehensive Capital Assessment Review (CCAR).
Note: Ally Financial and American Express data are using adjusted planned captial action ratios.

Monitoring SIFIs:
Market Based Systemic Risk Measures

Chart 6
U.S. LISCC Firm 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.

2. Shadow Bank Monitoring

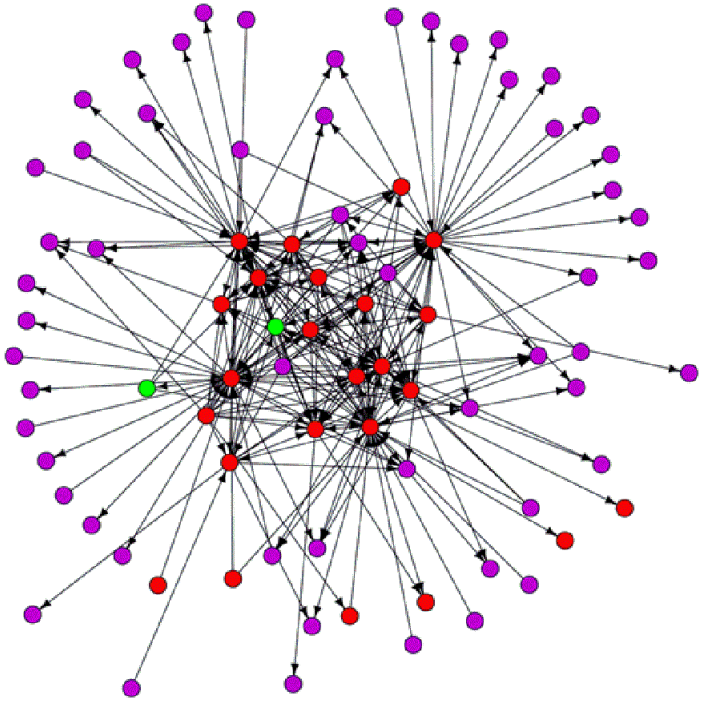
Leverage Cycle, Maturity Mismatch, and Run Risk

- 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

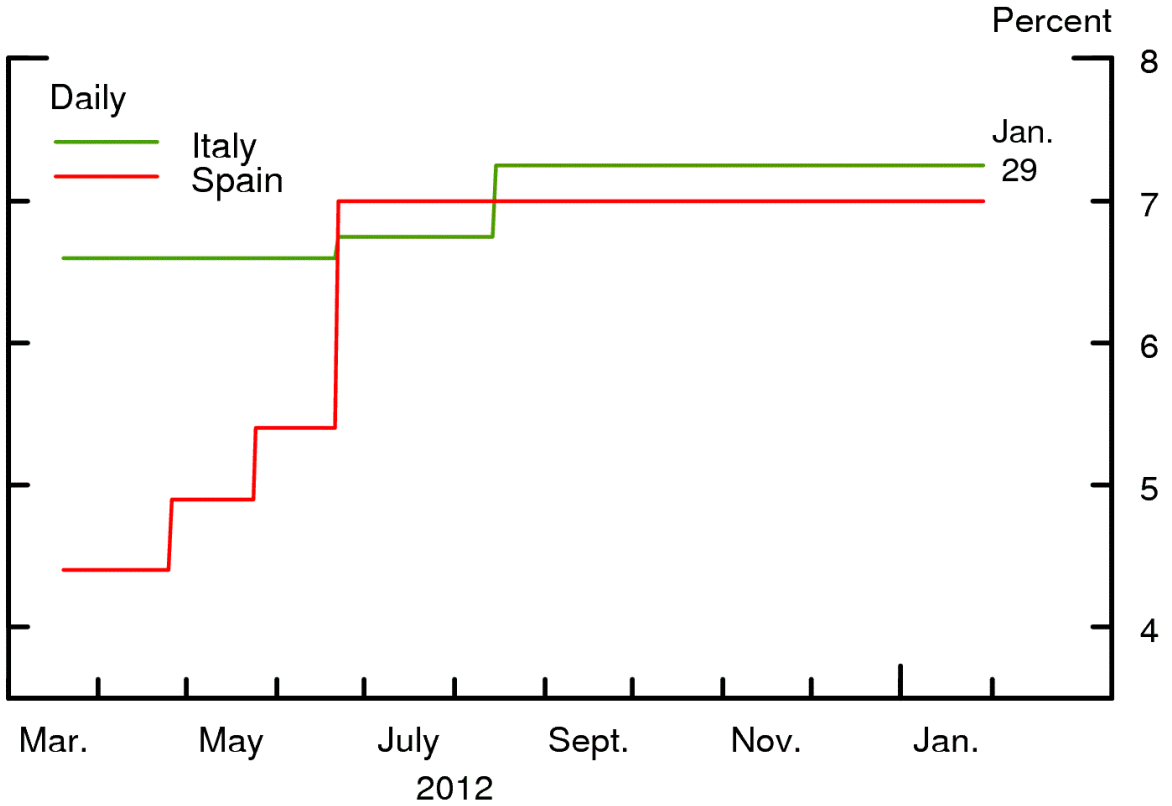
Chart 7
Interconnectedness of CCPs, Dealers, and Non-dealers in CDS



Source: Chelso Brunetti and Michael Gordy, June 2012.

Monitoring Shadow Banking: Margins

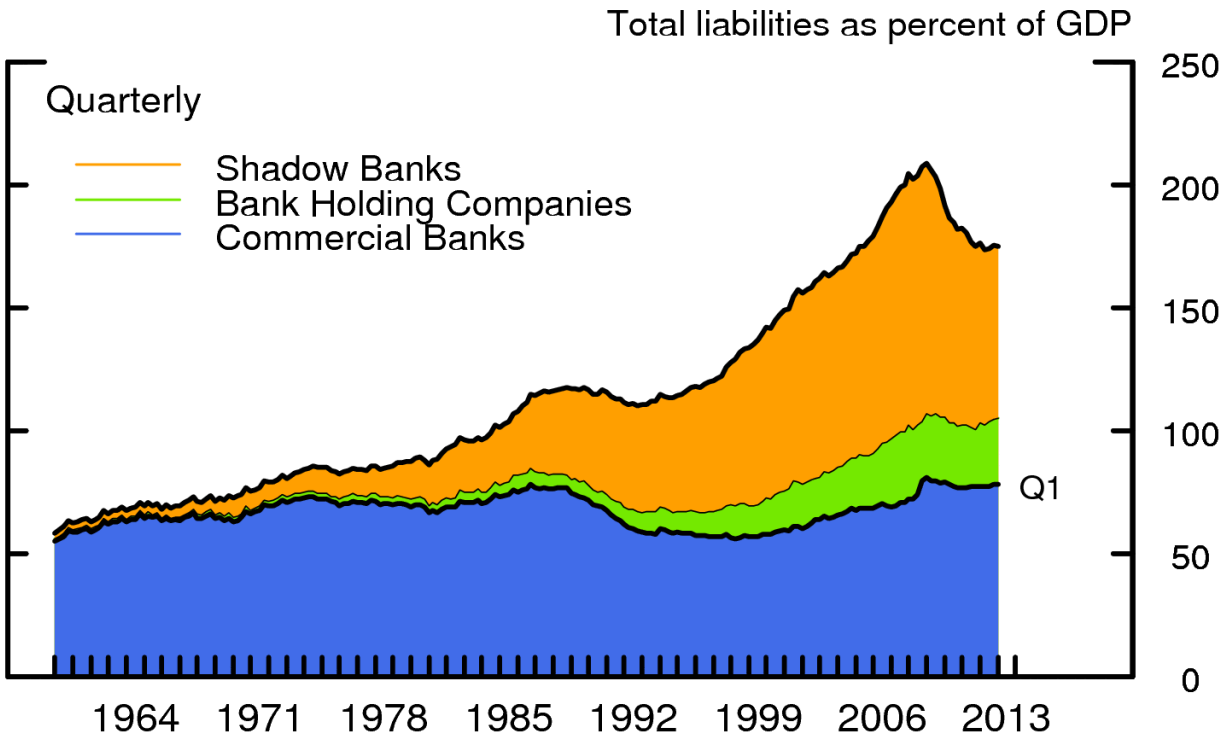
Chart 8
Margins on Italian and Spanish Sovereign Bonds



Note: Maturities of 3.25-4.75 years.
Source: LCH.Clearnet SA.

Monitoring Shadow Banking: Shadow Banking

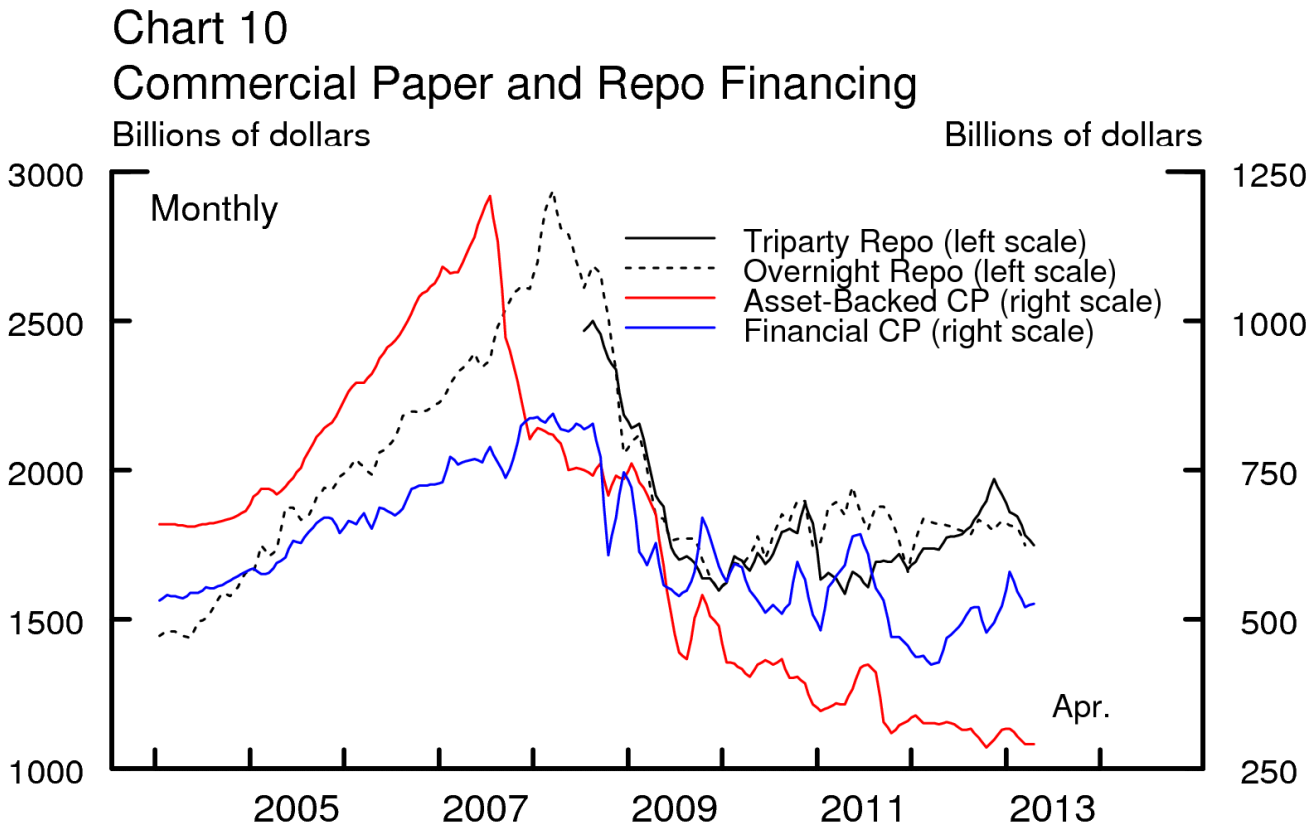
Chart 9
Financial Sector Liabilities



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

Source: Federal Reserve Flow of Funds.

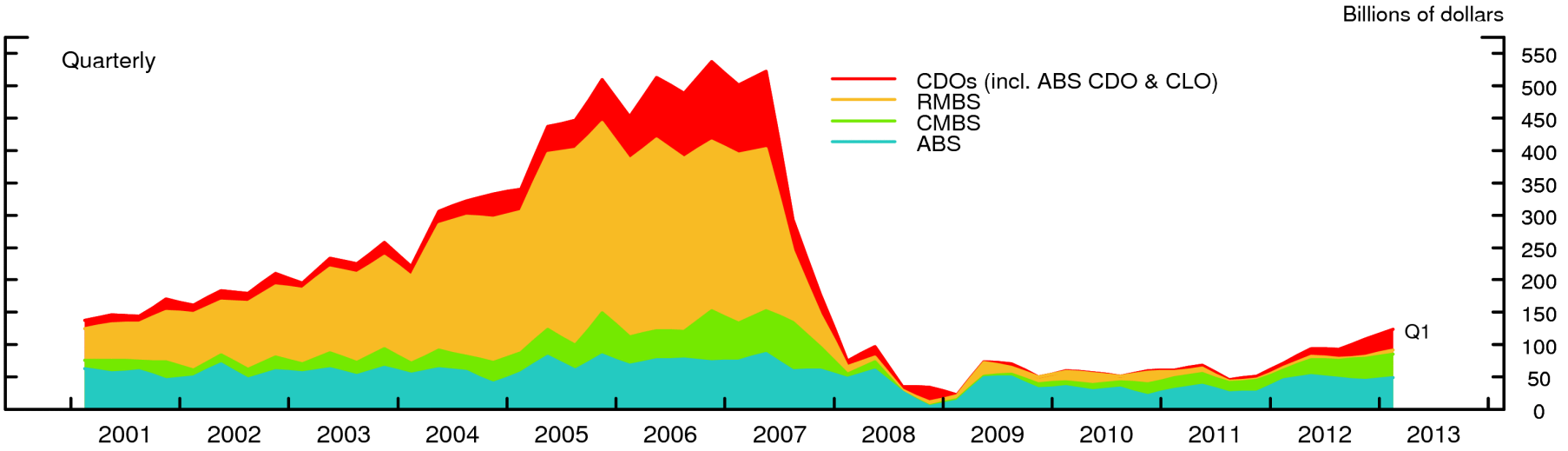
Monitoring Shadow Banking: Wholesale Money Market Funding



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: Securitization Issuance

Chart 13
U.S. Securitization Issuance



Note: CLO refers to all securities backed by loans or bonds issued by businesses. CMBS and RMBS refer respectively to securities backed by commercial and residential mortgages. ABS refers to securities backed by consumer loans.
Source: Asset-backed Alert, Commercial Mortgage Alert from Harrison Scott Publications, Inc. (downloaded May 8, 2013).

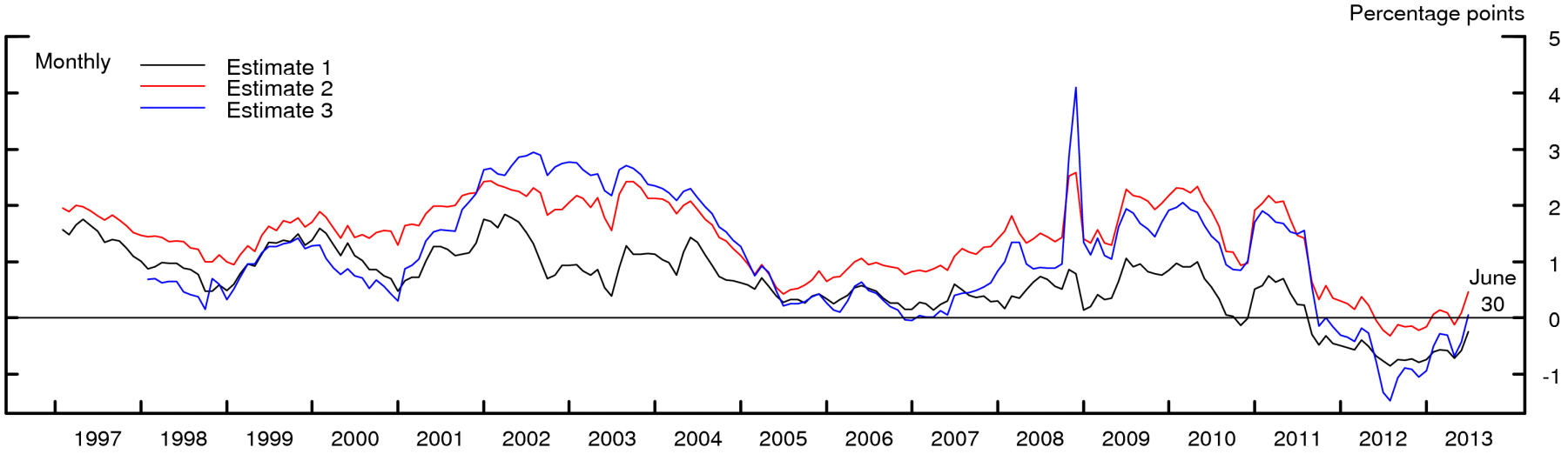
3. Monitoring Asset Values

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 Values: Treasury Term Premia

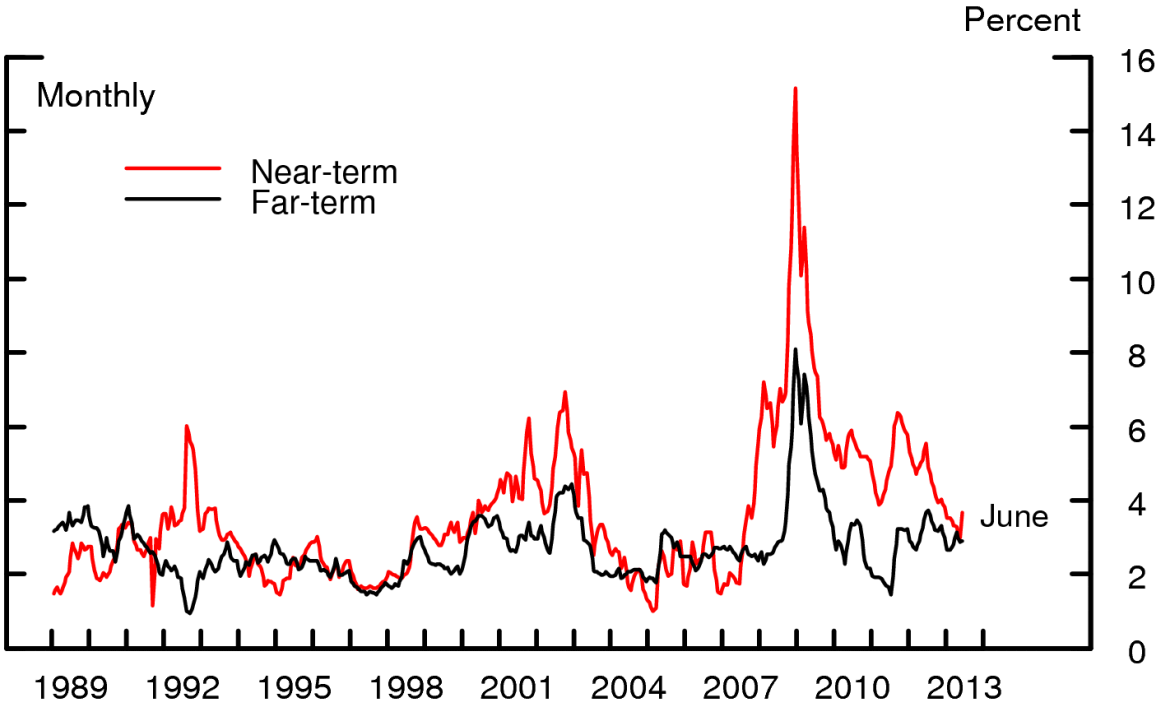
Chart 14
Ten-Year Nominal Yields and Term Premium Estimates



Note: Term premia are estimated by; Estimate 1: three-factor term structure model combining Treasury yields with SPF interest rate forecasts (Kim and Wright, 2005), Estimate 2: a four-factor term structure model using Treasury yields only (Adrian, Crump, and Moench, 2012), and Estimate 3: a three-factor model using Treasury yields only (Christensen, Diebold, and Rudebush, 2009).

Monitoring Asset Values: Forward Credit Spreads

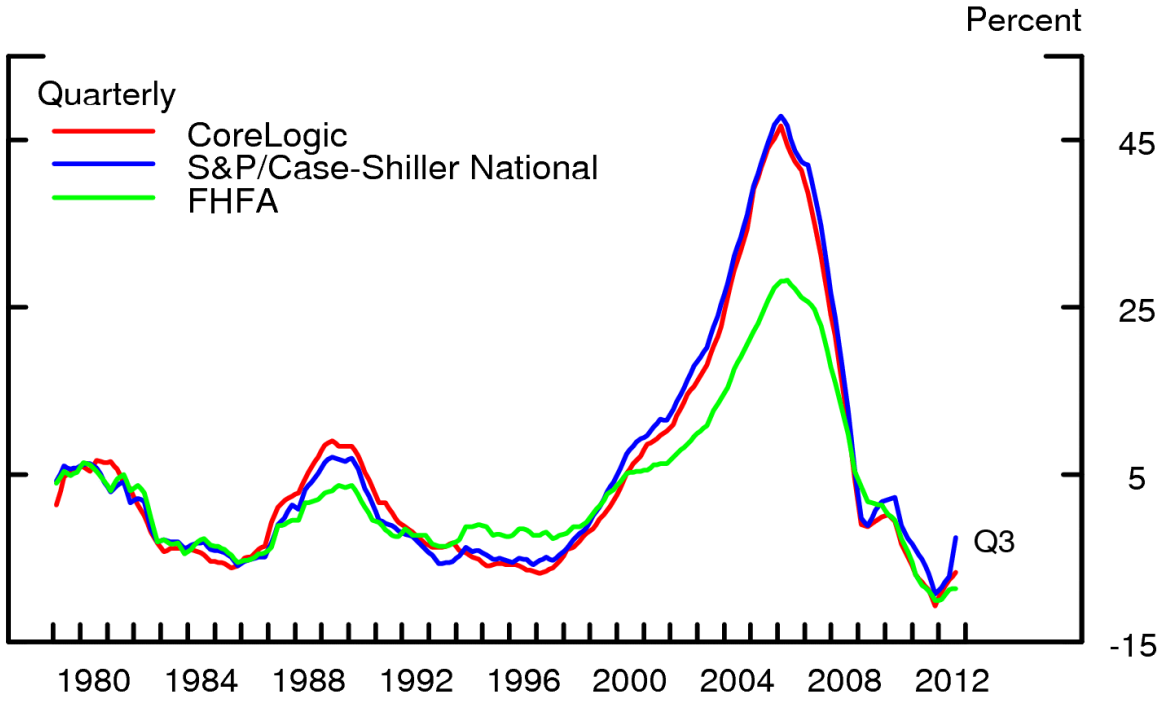
Chart 15
Near- and Far-Term BB Forward Credit Spreads



Note: Near-term forward spread between years two and three, far-term forward spread between years nine and ten.
Source: Staff estimates.

Monitoring Asset Values: House Price Valuations

Chart 17
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, S&P/Case-Shiller National, FHFA and BLS.

4. Real Economy Monitoring

Nonfinancial sector risk

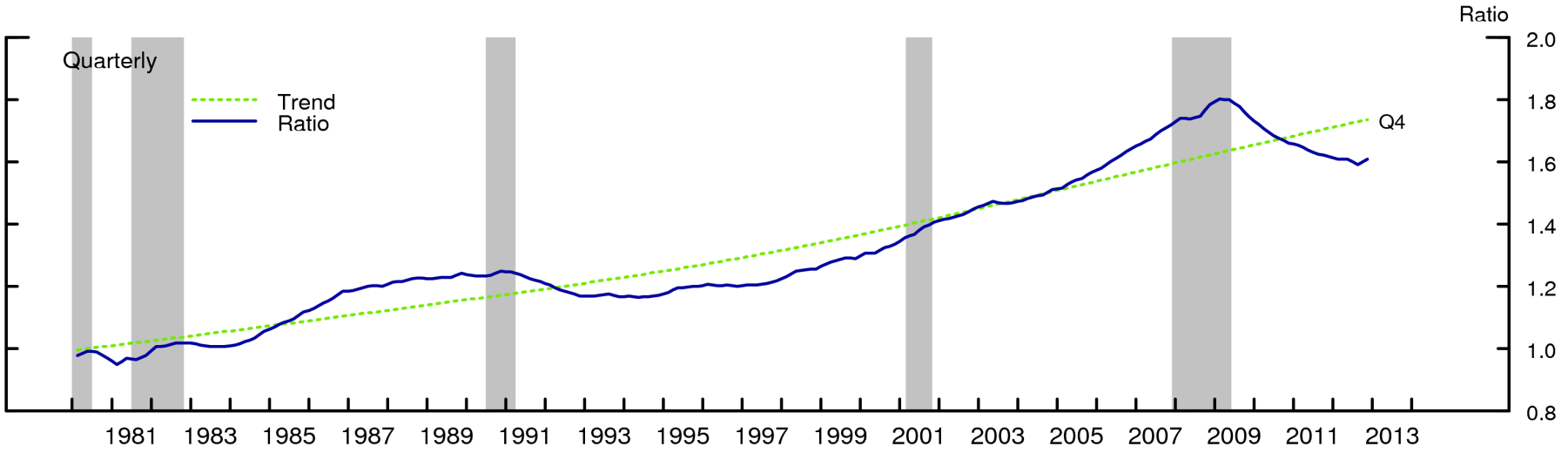
- Leverage of nonfinancial sector—households, businesses, governments
- Nonfinancial credit that is ultimately funded with short-term debt

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

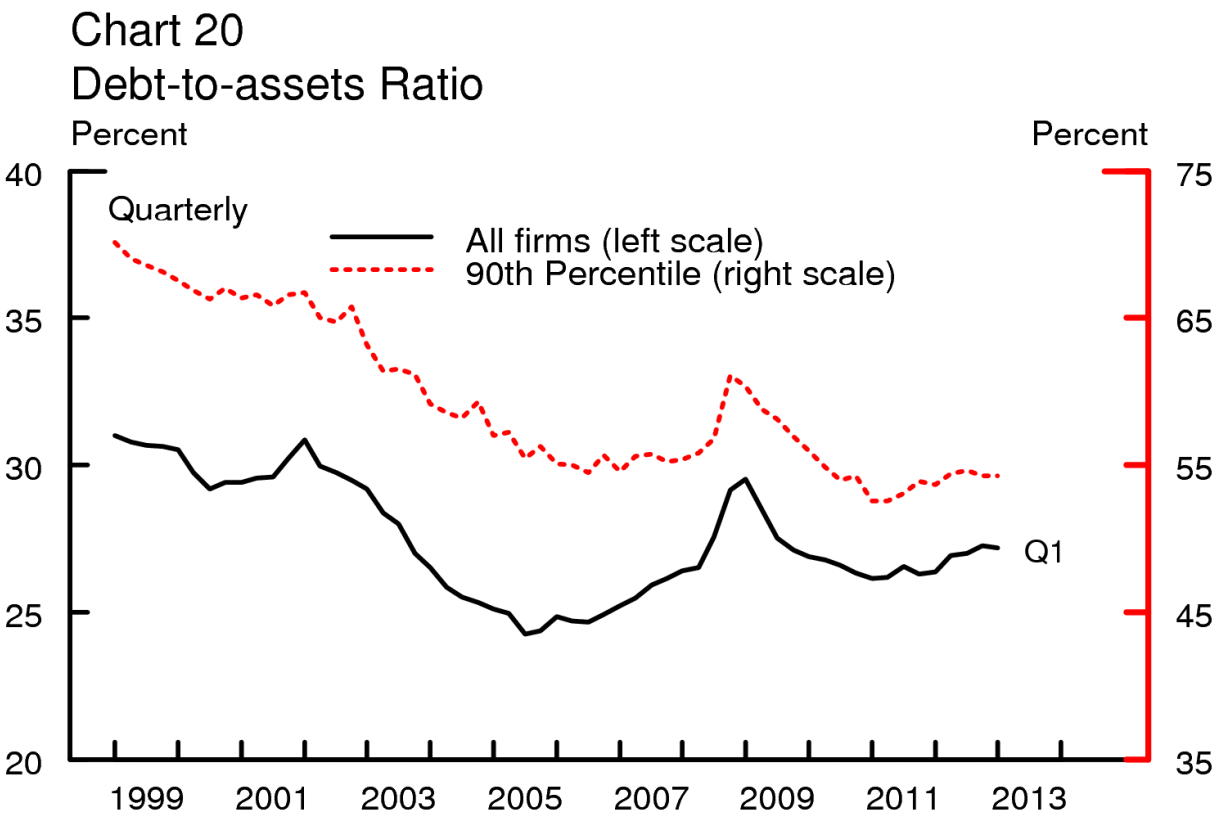
Real Economy Monitoring: Nonfinancial Sector Credit-to-GDP Ratio

Chart 19
Private Nonfinancial Sector Credit-to-GDP Ratio



Note: Calculated using an HP filter. Shaded areas denote NBER recessions.
Source: FOFA, NIPA, and staff calculations.

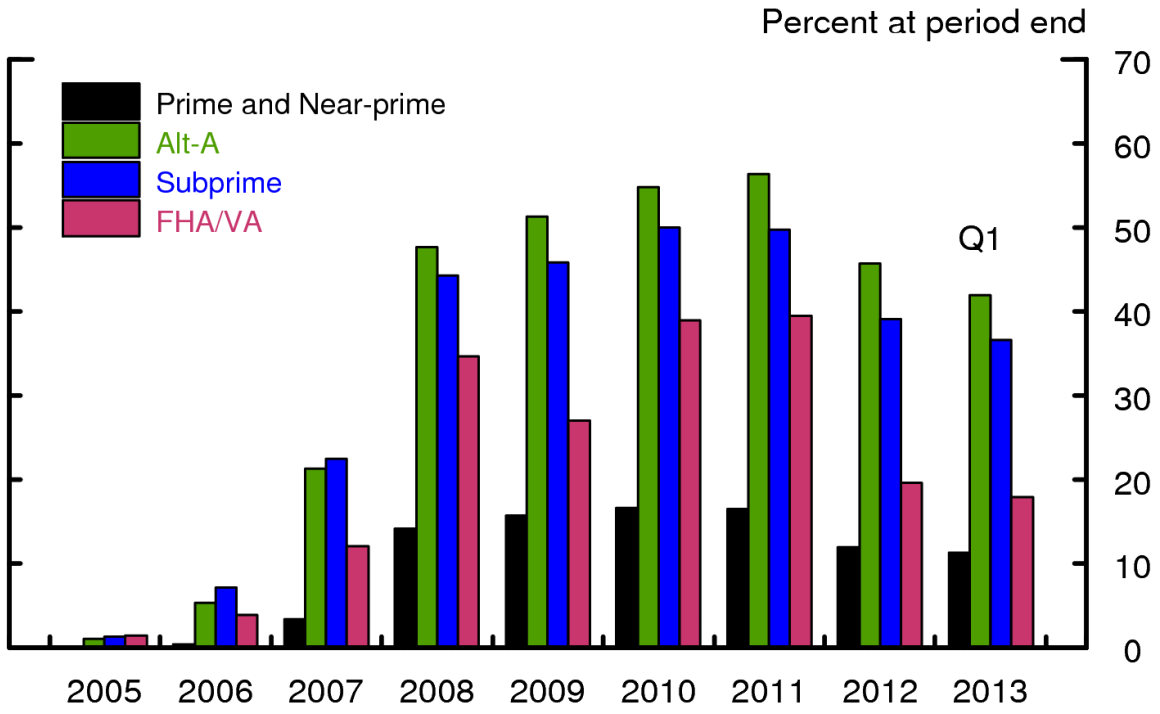
Real Economy Monitoring: Debt-to-asset Ratios of Non-financial Firms



Note: Ratio of the book value of total debt to total assets. 90th percentile is calculated from subset of 3000 largest firms, by assets.
Source: Compustat XpressFeed.

Real Economy Monitoring: Underwater Mortgages

Chart 21
Underwater Mortgages



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.

Policy Response to Systemic Risk

Monitoring indicates the extent to which shocks might trigger systemic events

- Monitoring informs us about exposures to changes in the pricing of risk
- Sharp increases in the pricing of risk can generate systemic risk

Tradeoff between systemic risk and the price of risk

- Regulation is trading off the price of risk with the level of systemic risk
- Higher price of risk today may reduce buildup of systemic risk

Tougher regulation, higher price of risk, less systemic risk

Conceptual Framework for Financial Stability

1. The price of risk, *p*, increases with financial shocks, *s*
2. *p* is more sensitive to *s* when vulnerabilities, *v*, are high
3. When *s* is low, *p* is decreasing in *v*

Trade-off between the pricing of risk in normal times, and in crises