

Global Oil & Gas Firms: Current State of Play, Vulnerabilities, and Implications for Financial Stability

Oil and the Economy: Adapting to a New Reality

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Federal Reserve Board

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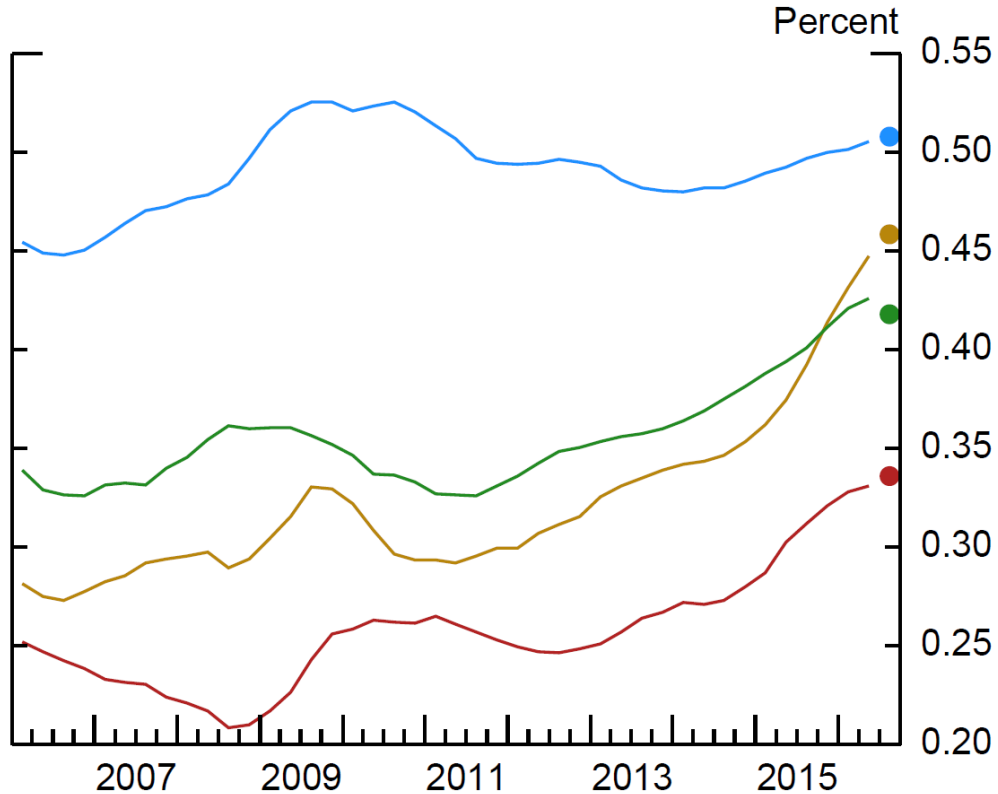
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* This presentation benefited from contributions from Clara Vega, Maria Tito, Daniel Dias, Chris Collins, and Nick Botti. All errors are my own.

Rapid growth in leverage post-GFC, partly used to finance new investments in E&P

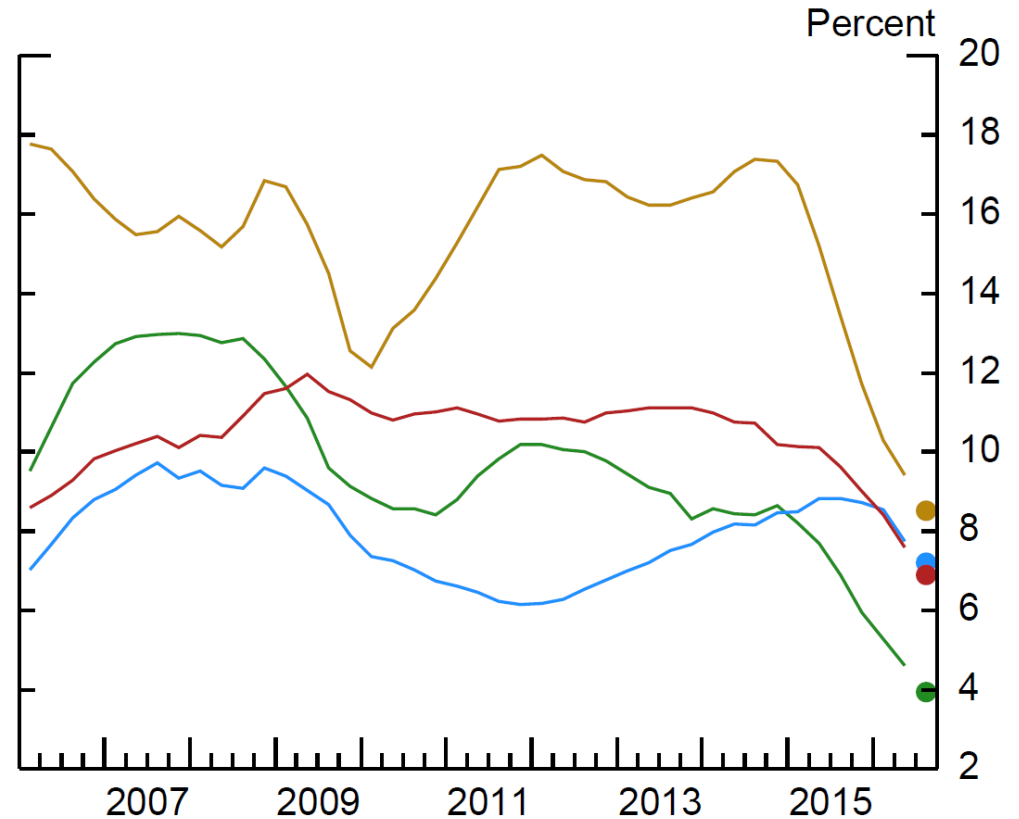
— Exploration & production — Equipment & drilling services — Refining, storage, & transport — Integrated

Leverage*



*Leverage Ratio = Debt/(Debt + Equity)
Source: Capital IQ.

Capital expenditures to assets



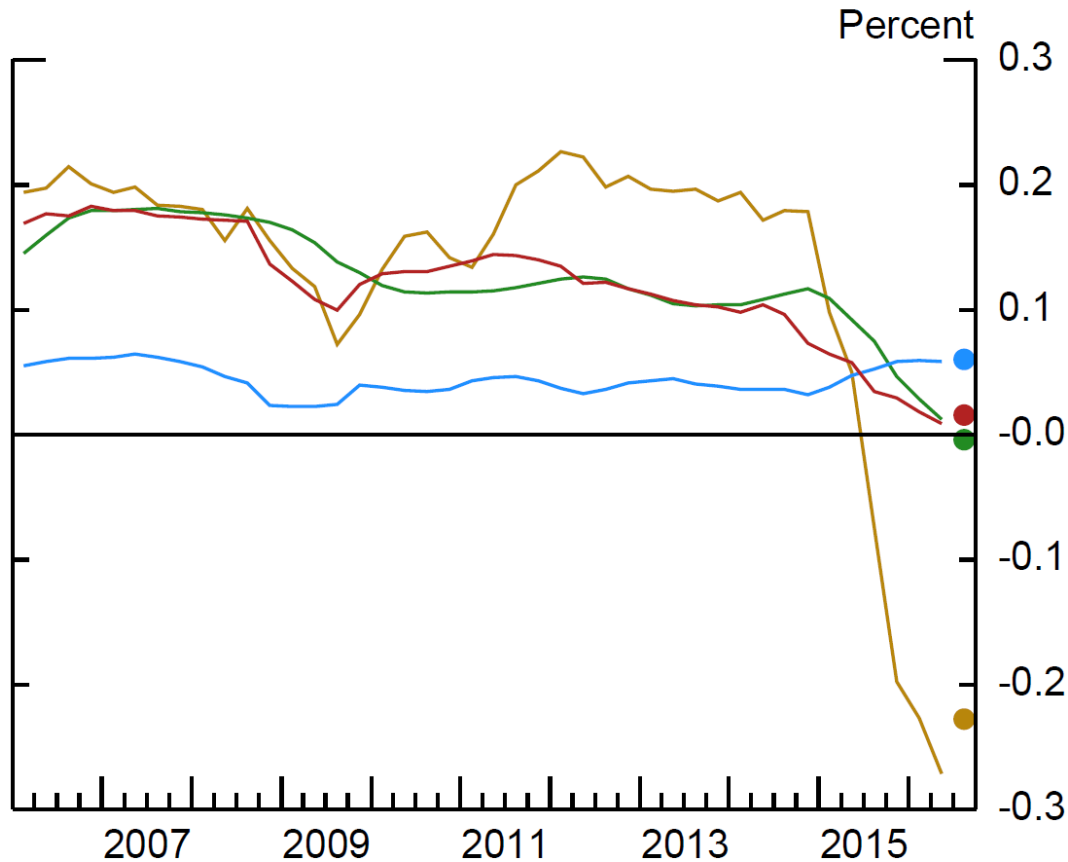
Source: Capital IQ.

Based on a sample of 1,957 domestic and foreign oil and gas firms (722 US firms, 1,235 foreign firms)

With sharp decline in oil prices, profits plunged

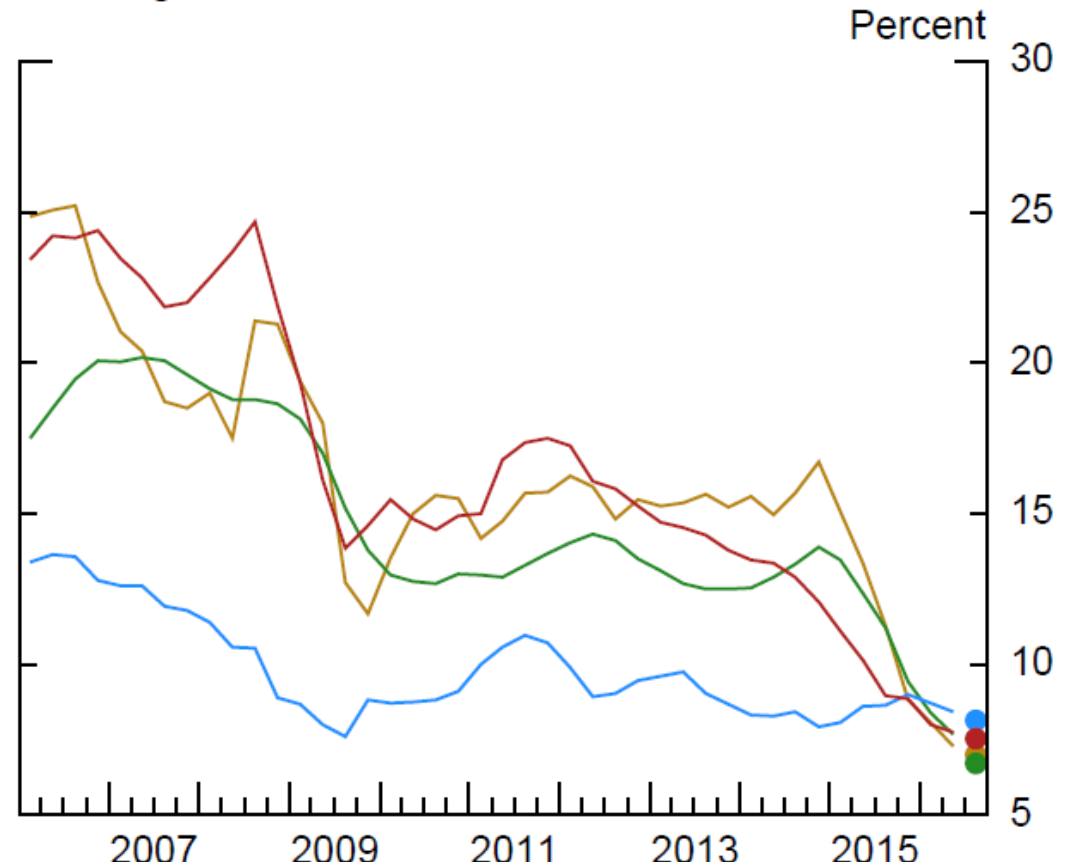
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Profit margin



Source: Capital IQ. Profit margin defined as pre-tax income less special items, divided by net sales.

Earnings to assets



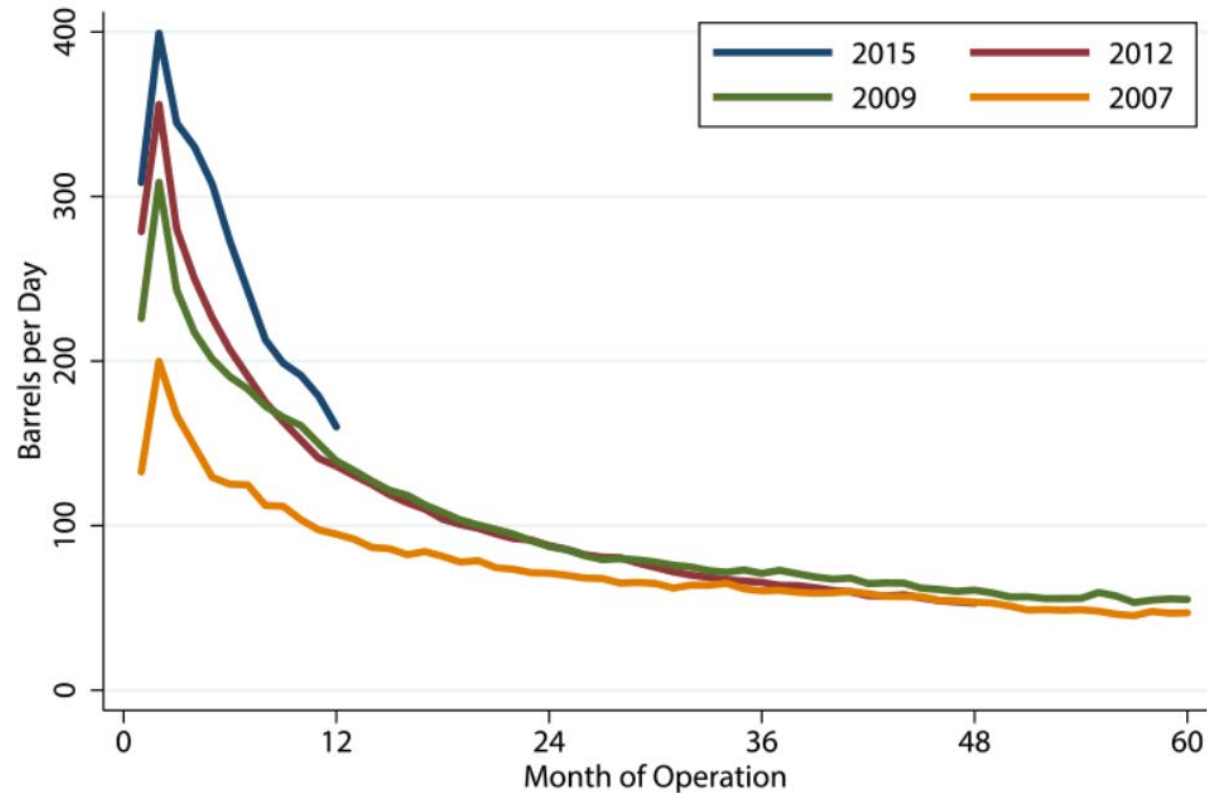
EBITDA to assets
Source: Capital IQ.

Based on a sample of 1,957 domestic and foreign oil and gas firms (722 US firms, 1,235 foreign firms)

How have U.S. shale producers adapted to lower oil prices?

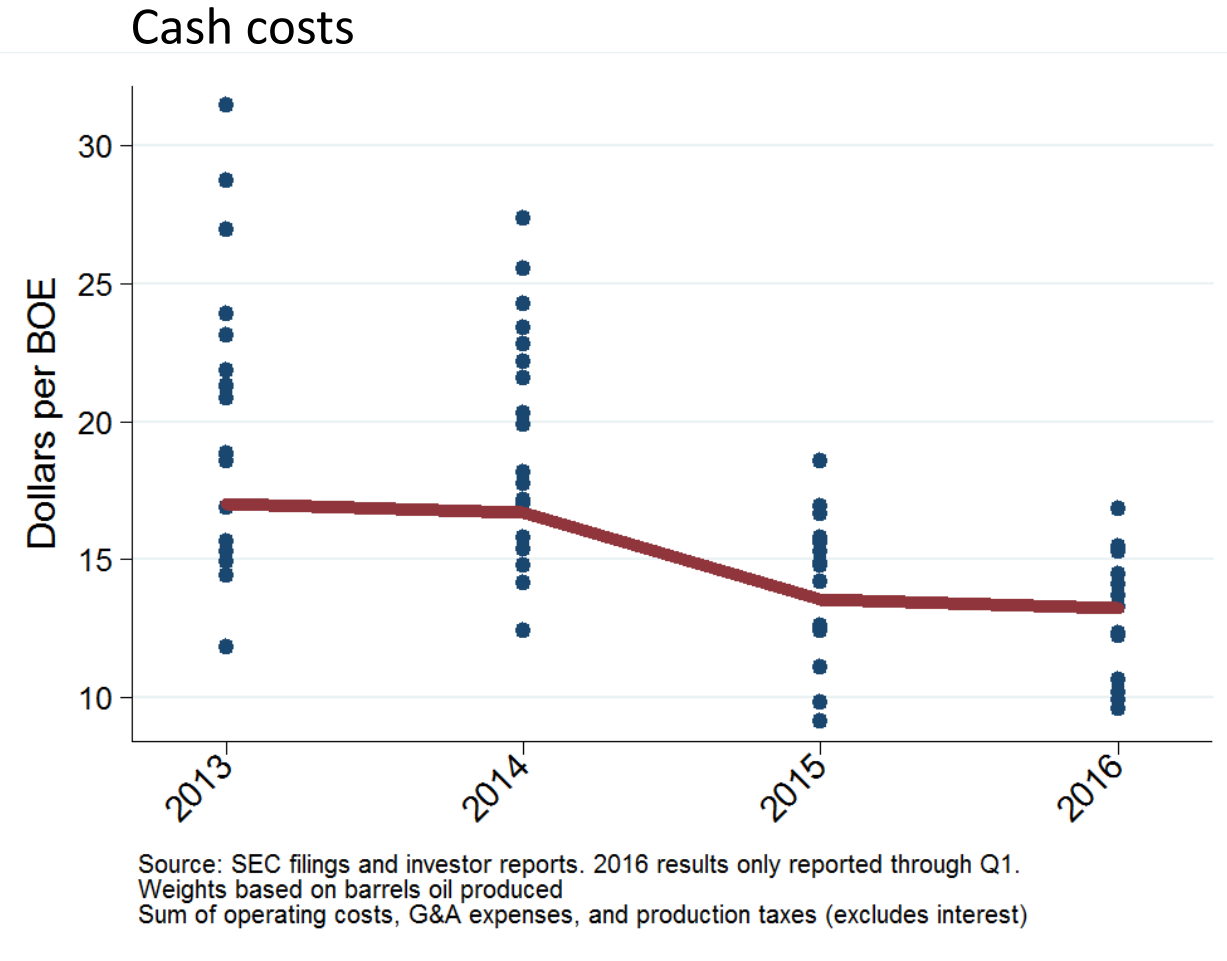
Productivity improvements in US shale production (North Dakota)

Average well decline curve by cohort



Source: Ryan Decker, Aaron Flaaen, and Maria Tito (2016), "Unraveling the Oil Conundrum: Productivity Improvements and Cost Declines in the U.S. Shale Oil Industry," FEDS Notes, March 22.

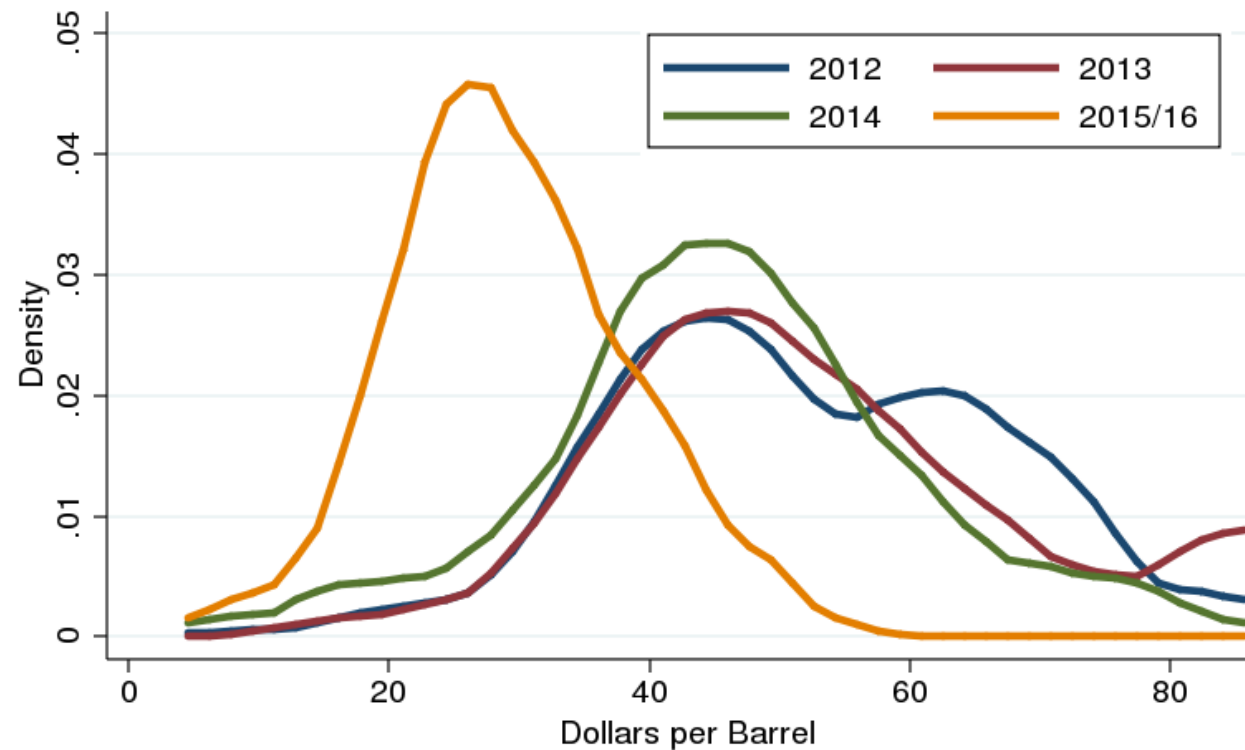
Current oil spot price is above cost of operating existing wells of U.S. shale producers



Source: Ryan Decker, Aaron Flaaen, and Maria Tito (2016), "Unraveling the Oil Conundrum: Productivity Improvements and Cost Declines in the U.S. Shale Oil Industry," FEDS Notes, March 22.

Some new projects are economically viable with oil in the \$45-\$50 range

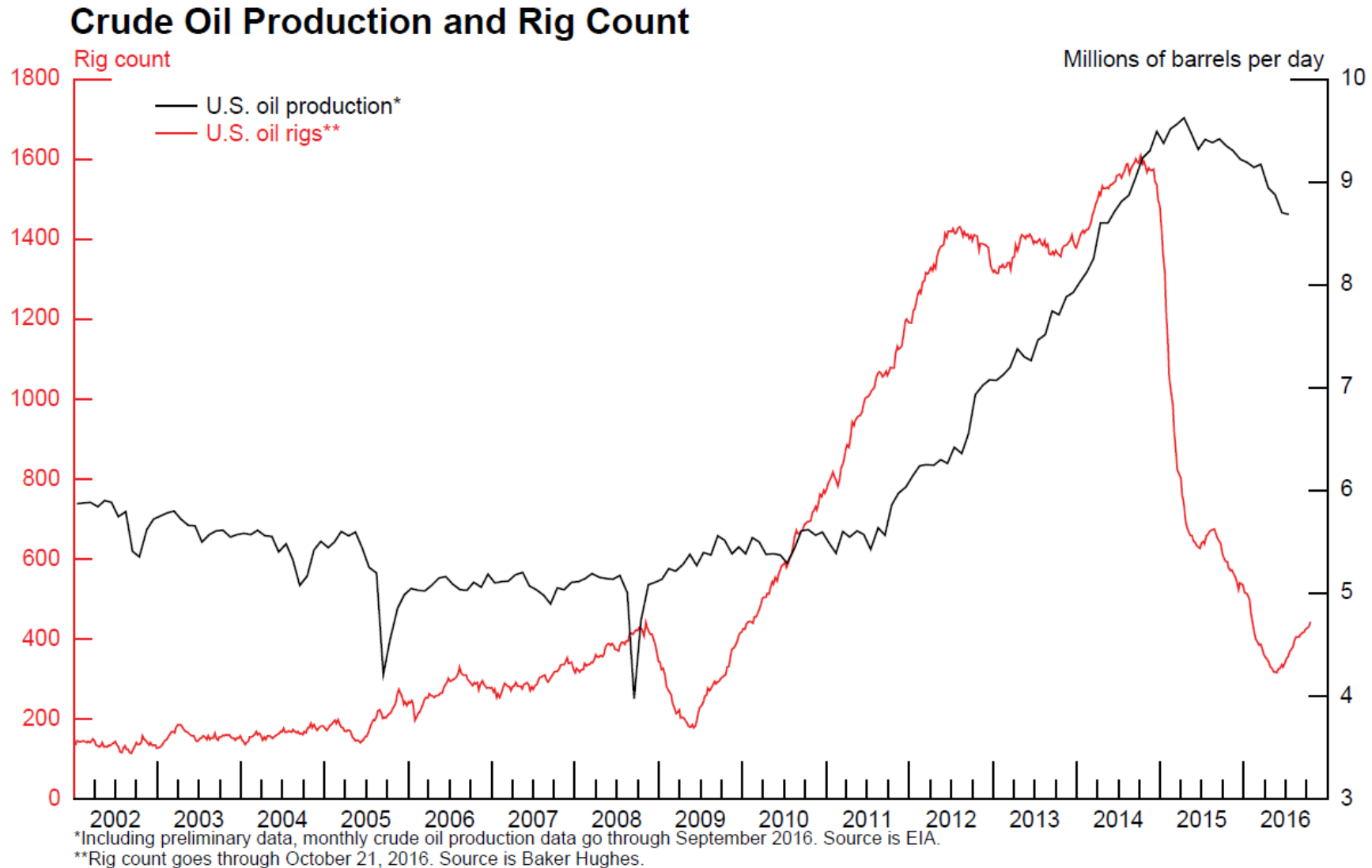
Long-cycle breakeven prices in Bakken region (North Dakota)*



Source: Ryan Decker, Aaron Flaaen, and Maria Tito (2016), "Unraveling the Oil Conundrum: Productivity Improvements and Cost Declines in the U.S. Shale Oil Industry," FEDS Notes, March 22.

*Reflects the price at which new wells are economically viable, includes cash costs as well as drilling costs, and internal cost of capital, but excludes transportations costs, which range between \$7-\$10 per barrel for the Bakken region.

Consistent with the recent rise in rig counts



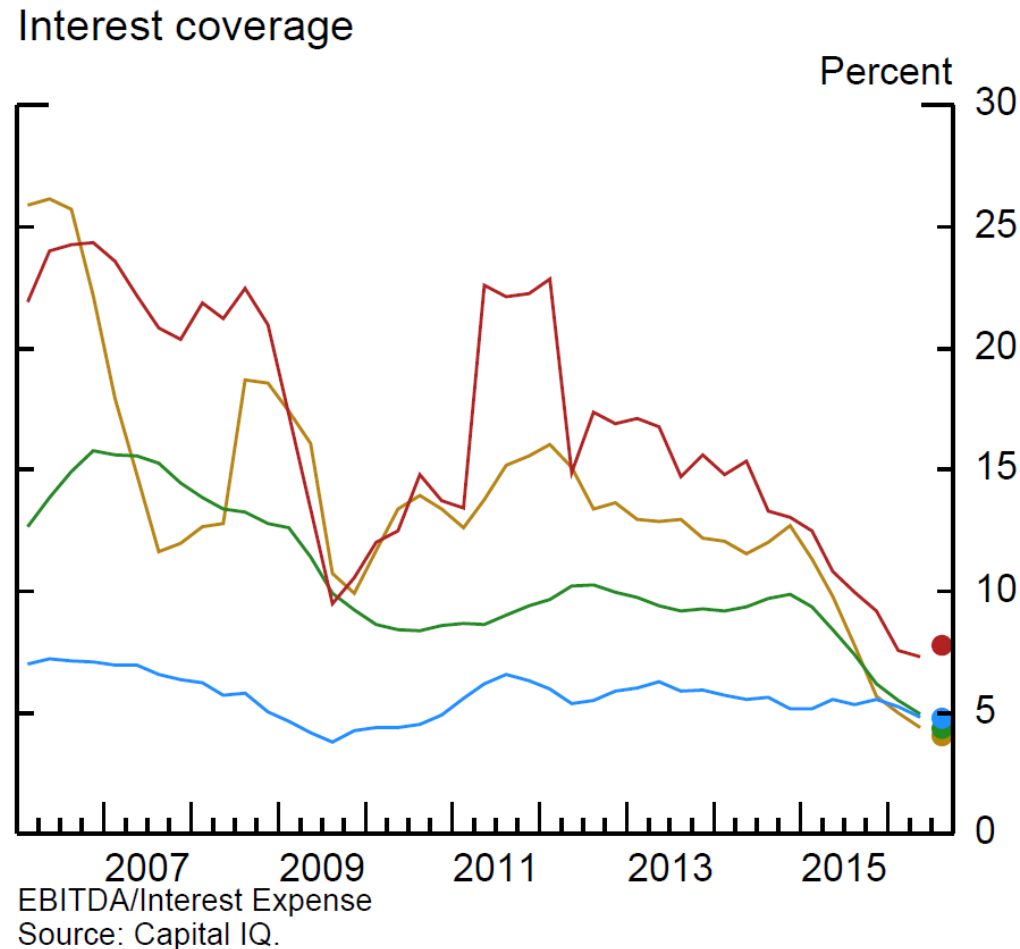
Bottom line for U.S. shale

- US energy firms have greatly reduced operating costs, but profitability remains weak, and leverage high, especially for upstream firms
- What's different during this bust cycle: high leverage
- With the price of oil in the range of \$45-\$50 per barrel
 - It is still profitable to operate most existing wells in the US
 - Based on the most recent experience, this price range should also be sufficient to encourage new drilling activity in some areas

Implications for financial stability

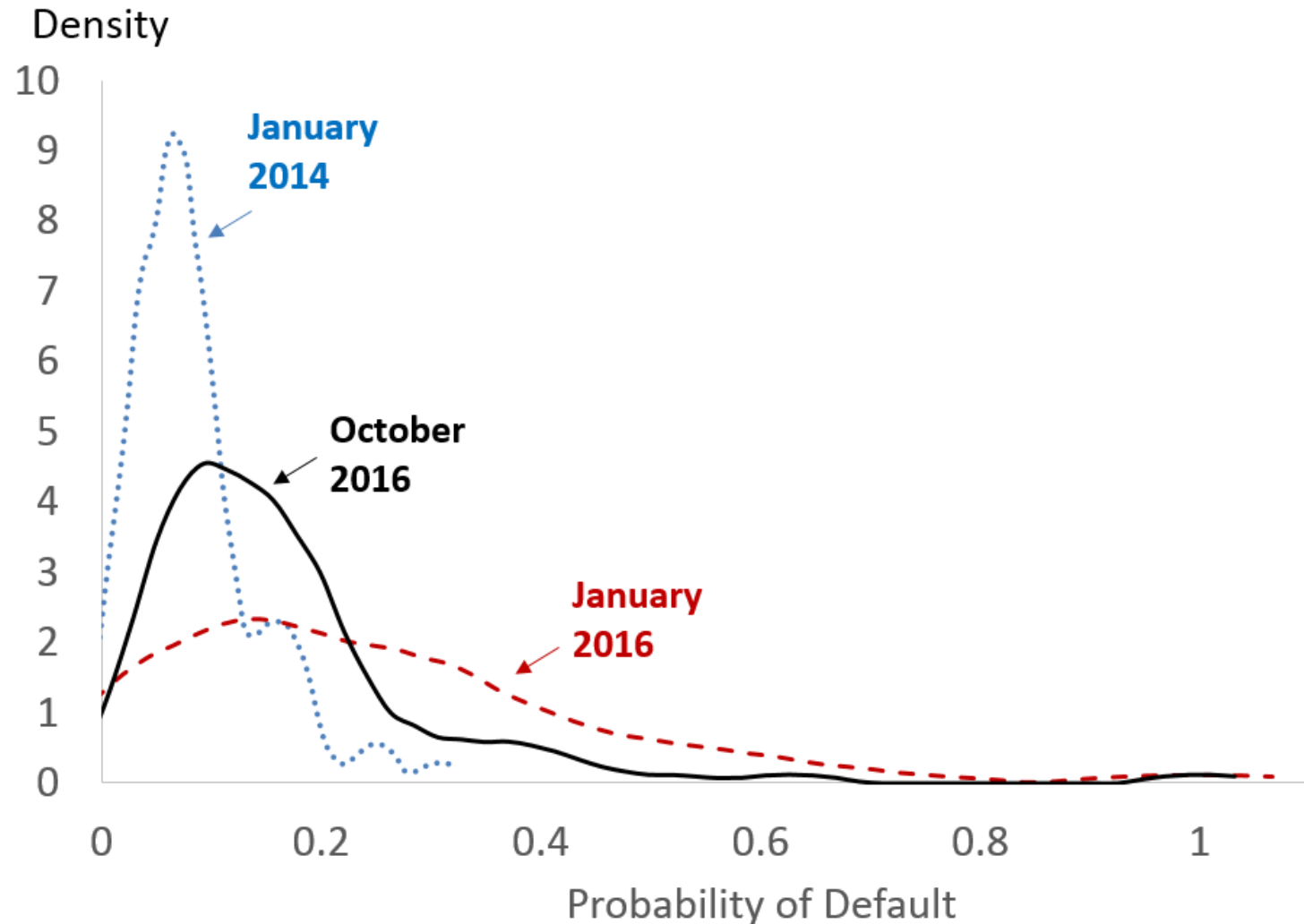
Debt servicing capacity deteriorated

— Exploration & production — Equipment & drilling services — Refining, storage, & transport — Integrated



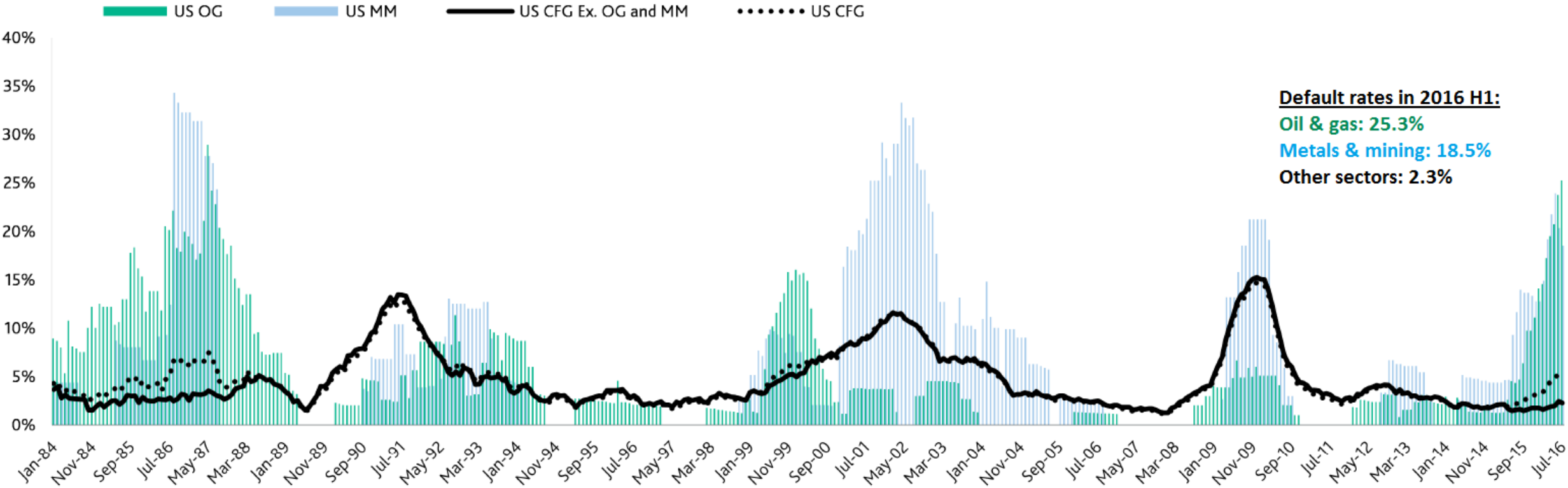
Based on a sample of 1,957 domestic and foreign oil and gas firms (722 US firms, 1,235 foreign firms)

Implied probabilities of default have declined since January 2016, but remain elevated



Source: Staff estimates using Markit data actively traded CDS contracts for 85 medium and large U.S. energy firms.

US O&G spec-grade defaults rising

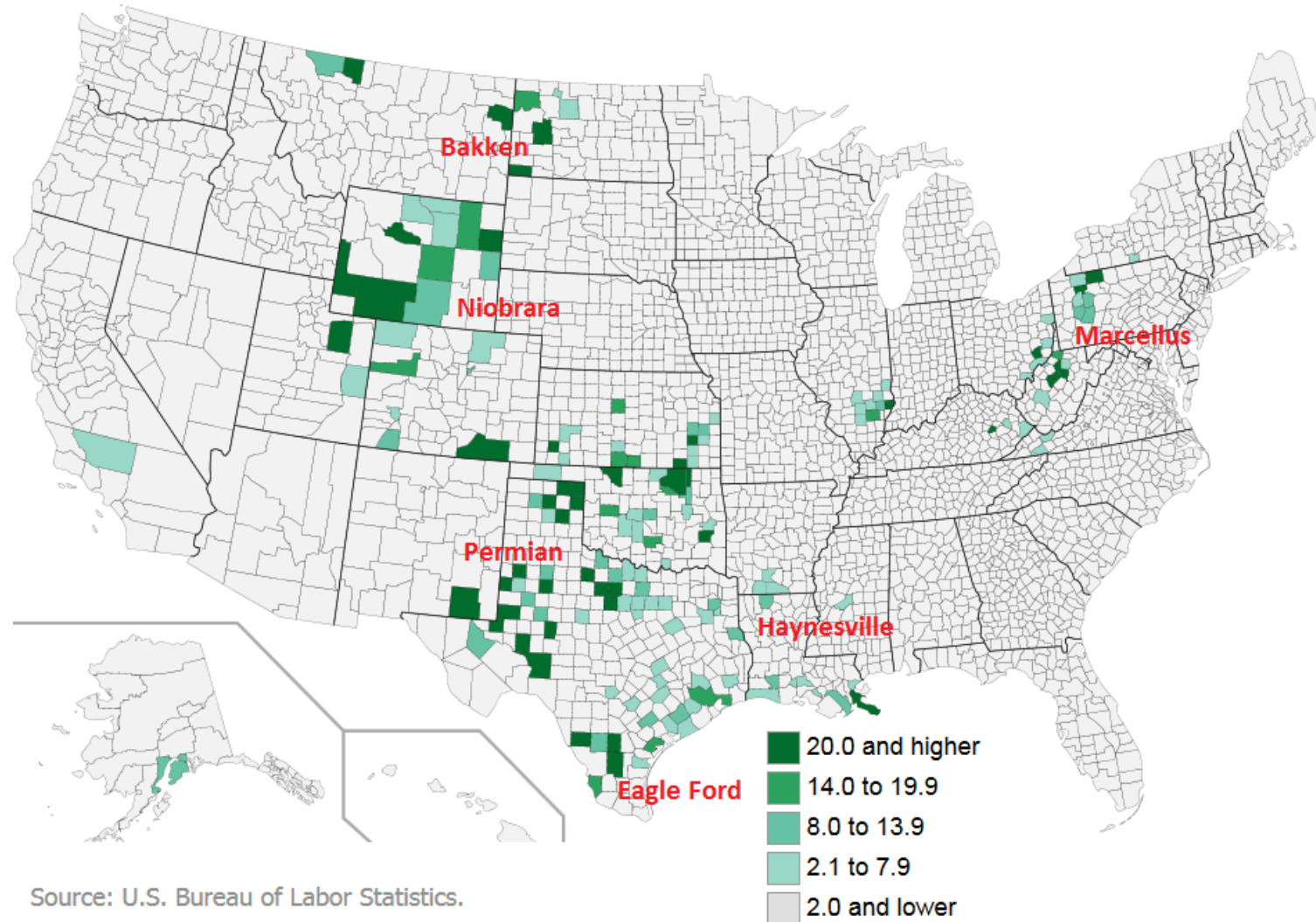


Default rates in 2016 H1:
Oil & gas: 25.3%
Metals & mining: 18.5%
Other sectors: 2.3%

“OG”- Oil&Gas companies; “MM”- Metals & Mining companies; “US CFG”- 12-month trailing spec-grade corporate default rate in US; “US CFG Ex. OG and MM”-12-month trailing spec-grade corporate default rate in US, excluding OG and MM.

Source: Moody's Investors Service

Concentration of O&G employment (location quotient*)



Source: U.S. Bureau of Labor Statistics.

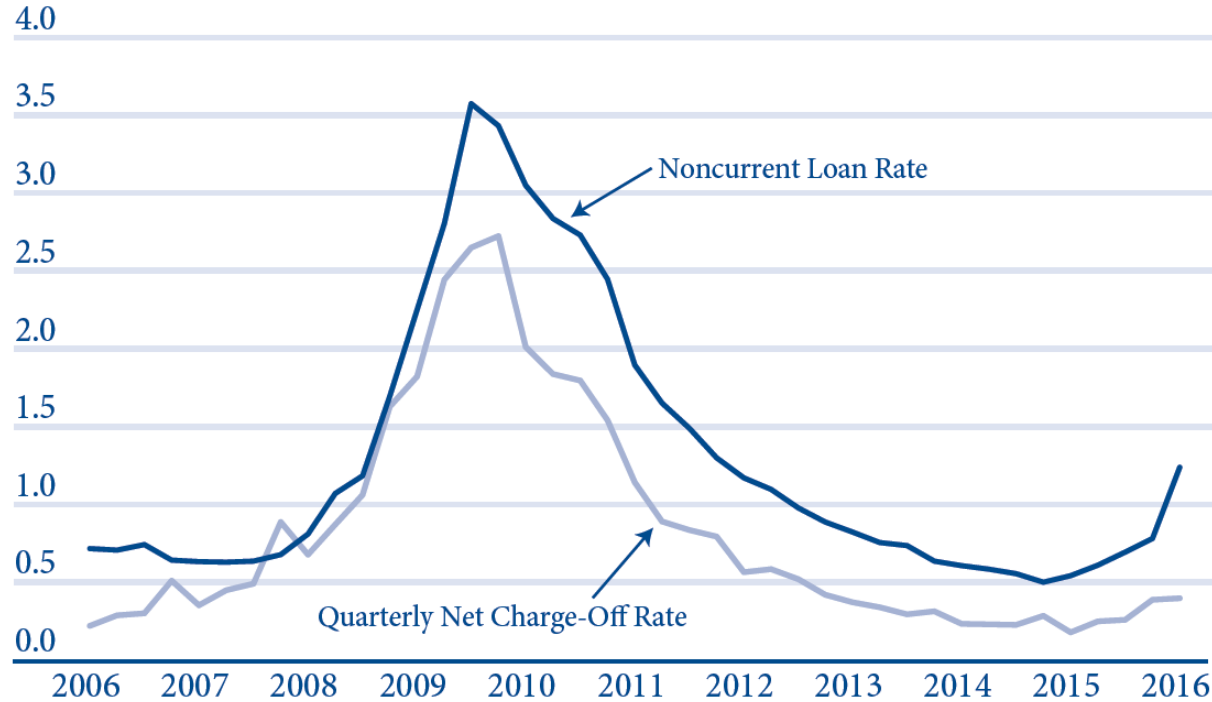
* Location quotients measure an industry's employment concentration in an area. A location quotient greater than 1 means that an industry's share of employment in an area is greater than the share for the entire United States.

Commercial & industrial (C&I) loan performance

C & I Loan Performance

All FDIC-Insured Institutions

Percentage



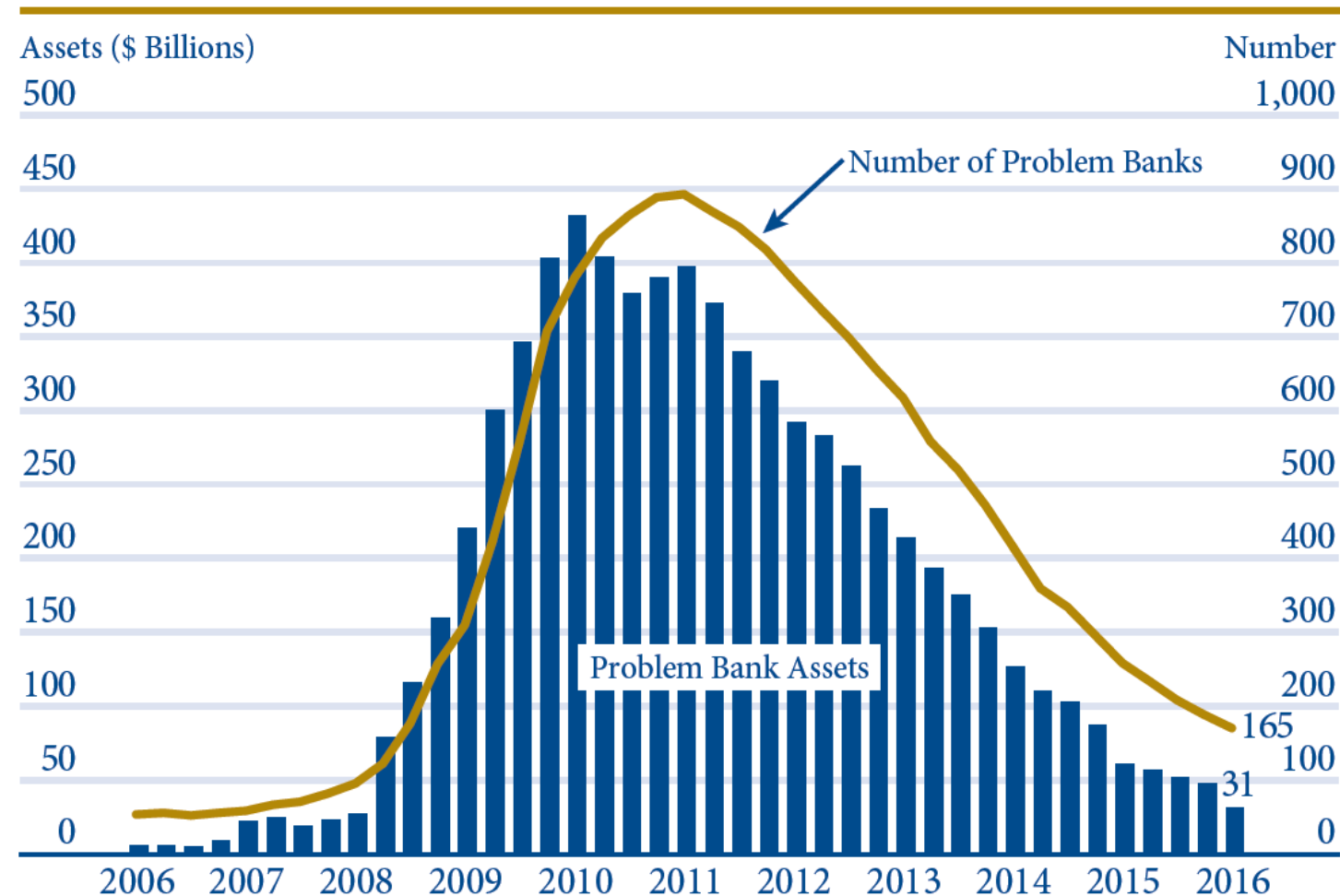
Source: FDIC.

Noncurrent loans are those that are 90 days or more past due or in nonaccrual status.

- Notable increase in noncurrent C&I loans in Q1
 - Largely due to O&G loans
 - Mostly at banks with assets greater than \$10 billion

Number of “problem” banks declining*

Number and Assets of Banks on the “Problem List”

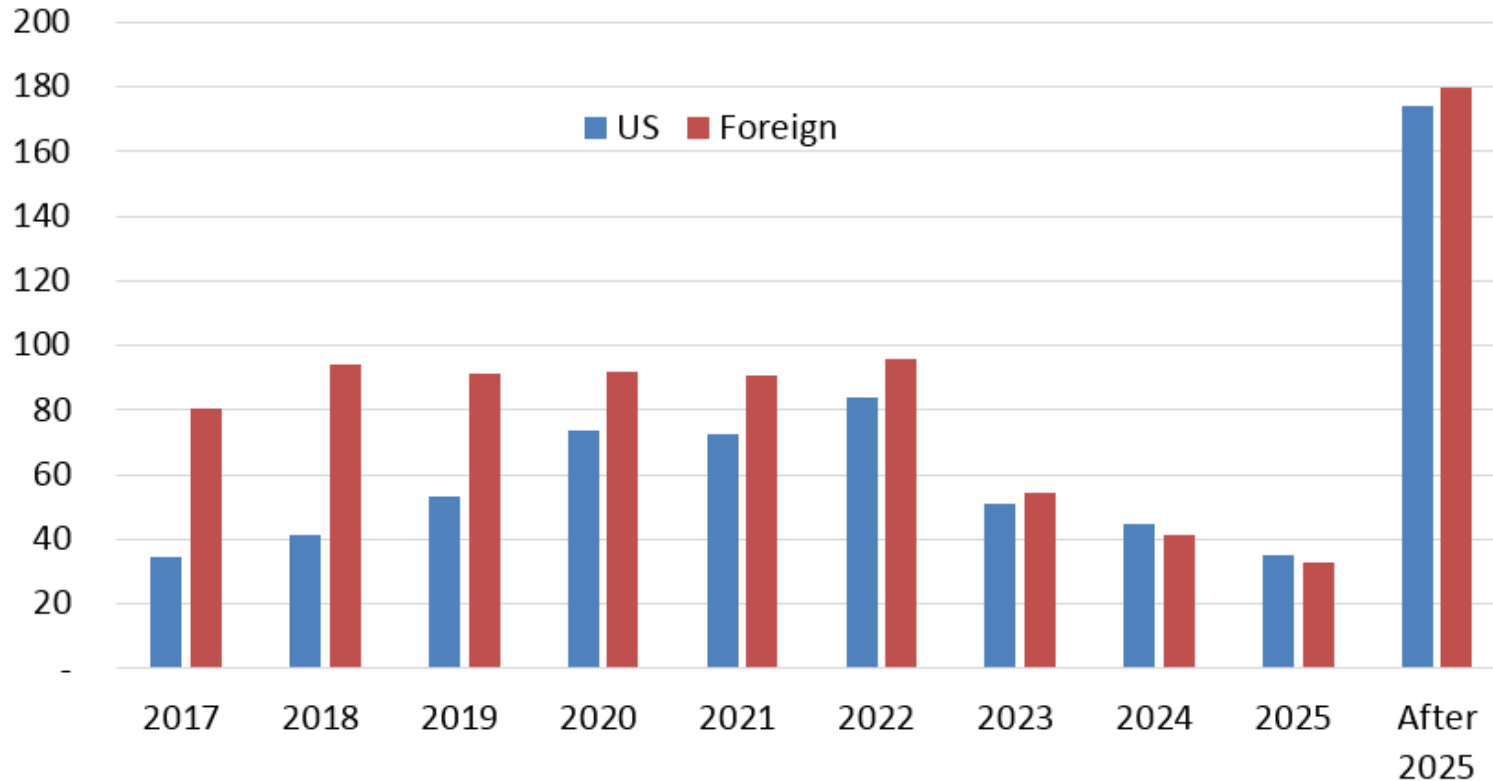


* “Problem” institutions are those with financial, operational, or managerial weaknesses that threaten their continued financial viability, with a supervisory rating of either 4 or 5 (on a scale of 1 to 5 in ascending order of supervisory concern.)

Oil prices have time to recover before majority of firms need to refinance or repay their bonds

Maturity Structure of Oil and Gas Speculative Grade Bonds

Billions of dollars



Total: \$1.52 trillion (as of Nov.14,2016)

Of which, US firms: \$670 billion

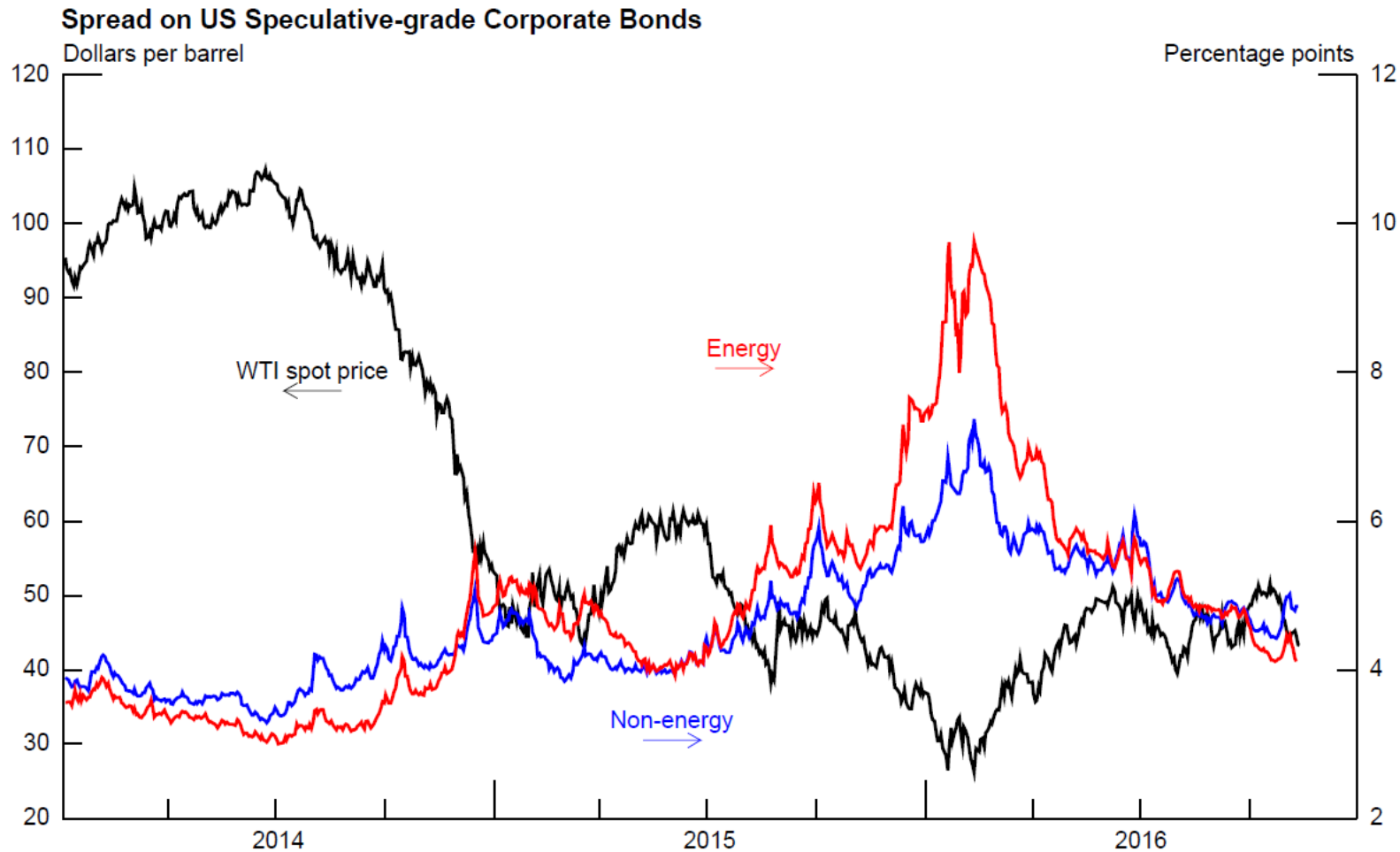
Of which, maturing in 2017-2018: 14%

Of which, foreign firms: \$850 billion

Of which, maturing in 2017-2018: 22%

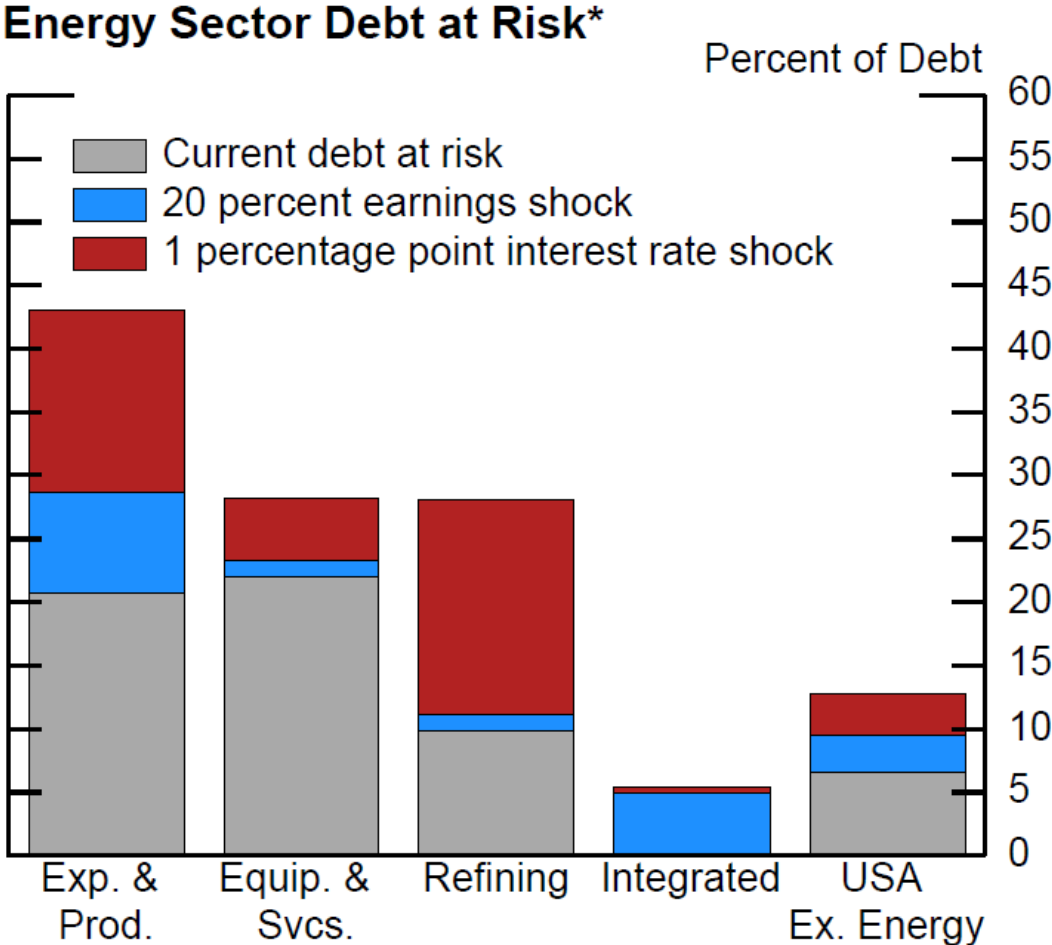
Source: Bloomberg. Includes only bonds rated BBB or lower according to S&P and Fitch, or those rated Baa2 or lower according to Moody's.

Potential for spillovers in bond markets



Source: Merrill Lynch. High yield indexes over relevant benchmark rate.

Debt at risk sensitivity analysis



FRB staff estimates using Capital IQ data.
 * Debt of firms with EBITDA / Int. Expense below 2 divided by total debt of all firms in sample.

Implications for financial stability

- The global energy sector remains vulnerable, as profitability remains weak and debt servicing capacity constrained by both weak earnings and high leverage
- However, the potential for further stress in the energy sector does not alone appear to pose significant risks to the U.S. financial system:
 - U.S. banks are well-capitalized and their exposure to energy firms is limited
- In the emerging market economies (EMEs), the largest oil & gas firms are nationally owned, so their troubles directly impact the sovereign sector
 - Fiscal balances have deteriorated significantly for oil-producing EMEs, which have been financing them with a combination of bond sales and withdrawals from foreign reserves (including sovereign wealth funds)
 - A default by a large EME corporate could potentially result in tighter financial conditions for other spec-grade oil firms
 - However, direct exposures of U.S. investors to the EM corporate sector are limited

References

- Ryan Decker, Aaron Flaaen, and Maria Tito (2016), “Unraveling the Oil Conundrum: Productivity Improvements and Cost Declines in the U.S. Shale Oil Industry,” FEDS Notes, March 22.
- Moody’s Investor Service (2016), “Lessons Learned from the 2015 Oil Bust,” Sept. 12.
- Federal Deposit Insurance Corporation (2016), *FDIC Quarterly*, 2016-Q1, volume 10 (2).
- Bureau of Labor Statistics, U.S. Department of Labor (2014), *The Economics Daily*, Counties with highest concentration of employment in oil and gas extraction, June.