

Natural Gas Price Trends

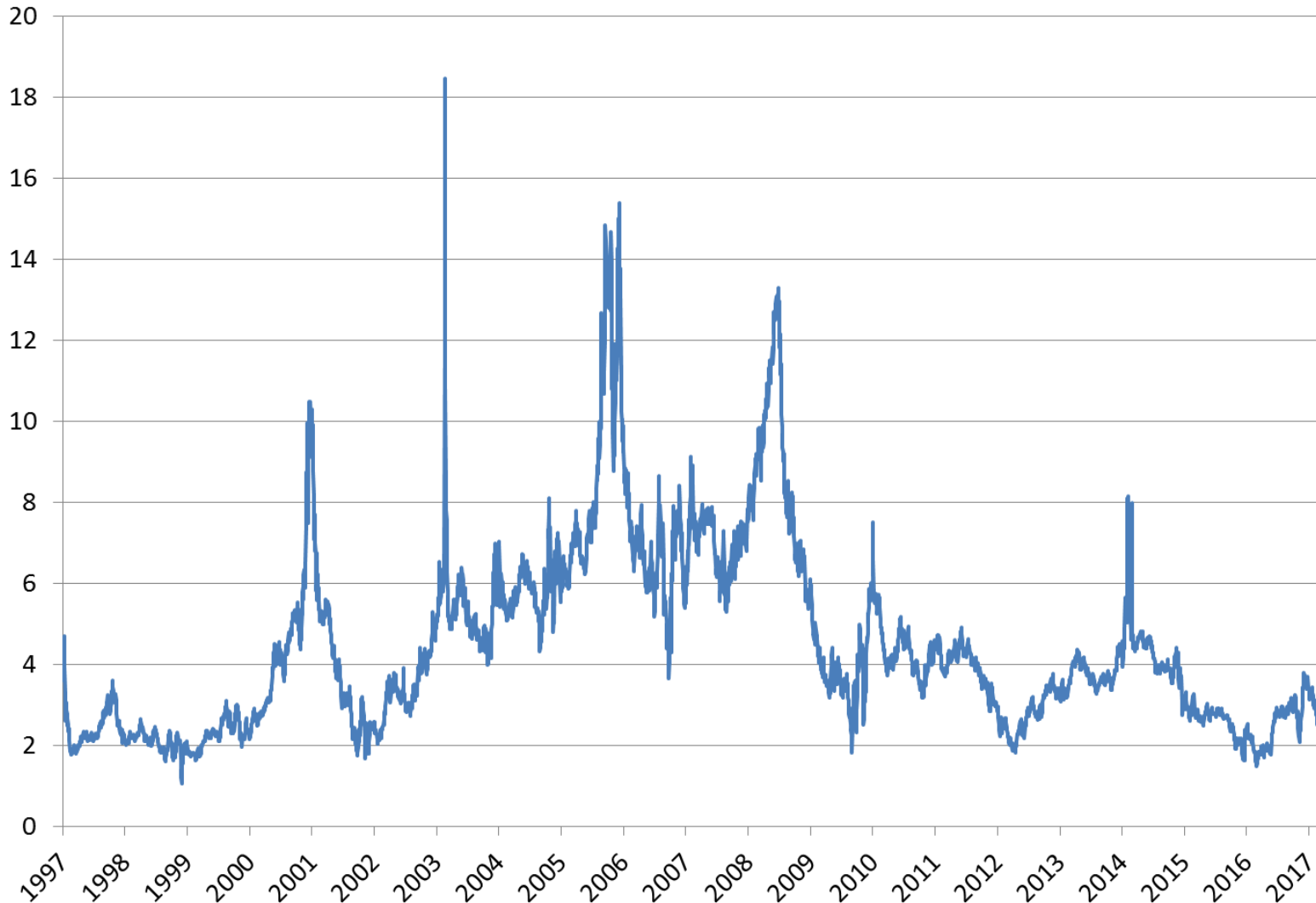
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2017 IRP Contemporary Issues Technical Conference

Indianapolis, IN

April 25, 2017

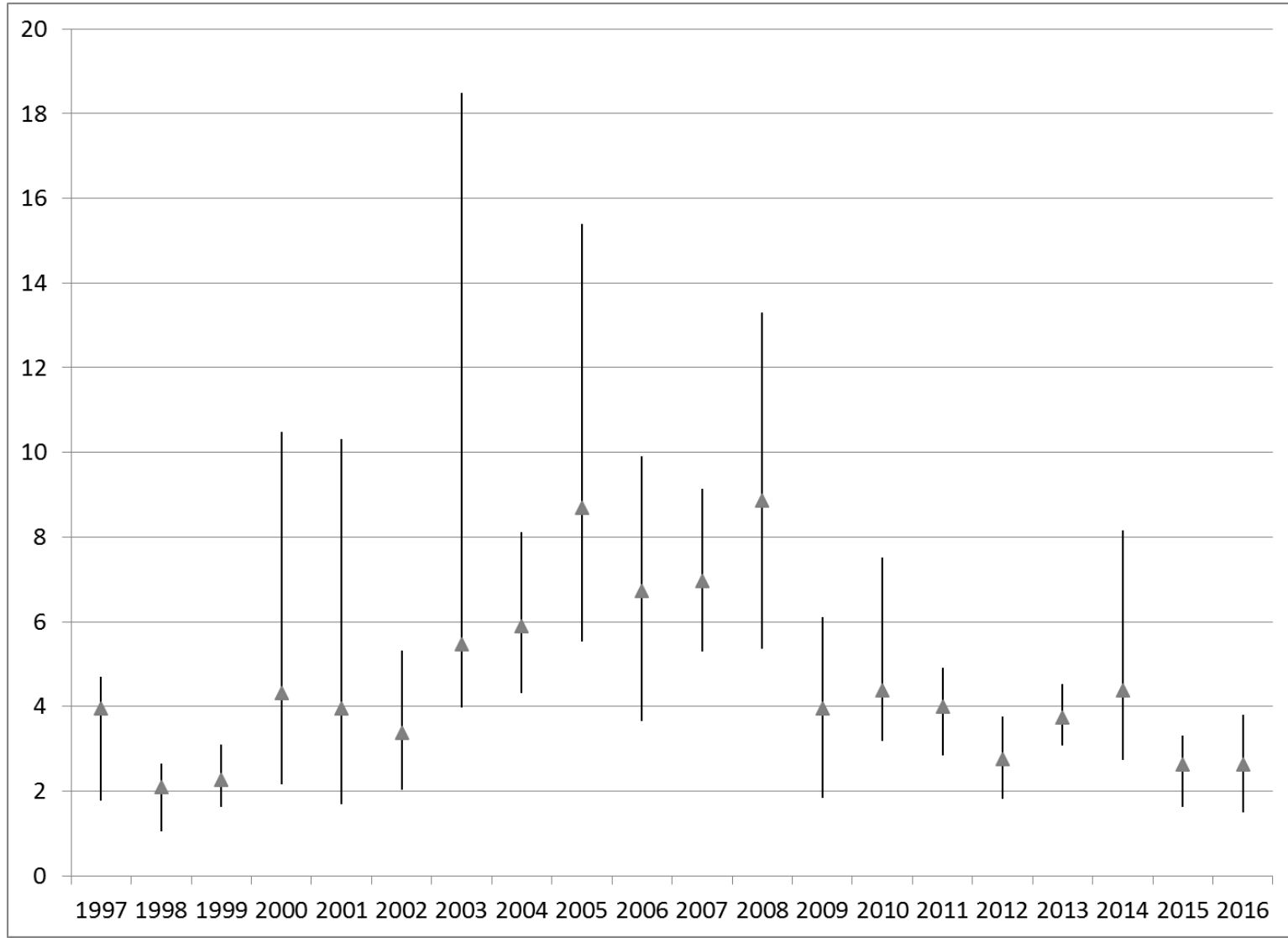
Henry Hub Gulf Coast Natural Gas Spot Price (\$/MMBTU)



Historical Price Spikes

- 2001 – very low storage entering winter
- 2003 – well freeze-offs in South with low storage after prolonged winter
- 2005/2006 & 2008 – hurricanes along Gulf Coast disrupted supply
- 2014 – polar vortex

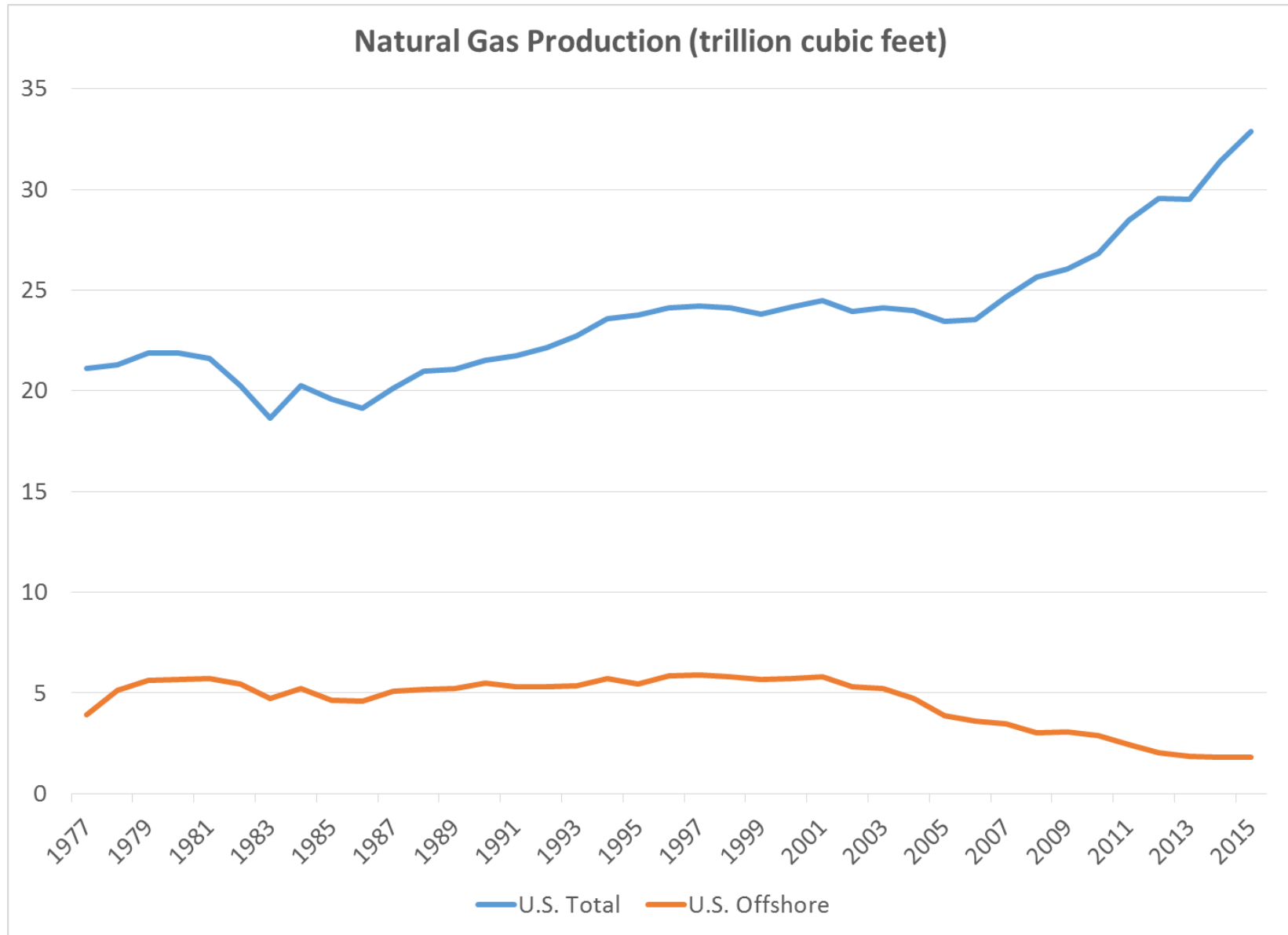
Natural Gas Price Spreads w/ Mean (▲)



Price Spreads

- Pre-fracking, spreads are commonly wide
- Post-fracking, spreads are narrow
 - extreme weather associated with the polar vortex caused a wider spread in 2014, but even that was much smaller than previous extreme years

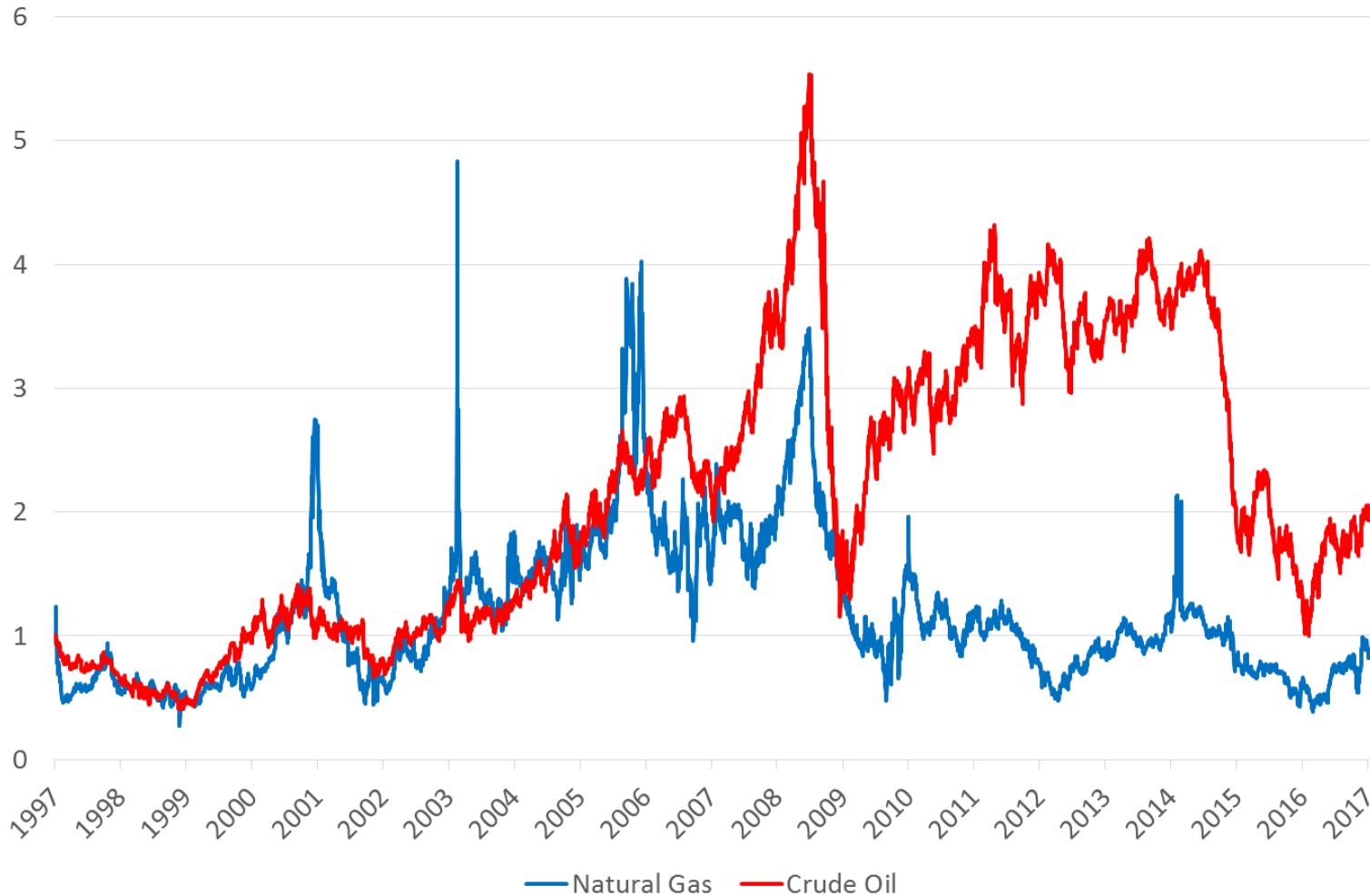
Natural Gas Production (trillion cubic feet)



Geographic Supply Diversity

- In 2015, eleven different states produced at least 2.5% of U.S. production
- Reliance on off-shore supply continues to fall
 - 21.6% in 2003
 - 8.5% in 2011
 - 5.5% in 2015

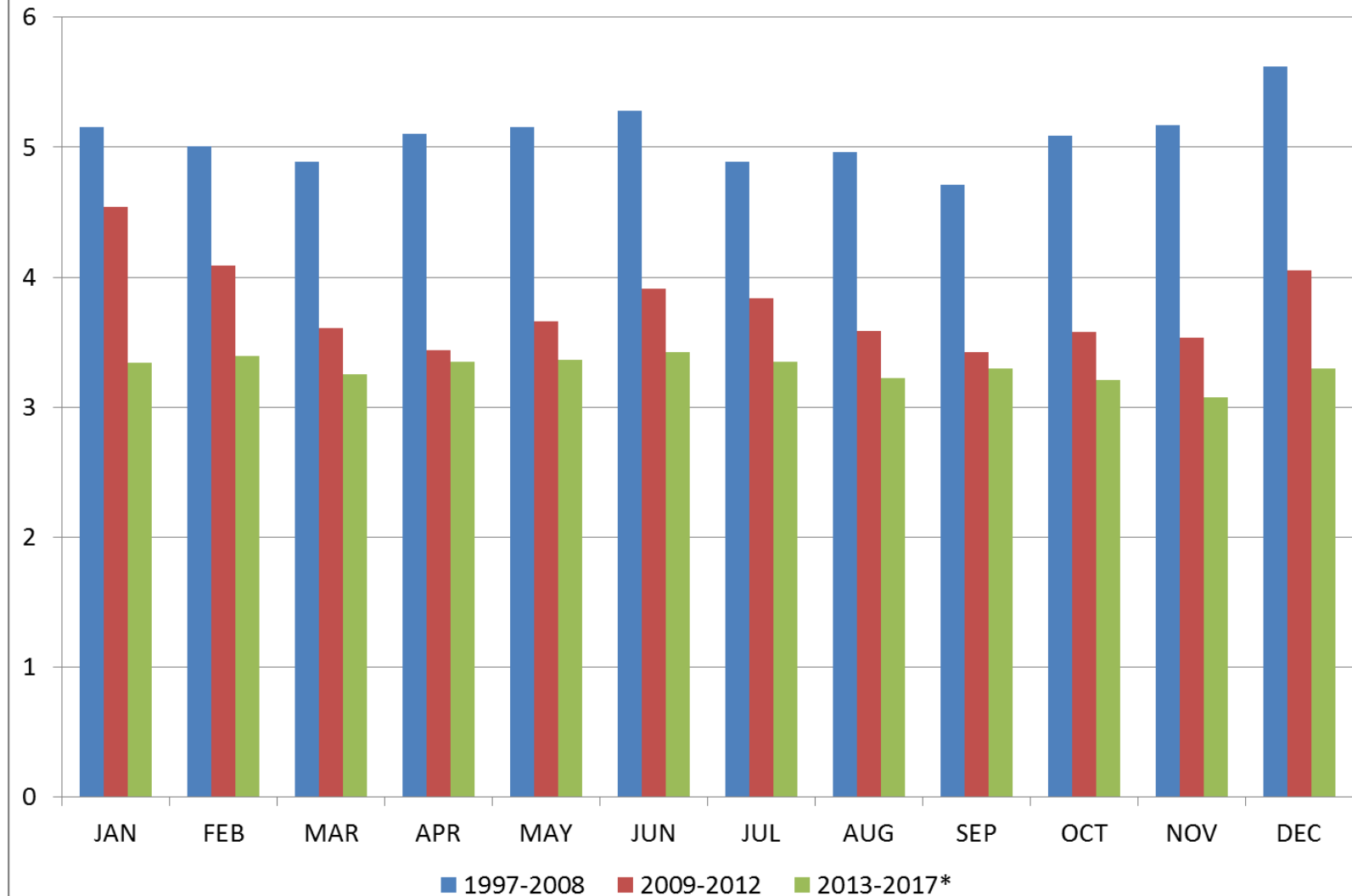
Henry Hub Natural Gas and West Texas Intermediate Crude Spot Prices
(normalized)



Natural Gas vs. Crude Oil

- Previous slide uses prices normalized to January 1997 to make the changes comparable
- Pre-fracking (1997-2008), oil and natural gas prices were strongly positively correlated (prices move up and down together)
- Post-fracking (2009-2012), prices separated and correlation was slightly negative
- More recently (2013-2017), positive correlation has returned, with both prices low and stable

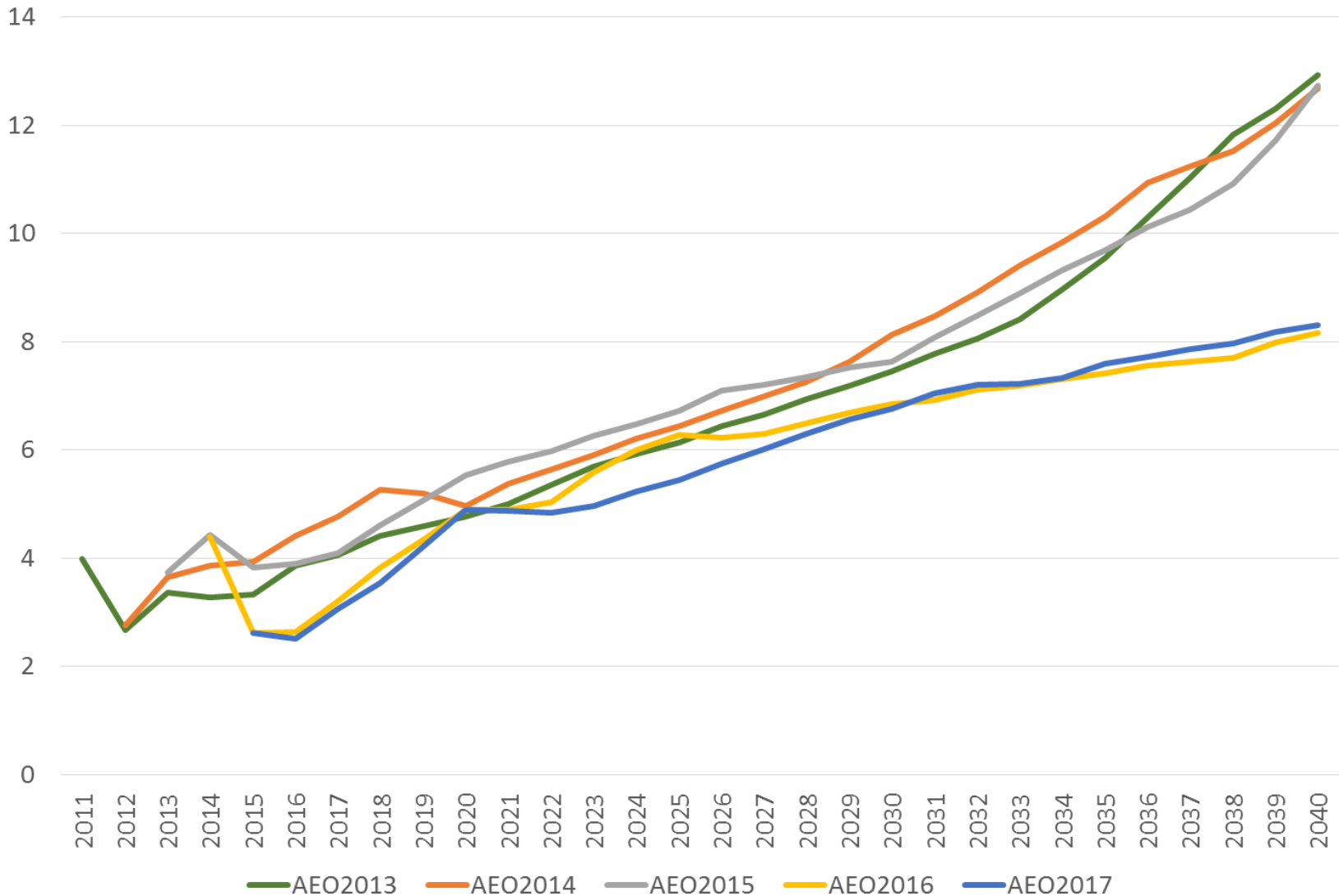
Henry Hub Natural Gas Monthly Average Price (nominal \$/mmBtu)



Monthly Mean Prices

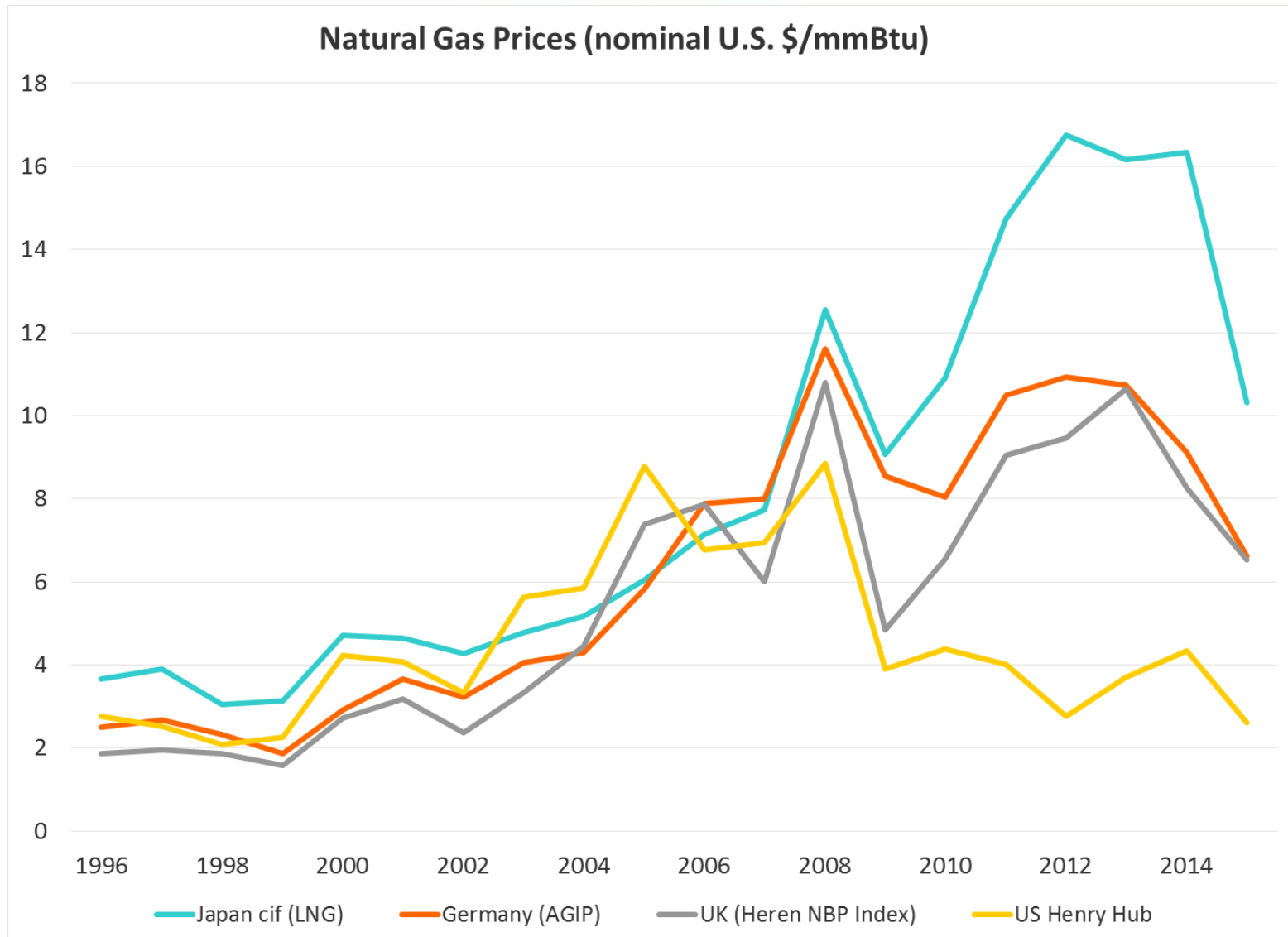
- For the two post-fracking periods, prices have been lower on average
- While the first two periods exhibit similar seasonal patterns (higher prices in winter/summer and lower prices in spring/fall), the most recent period shows little seasonal difference

EIA Henry Hub Price Forecasts (nominal \$/MMBtu)



Price Forecasts

- More recent forecasts have been for lower natural gas prices in the long-term
- EIA's April *Short-Term Energy Outlook* projects an increase in prices to average \$3.45/mmBtu in 2018 due to “new natural gas export capabilities and growing domestic natural gas consumption”



Data source: BP Statistical Review

LNG Exports

- Sabine Pass (LA) has two operational liquefaction units, with three more under construction
- Additional facilities under construction in TX, LA, and MD
- Lower overseas prices may be delaying further investment right now
 - Overseas prices still appear to be tied to oil prices

What Does This Mean?

- Evidence indicates that natural gas prices should remain fairly low and stable
 - Higher oil prices should result in increased LNG exports and domestic demand, but should also result in more drilling for wet gas
 - Supply is more diverse (reducing the impact of severe weather) and more elastic (allowing for a faster response to demand increases)