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Before the
U.S. House of Representatives
Committee on Small Business
Subcommittee on Agriculture, Energy and Trade

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Good morning Chairman Tipton, Ranking Member Murphy and distinguished Members of this Committee. Thank you for inviting me to contribute to your important discussion today regarding downstream challenges for small energy businesses. My name is Kevin Book and I head the research team at ClearView Energy Partners, LLC, an independent firm headquartered here in Washington D.C. that provides macro-level analyses to institutional investors and corporate strategic planners.

Mr. Chairman, I sit before you today with full recognition of the awesome challenge you and your colleagues face in reconsidering four decades of energy policy that was based on scarcity psychology so that our nation can best accommodate the rapid growth of new energy supply. Moreover, I appreciate the considerable emotional context and deep history that surrounds any discussion of whether and how to liberalize U.S. crude oil exports. It is no small thing to tackle U.S. oil policy – an issue that many Americans are likely to associate with energy insecurity – in an effort to maximize economic opportunity, and I am grateful for your efforts.

My testimony today suggests that even as many Americans celebrate the renewed production of light, sweet crude oil, current production trends may be creating an unstable equilibrium. Domestic crude supply appears poised to outgrow its available outlets under current export policy, creating uncertainty for upstream and downstream investments. Producers may soon see deeper discounts relative to global prices, while refiners must consider whether to commit capital to new infrastructure predicated in large part on these feedstock discounts. In my view, moving as quickly as possible towards a clear and durable policy decision regarding crude oil exports appears to in the interest of all parties.

Supply and Demand Are On the Move

Production of unconventional crude from shale and other tight formations ("shale oil") has been growing incredibly fast. On a trailing, twelve-month (TTM) average basis through March 2014, Energy Information Administration (EIA) statistics from the six regions the agency tracks in its *Drilling Productivity Report* (DPR) show 2.435 MM bbl/d[1] of incremental crude oil production relative to the CY2009 average[2].

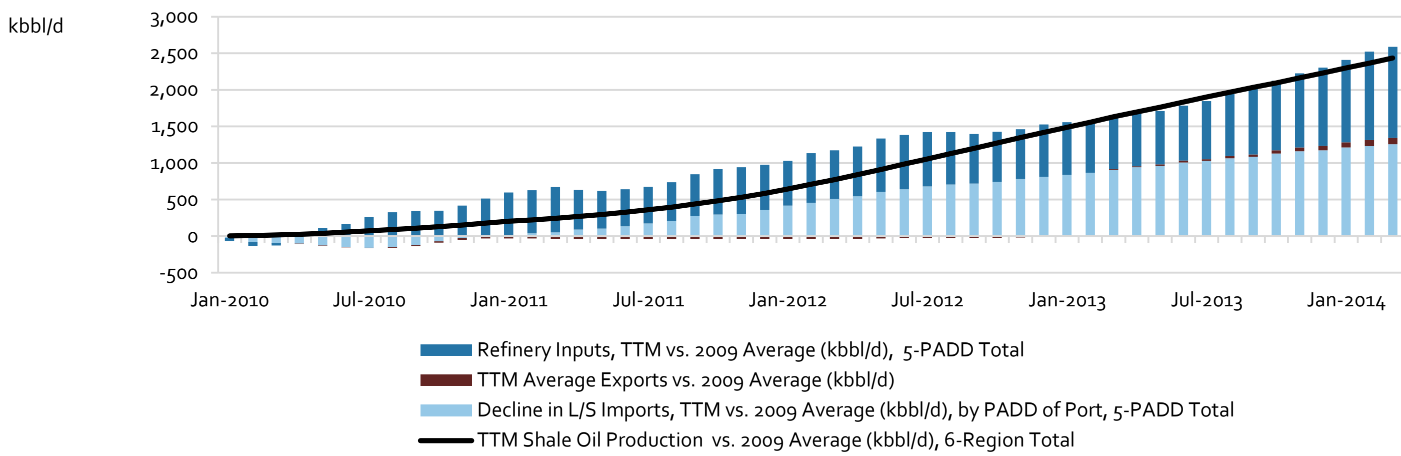
[1] This analysis employs a TTM average to smooth out seasonality, but backward-looking statistics have a tendency to understate late-breaking changes. On an absolute basis, six-region production in March 2014 was 2.859 MM bbl/d higher than it was in March 2009, according to EIA data.

[2] There are two reasons why 2009 presents itself as a useful baseline for comparisons. First, crude oil price benchmarks collapsed in the wake of the 2008 financial crisis, reaching lows in December of that year. This makes 2009 something of a "starting point" as global supply, demand and price climbed back to a *new normal*. Second, averaging EIA monthly data for U.S. field production of crude oil on a TTM basis, December 2008 also represented the "turning point" where long-declining production began to grow, making 2009 the first full calendar year of a *new era*.

Demand for shale oil has grown fast, too. Newfound U.S. volumes have gone to three principal outlets: (1) increased refinery utilization; (2) substitution for imported light, sweet crudes; and (3) exports to Canada. On a TTM average basis through March 2014, our firm's analysis of EIA data shows that U.S. refinery inputs increased 1.244 MM bbl/d and imports of light, sweet crude[3] decreased by 1.255 MM bbl/d relative to the CY2009 average. On a TTM average basis through March 2014, data from the International Trade Commission (ITC) at the Department of Commerce imply that exports to Canada increased by about 89 kbbl/d relative to the CY2009 average.

Figure 1 presents incremental shale oil supply (black line), incremental refinery inputs (dark blue bars), import substitution (light blue bars) and incremental exports to Canada (burgundy bars).

Figure 1 – Shale Oil, Refinery Utilization, Import Substitution and Exports to Canada (1/2010 – 3/2014 vs. CY2009), kbbl/d



Source: ClearView Energy Partners, LLC using EIA and ITC data

An Unstable Equilibrium

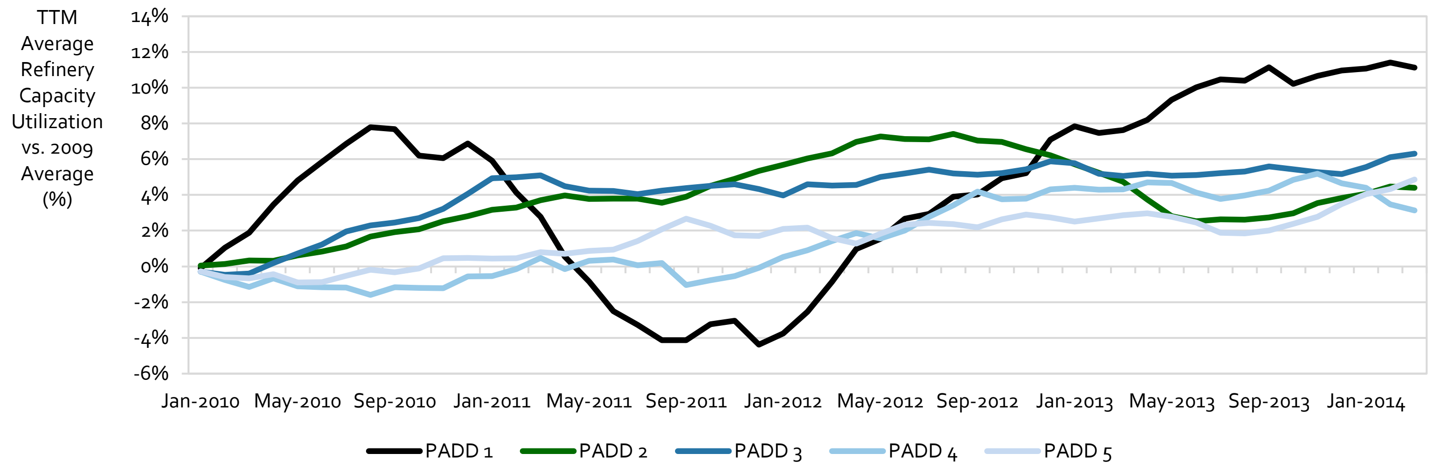
By all appearances, Figure 1 would suggest that supply and demand seem relatively balanced, but this conclusion deserves several *caveats.*

First, the six producing regions EIA tracks in the DPR represent most – but not *all* – of the incremental supply coming onstream. Including volumes from growing shale oil production in other regions – as well as incremental conventional and offshore production – would raise the black line a little higher above the colored bars, implying greater supply relative to demand (although not all of this production is light and sweet).

Second, petroleum refining is a manufacturing process that requires a certain amount of downtime to ensure safety and optimal performance. Notwithstanding questions of a mismatch between crude quality and refinery complexity, this limits the extent to which existing capacity can absorb incremental crude volumes without capacity expansions. Figure 2 presents incremental TTM average refinery capacity utilization in each of the five U.S. PADDs *vis-à-vis* the CY2009 average. Bottom line: refiners have already ramped up their throughput considerably.

[3] For the purposes of this this analysis, which relies on EIA's monthly, company-level import data, "light, sweet" crude is defined as having an API gravity greater than or equal to 31.2 degrees and a sulfur content less than or equal to 0.5%.

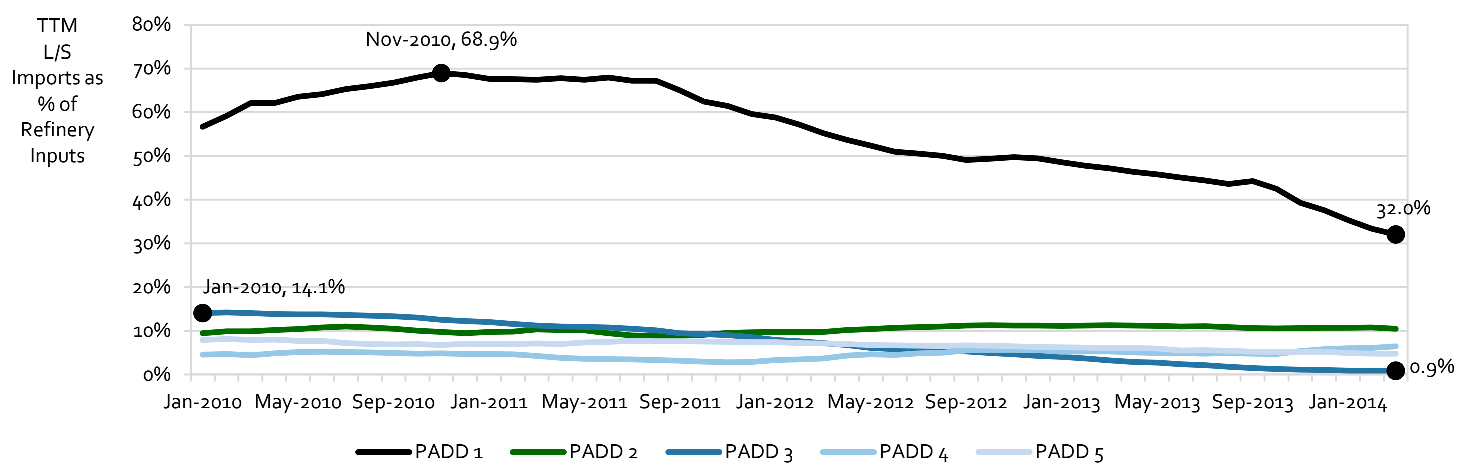
Figure 2 – Running Harder Already: Incremental Refinery Capacity Utilization (1/2010 – 3/2014 TTM vs. CY2009)



Source: ClearView Energy Partners, LLC using EIA data

Third, as Figure 3 shows, domestic production has already replaced nearly all of the volumes of light, sweet crude previously imported into the East Coast (PADD 1) and Gulf of Mexico (PADD 3), the U.S. regions that best lend themselves to import substitution[4]. In PADD 1, TTM light, sweet imports as a share of refinery inputs fell from about 69% in November 2010 to about 32% in March 2014. In PADD 3, light sweet imports as a share of refinery inputs fell from about 14% in January 2010 to less than 1% in March 2014. These trailing averages in Figure 3 somewhat understate circumstances on the ground. For example, in March 2014, the U.S. imported 223 kbbl/d of light, sweet crude into PADD 1 and only 16 kbbl/d into PADD 3, compared to CY2009 averages of 682 kbbl/d and 1.073 MM bbl/d, respectively.

Figure 3 – Light, Sweet Imports by Destination PADD as % of Refinery Inputs, TTM Average, 1/2010 – 3/2014



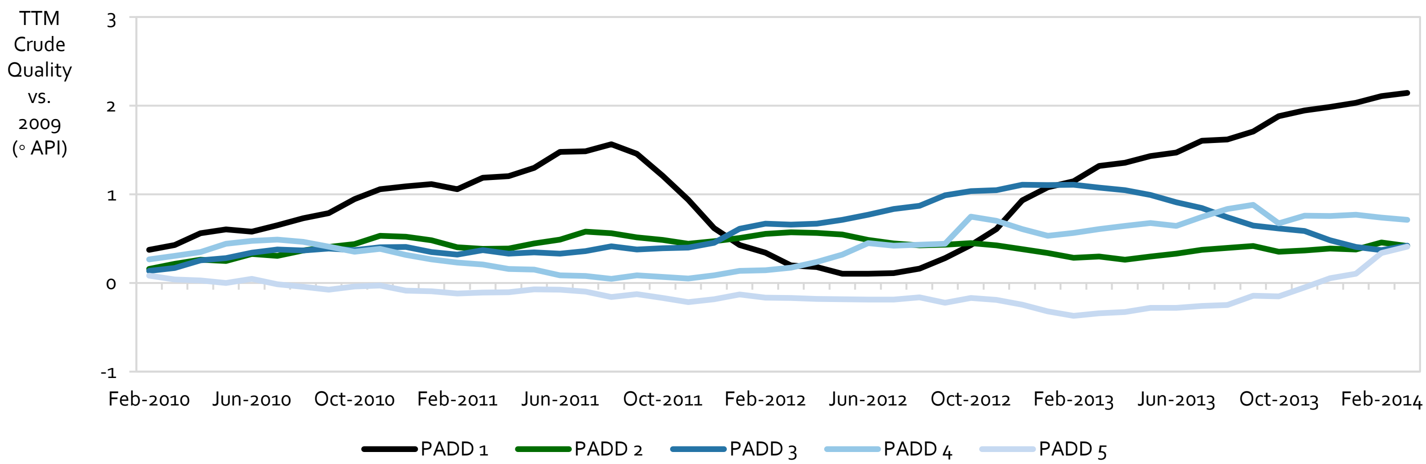
Source: ClearView Energy Partners, LLC using EIA data

Fourth, during the course of the last two decades, much of the U.S. refinery fleet was upgraded to process heavy, sour crude. These "high complexity" refineries can take advantage of lower quality feedstock that generally prices at a discount to light, sweet crude. This feedstock advantage – in tandem with low-cost natural gas as a source of process energy – has historically enabled many high-complexity refiners to generate better refining margins than overseas

[4] The Petroleum Administration for Defense Districts (PADDs), created during World War II for gasoline rationing purposes, divided the country into five regions. Government and industry analysts continue to reference these regions in their analyses today. PADDs 1, 3 and 5 directly receive crude from the open seas, and PADDs 3 and 5 have historically received greater volumes of light, sweet crude imports (imports into PADD 5 have increasingly replaced medium and heavy, sour Californian and Alaskan crude.)

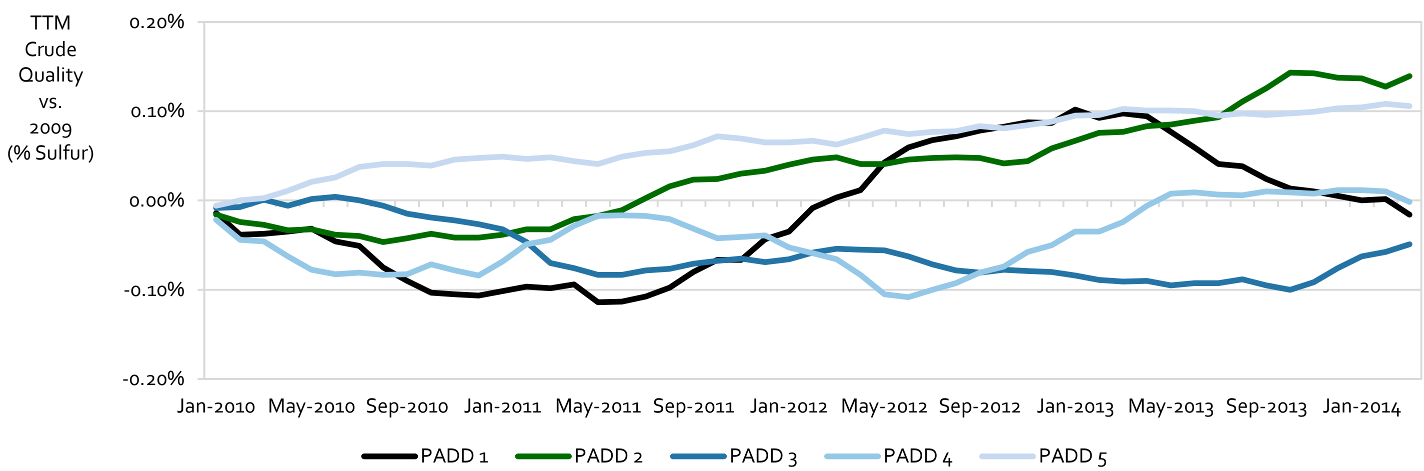
competitors. Moreover, many of the heavier crudes for which these refineries are configured tend to yield a thicker "cut" of the middle distillates (i.e., diesel fuel, kerosene and kerosene-type jet fuel) that often earn a premium relative to other products (i.e., gasoline, for which U.S. demand appears likely to trend flat-to-down for the next decade). In short, as the U.S. crude mix gets lighter and sweeter (Figures 4 and 5), U.S. producers must offer the nation's newly upgraded refiners discounts to encourage greater acquisition of a less suitable feedstock.

Figure 4 – Getting Lighter? EIA Weighted Average API Gravity by PADD (1/2010 - 3/2014 TTM Average vs. CY2009)



Source: ClearView Energy Partners, LLC using EIA data

Figure 5 – Getting Sweeter? EIA Weighted Average Sulfur Content by PADD (1/2010 – 3/2014 TTM Average vs. CY2009)



Source: ClearView Energy Partners, LLC using EIA data

Fifth, and perhaps most importantly, the EIA, the International Energy Agency (IEA) and many private forecasters (including my firm) expect U.S. crude production in general – and shale oil production in particular – to continue growing in the years ahead, likely exhausting import substitution here in the U.S. (and, eventually, in Canada) and outgrowing the ability of U.S. and Canadian refineries to increase their runs without expansions and/or modifications that require non-maintenance capital expenditures.

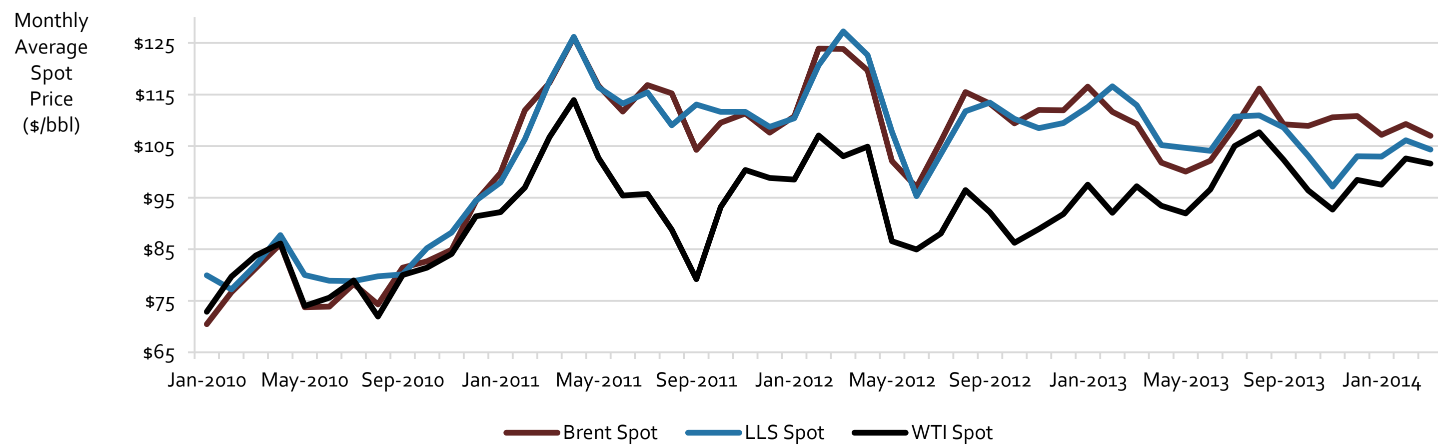
The Prospect of "Saturation"

Taken together with current U.S. policies largely prohibiting the export of crude oil, these *caveats* create the prospect that the U.S. could soon become "saturated" with light, sweet crude. The Light Louisiana Sweet (LLS) benchmark may provide an early indication of approaching saturation. LLS crude is comparable to the Brent benchmark (the light, sweet standard that forms the basis for the pricing of two-thirds of the world's oil).

Until recently, the LLS price (which is set in the U.S. Gulf Coast) tended to trade largely in line with the Brent price (which is set in the North Sea), reflecting similarity between the two. Last fall, however, LLS prices plummeted dramatically. This may be explained by atypical refinery outages during the "turnaround" (maintenance) season.

The price collapse may also have provided markets with a sign that the supply of light, sweet crude could be getting ahead of U.S. refiners' demand for that oil, especially in PADD 3. To this point, LLS prices (blue line in Figure 6) never fully converged back to Brent (red line).

Figure 6 – Early Indications of Saturation? Brent vs. WTI and Louisiana Light Sweet (Monthly $/bbl), 1/2010 – 3/2014



Source: ClearView Energy Partners, LLC using Bloomberg and EIA data

Enduringly high global crude oil prices have encouraged ongoing U.S. production, but widening discounts to global prices still have potential to discourage new upstream investment. Unlike ultra-deepwater projects that cost hundreds of millions of dollars and may take anywhere from two to five years to bring onstream, shale oil wells are characterized by (relatively) granular investment ($5-15 MM apiece) and rapid turnaround (from days to weeks, rather than years). Most producers plan their drilling programs six to twelve months ahead, but the smaller investment and faster completion of shale wells theoretically offers them the ability to change their drilling plans in the event that saturation leads to a sustained, atypical discount.

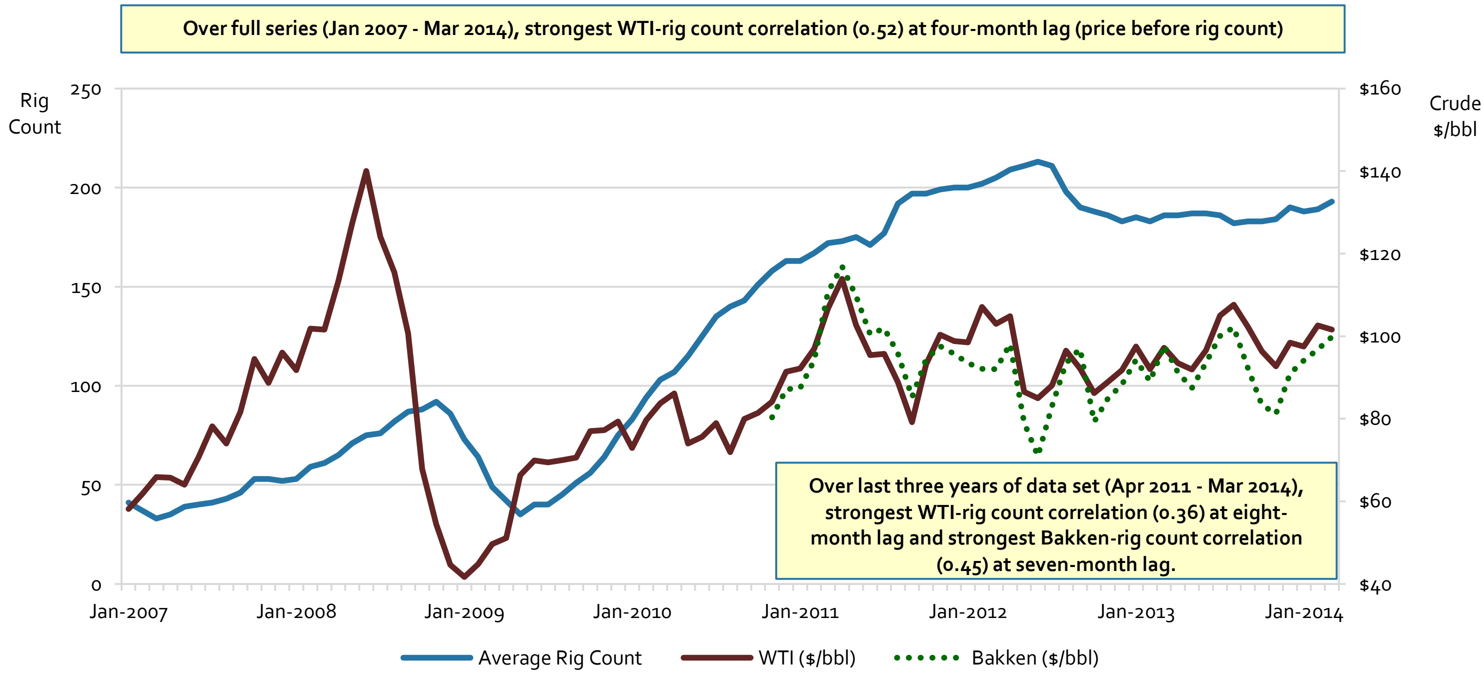
"Skid Marks"

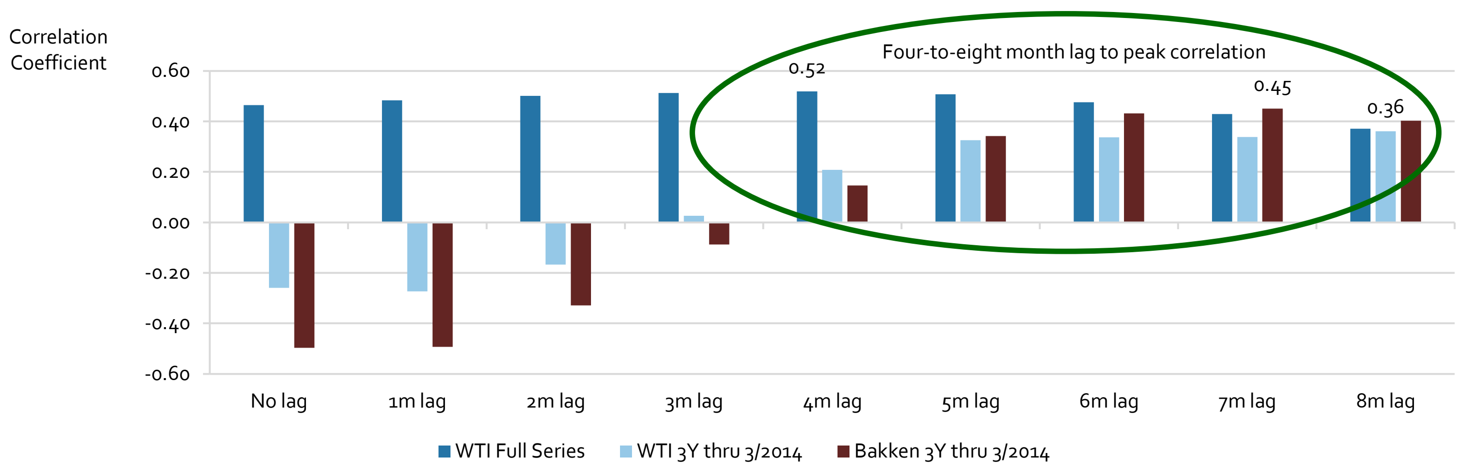
Unconventional crude oil production from shale and other tight formations is of recent vintage, and global crude prices have been relatively stable during the last three years. As a result, recent history provides few good examples of this sort of price-driven drilling slowdown. Figure 7 offers an imperfect proxy by examining correlations between crude prices and rig counts[5] in the Bakken compiled by the North Dakota Petroleum Commission (NDPC) between January 2007 and March 2014.

[5] Rig counts may be an imperfect proxy for activity levels because producers have achieved greater productivity per rig as they have traversed their shale oil learning curves.

Over the full data series, the strongest rig count-price correlation with WTI (0.52) occurs with a four-month lag (rig count after price). During the three years through March 2014, the strongest rig count-price correlations occur for the Bakken benchmark (0.45) with a seven-month lag, and for WTI (0.36) with an eight month-lag. This suggests somewhere between four and eight months of "skid marks" between a price collapse and a production slowdown, an implication that intuitively comports to the granularity of shale well investment.

Figure 7 – Bakken Data Suggest Four-to-Eight Months of "Skid Marks" before (Some) Drill Bits Stop Turning





Source: ClearView Energy Partners, LLC using Bloomberg, EIA and NDPC data

Jobs Multipliers Can Work in Reverse

The five states with the greatest shale oil production growth relative to CY2009 also demonstrated estimable employment and tax revenue gains, as presented in Figure 8.

Figure 8 – States with Significant Production Gains Also Saw Employment and Tax Revenue Benefits

State	Change in Production (T4Q Avg., 4Q2012 vs. 4Q2009), kbbl/d	Change in Production (T4Q Avg., 4Q2013 vs. 4Q2009), kbbl/d	Change in Unemployment Rate (T4Q Average, 4Q2012 vs. 4Q2009), %	Change in Unemployment Rate (T4Q Average, 4Q2013 vs. 4Q2009), %	Change in Tax Revenues (T4Q Average, 4Q2012 vs. 4Q2009), %	Change in Tax Revenues (T4Q Average, 4Q2013 vs. 4Q2009), %
TX	479	1,463	-0.6%	-1.2%	25.2%	33.6%
ND	252	640	-1.1%	-1.2%	96.8%	170.9%
OK	37	123	-1.3%	-1.2%	22.9%	24.7%
NM	36	105	0.2%	0.0%	14.5%	19.8%
CO	31	93	-0.3%	-1.3%	29.2%	39.1%

Source: ClearView Energy Partners, LLC using BLS, Census and EIA data

Generally speaking, energy production is characterized by relatively low labor intensity in contrast to other sectors of the economy. Some researchers credit an underlying jobs "multiplier" for production-related economic upside, meaning that states don't just realize direct economic benefits from upstream production activities, but also benefits from the activities indirectly associated with production as well as the jobs "induced" by new income[6].

Put another way, oil and gas production jobs may have disproportionate economic impact because of this multiplier, and it may be worth considering the extent to which a jobs multiplier could also work in reverse. In that vein, if saturation leads to a production slowdown, the undesirable economic impacts that result could reach well outside the oil patch.

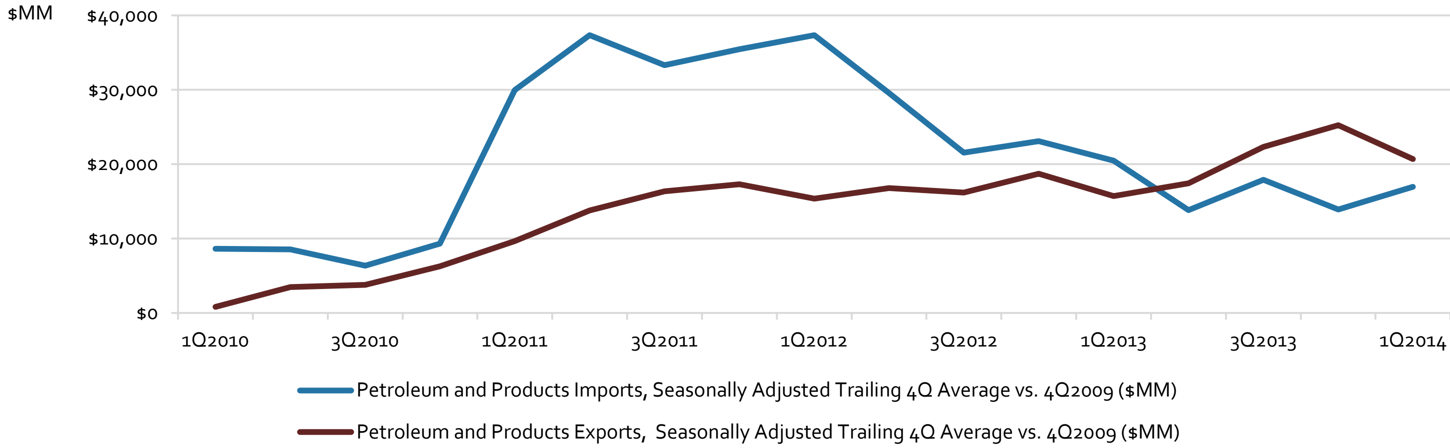
In the last year, articles appearing in the news media have framed the discussion of whether and how to liberalize U.S. crude oil exports as a question of allocating economic "rents" between upstream producers and downstream refiners. Indeed, current U.S. crude oil export prohibitions tend to favor refiners – especially low complexity refiners that rely on light, sweet crudes – by providing them with discounted feedstock relative to their global competitors (refined products may be exported essentially without limitation).

As Figure 9 demonstrates, on a trailing, four-quarter (T4Q) average basis compared to CY2009, petroleum and products exports through 1Q2014 were responsible for roughly $20 billion per quarter in incremental trade benefits. On the other side of the national energy balance sheet, a reduction in petroleum and products imports – which reflects import substitution and increased domestic refining activity – accounted for trade benefits of equivalent scale since 2Q2011. Taken together, this implies that importing less petroleum of all kinds and exporting more refined products appears to be responsible for roughly $40 billion per quarter in combined trade benefit[7].

[6] See Larson, J., R. Fullenbaum, R. Slucher et al. *America's New Energy Future: The Unconventional Oil and Gas Revolution and the US Economy,* Volume 1. IHS/IHS CERA/IHS Global Insight: October 2012, pp. 26-35. Volume 2 of the IHS study, released in December 2012, suggests that significant economic benefits also inhere to states without unconventional production activities, as well.

[7] This $40 billion corresponds to the sum of the $20.675 billion in incremental petroleum and products exports since CY2009 and the difference between 2Q2011 petroleum and products imports ($37.321 billion) and 1Q2014 petroleum and products imports ($16.926 billion), representing a beneficial reduction of $20.394 billion (all figures quoted are on a seasonally adjusted basis).

Figure 9 – Balance of Trade Benefits on Both Sides: Trailing 4Q Averages vs. 4Q2009 ($MM)



Source: ClearView Energy Partners, LLC using BEA data

Conclusion

It may be tempting to extrapolate from the *status quo* and conclude that continuing current policies might perpetuate the downstream economic benefits observed to date, particularly if U.S. refiners add capacity to take advantage of discounted feedstock. As of this month, companies have announced between 450 and 700 kbbl/d of refinery capacity expansions and new projects[8] in the U.S. (depending on one's definition of capacity) to process light, sweet crude and condensates from unconventional production.

On the other hand, the *status quo* may not hold for several reasons, even without liberalized crude oil exports. First, saturation could lead producers to pare back upstream investment, particularly if global crude prices trend downward, leading to tighter supply and incrementally higher feedstock costs for U.S. refiners. Second, significant downstream capacity expansions could exert upward pressure on feedstock costs from the demand side, too. However they come about, higher feedstock costs could weaken the business case for capacity expansions and new facility construction. That said, U.S. refiners appear likely to continue to enjoy lower process energy costs even if feedstock costs rise, contributing to ongoing competitive advantage (every $1/MMBtu in natural gas price discount relative to overseas prices can lower processing costs by between $0.25 and $0.50 per barrel).

Mr. Chairman, this concludes my prepared testimony. I will look forward to any questions at the appropriate time.

[8] See Meyer, G. and E. Crooks. "U.S. oil industry finds way around export ban." *Financial Times*. June 9, 2014. See also Friedman, N. "Condensate about to have its moment." *Wall Street Journal*. June 5, 2014.