



SPRING 2016

CONTRIBUTING EDITOR'S COLLECTION

"WHEN HAS OPEC SPARE CAPACITY
MATTERED FOR OIL PRICES?"

"WHAT ARE THE SOURCES OF
RETURN FOR CTAs AND
COMMODITY INDICES? A BRIEF
SURVEY OF RELEVANT RESEARCH"

"CASE STUDIES FROM
COMMODITY DERIVATIVES
DEBACLES"

"BRIEF CASE STUDIES ON FUTURES
CONTRACT SUCCESSES AND
FAILURES"

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GLOBAL COMMODITIES APPLIED RESEARCH DIGEST

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Contributing Editor's Collection

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This collection of four separate digest articles provides answers to the following questions:

- When has OPEC spare capacity mattered for oil prices?
- What are the sources of return for CTAs and commodity indices?
- What are the risk-management lessons from high-profile commodity derivatives debacles?
- What determines whether commodity futures contracts succeed or not?

Each article takes a different approach in answering these questions, as noted on the next page.



Hilary Till, M.Sc. (Statistics), Solich Scholar, J.P. Morgan Center for Commodities (JPMCC) at the University of Colorado Denver Business School, posing a question at the JPMCC's Research Council meeting on December 4, 2015. She is flanked (left) by Dr. Sueann Ambron, Former Dean of the Business School and Senior Advisor, JPMCC; and (right) by Dr. Thomas Brady, Chief Economist at Newmont Mining Corporation; and (immediate foreground) by Dr. Margaret Slade, Professor Emeritus, Vancouver School of Economics, University of British Columbia and Co-Chair of the JPMCC Research Council.



Original Empirical Analysis

The first article on OPEC spare capacity and oil prices examines historical data and finds that at least in the past, OPEC spare capacity has only mattered when (U.S.) crude oil inventories have been low. The article does raise the question on whether a focus on OPEC behavior will continue to be relevant if America's shale industry has replaced OPEC as the oil market's "swing producer."

Survey of Empirical Research

The second article on Commodity Trading Advisors (CTAs) and commodity indices surveys empirical research on the long-term drivers of return for futures programs. From this survey, one can find strong evidence that there are persistent returns in futures programs due to momentum, roll yield, and also due to rebalancing. Further, a CTA investor may also require that a program's dynamic trading strategies produce returns that have options-like payoff profiles; and institutional investors expect commodity index programs to provide diversification for their balanced equity-and-bond portfolios.

Industry Case Studies

The third article on commodity derivatives debacles uses case studies to infer key risk-management lessons. Each of the case studies did not involve complex mathematical issues; instead, they can each be summarized as fundamental control problems. Large commodity derivatives trading companies must emphasize (1) compliance with regulatory rules and laws; (2) the valuation of derivatives instruments by third parties independent of front-office personnel; and (3) the imposition of position limits in all electronic trading systems.

A Complex System Modeled as a Competitive Game

The fourth article on futures contract successes and failures treats the futures markets as a competitive game. Specifically, futures trading can be seen as a game where the competing players, the hedgers and speculators, each have sufficient economic reasons to participate. The referee of this game, the government authorities, has the power to stop the game, if there is not a convincing economic rationale for a futures contract's existence. Therefore, a futures contract can only succeed if it responds to a hedging need, and if speculators are able to manage the risk of taking on hedger positions. In addition, if one cannot make a convincing case that a contract serves an economic purpose, then the contract is at risk to either being banned or being heavily curtailed.

Common Theme

The goal with each of the four digest articles that follows is to provide both industry participants and policymakers with useful insights on the frequently opaque, but always dynamic, commodity markets.

When Has OPEC Spare Capacity Mattered for Oil Prices?

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Forthcoming in [Argo: New Frontiers in Practical Risk Management](#)

Available at SSRN: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2682694

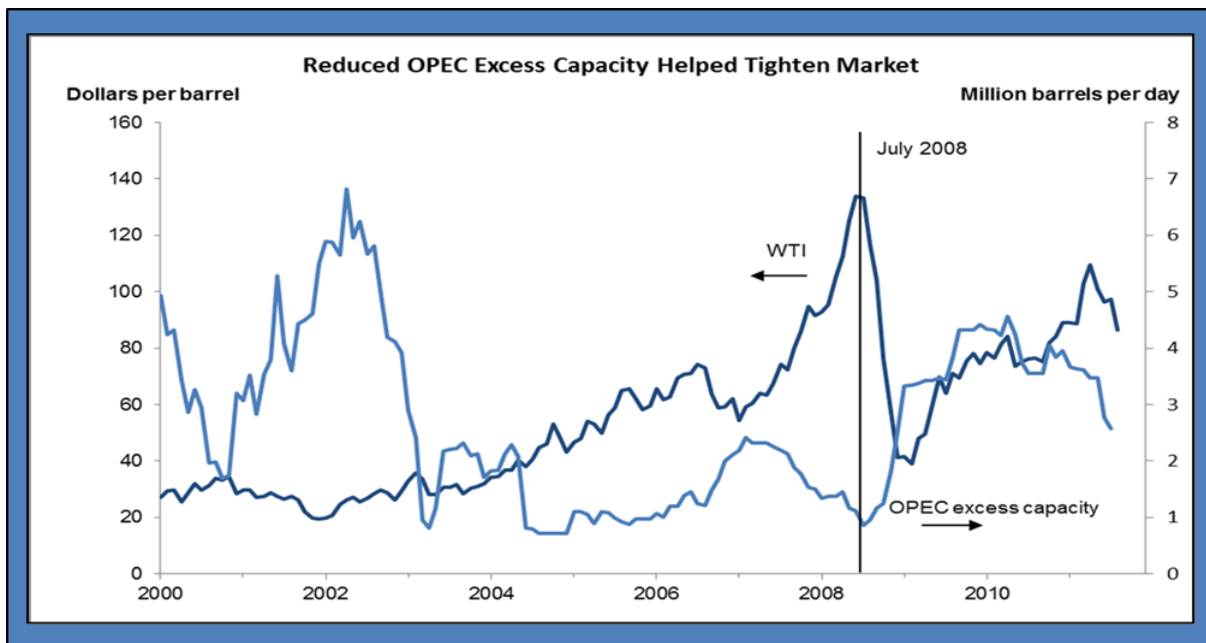
Oil prices are usually influenced by a number of factors. But there have arguably been times when OPEC spare capacity has been the most important factor for driving oil prices. This paper discusses the circumstances when this has likely been the case in the past.

In order to motivate why the spare capacity situation might be quite important to the behavior of crude oil prices, one can review the circumstances of 2008. The events of that year showed what can happen if the oil excess-capacity cushion becomes quite small. At the time, the role of the spot price of oil was arguably to find a level that would bring about sufficient demand destruction, after which the spot price of oil spectacularly dropped.

2008: A Clear Relationship

Figure 1 illustrates that when OPEC excess capacity levels reached pinch-point levels in 2008, the price of crude oil responded by exploding.

Figure 1



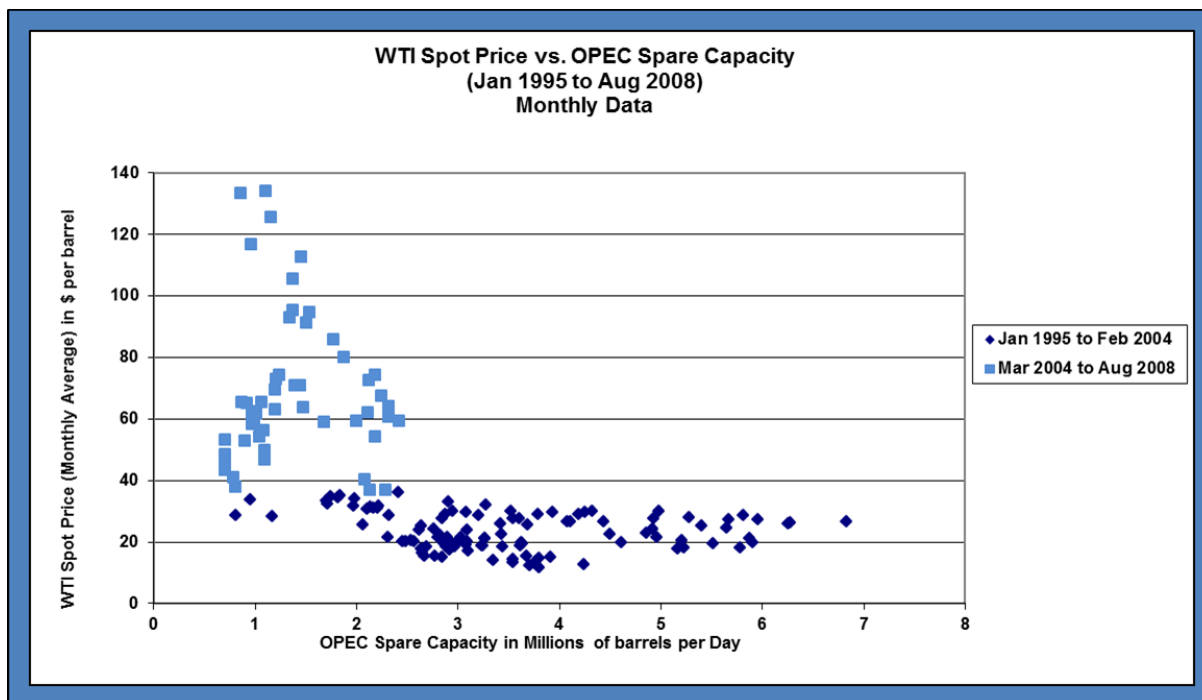
Source: Plante and Yücel (2011), Chart 2. [The dark blue line is WTI prices while the light blue line is OPEC excess capacity.] Authors' Notes: Oil prices are monthly averages. Sources of Data: U.S. Energy Information Administration (EIA) and the *Wall Street Journal*.



When Has OPEC Spare Capacity Mattered for Oil Prices?

Figure 2 provides another way of illustrating what happened to the price of crude oil as OPEC spare capacity collapsed in mid-2008.

Figure 2



Source: Till (2014), Slide 19.

Sources of Data:

The WTI Spot Price is the "Bloomberg West Texas Intermediate Cushing Crude Oil Spot Price," accessible from the Bloomberg using the following ticker: "USCRWTIC <index>".

The following Bloomberg formula was used to create a monthly data set from daily prices:
`bdh("USCRWTIC Index","px last","1/1/1995","8/31/2008","per=cm","quote=g")`

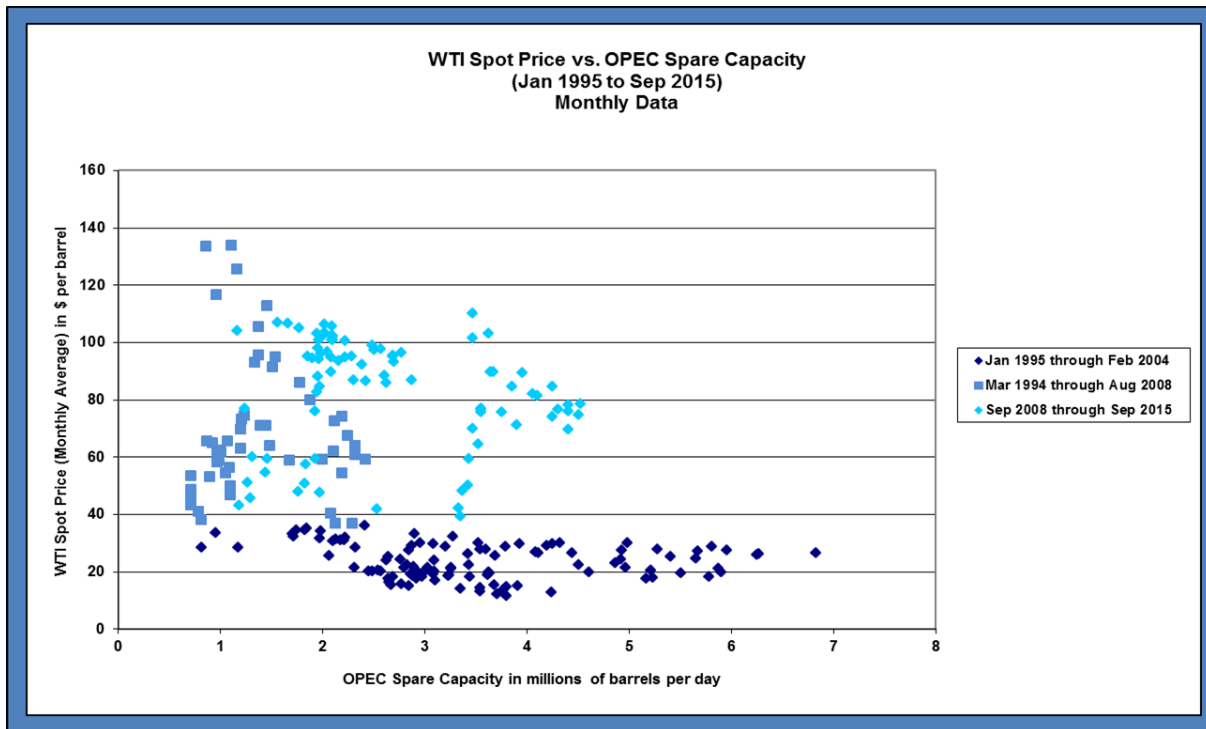
The OPEC Spare Capacity data is from the U.S. Energy Information Administration's website, which was accessed on 8/30/14.

Presenting data in this fashion is based on Büyükşahin *et al.* (2008), Figure 10, which has a similar, but not identical, graph. Their graph, instead, shows "Non-Saudi crude oil spare production capacity" on the x-axis.

Post-2008: An Unclear Relationship

After 2008, the relationship illustrated in Figure 2 structurally changed. This is illustrated in Figure 3 with the addition of data from September 2008 through September 2015. Using data through September 2015, it is not clear what the relationship between WTI oil prices and OPEC spare capacity is, if any.

Figure 3



Sources of Data:

The WTI Spot Price is the "Bloomberg West Texas Intermediate Cushing Crude Oil Spot Price," accessible from the Bloomberg using the following ticker: "USCRWTIC <index>".

The following Bloomberg formula was used to create a monthly data set from daily prices:
`bdh("USCRWTIC Index","px last","1/1/1995","9/30/2015","per=cm","quote=g")`

The OPEC Spare Capacity data is from the U.S. Energy Information Administration's website, which was accessed on 8/30/14 (for the 1995 data) and on 10/24/15 (for the 1996 through September 2015 data.)

Presenting data in this fashion is based on Büyükşahin *et al.* (2008) and Büyükşahin (2011).

A Clear Relationship Re-emerges

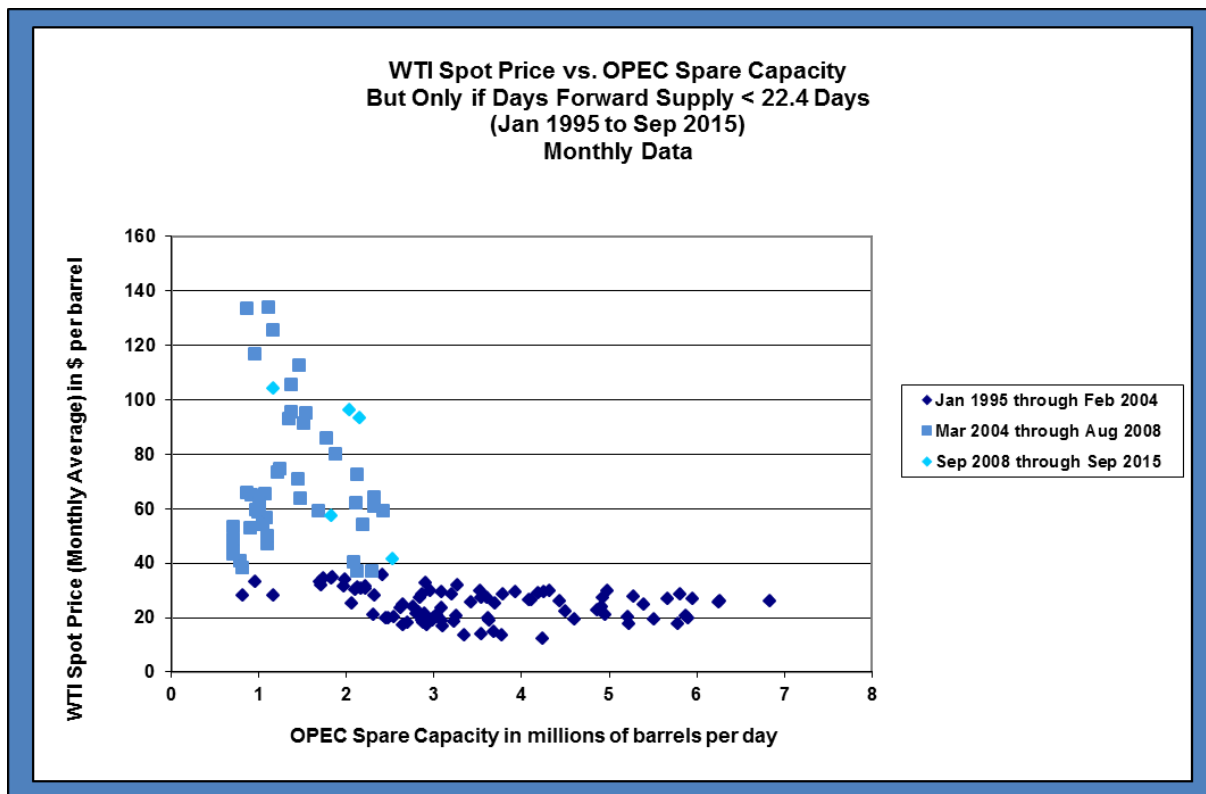
It may only be in a certain state-of-the-world that OPEC spare capacity matters. But what precisely describes that particular state-of-the-world? Ori (2015) essentially provides the answer: *OPEC spare capacity should only matter if one is in a state of low inventories.*



When Has OPEC Spare Capacity Mattered for Oil Prices?

Figure 3 can be re-examined based on Ori (2015)'s insight. The relationship between WTI oil prices and OPEC spare capacity from January 1995 through September 2015 is examined, *but only when crude oil inventories are low*. This particular conditional examination is illustrated in Figure 4. At least over the period, January 1995 through September 2015, it is apparent that tight levels of OPEC spare capacity had only mattered when (U.S.) oil inventories were low. Here, the low levels of inventories are defined as being under 22.4 days-of-forward-supply-of-crude-oil in the U.S.

Figure 4



Sources of Data:

The WTI Spot Price is the "Bloomberg West Texas Intermediate Cushing Crude Oil Spot Price," accessible from the Bloomberg using the following ticker: "USCRWTIC <index>".

The following Bloomberg formula was used to create a monthly data set from daily prices:
`bdh("USCRWTIC Index","px last","1/1/1995","9/30/2015","per=cm","quote=g")`

The OPEC Spare Capacity data is from the U.S. Energy Information Administration's website, which was accessed on 8/30/14 (for the 1995 data) and on 10/24/15 (for the 1996 through September 2015 data.)

"Days Forward Supply" refers to the U.S. Department of Energy's U.S. Days-of-Supply-for-Crude-Oil, accessible from the Bloomberg using the following ticker: "DSUPCRUD <index>".

The following Bloomberg formula was used to create a monthly data set from weekly data:
`bdh("DSUPCRUD Index","px last","1/1/1995","9/30/2015","per=cm","quote=g")`

Presenting data in this fashion is based on Büyükşahin *et al.* (2008) and Büyükşahin (2011).

A Debate on Practical Relevance

The data set in this paper is largely during the period when OPEC, and specifically Saudi Arabia, had been considered the swing producer for the oil market, and who traditionally attempted to prevent a free fall in the price oil. When there was sufficient spare capacity, these producers, in effect, underwrote an (implicit) put on the price of oil, as explained in Till (2015). It was only when there had been insufficient OPEC spare capacity that oil prices spiked.

Perhaps going forward, U.S. shale producers will instead be considered the swing producers, but in their case, their actions would cap the price of oil. These producers would, in effect, be underwriting an (implicit) call on the price of oil, as argued in Citi Research (2015). The price spikes illustrated in the survey paper would thereby not be expected to occur in the future.

On the other hand, Coy (2015) has argued against the view that “America’s shale oil industry has supplanted OPEC as the so-called ‘swing’ producer,” noting that “a true swing producer has freedom of action.” Explained Coy (2015): A swing producer “has a large market share, spare capacity, and very low production costs, and it is capable of acting strategically—alone or in a cartel—to raise and lower production to affect the price. Saudi Arabia fits that description; America’s shale producers don’t.”

Continued Coy (2015): “The shale players are too small to move prices on their own, and they don’t act in concert. Shale producers have essentially no spare capacity because they’re always producing as much as they profitably can. Production costs are also far higher than those of the Saudis or Kuwaitis. In the language of economics, U.S. shale producers are price takers, not price setters.” Under Coy (2015)’s framework, the survey paper’s results *would* continue to have practical relevance.

Conclusion

Based on an examination of data over the past 20 years, OPEC spare capacity has only dramatically mattered for oil prices when (U.S.) crude oil inventories have been below a threshold level. That said, the survey paper’s practical relevance depends on whether the U.S. shale industry supplants OPEC as the world’s true swing producer.

Endnote

The title of the SSRN version of this article is “OPEC Spare Capacity and Oil Prices.”

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