

## Workshop Summary Notes

### Financial and Physical Oil Market Linkages II

September 27, 2012

Department of Energy  
1000 Independence Avenue, SW  
Washington, D.C. 20585

**Session 1: 9:15 a.m. – 10:45 a.m.**

**Paper Title: Physical Market Conditions, Paper Market Activity, and the Brent-WTI Spread**

**Presenter: Michel Robe, American University**

**Discussant: Lutz Kilian, University of Michigan**

**Presentation: [Presentation materials link in here]**

#### Paper Abstract

We document that, starting in the Fall of 2008, the benchmark West Texas Intermediate (WTI) crude oil has periodically traded at unheard of discounts to the corresponding Brent benchmark. We further document that this discount is not reflected in spreads between Brent and other benchmarks that are directly comparable to WTI. Drawing on extant models linking inventory conditions to the futures term structure (Fama and French, 1988), we test empirically several conjectures about how time and quality spreads (prompt *vs.* first-deferred WTI; prompt Brent *vs.* WTI) should move over time and be related to the inventory situation at Cushing. We then utilize a daily, non-public CFTC dataset of trader positions in WTI crude oil futures between 2004 and 2012 to investigate whether, after controlling for macroeconomic and physical market fundamentals, spread behavior is partly predicted by the trading activities of commodity index traders and physical traders.

#### Presenter's Remarks

- Pre-2007 WTI traded with a modest premium due to the premium quality of WTI oil. This trend was briefly broken in spring and summer of 2007 when the WTI contract traded a discount to Brent, with a permanent change in late 2010 (consistent with unrest in Middle Eastern countries).
- For the WTI-Brent price spread, the spread revealed the higher volatility of the calendar date roll due to price fluctuation at the expiration, especially between the fall of 2008 and the spring of 2009 (consistent with financial crisis); in contrast to the price swings and differential levels computed using a calendar-based roll rule, this volatility was not present based when the futures roll date was instead based on the prompt month open interest (OI) (referring slide #8).

- The historical pattern of spreads between WTI and Louisiana Light Sweet (LLS), WTI-LLS, is the same as the WTI-Brent spreads; however, LLS-Brent spreads are relatively constant with no differences in patterns.
- The WTI and West Texas Sour (WTS) spreads, WTI-WTS, also referred to as quality spreads, remained positive in the sample period – and there were no significant changes in the spread patterns, unlike those highlighted by the WTI-Brent and WTI-LLS spreads.
- The WTI-Brent spread can be expressed as a combination of three separate components; “Landlock” spread; “Transatlantic” spread; and “Brent Nearby” spread. This decomposition allows one to examine specific breaks in these different spreads (markets).
- Observing and comparing the structural changes within the different spreads visually is complemented by testing for structural breaks with a statistical approach. Three hypotheses were considered for statistical evaluation, assuming a single structural break in each test.
  - Hypothesis 1: Landlock spread points to structural change in late 2008 in the WTI market while there is relatively no change in the other spread (LLS-Brent).
    - Rationale: The WTI market is land based, while the LLS and Brent are linked through a Transatlantic (sea-borne) transportation link. The WTI storage elements and transportation constraints were mentioned to be as landlocked after 2007, while the recession started in the Fall 2008.
  - Hypothesis 2: Structural break in time spread (not specifically formulated in the decomposition equation, but as part of the landlock spread) which indicates changes in near-term structure and less so further out on the curve.
    - Rationale: Cushing storage reaching physical limits.
  - Hypothesis 3: Structural break occurs in late 2010 in the WTI-Brent spread.
    - Rationale: The structural break is hypothesized from both financial and physical sides. In the physical markets, the Arab Spring caused Brent prices to react more towards the uncertainty due to unrests, while the WTI continued in the landlocked dynamics. On financial side the Brent contracts were added for the first time in the DJ-UBS commodity index, and Brent weight was increased in the GSCI.
  - All coefficients for these hypotheses are statistically significant, supporting the structural breaks.
- Amid tight supply-side conditions in the global market, shortages of one or more of the four crude oil streams (BFOE) that make up the Brent crude benchmark has the potential to push Brent prices higher than other major benchmarks.
- We proxy the tightness of the oil storage market in Cushing by way of the slope of the term structure of futures prices. We isolate the impact of interest rate fluctuations by subtracting, from the percentage calendar spread, the appropriately scaled money factor. We use the London Interbank Offered Rate (LIBOR) to compute the money factor under the assumption that it is representative of the funding costs of futures-market participants.
- Plotting the calendar spread yield (calculated as the annualized percentage difference between the prompt and first-deferred WTI contract net of LIBOR), the curve shows a structural break in levels and volatility after November 2008; therefore, we expect this calendar spread proxy for a high rate of storage utilization in Cushing to be positively linked to the WTI-Brent commodity spread.

- Capturing the changes over the past decade in the amount of trading activity in the WTI and Brent markets, as well as the resultant increase in paper-oil market liquidity, the study measures the total open interest in the three nearest-months WTI or Brent futures. We concentrate on near-dated contracts because our focus is on the nearby WTI-Brent spread. Illustrating open interest (OI) in the WTI and Brent contracts, WTI OI after 2007 shows a decreasing trend while the Brent market is contrasting with two periods of rising open interest.
- In order to answer the question like whether CIT activity predicts commodity price levels or whether CIT positions in WTI futures or in Brent futures could also help predict the WTI-Brent spread, the study uses a comprehensive but confidential daily dataset of trader-level positions in WTI futures. We use this information to compute aggregate CIT long positions in the three nearest-dated WTI futures. Because no such data are available for Brent futures, we impute CIT near-dated positions in Brent futures using the relative weights of WTI and Brent crudes in Standard and Poor's GSCI commodity index.
- Summary of findings:
  - The structural breaks in 2008 and 2010 appear to have different drivers.
  - Increase in overall open interest predicts increase in the WTI-Brent spread.
  - The WTI-Brent spread is partly predicted by the paper-market positions of commodity index traders (CITs), after controlling for macroeconomic and physical market fundamentals.
  - Between 2004 and 2012, the study finds predictive power for the aggregate long position of CITs in WTI futures (as well as their imputed aggregate long position in Brent futures).

### Discussant Remarks

- Crude oil is not perfectly homogeneous
  - There are differences in composition and location; thus, what is the benchmark, WTI or Brent?
- The growing spread of Brent over WTI crude oil can be explained by:
  - Regional supply shocks; are they temporary or persistent?
    - Libyan supply disruption (temporary)
    - Strikes affecting North Sea fields (temporary)
    - U.S. shale oil (persistent)
  - Regional demand shocks; are they temporary or persistent?
    - Arab Spring (political risk; is it persistent?)
    - Growing European demand for diesel fuel (persistent)
    - Fukushima (is it temporary?)
    - U.S./Euro financial crisis (is it persistent?)
  - International transmission complicated by:
    - Bottleneck in European refinery processing capacity
    - Bottlenecks in transportation infrastructure limiting trade in crude oil or in refined products

- For decomposing the spread, there is no “*landlock spread*” for Brent in the spread equation. It would be recommended to check whether the *landlock spread* is influenced by differences in crude quality.
- Since the structural-break tests shown in this study are designed to detect one-time break only, we may over look that there might be multiple breaks. Further, the study did not offer any rationale for the assumed deterministic time trend in the spread.
- In these regards, alternative regression models may be useful, such as:
  - Deterministic break models with multiple breaks
  - Time Varying Parameter (TVP) model
  - Threshold models
  - Models with common factors and idiosyncratic factors
- Evolution of the spread can be explained by the following:
  1. Regional macroeconomic business cycle
    - a. A variable for a measurement of U.S. macroeconomic health is in question, i.e., SHIP (global) versus ADS (U.S.)
    - b. Shifts in relative demand needed for explaining the relative price and the spread.
  2. Lack of physical market integration
    - a. Brent crude oil production
      - i. Don’t we need production relative to WTI crude oil?
      - ii. What about European oil imports? Substitute?
      - iii. What about Canada? Does the quality not matter?
    - b. OPEC production spare capacity outside of Saudi Arabia
      - i. What is the rationale for excluding Saudi Arabia?
      - ii. Difference in quality? (e.g., Libya vs. Venezuela)
      - iii. What about rest of the world (ROW) oil producers? (e.g., Russia, Nigeria)
      - iv. How does this capture market conditions for seaborne crude (and why would we care)?
    - c. Storage condition in Cushing, OK (slope of WTI term structure adjusted for LIBOR)
      - i. Why does this matter as opposed to the bottlenecks in getting the oil out of Cushing
      - ii. How do we separate voluntary from involuntary storage?
      - iii. What about storage conditions in Europe? Slope of Brent term structure?
      - iv. Relative slopes needed for explaining the relative price?
  3. Financial variables
    - a. Does the financialization of oil futures markets explain the Brent-WTI spread?
      - i. Using liquidity in oil futures market and trader positions (long versus short); however, correlation is not causation. Thus, we need to ask why traders took those positions.
    - b. Variables not related to financialization
      - i. Changes in financial market stress (Ted spread)
      - ii. Arab Spring dummy (really an expected fundamental?)
- Autoregressive Distributed Lag (ARDL) methodology for causal inference?

- Unless the explanatory variables are exogeneous, one cannot compute dynamic effects from this regression. Recommend use of the full system of equation.
- The coefficients of the cointegrating vector are not the long-run response to exogenous variable in the explanatory variable.
- We should ask a better question; can the evolution of these spreads be predicted?
  - This requires:
    - Dropping the contemporaneous regressors
    - Enforcing real-time data constraints
  - Alternative:
    - Forecast combination model
  - Benchmark:
    - Random walk model of spread (Baumeister & Kilian 2012)

**Session 2: 11:00 a.m. – 12:30 p.m.**

**Paper Title: Speculation in the Oil Market**

**Presenter: Luciana Juvenal, Federal Reserve Bank of St. Louis and IMF**

**Discussant: James Hamilton, University of California, San Diego**

**Presentation: [Presentation materials link in here]**

### Paper Abstract

The run-up in oil prices since 2004 coincided with growing investment in commodity markets and increased price comovement among different commodities. We assess whether speculation in the oil market played a role in driving this salient empirical pattern. We identify oil shocks from a large dataset using a factor-augmented vector autoregressive (FAVAR) model. This method is motivated by the fact that a small scale VAR is not informationally sufficient to identify the shocks. The main results are as follows: (i) While global demand shocks account for the largest share of oil price fluctuations, speculative shocks are the second most important driver. (ii) The comovement between oil prices and the prices of other commodities is mainly explained by global demand shocks. (iii) The increase in oil prices over the last decade is mainly driven by the strength of global demand. However, speculation played a significant role in the oil price increase between 2004 and 2008 and its subsequent collapse. Our results support the view that the recent oil price increase is mainly driven by the strength of global demand but that the financialization process of commodity markets also played a role.

### Presenter's Remarks

- We examine the effects of oil shocks in a factor-augmented vector autoregressive (FAVAR) model with sign restrictions and we analyze the transmission of oil shocks to a large number of variables.
- Here are what we find:

- Global demand shocks accounts for the largest share of oil price fluctuations.
- Speculative shocks also played a role in the oil price increase between 2004-2008 and its subsequent collapse.
- The comovement between oil prices and the prices of other commodities are mainly explained by global demand followed by speculative shocks.
- We analyze and assess the role of supply, demand and speculative shocks as drivers of oil prices:
  - Oil supply shock: Shock to the flow of crude oil production.
  - Global demand shock: Shock to the demand of oil driven by the global business cycle.
  - Oil inventory demand shock: Shock to the demand of oil inventories arising from expected shortage (or uncertainty of future supply). This notion is proposed by Kilian and Murphy.
  - Speculative shock: Shock driven by higher expected future prices that shows how speculators can affect the incentives faced by producers by purchasing a large number of futures contracts and signaling higher expected spot prices. Producers, revising their expectations for the price of oil for future delivery, will hold oil back from the market and accumulate inventories. This is inspired by Hamilton where he conjectures an alternative channel through which speculation can affect the physical side of the market.
- We estimate the model using a two-step procedure. In the first step, the unobserved factors and loadings are estimated using the principal components method described by Stock and Watson in 2002. In the second step, we use the estimated factors along with the oil variables to estimate our FAVAR model.
- There are three concluding evidences based on the empirical results that explain the 2003-2008 oil price shock:
  - No evidence that supply shocks were behind the oil price increase.
  - Strong evidence that a booming world economy was the cause of the price increase (global demand shock).
  - Evidence that speculation also played a role (speculation shock).

### Discussant Remarks

- Methodologically, there are advantages of informative priors over sign restrictions.
  - Sign restrictions produce set estimates, not unique point.
  - Informative priors could be more concrete in discussing historical episodes, e.g., supply shock that reduced production by x million barrels and speculation that added y million barrels to inventories.
  - It can see how results change even with weaker priors.
- Is speculation good or bad? Speculation defined as “the purchase of commodities ... in anticipation of a financial gain at time of resale.” This action (speculation) will reduce the quantity available to consumers today, which increases prices today. However;
  - If it results in more products being available to consumers at a future date when the product is more valuable, speculation is good.

- If it results in more products being available to consumers at a future date when the product is less valuable, speculation is bad.
- Good speculation is profitable to the speculator, bad speculation is not.
- This paper's identification strategy is if we see that (1) price is higher than expected; (2) inventories are higher than expected; and (3) supply is lower than expected, then we will assume that this likely resulted from an increase in speculation. For example, suppose there is news that a military conflict in the Middle East is developing. Supply begins to fall, price begins to rise, and inventories build up at the beginning of the conflict, then are drawn down, as shown the cases of 1973 and 1978.
- Real world GDP increased 17.5% from 2004 to 2008 while the actual oil production is flat, which leads to increased prices.
- A summary of my comments is:
  - Speculation as the paper defines it is probably a good thing.
  - The method for estimating the contribution of speculation in the paper is not convincing.
  - The paper concludes that speculation historically mattered very little and not at all for the price spike of 2007-2008.
  - The most important fact is stagnating global production since 2005.

### **Summary of Discussion:**

Since there have been tremendous thoughtful exchanges in the round table discussion, here we summarize and present the overall themes of the discussion. The discussion following presentation of the paper, *Speculation in the Oil Market*, by Luciana Juvenal (based on a paper coauthored with Ivan Petrella) centered around three major issues.

1. The first concerned methodological issues about the paper's results and their implications.
2. The second focused on the definition of speculation and possible normative implications.
3. The final area of discussion concerned the range and reliability of findings of other papers with a similar focus.

### **Methodology and Implications**

The paper uses some very specific identifying assumptions about the role of speculation to arrive at its conclusions. Several participants expressed concern regarding the appropriateness and validity of these underlying assumptions, noting that papers using similar methods but different assumptions give very different results. Other participants observed that the identifying restrictions in question were not derived from economic theory and indeed in part inconsistent with economic theory.

Some participants also raised concerns about the econometrics methodology used in this study. The paper's key results are based on the responses of selected variables to certain demand and supply shocks. Generating these responses is not straightforward, and the use of inappropriate methods can lead to very different results. This was brought up because some of the participants

felt that the estimated movements in the oil price or in real activity were counterintuitive, and may have been due to the use of improper econometric methods.

Another point, on which there was widespread agreement, was that the model in question is not designed to infer anything about the presence of financial speculation. Specifically, the fact that speculation (as defined in this paper) is found to contribute somewhat to oil price movements in 2004-05 does not say anything about how, where, or why that speculation occurs. Some participants also asked whether the model is designed to account for features such as changes in the cost of exploring and drilling for oil.

This last point prompted a discussion about the importance of structural changes in both the world economy and in oil markets in the period under consideration. Some participants commented that using the same model over the period from the 1970s through the 2000s might not be appropriate or remarked that the data reliability over the period might raise some questions as well, while others pointed to evidence that these concerns are unwarranted provided care is exercised in specifying the model.

#### Definition and Implication of Speculation

There seemed to be agreement among the majority of participants that speculation is poorly defined in much of the public debate and widely misunderstood by many policy makers; however, it was noted that speculation is clearly defined in many recent academic studies. Most participants seemed to agree with the idea that speculation reallocates resources through time by taking supply off the market when prices are low and putting supply on the market when they are high. Because speculators allocate physical commodities in such ways, they are able to impact both current and future prices. The point was also made that this allocation occurs through storage inventories in the oil market or by purchasing futures contracts; these activities are tied together by an arbitrage condition according to standard economic theory, creating a direct link between spot and futures prices.

Some of the participants attempted to distinguish between good and bad speculation. One way of differentiating between these two types of speculators, as noted by Milton Friedman, is that good speculators buy low and sell high, whereas bad speculators do the opposite. The result is that bad speculators do not last very long in the market, and maybe there shouldn't be any concern about bad speculators. Others cautioned against taking this analogy too far because speculators don't always get it right, so there will be both good and bad speculators on any given trade, and their roles may be reversed in future trades.

Some participants pointed out that the implication of this is that both good and bad speculators ("smart and dumb money") are able to influence the price of oil. The key point is that bad speculators cannot influence the market forever, and so speculative distortions are easy to see. Three examples were given: activities by the international tin council in the tin market, attempted cornering of the silver market by the Hunt brothers, and U.S. government attempts at fixing the price in the milk market. In each case to affect the price the individuals/organizations had to purchase sufficient quantities of the respective commodity to influence the price. They were able to do so for a short time, but not over the long term. The result was large price movements opposite to what was intended by the individuals/organizations.

Finally, another participant observed that the distinction between good and bad speculation is near impossible, but also is largely moot if there is no speculation at all over the time period in question, as suggested by recent research.

### Other Studies

Throughout the discussion others papers quantifying the impact of speculation (possibly defined differently) were mentioned. The majority of participants expressed confidence in the numerous recent academic studies which consistently found that there has been no impact of financial investors on the price of oil. Several participants stated that the few papers that claim to have found evidence of speculative behavior by financial investors in recent years were suspect, because of methodological shortcomings of these papers

**Session 3: 1:45 p.m. – 3:30 p.m.**

**Institute of International Finance (IIF) Commodities Task Force Submission to the G20  
Report Title: Financial Investment in Commodities Markets: Potential Impact on  
Commodity Prices & Volatilities**

**Presenter: Hung Tran, Institute of International Finance (IIF)**

**Discussant: James Smith, Southern Methodist University**

**Presentation: [Presentation materials link in here]**

### Report Preface

Amidst increasing concerns about global growth prospects and financial market volatility, commodity prices continue to be a focus for policymakers. The French G-20 presidency has made this topic a priority, emphasizing the potential role of financial investment in driving trends in commodity markets. With commodity prices closely linked to inflation trends, particularly in low-income countries where food security is a vital issue, the search for policy tools to combat volatility and upward price pressure has intensified.

To provide policymakers with private-sector views on these issues, the Institute was asked by the G-20 leadership to bring together senior market practitioners to add their perspectives to the debate. The IIF Commodities Task Force, including market professionals, academics and other private-sector researchers, was convened in February 2011; the productive and robust discussions held among members of this Task Force are reflected in this position paper. We would like to highlight the following key points:

1. A review of the academic literature and studies by official sector bodies suggests that despite periods of correlation, there is little evidence of a *causal* link between financial investment in commodities and trends in commodity prices and volatility.
2. These same studies broadly support the well-established view that commodity price trends and volatility continue to be driven far more by market fundamentals. In recent years, rising demand from emerging markets has contributed to the trajectory of

commodity prices and volatility, exacerbated by periodic or structural supply constraints (e.g. impact of inclement weather, demand for biofuels, infrastructure bottlenecks, etc.).

3. Financial investment (sometimes referred to as “speculation”) does not take place in the absence of fundamentals: rather, it allows new information in spot and futures commodity markets, such as changes in fundamental supply and demand-related factors, to be processed. Constraints on financial investment could dampen price signals to suppliers- and hence the supply response.
4. It is important to bear in mind that financial investment is an integral part of commodities trading.
5. Measures to enhance the transparency of data provision to regulators on prices, trading activity, and factors affecting the supply and demand of individual commodities are broadly welcomed.
6. The potential impact of a tighter regulatory environment should be carefully scrutinized, as additional regulation (e.g. position limits) may have unintended and damaging consequences, including impairment of market liquidity and efficiency and market distortions, as well as a shift of trading activity to unregulated markets and/or physical commodity markets.
7. By far the most effective way to tackle the problem of excessive commodity price volatility and upward pressure on prices is to directly address underlying supply/demand imbalances. Measures should include steps to alleviate supply constraints, e.g. removing restrictions on the supply or export of key commodities, or investment in productive capacity.

From the discussions of the IIF Commodities Task Force, it was clear that market participants fully acknowledge policymakers’ challenges in mitigating the impact of rising commodity prices and volatility. However, it is essential to strike the right balance, thereby safeguarding the provision of efficient trading and liquidity in commodities markets.

### Presenter’s Remarks

#### IIF Commodities Task Force Report Key Findings:

- A review of the academic literature and studies by official sector bodies suggests that despite periods of correlation, there is little robust evidence of a causal link between financial investment in commodities and trends in commodity prices and volatility.
  - There is no consistent causal link that spans multiple commodities.
  - Speculation does have an impact on supply/demand for commodities markets.
  - Other market behavior, like impulsive buying and hedging, might actually have a bigger impact on price than speculation.
- In recent years, rising demand from emerging markets has contributed to the trajectory of commodity prices and volatility, exacerbated by periodic or structural supply constraints
- Financial investment is an integral part of commodities trading; excessive regulatory constraints on investment could dampen price signals, impair market liquidity and efficiency

- There may be a link between commodity prices and inflation.
- Growing concern about increasing food prices and the impact of investment on price expectations and inflation formation.

Other key findings:

- Tougher to find causality in the correlations between open interest and volatility.
- Commodities and equities have become increasingly correlated since 2006 compared to the previous two decades.
- Periods of divergence between cash and futures prices have triggered concern about mispricing and these arguments have been used to justify position limits. But researchers find that there is no compelling evidence that commodity index trading in futures markets distorts cash markets.
- The long over short ratio (known as Working's T ratio) of 1 is desirable, but not expect it always. Note that this ratio for crude oil is closer to 1 than most other commodities, leading us to believe it's actually the least influenced by speculators.
- Recall that both traded and non traded commodities are subject to the physical forces of supply and demand, rather than investment flows alone.

### Discussant Remarks

This is not a research paper, but an assimilation of research from a valued practitioner perspective with moderate tone and modest recommendations. It is far above the level of many "white papers" offered up to serve a private agenda and provocative for what it says about what research has so far achieved, and what remains to be accomplished. The issues and questions that remain unresolved can be illustrated using five quotations drawn directly from the IIF report.

1. Impact of Speculation on Prices: "Proponents argue that speculation does have a measurable impact on trends in commodity prices..."
  - There is good and bad speculation. Speculation should influence prices; investment decisions reveal privately held information and provide the market with early warning signals.
  - Whether the speculators are correct or incorrect, they have potential to move the price.
  - Our real concern is that speculation creates bubbles.
  - Phillips and Yu, they try to tackle the problem but their approach is still indirect. There is room for more research on this topic, especially in commodities.
2. The Role of Index Investors: "Non-commercial speculative activity is active in nature, as participants take both short and long positions. Index investors are classified as 'passive' investors; they mostly take long-only positions."
  - Barclay's investor survey participants were commodity market index traders
    - Over half of responses are passive (43%+9%, possible emerging markets as well at 17%)
    - Participants are mostly non-aggressive investors, such as pension funds and insurance companies; these types of investors could have an even bigger

effect on prices than the smaller proportion of aggressive speculators trying to make money.

- Index investors are more passive than Hedge funds, who trade on their expectations and against the forward curve.
  - This is under-researched.
- 3. Futures and spot Price Divergence: “According to the Senate report, divergence between futures and cash prices, particularly when close to contract expiration, can be interpreted as an indicator of excess speculation.”
  - I disagree on the statement. Convergence is achieved through arbitrage
  - Lack of convergence has many potential causes, not necessarily missing arbitrage.
    - For example, divergence may be caused by contract specs regarding delivery.
- 4. Speculation in Non-Traded Goods: “The prices of these commodities reflect industrial demand, but are not traded in futures markets—as such, the index is seen as speculation-free and a good indicator of underlying supply and demand factors.”
  - Plenty of speculation in cash markets by commercial participants (producers and consumers), so is this incorrect in practice?
    - For example, consider the role of futures markets. They wouldn’t exist without speculative behavior.
    - Spot market speculation is instrumental in disseminating private information, eliminating differences in beliefs, and reducing speculative futures trading. Thompson and I have a research paper in this area. [Smith & Thompson (2012)].
- 5. Transparency is increasing: “Proponents (of reform) and opponents alike would be able to benefit if the CFTC made its LTRS data set openly available, allowing a clearer assessment of the possible impact of speculation on prices.”
  - CFTC is opaque because laws can prevent them from fully disseminating data.
  - Page 17 of the report, “UK Financial Services Authority, which noted in a 2009 report that it ‘does not believe, nor have we seen evidence, that a blanket approach through specific position limits is necessarily the most effective way’ to monitor or deter manipulative behavior in derivatives markets.” This is almost equivalence between speculative traders and arbitrageurs.
    - I do not believe this is so. The risk profile of the two different trader types is very different.
    - There is a whole new set of rules to deal with derivative markets, and position limits are among those rules. Current surveillance and regulations are sufficient.

Are speculators different from arbitrageurs? The latter enforces law of one price, so this behavior isn’t too risky. Speculators are taking more significant risk, though the same traders could use both methods. The point is to keep these terms straight.

In the 18th century, the good aspects of speculation and the fear of speculation was related to witchcraft. Even today, speculators are guilty until proven innocent and we must tackle that to change public opinion.

**Session 4: 3:45 p.m. – 4:45 p.m.**  
**Format: Roundtable Discussion**  
**Moderator: Adam Sieminski, EIA Administrator**

Moderator – The stock market reflects views on economic growth. Thus, do you expect a positive correlation or what is the meaning of correlation on stock prices and oil prices?

Participant – From the point of view of a structural autoregressive model, the correlation between stock prices and oil prices really depends on the observed time period. It's possible to get a positive, negative, or no correlation using the same model but different lengths or periods of time. The relationship is affected by supply and demand shocks.

Participant – In the 1970s, news was Middle East driven, with disruptions driving up prices, but lately it had been news about China that has been driving up demand.

Participant – Has the need for liquidity led to more trading volume?

Participant – Correlations between different asset classes and correlation with the stock market has been high since the Lehman collapse. Hedge funds contributed to this high correlation. Speculators and hedge funds might be responding to unexpected business cycle movement.

Participant – Note that investors reduced risk exposure after the crash and are now building it back up, which isn't that surprising to see. China does not appear to be doing well in the near future, yet both equities and oil are still high.

Moderator – Transparency is needed in global markets; greater cultural understanding exists in the West about data transparency. We need to get better inventory data from China. National Security Council staff believes it would be a good thing to have better data access to CFTC data. It's good to know what's going on, whether or not there is a problem.

Participant – Looking at factors that should jointly control different assets, the impact of financialization is growing smaller. The correlations between commodities that are in indices versus those commodities which aren't are only about 0.1. This gap is surprisingly small; are we making much ado about nothing?

Participant – In 2008, there was too little financialization. Big adverse balance sheet shocks to risk bearers in the market occurred. This increased correlation as all moved together. Major speculators are better able to bear risk but have too little risk bearing capacity. The Volker rule and its impact are still a source for concern. There are unintended consequences.

Participant – With respect to cross market correlations and linkages, no one has a normative model for what's a good amount of linkage. Puts us back in the situation of determining whether there is an impact of financialization and whether it's good or bad.

Moderator – From a policy standpoint, pressure only seems to come when prices go up. However, prices being forced down by speculation shouldn't be seen as good either. If upward

price swings are bad, so are downward swings. Think about lower corn prices harming farmers' income. For more on agricultural commodity speculation, Scott's paper is helpful.

Participant – Farm groups thought speculators were distorting agriculture commodities.

Participant – Natural gas prices have been going down just as oil has gone up. There is some evidence of large shorts in natural gas. There probably is speculation here but no one says anything because the price starts out so low. In the 1987 equities crash, people complained because we don't like it when equities go down. This supports the participant's point about asymmetry in the market and uneven complaining. If we were a net exporter, we wouldn't be talking so much about speculators driving up the price of oil. Producers want high prices while consumers want low prices.

Participant – Sometimes the beneficiaries do complain. They don't want productive capital to be taken away so that they are left out when they need it the most. There is a premium that can be linked to speculation. Is the efficient allocation benefit greater than the cost?

Participant – Investors invest in commodities as an inflation hedge and for portfolio diversification. Yet, commodity returns can be replicated with equity returns, at least in the short term, is that still a separate asset class? We need to look at long term correlations.

Moderator – One of the ways is to show that two assets are from different asset classes is to show that they're uncorrelated in the long run.

Participant – Fundamentals do well to mid-2011. There are many long lasting effects in markets. It is hard to understand why prices and equities are up and China expectations are weak.

Participant – Investing in commodities and equities was for diversification and portfolio allocation. What about inflation risk and protecting purchasing power? Both equities and commodities have an inflation hedge. Is this a paradigm shift for correlations? Will we go back to negative correlations between commodities and equities?

Participant – Correlations are based on global activity so the oil and equity correlations are likely to go away.

Participant – One way of interpreting financialization is through capital flows across markets. For example, we can test what the right amount of financialization is. The literature is looking for a rule. James Smith wants to know the benchmark for a given series. Maybe conventional correlation isn't the one you want to look at. We should focus on risk premiums and risk adjusted returns.

Participant – Looking at price evolution since 2010, growth explains what we're seeing in price movements. Don't forget about the fundamentals. Data in JODI explains price behavior pretty well, that there have been significant production losses. There were stock draws in 2010 and 2011 and we had rising prices. Stocks built in 2012 and prices fell. The third quarter we had a

stock draw and prices were rising again. Looking back, we can see the effect of fundamentals and explain price behavior.

Participant – We don't know it because there is a lag in data on fundamentals.

Moderator – The market was surprised by the size of the draw in the third quarter.

Participant – We've also had production increases, not just losses. It's important to look at net production growth. Sudanese oil is making progress. We need to do post mortems on events to analyze who did what to separate the effects of physical versus financial markets.

Moderator – Trading data is becoming available at a very fast pace (1000ths of a second). Can this help us identify who is impacting the market?

Participant – Is it a paradigm shift? Correlations have moved all over based on news; flight to the dollar and to US equities and assets. The price of crude was down 8 percent last week and inventories were up.

Participant – Do we have a theory to explain the optimal degree of financialization? What exactly are speculation and financialization? Theory says that the amount of speculators is determined by hedging demand from producers. Corporate finance tells us how to determine that hedging demand. Portfolio theory can explain behavior of some participants. The difference comes up between parties that have different views on the market and taking offsetting positions. Index funds usually want to be long.

Participant – Adam Smith saw the good side of speculation, even though he was hard on businessmen and wasn't naive on the profit motive involved in business.

Moderator – It's hard for a lot of people in general public (and policy makers) to differentiate between manipulation and speculation. Lots of people spoke today about how important it is to define these terms. What are the things that EIA could be doing that would help you do better research and better understand these markets? Data is available on physical markets, but are there series that EIA no longer collects that are helpful?

Participant – I would like improved access to global crude oil inventory data.

Participant – Does EIA know who visits the website?

Moderator – We recently conducted a survey and some software is helping us determine what is being looked at now. We use Google analytics and have found some interesting results.

Participant – Can we use the website to educate the public?

Moderator – One idea is to write a today in energy on who is using the EIA website.

Participant – The Energy Kids page on the EIA website is very good.

Participant – We need to lobby for the importance of data and for transparency in private industry transactions. The more data that is publicly available, the more efficient the market is, though that can infringe on investment profits. Greater transparency makes it harder to manipulate the economy.

Moderator – The Economist magazine reported that private data was being sold a few minutes earlier than other people getting it. EIA takes great care to ensure that everyone gets the data at the same time. Some agencies have problems. Application programming interface will help people get information from our website easier.

Participant – Time series of quarterly or monthly spare production of oil capacity back to 1973 would be very helpful.

Moderator – How to define OPEC becomes an issue as you go back in time.

Participant – Knowing effective spare capacity is more important than spare capacity. Can it be brought on within 90 days?

Moderator – High frequency trading is becoming an increasingly popular topic, perhaps, that is a worthy topic of discussion for another workshop in the near future; however, there is not a lot of data out there unfortunately.

Moderator – Thank you all for participating today's workshop.