



WTI: Understanding the Global Crude Oil Benchmark

Robert Levin

Managing Director, Energy Research & Product Development, CME Group

March 12, 2009

Disclaimer

Futures trading is not suitable for all investors, and involves the risk of loss. Futures are a leveraged investment, and because only a percentage of a contract's value is required to trade, it is possible to lose more than the amount of money deposited for a futures position. Therefore, traders should only use funds that they can afford to lose without affecting their lifestyles. And only a portion of those funds should be devoted to any one trade because they cannot expect to profit on every trade. All references to options refer to options on futures.

CME Group is the trademark of CME Group Inc. The Globe logo, Globex and CME are trademarks of Chicago Mercantile Exchange Inc. CBOT is a trademark of the Board of Trade of the City of Chicago. NYMEX, New York Mercantile Exchange, and ClearPort are trademarks of New York Mercantile Exchange, Inc. COMEX is a trademark of Commodity Exchange, Inc. All other trademarks are the property of their respective owners.

The information within this presentation has been compiled by CME Group for general purposes only. CME Group assumes no responsibility for any errors or omissions. Additionally, all examples in this presentation are hypothetical situations, used for explanation purposes only, and should not be considered investment advice or the results of actual market experience.

All matters pertaining to rules and specifications herein are made subject to and are superseded by official CME, CBOT, NYMEX and COMEX rules. Current rules should be consulted in all cases concerning contract specifications.

Copyright © 2009 CME Group. All rights reserved.

Price spreads between WTI and Brent spark allegations about WTI Market and Delivery Mechanisms

- Mid-continent market is physically/economically disconnected from the waterborne market
- Storage is fully utilized in mid-continent and cannot satisfy continuing demand
- Prices in the Mid-continent market are deflated; excess oil is being sold at a discount
- WTI is a poor benchmark; need multiple delivery point and crude streams
- Dispelling the myths; understanding the dynamics

This Webinar will address:

- Layout and Physical connectivity of oil market
- Commercial pricing mechanisms in oil market
- Price references
- Recent oil market performance

Physical Connectivity—US Mid-continent Market

- Economics—the US Gulf and Mid-continent are strongly interconnected; constant daily give and take between these two markets
- Mid-continent market includes up to 1.3 mmbd from US Gulf, 1.2 mmbd from Canada, 1.2 mmbd from Mid-continent sources
- Q4: 1.2 mmbd from US Gulf and 1.2 mmbd from Mid-continent
- Q1: US Gulf reduced to 900 mbd
- Clear, strong interaction between US Gulf and Mid-continent markets
- WTI market not land-locked

Storage at Cushing

- Storage in entire Mid-continent/US Gulf market is relevant
- Nonetheless: 47.5 million barrels of capacity at Cushing with 2.5 million barrels to be added later this year
- Excess capacity has been continually available for years; recent highest reported storage levels roughly 35 million barrels
- Operational storage often = 75-80% of capacity
- Pure storage motive (i.e. rainy day) can be greater than 90%
- Excess storage capacity at Cushing

Commercial Market

- Mid-continent/US Gulf market are integrated
- Supply, refining and trading are subject to multiple competitive opportunities each day—10 million barrels refined each day in PADDs 2 and 3
- WTI delivered at Cushing is most well-known and most relied upon reference
- Everyday dynamics of supply/demand lead to continuous shifts among the common price references—this is standard

Commercial Market ...continued

- Every crude stream reflects the conditions of the underlying local market; including benchmarks
- WTI reflects complex but important fundamental factors
 - ✓ Millions of barrels per day of production converging from Canada, US Mid-continent and US Gulf
 - ✓ Interaction between Mid-continent and US Gulf
 - ✓ Interplay between US Gulf production and foreign imports

Attributes of a Dependable Price Reference

- Accuracy in reflecting the scarcity value of underlying market and its conditions
- Fungibility of product and corresponding commercial obligations
- Significant supply and demand
- Liquidity
- Transparency of price
- Transparency of fundamental market information
- Timeliness of fundamental market information
- Reliability of fundamental market information
- Accessibility—ease of access
- Broad underlying industry participation
- Connectivity to market-at-large economically/physically
- Stability in regulatory oversight and enforcement

Brent Crude Oil Family

Five Distinct Market Mechanisms

- Labyrinth of sophisticated commercial mechanisms; can be daunting to navigate
- 5 Basic mechanisms with weak convergence
- Cargo market: 21 day forwards and Dated Brent; designed to be exclusive, opaque and lumpy
- Two OTC derivative mechanisms to staunch illiquidity of cargo market—partial forwards and CFDs (between Dated Brent and forwards/futures); less lumpy with modest liquidity
- Futures: liquid; final settlement references an entire day (sometimes volatile)

WTI Crude Oil

Two markets that integrate seamlessly; convergence extremely robust

Forward Market

- Physical delivery with substantial flexibility within pipeline system that overlaps through physical manifolds in Cushing, Oklahoma

Futures Market

- Deliveries are essentially subsets of the underlying forward market
- No rigid boundary exists between delivery obligations in these two markets; they are commercially indistinguishable

Pricing Formulas

Dated Brent Crude Oil

- Historically used by most producing countries that manage their own oil production and sales

WTI Crude Oil

- Preferred price reference for sales/trades that take place in the Western hemisphere

Dated Brent

- Expressly designed for big participants; exclusive
- Constructed to be lumpy and opaque
- Rigid borders between respective Brent streams
- Combined, supply/demand of the 4 streams is strong, but the streams are not fungible so it essentially comprises 4 sub-mechanisms
- No timely release of fundamental market information on supply/demand and inventories
- Pricing of cargo is illiquid; possible to impute price from partial and CFDs; or assessments; or all of the above

Price Market Mechanism Comparison

Dated Brent vs. WTI-Cushing

Each mechanism is designed to reflect specific oil market criteria

Recent Market Price Relationships

WTI vs. Brent as performance measure: not a valid indicator of either

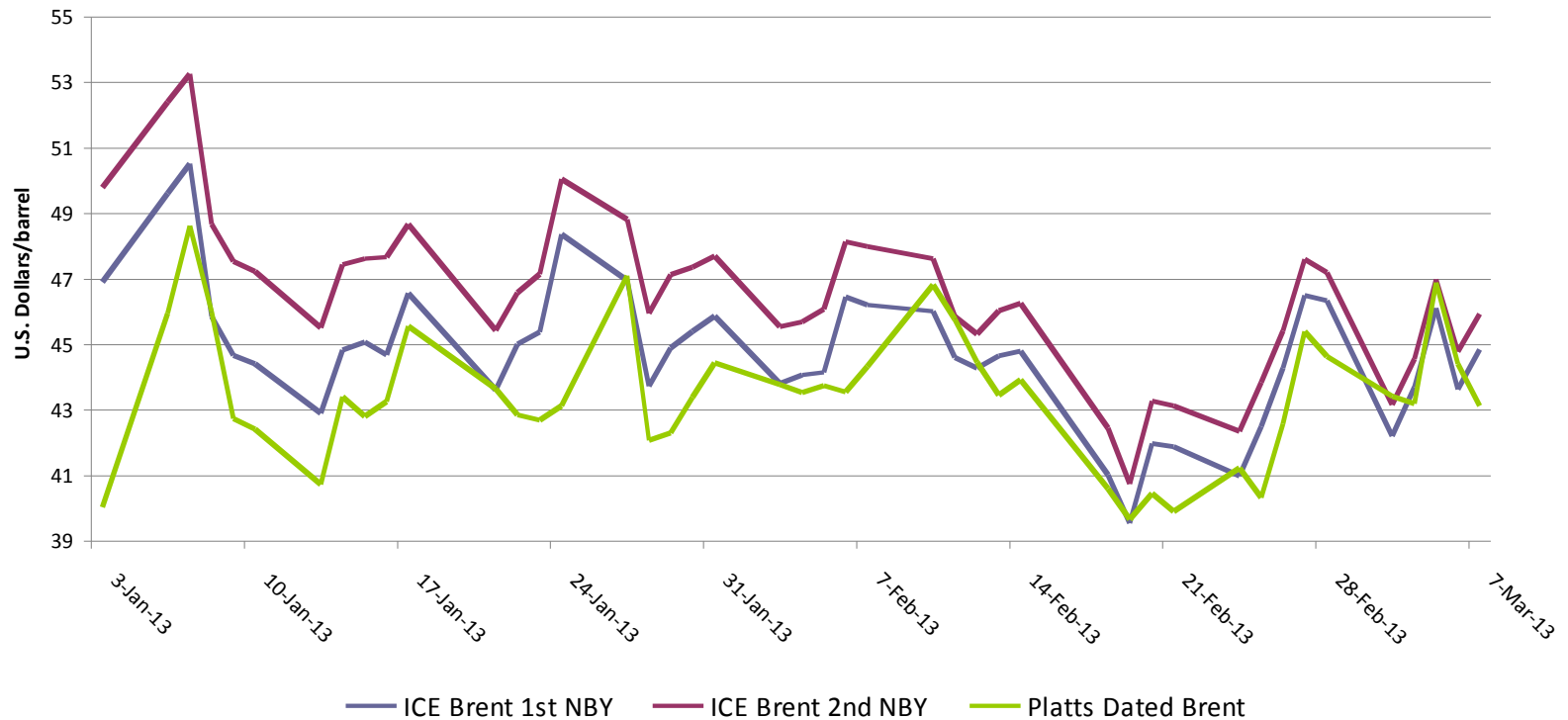
- Each reflects specific market-mechanism processes
- WTI reflects broad supply/demand conditions; smooth/seamless convergence between futures and physical markets; strong knowledge of Mid-continent and US Gulf physical oil flows is helpful
- Brent reflects interplay of specialized commercial mechanisms, especially the 2 cargo mechanisms and the 2 OTC derivative mechanisms; strong knowledge of transactions in these mechanisms is helpful
- WTI is rooted in physical supply/demand and is transparent
- Brent is rooted in commercial transactions and is opaque
- Not surprising that the dynamic between the two can be volatile

Recent Market Price Relationships

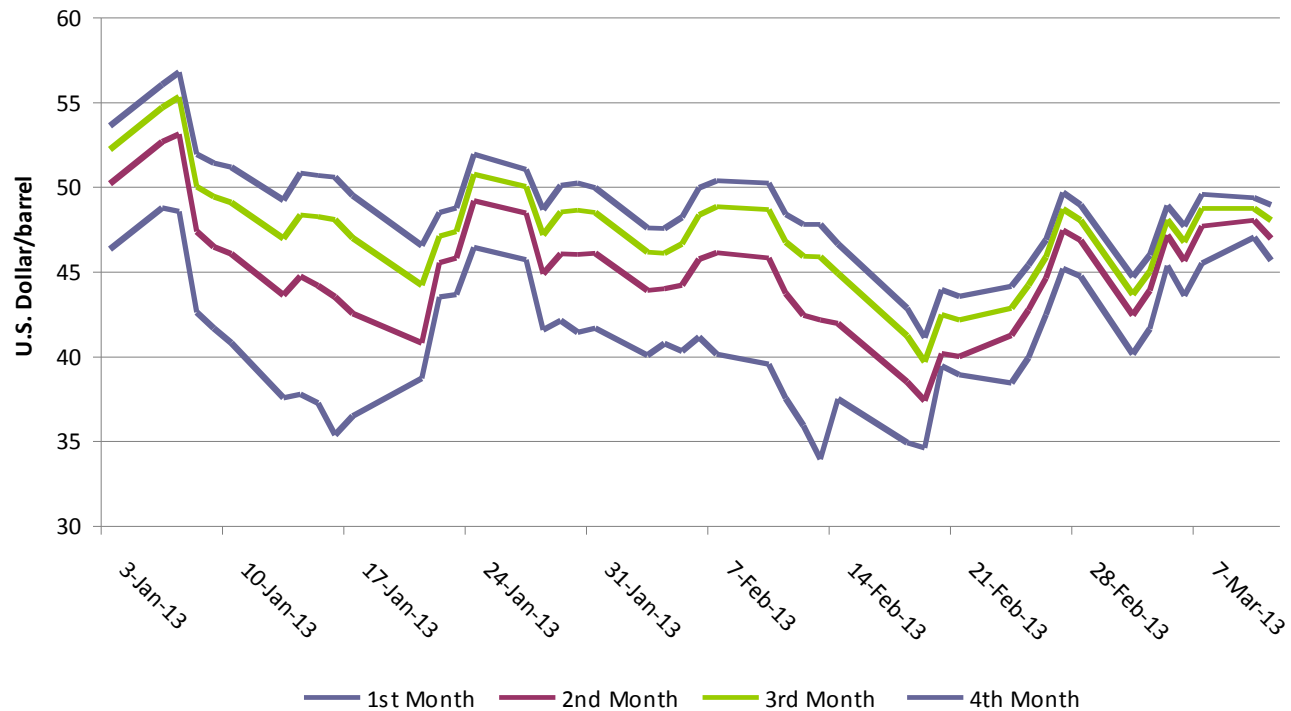
WTI and Brent recent price paths

- In both January and February, WTI futures were briefly \$8/bbl below Brent
- In both January and February, WTI for near-term delivery was consistently in contango
- In both January and February, Brent was everywhere
 - ✓ Most of the time, Brent was in Contango
 - ✓ Dated 1st and 2nd month futures showed inconsistent curvature
 - ✓ For 8 days during January and February (including 3 consecutive days), Dated Brent was in backwardation with respect to futures; futures were in contango

Brent Crude Oil Prices



NYMEX Crude Oil Prices



Criticism of WTI Benchmark Off Mark

- WTI curve consistently reflected market conditions in the Mid-continent/US Gulf market
- Mid-continent/US Gulf market is extremely dynamic; WTI, as a sound and reliable benchmark, reflects its volatility, which is a direct consequence of interplay between Mid-continent and US Gulf markets
- No downturn in use of WTI futures related to the “criticisms”
- Suggestions to make significant structural changes to WTI mechanism belie a complete lack of understanding of a robust/reliable benchmark; threaten fungibility, reliability, transparency, competitiveness, and liquidity of Cushing mechanism

Conclusion

- Misinformation; categorically inaccurate
- WTI reflects all of the desirable characteristics for a benchmark; better than any other benchmark
- WTI accurately reflects supply/demand conditions as well as expectations for its underlying physical market
- The world oil market relies upon WTI and other reference prices, especially the Brent mechanisms. Price paths for these mechanisms change in accordance with specific factors that influence each reference price.