

Financial Flows and Oil Prices

How do financial flows count?



RESEARCH

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January 27, 2009

Issues to cover

- Size of Financial Flows: Why did they mushroom? How large are they? What form do they take?
- The Impact of Speculation Predates the Recent Commodity Boom: Examples of dramatic impact on spot prices go back almost 20 years, when liquidity was much lower
- Speculative flows have gotten more sophisticated: Recent activity has dramatically impacted back end of the market
- Russell Dyk and Daniel Ahn will look at these markets in more detail

After 2003, investor interest in oil/commodity exposure exploded

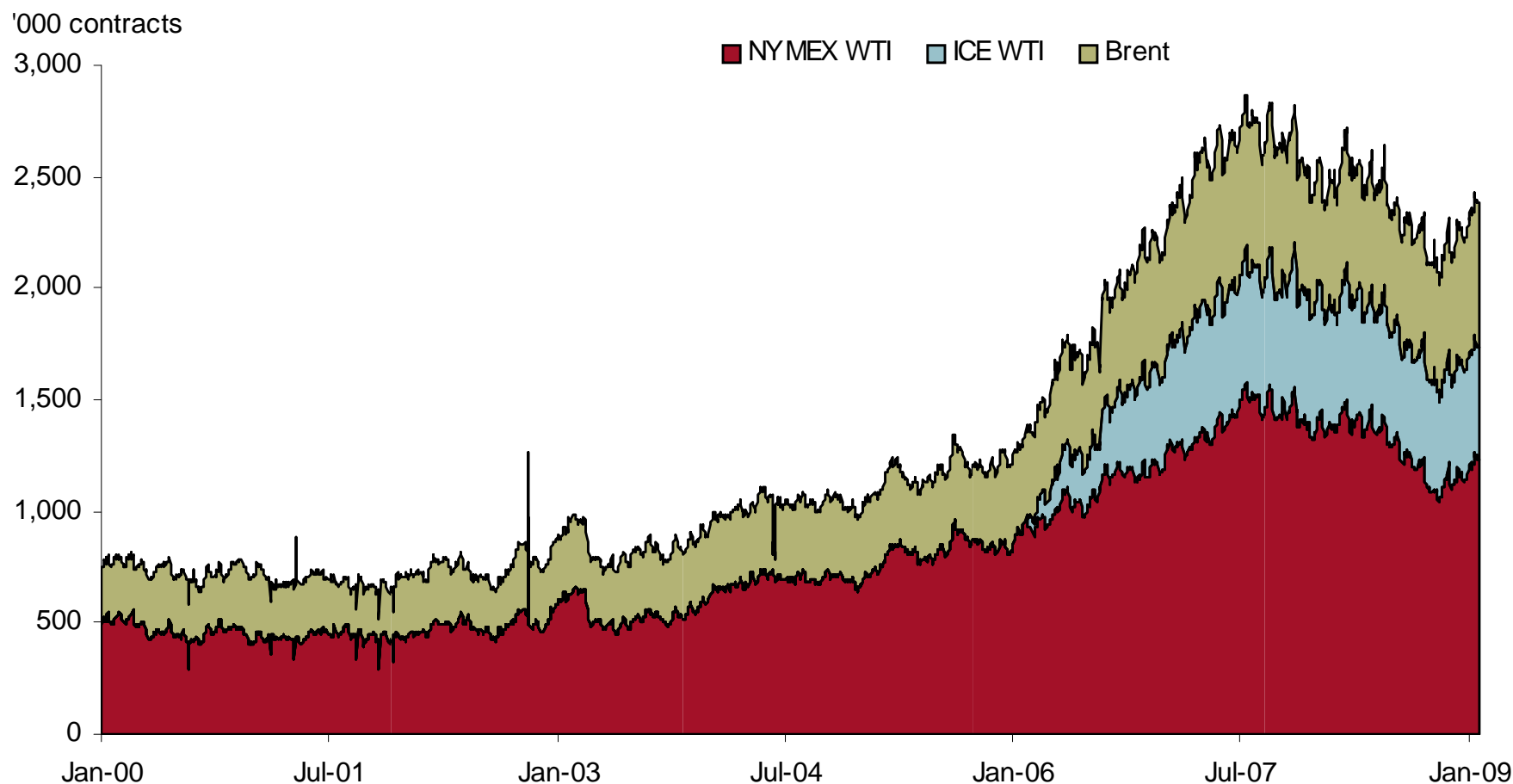
- ◆ **Before 2003, direct exposure to oil and other commodities was limited to traditional market participants**
 - Companies sought exposure to mitigate risk (producers, refiners, end users)
 - Speculators sought exposure to make profits
 - Banks were intermediaries, making markets for both companies and speculators; but they also engaged in proprietary trading.
 - Structured products were limited and largely served corporate needs, but speculative traders also developed structures to express a market view (e.g. three way structures saw prices fluctuating in a band, within which profits could be made)
- ◆ **Starting in 2002-2003 new market participants emerged who sought direct exposure to underlying commodities**
 - Holding commodities themselves was expensive, difficult logistically
 - Equities and bonds provided only indirect exposure to underlying commodities, even if the company was a pure producer
 - Regulators, trust fund authorities relaxed restrictions against investment in financial derivatives as proxies for underlying commodities
- ◆ **‘Long-only’ investors emerged as a new asset class**
 - Russell Dyk and Daniel Ahn will look at some of these in more detail
 - Portfolio diversification drove much of post-2003 increase in investments in commodities as asset class – timing initially good as returns on fixed income instruments, equities were down
 - Other motivations: inflation hedge and dollar hedge
 - Commodity investment cycle reached a turning point in 2002-2003, providing unique opportunities for extraordinary gains
- ◆ **‘CTA’s’ and long-short funds provided a different sort of vehicle for commodity exposure.**
 - Brought one form of proprietary trading to the retail level
- ◆ **Meanwhile, hedge funds saw their liquidity bulge and also increased participation in commodity markets**

How do we measure the size of the market?

- ◆ **Some of it is transparent and easy to measure**
 - Two major exchanges dominate trade in oil, NYMEX and ICE
 - Open interest in futures contracts provide one measure
 - This can be readily expanded by reviewing open interest in options
 - Exchange traded futures and options cover much of the activity of corporations, speculators, banks and through them pension funds via index funds and CTAs
- ◆ **But much of the market is not transparent and is difficult to measure directly**
 - Off-market, over-the-counter trades hold a significant place in the market
 - We have only indirect measures of OTC liquidity
 - It appears that before 2003, the OTC market was a fraction of the exchange-traded market
 - From 2003-to 2008 the OTC market became a multiple of the exchange-traded market
 - From winter 2007-through 2008, the OTC market dried up substantially as credit issues came to the fore
 - Meanwhile, exchange-traded liquidity fell, even though some of the OTC market migrated to the exchange-traded market.

Liquidity in crude oil grew from 750 mm bbls in 2000-2003 to 3 billion bbls in 2007, then shrank and is growing again

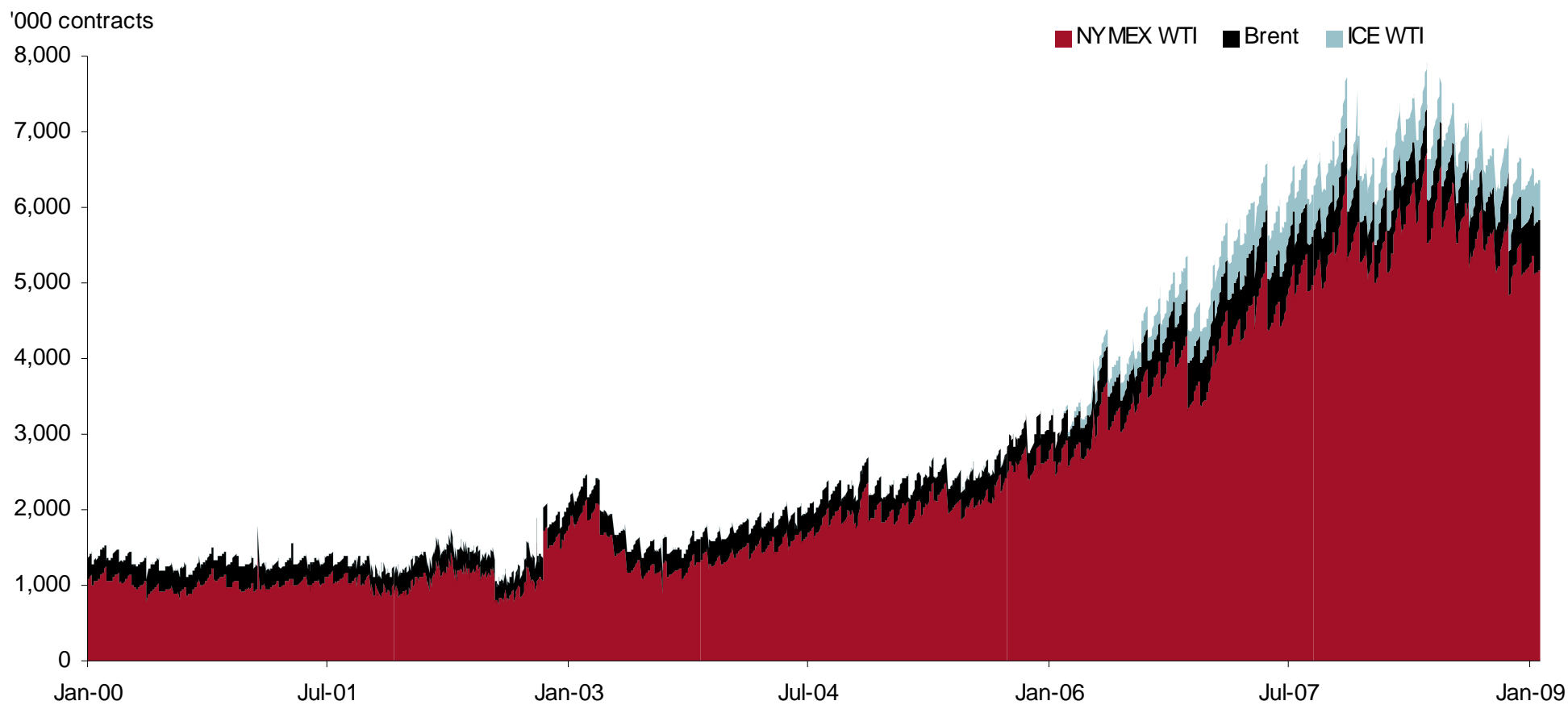
Aggregate futures open interest in WTI and Brent / WTI, 2000-2009



By comparison total global oil output was ~85 mb/d in 2007

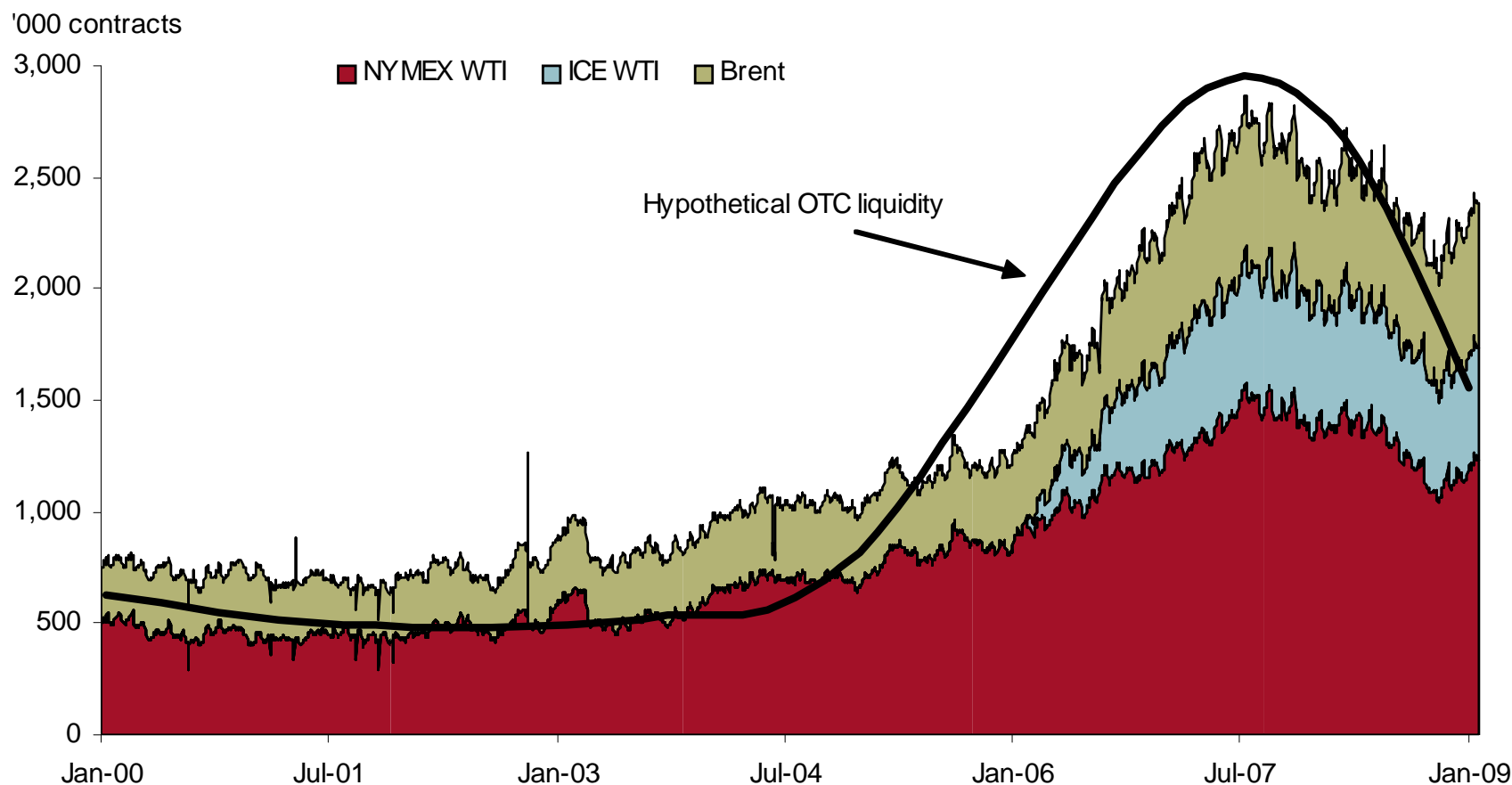
Add options, and liquidity grew from 1.5 bil. bbls in 2003 to over 6 bil. bbls before falling off after 2008

Aggregate futures open interest in WTI and Brent / WTI, 2000-2009



Add hypothesized OTC trading: futures grew to 6 bil. bbls and futures and options to over 10 bil. bls at peak

Aggregate futures open interest in WTI and Brent / WTI, 2000-2009



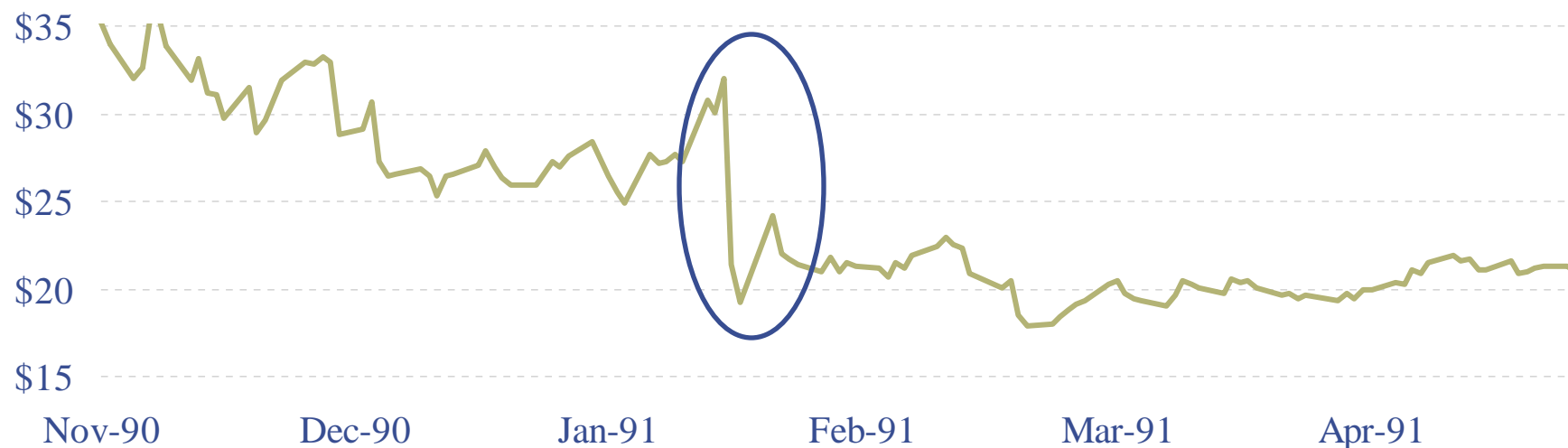
It's hard to imagine that this level of financial inflow/outflow had no influence on prices

Speculation and Fund Flows

Gulf War I: first dramatic speculative impact on spot/prompt prices

- During the buildup to conflict in December, speculators and Wall Street went massively long
- Prices moved from \$23 on Dec 6 1990 to \$32 on Jan 16 1991
- After the war began on Jan 17, speculators realized there would be no massive disruption in OPEC supplies
- Prices fell by 40% the first day after the war began as investors liquidated their positions
- Long speculators tried to sell and found no buyers until price dropped sufficiently
- Prices fell as OPEC spare capacity came on line, but rose in response to spec length

NYMEX WTI Price 1990-1991



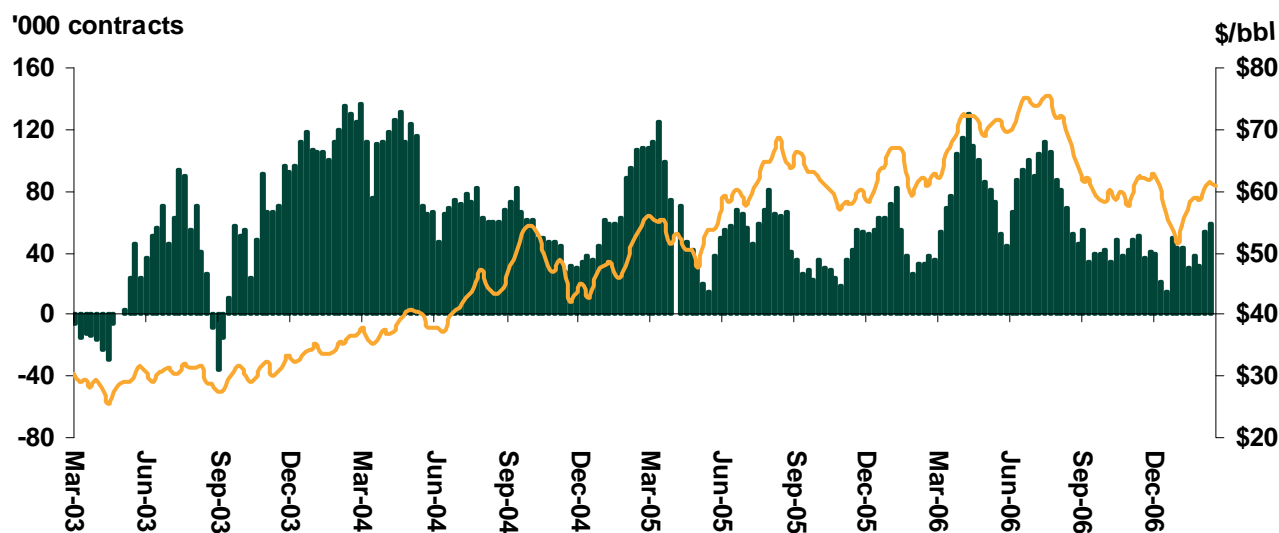
Source: Bloomberg

2003 illustrates effects of another liquidation, interaction of OPEC and market

Massive inflows started in 2003 as speculators anticipated market tightness

- Falling spare capacity, Iraq, Venezuela strikes, non-use of SPR contributed to expectations
- In August 2003, net length peaked and 90Mbbbl net length became 40Mbbbl short
- WTI prices fell from \$35 to \$27 in 6 weeks
- OPEC was convinced speculators drove the price down in relative terms
- OPEC cut production, the shorts were punished and prices rose

WTI Crude Futures & Options Large Non-Commercials Positions vs. Price



Source: Bloomberg, CFTC

Saudi Arabia, OPEC, US Fueled Investor Confidence

- Upside investments were made less risky when OPEC, in effect, gave speculators a free put option on the downside starting in 2003/2004
- OPEC's credibility in defending an increasing floor facilitated increased flows into the energy complex
- OPEC's lost spare production capacity after 2003 made going long a fairly safe investment
- Until 2005, Saudi/OPEC policy of keeping inventories low made investments even less risky; since then Saudis have twice shifted, promoting inventory builds (2005-06); discouraging them (2006-07); then encouraging them (after fall 2007); and now once again discouraging them (fall 2008 to present)
- US unwillingness to release SPR oil to cushion market (2002-2003) eliminated implicit \$35 ceiling, further fueling flow of funds into commodities

Financial activity can drive prices

In an ideal world with perfectly efficient markets, prices exactly reflect fundamental values and any deviation from that exact price causes a physical imbalance

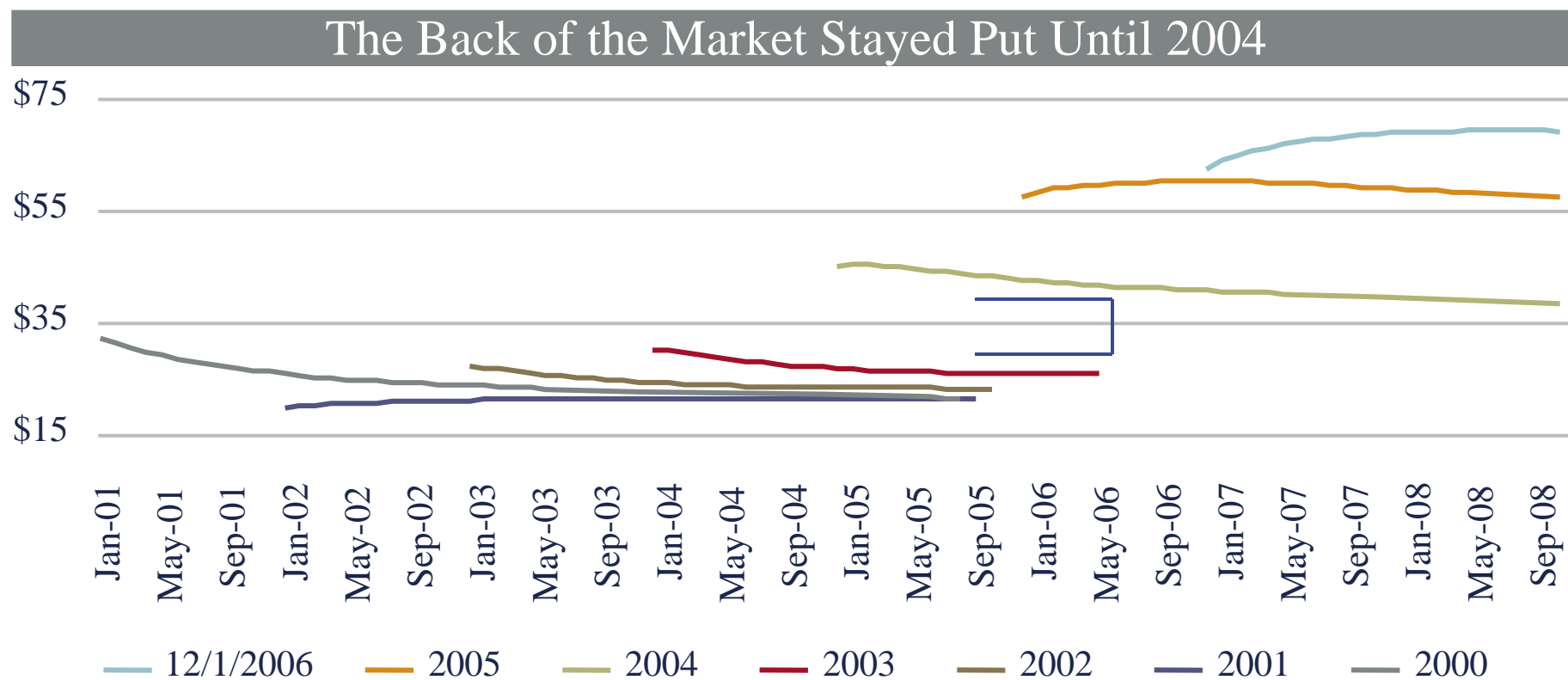
- But in reality, commodity markets suffer from severe data opacity and psychological herding and clustering.
- In oil markets, credible info on key aspects of the supply/demand balance, such as Saudi reserves or Chinese stockpiles, are not available.
- Also, supply and demand elasticities, at least for the OECD were low until prices spiked. Small changes in supply/demand translated to large price swings.
- With these market imperfections, market participants herd around financial activity, and cluster around the handful of available signals such as US inventory levels.
- In such an environment, financial activity can affect short-term prices.
- Producers re-entering the market (after sitting on sidelines during price rise) could depress forward prices

Back of curve responded rationally after 2003

Something fundamental has changed in this market

What moves the back of the market?

- Medium-term supply / demand and spare capacity outlook
- Changing political risks of disruption and to investment
- F&D cost inflation



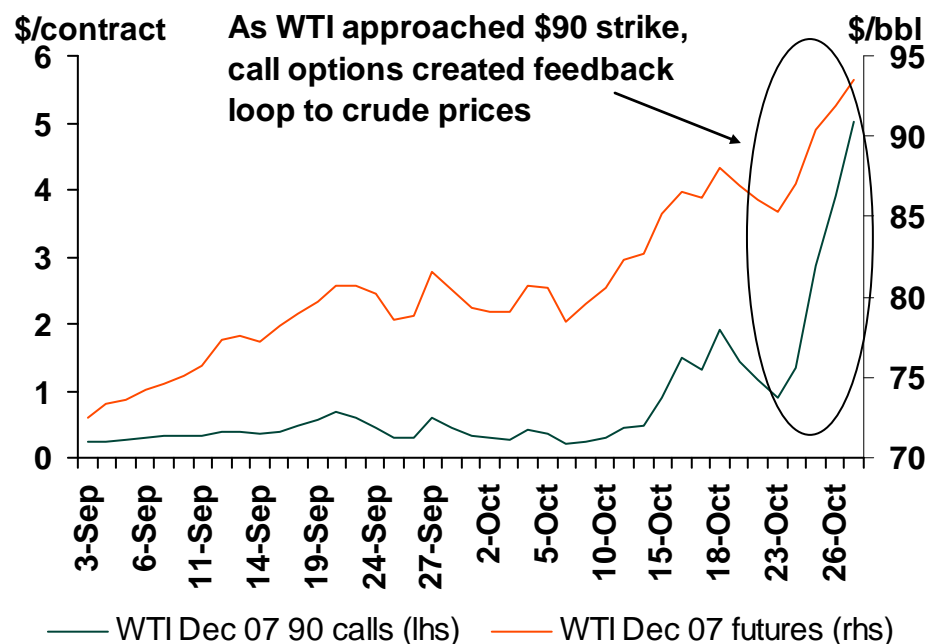
1. Forward curve on December 1, every year.

Options markets played particularly strong role in back end of the curve, or deferred prices: Example 1: Q3,4 2007

As crude topped \$80, options markets fuelled the rally, but with Dec-07 options expiration, some of financial premium left market

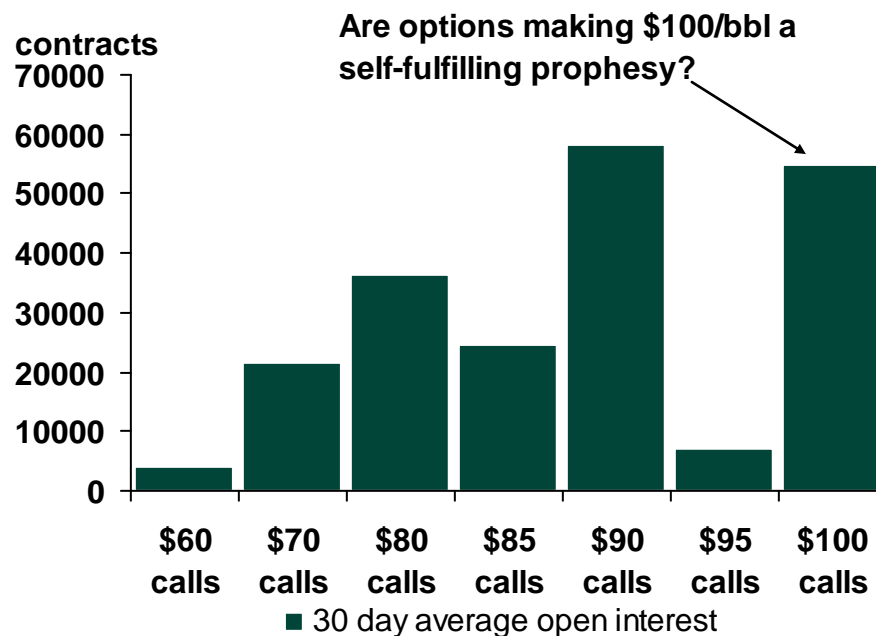
- As prices moved up, banks went from hedging primarily long call positions at \$70 and \$80 strikes to hedging primarily short call positions at \$90 and \$100 strikes
- But, with expiration of Dec-07 options on Nov 13 and \$100 not really tested, a good deal of open interest in WTI left the market with large liquidation in the front of the curve

WTI Dec 07 vs WTI Dec 07 90 calls



Source: Bloomberg, as of 29 Oct 07

Nymex WTI call option open interest



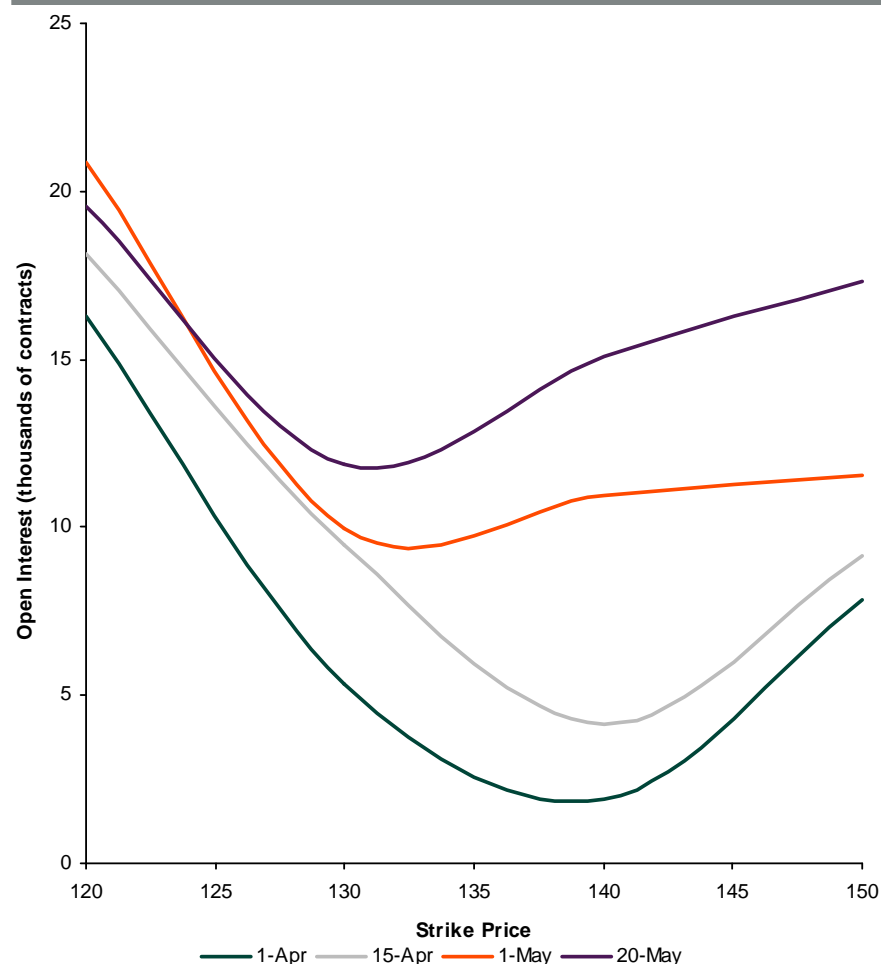
Example 2: how did the back of the curve rise so spectacularly after May 1 2008?

Call option markets position themselves for continued bullishness

Call Option Markets

- Open interest in calls generally rises as delivery date approaches, interest shifts to further out-of-the-money calls when investors are more bullish
- Starting May 15, interest in calls at \$120 strike peaked and began to be unwound.
- Meanwhile, interest in calls at the \$130, 140, and particularly 150 strikes continued to rise.
- Open interest in 150 calls rose almost as high as interest in 120 calls.
- Prices of 150 calls went from < 30 cents in January to \$8 in May.

Behavior of Dec-08 Call OI by Strike Price



Currencies and Oil: Macro-rationale on a theoretical level

USD & WTI crude oil relationships

While many commentators like to focus on the negative relationship between the US dollar and crude oil as a monolithic relationship, there are actually a myriad of economic mechanisms linking the two with causation going in either direction.

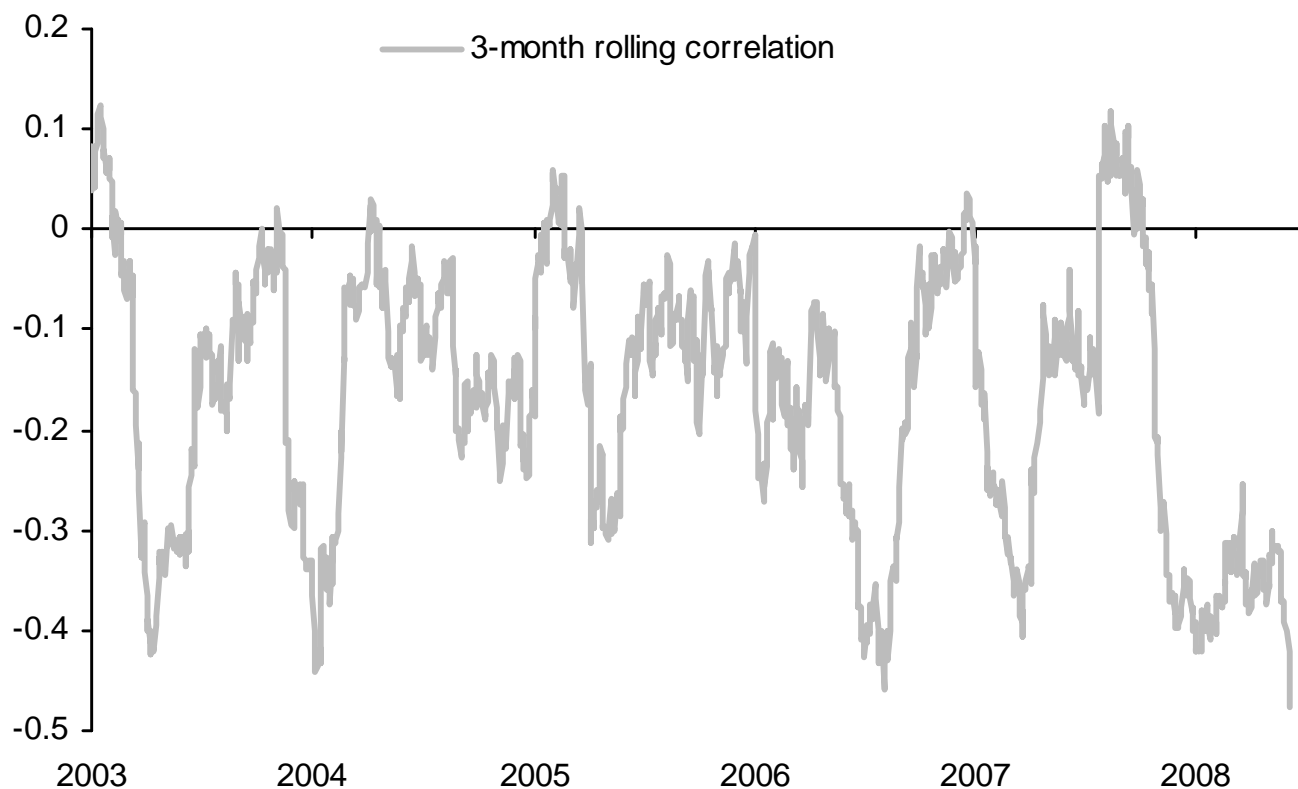
Some of the mechanisms are:

- Medium of Exchange effect: Demand for USD can rise as commodity prices increase as importers need more dollars to pay for purchases
- Terms-of-trade effect: The US is a large net commodity importer, so higher prices are a negative signal for the US current account, implying a weaker \$
- Demand effect: A weak USD may be a signal of a weak US economy with implications for demand for oil
- Denomination effect: As crude oil prices are typically denominated in dollars, dollar weakness while the “real” price of crude oil stays constant will cause a rise in the dollar denominated price of oil.
- Fed inflation-fighting effect: A commodity price rise stokes inflation fears which puts pressure on the Fed to raise interest rates, which will boost the strength of the USD relative to other currencies.

Correlations between the USD and WTI crude oil

Recent robust correlation between WTI (and other commodities) and the dollar is an exception rather than the rule

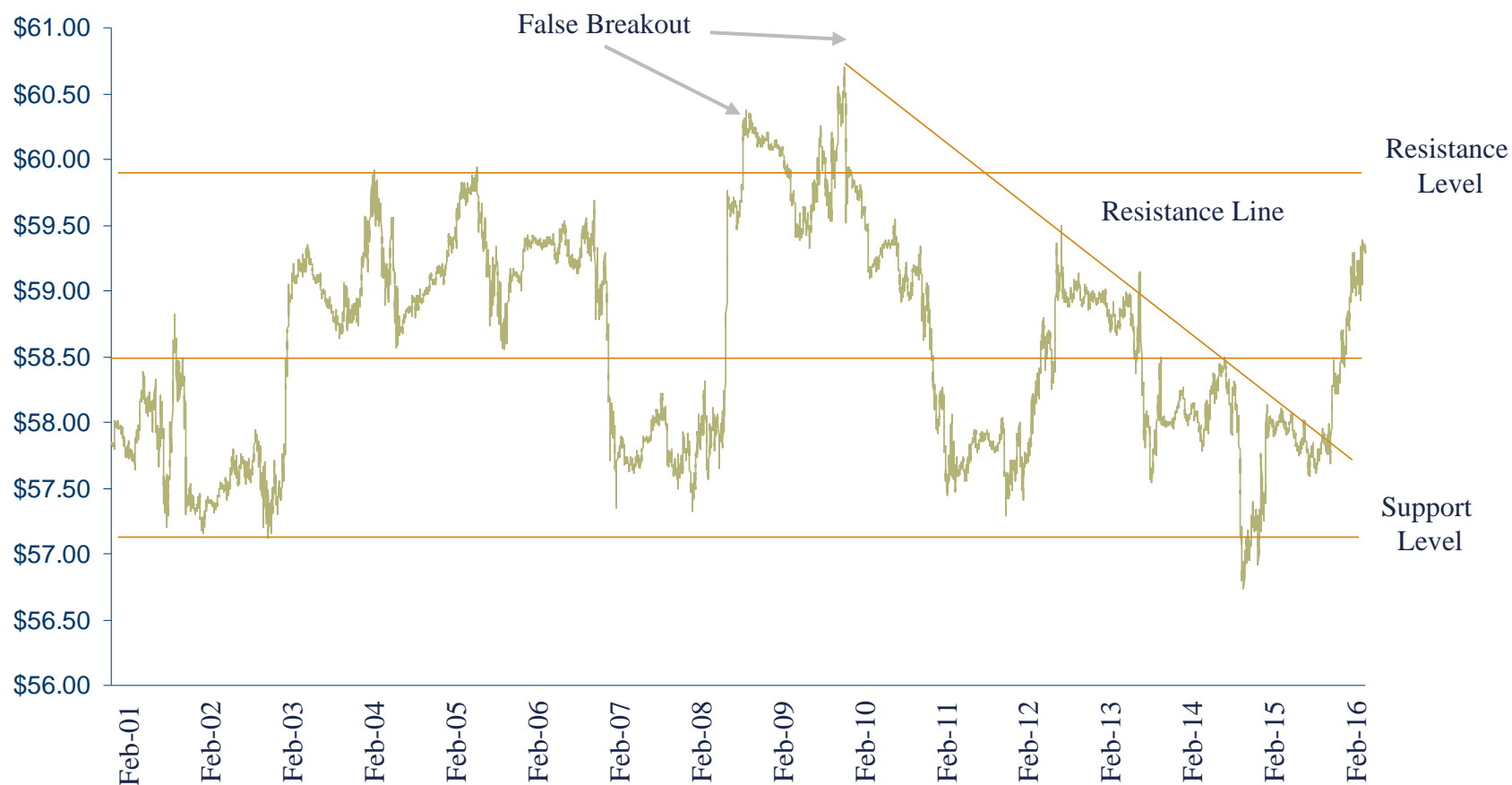
- While the correlation of the USD to the price of WTI crude oil has been strongly negative in recent months, a simple history of correlations show it is not a robust relationship.
- 1-month correlations dropped as low as -80% recently. However, sample mean of the 3-month rolling window correlation from 2003 to present is -6%.



With Rise in Volume, Black Boxes Rule Intraday

Technicals, rather than fundamentals, drive near term price behavior

Intraday WTI Price History, February 1–February 16, 2007



Source: Bloomberg, CFTC.

Take-a-ways on recent financial flows

- De-leveraging has affected all commodity markets
 - Credit problems led to sell-offs and accentuated weaker market fundamentals along the price curve
- As demand has fallen and supplies and spare capacity risen, risk premia have been reduced
 - It now looks as though even a disruption of all Iranian supplies wouldn't “spook” global markets
- Why have exchange traded crude oil futures and options not retreated even more?
 - Ironically, it appears that the deleveraging is pushing what were OTC trades into exchange trades, stemming the flight out of commodities
- It remains to be seen whether a loosening of credit markets would in turn see a resurgence of more speculative flows into commodities; and if it did, how rapidly this might occur

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