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Lehman Brothers oil outlook: Stronger signals of weaker prices

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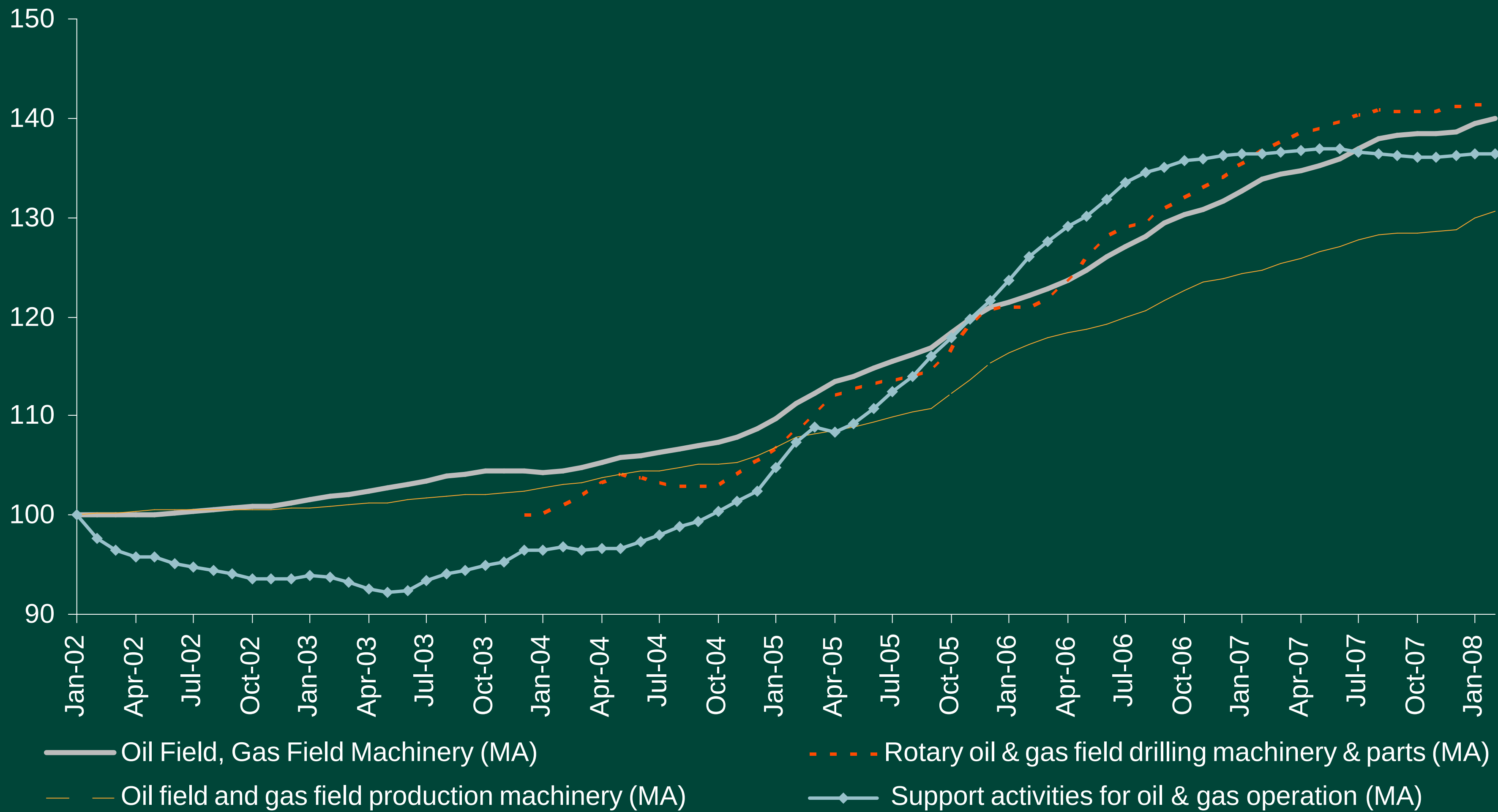
LEHMAN BROTHERS

What's driving oil markets today?

- Not the short run: Oil prices go up every time the US economy gets worse
- It's tempting to argue that the rise in oil prices now is simply a continuation of past trends
  - The cost of F&D continues to march up
  - Demand in China growing faster with no signs of slowdown
  - Upstream and downstream supply bottlenecks are permanent
- We think current price may be rising despite improvements on these fronts
- Yes, in the short run, weak dollar and inflation fears can push prices higher, but these are likely to dissipate by the end of the year
- We may be on the verge of a turning point in prices
  - Possibly the peak oil price comes this summer at $110-$120
  - Prices afterward could decline for 3 years or more
  - Oil may drop to $70-$80 by end-year

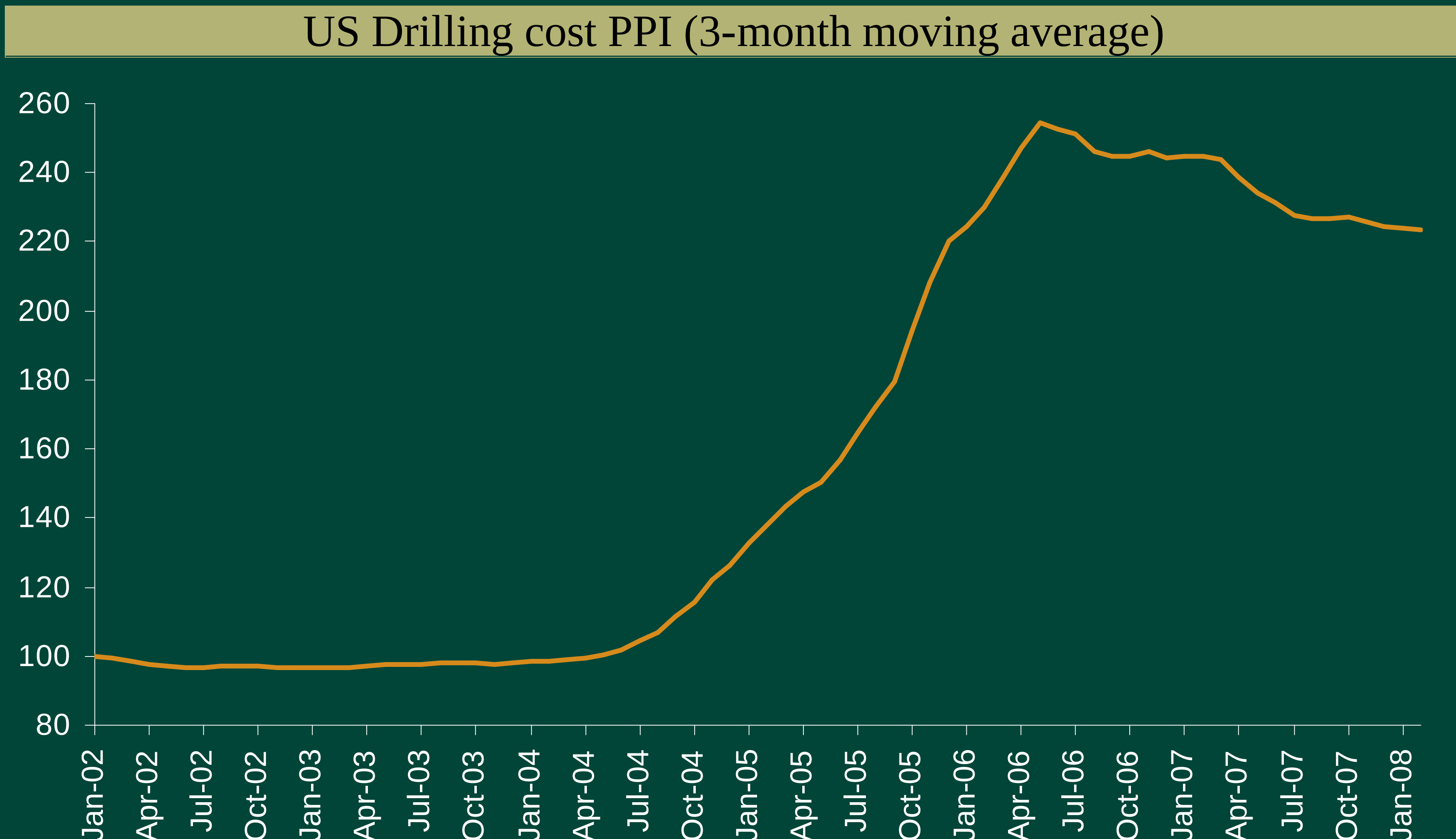
Upstream costs: After a clear run-up, US costs are flattening

US PPI Oil Producer Cost Indices are flattening (3-month moving average)



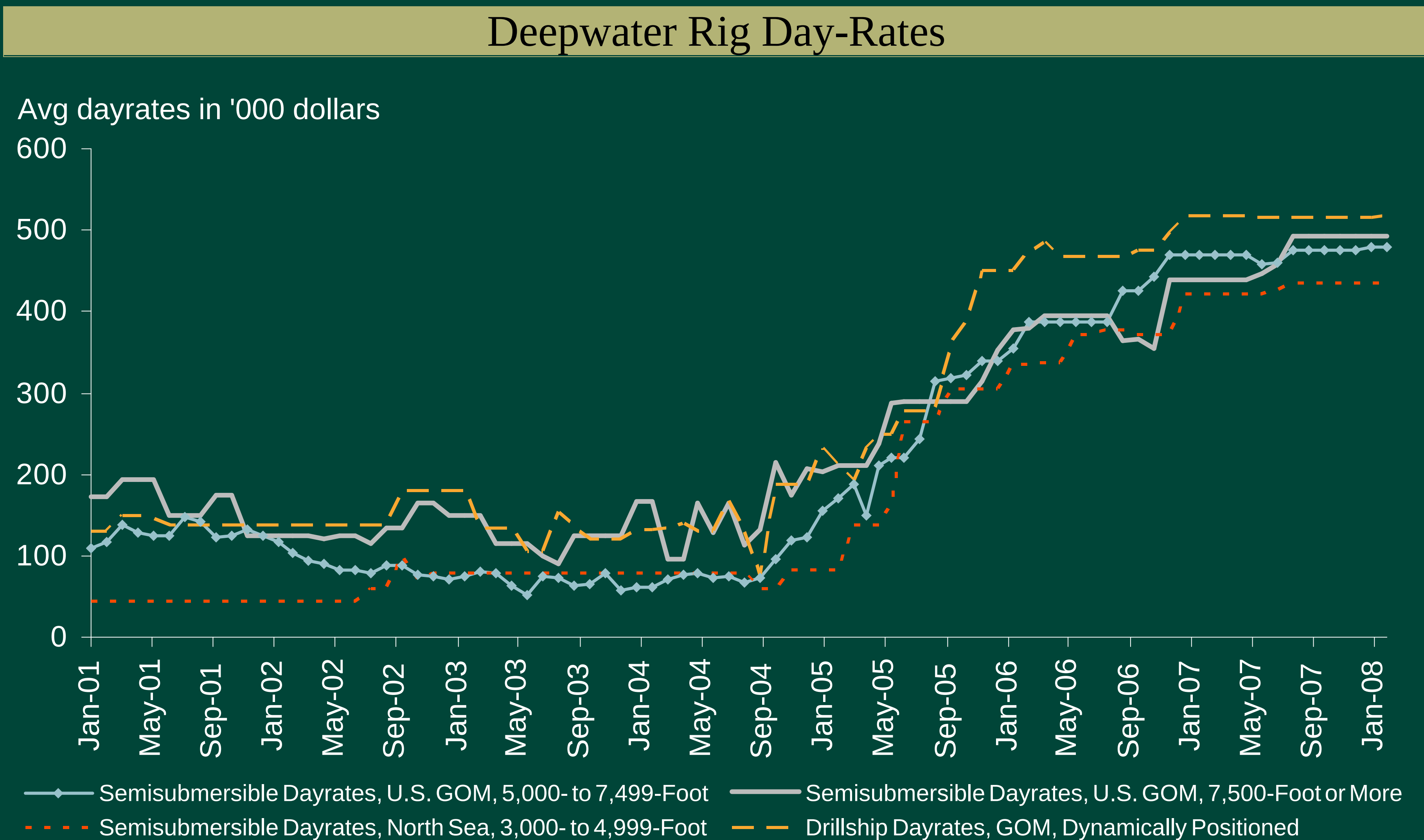
Source: US Bureau of Labor Statistics

US drilling cost rise and fall even more stark



Source: US Bureau of Labor Statistics

Even deepwater drilling costs are flattening

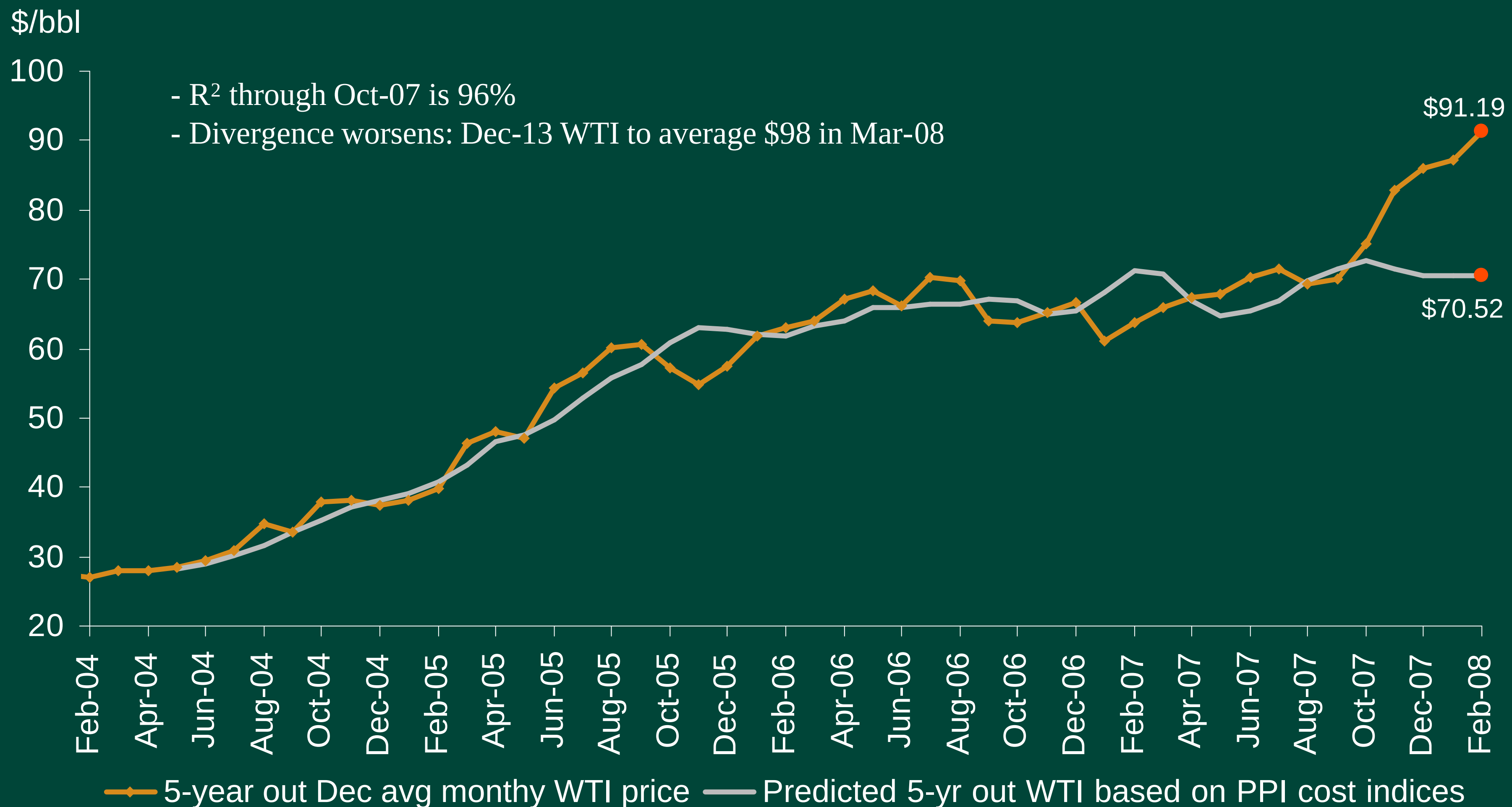


Source: ODS-Petrodata and Lehman Brothers Estimates

That costs have flat-lined is a problem for NYMEX WTI

Higher US costs appear to explain much of the rise in long-dated WTI prices until the divergence in October 2007.

US monthly PPI data regressed against average monthly 5-yr out WTI prices



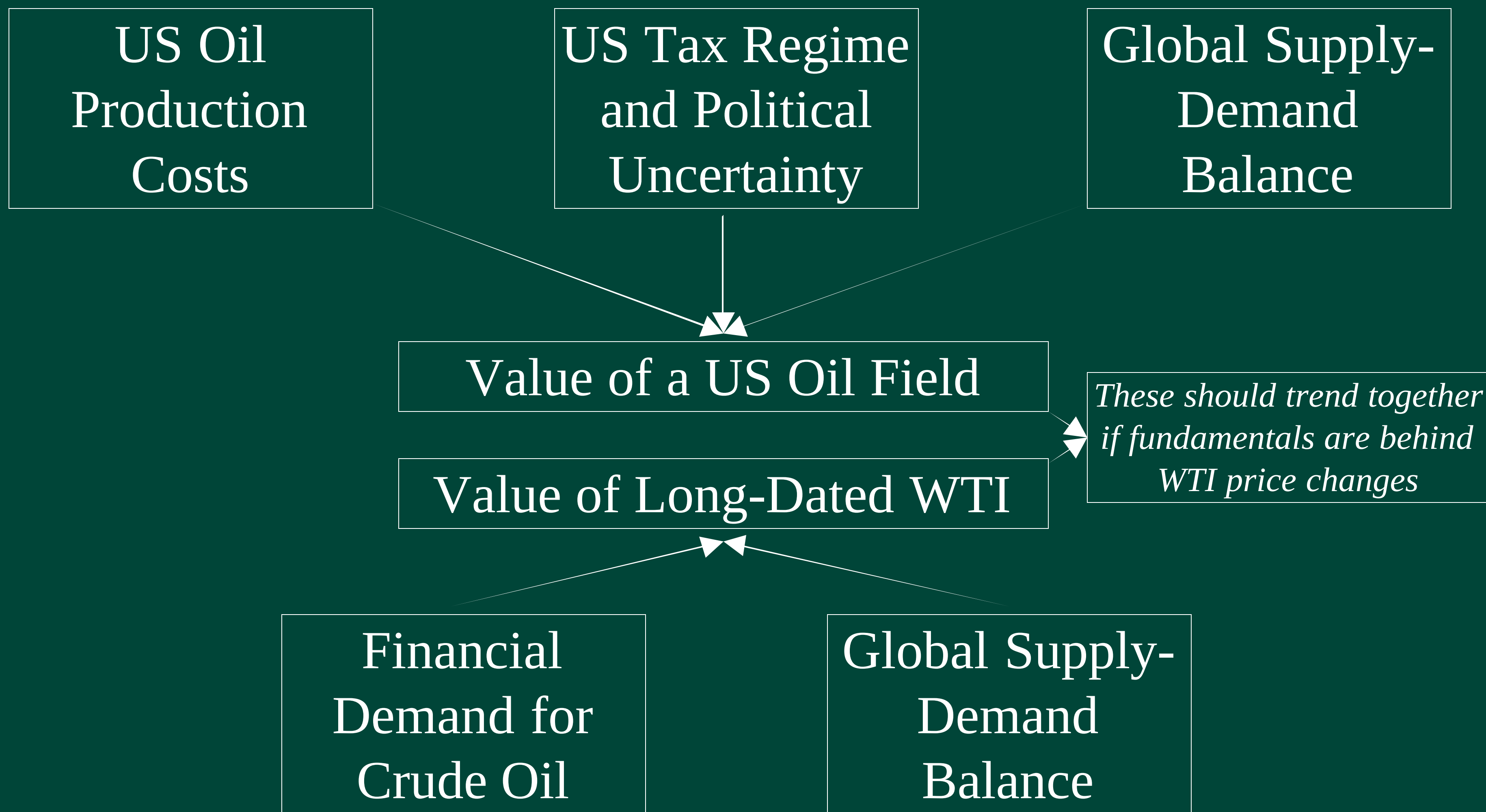
What may explain the breakdown?

- Costs of the global marginal producer can go up but not be reflected in the US PPI
  - Russian taxes or political risk
  - Specific machinery not used in the US

- Because US costs are flat, we can test whether the global supply-demand balance has indeed tightened the way the back of NYMEX WTI would suggest

Are fundamentals or flows driving oil prices?

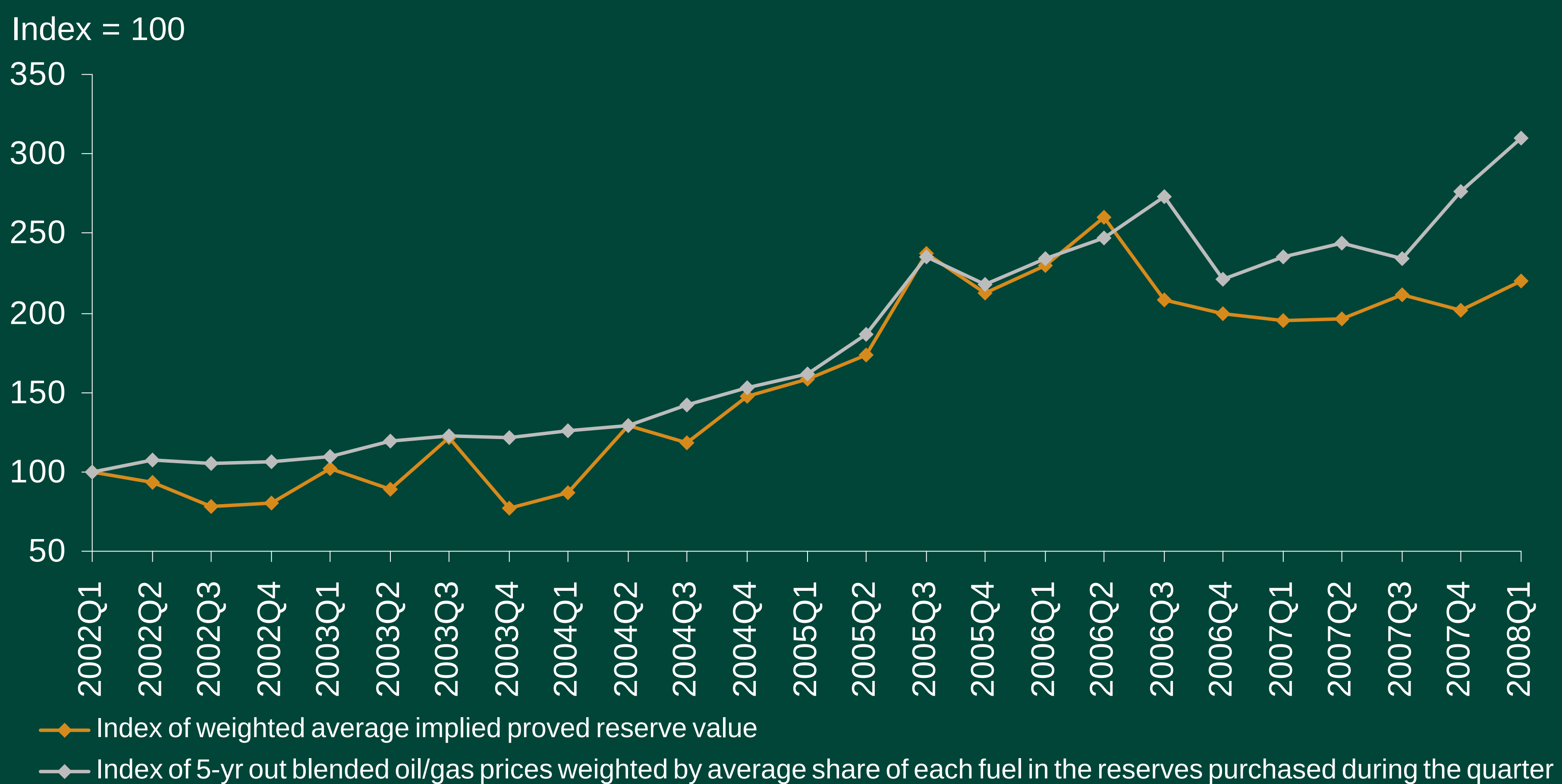
The market for US oil assets provides another data point for long-dated crude oil prices, holding US costs and politics constant



Like costs, US reserve prices have flattened

Relative to the fundamentals, either US reserves are undervalued or WTI is overvalued for some flows-related reason

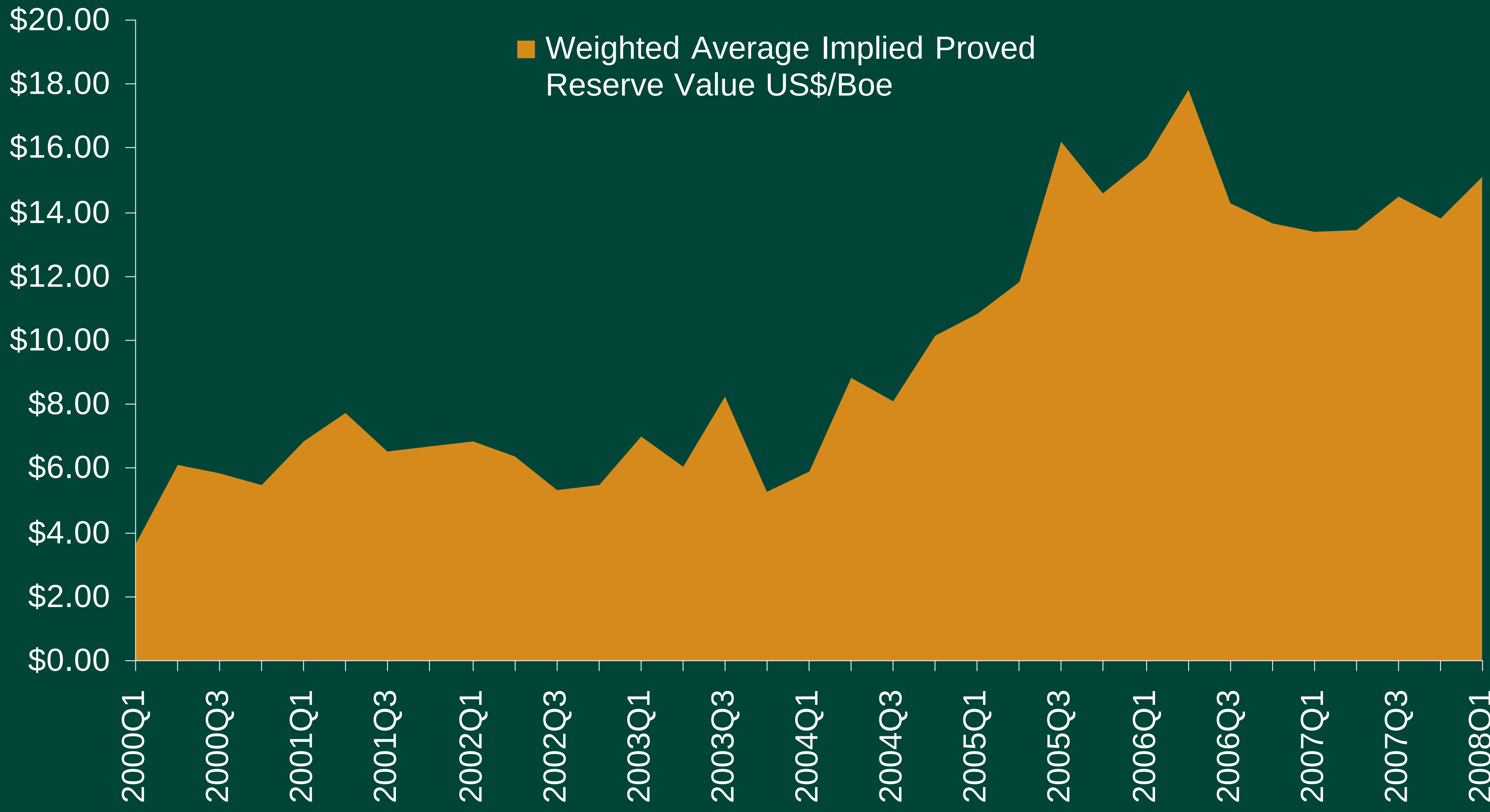
Index of WTI/HH prices vs US reserves valued through US M&A activity



Source: John S. Herold Upstream M&A Review

Is there an arbitrage that will push NYMEX WTI lower?

Price of US reserves valued through US M&A activity



Source: John S. Herold Upstream M&A Review

Adjusting US reserve values to compare to oil price levels

Rule of thumb for the US: Multiply reserve valuation by 3-4x to get expected minimum realized oil price

Assumptions

- Cost of proposed reserve acquisition: $15/boe
- Lifting cost: $8/boe
- R/P Ratio: 10 years
- Required minimum ROCE: 10%
- Government take = 40%

Math

- Total capex = $15/boe for 10 years = $150/boe of daily capacity
- That requires $15/boe of daily profit to make a 10% return on capex
- Assuming a 40% tax rate, profit before tax must equal $25/boe
- Then you must cover capex of $15/boe and lifting costs of $8/boe, meaning your overall realized price must equal $25+$15+$8= $48, or 3.2x your capex cost
- 20% ROCE achieved if realized oil and gas prices are $73/boe, what they are today

How Wall Street may have broken the markets' link

- What may be preventing the arb?
  - No access to credit to purchase assets
    - Many producer hedges already underwater
  - Counterparty risk and margin calls
    - Grain elevator operators in 2008
  - Inability especially of big players to hedge all production
    - A big hedge could cause a major drop (Mexico in Dec-06)
- Arb may work again if:
  - Confidence rebuilds in the US banking system
  - As financial instruments to mitigate these risks become more widespread

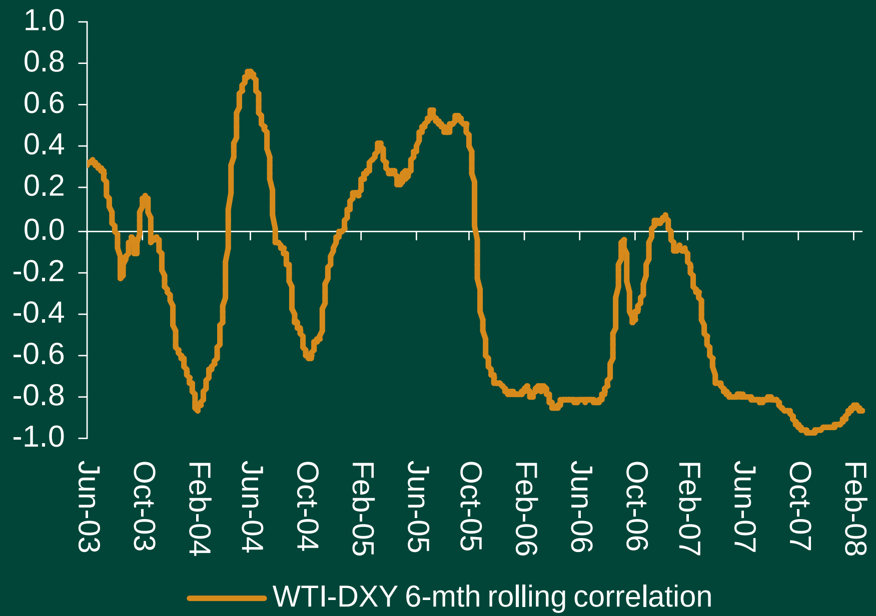
So is NYMEX overvalued or reserves undervalued?

- Cost of exploration and price of US oil assets are substitutes
  - Could provide an anchor to price of oil reserves as the arb closes, forcing NYMEX WTI down
- Stronger natural gas prices take pressure off of oil to rise to provide an incentive to invest all on its own
- **But in the meantime, in the absence of producer selling or links to the market for physical oil reserves, WTI prices can trade purely on financial flows**

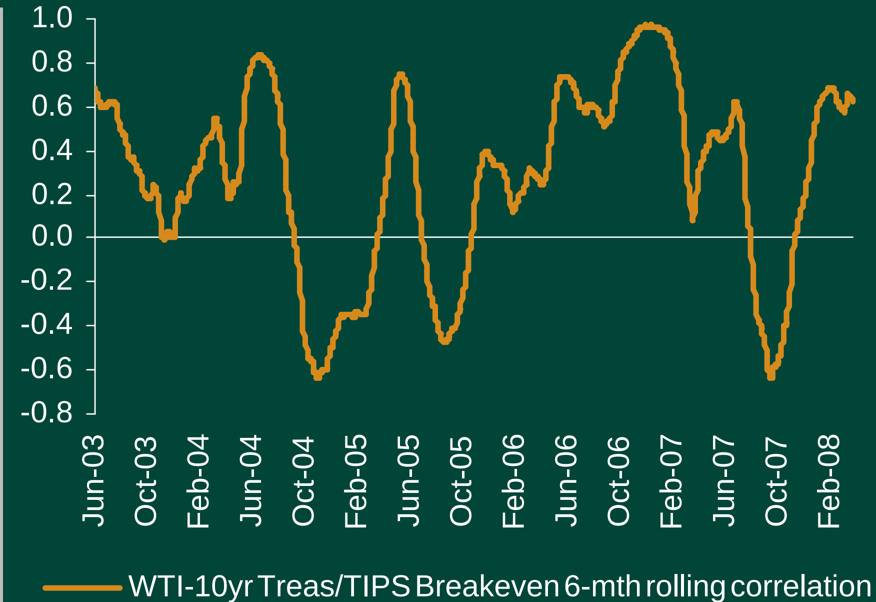
Commodities and inflation: the vicious cycle

Strengthening rolling correlations between oil/dollar and oil/inflation expectations have created a self-fulfilling prophecy

WTI 1M vs. DXY Index



WTI 1M vs. Inflation*

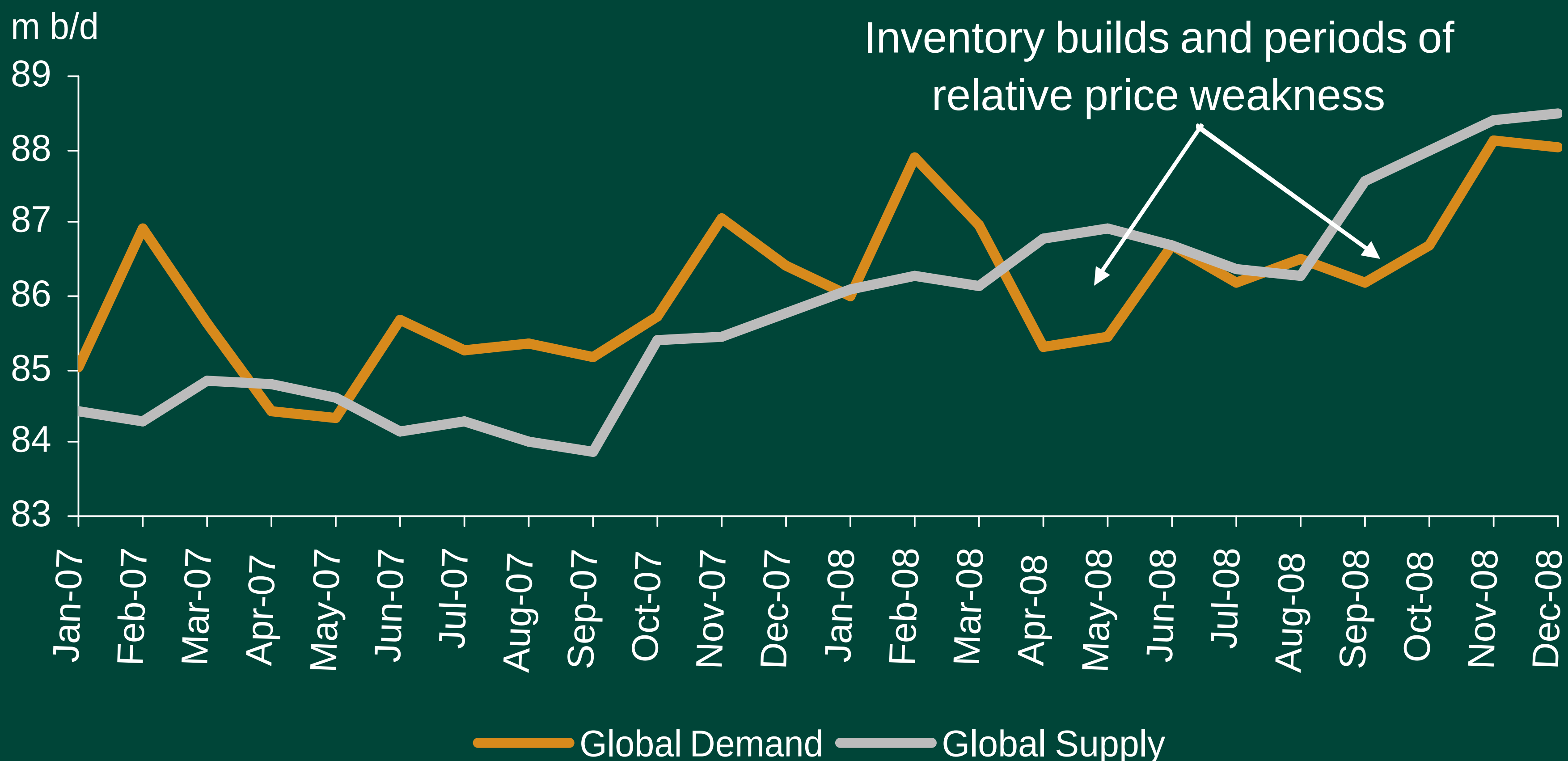


**Inflation compensation as measured by the difference between 10-year treasuries and 10-year TIPS*
Source: Bloomberg, Lehman Brothers Estimates

Tighter fundamentals may reinforce flows in 3Q08

Summer tightness to come from Iran, hurricane risks, North Sea maintenance, US fiscal stimulus, Mideast supply-demand shock

Lehman Brothers monthly oil supply-demand balance



Source: Lehman Brothers.

China could turn bearish versus expectations

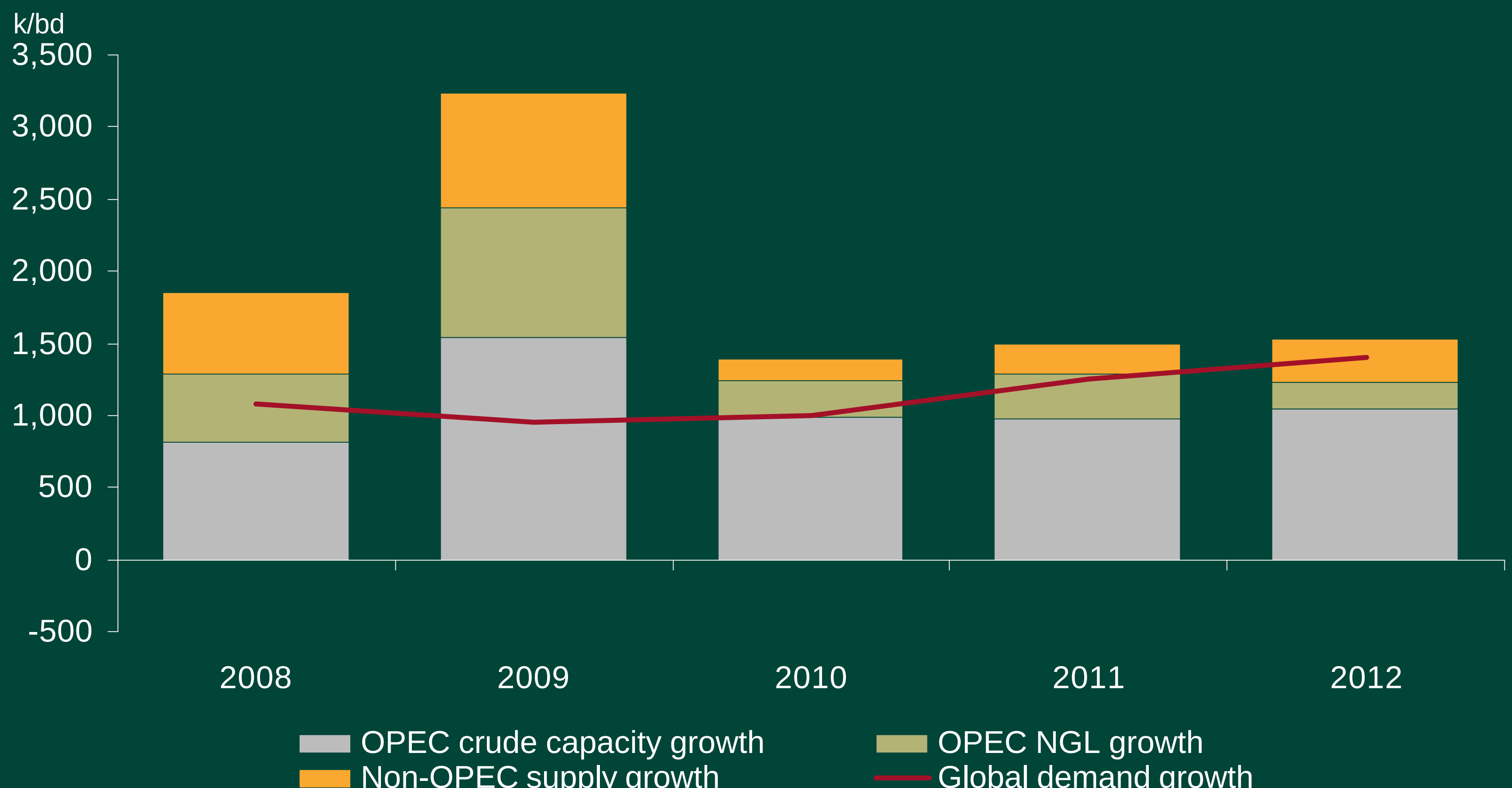
Via the trade and financial market channels, a period of extended US weakness could spread to emerging markets by 4Q08

- China is particularly vulnerable and crucial to commodity markets
  - China GDP growth depends on investment (60% self-funded) and exports
  - Rising RMB, higher taxes, less import demand, higher energy prices = lower profit margins and potential overcapacities in China's heavy industries
  - Pollution concerns + Olympics could be the catalyst for permanent closures and starting back toward less energy-intensive GDP growth seen in 1990s

Show-me-market: Until the creation of market cushions is imminent, fear of long-term shortage to push prices up

We think 5m b/d of upstream and downstream spare capacity by end-2009 will be enough to stem the price rise for at least 3 years

Global liquids production capacity growth vs. global oil demand growth



Source: Lehman Brothers estimates

Lehman Brothers Oil Outlook

Lehman Brothers Oil Price Outlook

	1Q07A	2Q07A	3Q07A	4Q07A	1Q08E	2Q08E	3Q08E	4Q08E	2006A	2007A	2008E	2009E
Brent ($ per barrel)	58.62	68.66	74.61	88.53	96.31	90.00	105.00	80.00	66.15	72.60	93.00	83.00
WTI-Brent differential	-0.16	-3.45	0.47	1.98	1.51	-1.00	1.00	-1.00	0.34	-0.29	0.00	0.00

Lehman Brothers Oil Supply-Demand Balance

	1Q07	2Q07	3Q07	4Q07	1Q08	2Q08	3Q08	4Q08	2006	2007	2008	2009
Global Demand	85.9	84.8	85.3	86.4	86.9	85.8	86.3	87.6	84.4	85.6	86.7	87.6
OECD	49.4	47.9	48.4	49.4	49.4	47.6	48.2	49.4	49.0	48.7	48.6	48.5
USA	20.9	20.7	20.8	20.8	20.5	20.5	20.5	20.7	20.7	20.8	20.5	20.6
Europe	15.2	15.0	15.4	15.6	15.4	15.0	15.5	15.6	15.6	15.3	15.4	15.3
Non-OECD	36.5	37.0	36.9	37.0	37.6	38.2	38.1	38.2	35.5	36.8	38.0	38.9
China	7.4	7.6	7.4	7.6	7.7	8.1	7.7	8.0	7.0	7.5	7.9	8.2
Middle East	6.6	6.7	7.1	6.6	6.9	7.0	7.4	6.9	6.4	6.7	7.1	7.5
Global Supply	84.5	84.5	84.1	85.5	86.2	86.8	86.7	88.3	84.8	84.7	87.0	89.0
Total Non-OPEC	50.5	50.2	49.7	49.9	50.3	50.5	50.6	51.1	49.7	50.1	50.6	51.4
OECD	20.1	19.9	19.5	19.6	19.7	19.6	19.5	19.8	20.0	19.8	19.6	19.6
N. America	14.3	14.3	14.1	13.9	14.0	14.1	14.0	14.1	14.1	14.1	14.1	14.4
Europe	5.3	5.0	4.7	5.0	4.9	4.7	4.6	4.7	5.3	5.0	4.7	4.3
Non-OECD	28.1	28.0	27.9	28.0	28.2	28.5	28.7	28.9	27.5	28.0	28.6	29.1
FSU	12.8	12.7	12.8	12.8	12.9	13.1	13.3	13.6	12.2	12.8	13.2	14.0
Other (1)	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.5	2.2	2.3	2.4	2.7
OPEC Crude	29.8	30.0	29.9	31.1	31.2	31.7	31.2	31.9	31.0	30.2	31.5	31.8
OPEC NGLs	4.2	4.4	4.4	4.6	4.6	4.6	4.9	5.3	4.1	4.4	4.9	5.8
Inventory Change	-1.3	-0.3	-1.2	-0.9	-0.8	1.0	0.5	0.7	0.4	-0.9	0.3	1.4
Call on OPEC	31.1	30.3	31.2	31.9	32.0	30.7	30.8	31.2	30.7	31.1	31.2	30.4

Source: Lehman estimates; (1) Other includes global processing gains, biofuels outside US, Brazil and Europe, GTL, CTL and unaccounted for new projects

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