Supply constraints drive resource realignment

Oil shortages likely to re-appear with DM demand recovery

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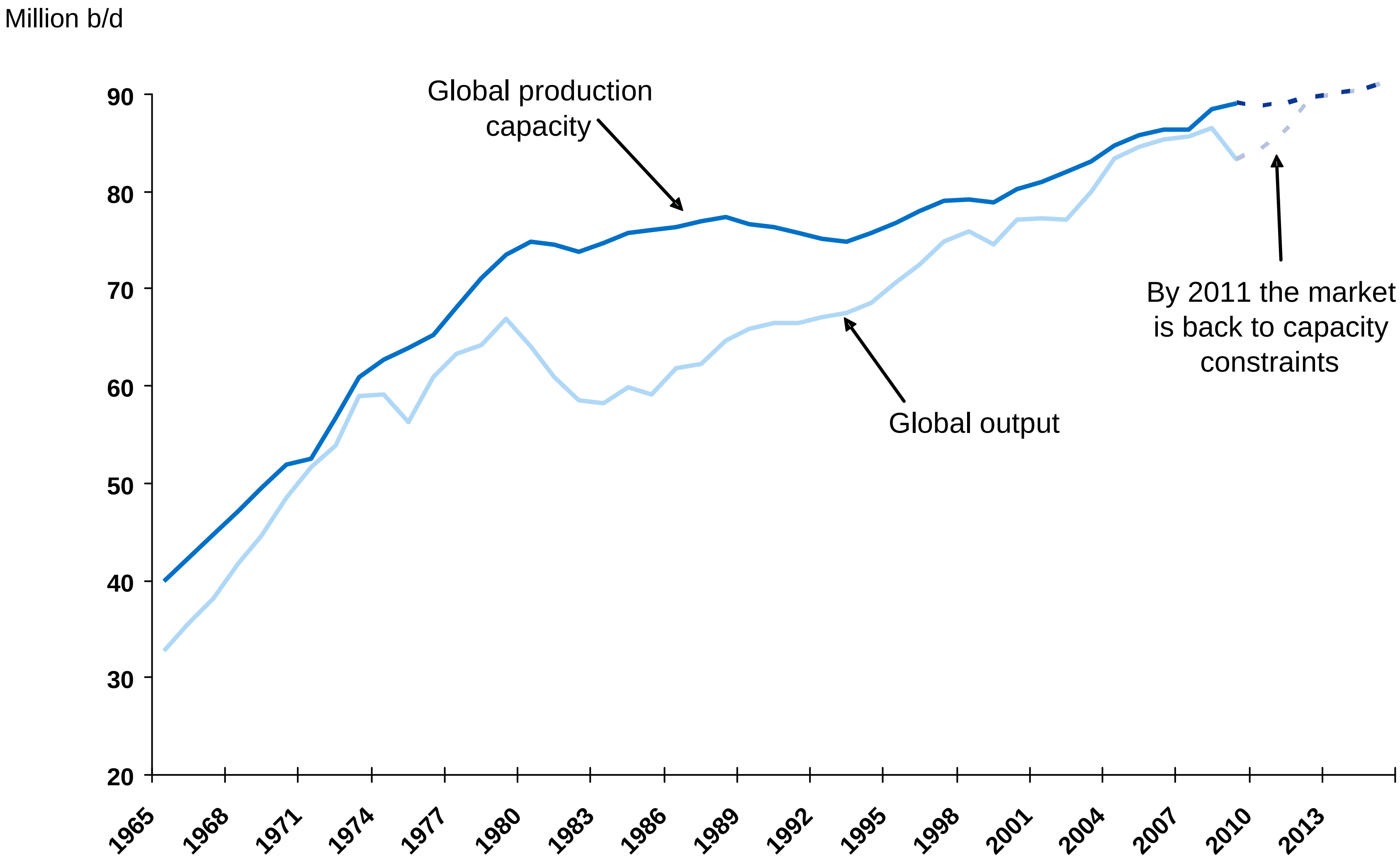
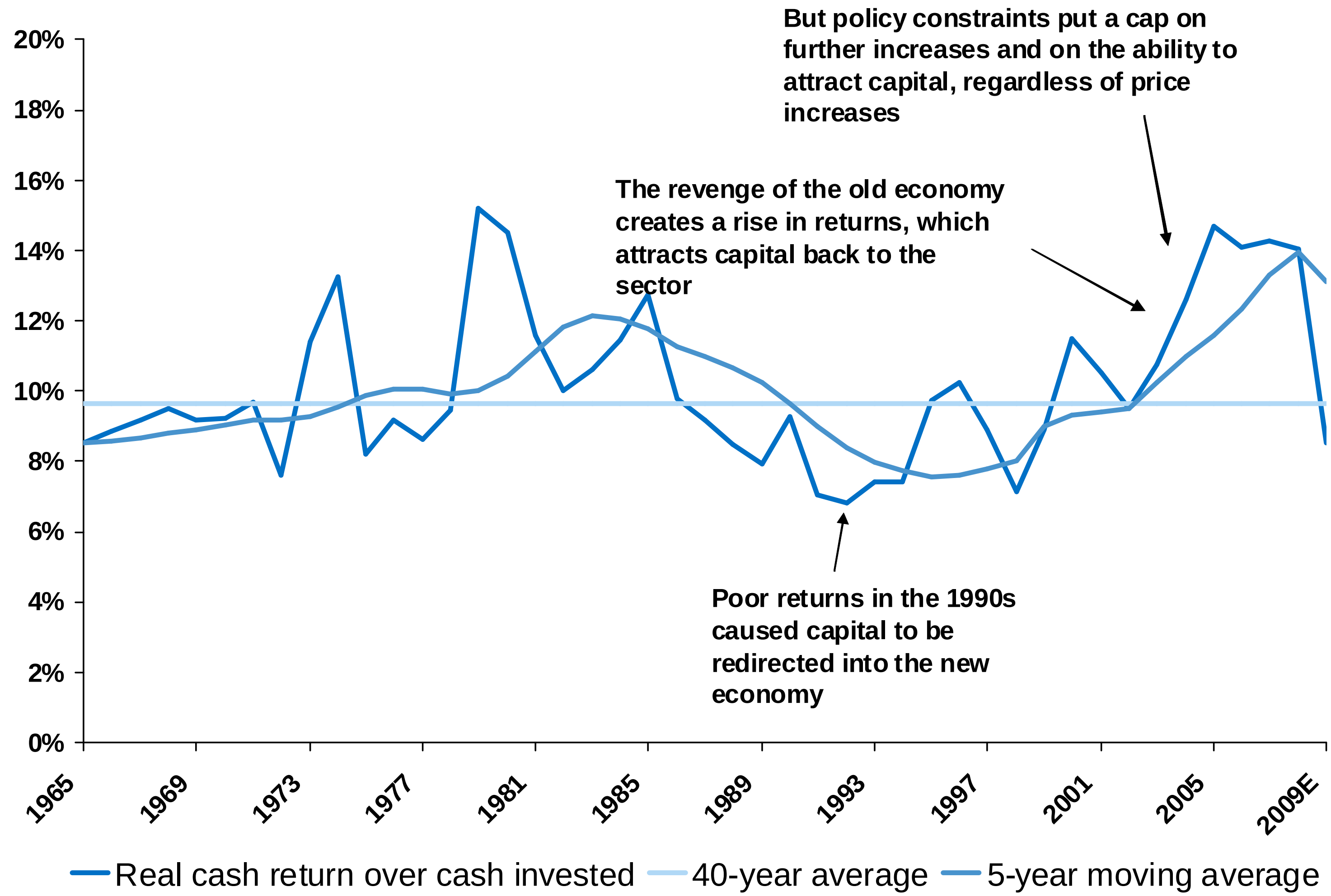
The commodity crisis is an obvious imbalance like the financial crisis was



Source: IEA, GS Global ECS Research

However, the financial crisis created a collapse in company returns which has significantly interrupted the investment phase

Average cash return among oil integrated companies



Source: Goldman Sachs Equity Research

The collapse in commodity demand was driven by the decline in GDP, not higher prices, which suggest as the economy recovers, so will demand

Percent change year over year – GDP on left axis

Source: Goldman Sachs Global ECS Research.

Two concepts that drive our views:

1. *The adding up constraints* – Commodities are physical, not financial markets. So you cannot consume what you do not have, and you cannot store what you don't have space to store.

2. *Don't begin an argument with price as it will only get you into trouble*. Instead always start an argument with a fundamental event, i.e. inflation expectations and the impact of oil prices on economic growth.

Commodities that are more difficult to store are more volatile

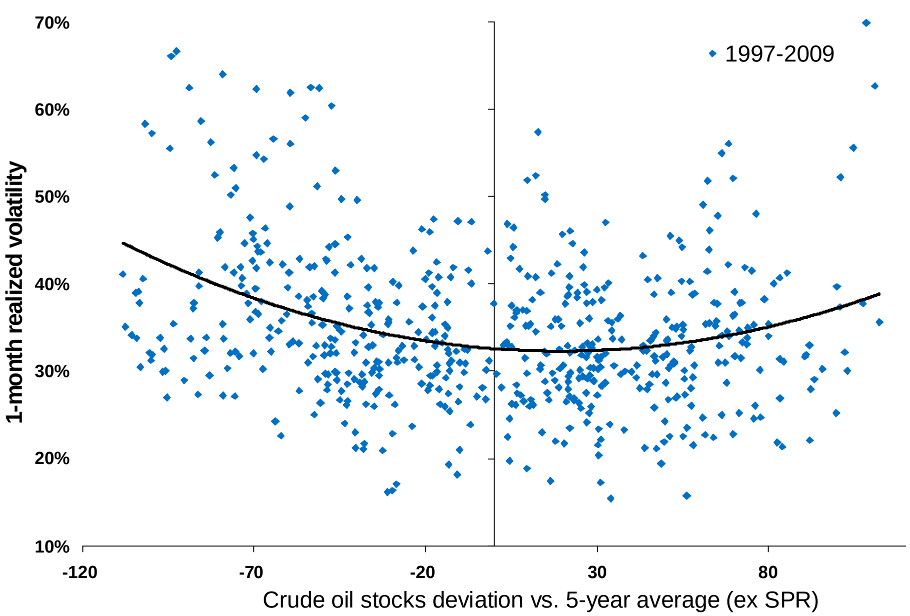
Commodity	Annualized volatility
US Power (PJM West Hub - real time)	308.7
US Power (PJM West Hub - day ahead)	180.4
NYMEX Natural Gas	75.6
UK Natural Gas	74.8
WTI Crude Oil	64.2
NYMEX RBOB	54.9
LME Nickel	53.1
USGC Heating Oil	52.3
Brent Crude Oil	50.9
LME Zinc	43.8
LME Copper	43.6
CBOT Corn	42.0
CBOT Wheat	41.2
CME Lean Hog	39.9
London Silver	39.9
NYBOT Cocoa	38.4
NYBOT Sugar	37.9
CBOT Soybean	37.2
NYBOT Cotton	35.2
London Palladium	34.4
LME Aluminum	32.2
NYBOT Coffee	31.2
London Platinum	29.3
London Gold	22.9
CME Live Cattle	17.3

Source: Various exchanges and GS Global ECS Research.

Commodity inventory drives volatility

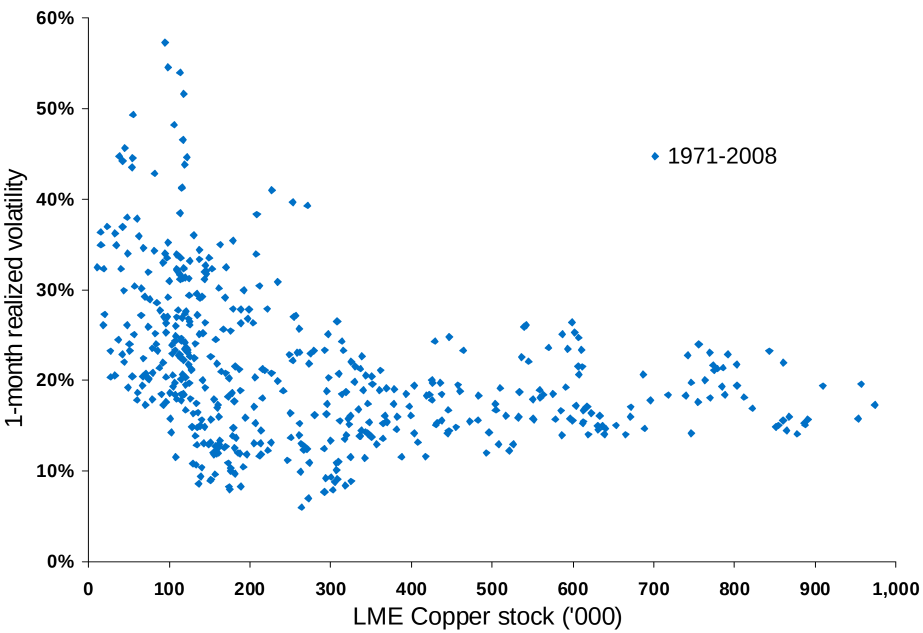
WTI volatility increases as inventories approach exhaustion and as inventories approach capacity

Percentage, vertical axis; million barrels, horizontal axis



Copper volatility increases as inventories approach exhaustion, but remains steady as inventories rise given few storage capacity constraints for metal

Percentage, vertical axis; Thousand mt, horizontal axis



Source: NYMEX, LME and GS Global ECS Research.

Three emerging themes that are likely to dominate in 2010 and beyond

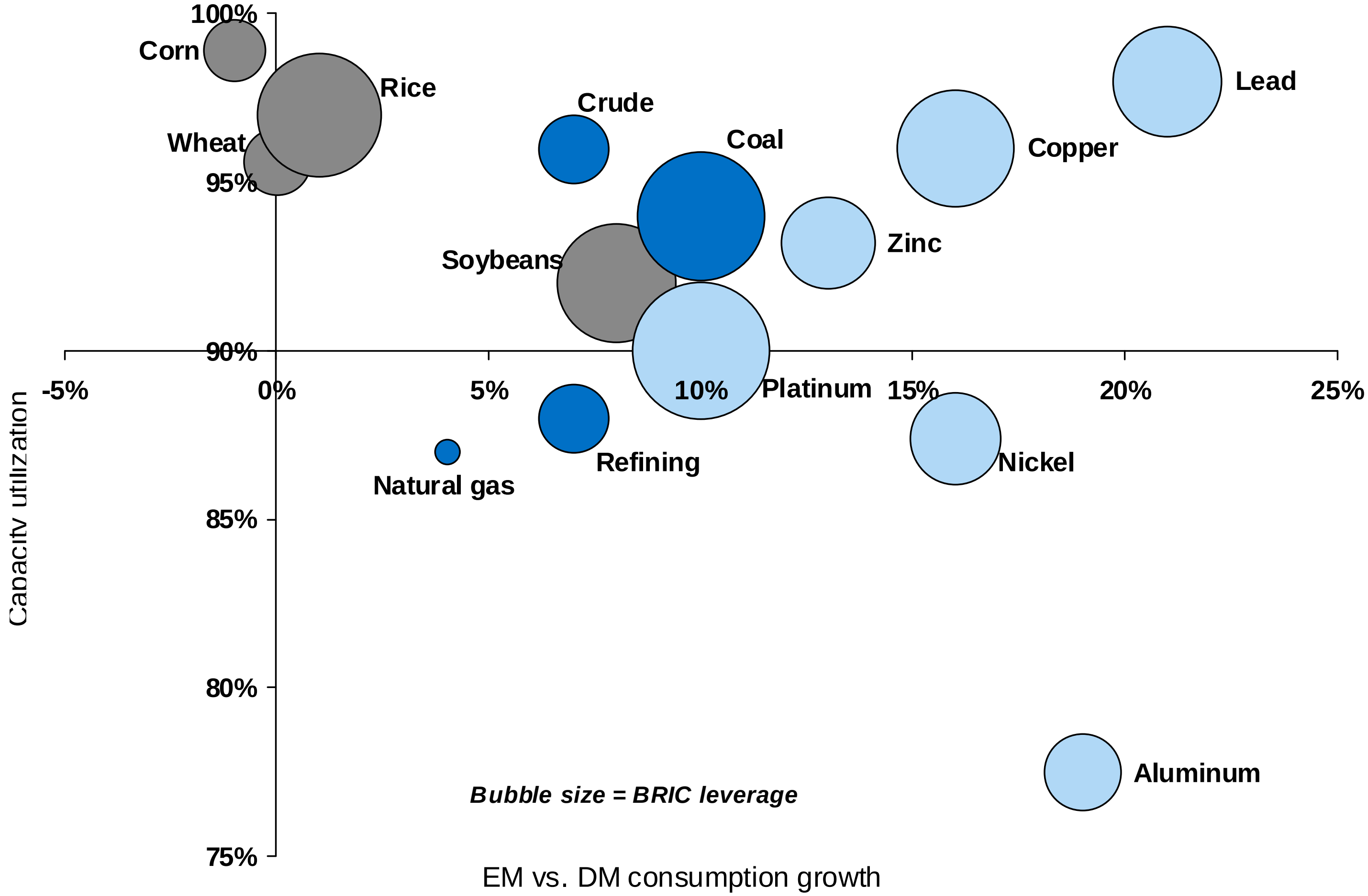
1. Differentiation between commodities driven by the extent of supply constraints that will likely drive greater price dispersion across the commodity complex i.e. the end of Btu convergence

2. Resource realignment as emerging markets are forced to bid away scarce commodities from the developed economies, especially when supply constraints are more restrictive, which shifts the focus away from the sustainability of higher *prices* and towards the sustainability of higher *growth*;

3. Increasing macroeconomic correlations as resource realignment will likely increase the relevance of the commodity prices and supply to the broader macroeconomic environment.

Commodities with more restrictive supply constraints and greater leverage to emerging market demand growth have more positive outlooks

Capacity utilization as of November 2009, EM vs. DM consumption growth is annual based on 1999-2008 consumption, BRIC leverage is average of 2008 and 2009



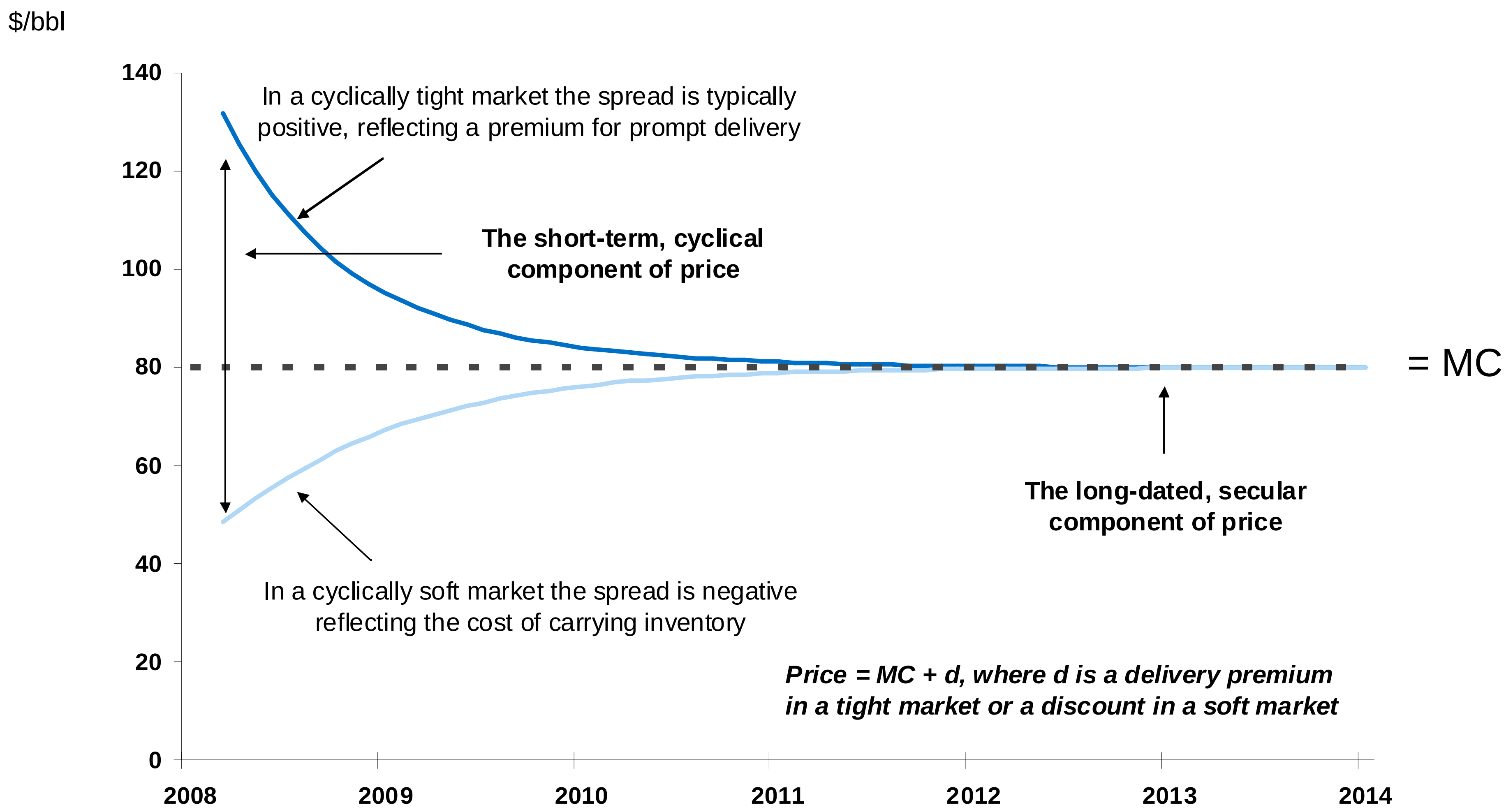
* Leverage score = (mkt share)^2 + (imp share), Capacity utilization for metals has been normalized by the historical maximum utilization for each metal.

Source: Goldman Sachs Global ECS Research.ce: DOE.

Goldman Sachs

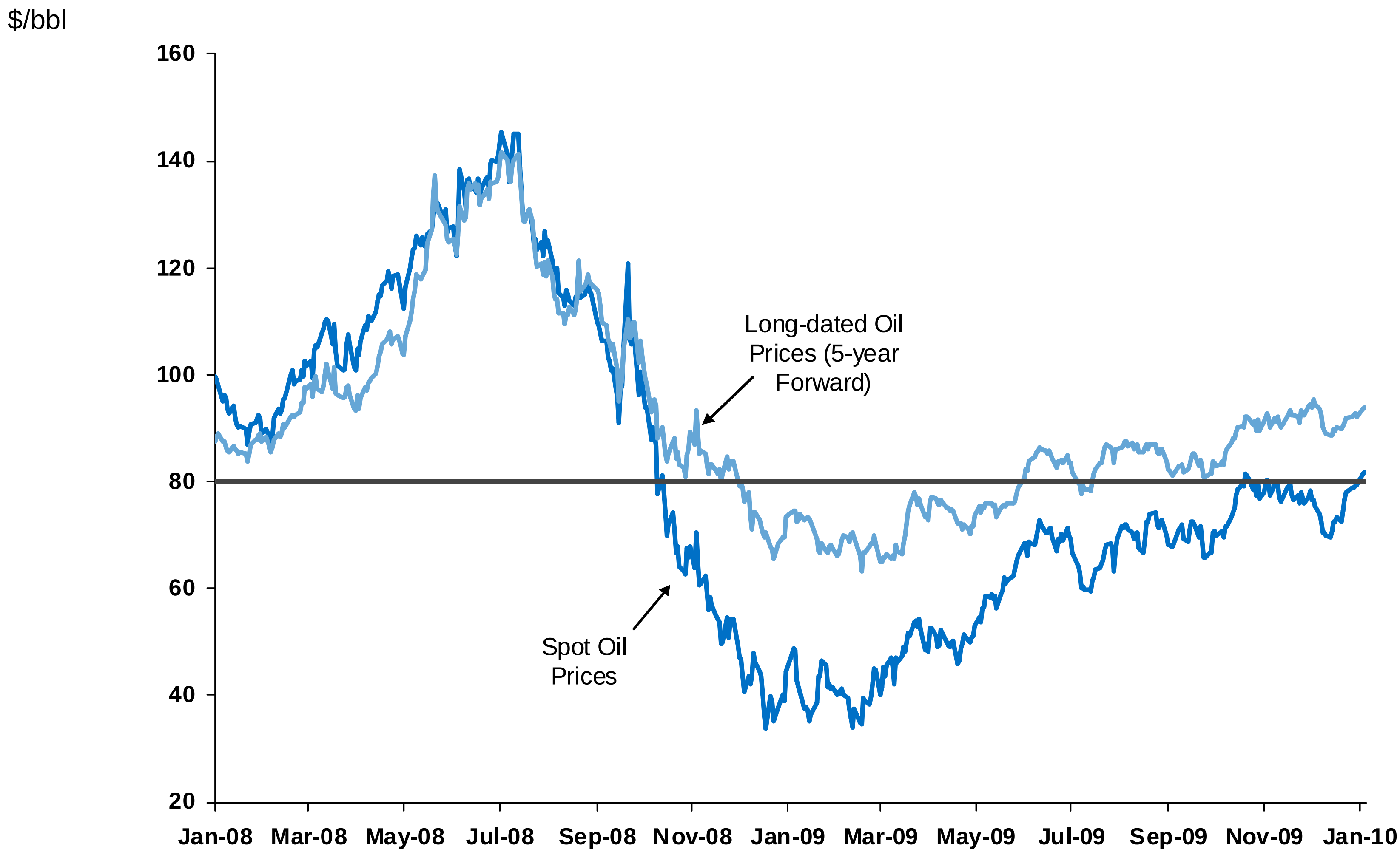
Credit normalization drove the most recent rally, as we still await the economic recovery rally

Decomposition of a commodity forward curve



Source: GS Global ECS Research

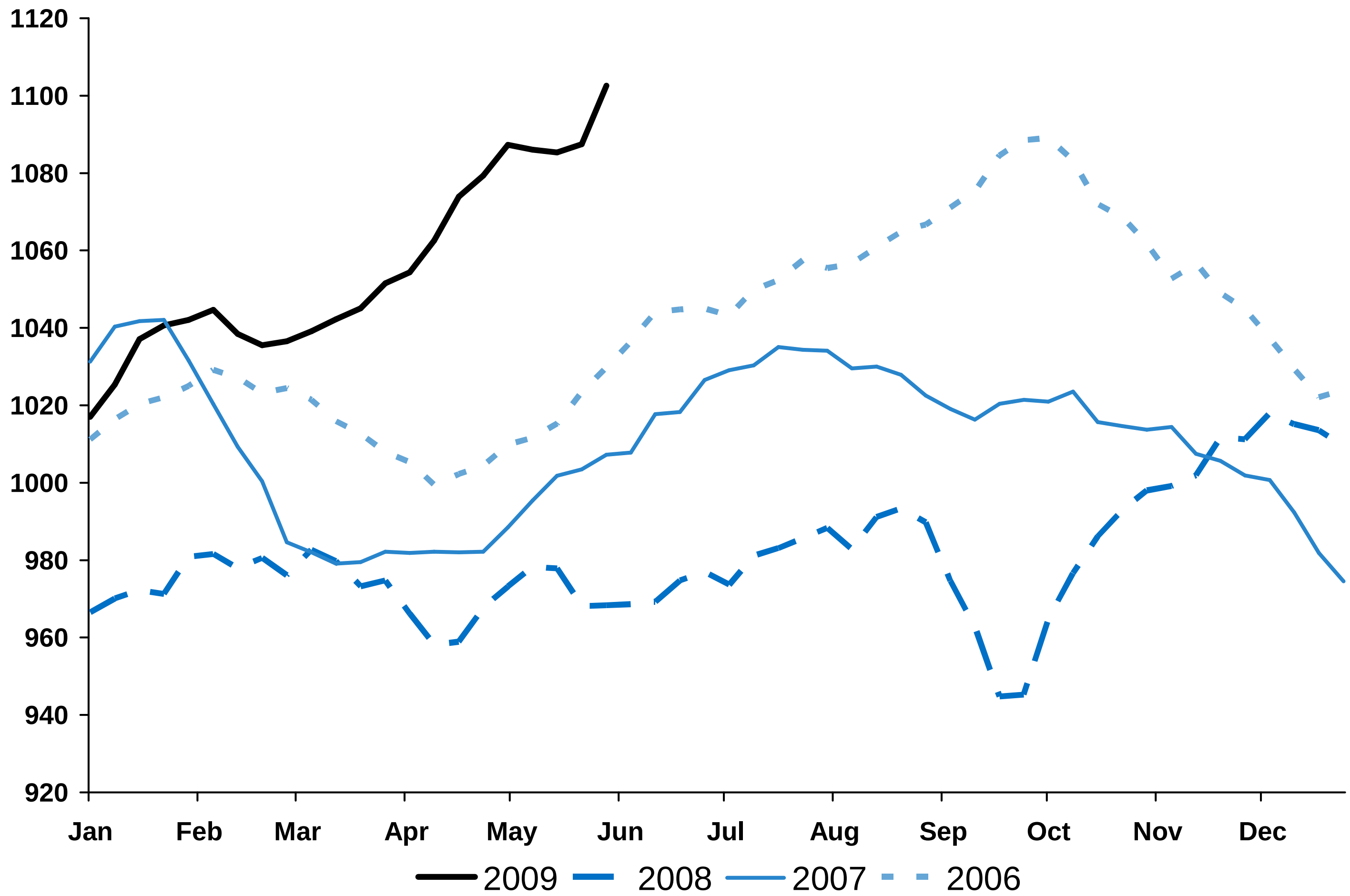
Long-dated commodity prices have remained very stable during the credit crisis, with most of the volatility in prices being driven by term structure



Source: NYMEX.

In early May, oil market fundamentals looked terrible, but the oil market wasn't pricing oil fundamentals...

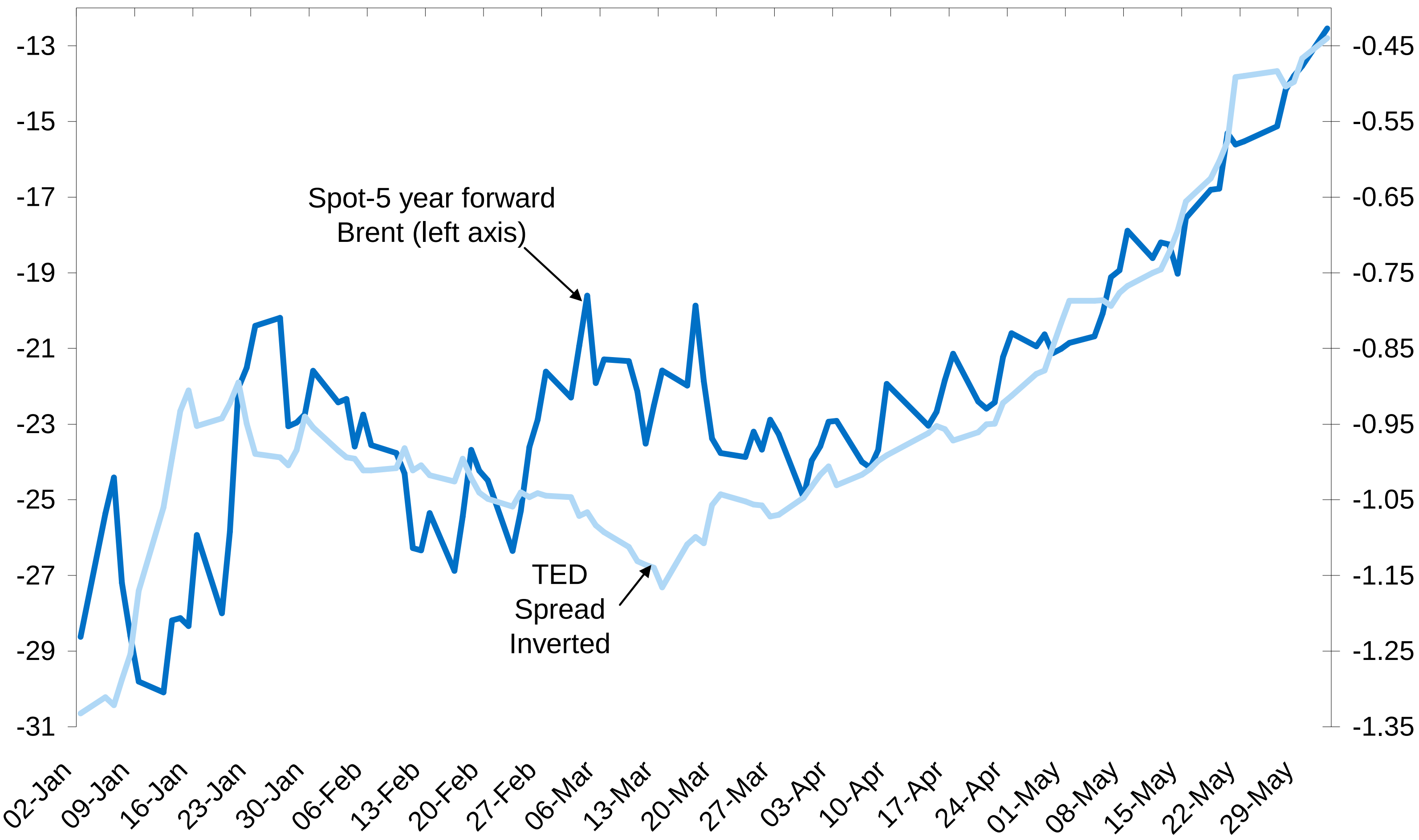
Million barrels



Source: DOE.

... instead the oil market was pricing credit market fundamentals, as credit markets normalized so did oil market timespreads, which was worth $20/bbl

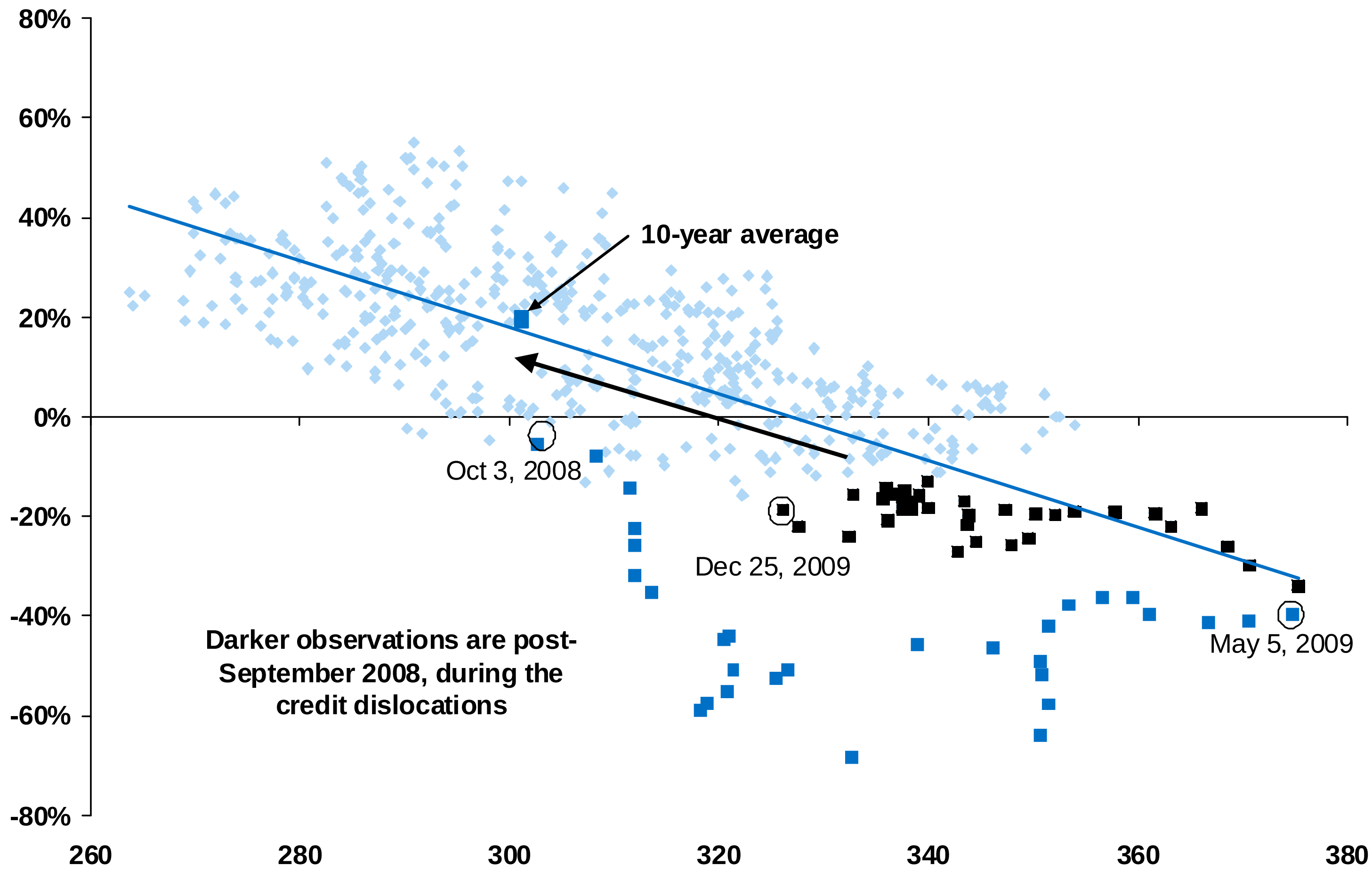
$/bbl (left axis) ; % return (right axis)



Source: ICE and US Federal reserve.

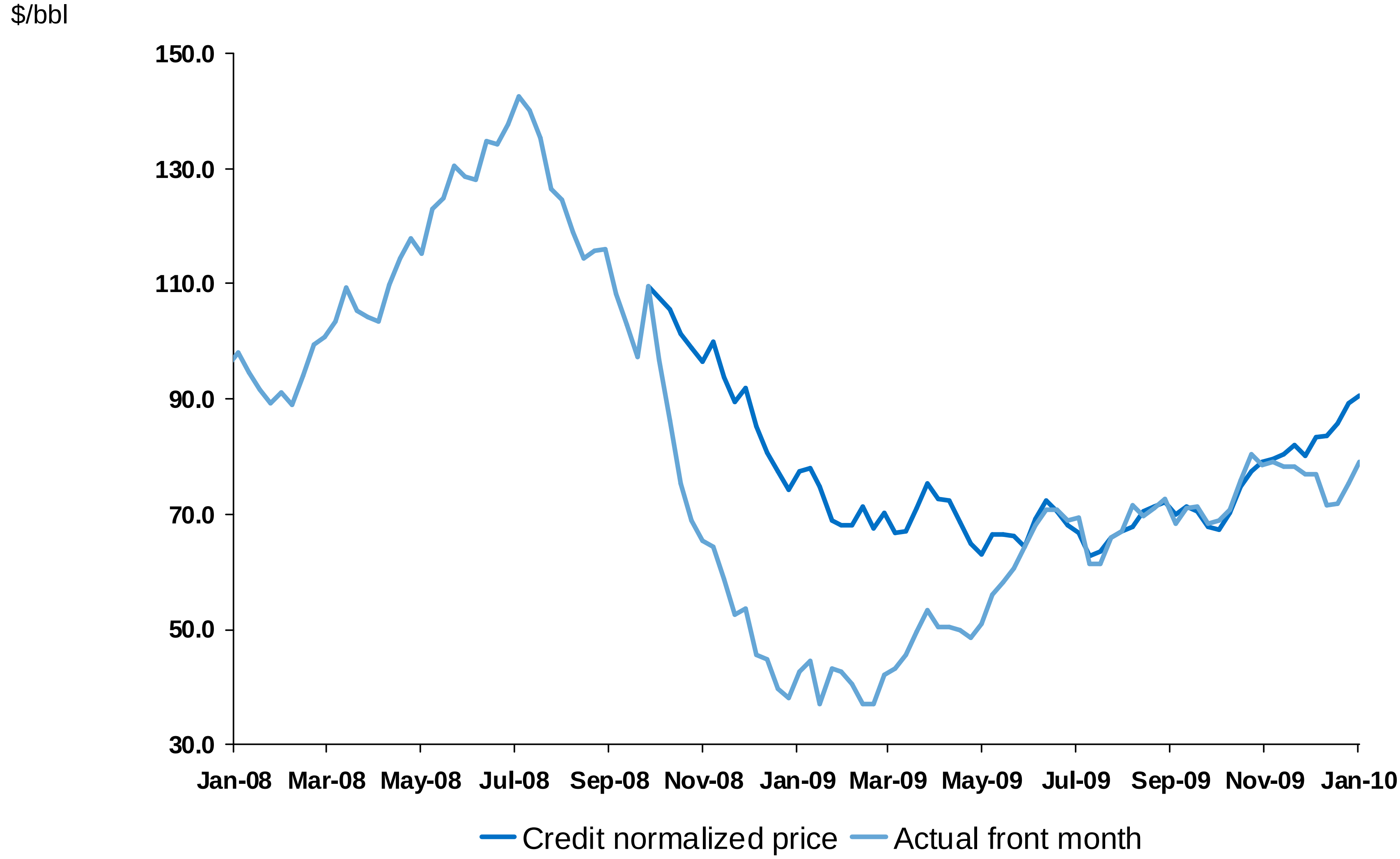
The discount of spot prices to forward prices was larger than inventory levels would have suggested owing to limited access to capital and surging funding costs

Percent 1st vs. 60th month timespread (vertical); million barrels of US crude oil in storage (horizontal)



Source: NYMEX, Goldman Sachs Global ECS Research

Normalizing the price action for credit, prices are just barely off their lows, suggesting more upside as the economic recovery takes hold

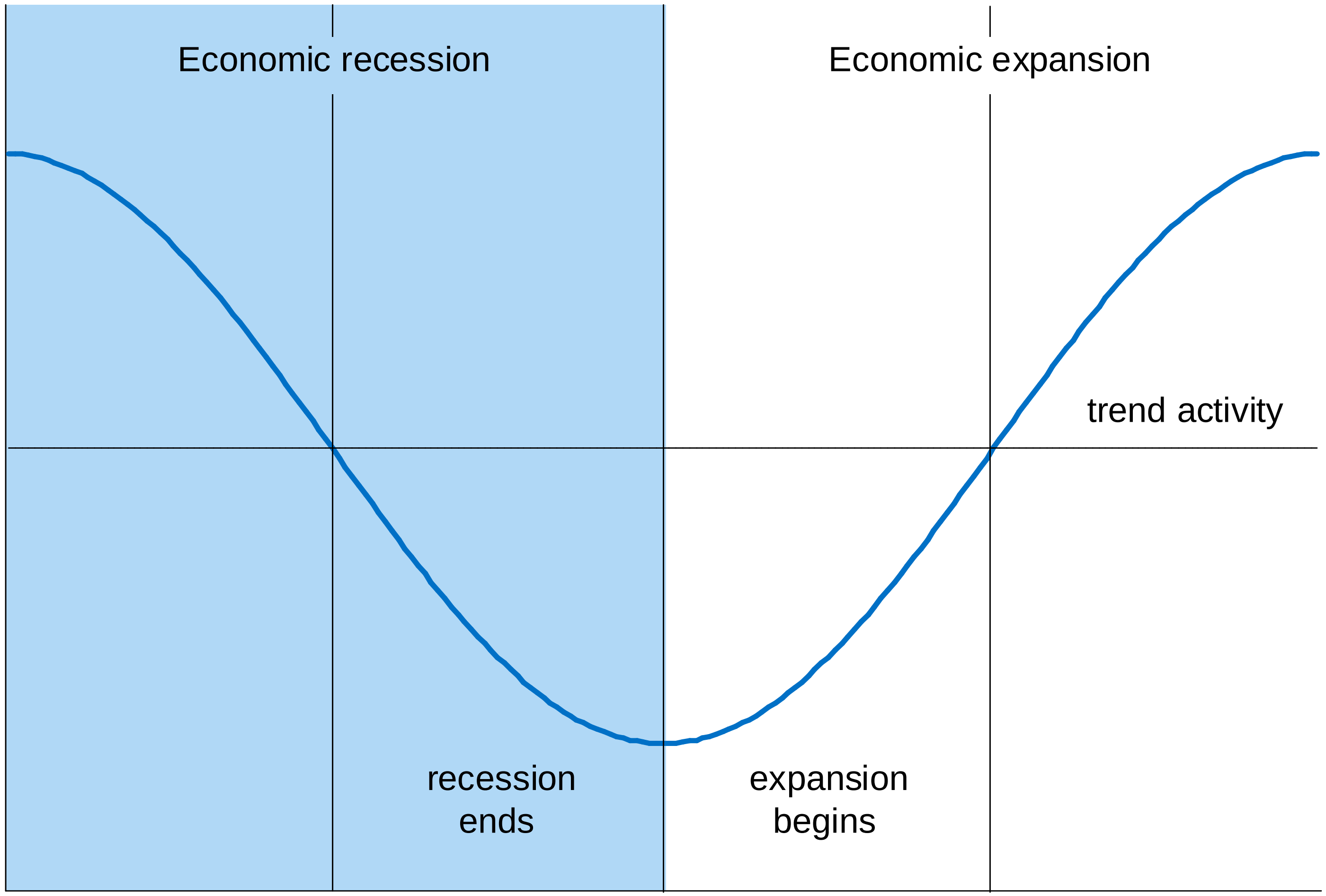


Source: NYMEX and GS Global ECS Research.

Still on the cyclical trough, awaiting the recovery

The end of an economic recession corresponds to the trough in economic activity, not a return to normal

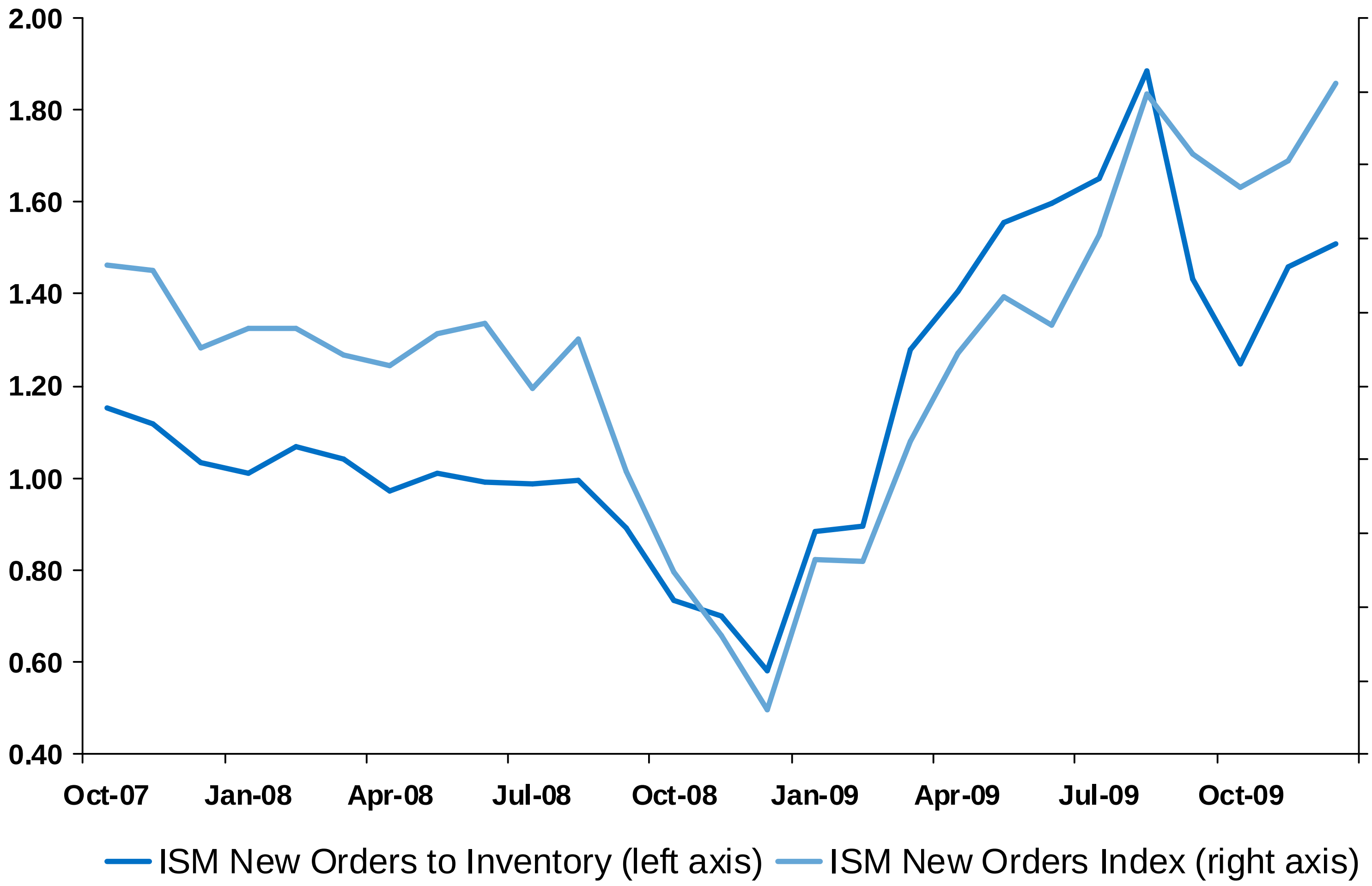
Stylized economic cycle



Source: GS Global ECS Research.

The leading indicators point to a strong rebound in 2010...

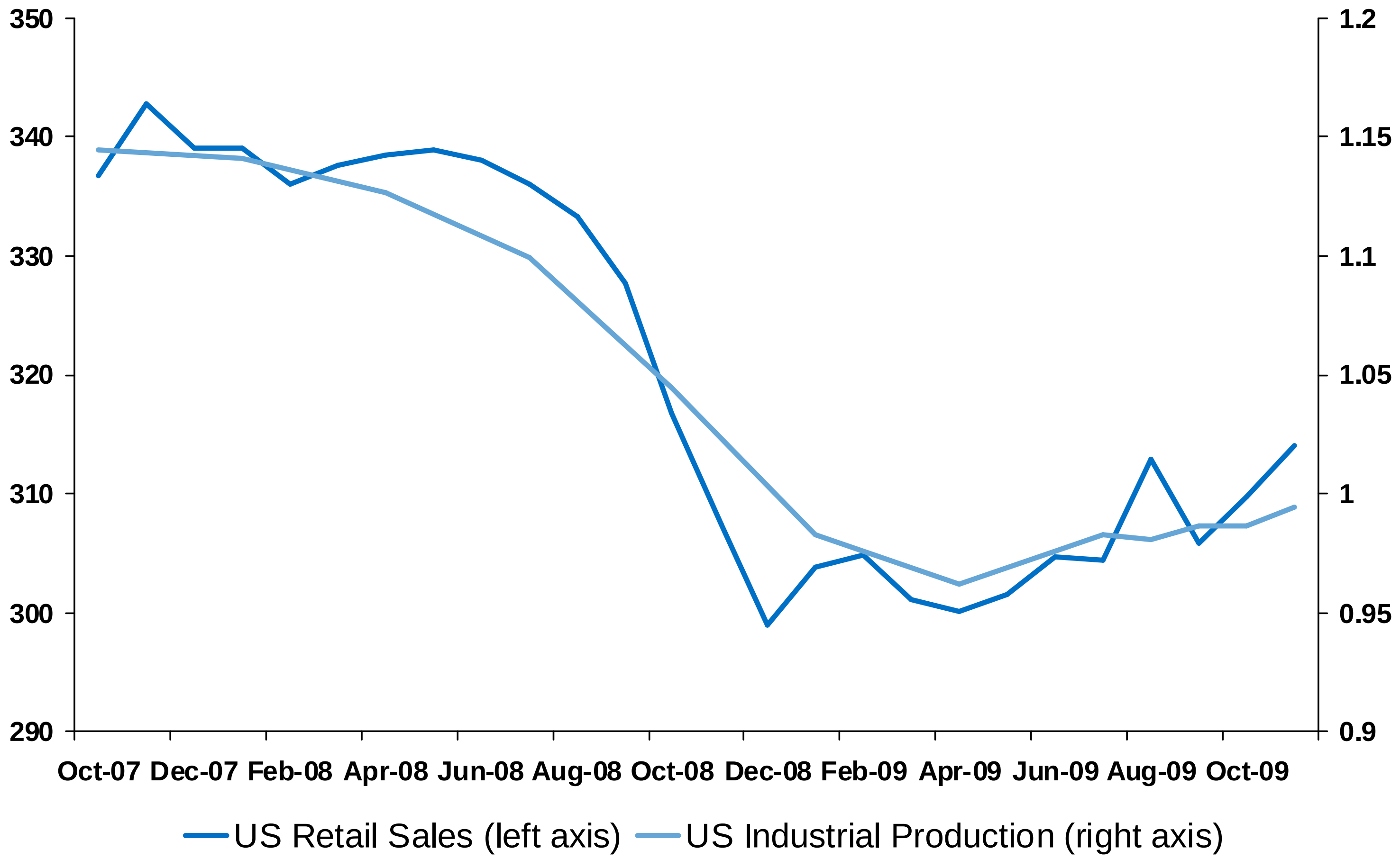
New orders to inventory ratio (left); diffusion index (right)



Source: ISM.

… that has only just begun in the coincidental indicators

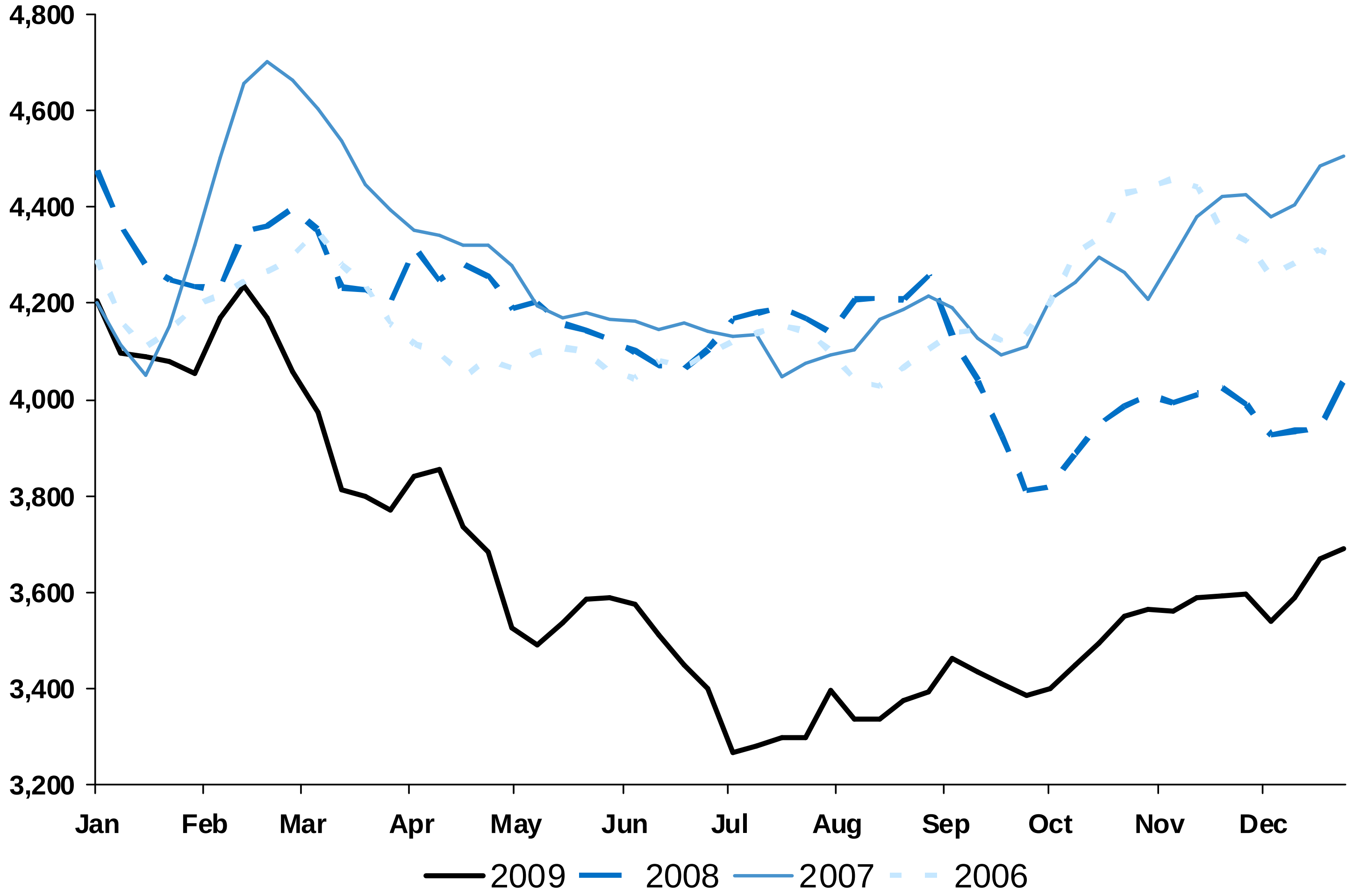
$ bn (left axis); industrial production index (right axis)



Source: GS Global ECS Research

As a result, US distillate demand has lagged, leaving it as the focal point

Products supplied, Mb/d



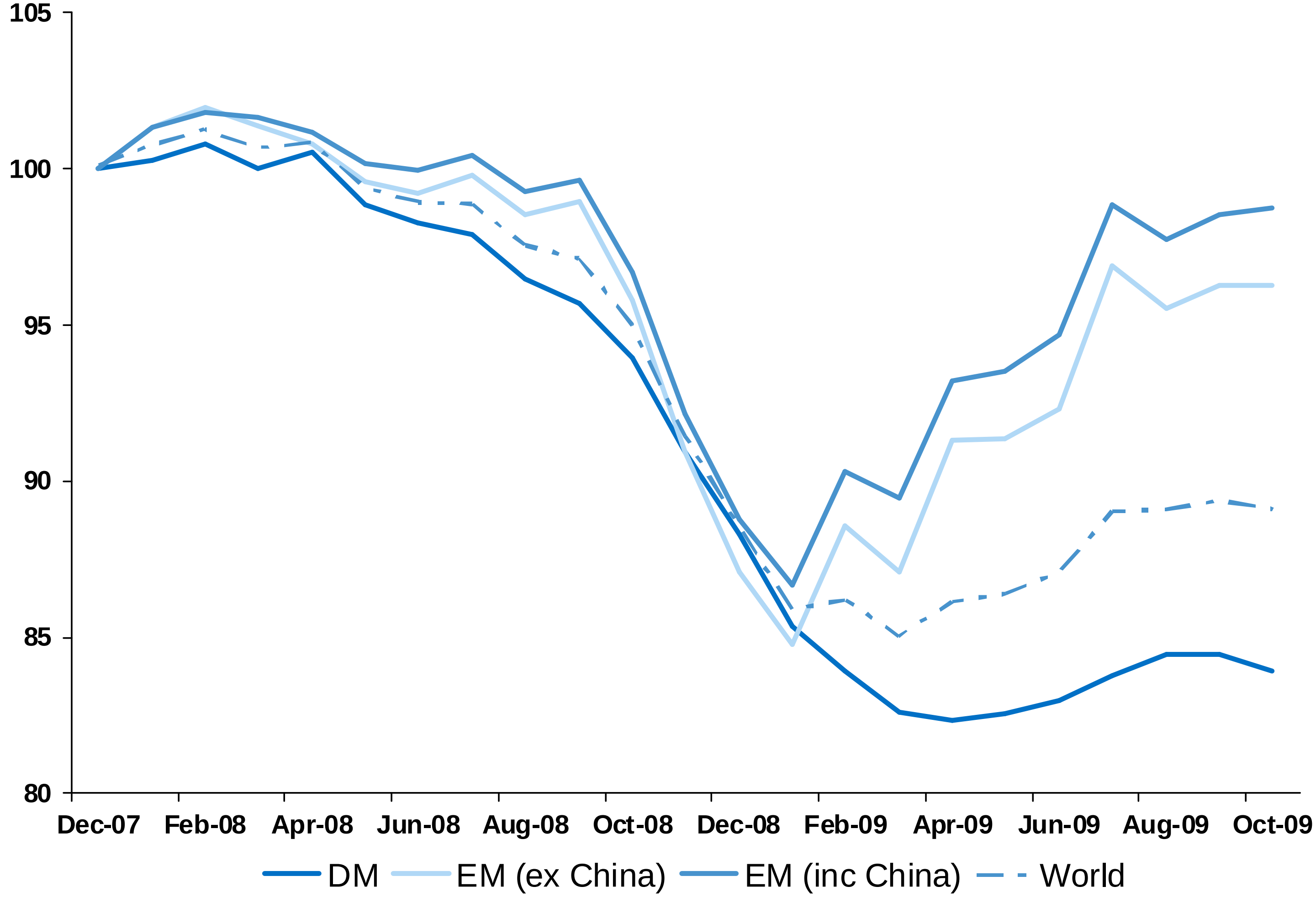
Source: DOE, GS Global ECS Research.

Goldman Sachs

EM market demand has been strong, but in oil not enough to offset the DM weakness

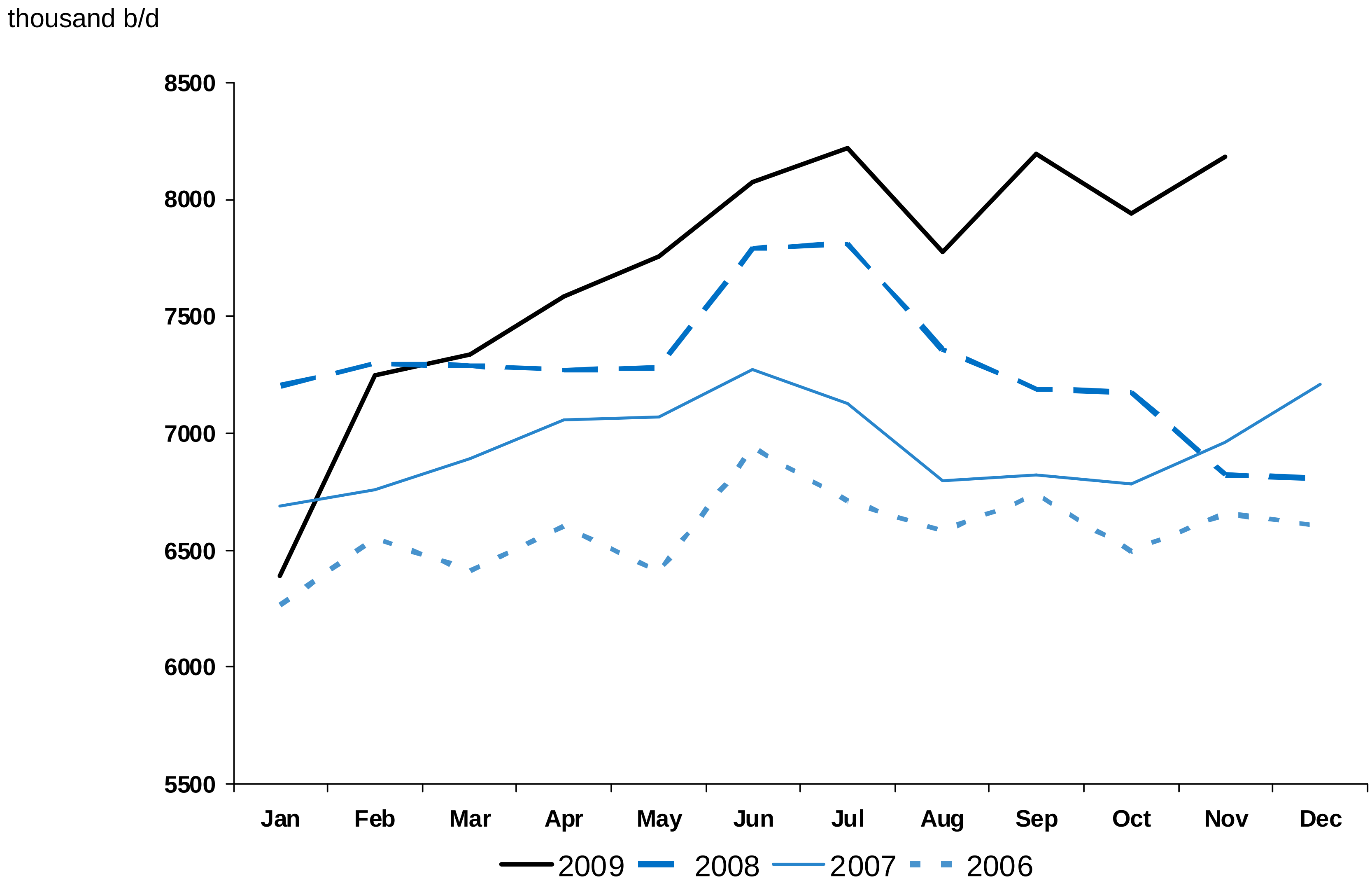
This also represents a transition from EM to DM growth leadership

Industrial Production index – 100 as of Dec-07



Source: GS Global ECS Research.

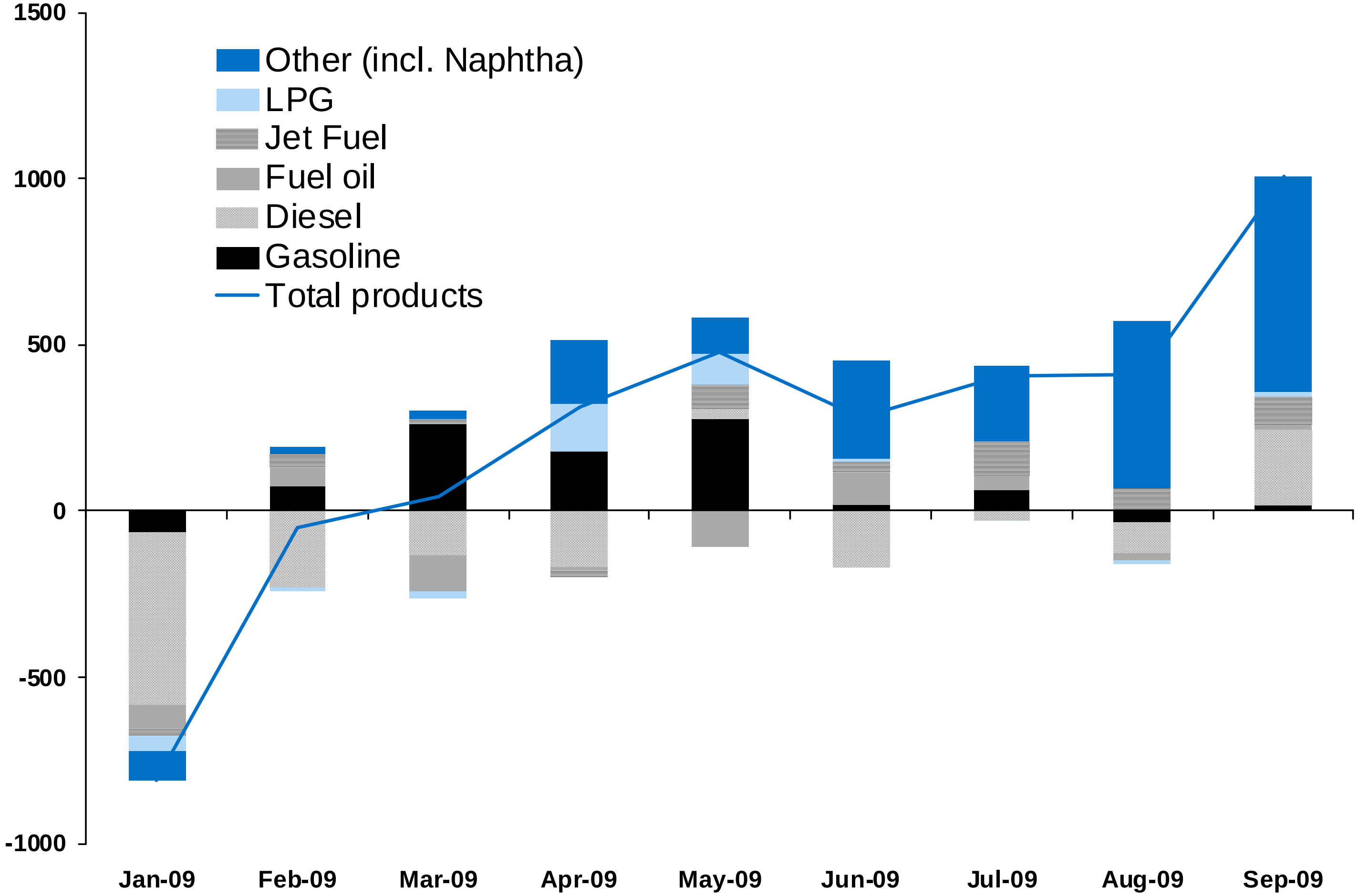
China is beyond recovery, as Chinese oil demand remains above the pre-recession highs



Source: Chinese National Bureau of Statistics and GS Global ECS Research.

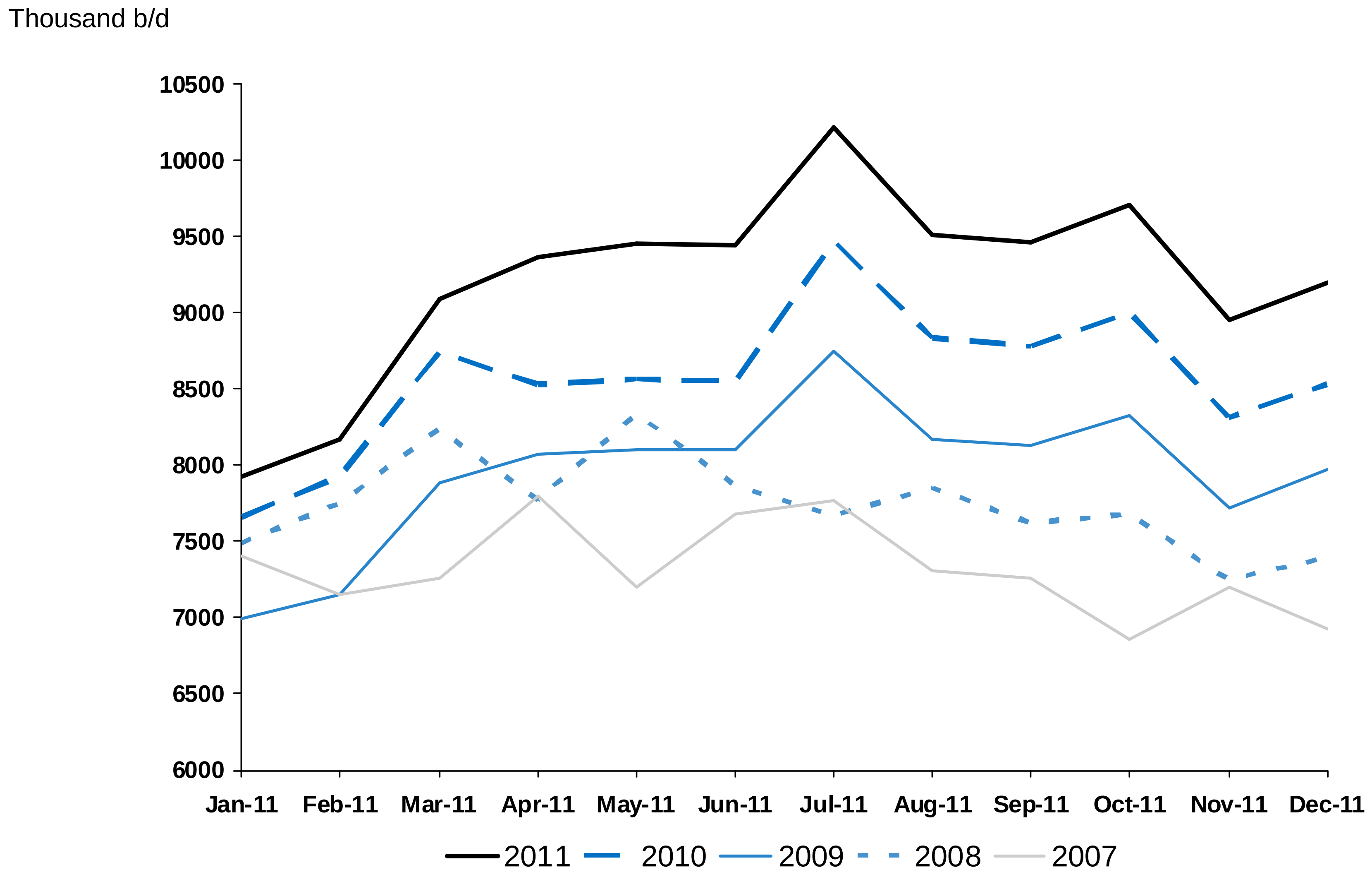
Chinese oil demand was largely driven by demand for industrial related “other” products…

Year-over-year changes in thousand b/d



Source: China Customs, National Bureau of Statistics of China, Goldman Sachs Global ECS Research.

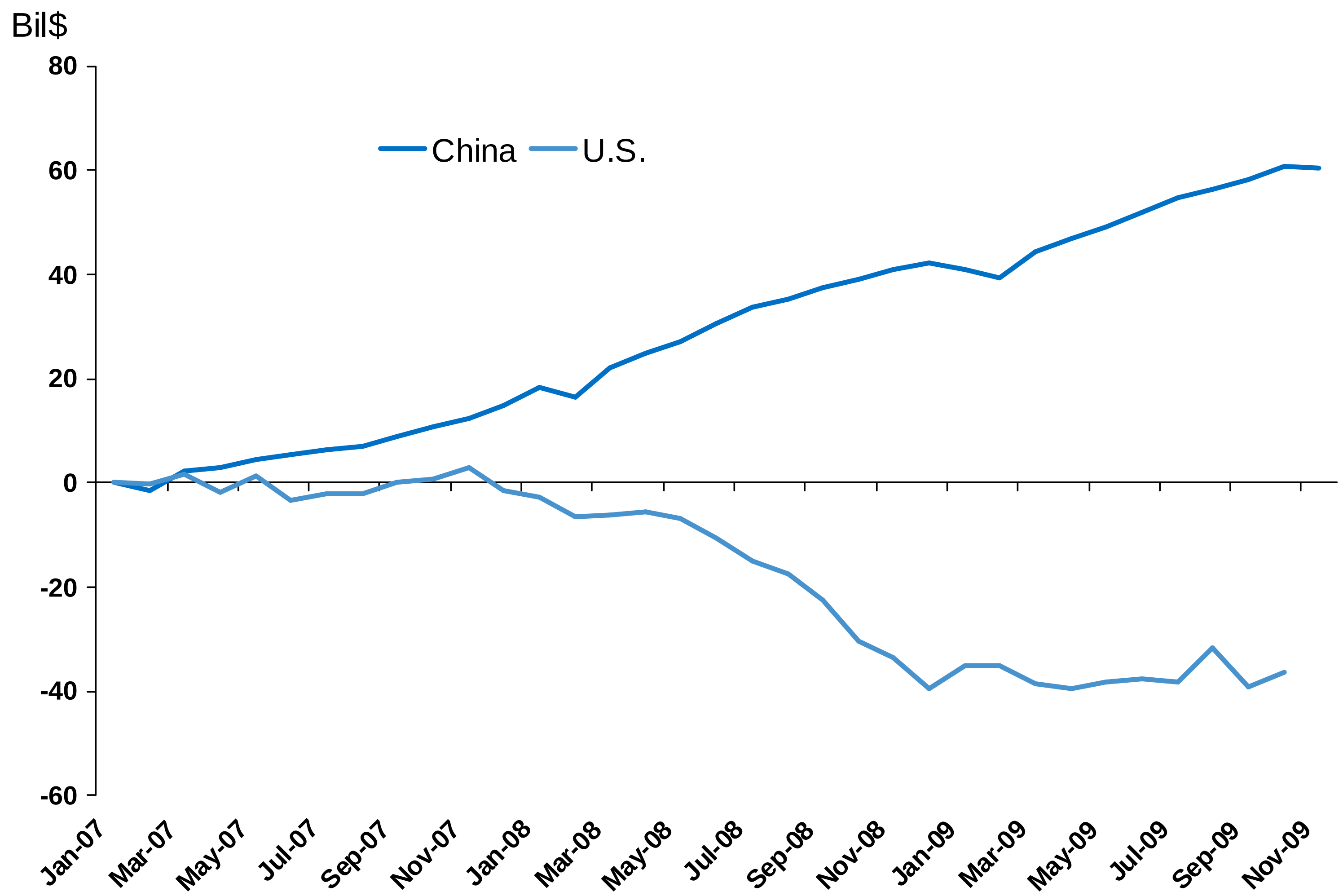
...implying positive upside surprise to our forecast if demand for transportation fuel follows total product demand



Source: IEA, Goldman Sachs Global ECS Research.

Chinese retail sales growth has more than offset US weakness

Change in Real Retail Sales Since January 2007 - USD Billion January 2007

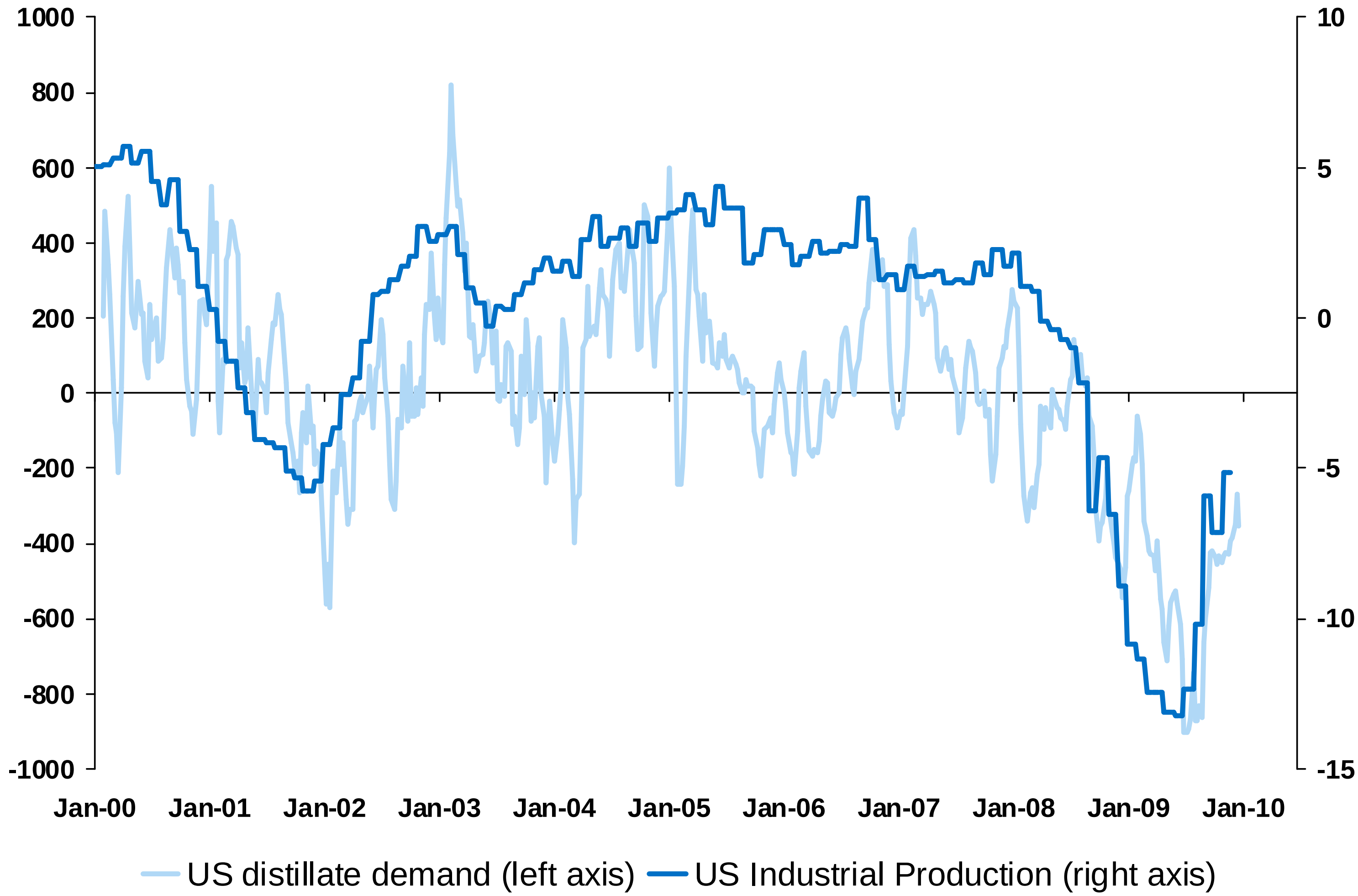


Source: GS Global ECS Research

The distillate market needs to rebalance to support a sustainable move higher

Distillate demand is not that out of line with IP growth that has been slow to rebound

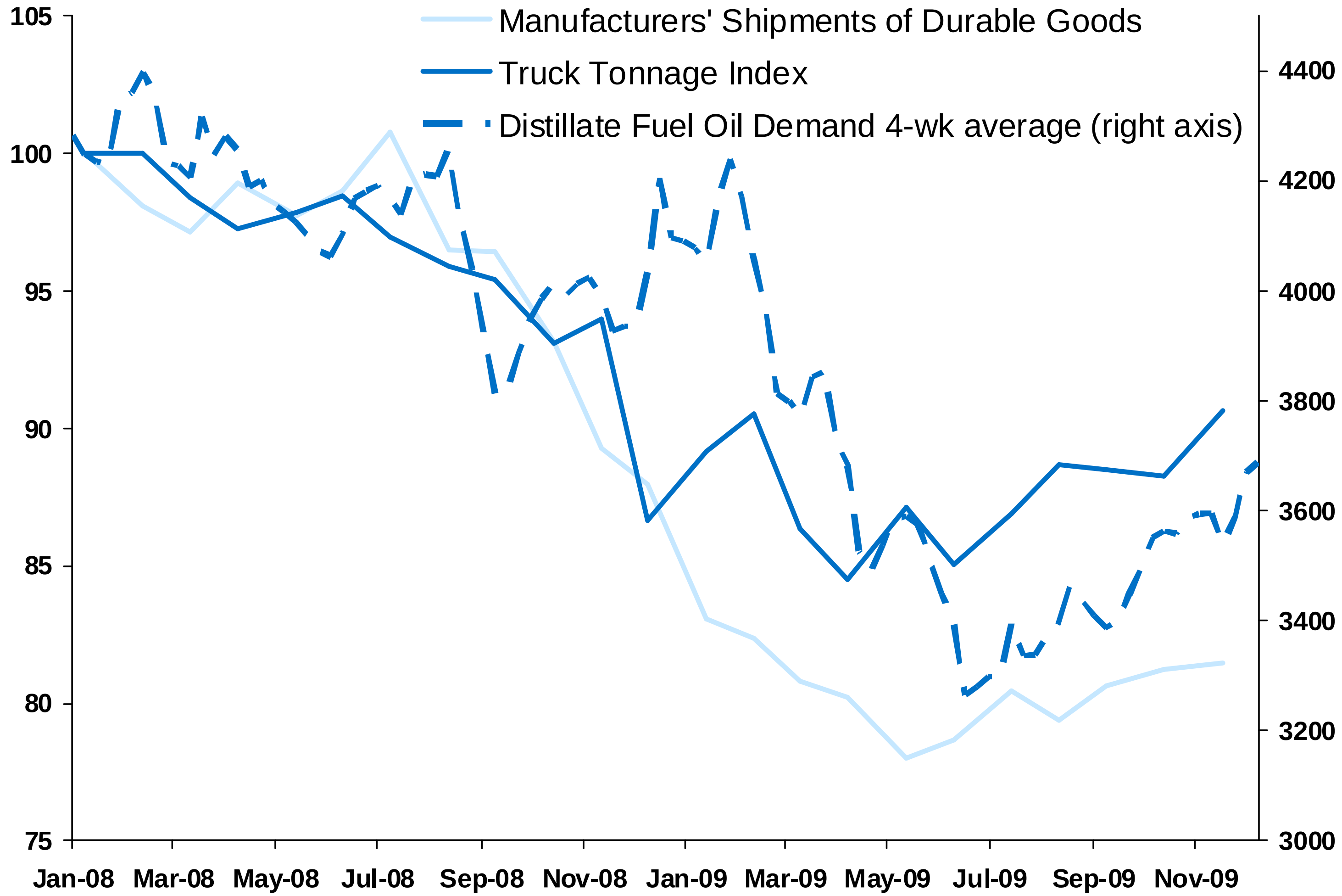
Yoy change in thousand b/d (lhs); yoy % change (rhs)



Source: US FRB, DOE, GS Global ECS Research

Trucking has now shown signs of rebounding in the past month or so as destocking reverses

Index, Jan-08=100 (lhs); thousand b/d (rhs)



Source: American Trucking Association, Census Bureau and DOE.

A recovery in DM demand growth should push the market back towards effective production capacity by 2011

Oil and agriculture are running at the highest capacity utilization

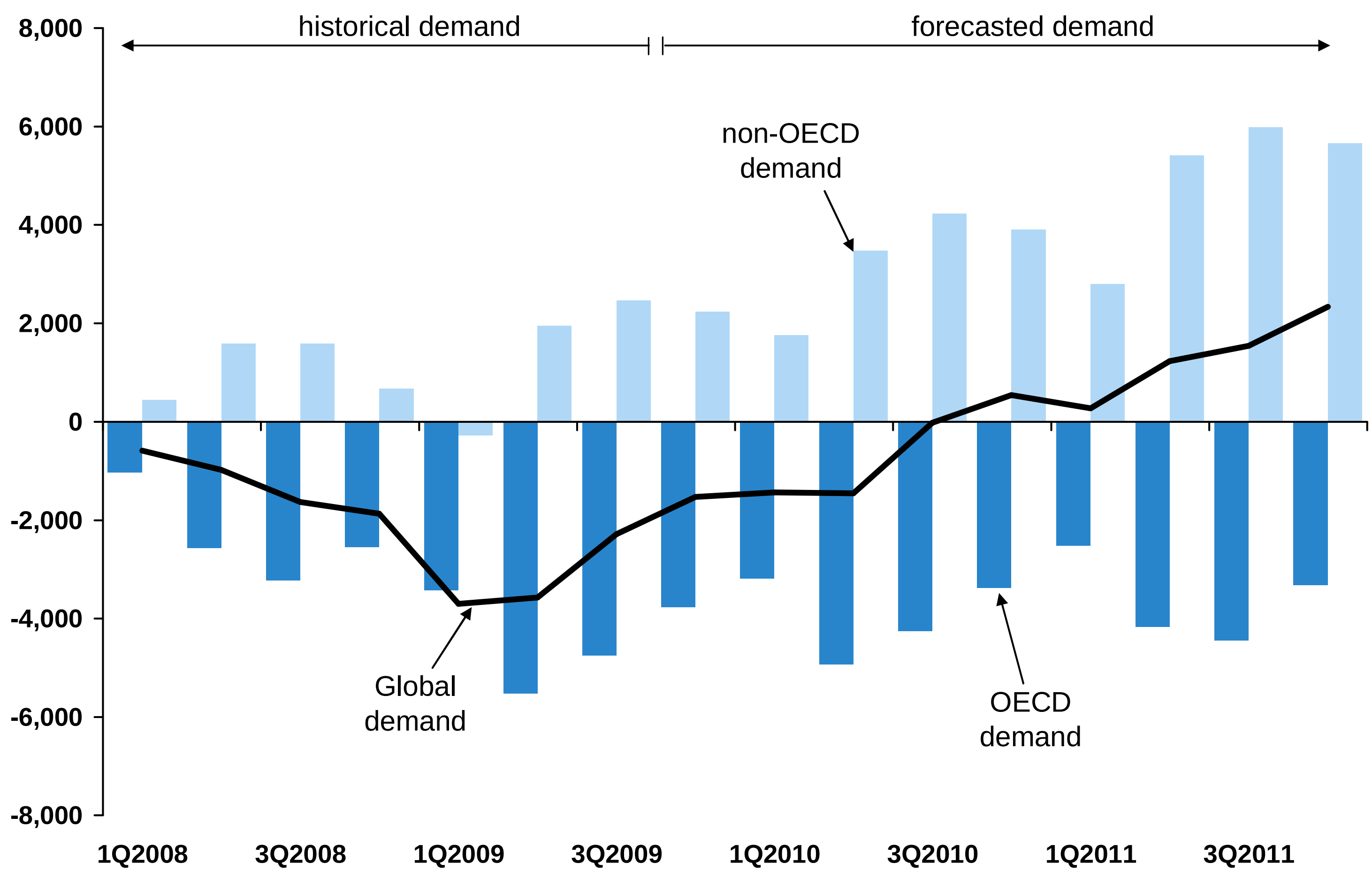
Commodity	2006	2007	2008	Most recent	Reference period
Corn	97%	97%	100%	97%	2008/2009
Copper	94%	91%	90%	96%	2Q2009E
Petroleum	98%	97%	98%	95%	Jun09
Wheat	90%	87%	89%	94%	2008/2009
Coal	99%	98%	99%	93%	Jun09
Coffee	76%	91%	83%	93%	2008/2009
Zinc	88%	91%	89%	92%	2Q2009E
Soybeans	99%	100%	93%	89%	2008/2009
Natural gas	99%	99%	99%	88%	Jun09E
Sugar	86%	92%	91%	86%	2008/2009
Cocoa	90%	79%	86%	85%	2008/2009
Nickel	96%	94%	83%	83%	2Q2009E
Cotton	95%	97%	92%	83%	2008/2009
Platinum	100%	100%	92%	82%	2Q2009E
Aluminum	90%	93%	89%	76%	2Q2009E

* Capacity utilization for metals has been normalized by the historical maximum utilization for each metal.

Source: GS Global ECS Research

Declines in DM oil demand were accelerated by the recession, freeing up oil supply, which has allowed EM demand to grow unimpeded, likely returning global oil demand back to pre-recession levels by 3Q2010

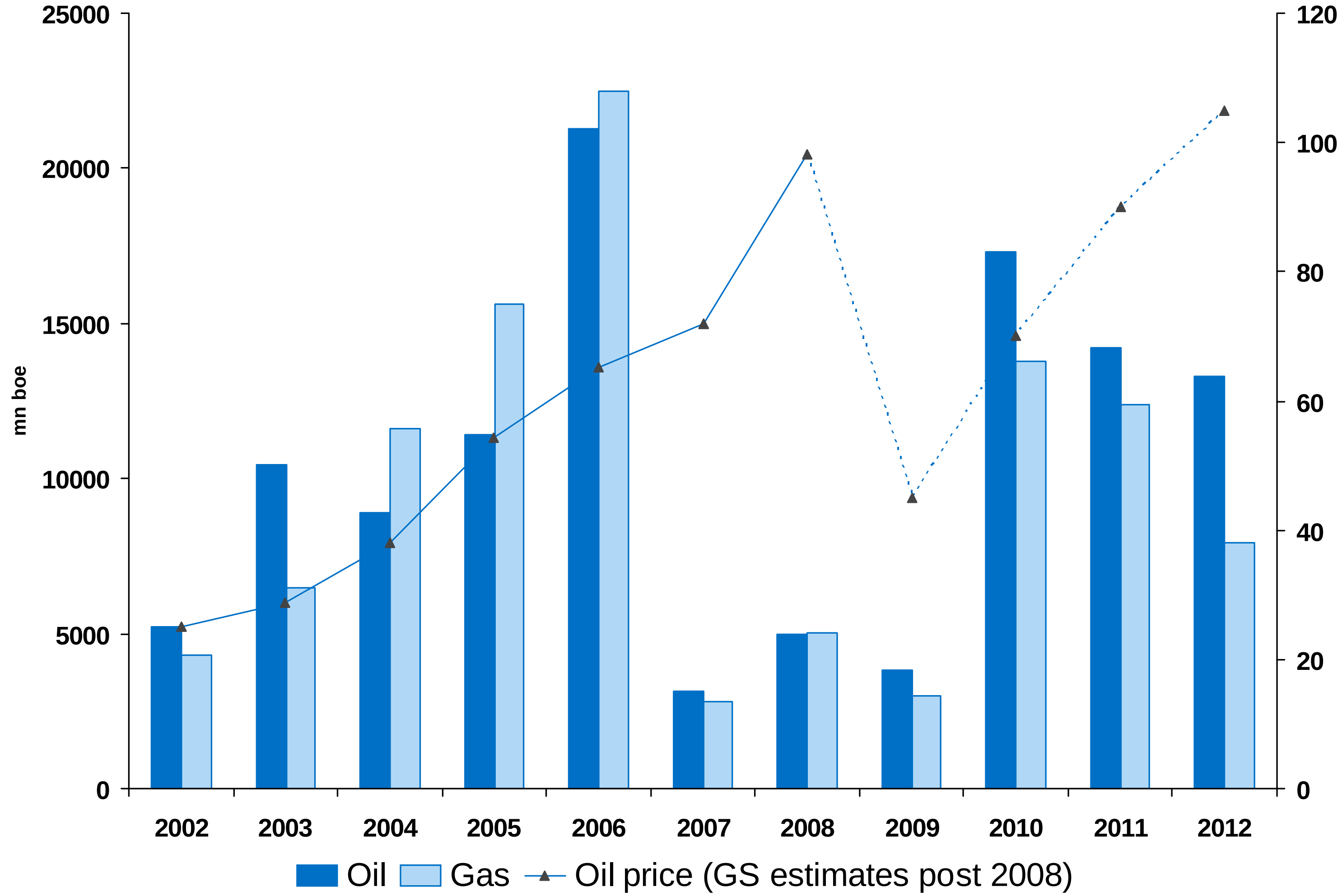
Change vs. 4Q2007, thousand b/d



Source: GS Global ECS Research.

The commodity crisis is a supply problem more than a demand problem

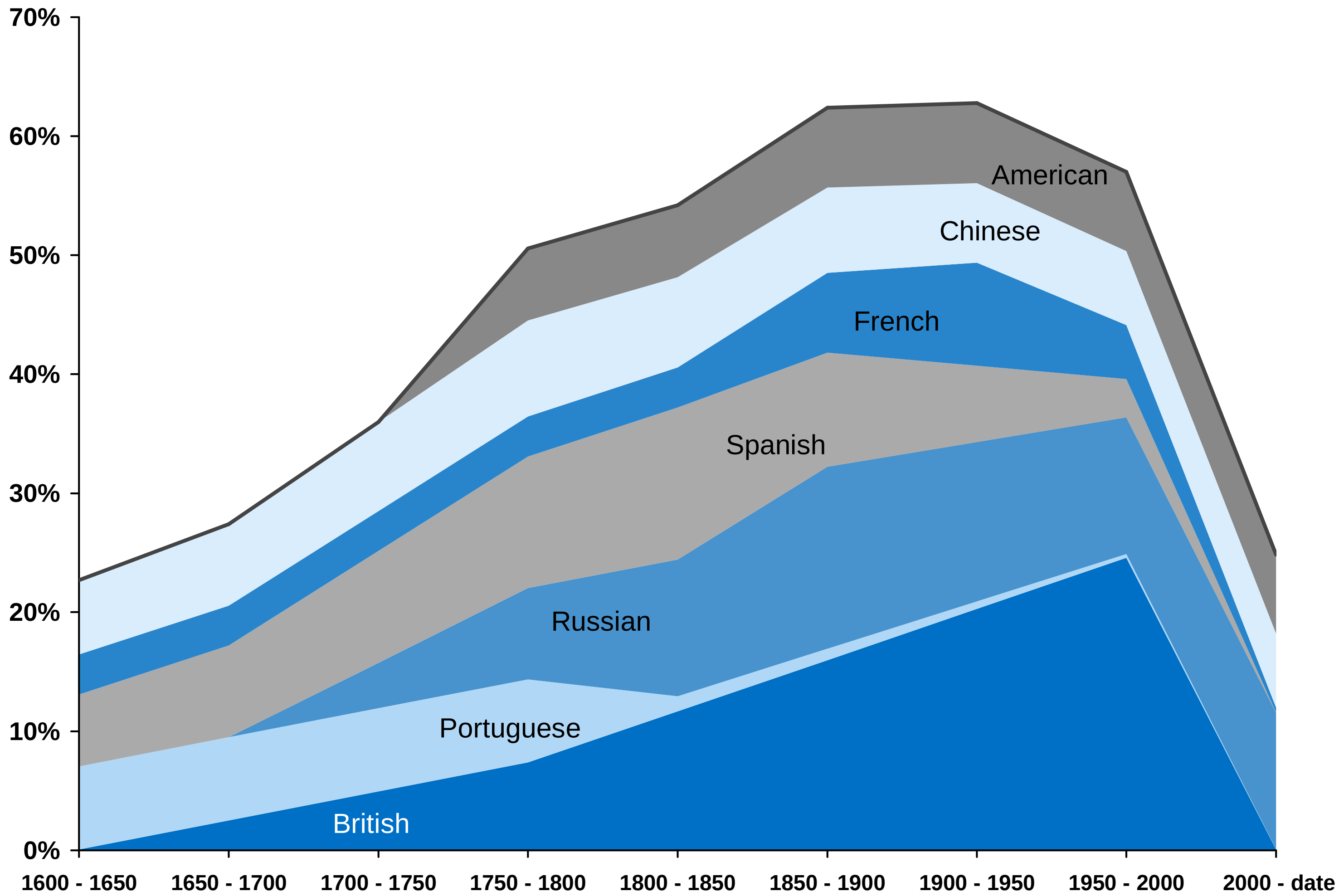
2009 is about as good as it will get for the next three years as sanctioned projects peaked in 2006



Source: Company data, Goldman Sachs Research estimates.

Why are we not seeing investment and a supply response? The terra-concentration ratio is the lowest since 1650 under mercantilism

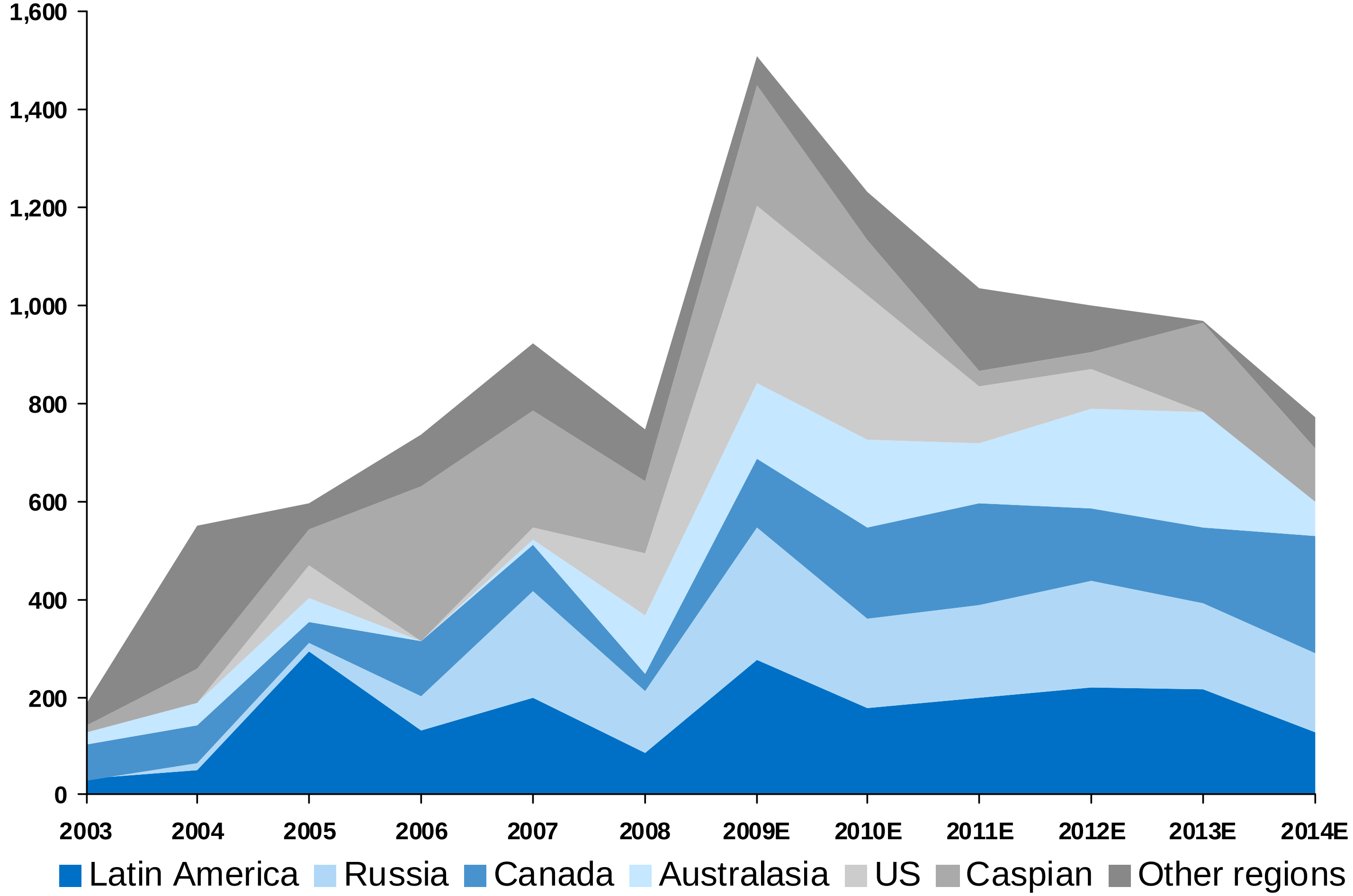
Percentage of total global terrain controlled by superpowers



Source: GS Global ECS Research.

Last year represented the peak in new greenfield projects

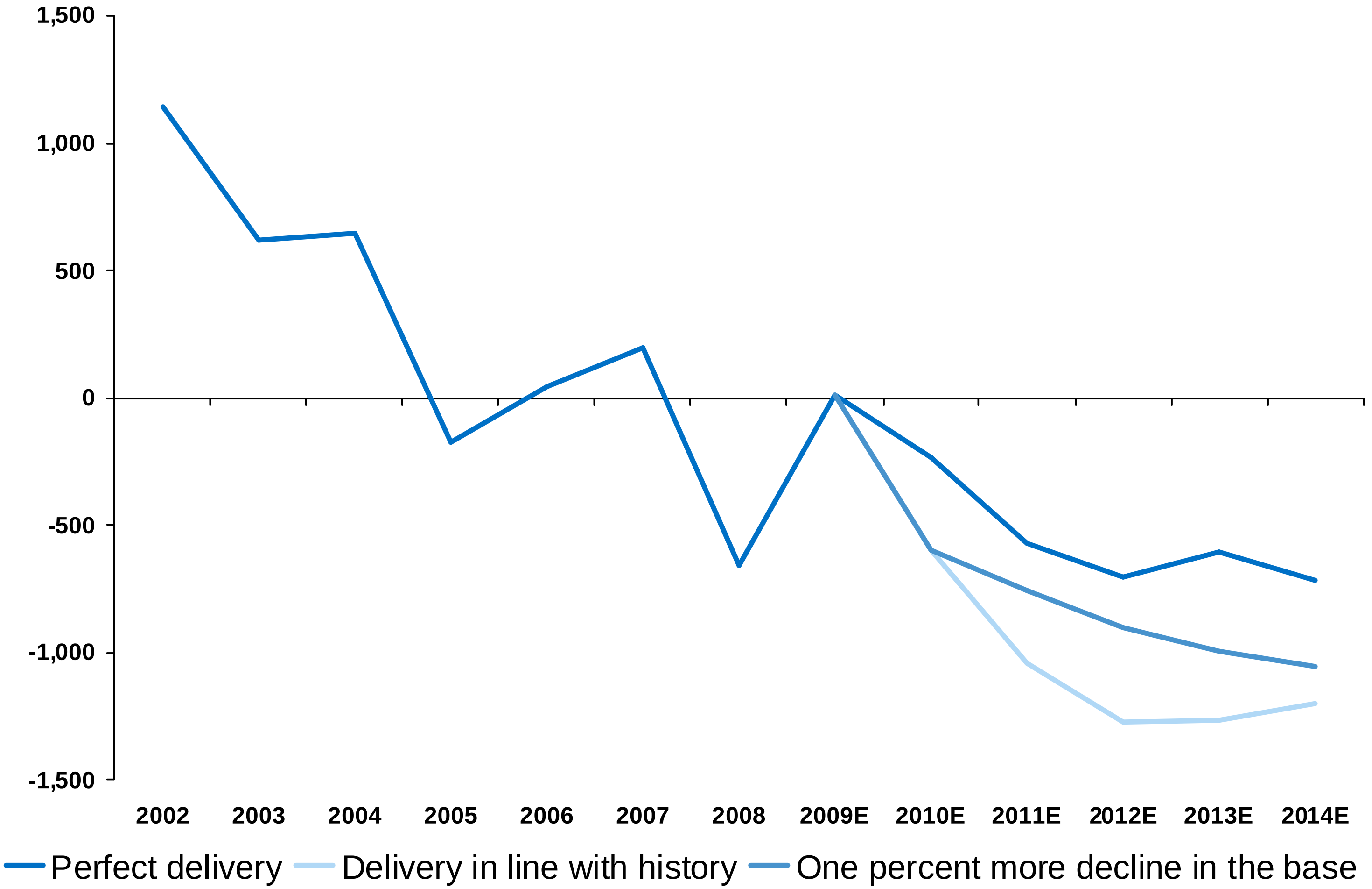
new start-ups boe addition by year in each region



Source: Company data, Goldman Sachs Research estimates, Top 230.

Non-OPEC could decline by about 1 mn b/d in two realistic scenarios in 2011E – 2014E

Non-OPEC yoy production growth/decline kb/d

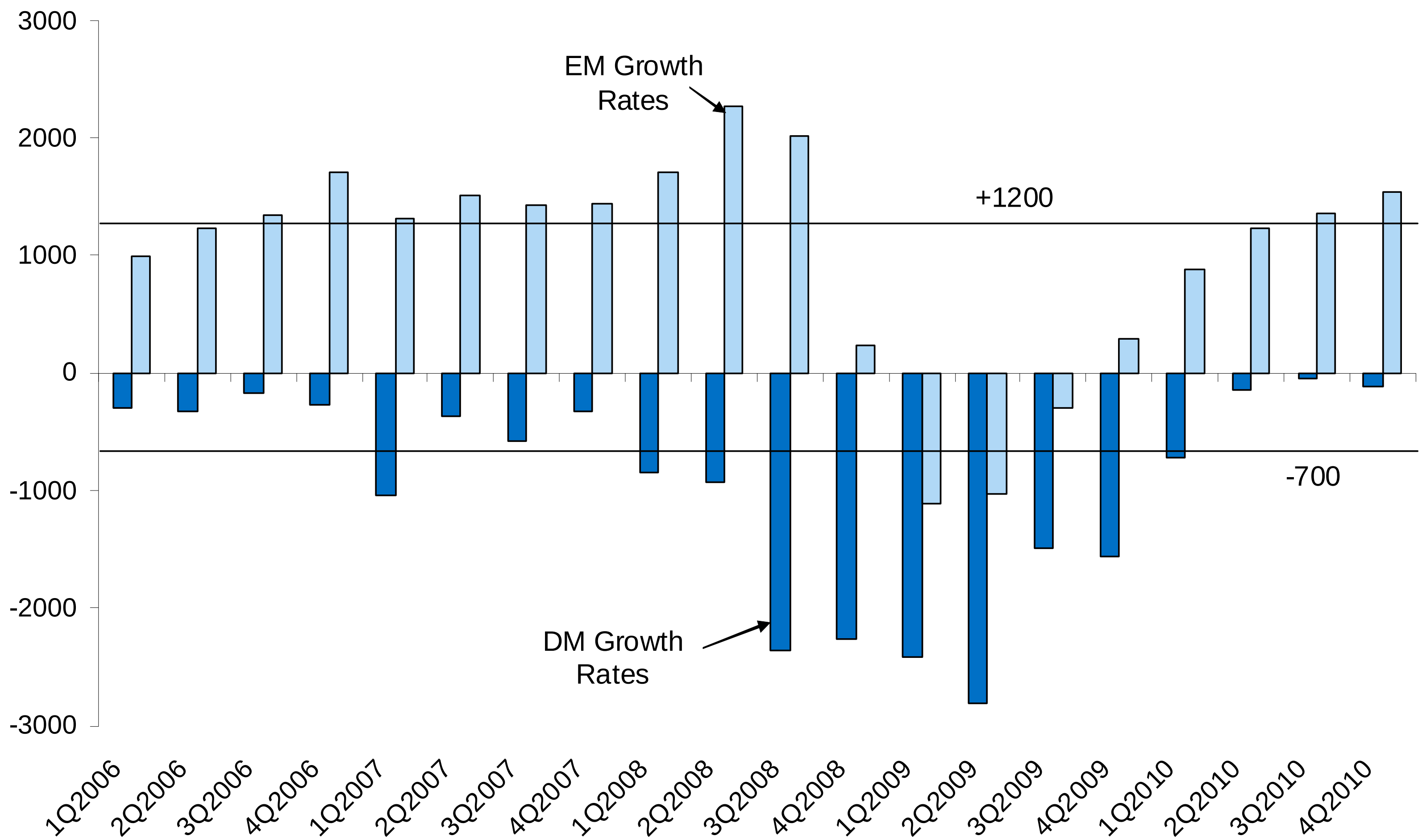


Source: Company data, Goldman Sachs Research estimates, Top 230.

DM demand will have to contract going forward to make room for EM demand due to supply constraints

We expect emerging market demand growth to crowd out developed market demand as supply growth will be limited

Thousand b/d



Source: IEA and GS Global ECS Research.

Metals and agriculture are the most leveraged to China

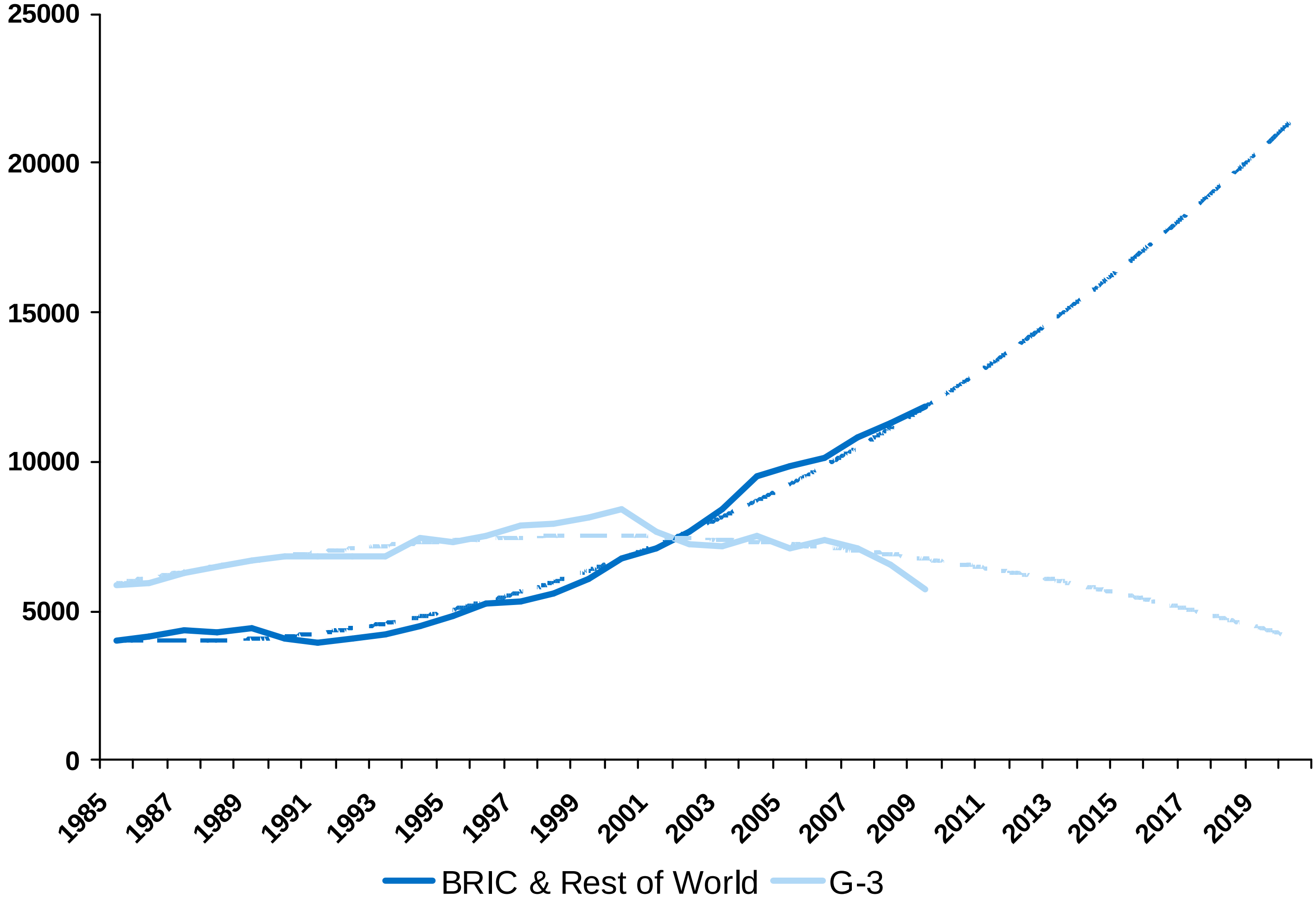
Commodity	Units	Average 2008 Figures: China Consumption	China Production	China Net Imports	Global Output	China Demand % Global	China Net Import % Global	China Leverage Score*
Cotton	mmMT	10.7	8.2	2.5	26.3	40.6%	9.5%	0.2602
Soybeans	mmMT	49.8	12.5	37.4	220.8	22.6%	16.9%	0.2201
Copper	kMT	5014	3652	1362	18371	27.3%	7.4%	0.1486
Soybean Oil	mmMT	9.7	7.1	2.6	37.6	25.8%	7.0%	0.1365
Zinc	kMT	4018	3755	263	11509	34.9%	2.3%	0.1448
Lead	kMT	3021	3024	-3	8464	35.7%	0.0%	0.1271
Nickel	kMT	280	168	112	1397	20.0%	8.0%	0.1201
Aluminum	kMT	12854	13435	-581	39594	32.5%	-1.5%	0.0907
Rice	mmMT	127.5	128.1	-0.7	431.9	29.5%	-0.2%	0.0855
Petroleum	mmb/d	7.8	3.8	4.0	86.5	9.0%	4.6%	0.0544
Soybean Meal	mmMT	30.8	31.3	-0.4	158.5	19.5%	-0.3%	0.0352
Corn	mmMT	149.0	149.5	-0.5	790.9	18.8%	-0.1%	0.0348
Wheat	mmMT	104.0	106.8	-2.8	609.1	17.1%	-0.5%	0.0246
Cocoa	mmMT	0.1	0.0	0.1	3.6	1.7%	1.7%	0.0177
Sugar	mmMT	14.9	14.0	0.8	166.6	8.9%	0.5%	0.0130
Coffee	mmMT	0.0	0.0	0.0	7.3	0.2%	0.2%	0.0025
Natural Gas	Bcf/d	7.1	6.6	0.4	301.4	2.3%	0.1%	0.0020

* Leverage score = (mkt share)^2 + (imp share)

Source: GS Global ECS Research

Due to a lack of copper supply, DM demand will likely be crowded out by BRIC demand

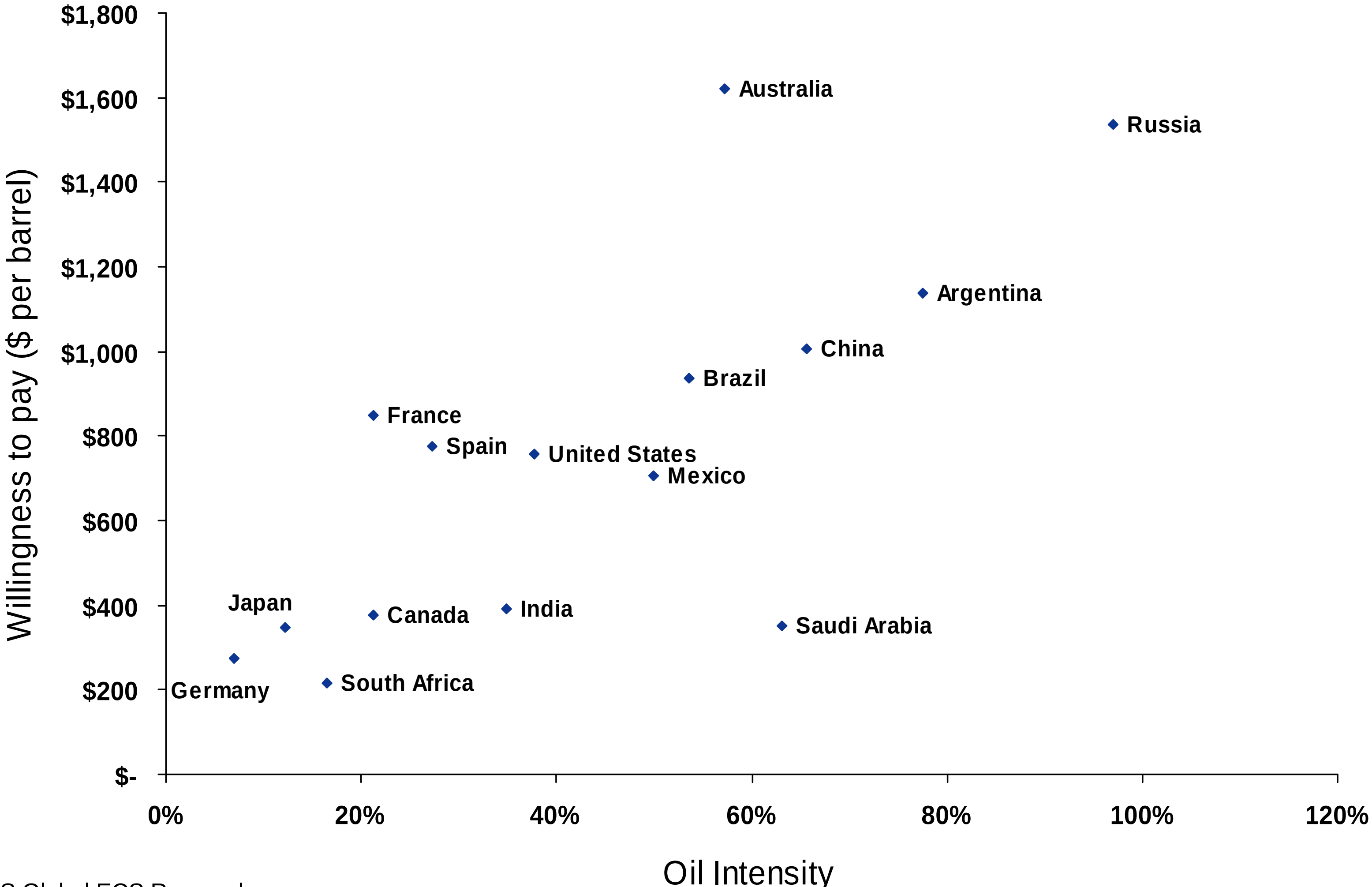
Copper demand in kmt



Source: Brook Hunt, GS Global ECS Research

Germany and Japan have the lowest willingness to pay for commodities

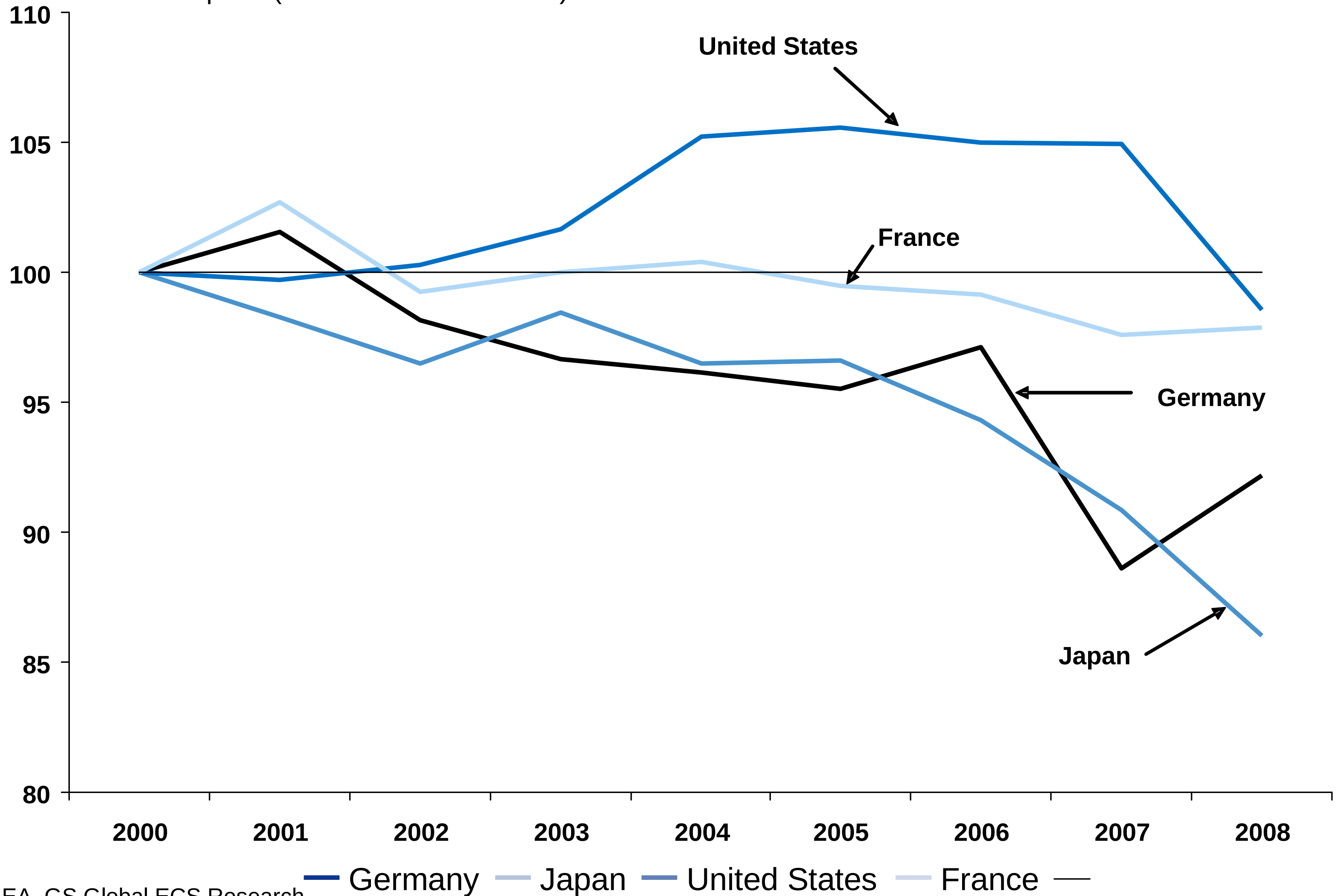
Regional willingness to pay for oil



Source: GS Global ECS Research

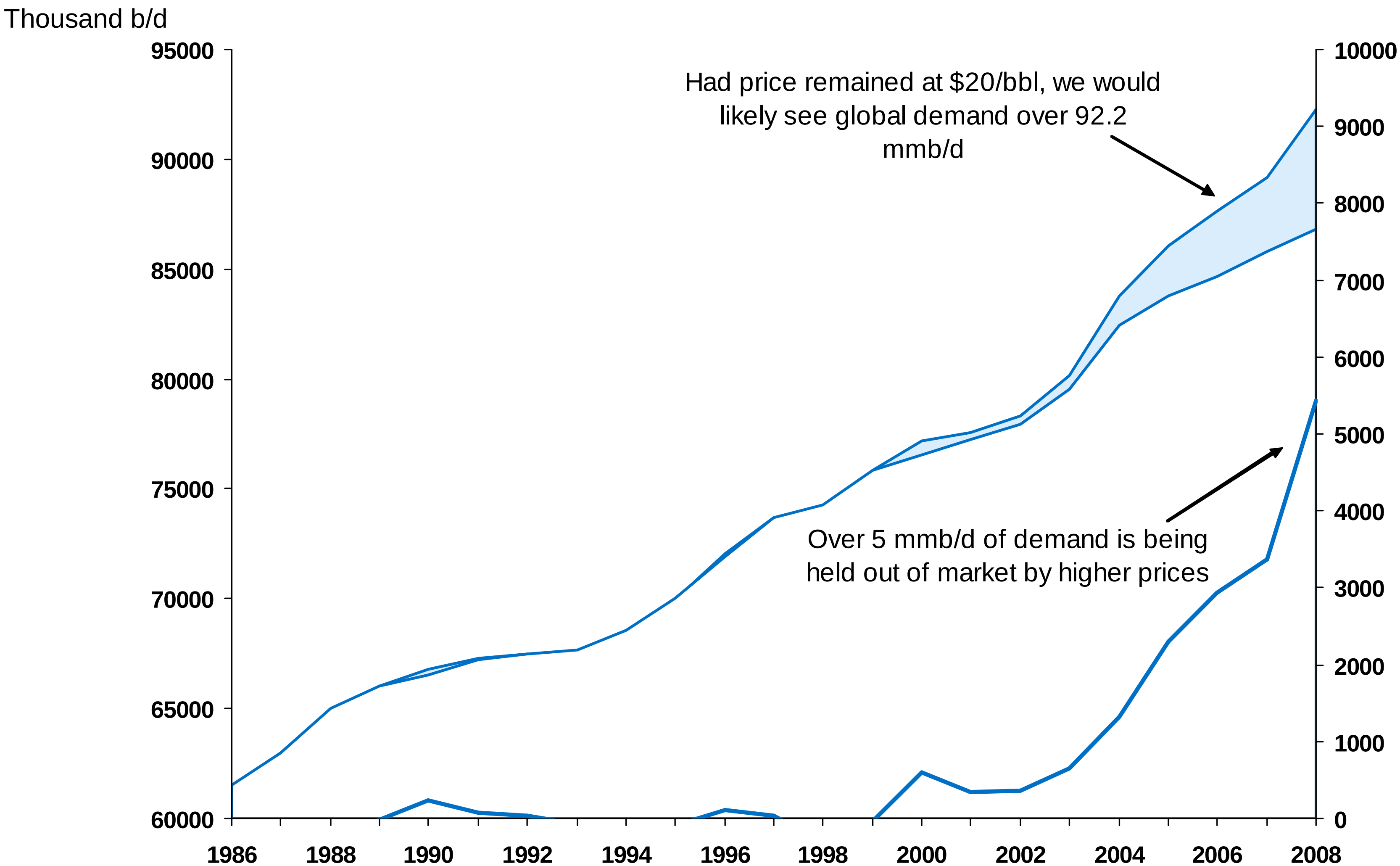
Accordingly, they have seen the largest reductions in demand already

Total Petroleum consumption (rebased to 100 in 2000)



Source: IEA, GS Global ECS Research

Rising prices over the past 6 years have already reduced demand over 5.0 million b/d

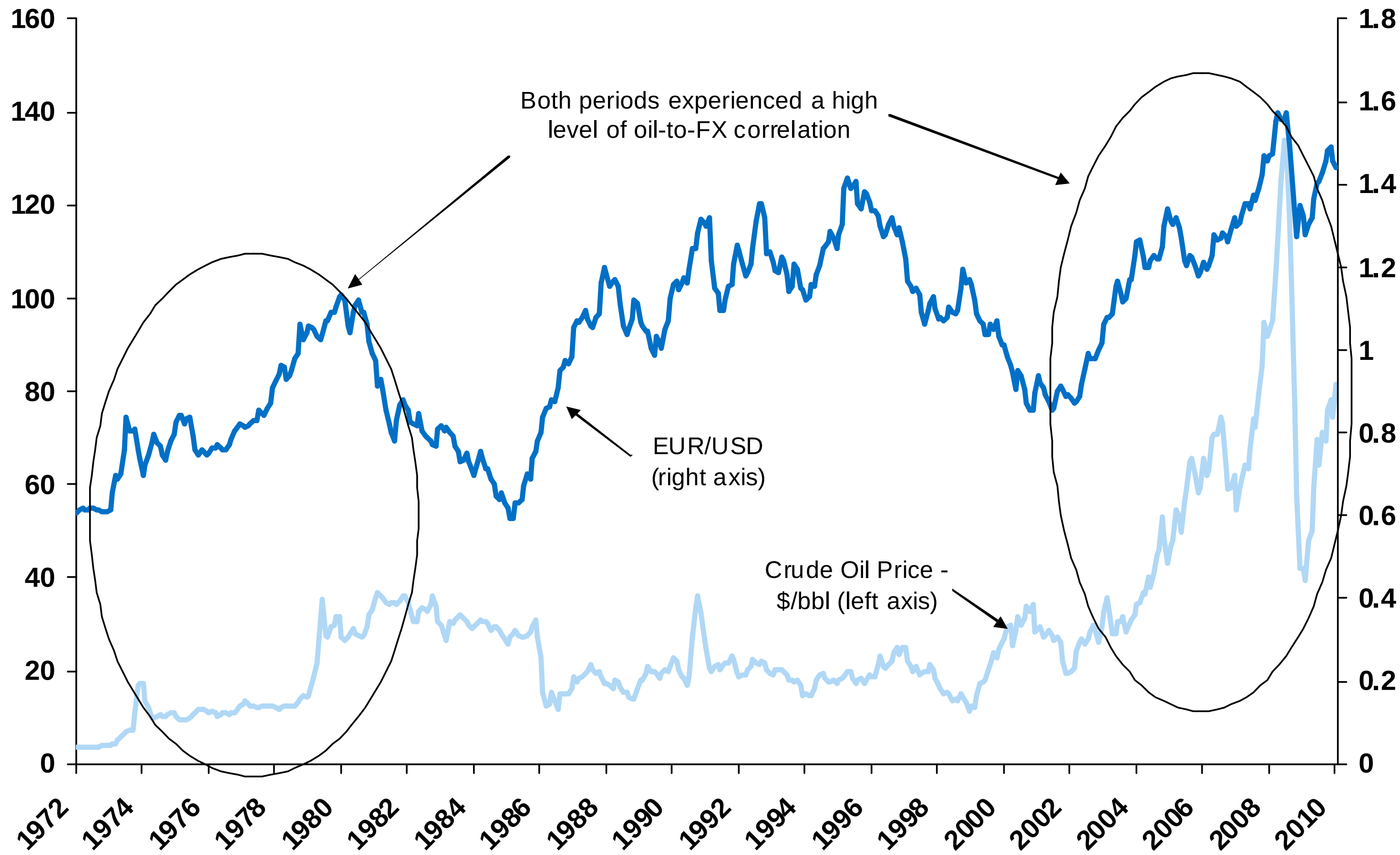


Source: IEA and GS Global ECS Research.

The macroeconomic linkages

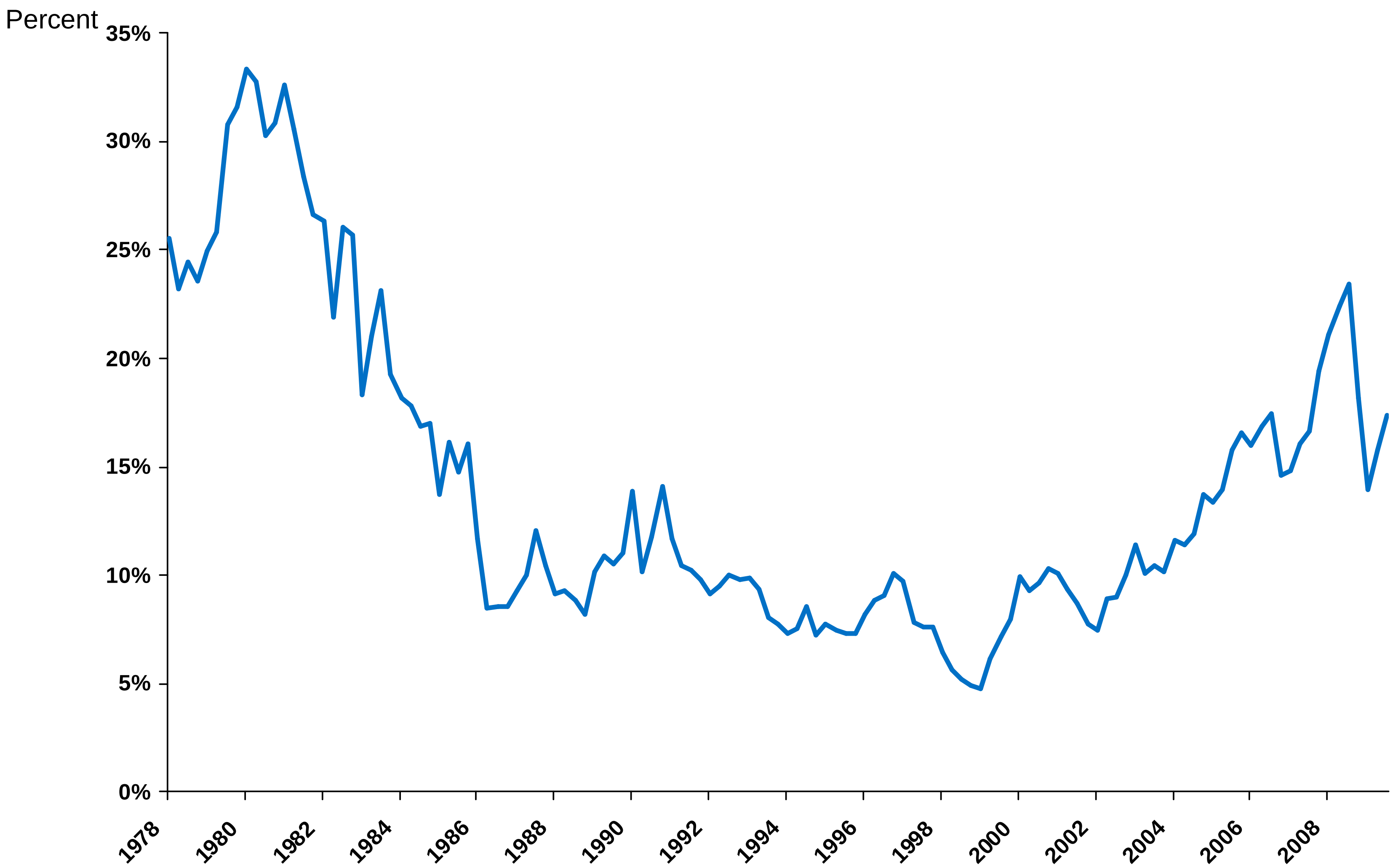
The oil price and USD were highly correlated in the 1970s as the causality is oil to FX, not vice versa

Oil in $/bbl (let axis); EUR/USD (right axis)



Source: Oil & Gas journal and Goldman Sachs Commodities Research.

Oil as a share of US imports is rising back towards 1970 levels



Source: Haver Analytics

Relative to the barrels of oil that oil companies could hedge, index investors are holding a relatively small amount of oil price risk

million barrels (end of 2007)

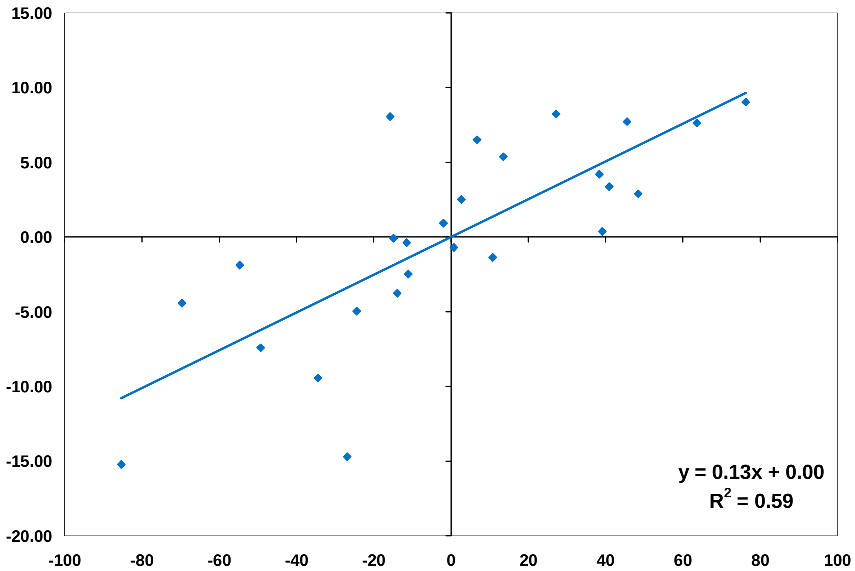
Company	Proven Reserves (million barrels)
Exxon Mobil	11,075
Petrobras	9,613
Chevron	7,087
ConocoPhillips	6,320
Suncor Energy	2,515
Occidental Petroleum	2,224
Canadian Natural Resources	1,358
Apache Corporation	1,134
Marathon Oil	1,071
Hess Corporation	885
Index Investors	**855**
Nexen	835
Talisman Energy	648
Petro-Canada	597
Murphy Oil	307

Source: Goldman Sachs Equity Research and Goldman Sachs Commodity Research.

Crude Oil Speculators vs Index Investors

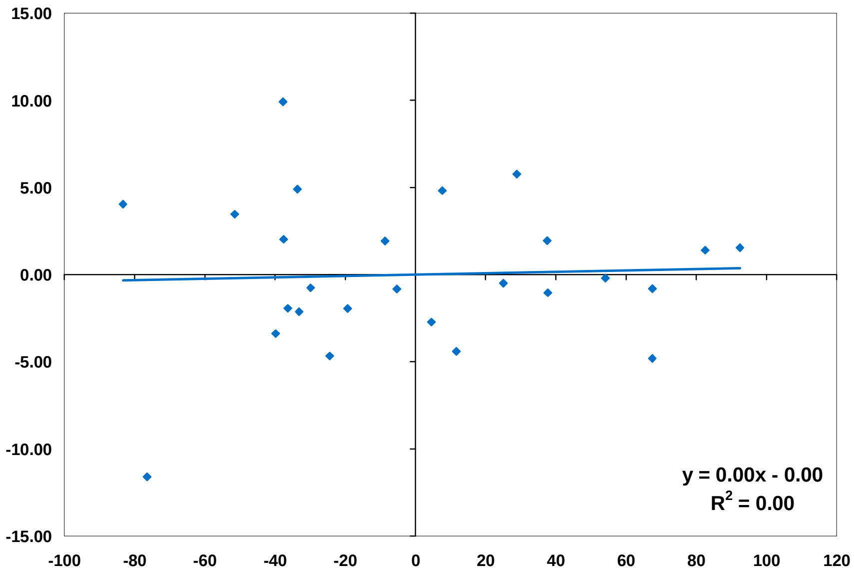
Crude oil prices move with speculators…

percentage (vertical axis), million barrels(horizontal axis)



… but not with index investors

percentage (vertical axis), million barrels (horizontal axis)



Source: NYMEX, CFTC, and Goldman Sachs Commodities Research.

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January 6, 2010

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