

Energy Outlook:

Credit crunch is near-term bearish, long-term bullish

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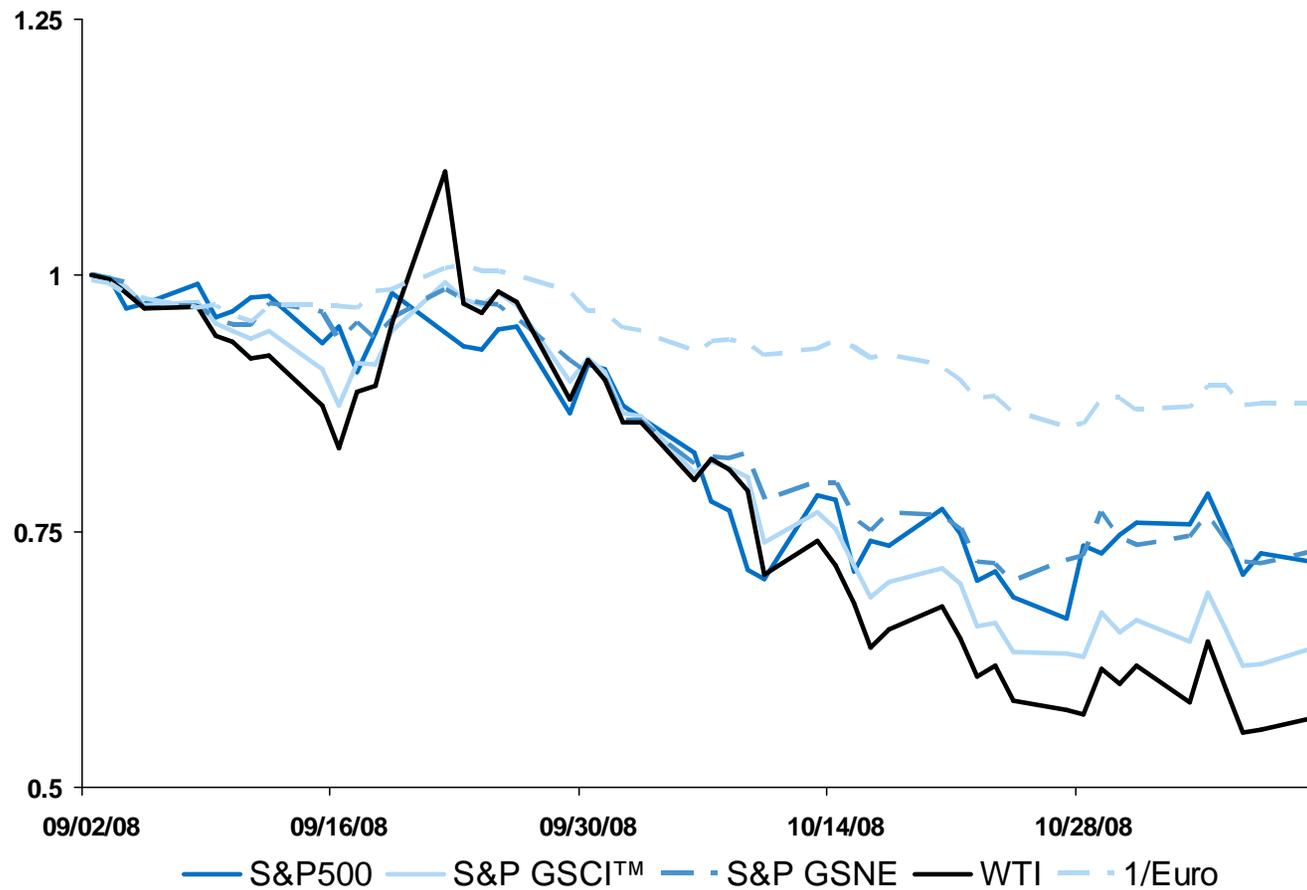
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Pricing: credit crunch putting downward pressure on crude oil timespreads

Crude oil prices have declined with the broader sell-off across asset markets

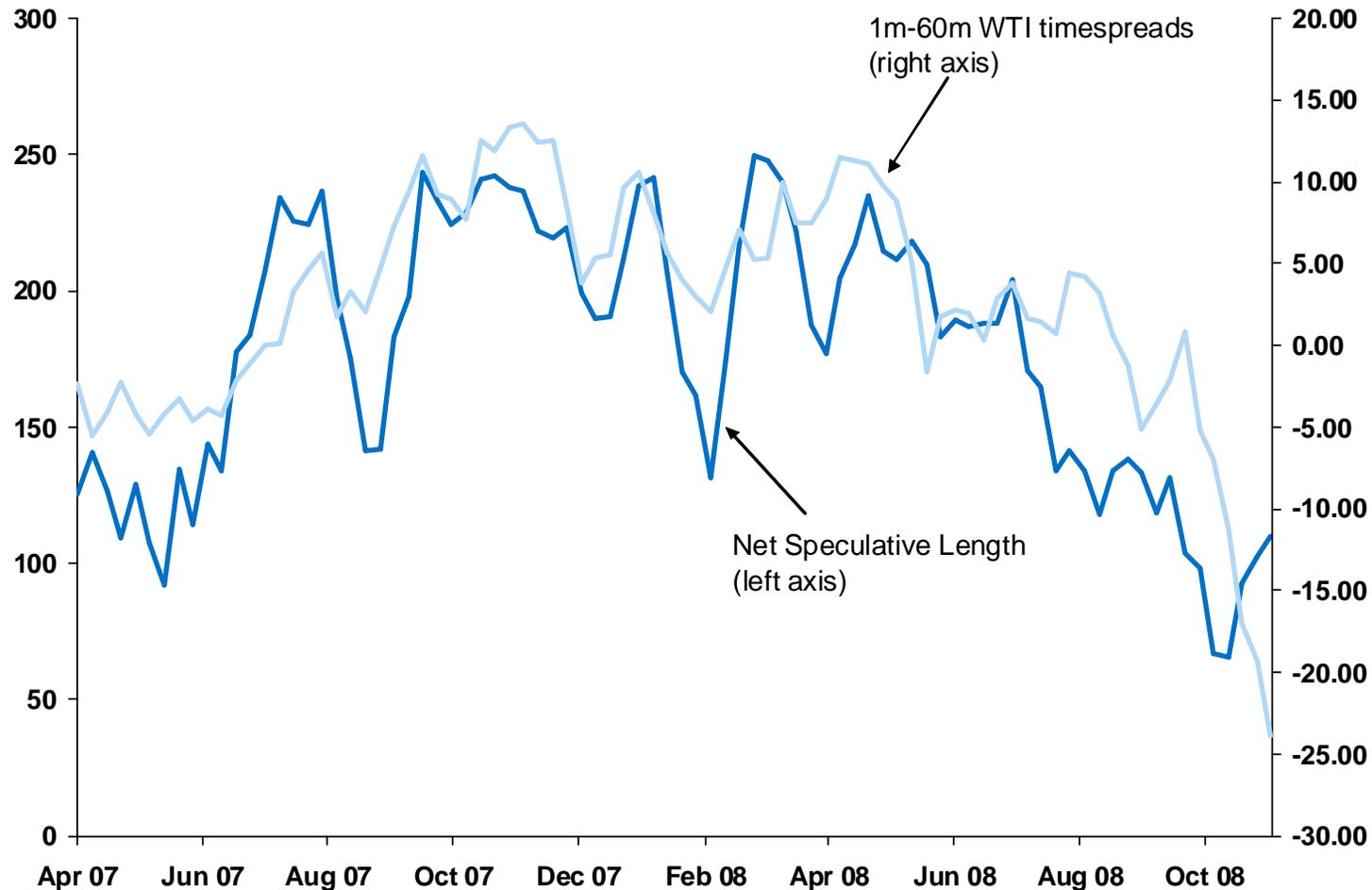
Index Sep 2, 2008=100



Source: NYMEX, Standard and Poors, and Goldman Sachs Commodities Research.

A sharp decline in net speculative long positions has contributed to the weakening of WTI timespreads...

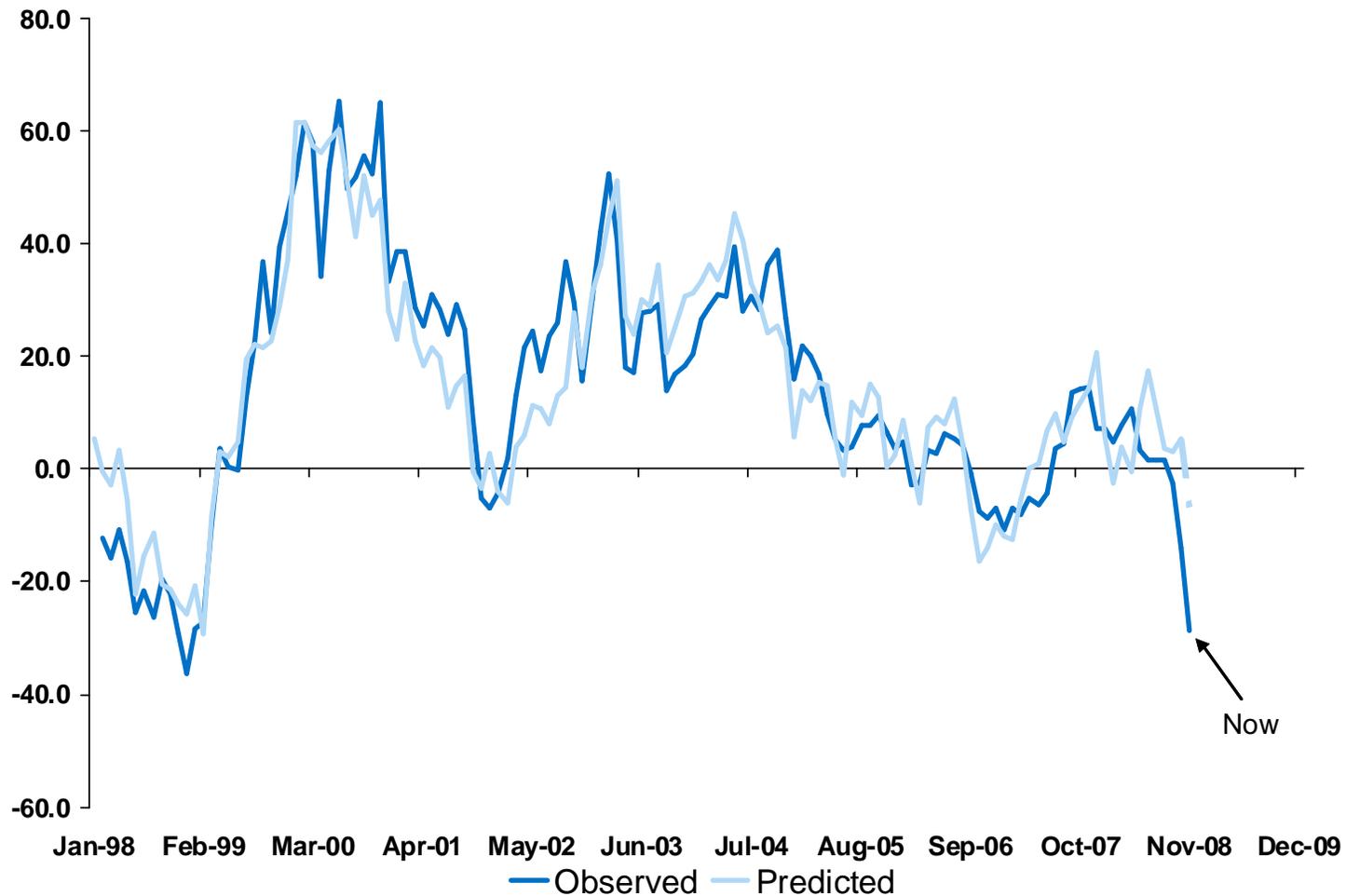
Million barrels (left axis), \$/bbl (right axis)



Source: Commodities Futures Trading Commission (CFTC) and Goldman Sachs Commodities Research.

... but WTI timespreads have weakened beyond what inventories, speculative length and rates can explain

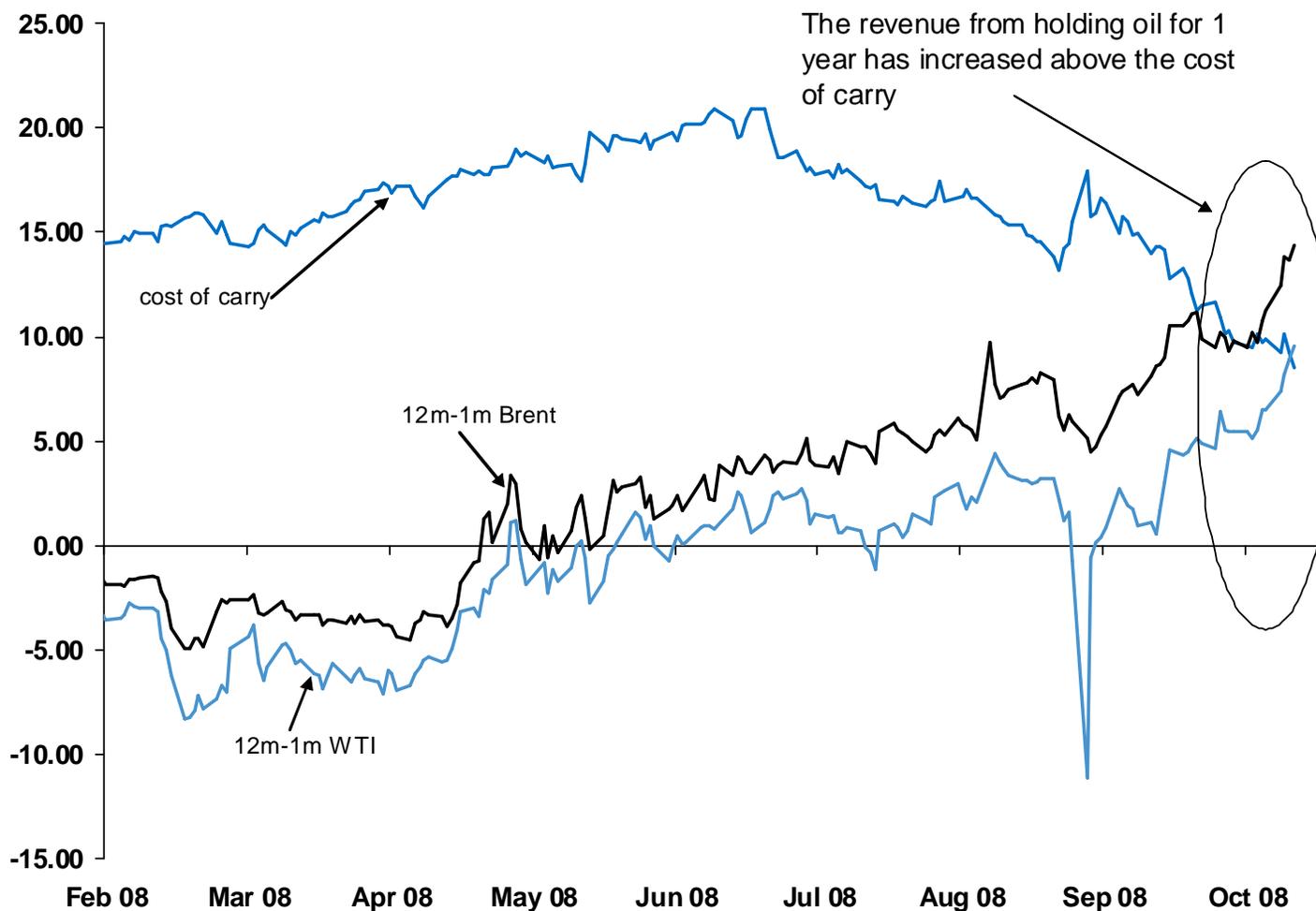
1m/60m WTI timespreads in %



Source: Goldman Sachs Commodities Research.

Contango becomes Super-contango, breaching the cost-of-carry threshold...

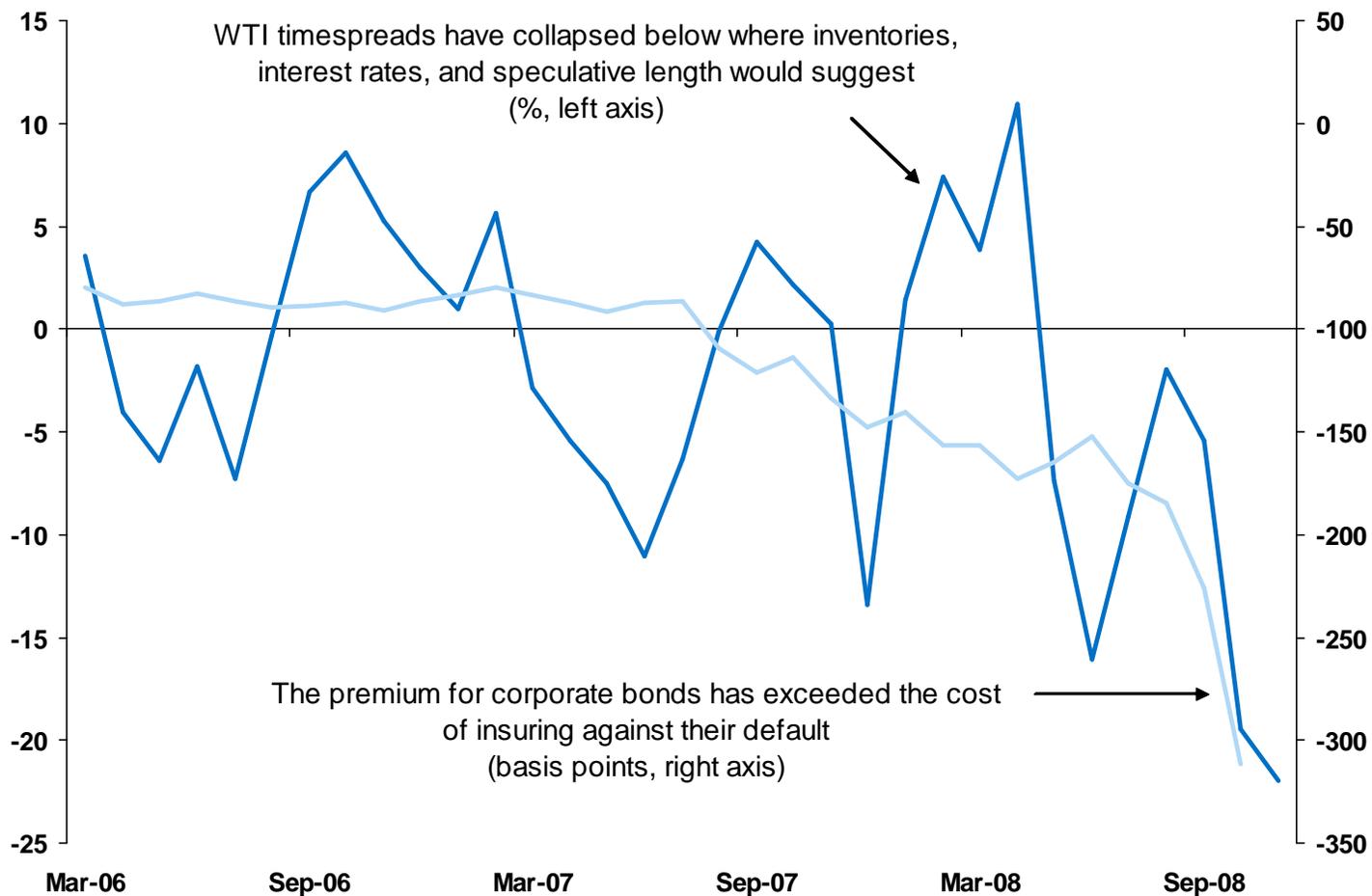
US\$/bbl; cost of carry proxied by LIBOR+200bps + 0.8% of oil spot price for monthly storage costs



Source: NYMEX, ICE and Goldman Sachs Commodities Research.

... similar to trades in other asset classes that require cash funding up front.

% per annum (left and right axes)

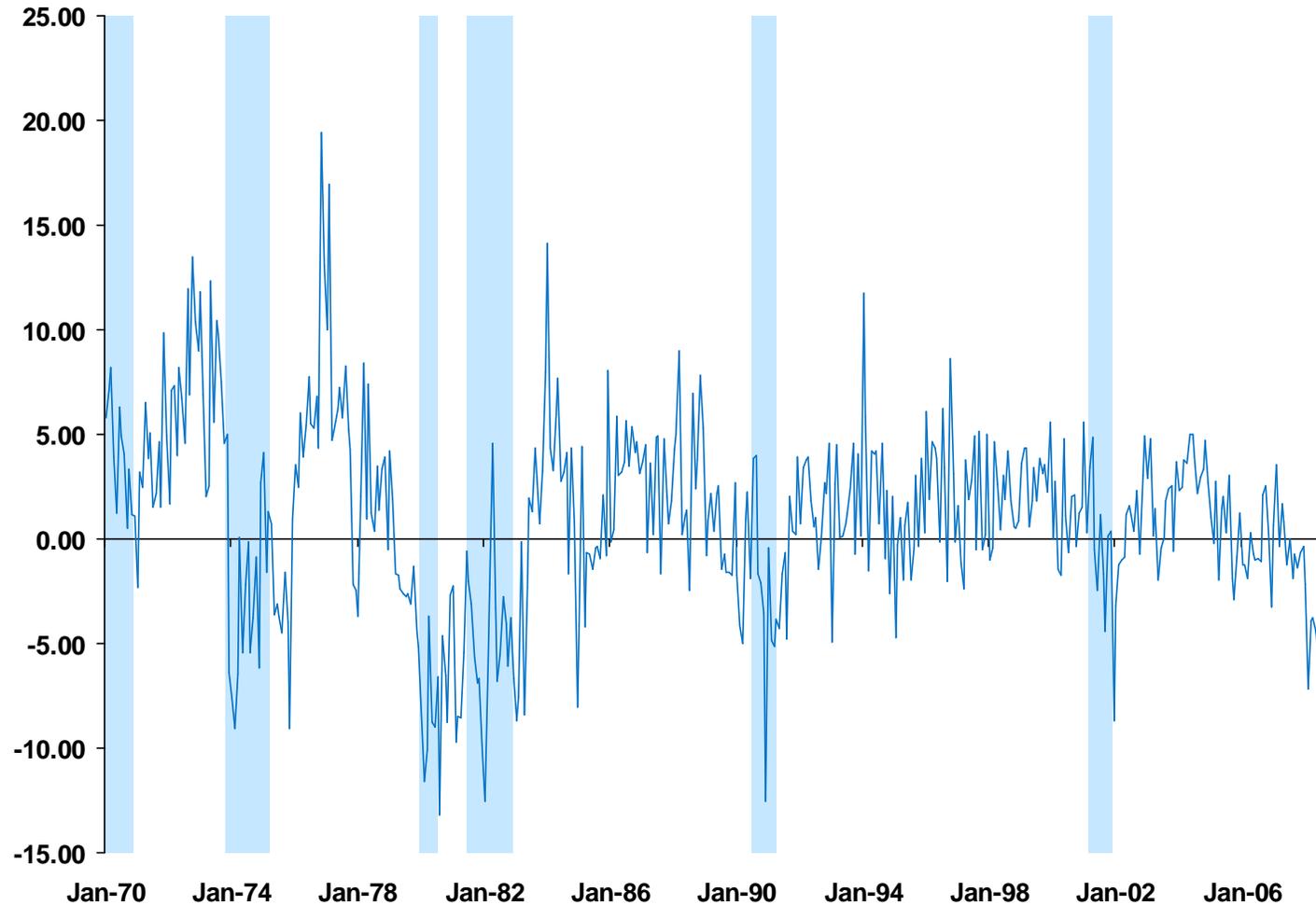


Source: NYMEX and Goldman Sachs Research.

**Demand: weak economy and credit crunch
sends US and OECD demand plummeting**

US total petroleum demand growth has slowed to recessionary levels...

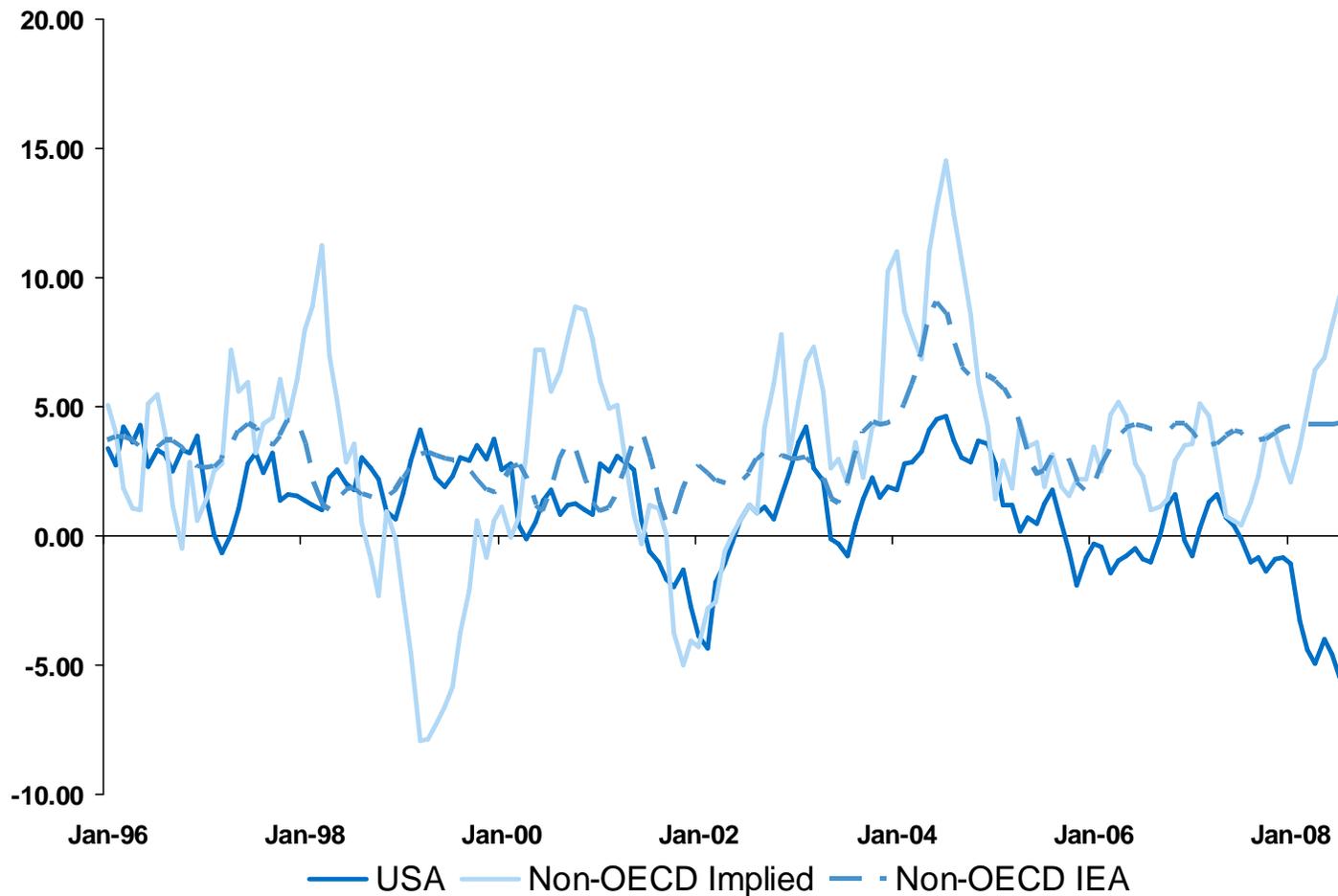
% change year over year



Source: DOE and Goldman Sachs Commodities Research.

... while reported non-OECD demand growth has stayed firm and implied growth has soared

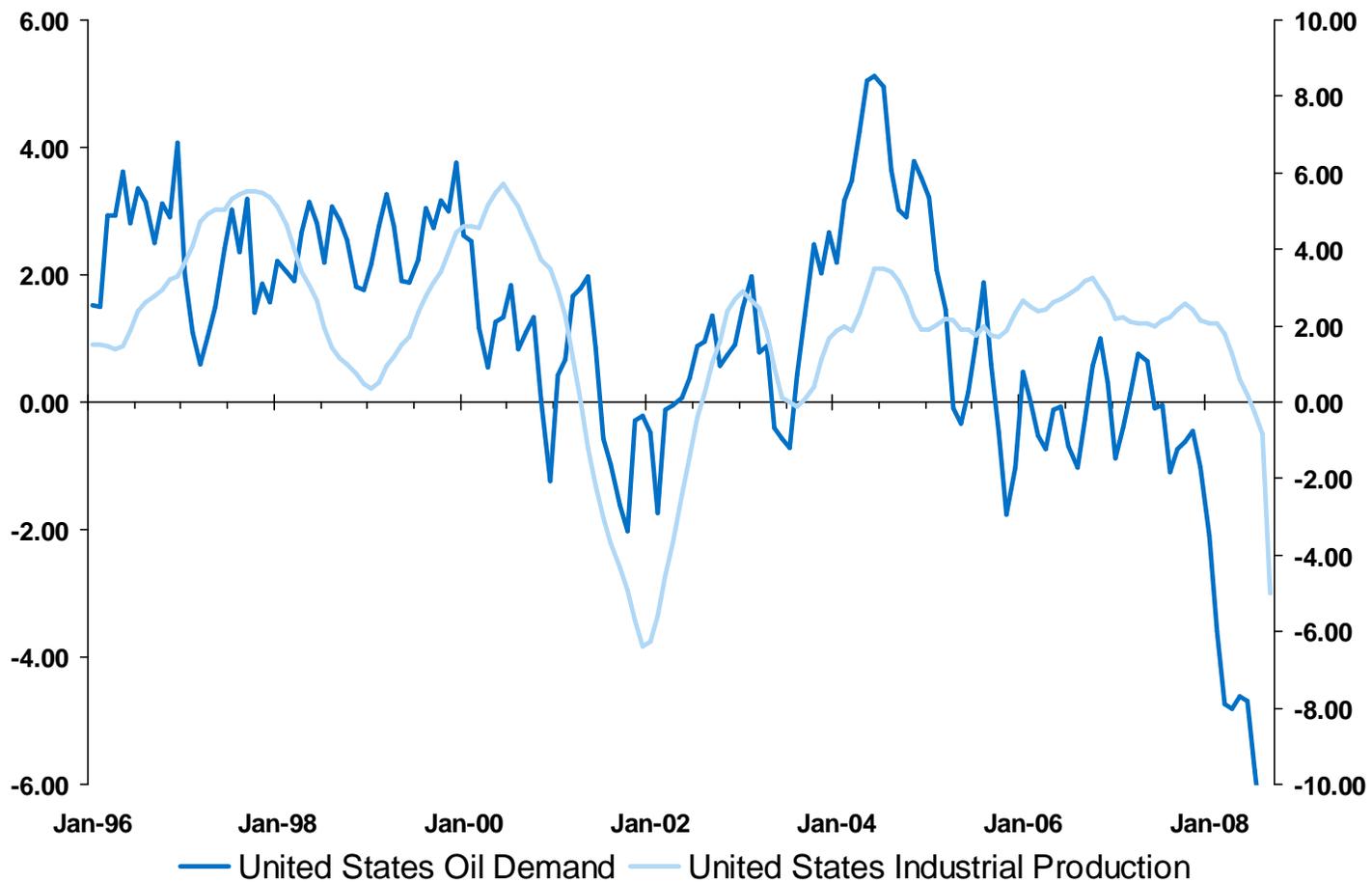
% change year over year



Source: DOE and Goldman Sachs Commodities Research.

US oil demand has fallen faster than overall economy has slowed...

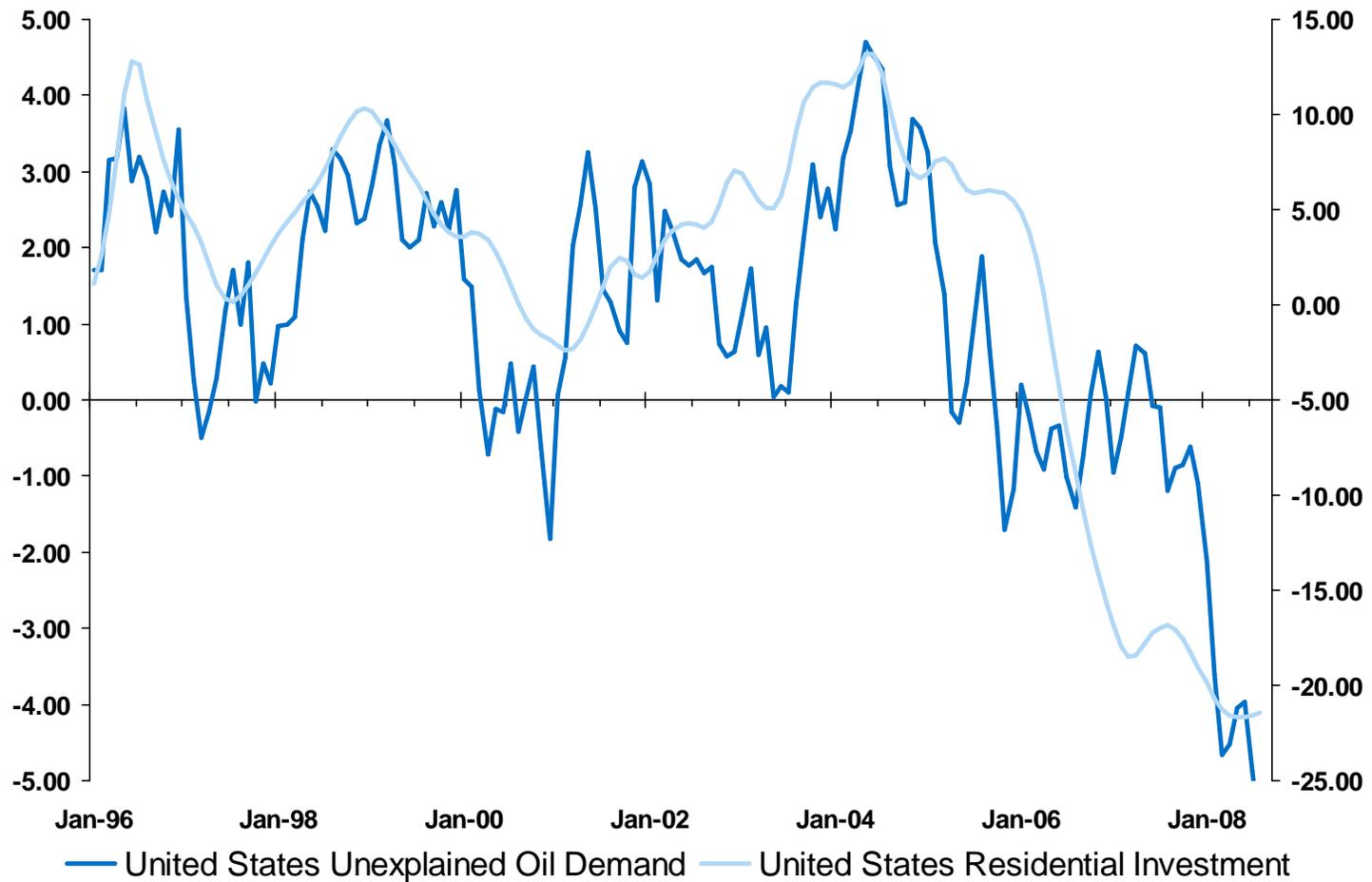
% change year over year



Source: DOE and Goldman Sachs Commodities Research.

... but discrepancy can be explained by impact of housing downturn on US consumer

% change year over year

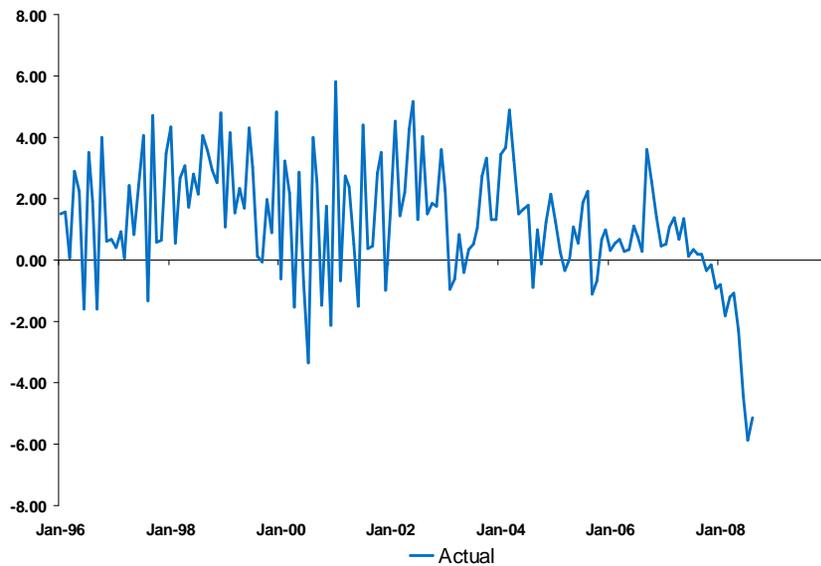


Source: DOE and Goldman Sachs Commodities Research.

US motor gasoline and diesel demand fell through the floor starting in June...

US motor gasoline demand

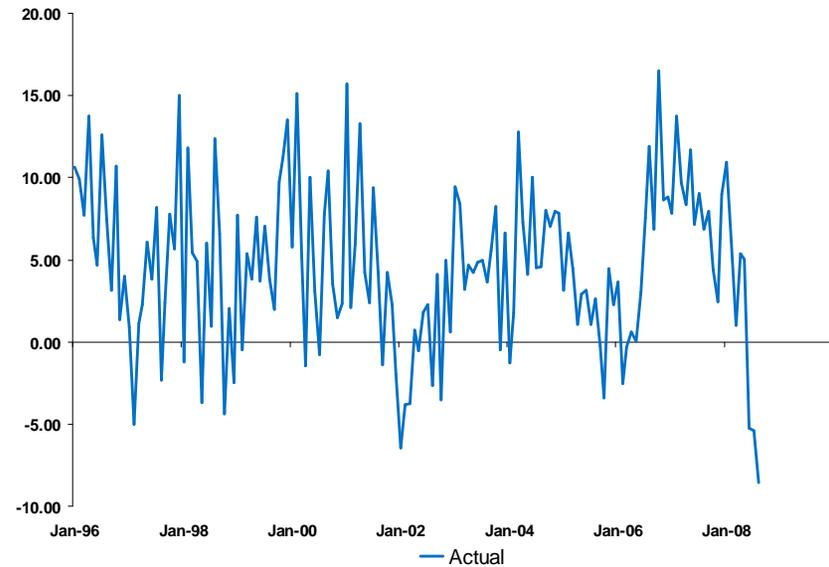
% change year over year



Source: DOE.

US diesel demand

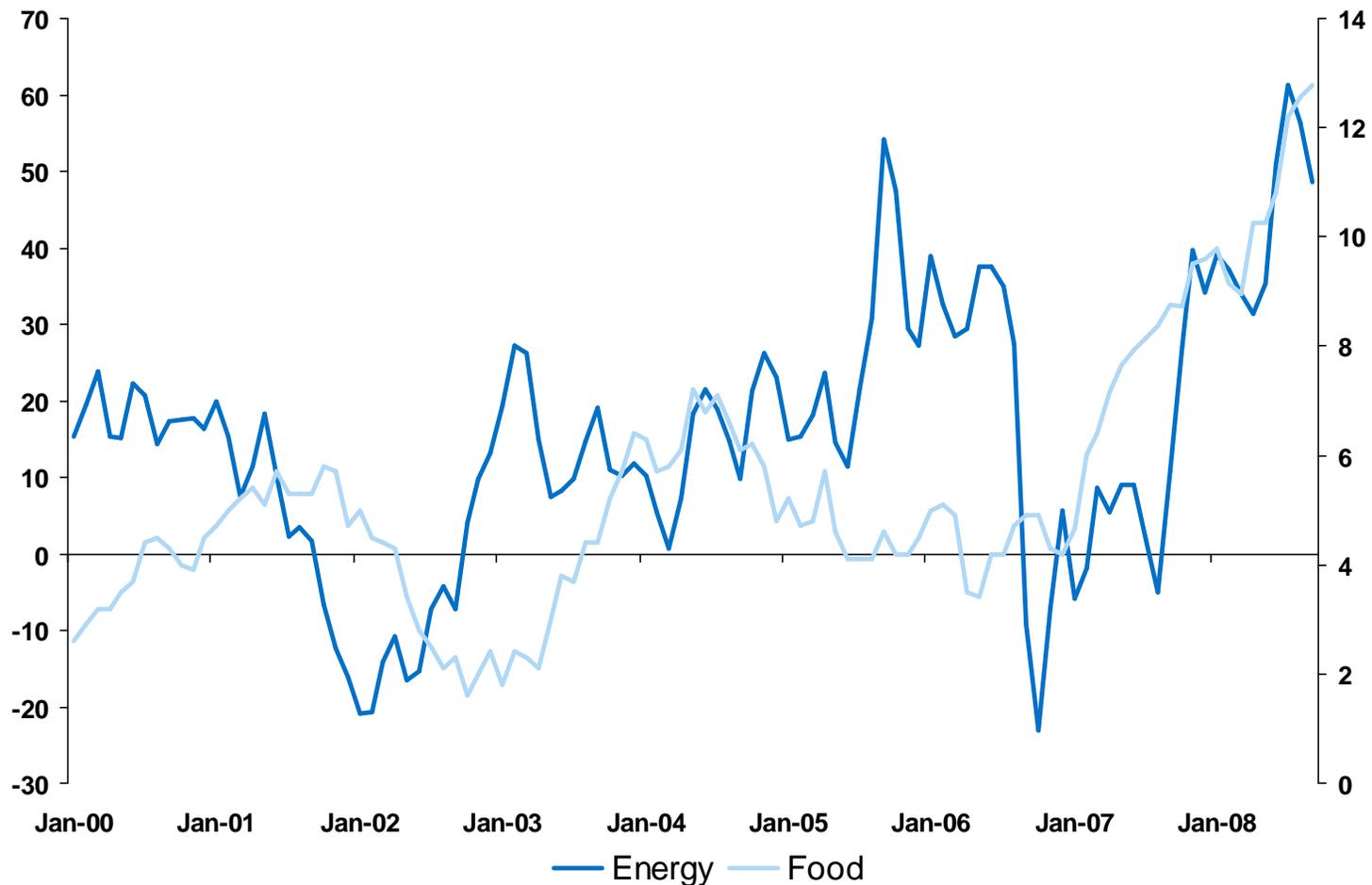
% change year over year



Source: DOE.

... as rising energy and food prices combined with falling housing prices put squeeze on consumers.

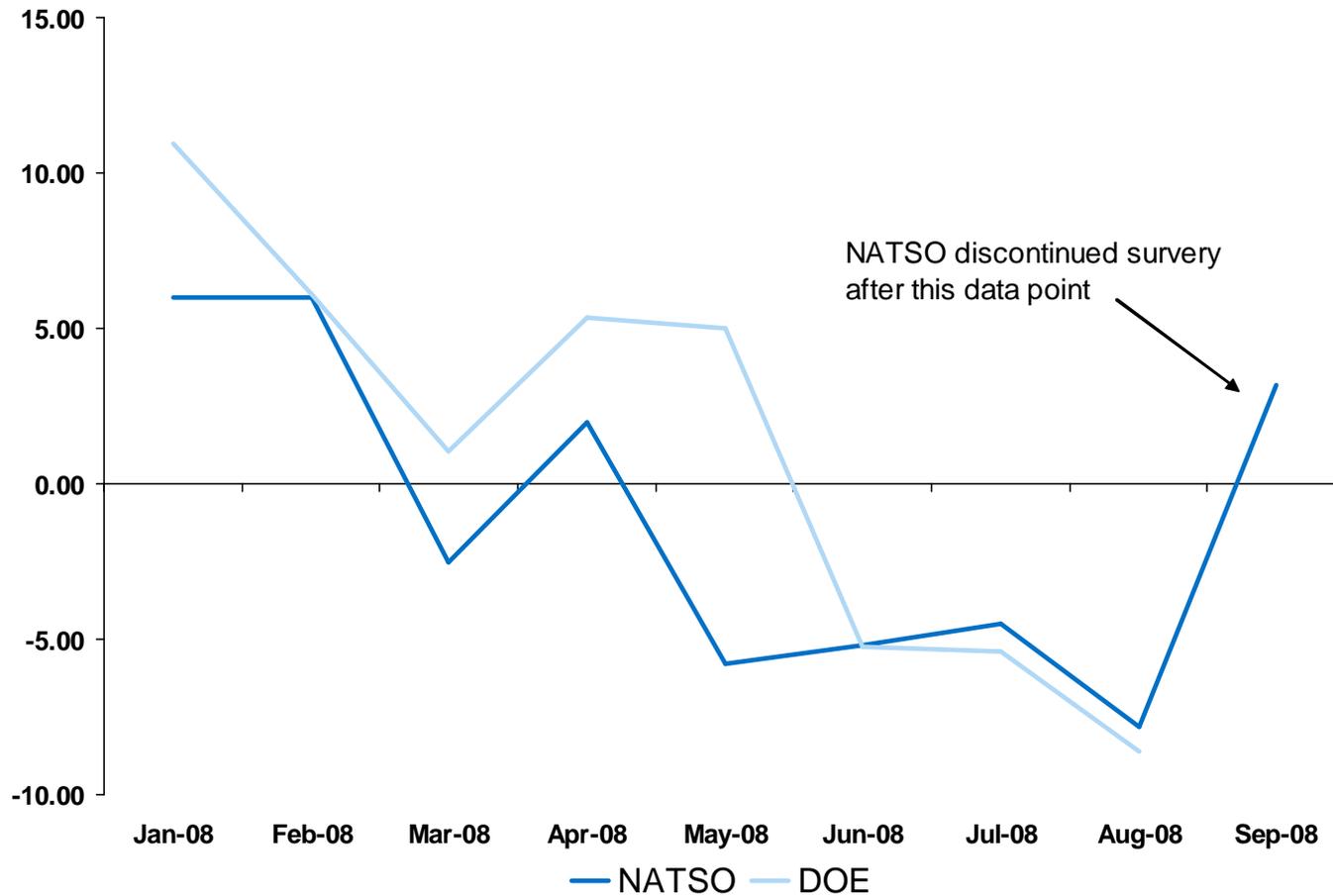
% change year over year in CPI (Energy left axis, Food right axis)



Source: US BLS and Goldman Sachs Commodities Research.

NATSO retail level survey of diesel demand confirms declines in monthly DOE data

% change year over year

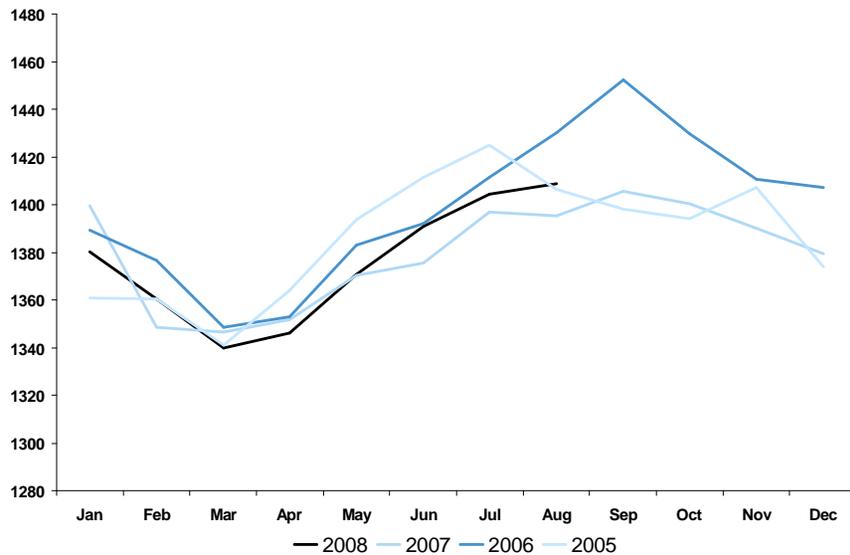


Source: NATSO, DOE and Goldman Sachs Commodities Research.

US petroleum product demand declines resulting in higher exports, not higher inventories.

US total petroleum product inventories

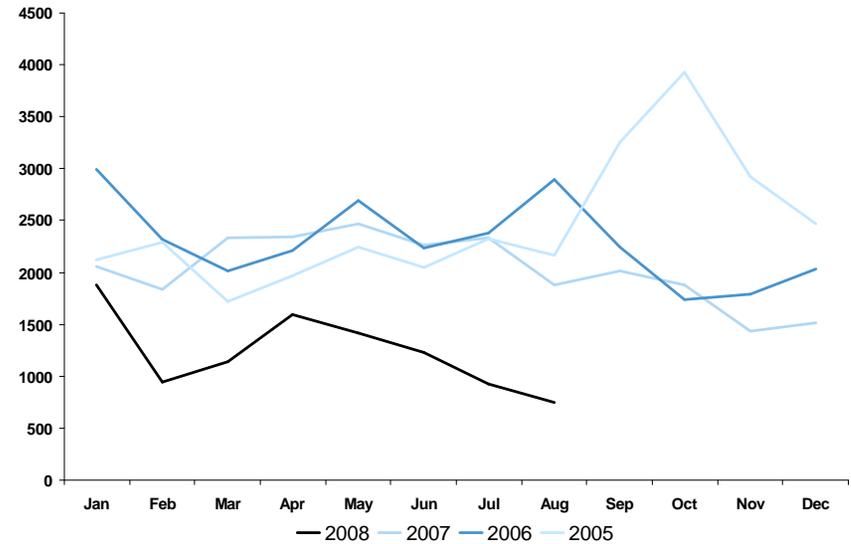
Million barrels



Source: DOE.

US total petroleum product net imports

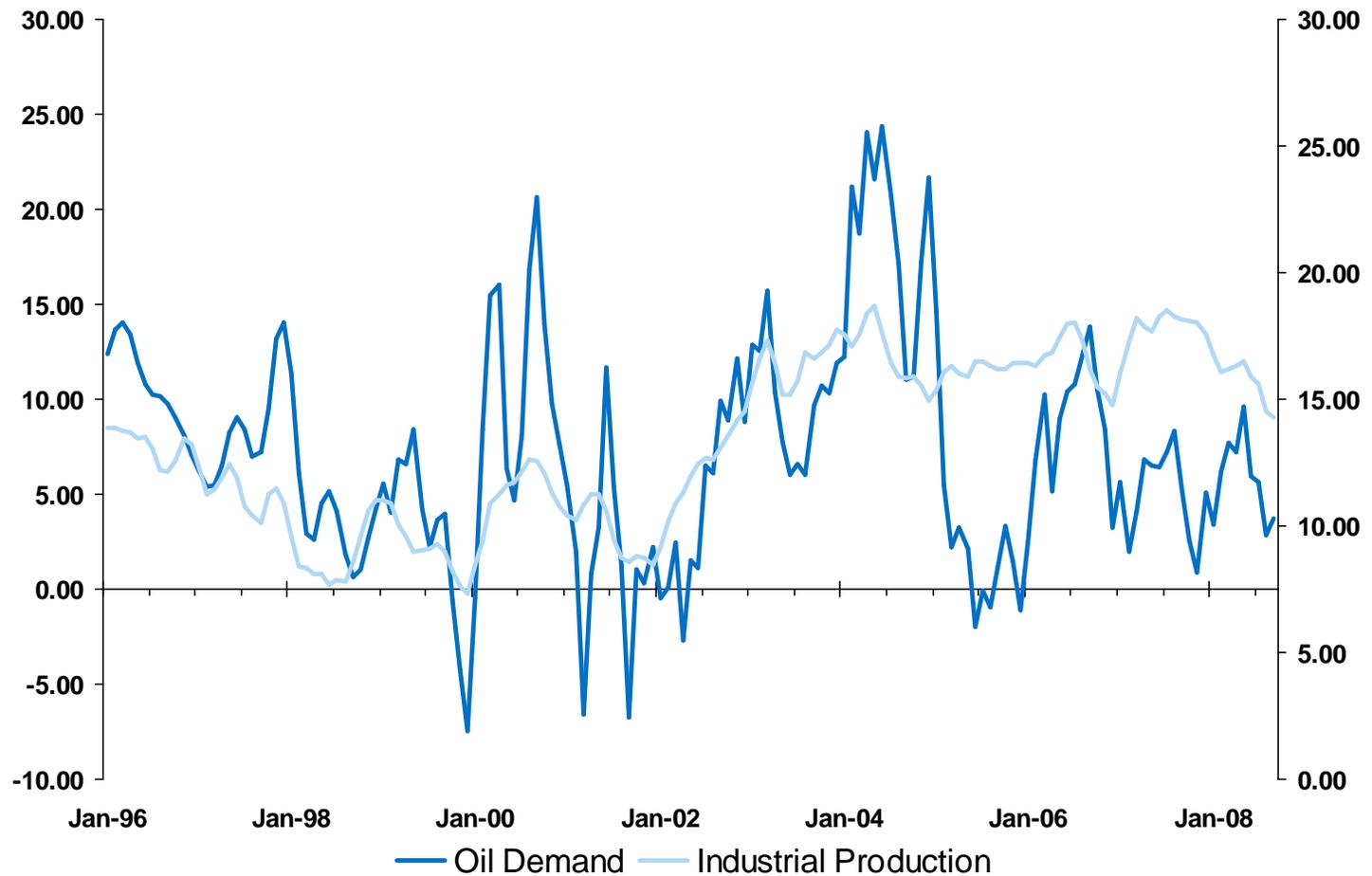
Thousand b/d



Source: DOE.

Chinese industrial production alone does not explain recent moves in Chinese oil demand growth...

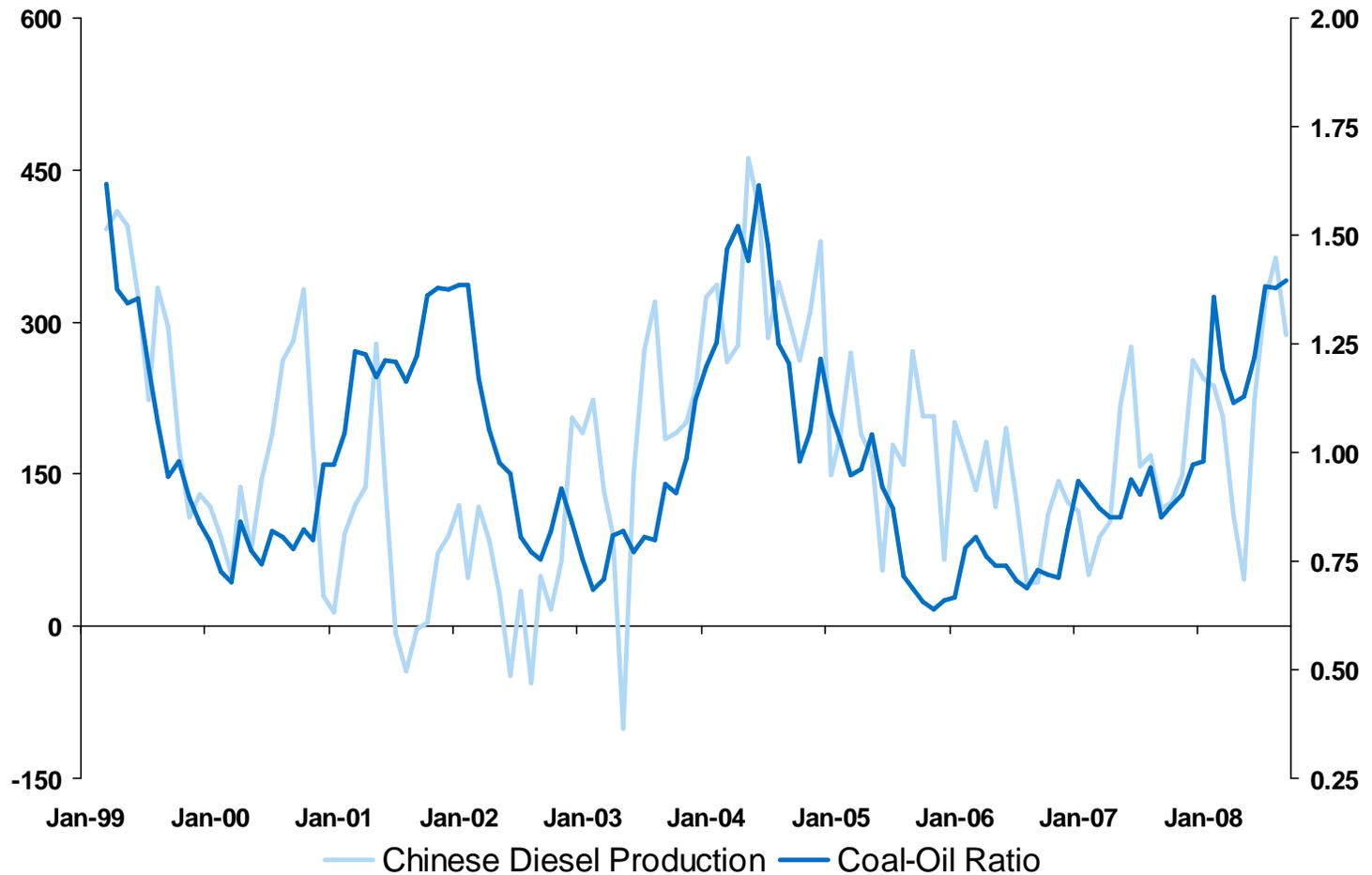
% change year over year (Oil demand, left axis. IP, right axis)



Source: DOE and Goldman Sachs Commodities Research.

... issues in power generation have also been quite important

Thousand b/d (left axis), Newcastle coal price (\$/ton) / WTI crude oil price (\$/bbl) (right axis)

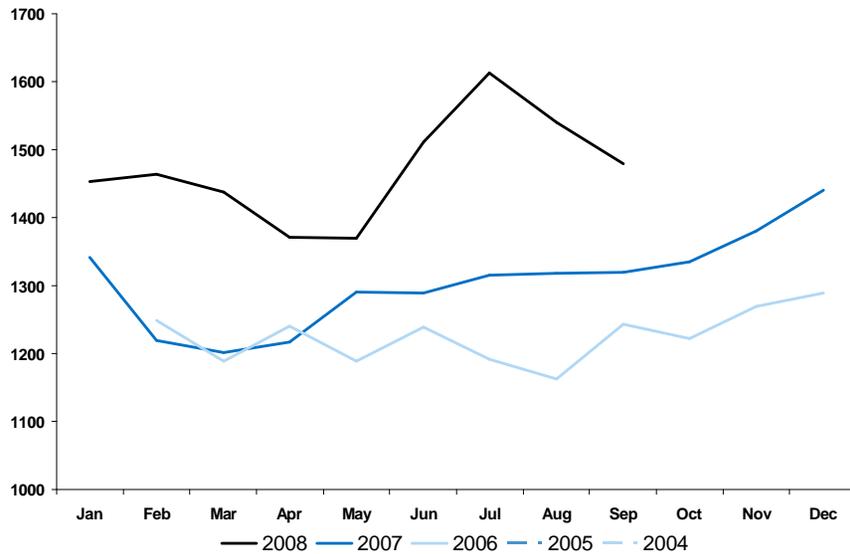


Source: DOE and Goldman Sachs Commodities Research.

Interestingly, Chinese motor gasoline and diesel demand continue to look robust...

Chinese motor gasoline implied demand

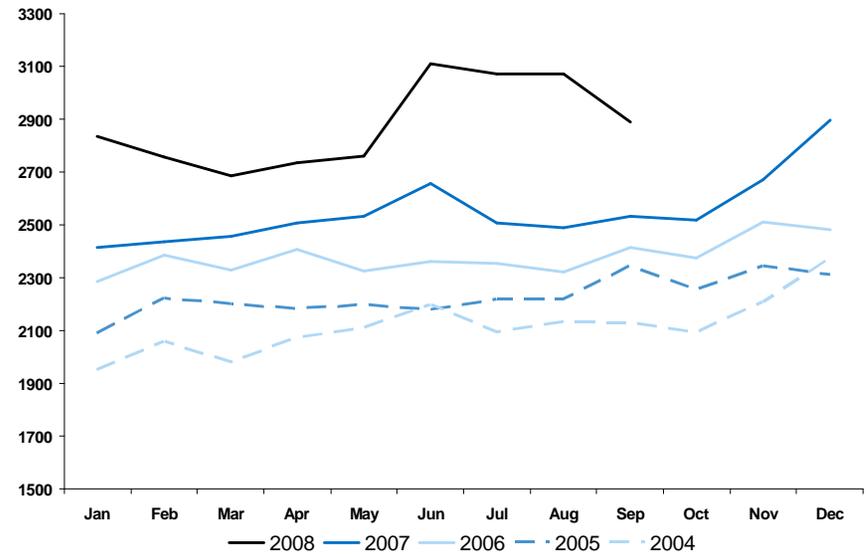
Thousand b/d



Source: DOE.

Chinese diesel implied demand

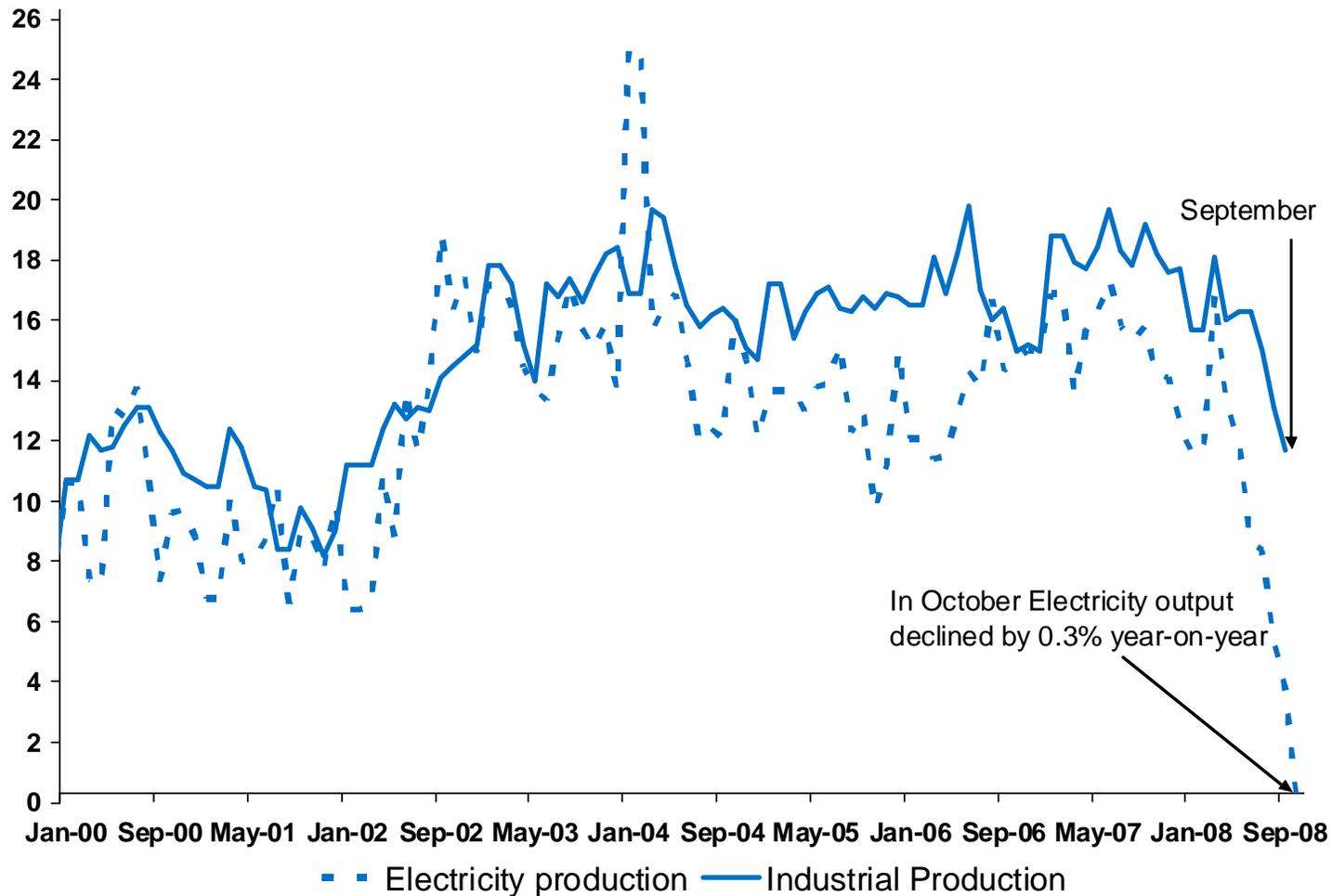
Thousand b/d



Source: DOE.

... but recent economic indicators suggest downside risk to Chinese demand

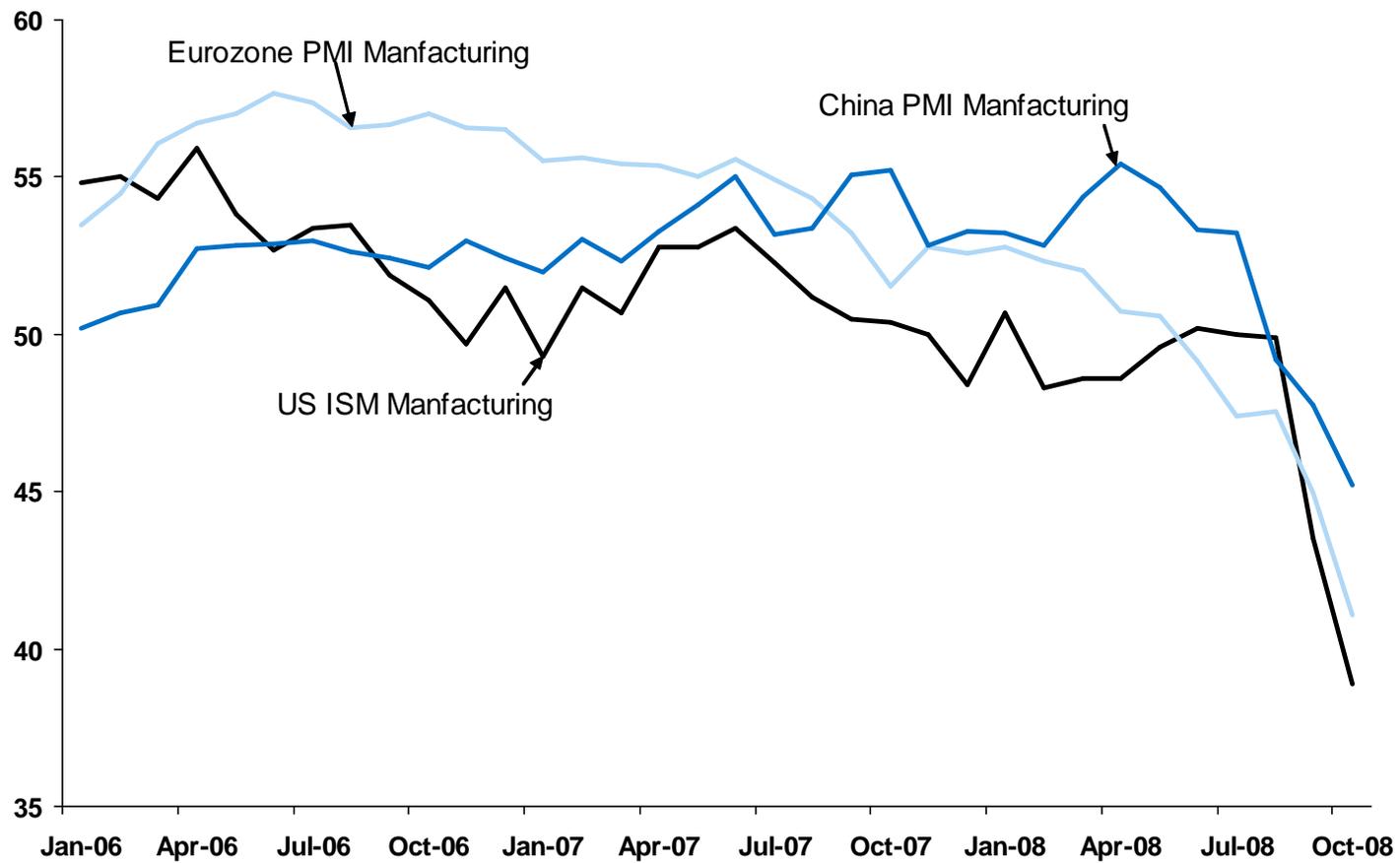
Year-on-year change



Source: National Bureau of Statistics.

Chinese PMI declined sharply in October

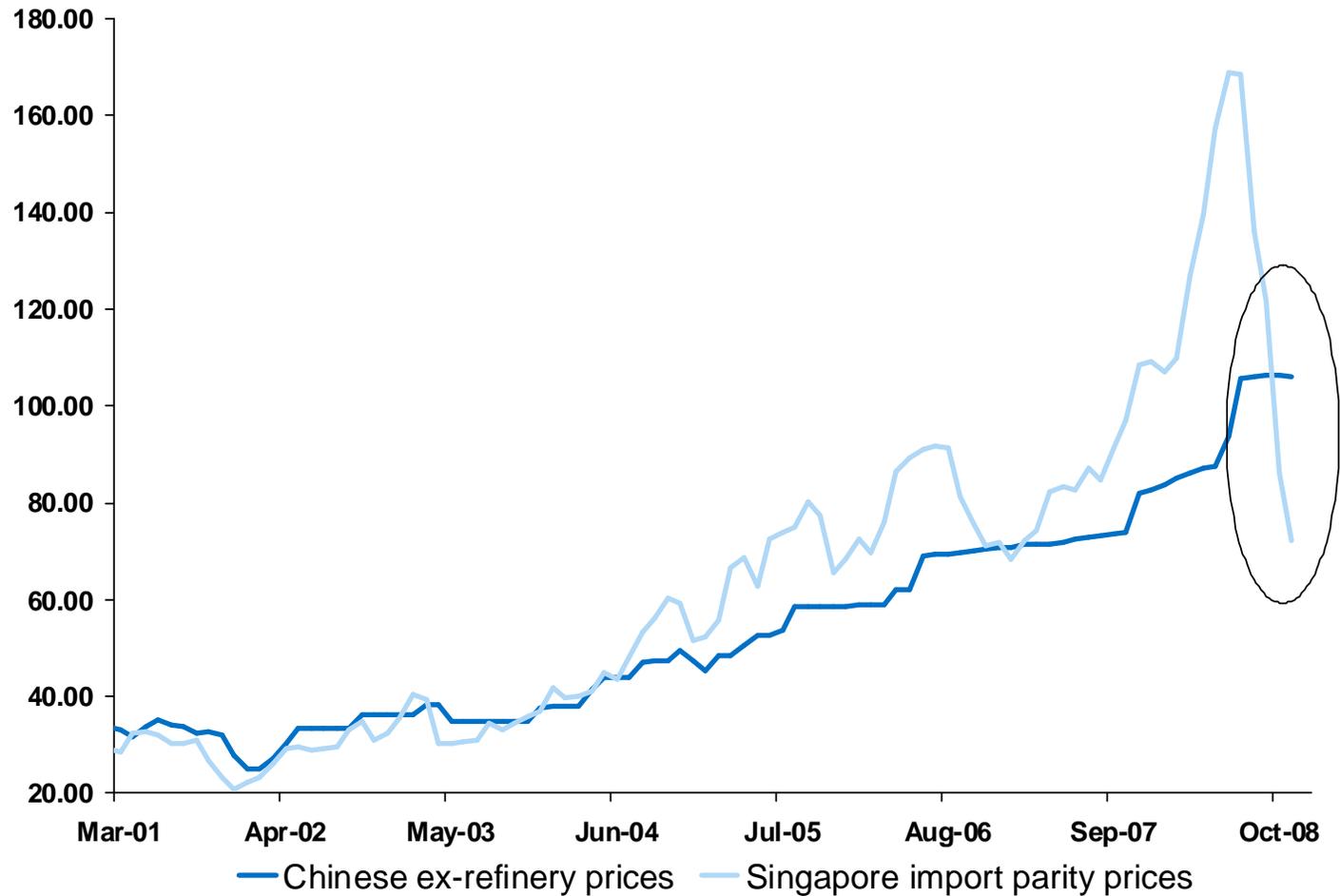
Chinese Purchasing Manager Index: manufacturing, seasonally adjusted



Source: China Federation of Logistics and Purchasing.

Chinese gasoline controlled prices are now well above Singapore market prices

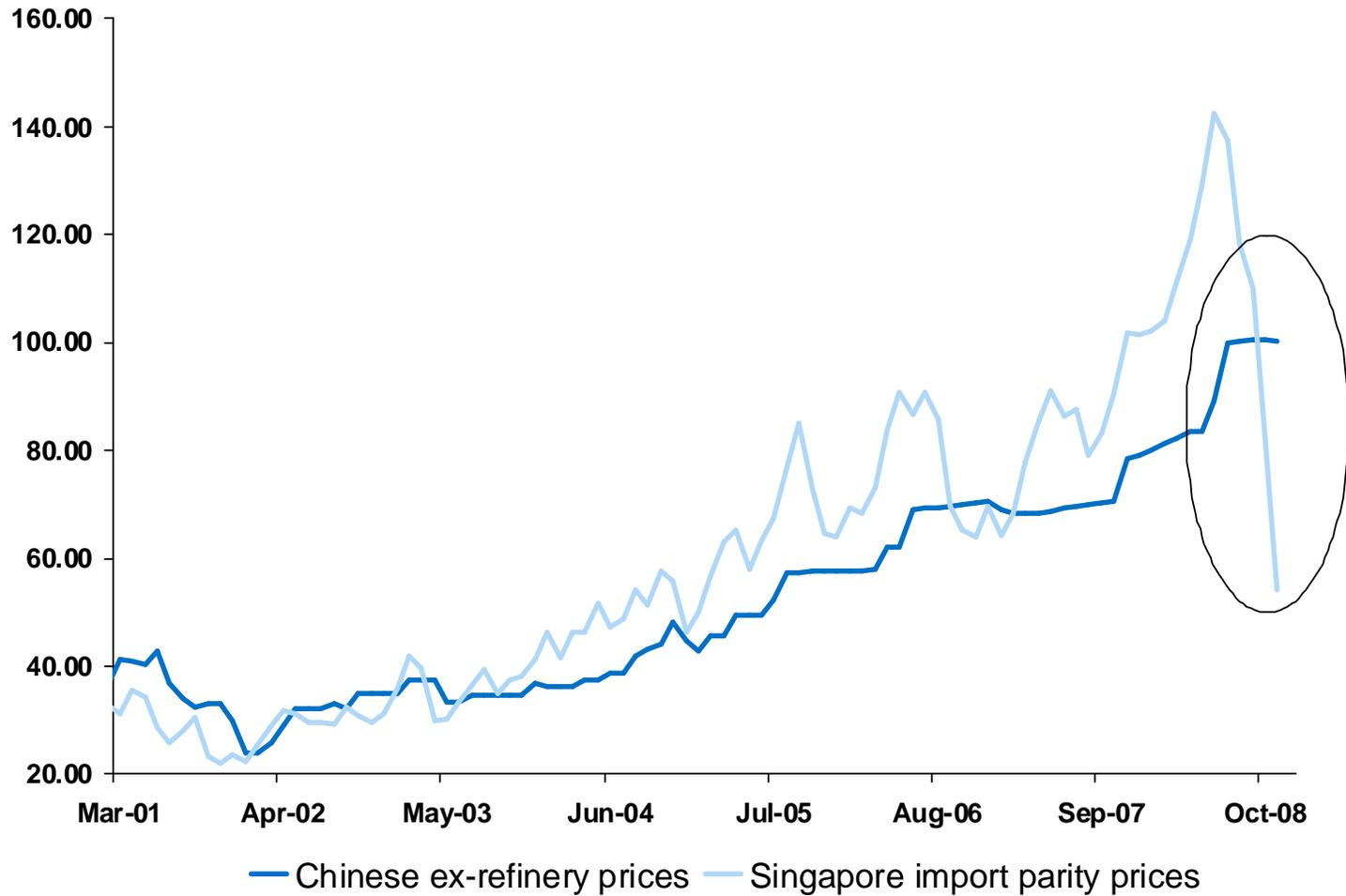
US\$/bbl



Source: Goldman Sachs Research.

.... and so are diesel prices

US\$/bbl

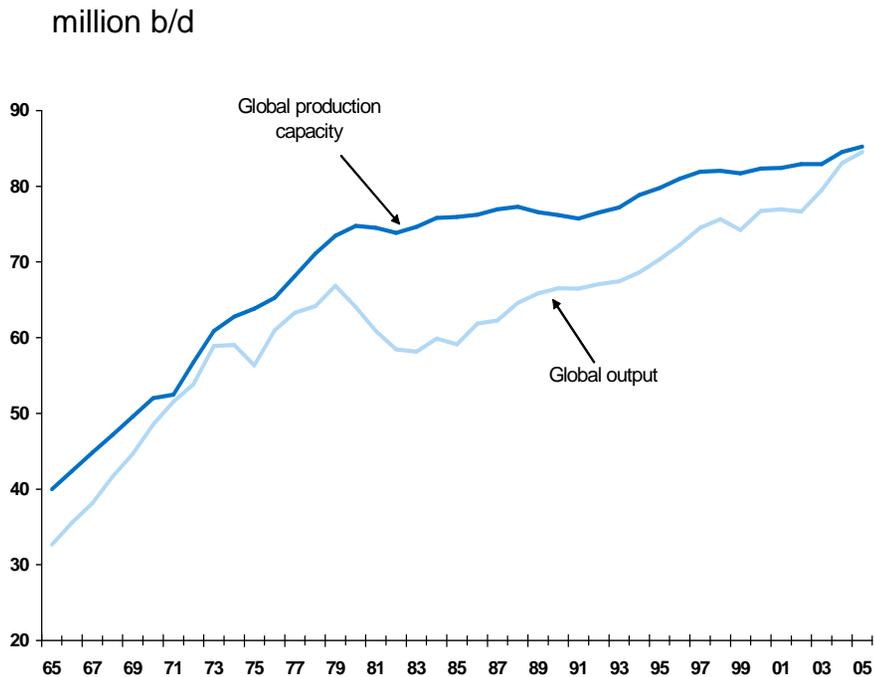


Source: Goldman Sachs Research.

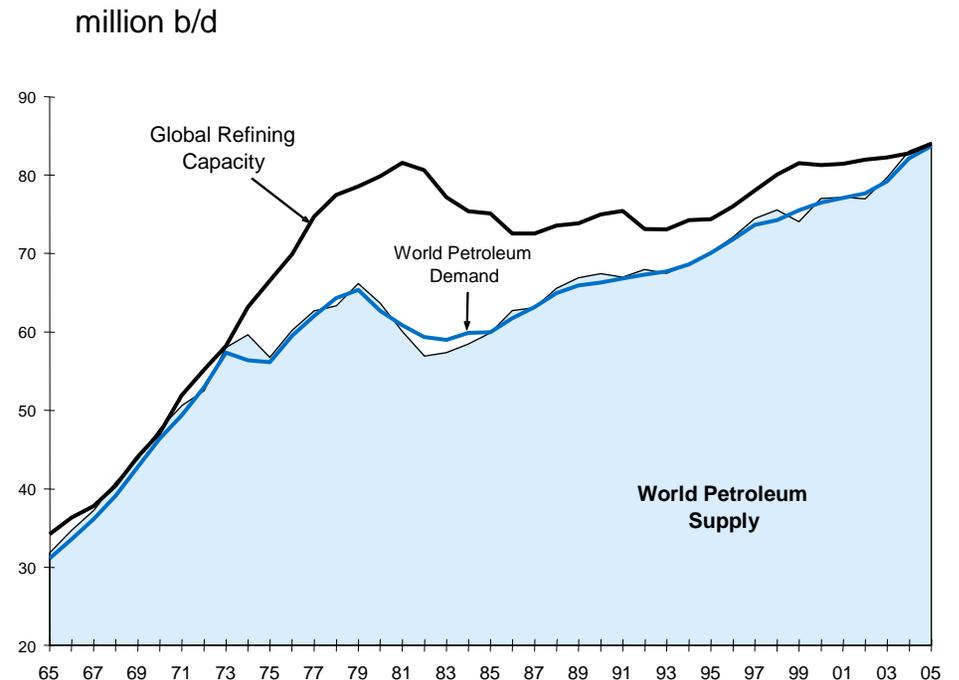
Supply: capacity constraints exacerbated by financial turmoil

The industry has exhausted spare capacity, ending an exploitation phase and beginning a new investment phase

Global oil production and capacity



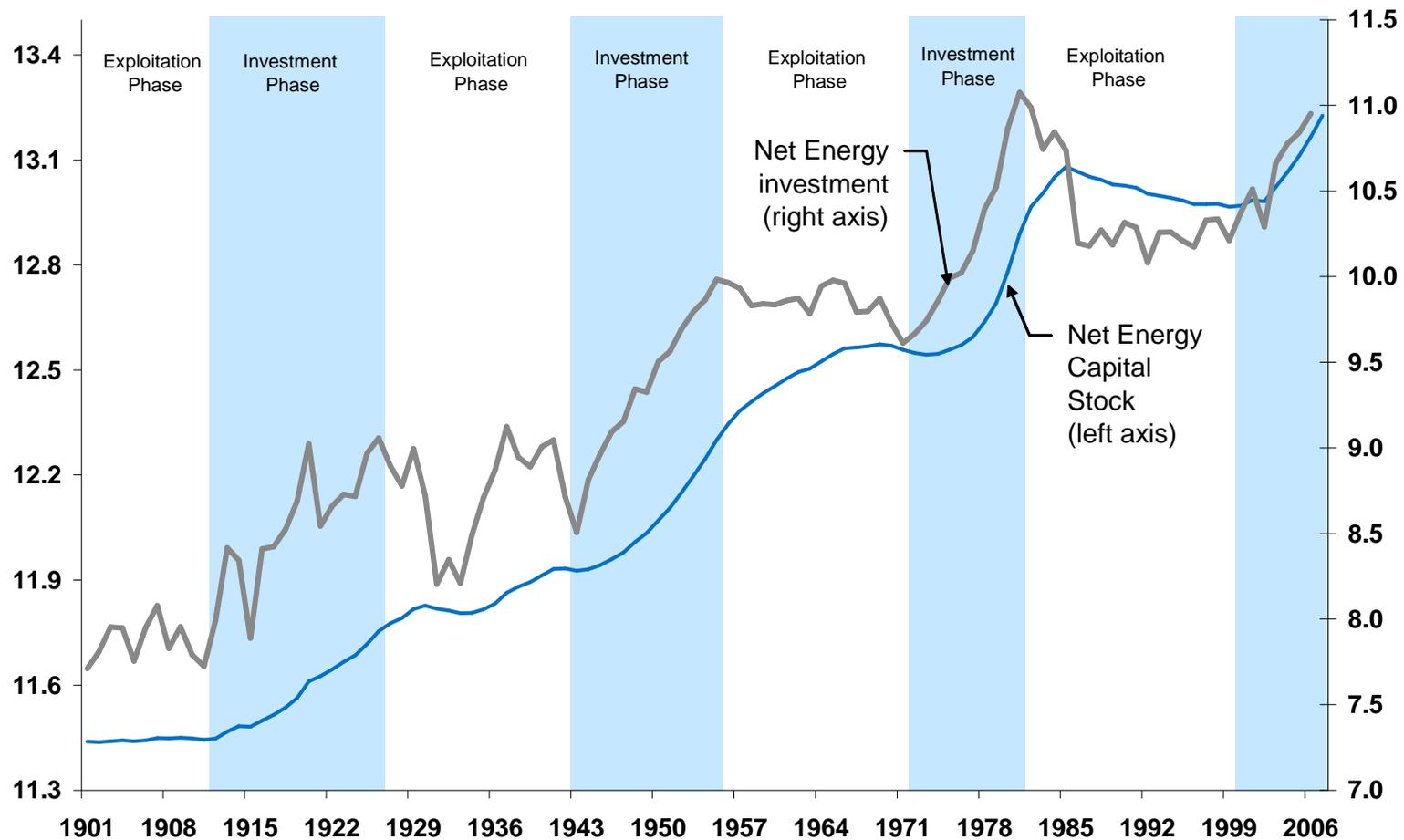
Global refining capacity



Source: International Energy Agency (IEA), DOE, Goldman Sachs Commodities Research.

Commodity markets have historically transitioned between investment phases and exploitation phases defined by spare capacity

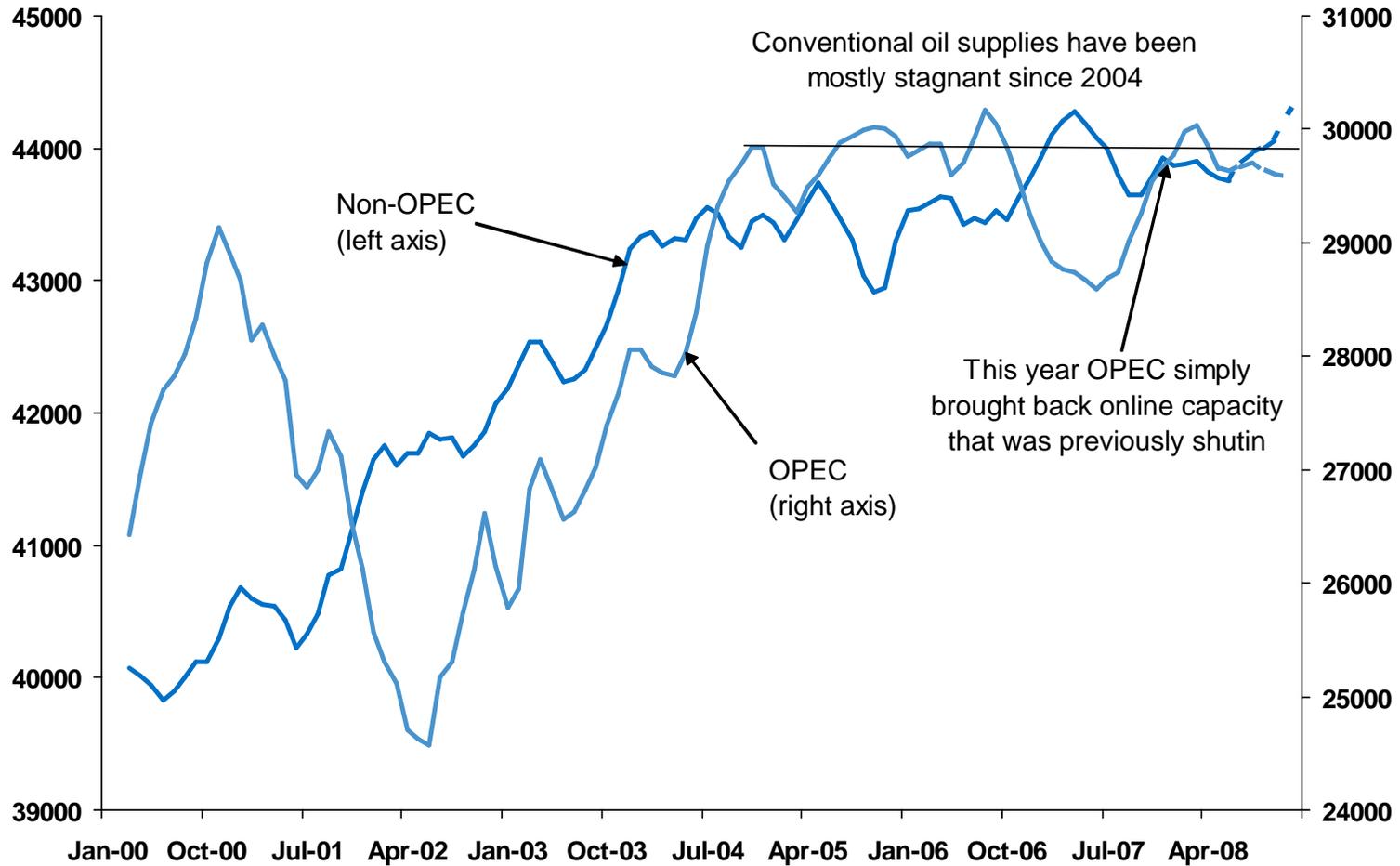
US data in real 2000 log \$



Source: US Bureau of Economic Analysis and Goldman Sachs Commodities Research.

Conventional oil supplies have remained stagnant since 2004

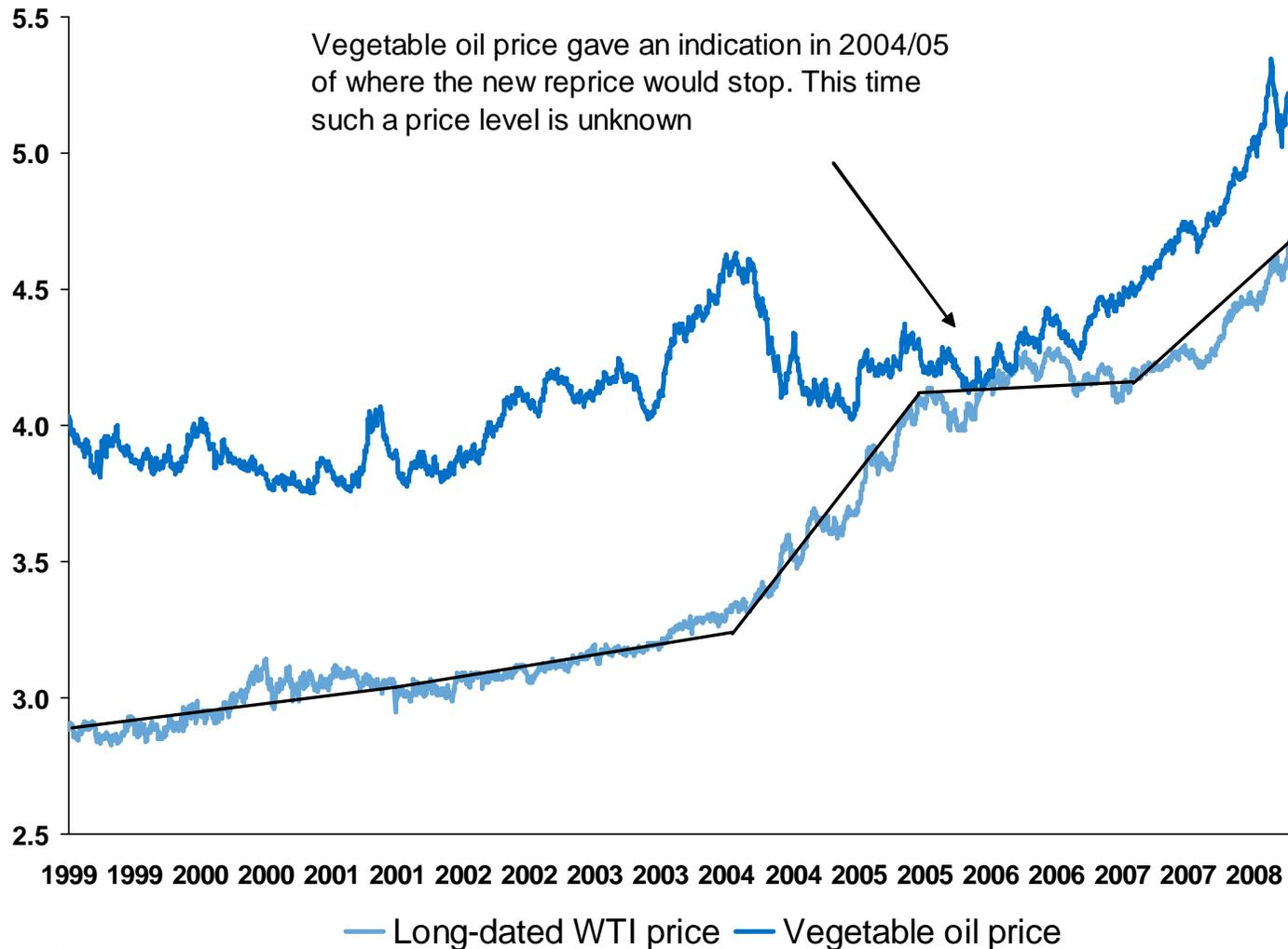
Thousand b/d



Source: IEA and Goldman Sachs Commodities Research.

Long-dated oil prices had found an equilibrium at biofuel price levels...

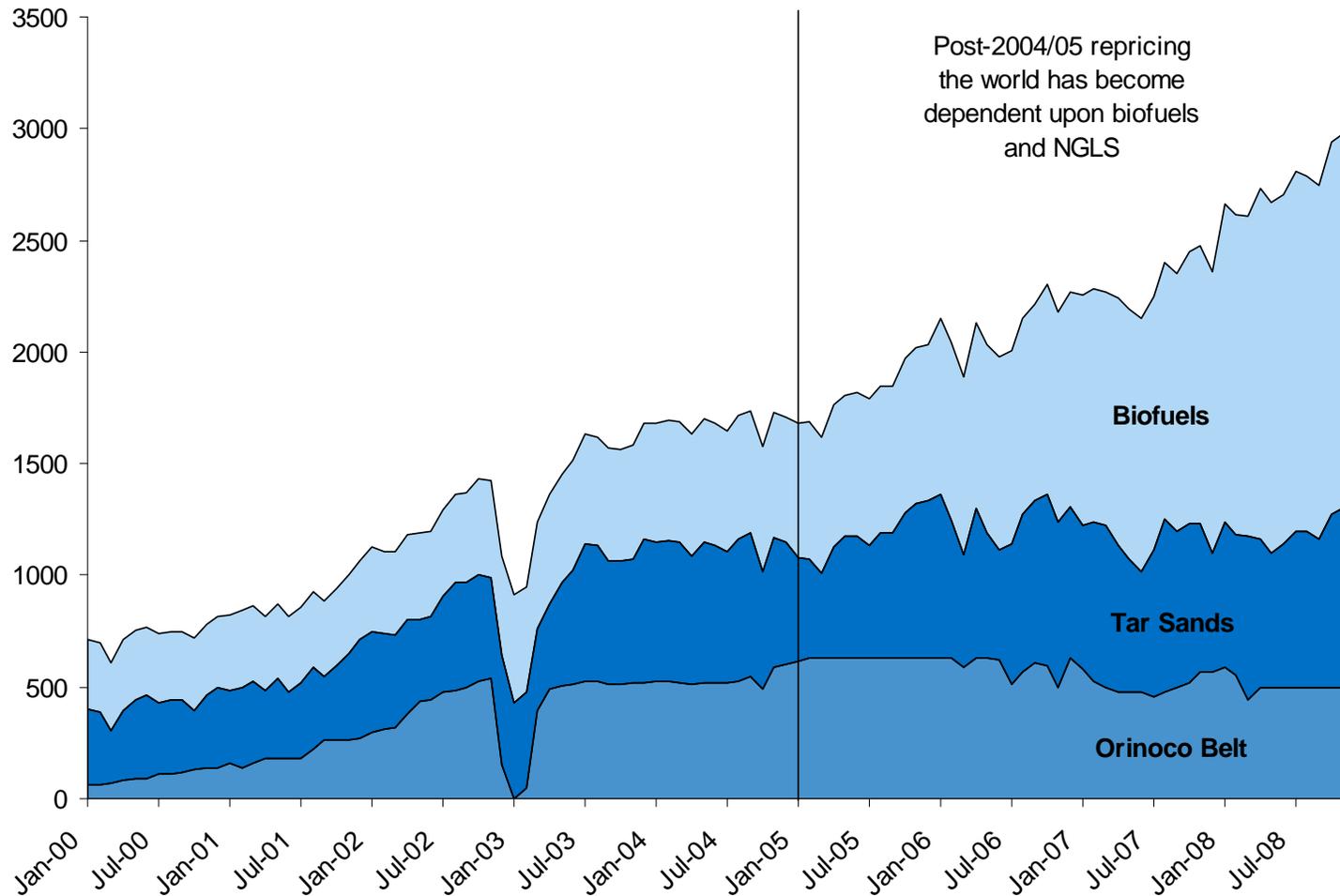
Log(\$/bbl)



Source: NYMEX and CBOT.

Making biofuels economically viable and creating significant growth in their supplies

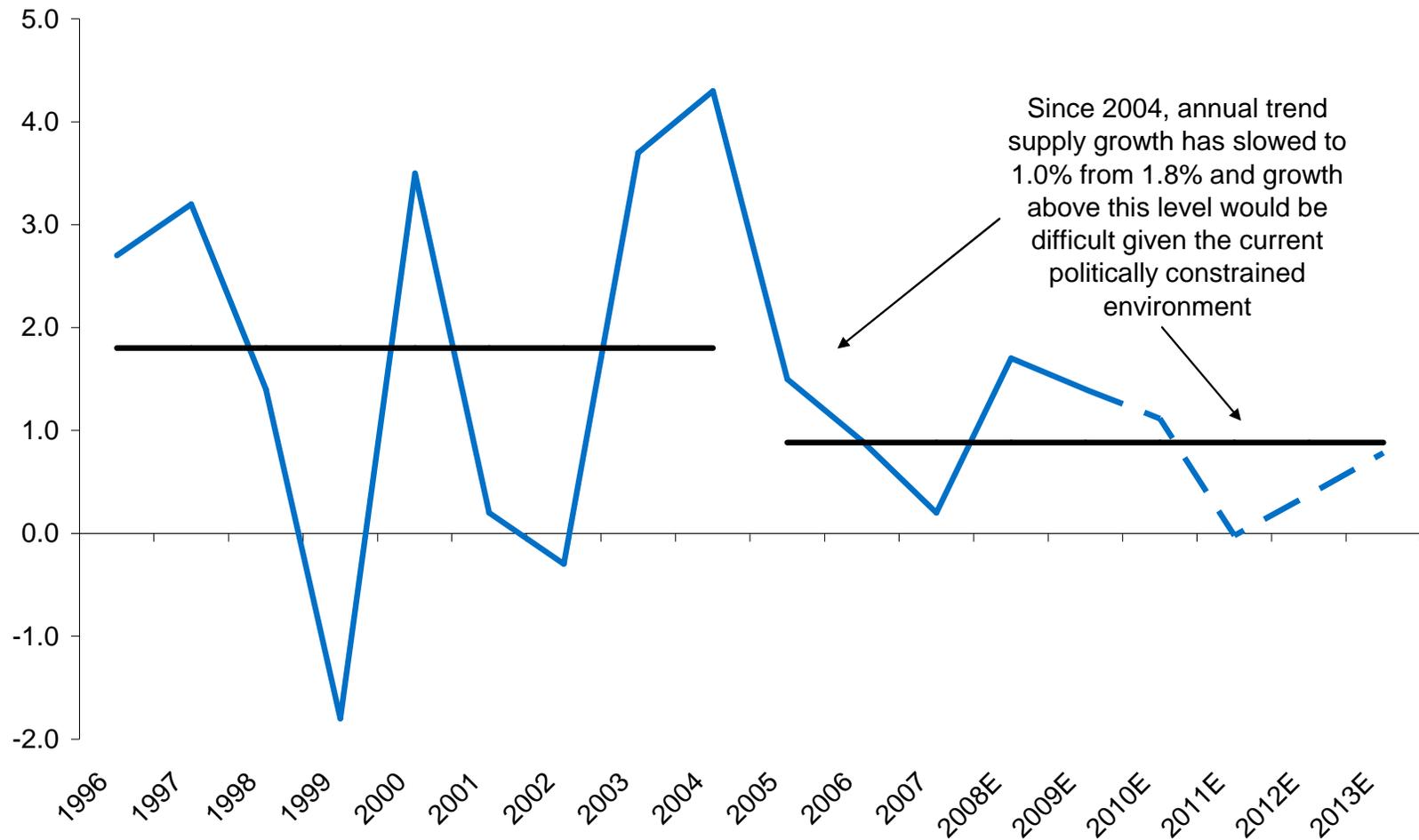
Thousand b/d



Source: IEA and Goldman Sachs Commodities Research.

Trend oil supply growth has slowed over the past several years to 1.0% per year

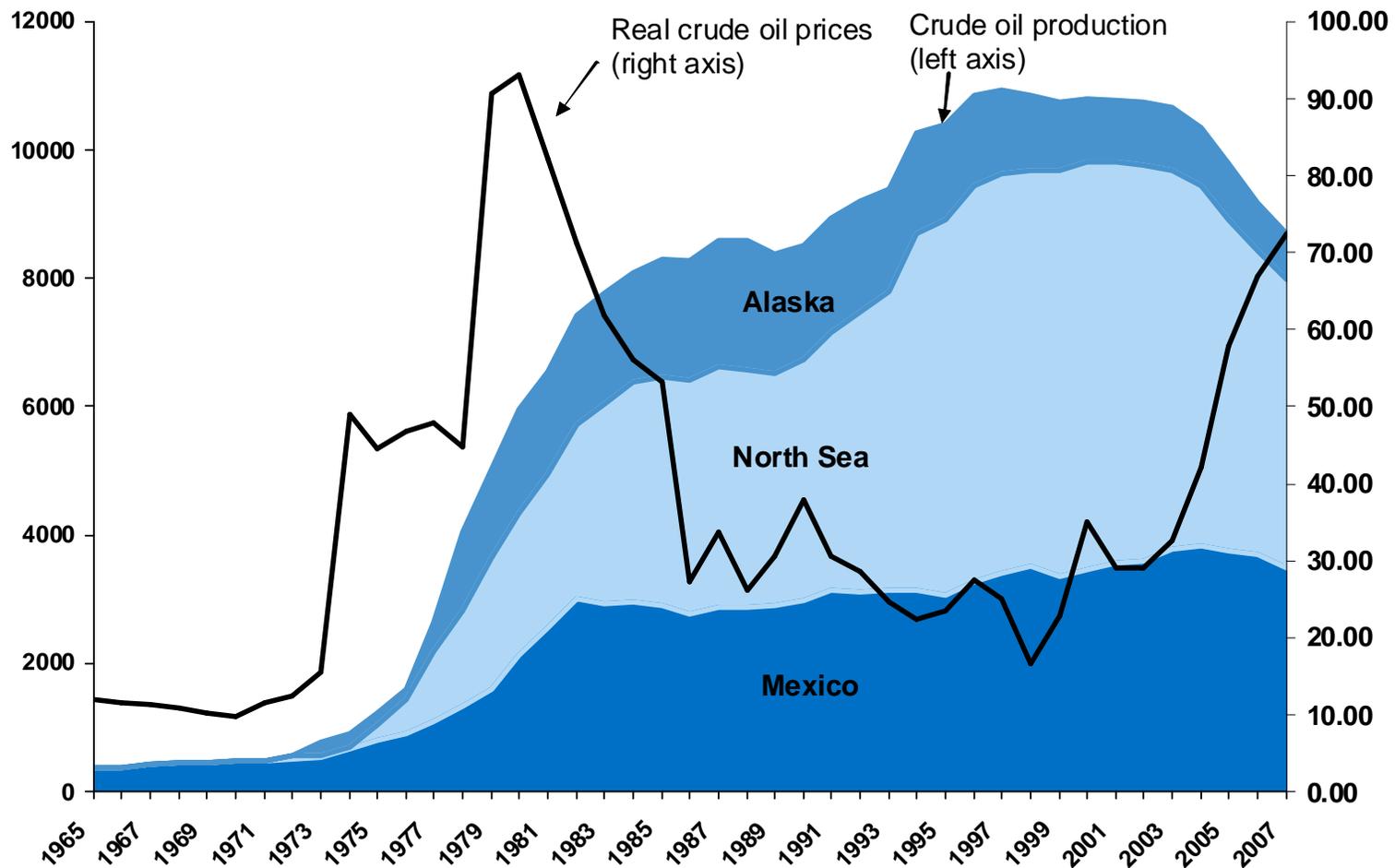
% change, IEA capacity growth estimates in dashed line



Source: IEA and Goldman Sachs Commodities Research.

The end of the last commodity cycle was characterized by the ramp up of massive next generation projects that don't exist today

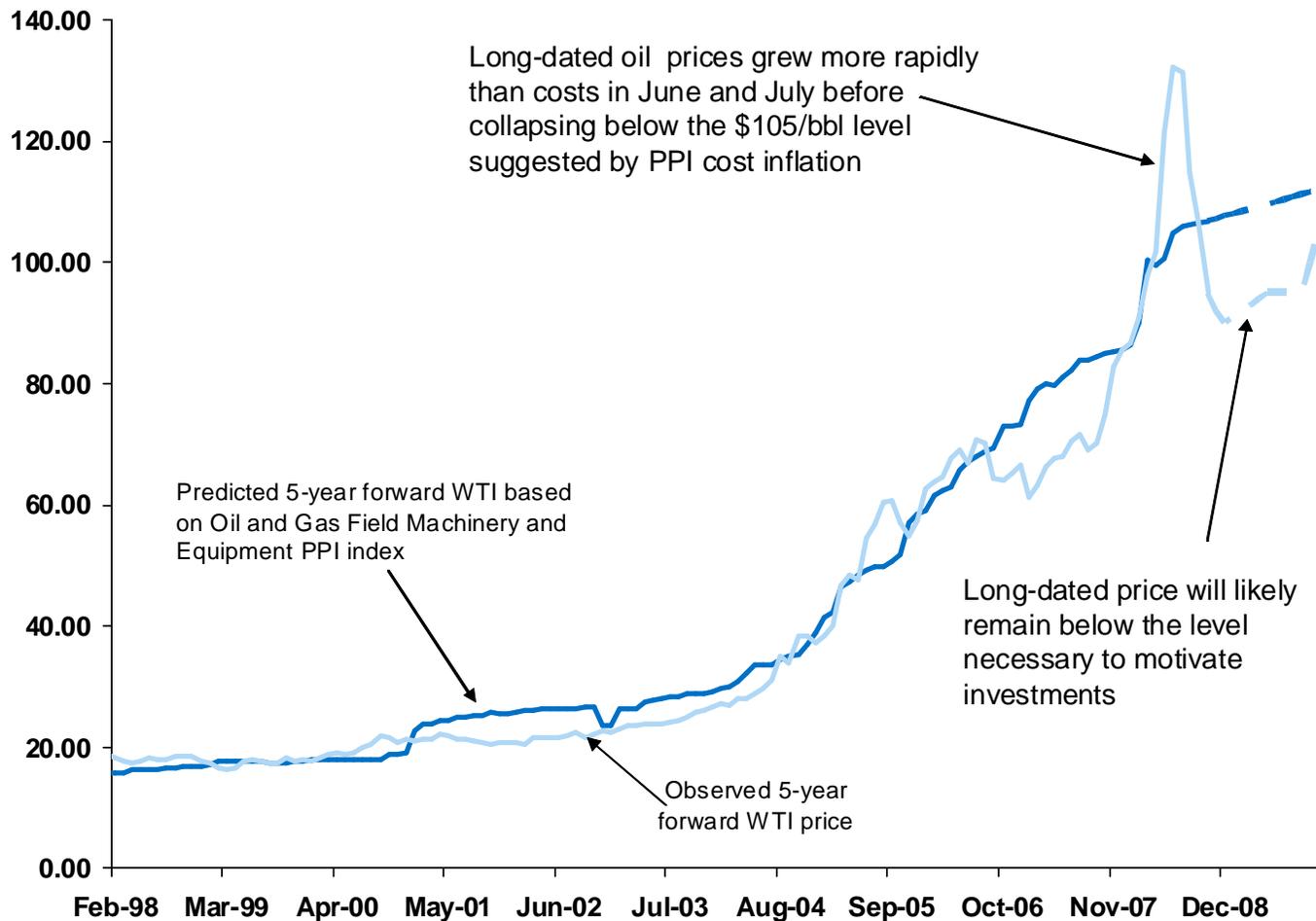
Thousand b/d, left axis; 4/bbl, right axis



Source: IEA and EIA.

Given the current credit-constrained environment and its negative implications on producer's ability to invest in future supply, we expect long-dated oil prices to remain below marginal cost of production levels

\$/bbl



Source: Goldman Sachs Commodities Research.

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November 11, 2008

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