Oil Prices: Have they Peaked?

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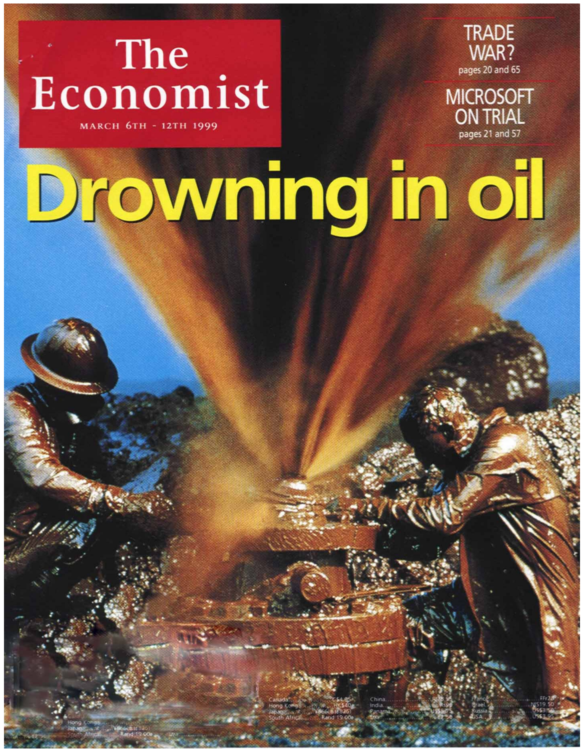
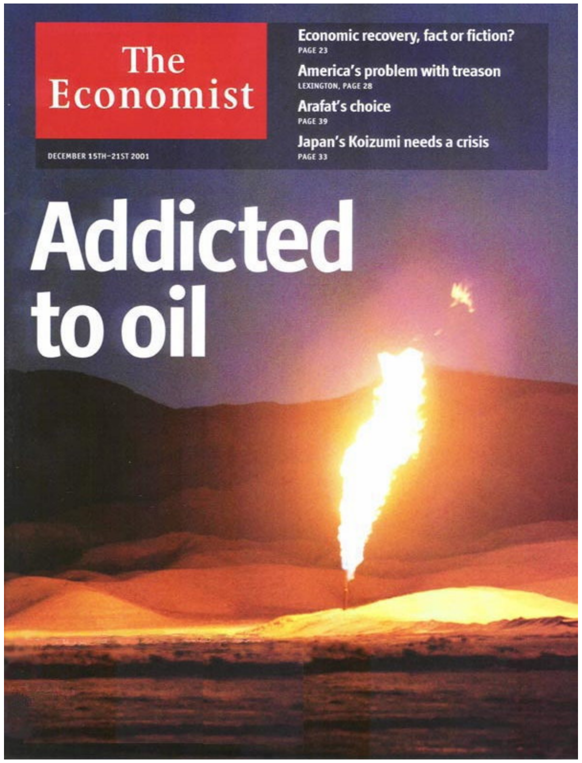
A Passion to Perform. Deutsche Bank

…which one of these do you agree with?

Mar 1999	Dec 2001	Oct 2003

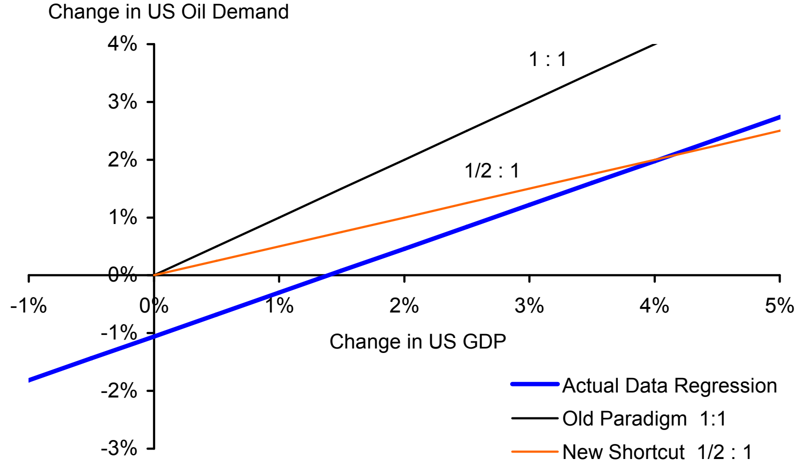




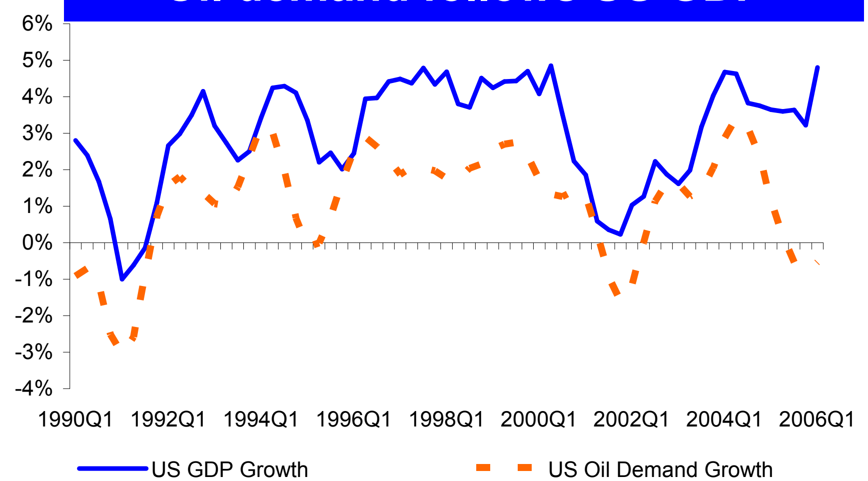
Source: Economist.com

Income Elasticity of Demand

Oil vs. GDP – intercept is not zero



Oil demand follows US GDP



- **The long-held rule of thumb, developed after the oil shocks of the 1970's was that for every 1% increase in GDP, there is a 1/2% growth in US oil demand**
- **However, recent work by Deutsche on data 1990-2005 suggests that this is not true at levels of GDP growth below 2%**
- **If the U.S. GDP real growth rate drops below 2%, we could see virtually no growth in U.S. oil demand.**
- **DB's US economics team expects a significant drop in US GDP from 4.8% in Q1 toward 2% in Q2**
- **The combination of price and income elasticities could result in surprisingly slow US oil demand growth.**

Source: DOE/EIA, BLS, DB Global Markets Research

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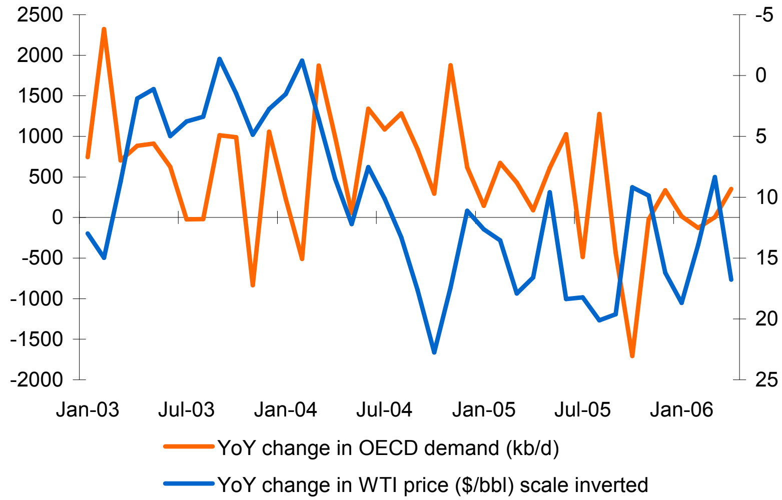
Price Elasticity of Demand

OECD Demand Change v. Oil Price Change



Average Net Demand Elasticities

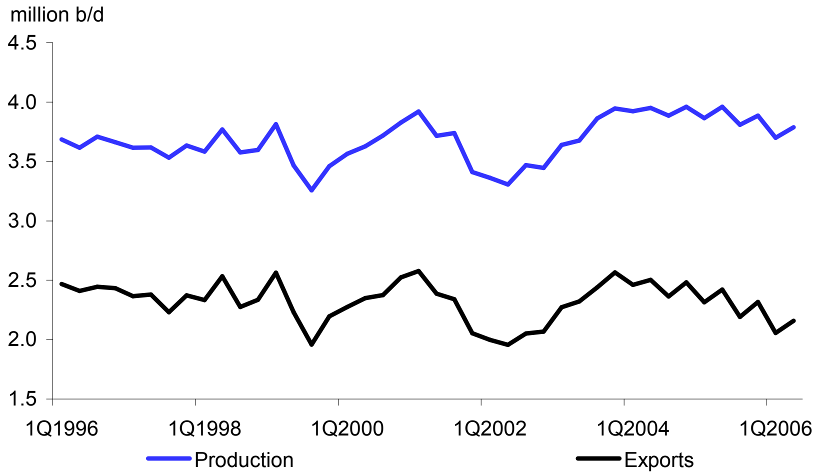
	New values		Old values	
	10% Change in Price		10% Change in Price	
	WTI Oil	HH Gas	Oil	Gas
Petroleum				
Total	**-0.37**	0.08	**-0.3**	0.1
Gasoline	**-0.56**	0.00	**-0.3**	0.0
Distillate	**-0.29**	0.47	**-0.2**	0.0
Other	**-0.19**	-0.05	**na**	na
Natural Gas				
Total	0.36	**-1.37**	0.3	**-0.4**
Residential	-0.11	**-0.42**	0.0	**0.0**
Commercial	-0.15	**-0.55**	0.0	**0.0**
Industrial	0.78	**-2.69**	0.2	**-0.5**
Electric Power	0.55	**-1.38**	1.6	**-1.5**

- **New baselines have been set around the EIA's Feb-06 forecasts of USD60-65/bbl for WTI and USD8.50-9-00/mmBtu for natural gas out to December 2007.**
- **New estimates are generally higher than the old values last published in July 2005.**
- **Because of better substitution potential, natural gas demand appears more price elastic than oil, and gas elasticities were "upgraded" more than oil.**
- **EIA's implied gasoline on gasoline demand elasticity would be about twice the WTI on gasoline estimate- or approximately -1.0% for a 10% rise in gasoline prices.**
- **Weather needs to be included as a key term in the elasticity model. Demand will not decrease due to high prices if the weather is cold.**
- **There are differences between short-term and medium-term elasticities. The medium-term elasticity is higher due to the lagged effects of price changes on demand.**

Source: IEA; Nymex; DB Global Markets Research

Iran: Deal Offered; Exports Falling

Iran Production and Exports



Timetable

- **Mid-October for mild sanctions?**
- **US Elections: Strong US action unlikely prior to November elections**
- **Spring 2007: Date by which Iran is expected to have achieved important technical advances in enrichment**
- **The USD10/barrel premium in oil that reflects potential for a serious disruption in supplies may not go away anytime soon.**

- **A new deal on the uranium enrichment issue has been offered to Iran**
- **This time it includes direct negotiations with the US - something not seen since 1979**
- **The incentives include Iran's re-integration into global dialogue and commerce.**
- **Seasoned diplomats are skeptical that this deal will be agreed, and relatively toothless sanctions suggest a military confrontation could still occur.**
- **What Iran would get in the deal:**
  – Light-water reactor technology from America
  – Enriched fuel from Russia
  – Access to US aircraft parts and other technology
  – Support for Iranian membership in WTO
  – No US interference in outside oil investments in Iran
  – Suspension of UN actions against Iran

Source: DB Global Markets Research

Non-OPEC Production Rollercoaster

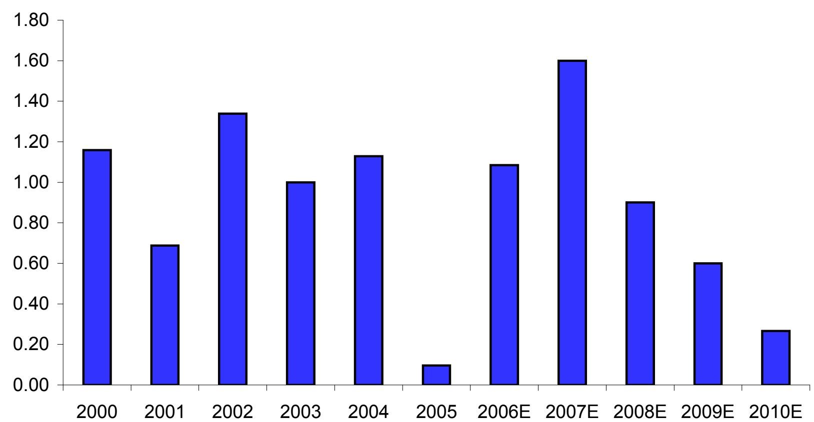
Key Non-OPEC Countries

(yearly change, mmb/d, ranked on 2007)

	2005	2006E	2007E	2008E	2009E	2010E
Angola	0.26	0.21	0.34	0.20	0.25	0.25
Kazakstan	0.05	0.03	0.31	0.20	0.20	0.20
United States	-0.33	0.15	0.30	-0.04	-0.04	-0.04
Azerbaijan	0.14	0.17	0.27	0.20	0.25	0.00
Russia	0.25	0.22	0.19	0.20	0.20	0.21
Canada	-0.03	0.11	0.18	0.15	0.12	0.08
Brazil	0.19	0.19	0.14	0.30	0.10	0.10
Sudan	0.03	0.16	0.09	-0.01	-0.02	-0.04
United Kingdom	-0.21	-0.10	0.07	-0.09	-0.12	-0.11
India	-0.03	0.04	0.04	0.10	0.00	-0.02
Chad	0.01	-0.01	0.03	0.00	0.00	0.00
Norway	-0.22	-0.09	0.02	-0.06	-0.06	-0.06
Mauritania	0.00	0.05	0.02	0.03	0.04	0.03
China	0.13	0.09	0.02	0.02	0.02	-0.01

Non-OPEC Production Growth

million barrels/day

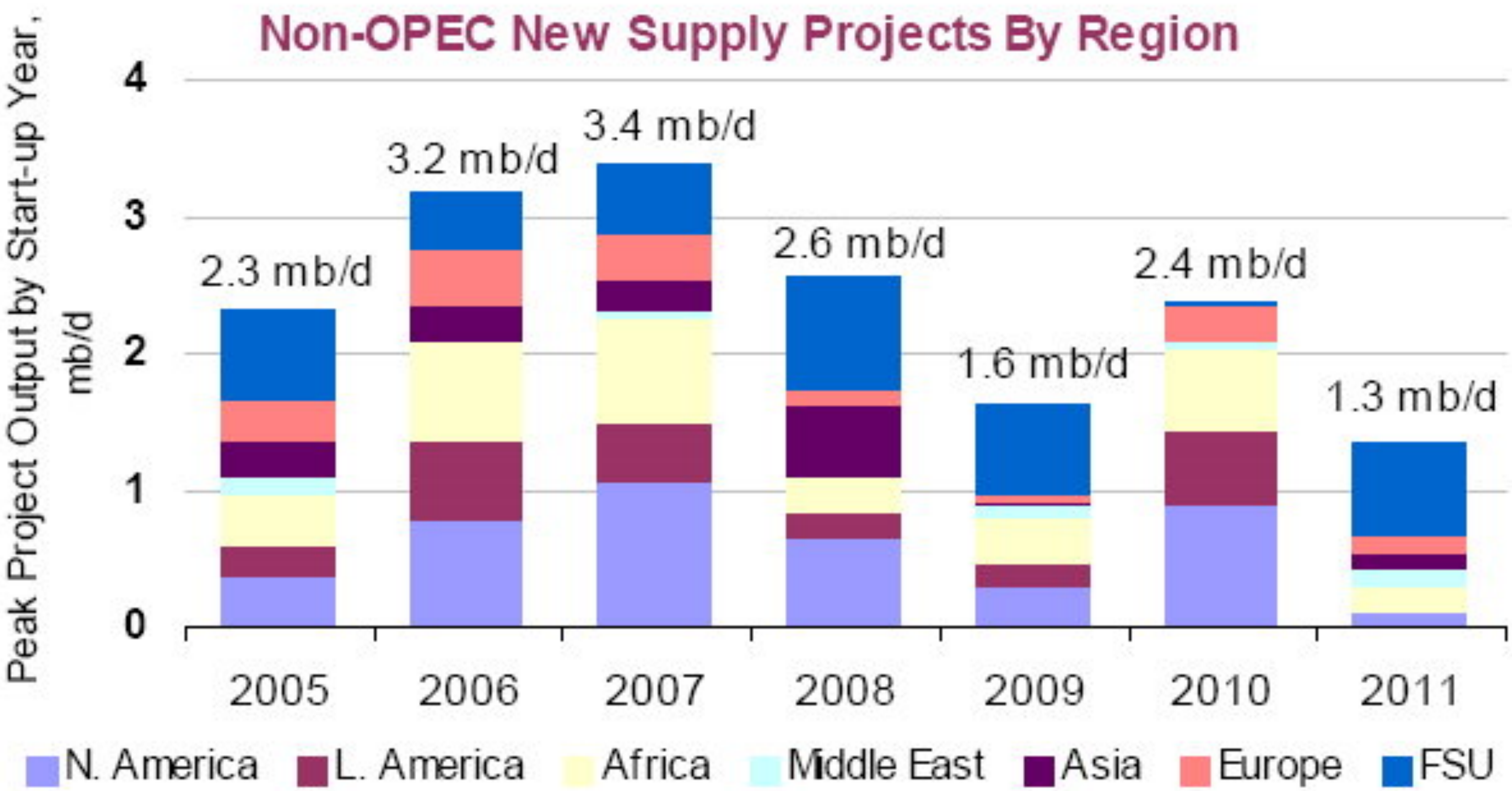


Source: IEA, DB Global Markets Research

- **Non-OPEC production growth has been on a rollercoaster and is likely to continue to be volatile in 2007-2010**
- **In 2005, non-OPEC supply grew by only 0.1mmb/d to reach 50.35mmb/d. We expect 1.1mmb/d growth in 2006 and 1.6mmb/d in 2007 (assuming the absence of big problems)**
- **By 2010, non-OPEC output growth could sink again- as depletion curves for conventional oil in the North Sea, North America, and elsewhere become harder to overcome**
- **Without an unforeseen slowdown in global demand, these forecasts do not suggest that OPEC faces significant allocation pressures**
- **2007 forecast subject to 0.3-0.4mmb/d downward adjustment on unanticipated losses, and 2009-10 probably higher unanticipated gains**

Gross Additions to Non-OPEC Supply

- Industry has to add 16.8mmb/d gross to get 6.6mmb/d net over 2004-2011
- Implies a 3.2%/yr compound decline (depletion) rate on 50.1mmb/d 2004 base



Source: IEA

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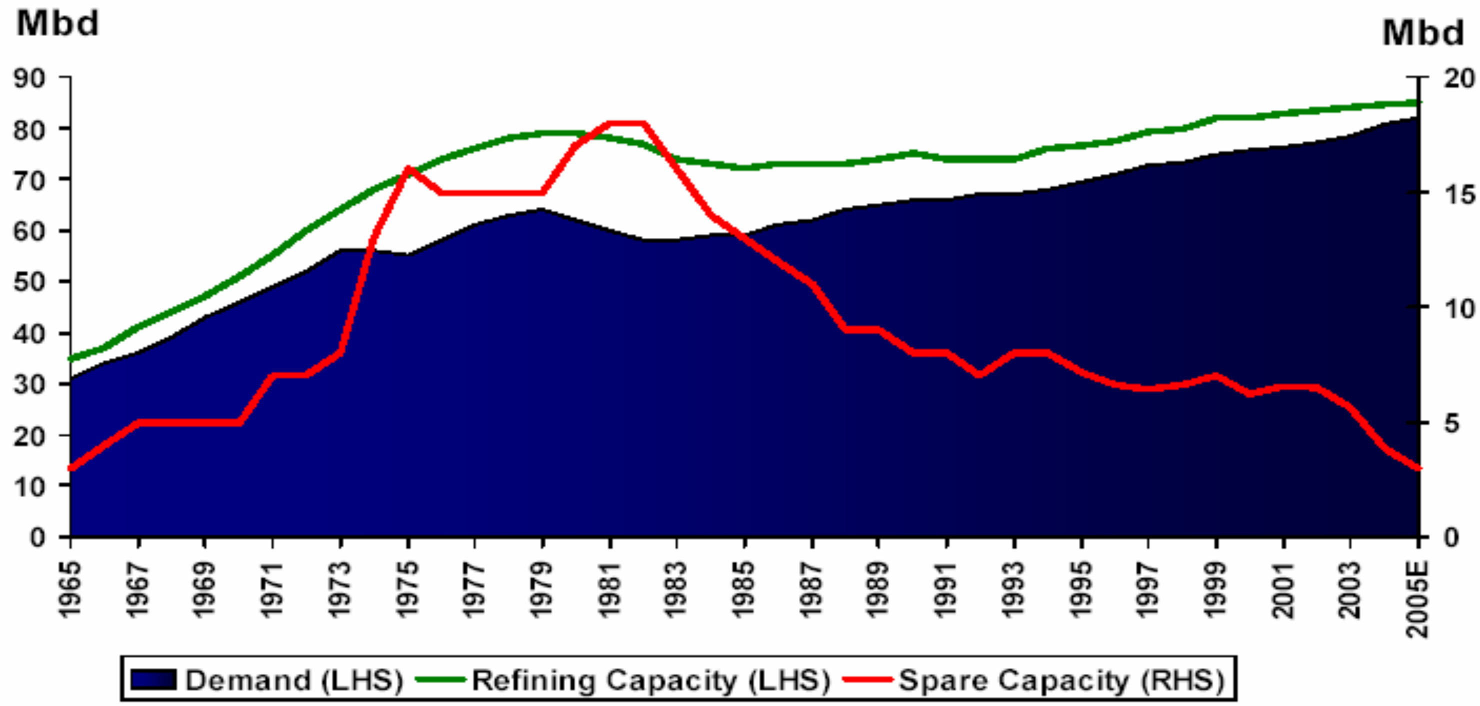
Global Refining Capacity Squeezed

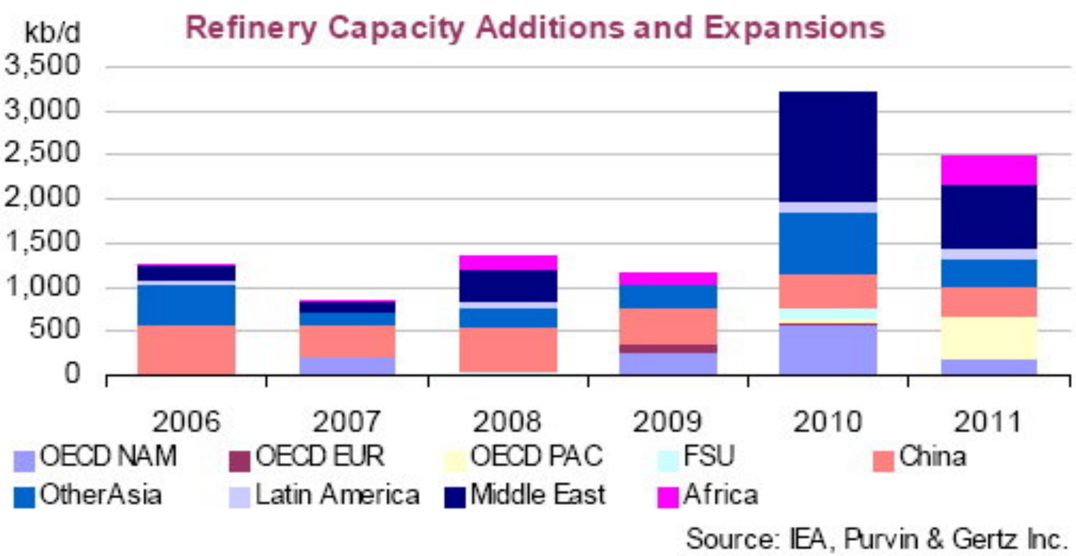
- **Spare capacity tightened significantly in the last two years**

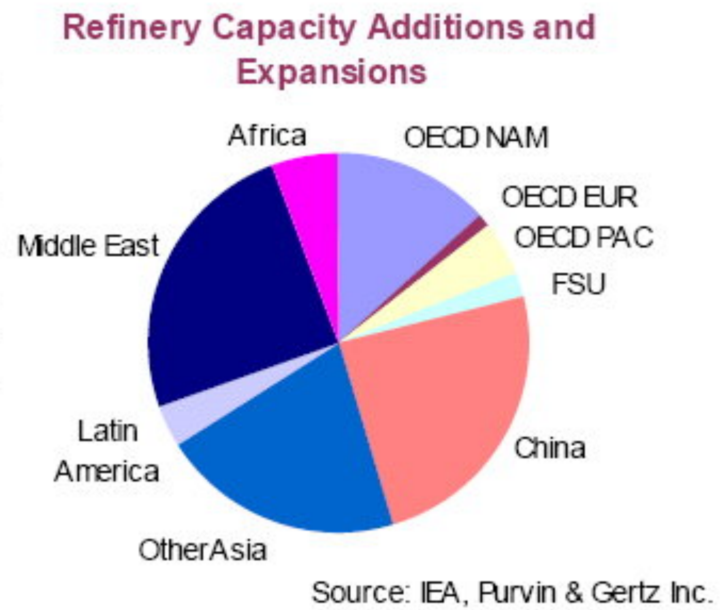


Source: Wood Mackenzie Consultants

Refinery Capacity Expansion

- Cost for a new-build refinery in Europe or the US: $15,000-20,000/daily barrel
- 200kb/d refinery costs about $3-4 billion





Source: IEA Medium-Term Oil Market Outlook, July 2006

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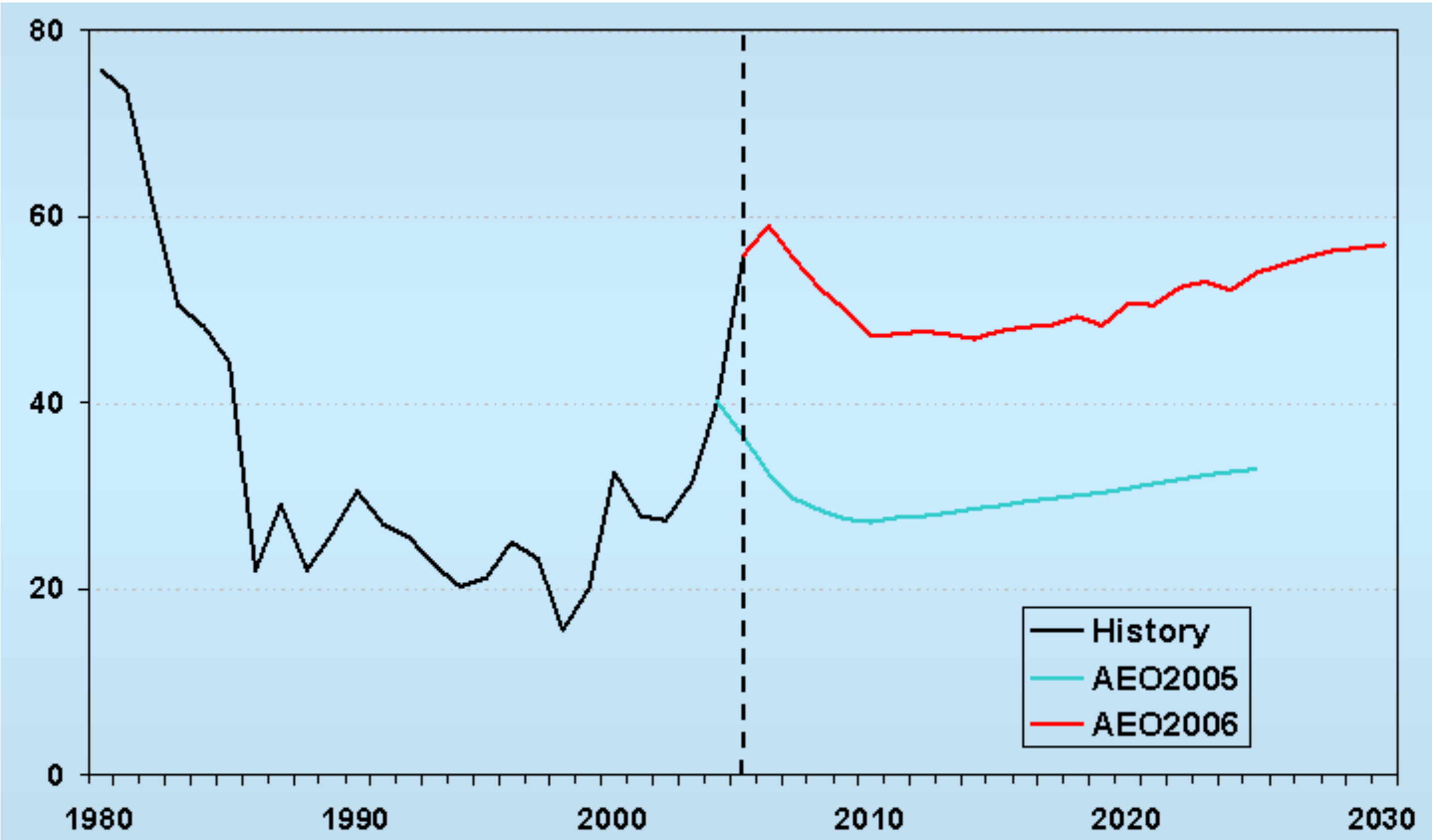
Oil Prices (2004 dollars per barrel)

- **Oil prices in the US DOE/EIA AEO 2006 are expected to fall toward $45 by 2010 but then push back up toward $57/barrel by 2030**

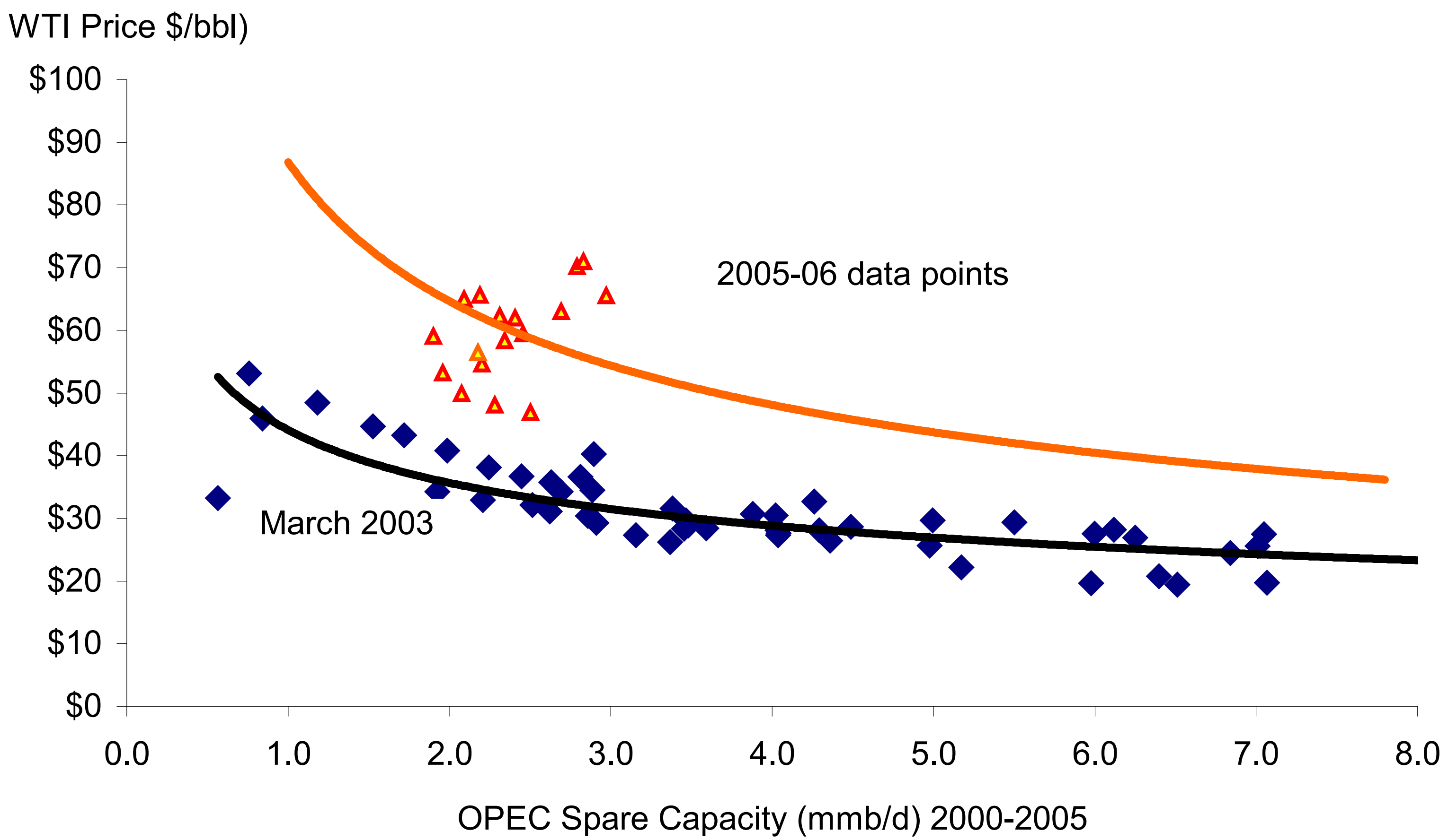


*World oil price is the weighted average price of imported low sulfur light crude oil.

Source: US DOE/EIA Annual Energy Outlook 2006,
DB Global Markets Research

OPEC Spare Capacity vs. Price

- **Prices are dependent on OPEC spare capacity**
- **The 2005-06 data is off the old regression line… and on a new one?**



Source: IEA; Nymex, DB Global Markets Research

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OPEC Crude Production Capacity 2005-2011

- **33mmb/d now and 36mmb/d by 2011**
- **If "call on OPEC crude" stays near 30mmb/d, spare capacity grows by 3mmb/d**

Estimated Average Sustainable OPEC Crude Production Capacity
(thousand barrels per day)

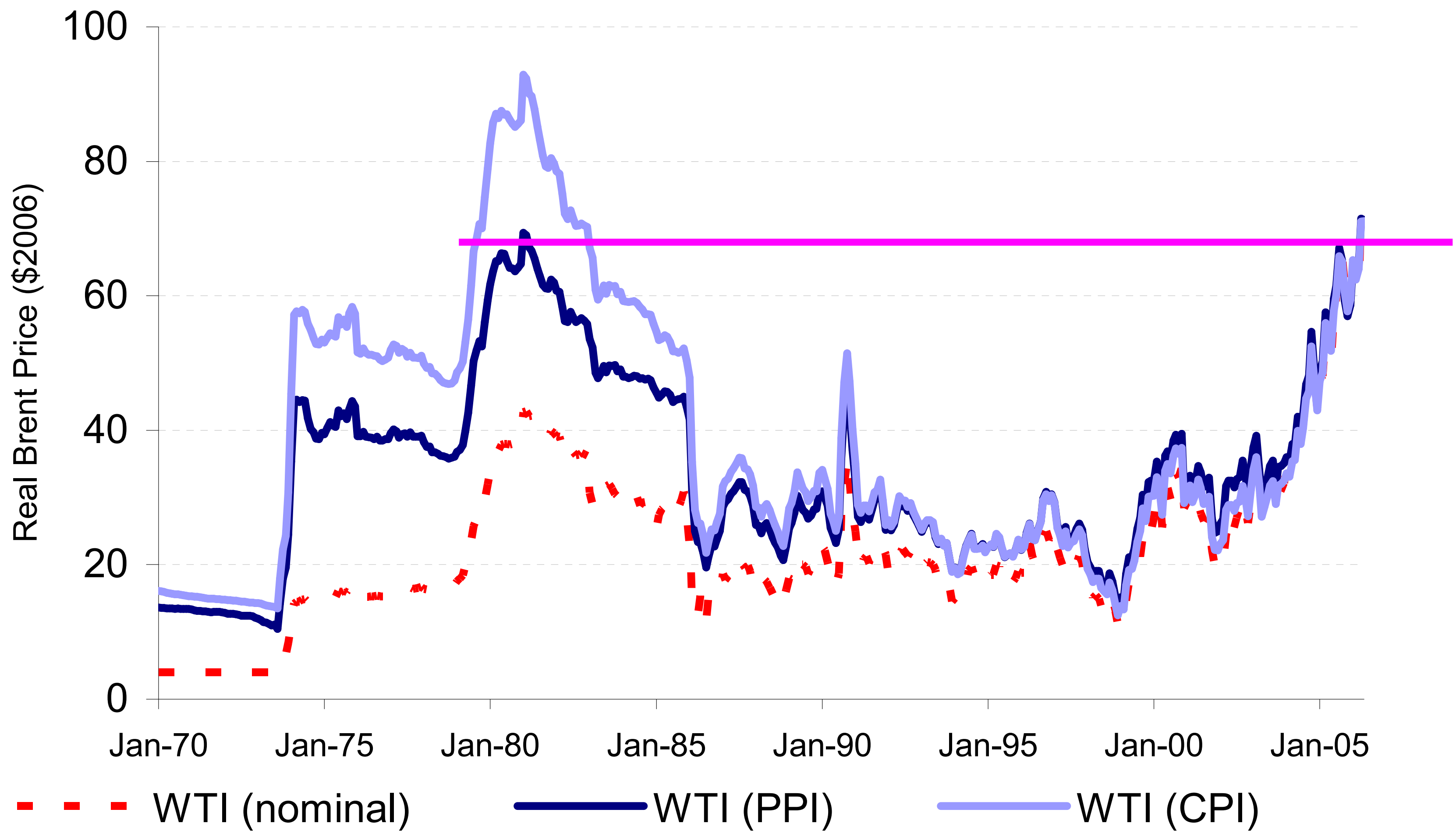
	2005	2006	2007	2008	2009	2010	2011	Increment[1] 06-11	National Government Forecast	National Government Applicable
Algeria	1345	1380	1380	1425	1510	1590	1595	215	2000	2010
Indonesia	990	990	975	985	1045	1090	1045	60	1150	2009
Iran	4035	4020	4235	4265	4155	4000	3930	-90	5200	2011
Kuwait	2525	2600	2645	2825	2840	2965	2945	345	4000	2020
Libya	1650	1730	1805	1820	1820	1820	1800	70	3000	2010
Nigeria	2545	2805	2935	2995	3050	3025	3120	315	4000	2010
Qatar	835	875	955	1055	1095	1165	1170	295	1175	2009
Saudi Arabia	10440	10725	10800	11170	11465	12260	12330	1605	12500	2010
UAE	2565	2675	2875	2885	2845	2900	3255	580	3500	2011
Venezuela	2705	2675	2620	2620	2620	2620	2620	-55	5400	2012
Sub-total OPEC 10	**29630**	**30470**	**31225**	**32045**	**32450**	**33430**	**33810**	**3335**	**41925**	
Iraq	2500	2500	2500	2500	2500	2500	2500	0	4000	2010
Total OPEC	**32130**	**32970**	**33725**	**34545**	**34950**	**35930**	**36310**	**3335**	**45925**	
Yearly Increment		840	755	820	405	980	375			

1 Increments may differ to those implied by displayed yearly data due to independent rounding.

Source: IEA MT OMR, July 2006

Oil Prices Are Very High in Real Terms

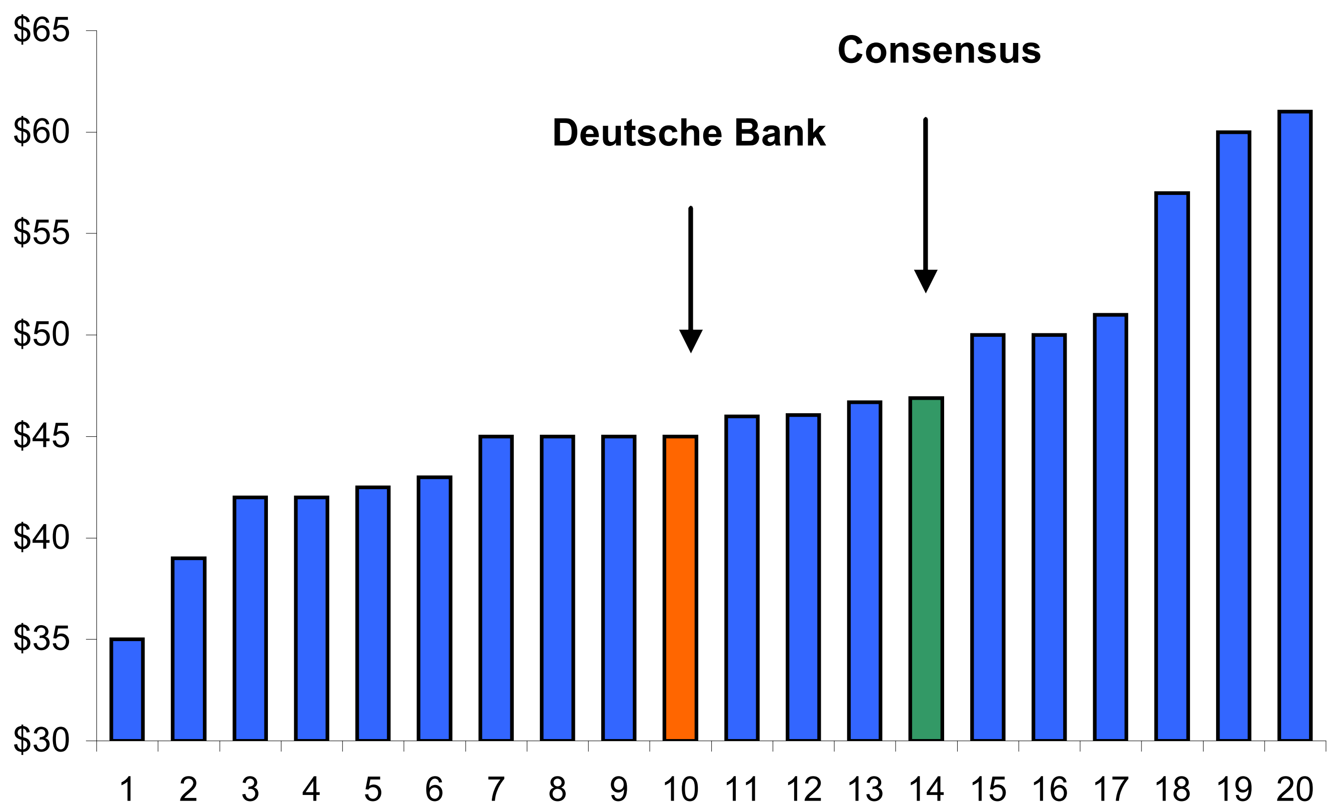
- **Oil prices are now above historic highs (if the PPI is used as the deflator rather than the CPI). The PPI is likely the more appropriate deflator for crude oil.**



Source: Nymex, Bloomberg, BLS, DB Global Markets Research

Oil Price Forecasts for 2010

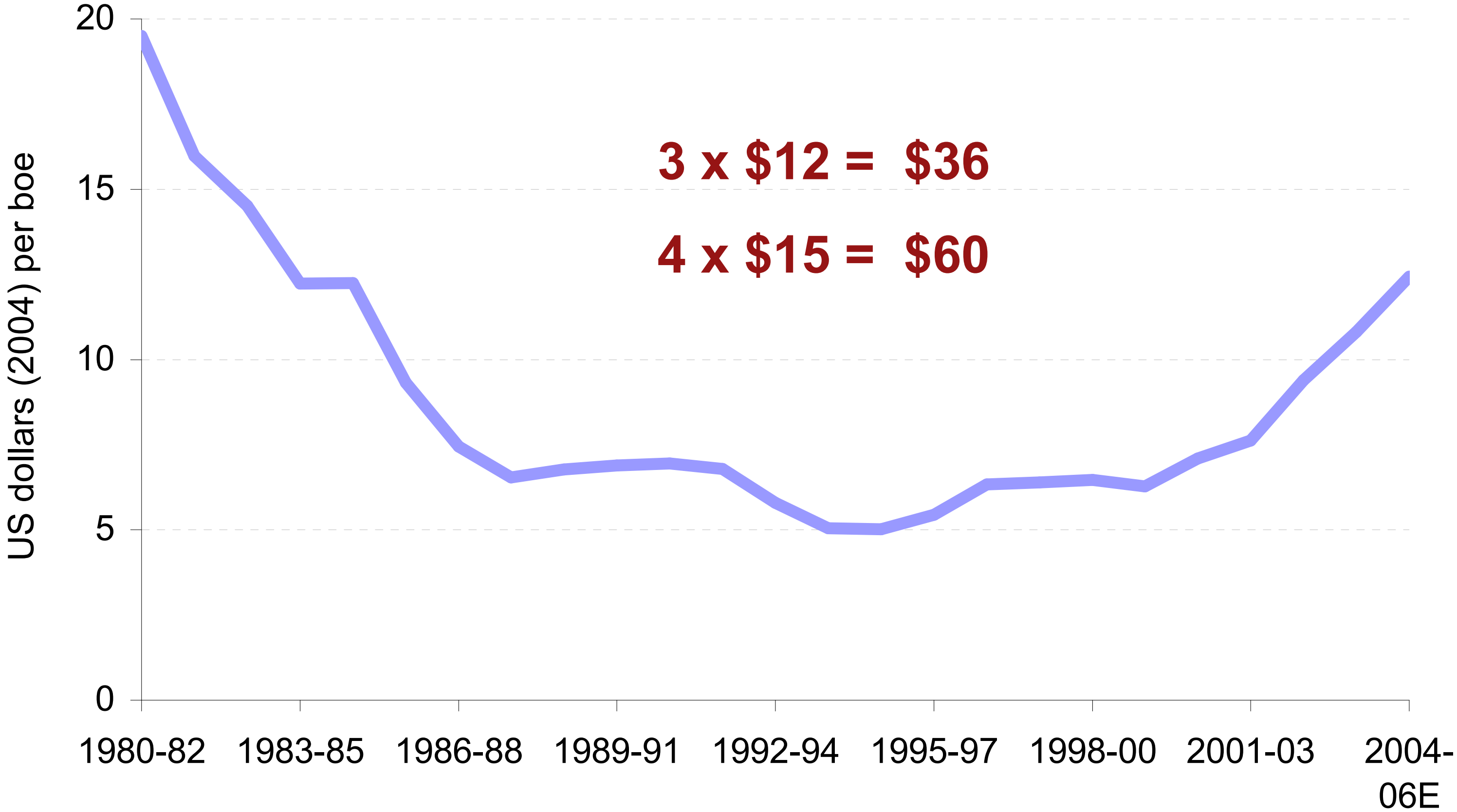
- **Consensus WTI oil price forecast for 2010 at $46-47/barrel**
- **Deutsche Bank at $45**



Source: Reuters, Deutsche Bank

What Do Finding Costs Say?

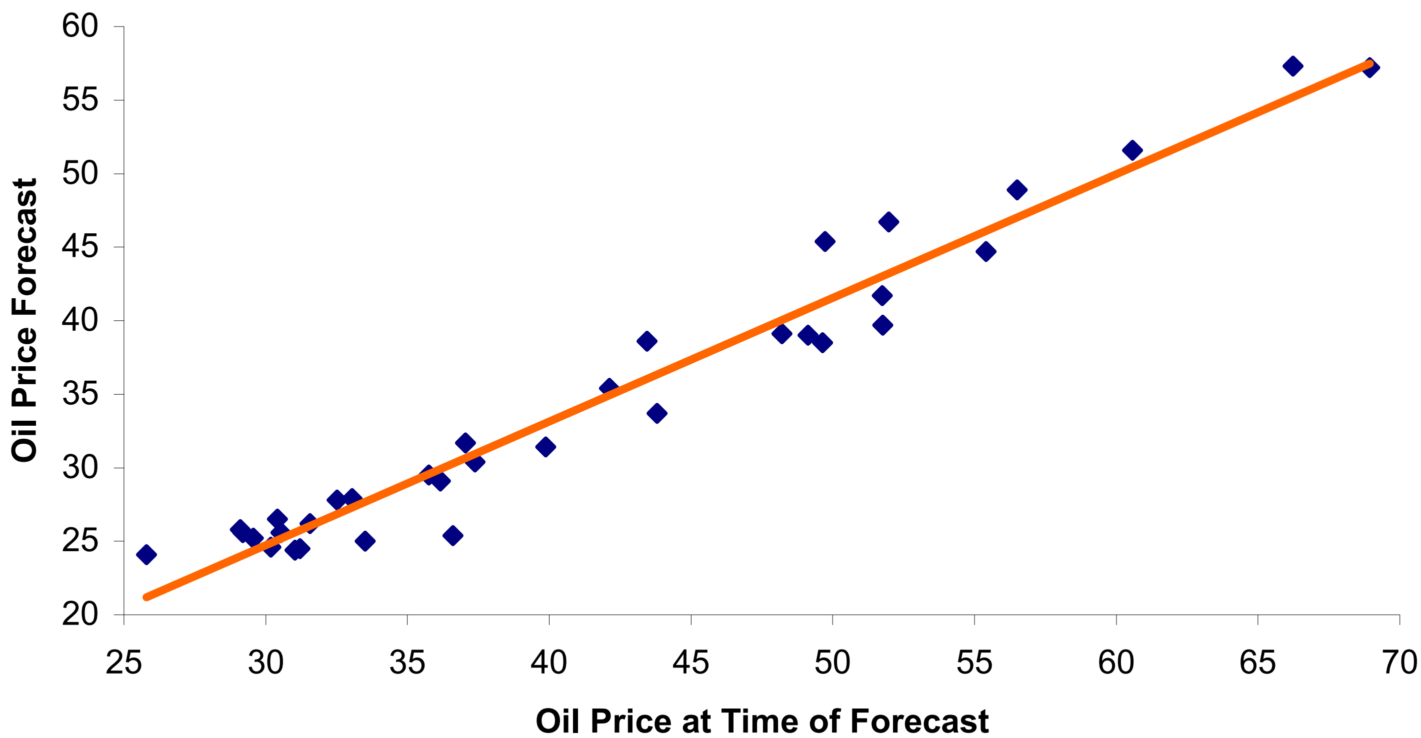
- **Oil investment rule: Finding cost X 3 = Price Needed**
- **With rising government take it might be: Finding cost X 4**



Source: US DOE/EIA, DB Global Markets Research

Nasty Secret of Oil Price Forecasts

- **Analysts are highly biased by the price at the time of their forecast**



Source: Nymex, Consensus Economics, DB Global Markets Research

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