Spare Capacity, Oil Prices and the Macroeconomy

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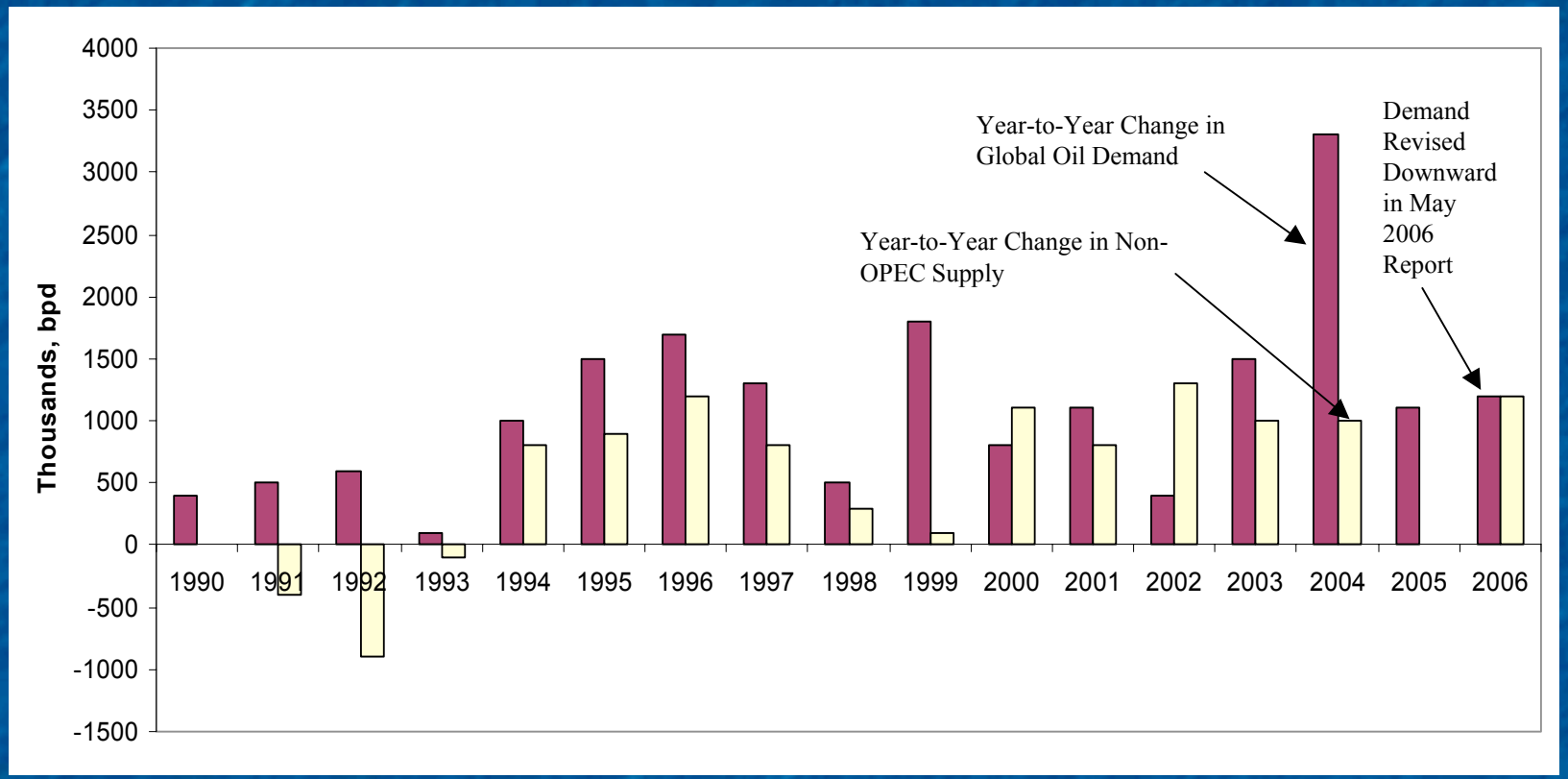
1. The End of Spare Capacity

- The end of spare capacity in oil production, refining and the entire oil supply chain

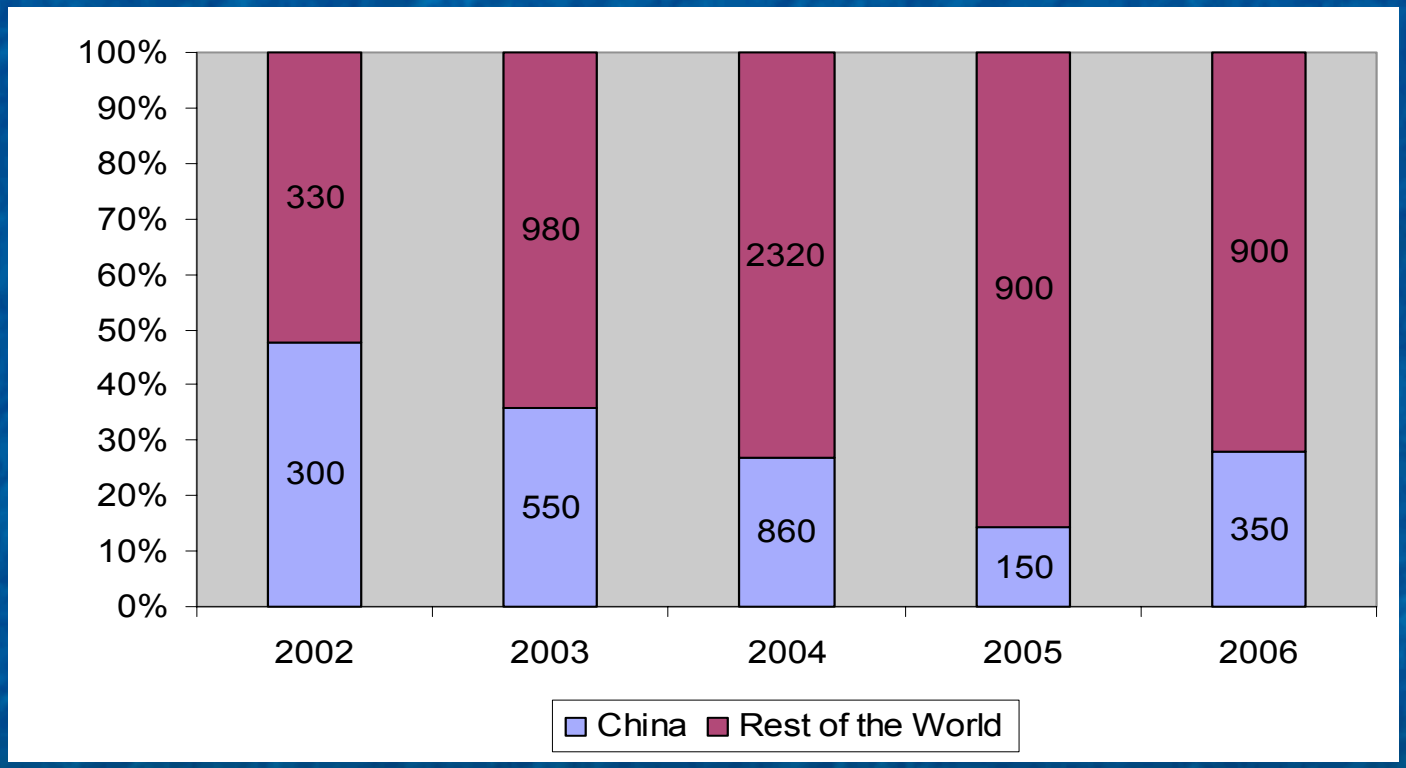
Gradual Erosion Of Spare Capacity



Source: IEA, Oil Market Report

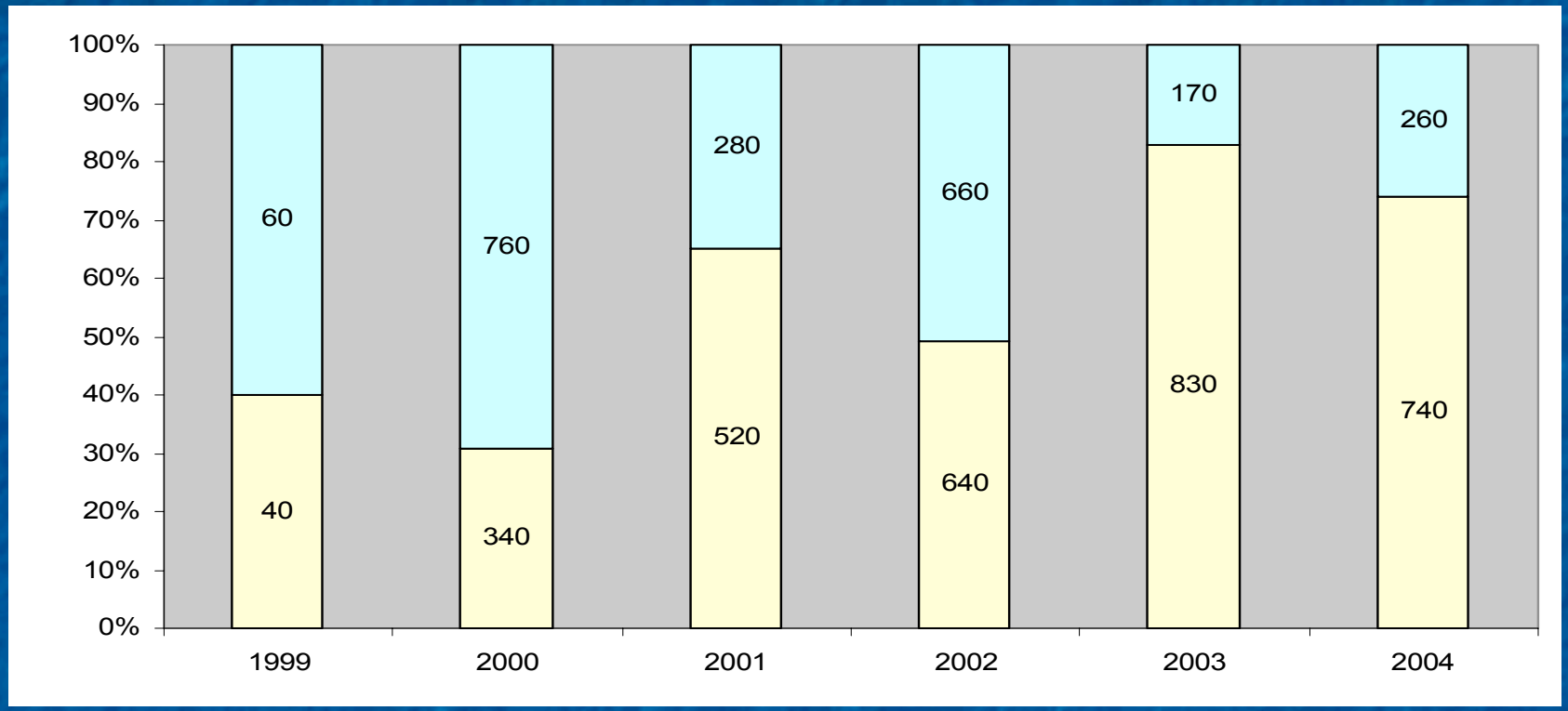
- Year-to-Year change in global oil demand outpaced year-to-year change in non-OPEC oil supply in almost every year (exceptions: 2000 and 2002)
- Over the period 1990-2005, the demand for oil increased by around 17.6 million bpd, while the increase in non-OPEC supply amounted only to around 7.9 million bpd

The China Factor



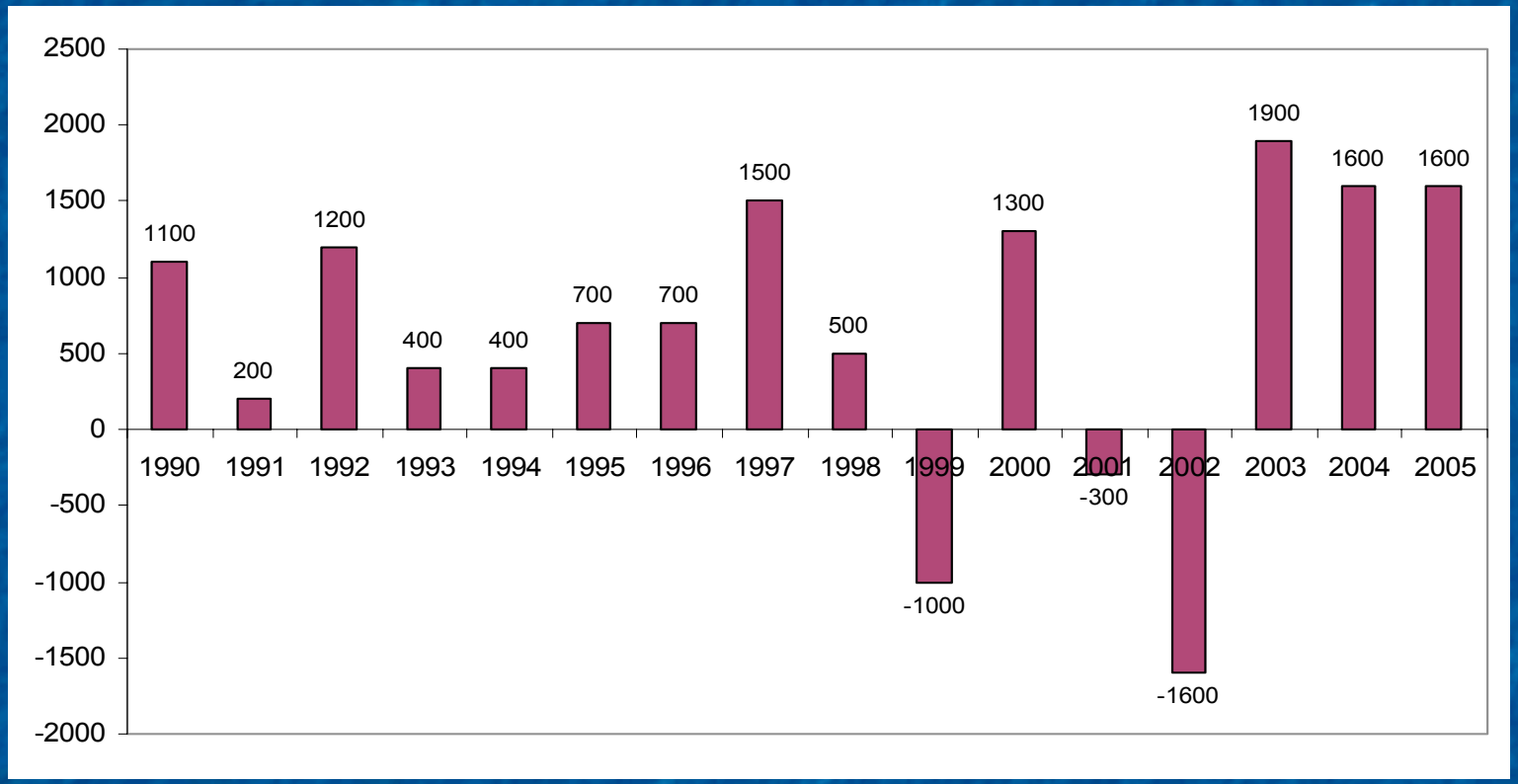
During 2002-2006 China accounted for almost 40% of the increase in global oil demand

Russia Growth Key to Non- OPEC Oil Supply Growth



- During 2000-2004, Russia accounted for almost 60% of the annual change in non-OPEC supply
- But Russian oil supply growth has slowed down
  - 250,000 bpd in 2005 and 240,000 bpd in 2006 (IEA estimate)

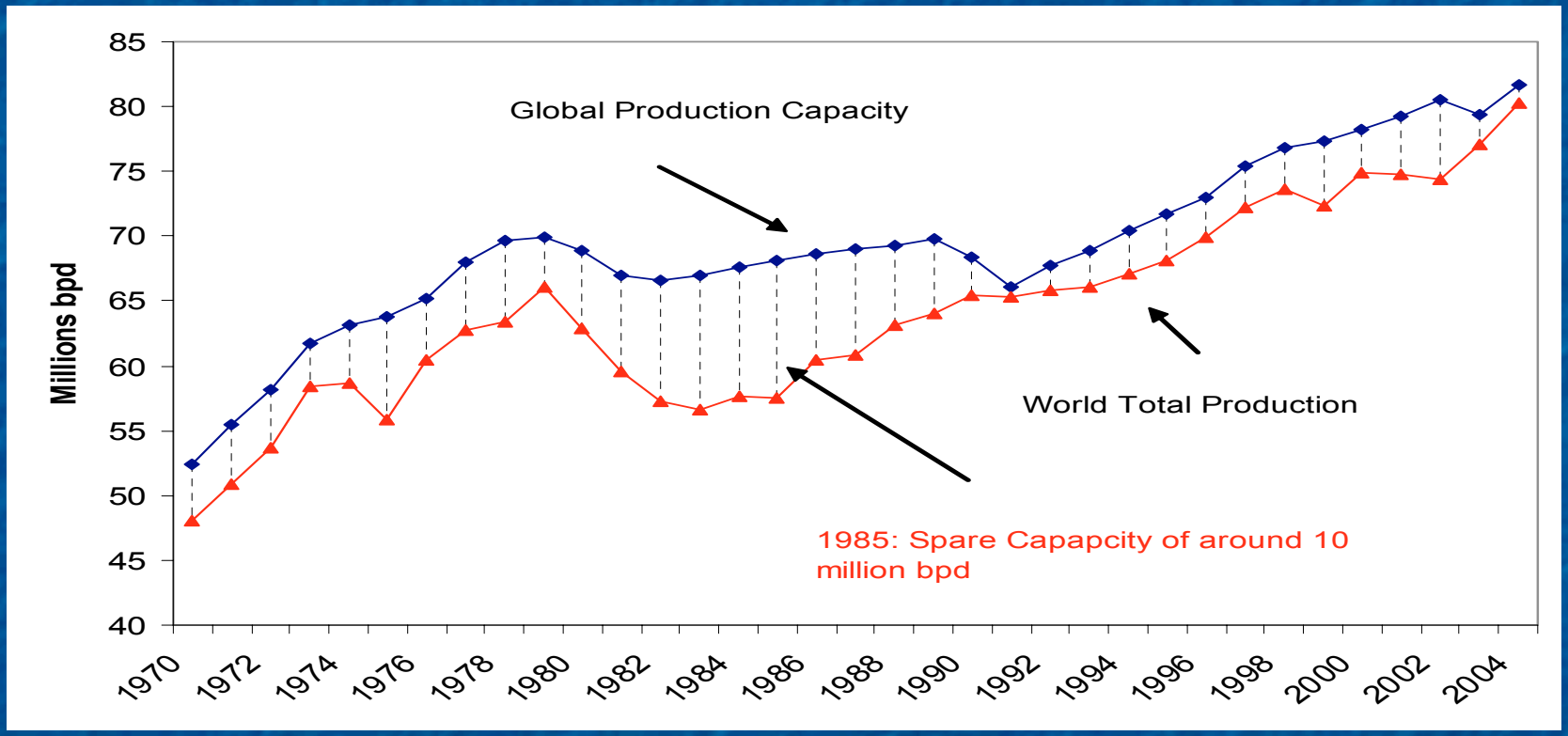
Increase in Demand Met By OPEC



Source: IEA; Figures include crude oil condensates, and NGLs

- Over the period 1990-2005, OPEC supplied an additional 10 million bpd with OPEC production increasing from 24.8 in 1990 to 33.9 million bpd in 2005
- This increase in production was possible because of OPEC spare capacity

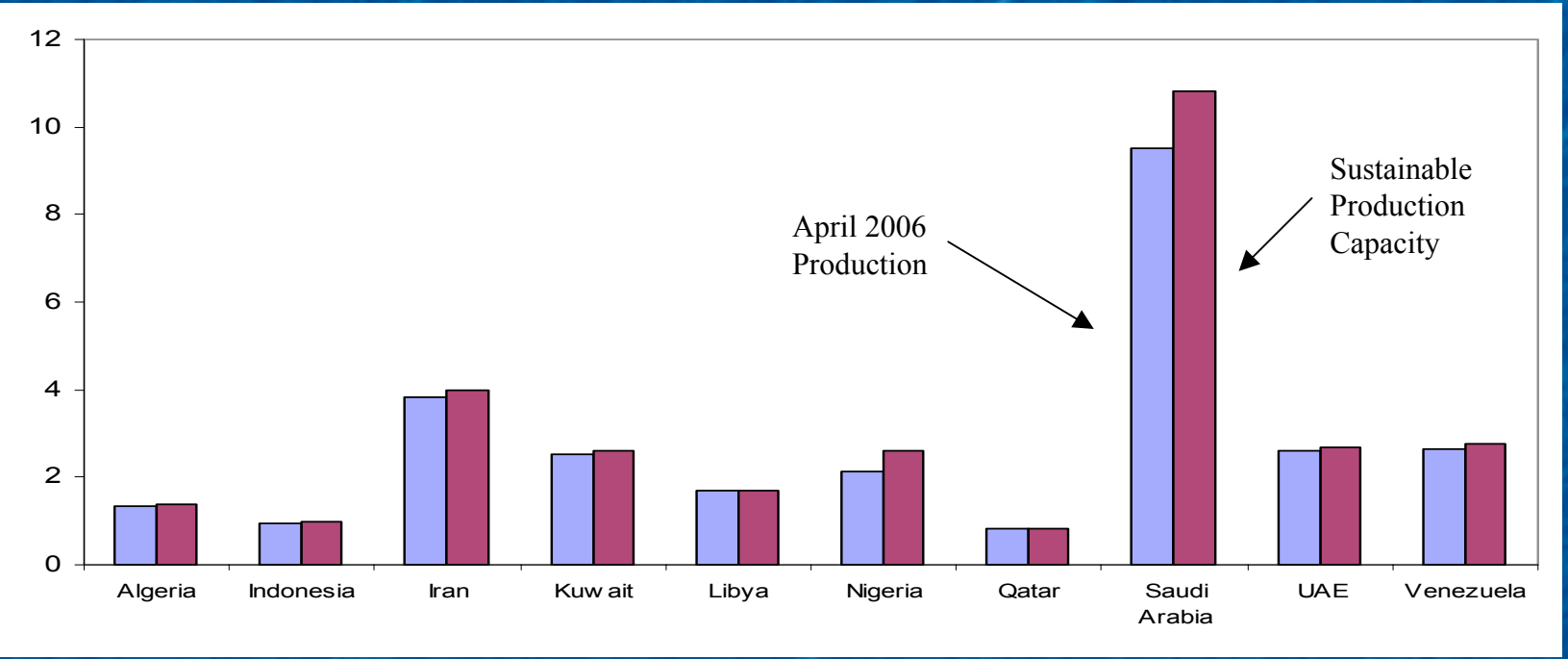
Erosion in OPEC Spare Capacity



Source: IMF; BP

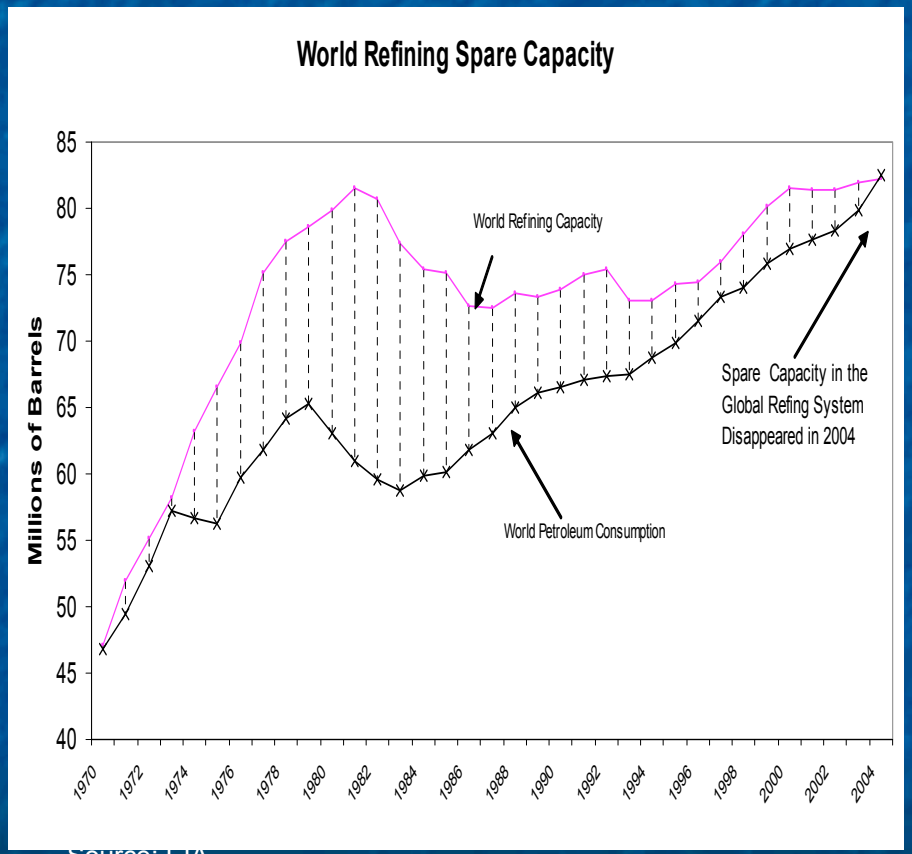
- Spare capacity around 2% of global oil demand in 2004 despite increase in OPEC production capacity

Saudi Arabia Holds the Bulk of Current spare capacity

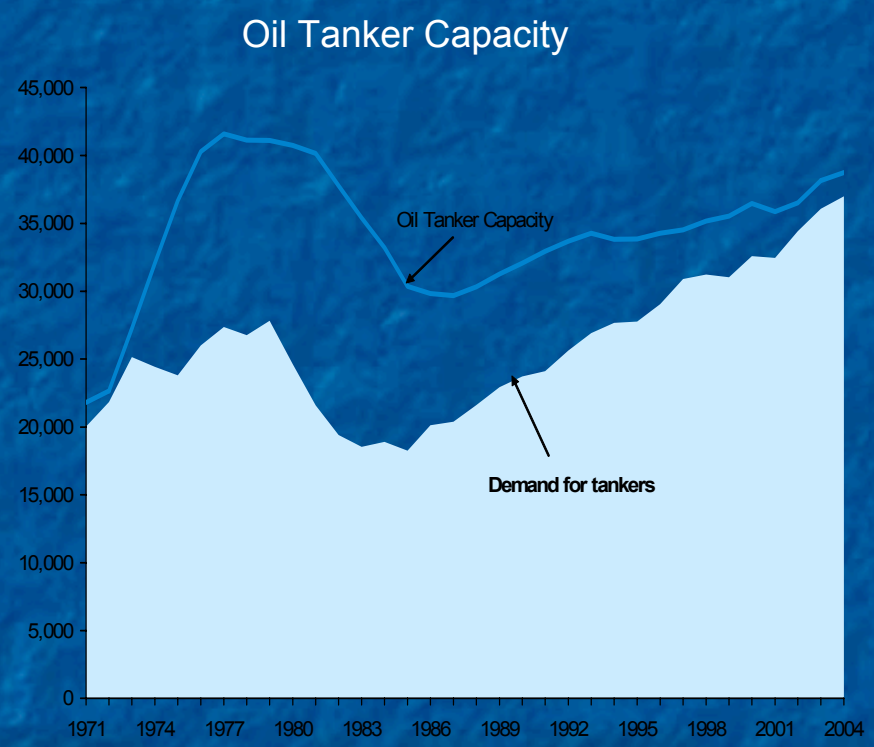


- Spare capacity in 2006 estimated at 2.3 mbd
- Saudi Arabia holds 55% of OPEC spare capacity
- Production capacity of SA reached 11.3 mm bpd after it began producing from the new Haradh field, which is pumping 300,000 bpd

Cushion of Spare Capacity Declined in All Parts of the Oil Supply Chain



Source: EIA



Source: Jeff Currie, *"The sustainability of higher commodity prices: The revenge of the old economy."*

2. The Impact of Loss of Spare Capacity Cushion on Prices

Accelerating Global Demand

Low Non-OPEC Supply Growth

Cycle of Underinvestment

OPEC Spare Capacity Reduced

Bottlenecks in Downstream

Global oil system's ability to respond to shocks weakened

Accelerated rise in oil prices

Volatility in oil prices

Occasional spikes in oil prices

Impact of shocks magnified in absence of spare capacity

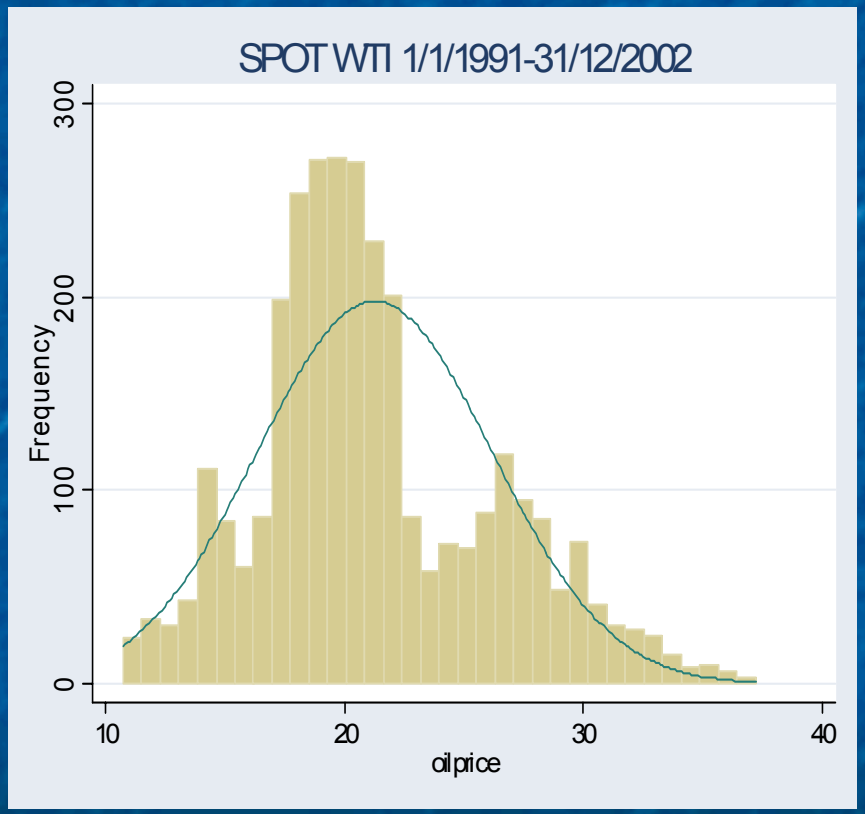
Geopolitical shocks

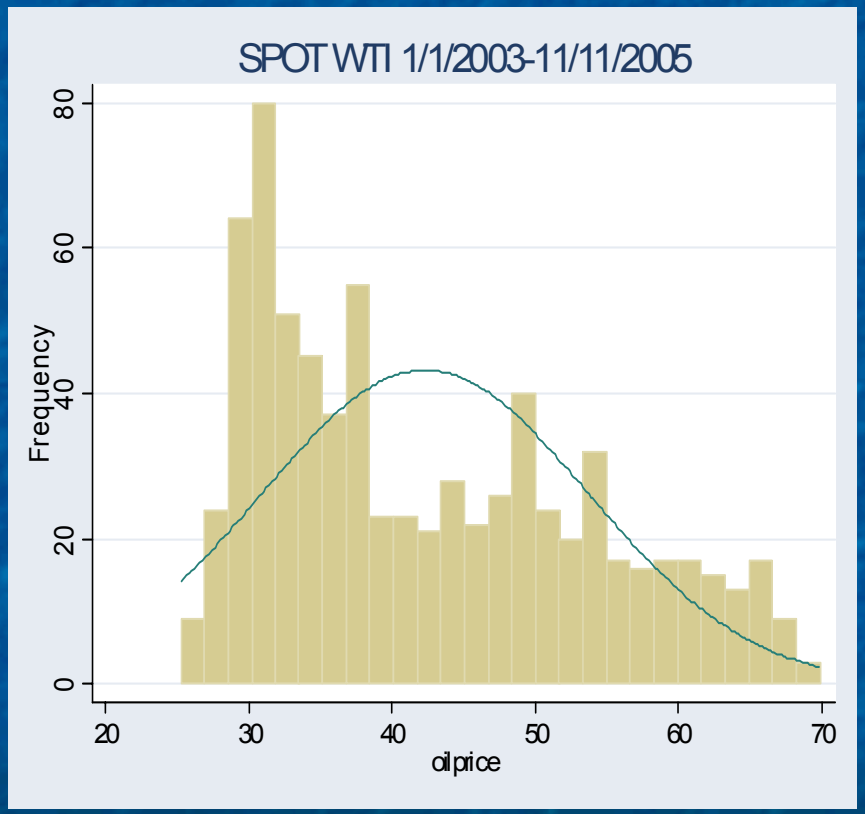
Weather shocks

Refinery fires

Speculators

Shift Upward in the Distribution of Oil Prices





Shift Upward in the Distribution of Oil Prices

Percentiles		Smallest		
1%	11.75	10.73		
5%	14.1	10.78		
10%	15.33	10.83		
25%	18.06	10.88		
50%	20.3		**Mean**	**21.25**
		Largest	**Std. Dev.**	**4.92**
75%	24.38	36.18		
90%	28.38	36.53	Variance	24.25
95%	30.35	36.88	Skewness	0.57
99%	33.93	37.20	Kurtosis	2.99

Percentiles		Smallest		
1%	26.28	25.23		
5%	28.63	25.48		
10%	29.73	25.68		
25%	31.98	25.73		
50%	39.19		**Mean**	**42.29**
		Largest	**Std. Dev.**	**11.40**
75%	50.91	67.58		
90%	59.86	68.95	Variance	130.00
95%	63.91	69.48	Skewness	0.56
99%	67.21	69.82	Kurtosis	2.16

Can the Spare Capacity Cushion Be Re-established?

Spare capacity not outcome of 'rational' investment decision

Spare capacity outcome of an historical developments in 1970s & 1980s

Few players today able or willing to invest in new spare capacity

International Oil Companies will not hold spare capacity

Who should bare the costs of spare capacity?

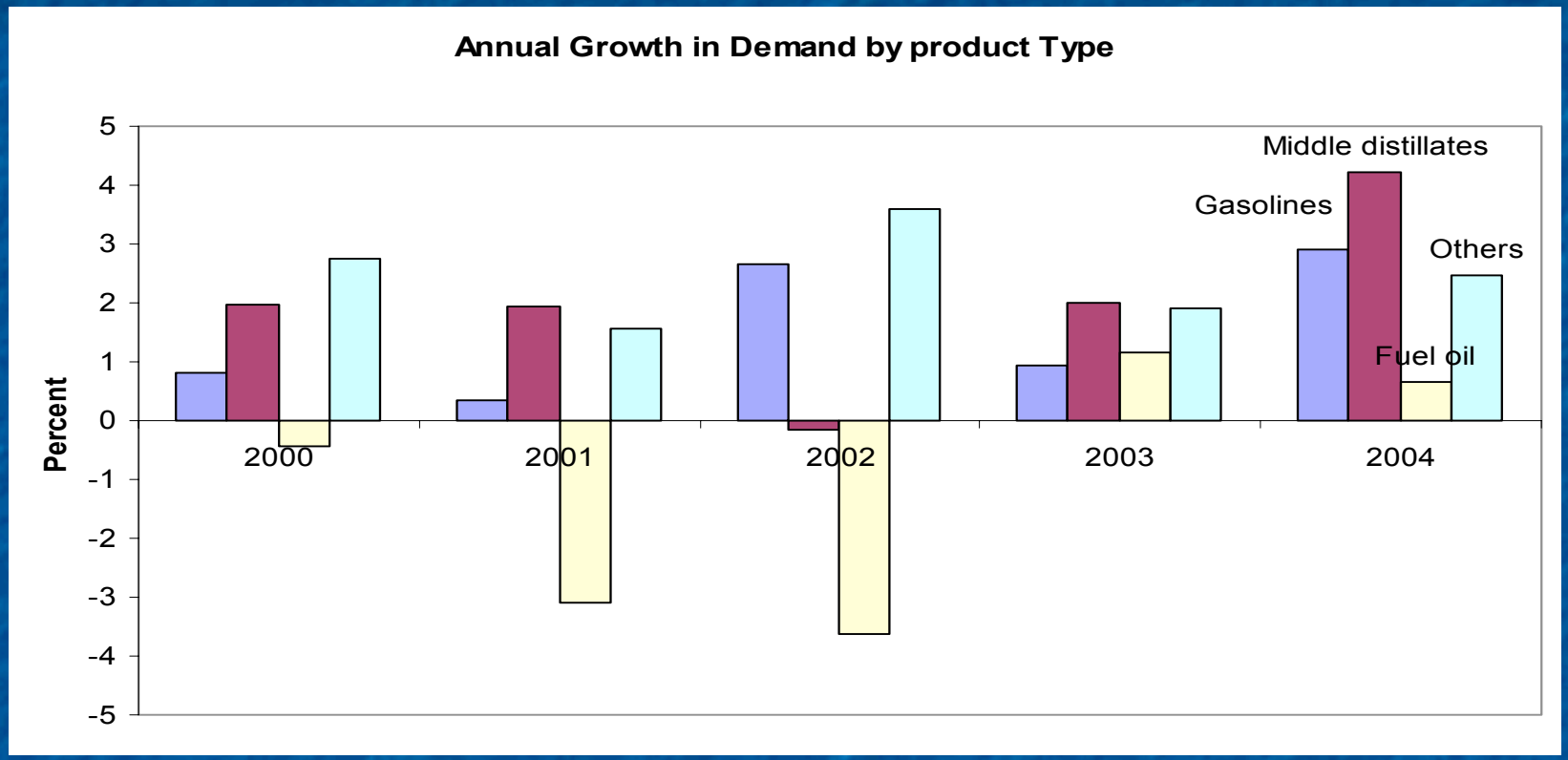
Face several years of capacity constraints even if new investments are made today
No short-term relief for oil market

Any increase in spare capacity in the coming two years arise mainly due to sharp slowdown in demand rather than increase in production capacity

3. Refining Bottlenecks

- Capacity shortage
- Structure of refining plants: limited deep conversion and de-sulfurization facilities
  - Incremental crude oil production is of heavy/sour varieties
  - Strong increase in demand for light end petroleum products such as gasoline

Strong Growth in Consumption for Light Products



Source: BP Statistical Review

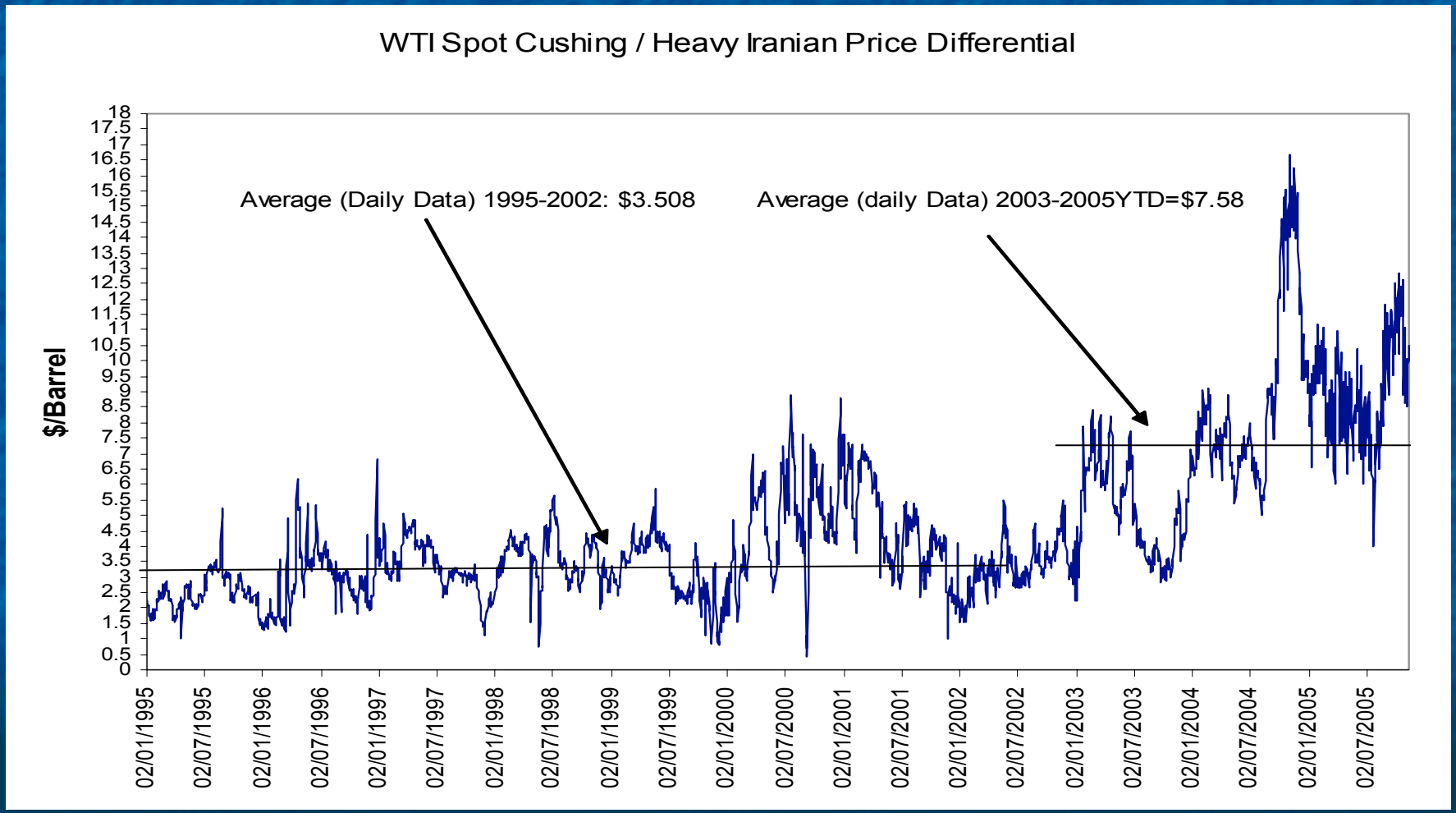
'Gasolines' consists of aviation and motor gasolines and light distillate feedstock (LDF)

'Middle distillates' consists of jet and heating kerosines, and gas and diesel oils (including marine bunkers)

'Fuel oil' includes marine bunkers and crude oil used directly as fuel

'Others' consists of refinery gas, LPGs, solvents, petroleum coke, lubricants, bitumen, wax and refinery fuel and loss

Price Differentials Between Light and Heavy Widened



4. Oil Prices: Short-Term Outlook

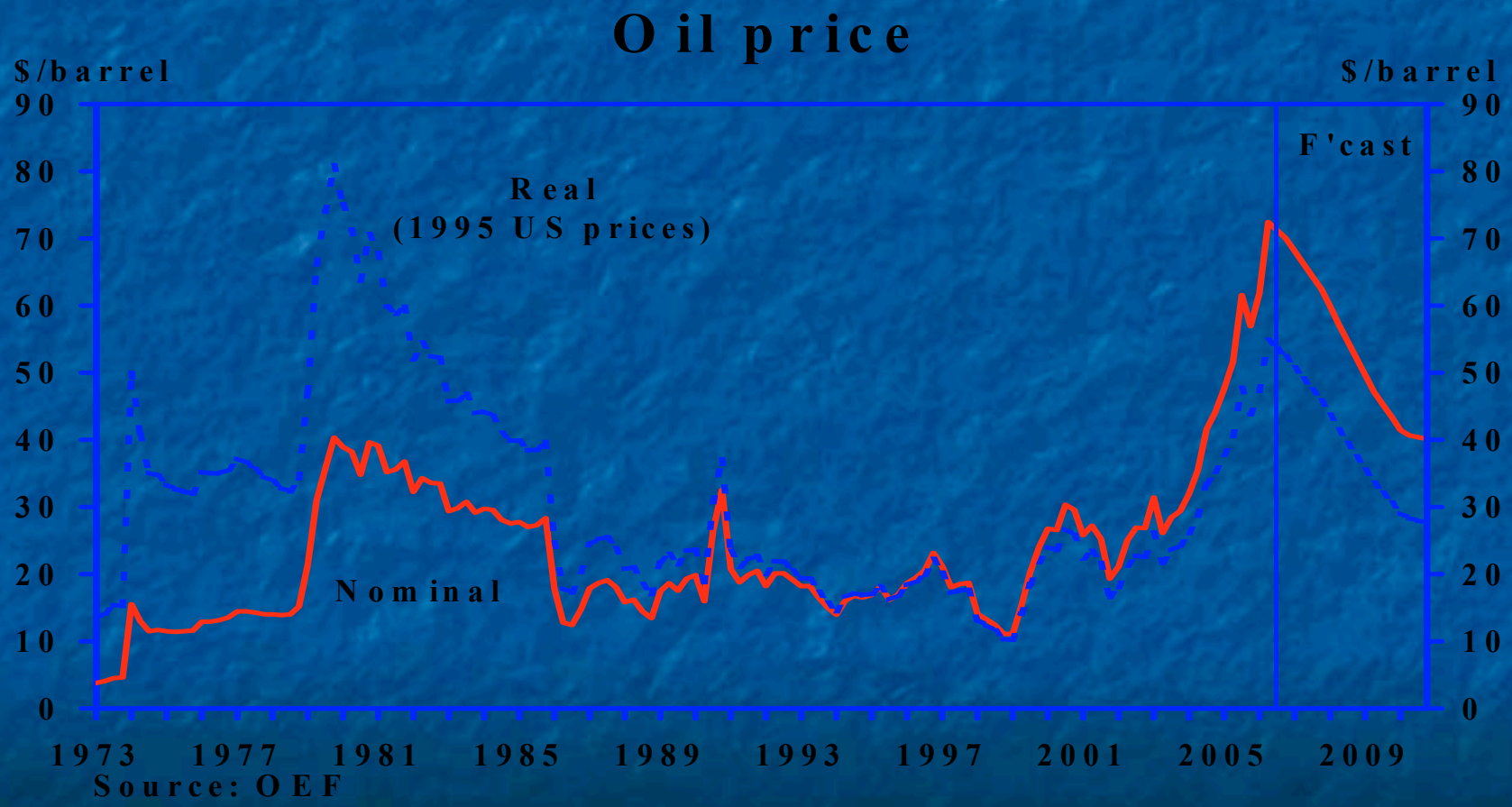
The Bullish View

- More supply shocks
- Spare capacity cushion would remain thin
- Refining bottlenecks
- Robust growth demand for oil; Rise in oil prices have not depressed oil demand so far
- Will Russia deliver? Non OPEC supply?

The Bearish View

- Resolution of any geopolitical factors knock down risk premium
- Mean Reversion: Question is when? To which average?
- China achieving a soft landing is not certain
- Non-OPEC supply will respond to higher oil prices
- Global demand for oil would ultimately decline in response to high oil prices

Oil Price Forecast



Cycles or New Paradigm?

- New cycle will emerge and prices eventually drop?
- Entered a new paradigm that breaks with the past?
- Both have elements of truth
  - Oil market is cyclical
  - Prices go up, production increases, demand slows and prices come down
  - Market will remain cyclical
- Prices different compared to 1986-2002, when the price per barrel fluctuated between $15 and $25
- Prices fluctuating in a higher range

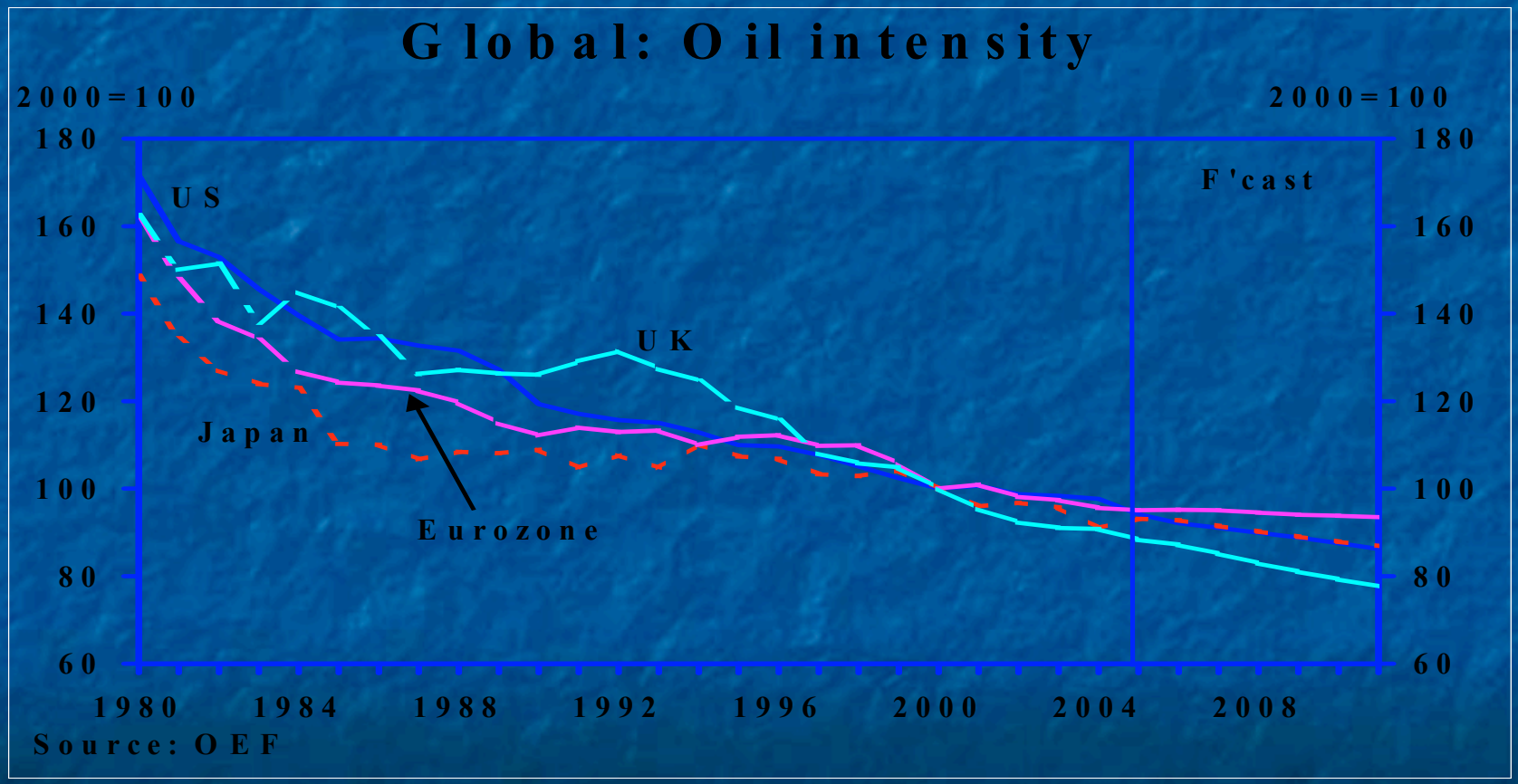
6. Oil and the Macroeconomy

- Oil price hikes often preceded global recessions
- IMF: a 10% rise in crude prices reduces global growth by 0.1 to 0.5 percentage points
- Asian Development Bank: Escalating oil prices could cut economic growth across Asia by at least 0.6%
- G8:"Overall global growth remains solid and this is expected to continue in 2006. Risks remain, including high and volatile energy prices"
- Samuel Bodman, the U.S. energy secretary
  - "Am I concerned about the impact of high oil prices on the economy? Sure. Having said that, it hasn't happened yet in a meaningful way."

Will oil prices Choke growth this time?

- Past oil shocks resulted from restrictions in supply unlike the current shock which is driven by rapidly growing demand
- Part of the rise in oil price to recover past price declines
- Oil is relatively less important to OECD economies than in the past
- Monetary policy response is different
  - Impact of oil prices on core inflation has been mild relative to previous shocks
  - Central banks have not had to raise the interest to reduce inflationary pressure

Oil Intensity



Oil Price and Inflation