Crude Oil Supply and Pricing Issues

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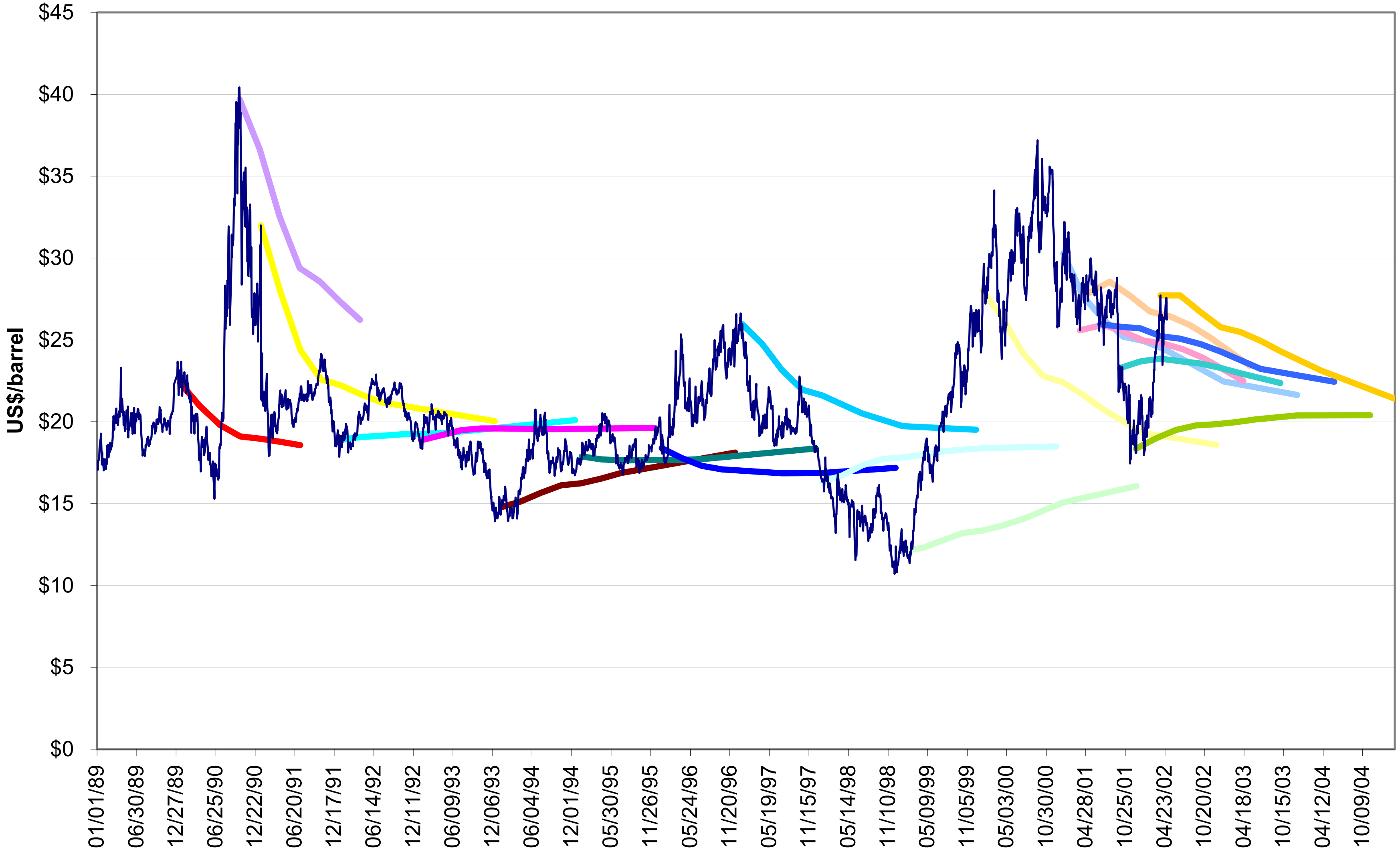
Crude oil is a commodity market

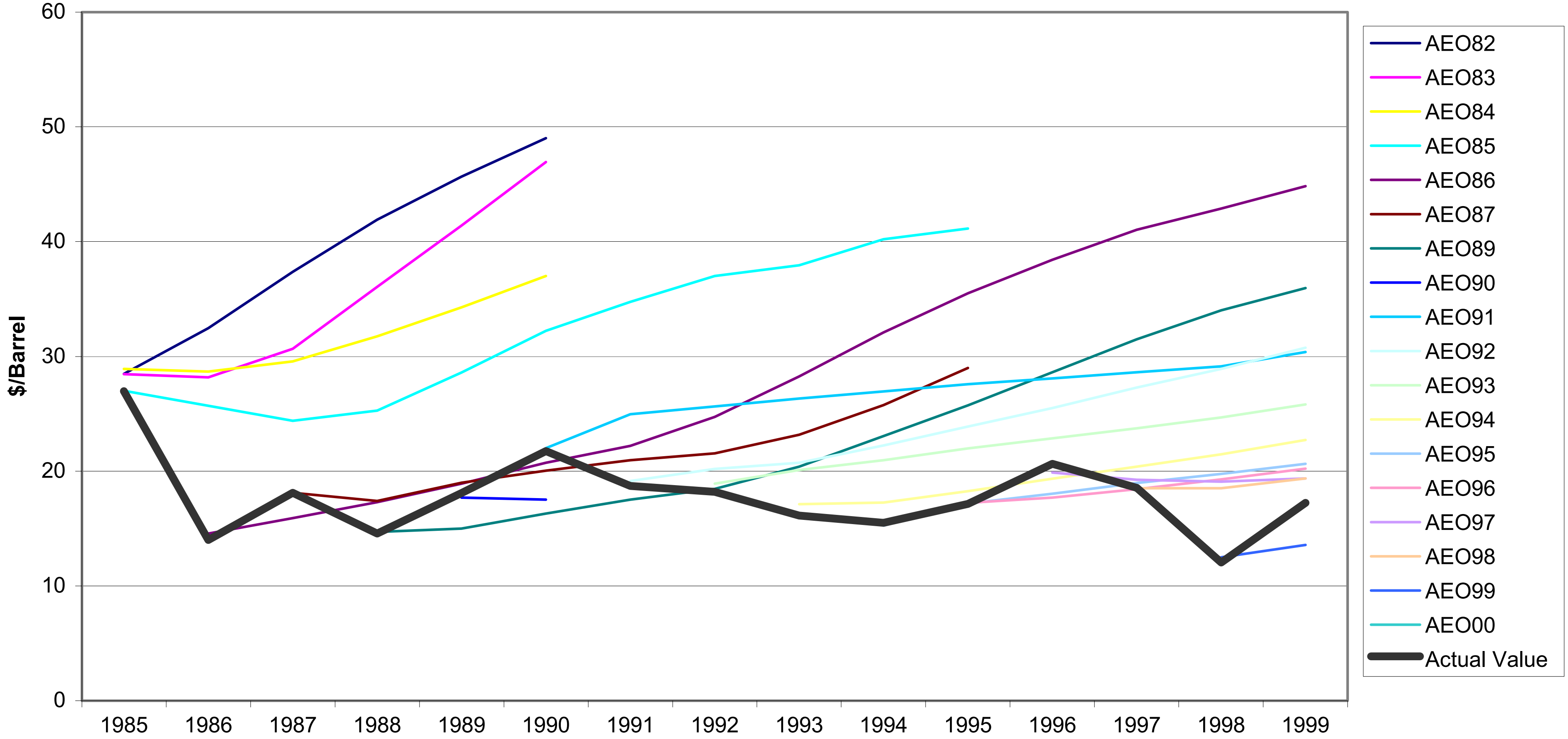
- Classic mean reverting process with very slight trend
- Time lags, inelastic demand, and capacity constraints can produce large short run volatility
- Price increases are temporary, more so when there is excess capacity
- Over time, technology in has more than kept pace with exhaustion to keep supply costs constant
  - 3-D seismic
  - Horizontal drilling
  - Deep water

Crude oil spot and futures prices



Source: CRA based on Bloomberg, NYMEX crude oil futures contracts CL commodity

Forecasters have found it hard to abandon the idea that oil prices will always go up



Source: EIA, Annual Energy Outlook, Analysis of Forecast Errors

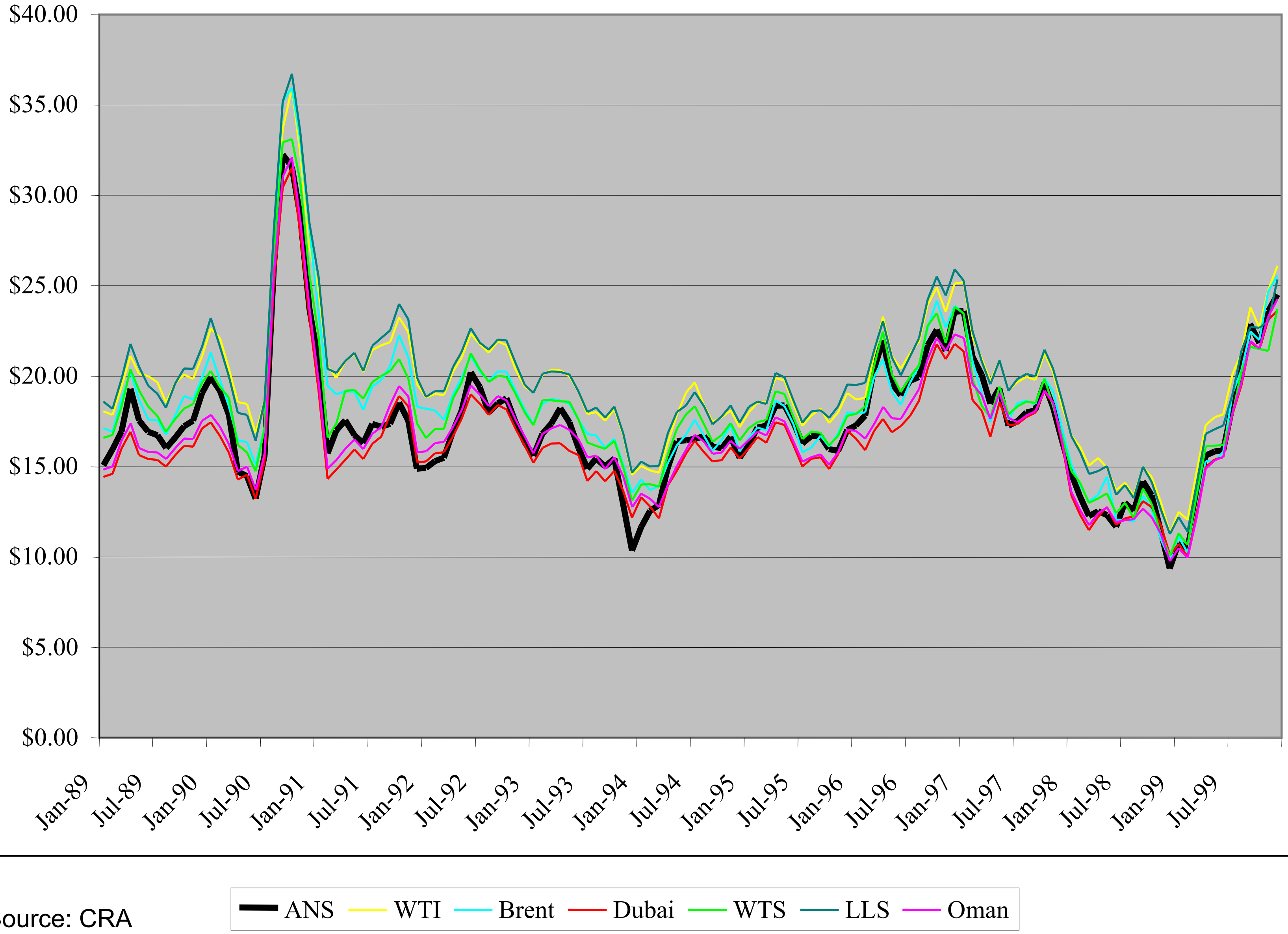
World oil production and prices

- Basics
  - OPEC had a 40% market share at the beginning of 2001, now down to 37% due to production cuts.
  - OPEC targeted a price band of $22 to $28 per barrel
  - Residual demand elasticity for Saudi oil is greater than one, except possibly in the very short run, implying further unilateral output reductions by Saudi Arabia are not profitable
- OPEC production restraint raised prices beginning in March 2002
  - Crude prices hit bottom in late November 2001
  - Production cuts created excess capacity
  - Precautionary demand may have caused some stock build
- All suggest further price increases are unlikely without worsening of political situation

U.S. crude oil price is determined by world oil price

- There is a single world crude oil market
  - Fungibility and substitutability
  - Ease and uniform cost of ocean transportation
- Differences in crude oil prices are due to
  - Quality
  - Transportation cost and capacity
- Outside OPEC
  - Rents exist due to differences in production cost, location and quality
  - Overall the market is highly competitive

Crude oil prices move together around the world



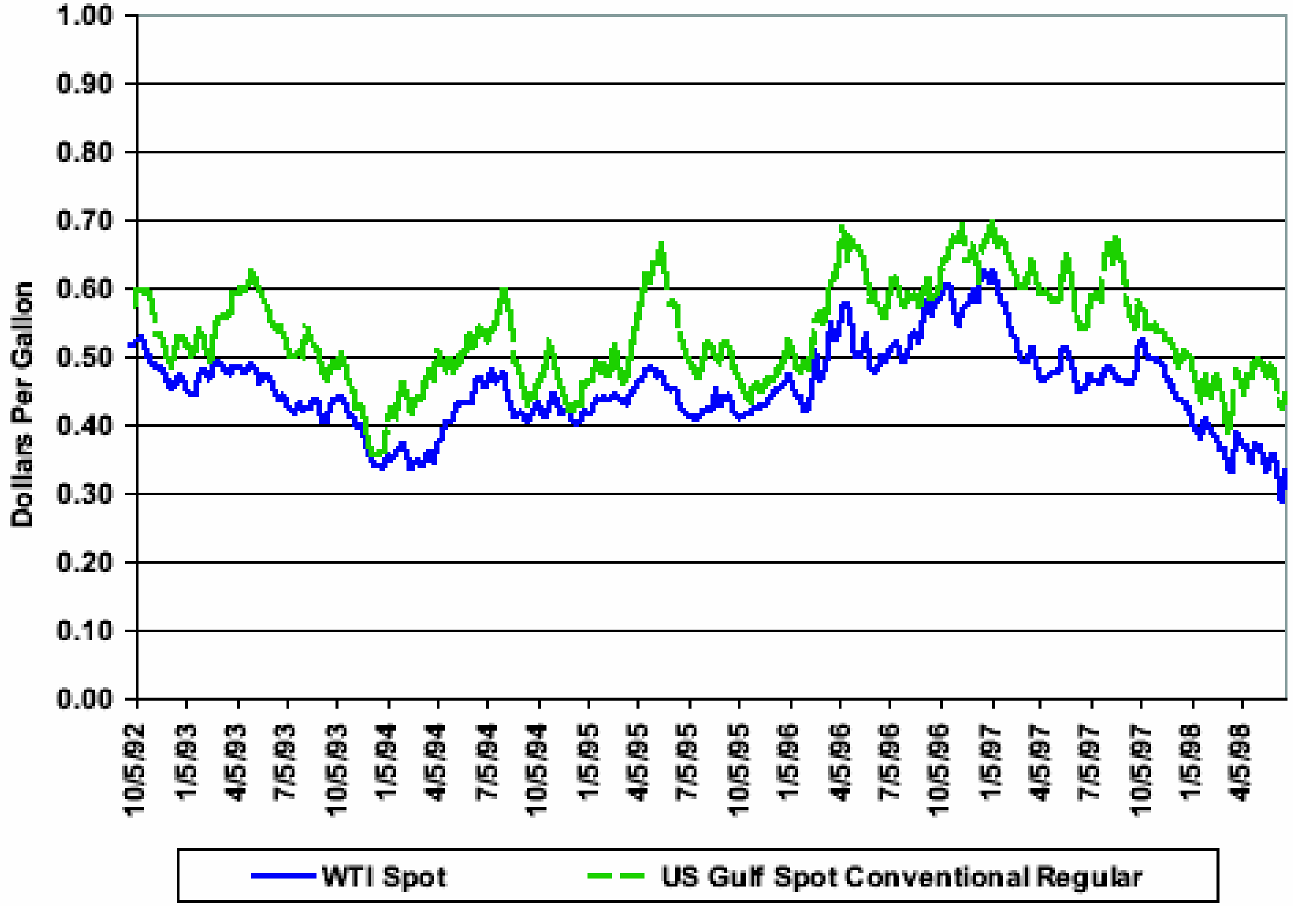
Source: CRA

Changes in supply in narrower markets will not affect prices: West Coast crude markets

- Import arbitrage conditions determine crude oil prices
- Since the mid 90s, ANS crude has not been the marginal source and therefore does not affect California prices
- Before 1993, price floor was netback from Gulf Coast and price ceiling was import parity
- PADD V became a net importer in 1993
- ANS crude moved to import parity when import arbitrage condition became binding
- Under these conditions, conceivable changes in ANS supply have no impact on the price of ANS crude or refined product prices
- In particular, Arco’s current crude production did not exercise any discipline on BP prices

Representative crude oil and refined product prices generally move together

Figure 3.3 Crude Oil Prices and Spot Gasoline Prices Move Together



Source: DRI, Inc.

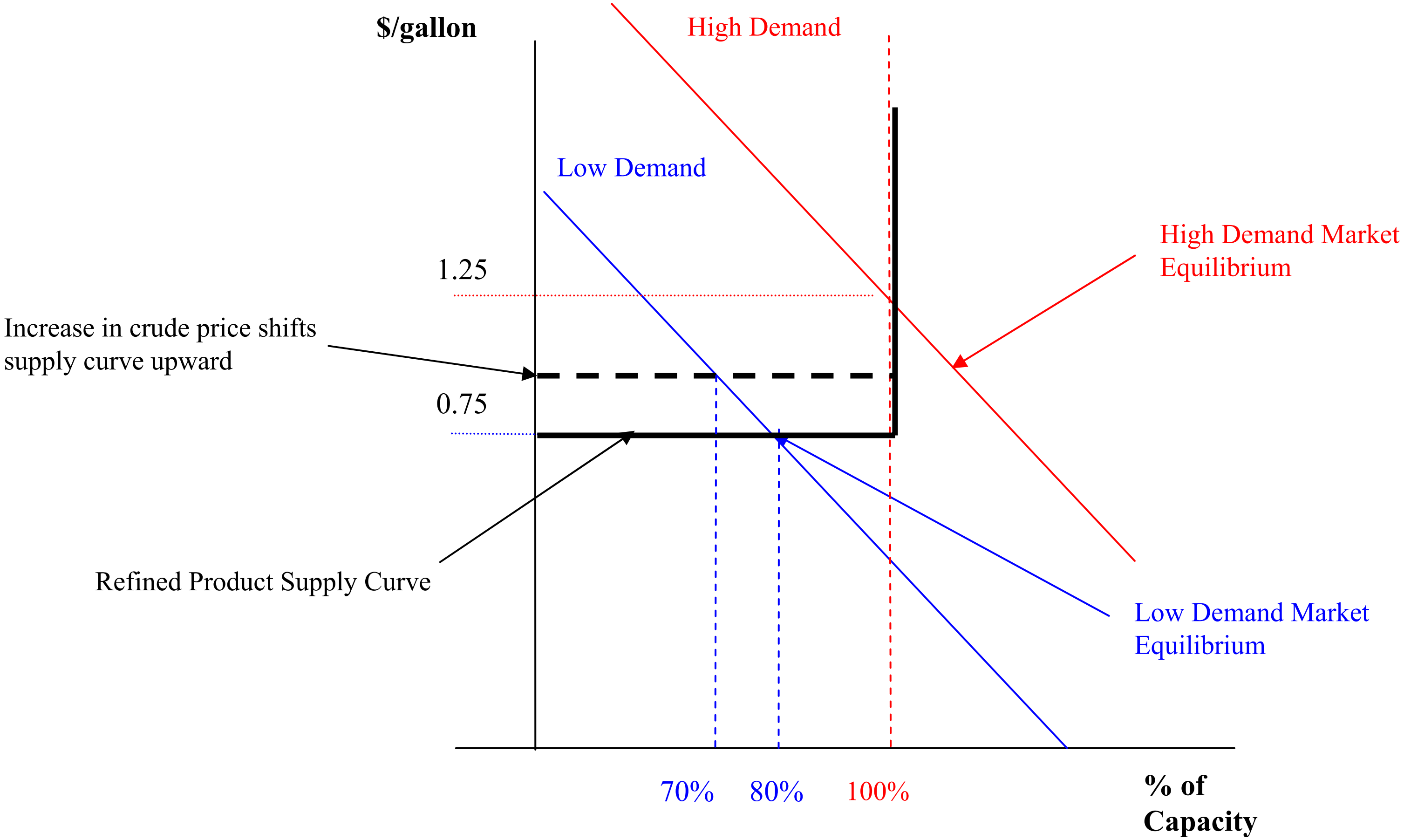
Source: EIA, “Price Changes in the Gasoline Market,” February 1999, DOE/EIA-0626

There are circumstances in which crude and refined product prices become disconnected

- Changes in processing costs (RFG, Unocal patents, Renewable fuel mandate)
- Scarcity rents in refining/marketing due to demand pressing against capacity
  - Supply shocks (Refinery outages, pipeline ruptures or product import interruptions)
  - Demand shocks (cold weather, unusual electric utility demand, MTBE ban, precautionary demand)
  - As the FTC staff have noted, regional fuel specifications can prevent imports from other regions from relieving scarcity and thus can be responsible for price hikes
- In looking at the relationship between specific crudes and refined product prices, identifying the marginal crude at a refinery matters

Basic elements of refined product pricing

increased crude costs at the margin increase refined product prices unless system is at capacity
When system is at capacity, prices rise to level required to equate demand to available capacity
Tightness may not be in crude distillation, but specific processes for producing RFG



Current situation

- Since January WTI crude prices rose about 21 cents per gallon, gasoline around 30, leaving 9 cents unexplained by crude
- Summer RFG requirements, precautionary stock building, normal summer swing in prices contribute to this increase
- Most important, in Q1 refiners were in deep trouble
  - Refiners experienced long periods of depressed profitability in the 80s and 90s
  - Temporary relief in 2000-2001 was followed by abnormally low prices and margins in late 2001 and early 2002
- Tighter markets restored net margins to more normal levels
- There is nothing unusual about these developments. They are the normal consequences of the operation of supply and demand