OPEC at 50: Evolution, Issues and Lessons

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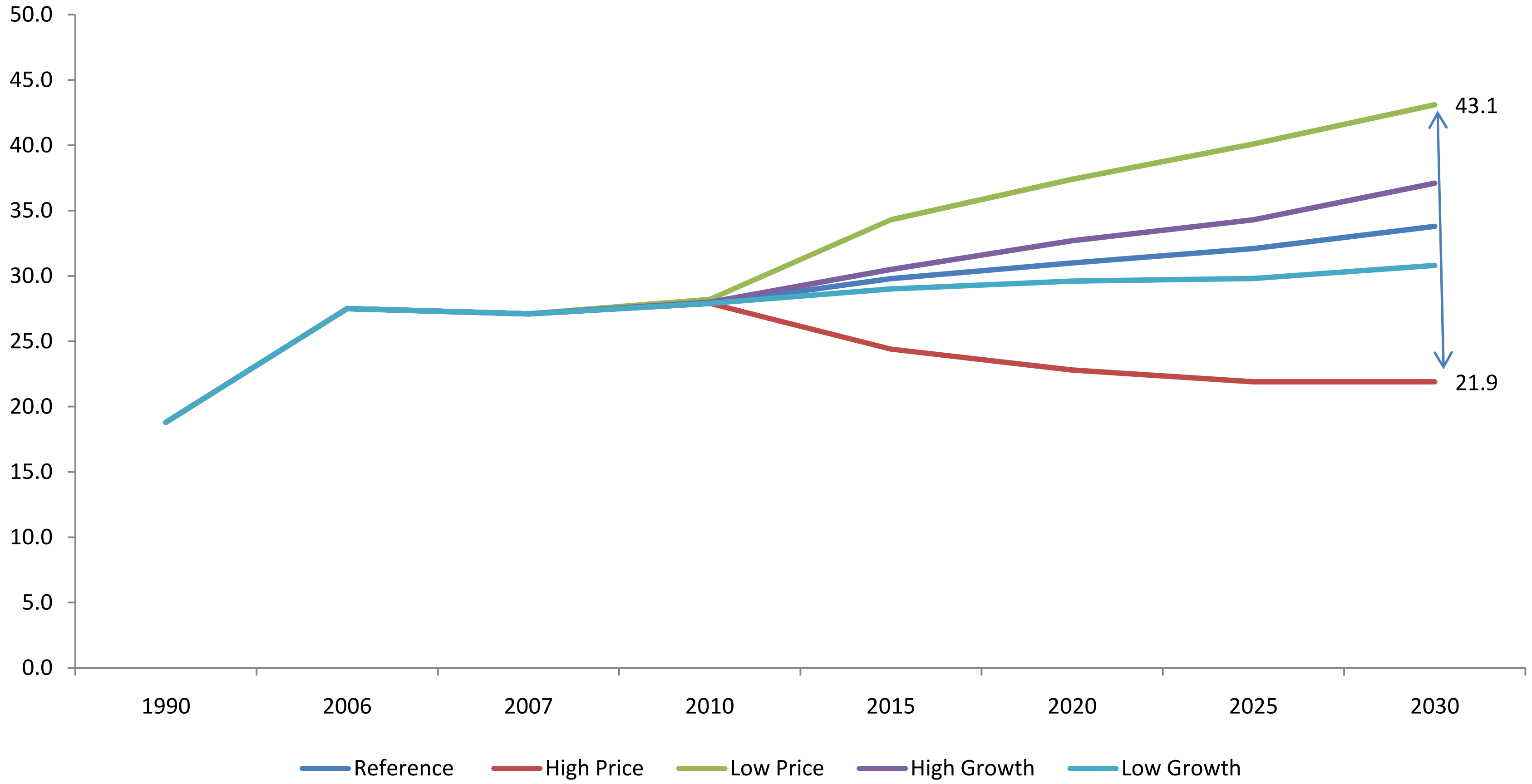
7 June 2010
Prepared for the
IAEE 10th International Conference

Structure of Presentation

- Four key features relevant for analysis of OPEC behaviour
  - Market structure
  - Pricing system
    - New perspectives on OPEC
      - Signalling
      - Coordination games
  - Perception of limited feedbacks
  - Changes in financial scene
- Lessons from the 2004-2009 cycle
- Conclusions

Projections of OPEC-MENA Oil Production

Projections of MENA-OPEC of Total Liquids Production (mb/d)



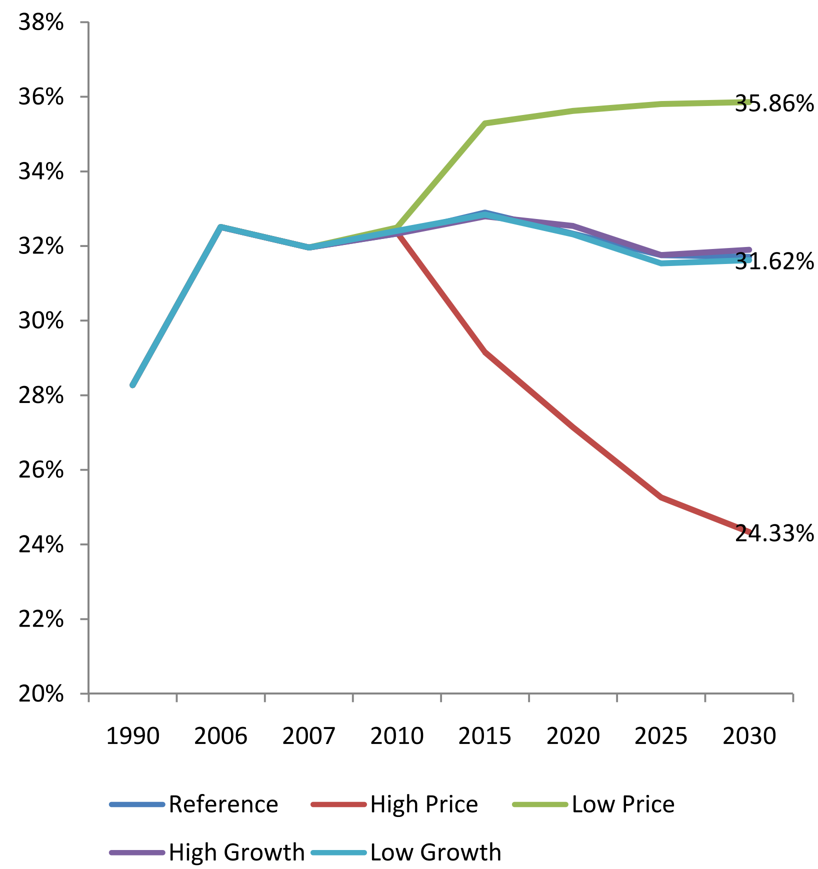
EIA: International Energy Outlook, 2009

OPEC-MENA: Iran, Iraq, Kuwait, Qatar, Saudi Arabia, UAE, Algeria, Libya

Underlying Assumptions

- Estimates based on “call on OPEC”
  - OPEC adjust market share and fills gap between world demand and non-OPEC supplies
  - OPEC output treated as residual
- Underlying key assumptions:
  - Producers in OPEC are passive players
  - Symmetric behaviour
    - Passive both in a rising market and declining market

OPEC-MENA Market Share



EIA: International Energy Outlook, 2009

Alternative Framework

- Simplifying assumptions
  - Based only on fact that bulk of world's proven reserves concentrate in region
  - No attempt to model behaviour of key producers
- OPEC behaviour is far from passive
  - Dominance of oil in economy & heart of industrialisation and diversification strategy
- Key questions
  - In a falling market how tolerant is OPEC to a decline in its market share?
  - In a rising market
    - Willingness: Does OPEC has incentive to increase market share?
    - Capability: Can OPEC –MENA increase production capacity to fill gap?

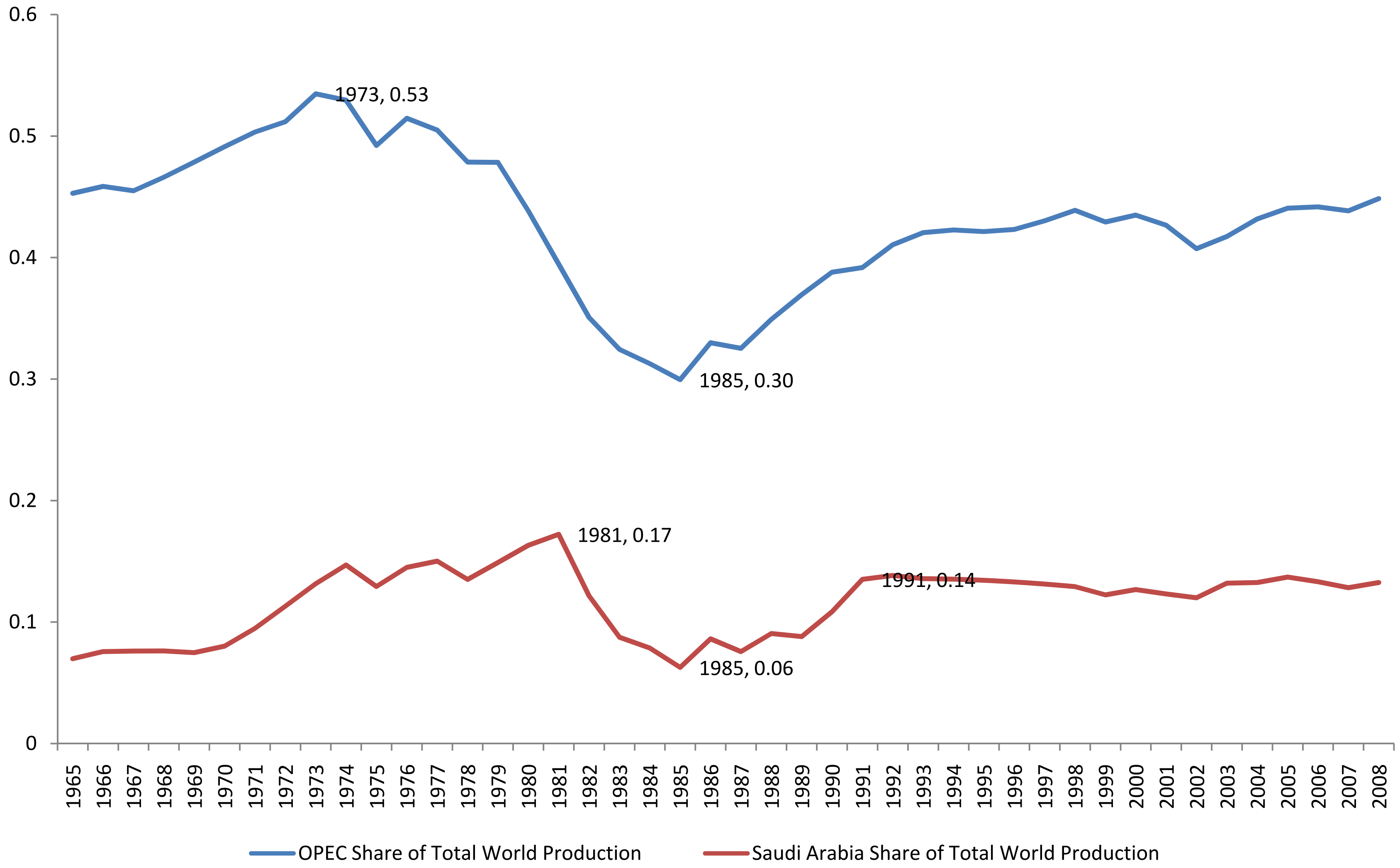
Feature1: OPEC & Market Structure

- Keeping a floor on oil price allows production and investment to shift towards high cost producers in non-OPEC countries and oil substitutes
  - Ali Naimi, justified $75 target price as "price that marginal producers need to maintain investments sufficient to provide adequate supplies for future oil consumption needs"
- Implications:
  - Squeezed both on supply and demand side
    - Decline in demand will affect call on OPEC
    - Increase in non-OPEC supply will affect call on OPEC
  - OPEC as a residual producer but.....
    - Switch in residual producer status possible & endogenous to market mechanisms
  - Oil price, marginal cost and price indeterminacy
    - Very low cost floor for crude oil production in OPEC and a very high price ceiling set by production in non-OPEC and substitutes & futures market participants' expectations
    - Market can clear at any price within a wide range depending on market conditions and interaction among market participants
    - Important implications on short term and long term price behaviour

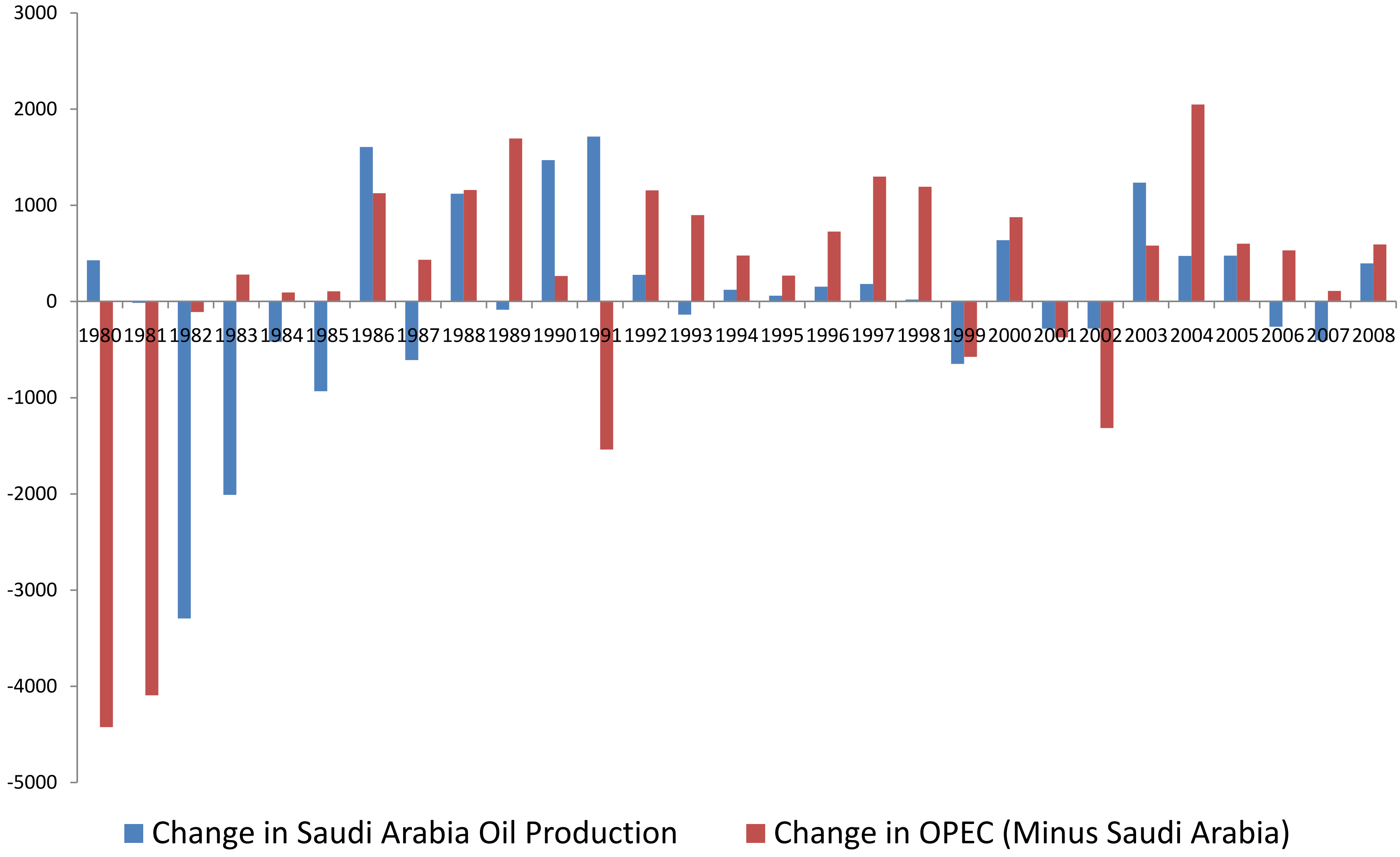
Feature II: Collapse of OPEC Administered System

- Collapse of OPEC administered system in 1986
  - Saudi Arabia’s attempts to defend marker price resulted in a dramatic reduction in its oil exports and loss of market share
  - First price war: S.A. Increase market share & collapse of oil price
  - OPEC abandons its fixed price target and returned to quota system with the understanding that it would not tolerate its output share falling below certain levels
  - Move to the market-related pricing system
- One important lesson
  - Oil pricing system incompatible with oil market conditions can’t survive
  - Change in market structure will most certainly lead to change in pricing system

OPEC Market Share



Saudi Arabia: Countervailing Force?



Increasing Importance of Futures Markets

- The development of the reference pricing
  - Identification of benchmark price
- Creation of financial layers around these benchmarks to manage risk
- Doubts about ability of benchmarks to generate price reflect accurately the price at the margin of physical barrel of oil
- Futures market not used only for risk hedging and speculation; its relevant market where oil price level is set
- Links to physical markets through highly liquid financial market (swaps, EFPs, contract for differences)
- Laid foundations of entry of new players into oil market (financial)

New Perspectives on OPEC

- New Dimensions
  - Is OPEC simply a price taker?
    - Characterization not accurate
    - By altering production plans OPEC send signals
    - Influence on oil prices however not straightforward
  - How to account for entry & consolidation of the role of financial players in price formation
  - Role of expectations
  - Role of inventories and spreads
- New approaches that can provide insights
  - Signalling literature
  - Game theory
  - Behavioural finance

Signalling in Different Oil Market Conditions

- Decisions of OPEC cuts can be viewed as signals to market about OPEC's preferred range of prices

- Signalling mechanism may or may not succeed depending on how financial market participants interpret these signals

- Important to emphasise:
  - When OPEC takes no action it is also signalling to the market

Weak Market Conditions

- In a falling market
  - Non-OPEC suppliers continue to produce at their maximum potential
  - OPEC in attempt to defend a target price would announce production cuts
- Credible signals?? What does the market think??
- OPEC's announcement of production cuts in face of fall of global demand and excess capacity not have intended effect as market may not attach any weight to this signal straightaway
  - Market participants doubt the effectiveness and credibility of OPEC's policy and may ignore the signal
  - OPEC signals are some sort of cheap talk
- It will take OPEC a series of cuts to convince the market

Tight Market Conditions

- The erosion of spare capacity
  - Without enough surplus capacity, OPEC's ability to influence oil prices weakens considerably
  - In absence of spare capacity OPEC becomes a price taker like any other producer
- In 2004 doubts about the ability of Saudi Arabia to supply the market with additional supplies of the required quality of crude
  - Rendered any announcements of production increases ineffective

OPEC Pricing Power

- OPEC pricing power is not constant
  - OPEC can lose its influence on oil prices in the short term
- OPEC influence on oil price behaviour depends on interaction with other players
  - Game theoretic approach
- OPEC can engage in excessive cuts or ‘over-produce’ to give credibility to its signal about its preferred oil price
  - Can create volatility and sharpen swings

Key Feature III: The Feedbacks in the Conventional Framework

- Changes in oil prices would induce supply/ demand feedbacks and government responses that put limit on oil price rise
- Demand side
  - High oil prices would have an adverse impact on demand through price and an income effect
  - High oil prices would eventually slowdown economic growth and oil demand
- Supply side
  - High oil prices encourage investment in non-OPEC countries
  - High oil prices encourage substitution at the margin by increasing the relative price of oil
  - OPEC increases oil supply to prevent oil prices from rising
    - High oil prices result in long-term destruction of oil demand and encourage the entry of substitutes at a large scale
- Availability of large spare capacity
  - Has effect of increasing the elasticity of oil supply and generates strong feedback in presence of large supply disruptions
- Policy response

Perception of Limited Feedbacks

- Uncertainty about existence of and timing of feedbacks from prices to oil supply and demand increased markedly during boom
  - Perception of strong feedbacks replaced by perception of limited feedbacks
- Key feedbacks absent
  - High oil prices would trigger a rise in global inflation rates and a subsequent recession, tempering growth in the demand for oil
  - High oil prices would induce strong growth in non-OPEC supply
  - OPEC would increase its oil supply to prevent oil prices from rising to high levels

Asymmetry in OPEC Response

- The conventional wisdom
- OPEC puts a floor on oil price
  - Prevent prices from falling below levels undesired by member countries
- OPEC puts a ceiling on oil price
  - Avoid demand destruction for its oil in long term
  - Limit entry of substitutes
- Reinforced by OPEC price band $22-$28 price band
- Reinforced by OPEC's official position
  - "extreme price levels, either too high or too low, are damaging for both producers and consumers"
- Implications
  - Establishes a feedback mechanism on the supply side
  - Influence short term expectations and behaviour (governments and financial investors)
  - Stabilise long term expectations

Asymmetry in OPEC response

- OPEC was not created to bring prices down
- In a rising market OPEC's role is to satisfy incremental demand at market determined prices
  - Learning process about the impact of oil shocks on growth
    - Global economy can grow with persistent rise in oil price
  - OPEC does not have the tools to bring prices down
  - Political constraints
- Implication: Feedback mechanism from OPEC absent
  - Affected market's long term expectations

Changes in the Financial Scene

- Financial markets witnessed transformations that consolidated importance of futures and OTC markets and financial players in process of oil price formation
  - Change in international pricing system
  - Large entry of financial players and increase in their diversity
    - Low rates of return on alternative assets, financial innovation, diversification purposes, hedging against inflation and weak US dollar
    - Perception of tight market conditions makes bets attractive
  - Crude oil increasingly acquired characteristics of a financial asset

- Growing interest of financial investors in the oil market
  - Endogenous to oil market conditions & interlinked with perception of tightening of physical market as a whole
  - Represents a consolidation of a trend that began with collapse of administered pricing system and emergence and increasing importance of derivatives markets in price discovery
  - What is the influence of financial players in the market? How did this change OPEC behaviour?

Speculation Versus Fundamentals Debate

- Behaviour of oil prices polarised views about key drivers of oil prices
  - Fundamentals
  - Speculation
  - Empirical evidence unlikely to settle the dispute
    - Data limitations, methodological problems, inter-related determinants, endogenity issues

- The dichotomy still dominates debate, but is it useful?
  - Assumes a clear dividing line between speculators and hedgers
  - Oil price be sliced into various components reflecting fundamental and non-fundamental factors theoretically weak and empirically can't be implemented
  - Assumes that speculators form a homogenous group
    - Financial players are quite diverse
  - Financial players don't operate in isolation of physical parameters of the oil market
  - Two layers of price discovery: paper and physical
    - What are the links between the two?

Implications

Wide Range of Financial Players

- **Investment banks**
  - Largest traders of oil since collapse of OPEC administered pricing system
  - More involved in bridging gaps between producers and a more diverse set of customers

- **Hedge funds** (leveraged account; allowed to borrow in order to finance activities)
  - Macro hedge funds
    - Trade in a range of markets (not just commodities)
    - Have a top-down approach and take a view on macroeconomic issues
  - Specialist commodity hedge funds
    - Bottom-up approach, use large quantities of data; take a strong view of fundamentals of supply and demand
  - ‘Black box’ hedge funds
    - Have a view of the oil price based on calculations known only to them

- **Institutional investors** primarily consist of pension funds, insurance companies, sovereign wealth funds
  - Typically put a small share of their funds into commodities for sake of portfolio diversification
  - Tend to sell when prices are high and buy when they are low, stabilising the market, owing to (price-weighted) limits in their portfolios

- **Retail investors**, including private investors and high net worth individuals
  - one of the fastest growing categories

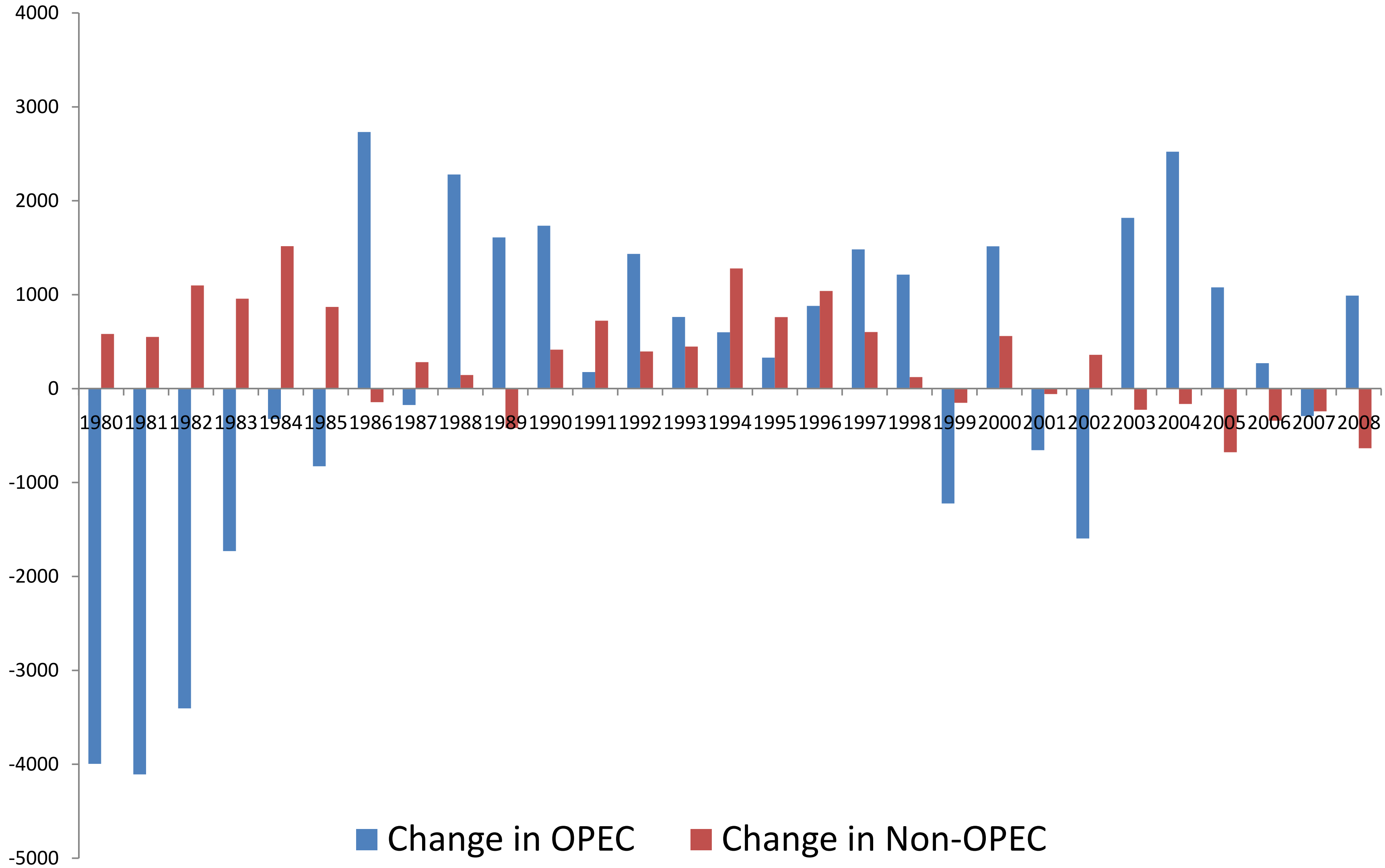
Implications on Market Participants’ Behaviour

- Short term expectations destablised
  - Market can clear at any price within a wide range
  - Very low cost floor for crude oil production and a very high price ceiling set by substitutes
- Affected way in which long expectations formed
- Market characterised by
  - Perceived limited feedbacks and indeterminacy of prices
  - Diverse set of financial players and room for coordination among investors and market players
- Bring to fore role of expectations, coordination games, and role of public signals in price formation

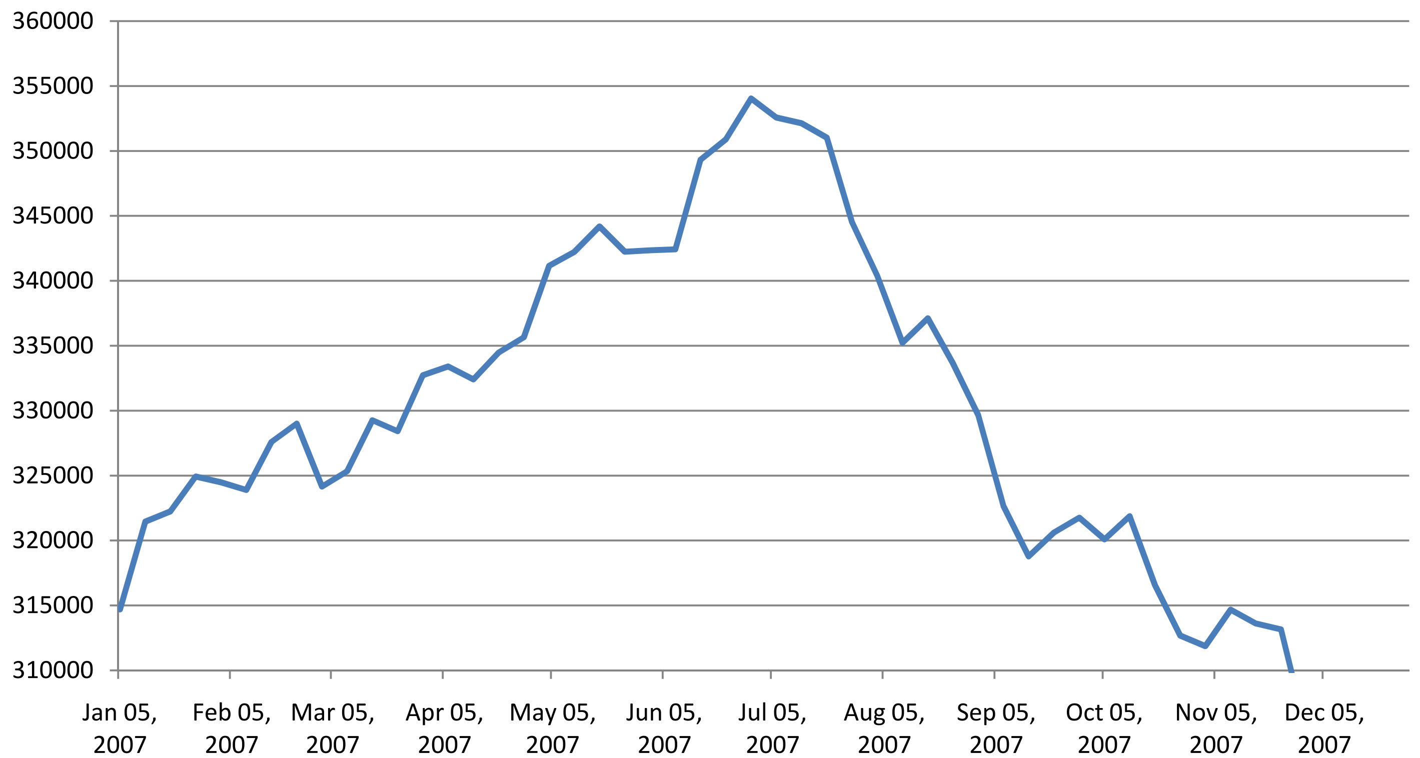
OPEC Behaviour: Lessons from the 2004-2009 Cycle

- Residual player in the early period of the boom
  - Increase output in response to customers' demand at market determined prices
- OPEC's residual role interrupted in 2007
  - Concerns about the rapid accumulation of inventories
  - OPEC responded by cutting supplies & importers tap into their oil stocks to satisfy demand reducing the level of crude oil inventories
  - Spot price rose and shape of futures curve changed from partial contango into backwardation
- OPEC resumed residual role supplying market upon demand at oil prices 'determined by the market'
  - No attempt to signal or bring down prices by putting additional barrels in the market
  - Despite decline in oil demand excess supplies did not appear because OPEC adjusted its output in line with reduction in oil demand
- The Jeddah meeting: A change in a key player's behaviour
  - Saudi Arabia as a signaller to the market
- Post-Lehman Brothers crisis
  - Implement cuts; OPEC strongest when it is perceived to be weakest
- In 2009
  - Signalling game, focal points, & stabilise oil price

Residual Supplier

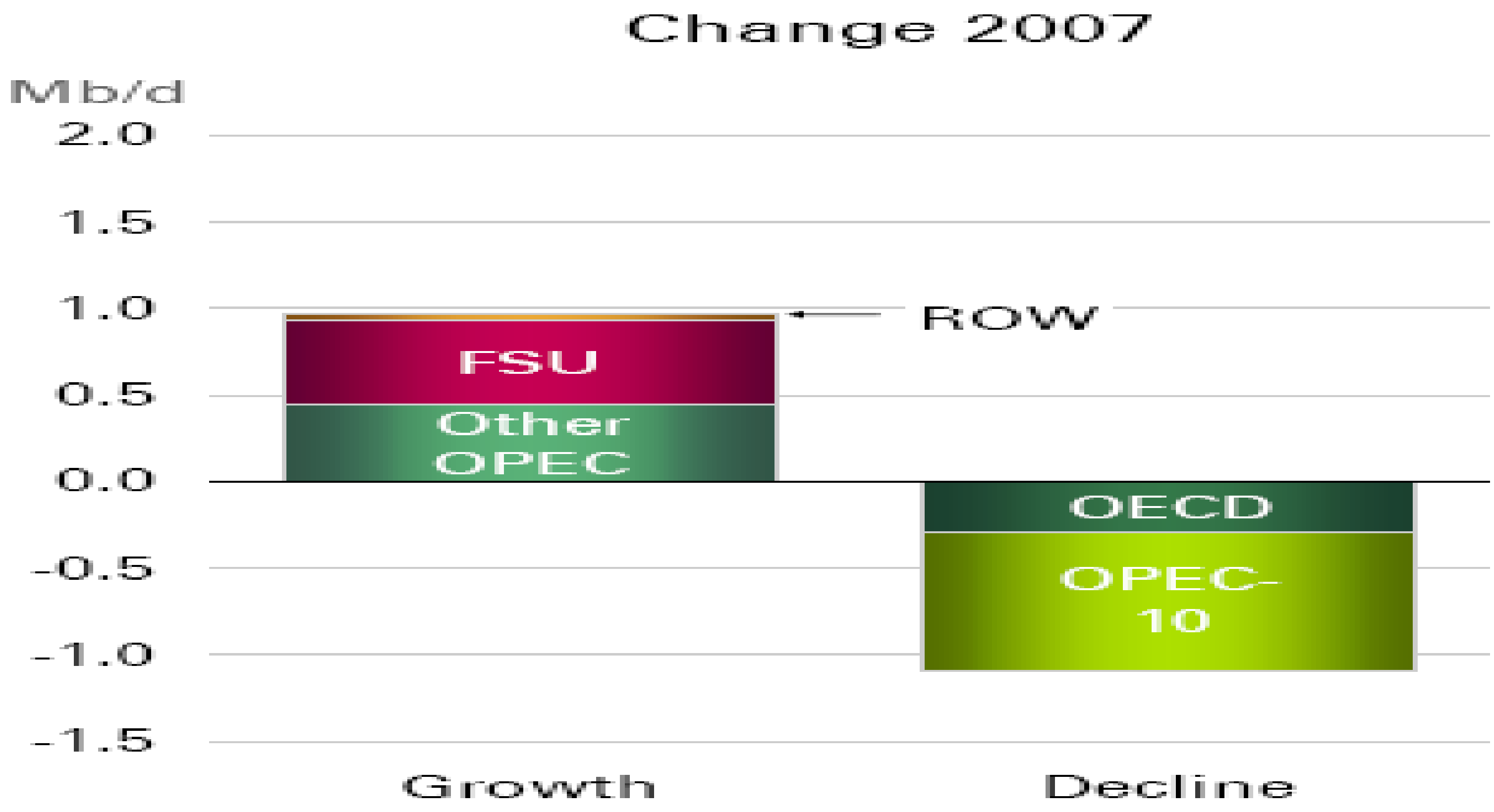


US Crude Oil Stocks 2007



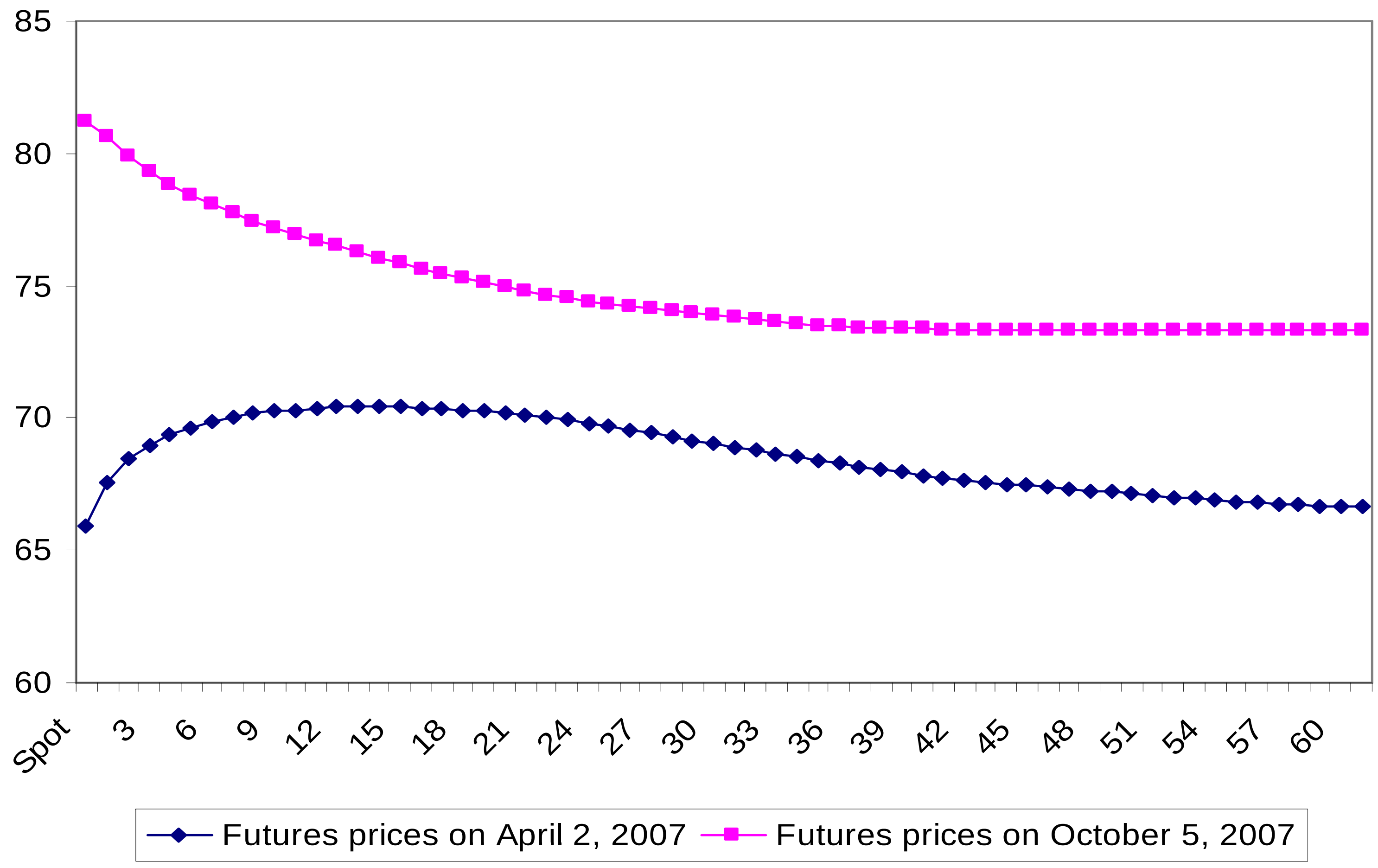
Source: EIA

OPEC Cuts Supplies in 2007



Source: BP

Change in Shape of Curve



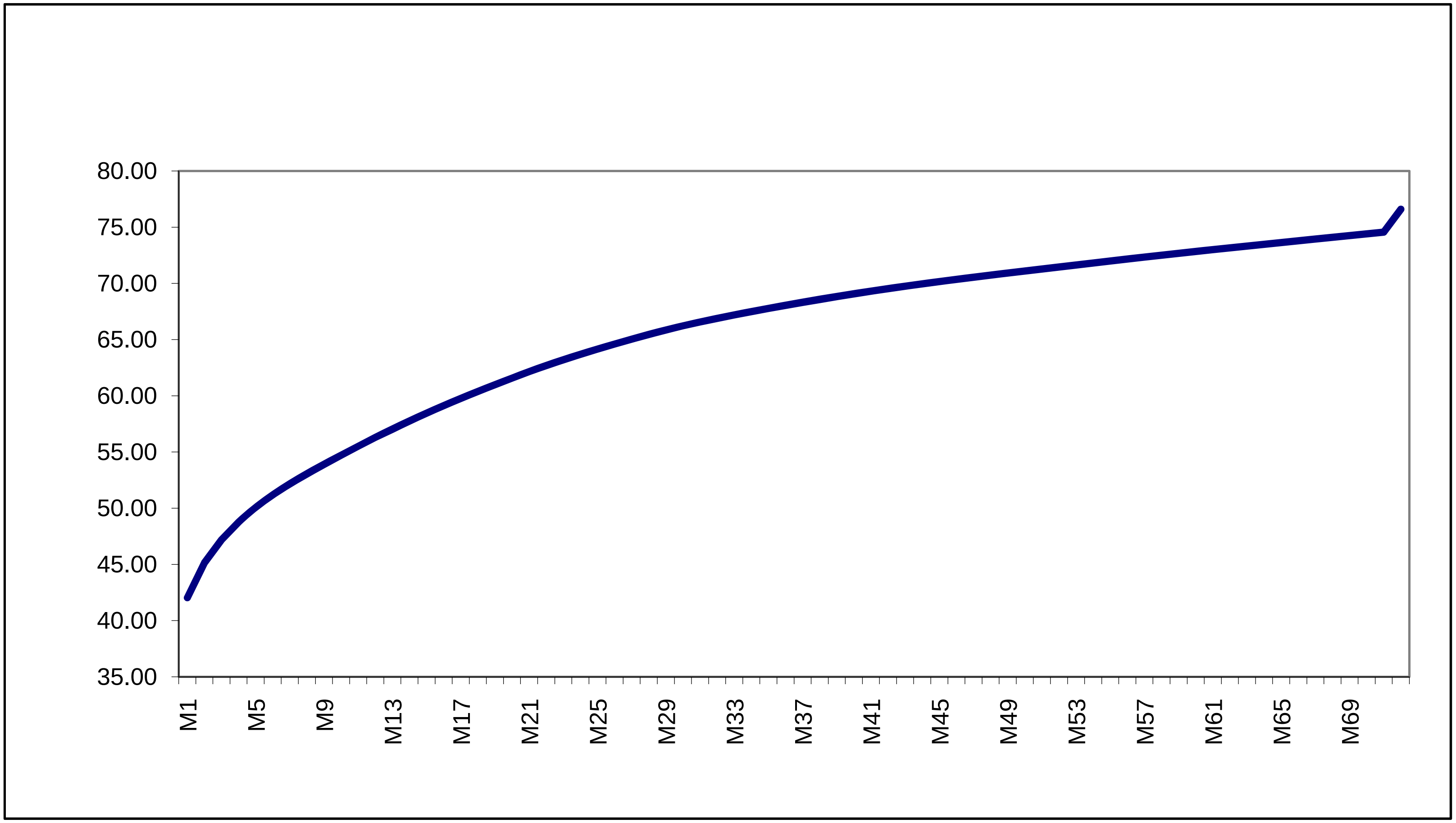
Source: IMF, World Economic Outlook: Globalization and Inequality, October 2007, Figure 1.9

2009: Recovery Phase

- Negative dynamics unleashed by financial crisis caused oil prices to undershoot
- As in other asset markets, oil prices were bound to recover to some extent as many investors realised that the fall in oil prices had gone too far by end of 2008
- Concerns at height financial crisis that credit constraints, high uncertainty, low price environment would limit investment flows into oil sector with negative consequences on future non-OPEC and OPEC supply growth
- Strong sentiment that oil industry can no longer function in a relatively low price environment
- Concerns about long-term/medium term fundamentals placed limit on how much market players were willing to discount the price at the front end relative to the price at the back end of the futures curve

Dislocation of Forward Curve

WTI Term Price Structure (December 2008, Monthly Average)

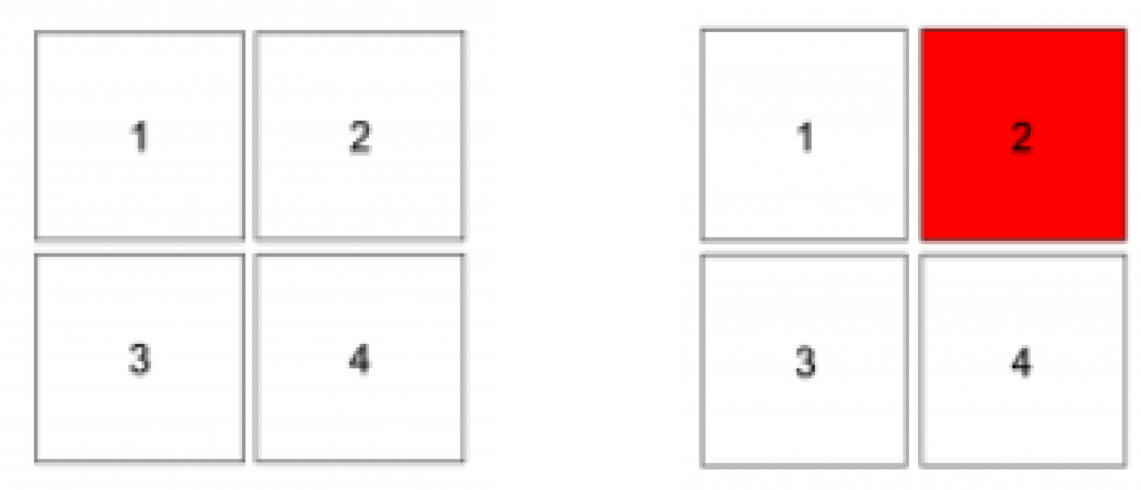


Bloomberg

Current Fundamentals, Expectations and The Oil Price

- Underplay the weight of current oil market fundamentals, inventories, size of spare capacity and increase importance of future fundamentals
- Problem: Future fundamentals highly uncertain
  - many unknown variables that can play an important role in shaping anticipations of these future fundamentals, many of which originate from outside the oil market
- But at what level should the price be set?
  - There is a wide range of prices at which the market can clear
- The issue then is how does the market converge to one price and not another
  - Signalling, focal points and coordination in which OPEC played a leading role

Some signals more visible than others



Market players can coordinate on choosing a box without communicating with each other

There is nothing special about the red box other than the fact that it helps players coordinate their decisions

Such an equilibrium is known as the *focal point*

Why Was OPEC Successful this Time Round?

- Convergence of expectations providing a focal point in oil market
- Expectations that oil market will tighten especially if prices remain low
    - Limited non-OPEC supply growth (peak oil, over-ground constraints)
    - Limited investment and weak supply growth in OPEC countries (willingness, capability, geopolitical)
    - Rapid growth in global oil demand fuelled by non-OECD countries
    - OPEC will remain in driving seat
- OPEC seems more cohesive
    - Coordination within OPEC
        - Clear leadership of Saudi Arabia
- What can change these dynamics?
    - Entry of Iraq; Climate change & energy security policies; Internal cohesion???

Conclusions

- OPEC's role evolving all time depending on oil market conditions
  - 1960-1970: Trade union
  - 1973-1985: Price setter
  - 1986: Abandons price setting power
  - 1986-2006: Residual producer & spare capacity holder
  - 2007: Inventory manager
  - 2008-2010: Signaller and getting better at it
  - In the next 50 years, what roles will OPEC play?
- In need of new approaches to analyse OPEC behaviour and its role in oil price formation