



THE OXFORD  
INSTITUTE  
FOR ENERGY  
STUDIES

# Current Oil Market Dynamics and the Role of OPEC: Reflections on Robert Mabro's Work

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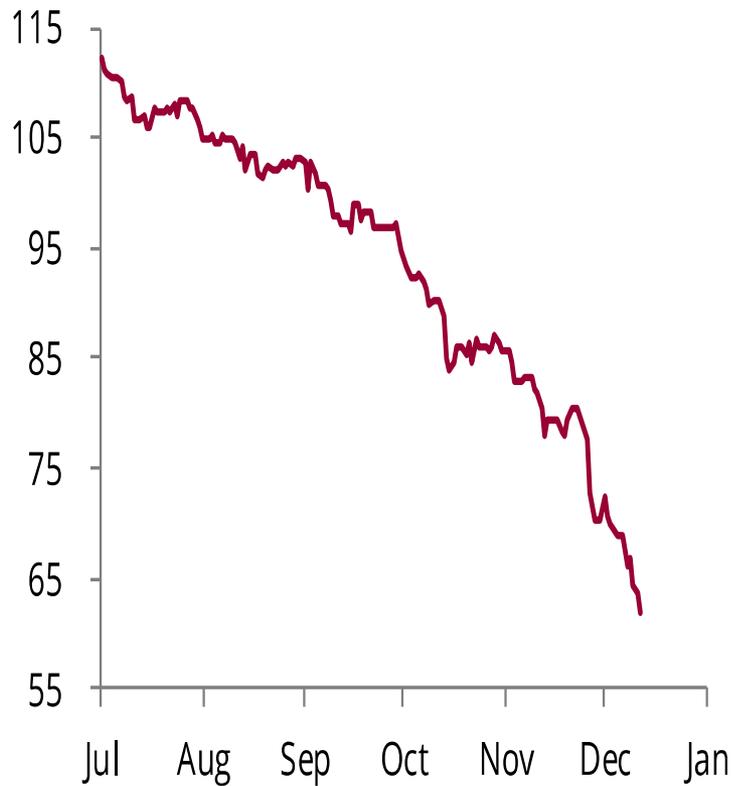
10 JANUARY 2015

PRESENTED AT ARAB ENERGY CLUB, BAHRAIN  
(SPECIAL SESSION: ROBERT MABRO'S WORK ON OPEC)

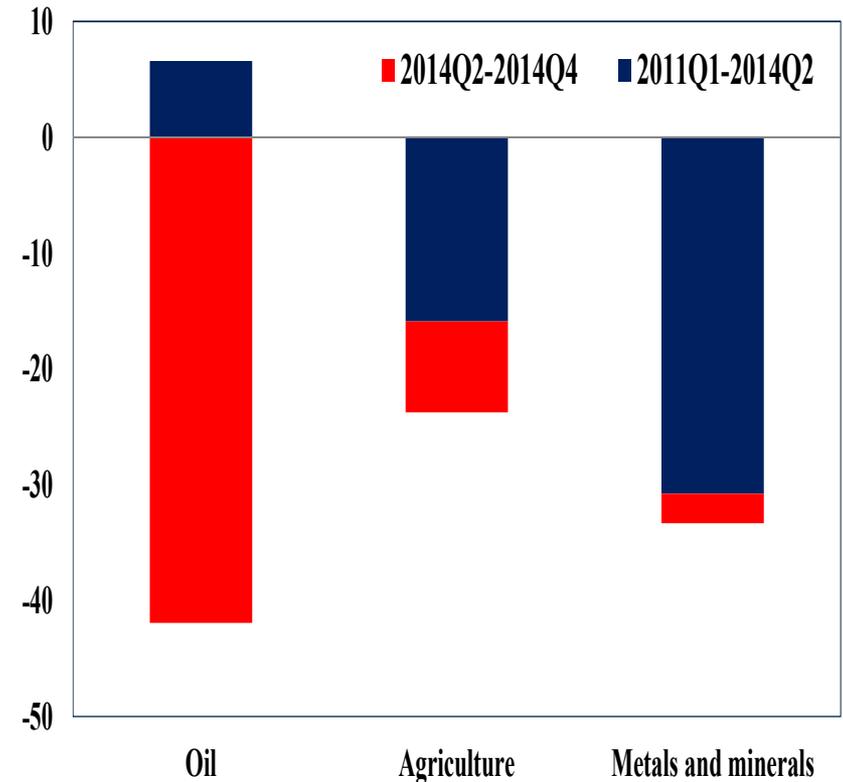
# Recent Oil Market Dynamics and the Inventory Problem

# Rising Geopolitical Tensions, yet Plummeting Prices

## ICE Brent Price, \$/barrel



## Cumulative Changes in Commodities Prices (Percent Change)



Source: World Bank.

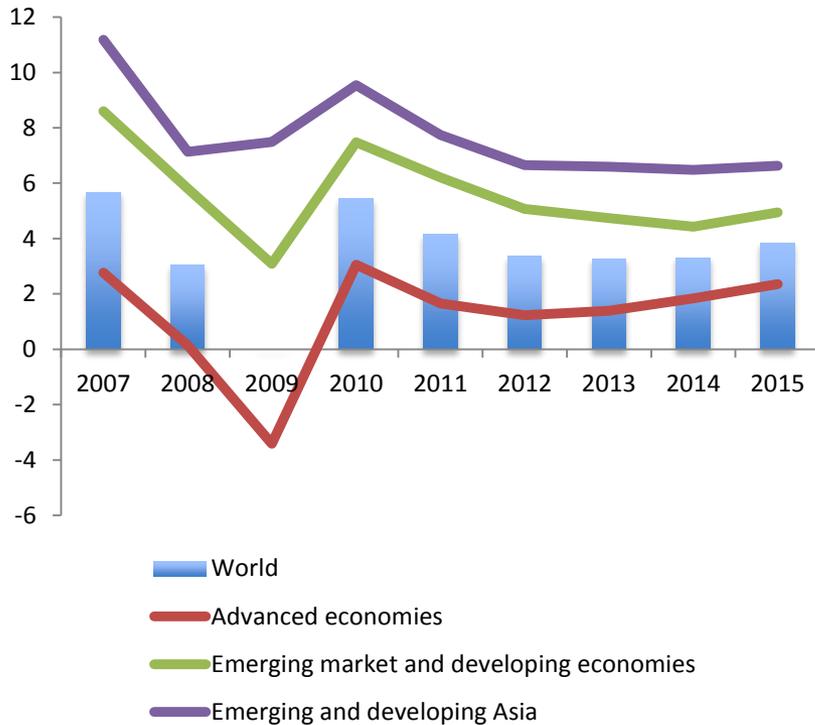
Note: Includes average of WTI, Brent, and Dubai oil prices, 21 agricultural goods, and 7 metal and mineral commodities.

*Weakness due to combination of demand/supply factors and OPEC behaving differently from what market expected (loss of feedback mechanism affecting market sentiment)*

*Oil prices have caught up with other commodities that started declining well before 2014 but the oil price decline has been sharper and faster*

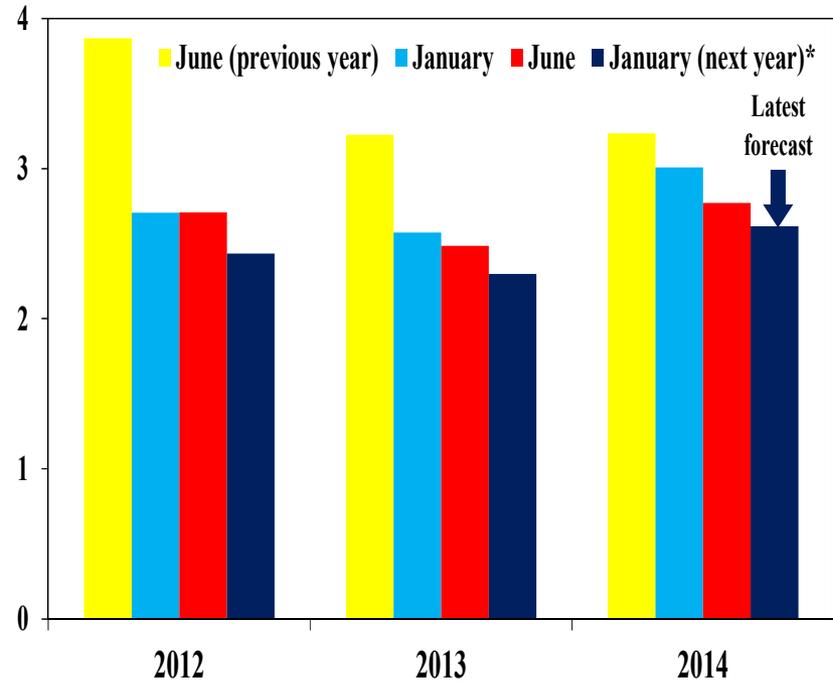
# Global Economic Growth Prospects Weakened

## Growth in GDP, Constant Prices



*Growth rates have been slowing down including in emerging economies*

## World GDP Growth Forecasts (percent)



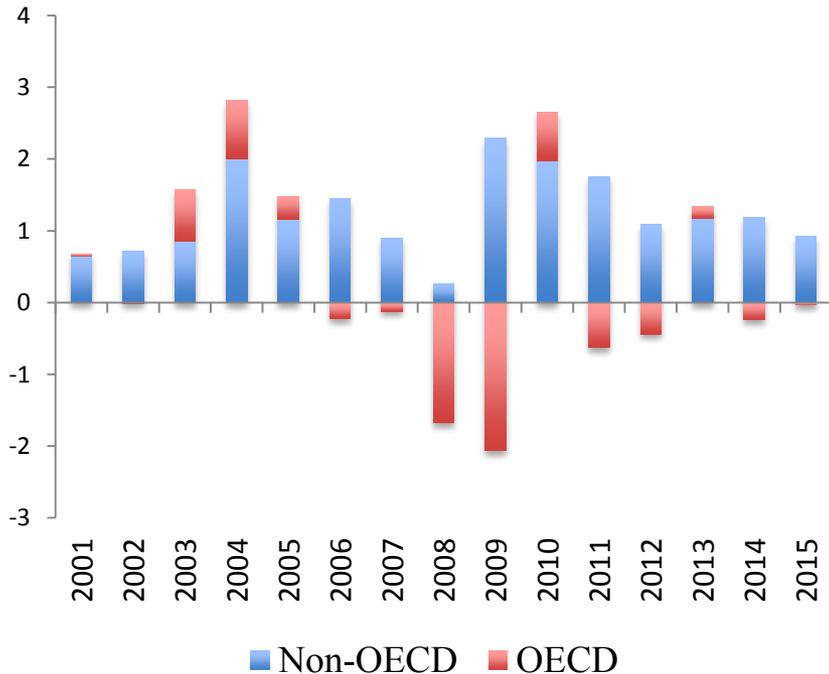
Source: Consensus Economics.

Note: Consensus Economics forecasts are aggregated based on constant 2010 USD GDP weights for G20 countries.

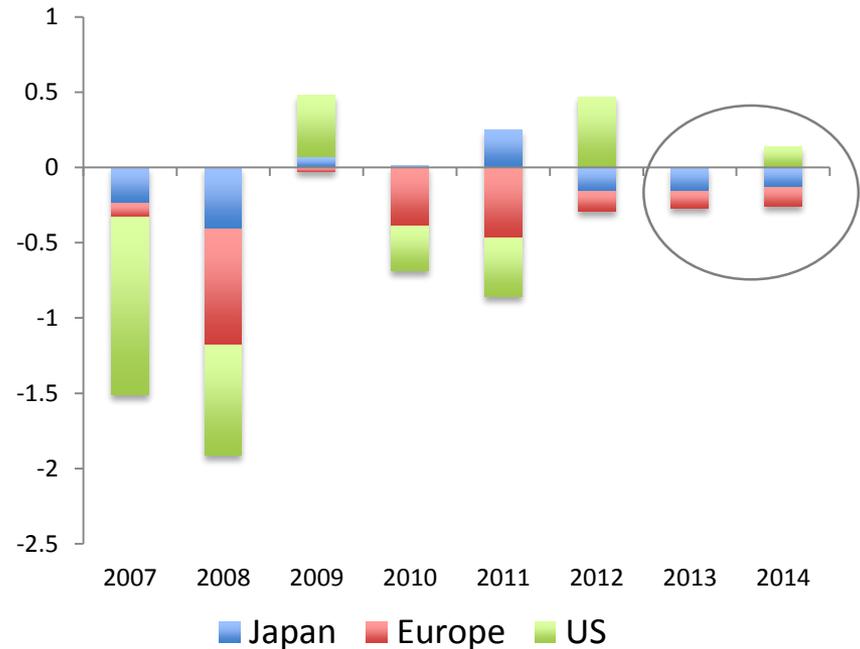
*Forecasts for world GDP growth continue to be revised downwards in the last few years*

# ....Reflected in Slower Global Oil Demand Growth

## Global Oil Demand, y/y change, mb/d



## OECD oil demand Dynamics, y/y change mb/d



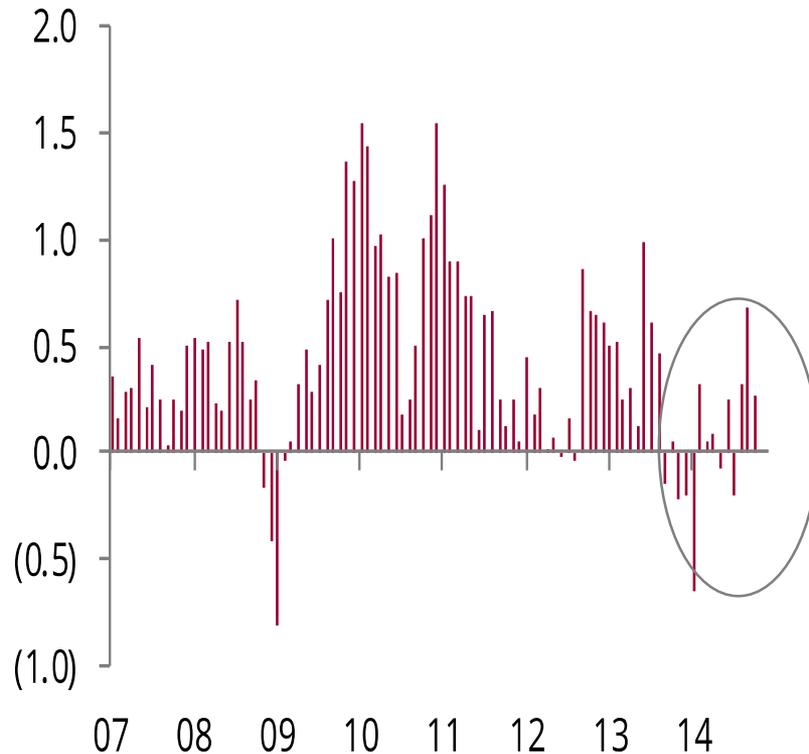
*Global oil demand growth in 2014 revised downwards throughout the year and estimated at around 0.8 mb/d in 2014 and around 0.9 mb/d for 2015*

Source: EIA

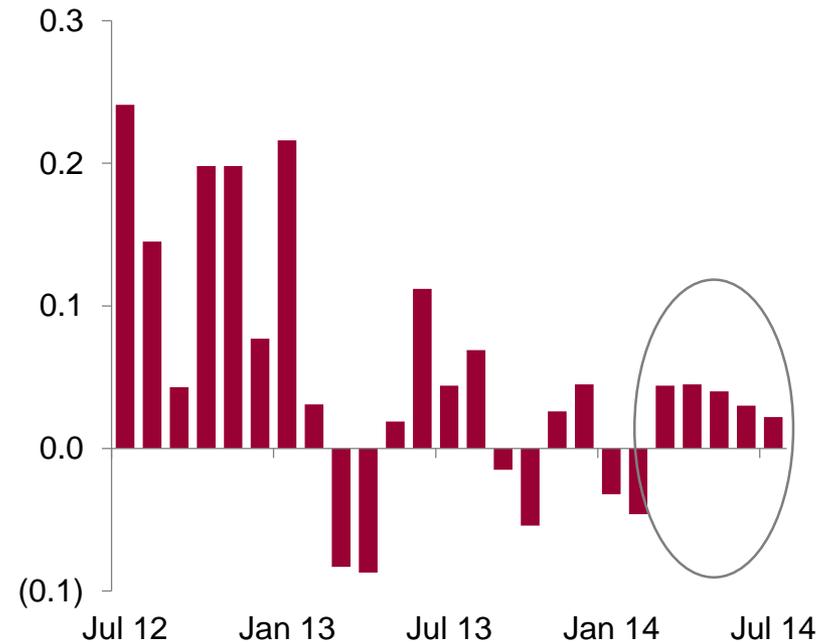
*OECD demand declines stepped up led by weak demand in Europe and Japan registering another decline in 2014*

# In Asia, it is not all about China and India

Chinese Actual Oil Demand growth, y/y, mb/d



Non-OECD Asia ex India and China, y/y change mb/d

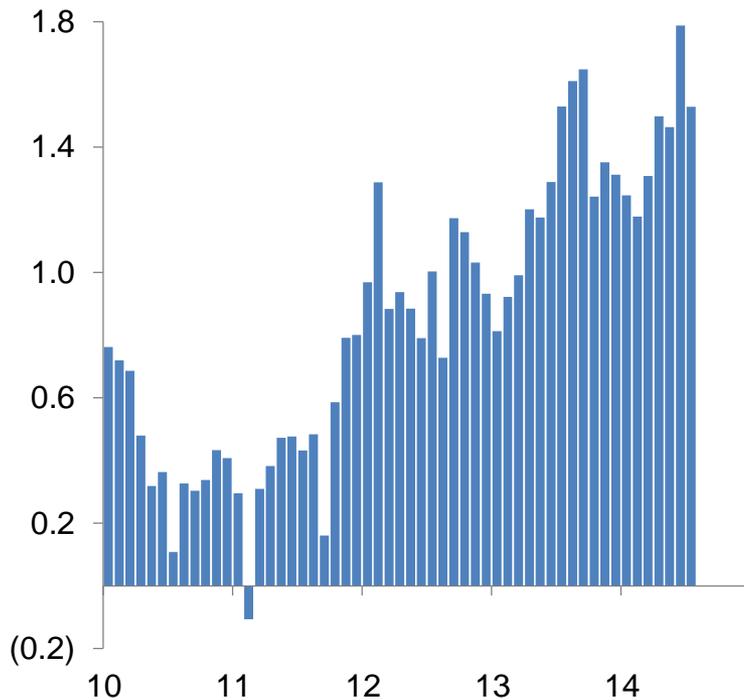


*Chinese demand has been weak overall as the economy continues to rebalance from investment toward consumption*

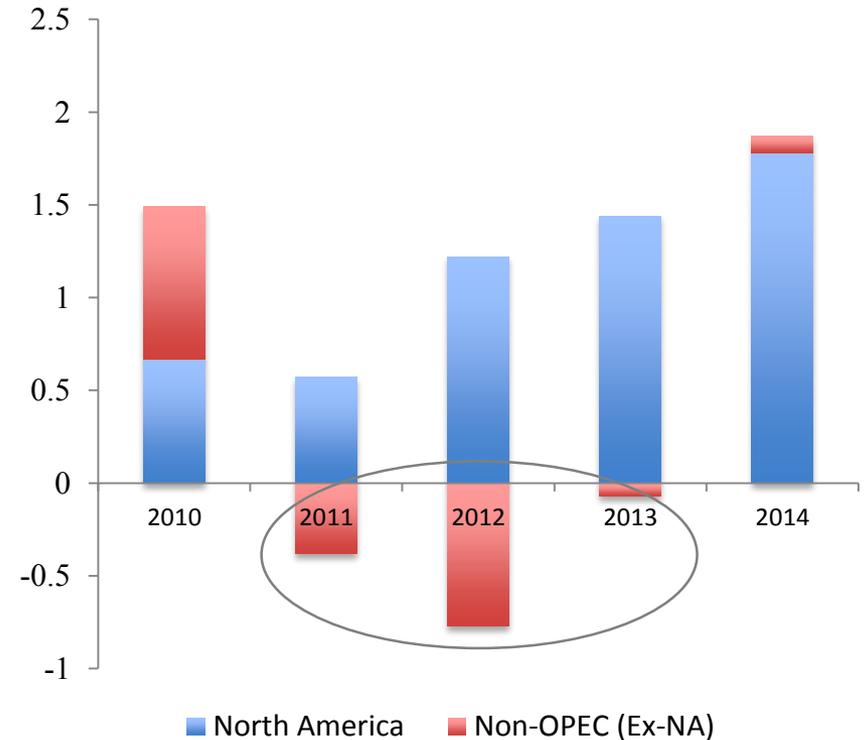
*Demand from other Asian economies has also slowed down*

# The US Oil Supply Shock

## US crude output, y/y change, mb/d



## Non-OPEC Supply, y/y change mb/d



*US output has continued to grow strongly, with crude output alone growing by about 1 mb/d in 2013 and 2014*

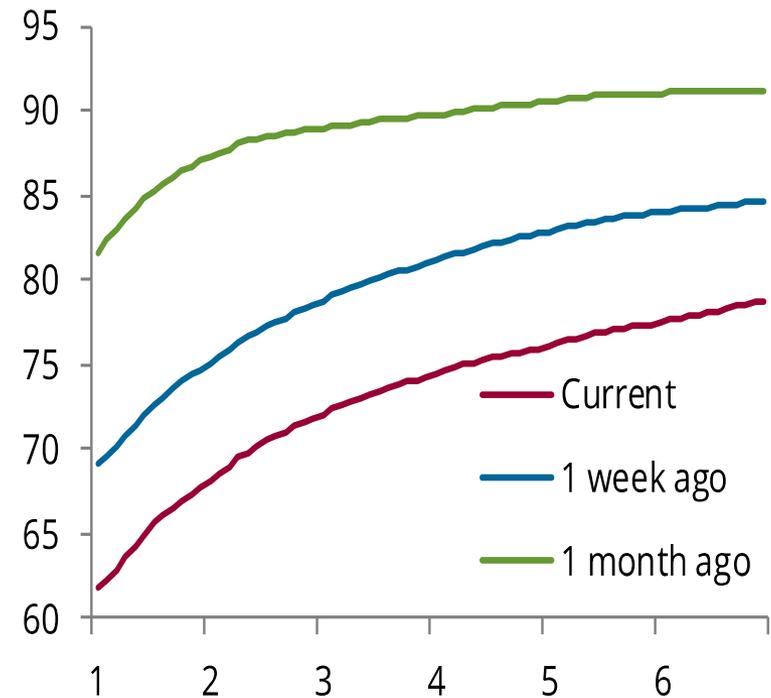
*Since 2011, non-OPEC supply has been all about North America and particularly the US*

# Inventories high and expected to accumulate further in H1 2015

## Oil Supply and Demand Balances, mb/d

	2014 Quarters					2015 Quarters					y/y change		
	2013	Q1	Q2	Q3	Q4	2014	Q1	Q2	Q3	Q4	2015	2014	2015
<b>Demand</b>	<b>91.9</b>	<b>92.1</b>	<b>91.7</b>	<b>93.4</b>	<b>93.6</b>	<b>92.7</b>	<b>92.8</b>	<b>92.7</b>	<b>94.3</b>	<b>94.5</b>	<b>93.6</b>	<b>0.8</b>	<b>0.9</b>
OECD	45.8	45.5	44.5	45.5	45.9	45.4	45.1	44.2	45.1	45.5	45.0	(0.5)	(0.4)
Non-OECD	46.1	46.6	47.2	47.9	47.7	47.4	47.7	48.5	49.2	49.0	48.6	1.2	1.2
<b>Non-OPEC supply</b>	<b>54.8</b>	<b>55.6</b>	<b>56.6</b>	<b>56.4</b>	<b>57.1</b>	<b>56.4</b>	<b>56.8</b>	<b>57.5</b>	<b>57.2</b>	<b>57.9</b>	<b>57.3</b>	<b>1.6</b>	<b>0.9</b>
Non-OPEC excl NA	36.7	36.6	37.1	37.1	37.2	37.0	36.8	36.9	36.9	37.1	36.9	0.3	(0.1)
North America	18.1	19.0	19.6	19.3	19.8	19.4	20.0	20.6	20.3	20.9	20.4	1.3	1.0
FSU	13.5	13.6	13.5	13.5	13.7	13.6	13.6	13.5	13.5	13.7	13.6	0.1	0.0
OPEC NGLs/Condensates	6.3	6.6	6.6	6.7	6.6	6.6	6.6	6.6	6.8	6.7	6.7	0.3	0.1
Call on OPEC crude	30.8	29.9	28.5	30.3	30.0	29.7	29.5	28.6	30.3	29.8	29.6	(1.1)	(0.1)
OPEC crude	30.3	29.9	29.9	30.5	30.3	30.1	29.8	30.1	30.1	29.9	30.0	(0.2)	(0.2)
Stockbuild	(0.4)	(0.1)	1.4	0.2	0.3	0.5	0.4	1.5	(0.2)	0.1	0.4	-	-

## Brent forward curve, \$/barrel, 15 December 2014



*With current level of OPEC output, inventories will continue to build well into the first half of 2015*

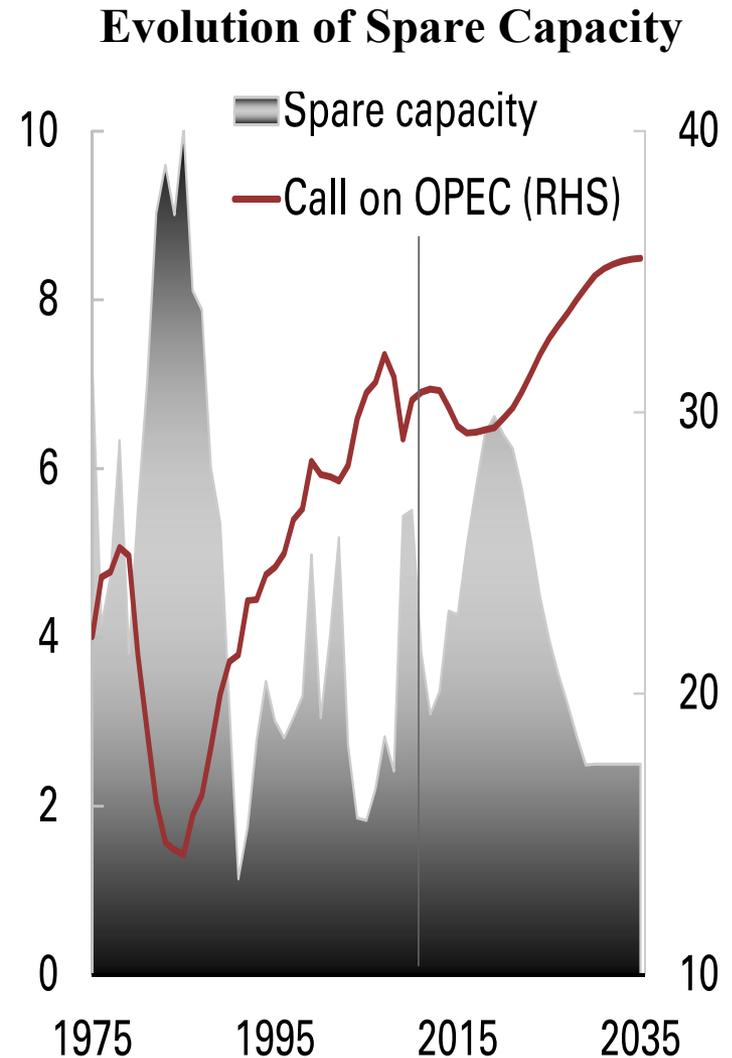
*Market in contango to provide incentive for over-ground (and later floating) storage*

# Inventories and Risks to OPEC

- Reinforcing contango
  - Mabro (1998): ‘It is excess supplies which initially cause stock levels to rise, and it is excess supplies which depress prices at the near-end of the term structure, and ultimately may cause a contango to obtain; and this, in turn provides an inducement to build stocks. A vicious circle is set in: excess supplies through this causal chain create a situation in which new demand exceeds consumption requirements and adds to stocks. **Excess supplies lead to further excess supplies.** The contango feeds on itself until storage facilities, including tankers, become *so* full as to raise the marginal cost of additional stocks to very high levels’.
- Marginal cost of storage rises which will be reflected in the forward curve structure
- The phenomenon of ‘floating storage’
- Limits to storage becomes an emerging market concern
- Sharp price movement on the downside becomes more probable as perception that storage is approaching the limit
- Without stock draws, upside potential of oil price would remain limited

# Underground Versus Over-Ground Storage

- Oil not produced today would be sold at a later time (stored underground)
- Will add to the spare capacity in the system (BP predicted spare capacity would exceed 6 mb/d by 2018, the highest since the late 1980s)
- Would higher spare capacity exert the same pressure on the price as high level of over-ground inventories?
- Shape of the curve does not need to change (market can stay in backwardation even if spare capacity is relatively high)
- The limits to storage not a problem
- Better control on when to release the stocks
  - Mabro (1998): ‘A producer holding stocks does not behave in the same way as a trading entity which has opened both physical and matching futures positions for commercial gains. The decision to release these stocks at some future date will depend on different determinants’



# The Market Sentiment

# The Role of 'Market Sentiment'

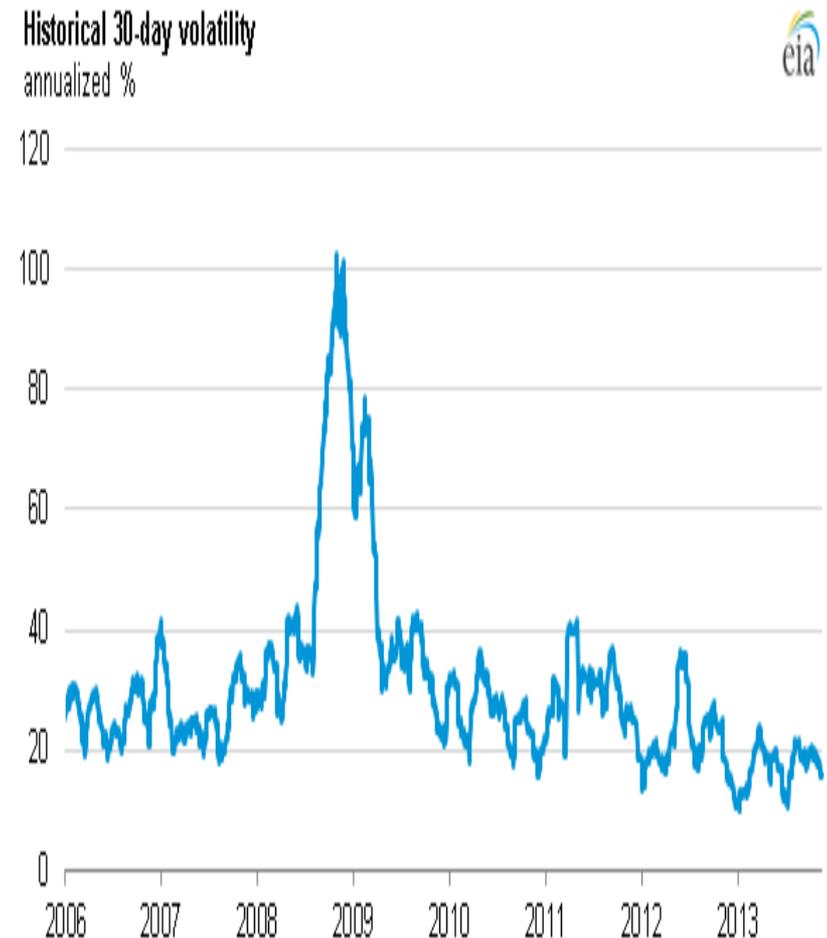
- Mabro (1998): 'This adverse impact resulting from a disequilibrium in the supply/demand relationship is aggravated...by the 'sentiment' that producers intend to pursue aggressively an output objective. Punters in futures and other derivatives markets then seek to sell. Whenever the willingness to sell exceeds the willingness to buy prices fall, as this is the only way in which an imbalance between *ex ante* intentions can yield *an ex post* equilibrium. On this count too prices immediately fall'.
- Mabro (1998): 'Many commentators, analysts and journalists became interested in a question which initially was: 'Who will blink first?' and later became 'Who has blinked first?'



# Perception of a Loss of a Supply Feedback

- A perception of fundamental change in OPEC policy implies that an important feedback mechanism on the downside has been lost or can no longer be taken for granted
- Market perception of an absence of a key feedback mechanism means that markets would have a higher tendency to undershoot and for prices to become more volatile
- A period of low price volatility and price stability within a narrow range may be over

## Crude Oil Price Volatility

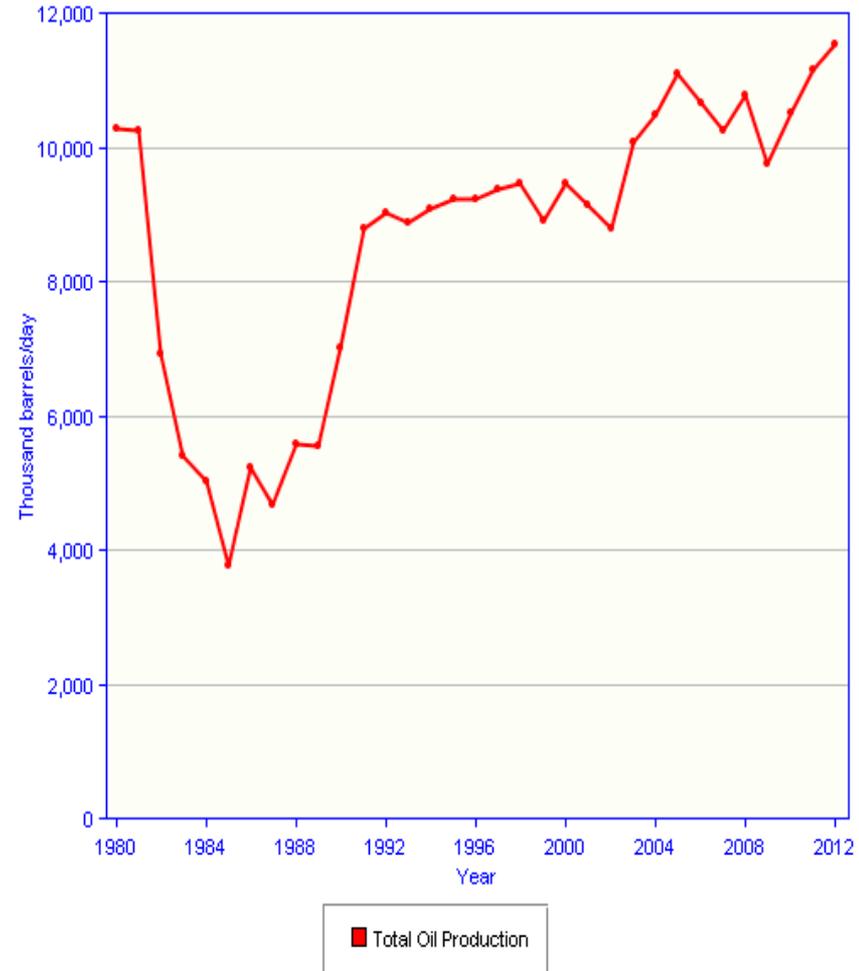


# Saudi Arabia Response and OPEC Cohesion

# Saudi Arabia Response: Was it a Surprise?

- Before the fall in oil price, Saudi Arabia sent clear signals that it is unlikely to reduce output unilaterally and is happy about the quota system
  - ‘we (Saudis) have learned our lesson. Every time we go to quotas, who bears the brunt? Us. We have learned the lesson. We are no longer the swing producer. Who needs quotas?’ (MEES, Dec 6, 2013 )
- Mabro (1998): ‘The point that Saudi Arabia has been making consistently since 1985, backed by its policy in 1986 which was a genuine price war, seems to have *sunk* in. Saudi Arabia's willingness to cut output on its own to influence the course of oil prices could not be taken for granted. **In fact nobody could realistically expect to see such willingness ever emerging again**’.

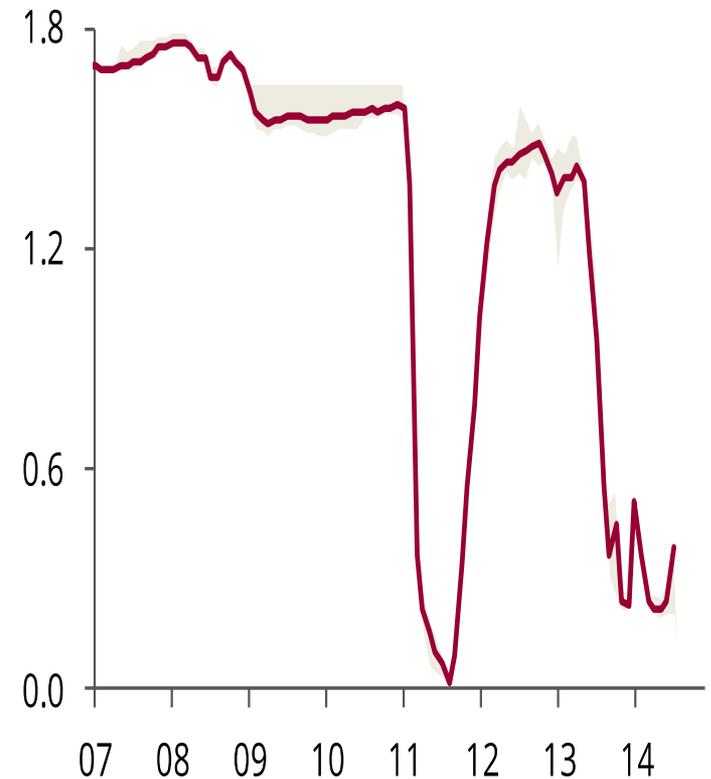
Saudi Arabia Oil Production



# A Difficult Task which is Becoming More Difficult

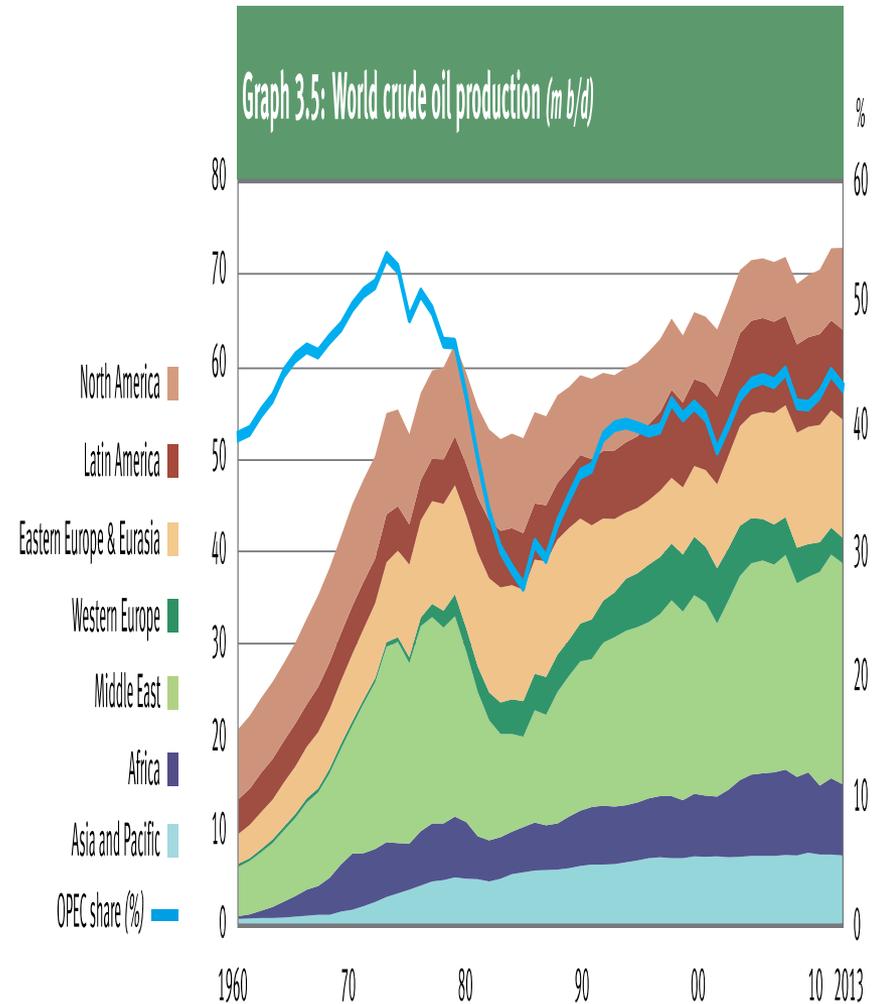
- Implementing OPEC cut never been easy
- More challenging in current environment: Many OPEC producers unable to reduce their production due to their heavy reliance on oil prices for basic functioning (e.g. paying wages in Libya, buying basic amenities in Venezuela)
- Even if a cut to OPEC quota agreed in November enforcing cuts across OPEC nations beyond very short term at best, will be difficult
- Coercing OPEC discipline through pushing prices lower may not work, especially that many are producing below their maximum capacity due to various sorts of problems

**Libyan oil production Mb/d**



# Getting Non-OPEC Members on Board

- Mabro (1998): ‘Today, OPEC no longer includes in its membership all the relevant exporting countries. It only provides a partial framework for effective policy making. **Imaginative ways need to be found to secure the involvement of outside exporters in policy making without attaching them to the Organisation with formal ties.** The co-operation issue does not concern large exporting countries exclusively...production increases by small producers, in aggregate, can also cause similar damages. And small producers are equally vulnerable to the reduction in revenues stemming from a fall in price. They have a fundamental interest in co-operating; not as we are often told to take a free ride’.

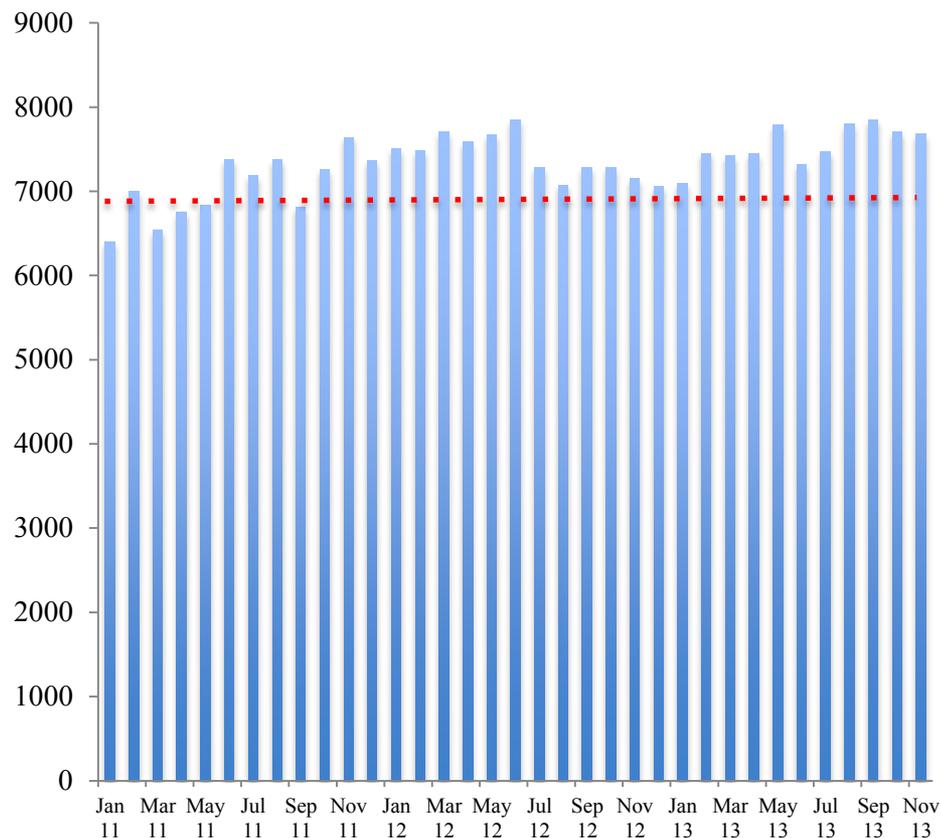


# Maintaining Market Share

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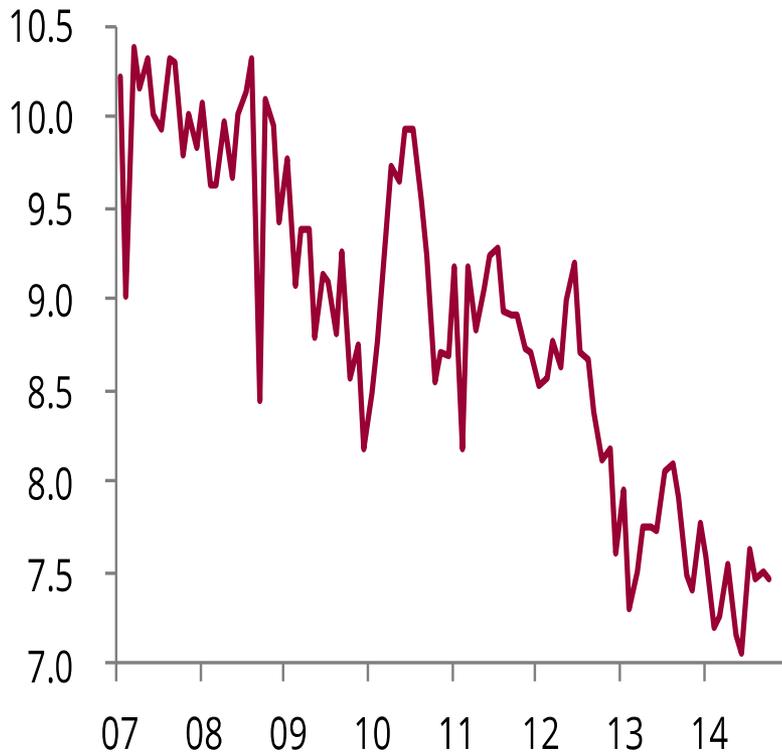
- Saudi Arabia Maintaining exports stable at around 7 million b/d
- Possible reasons
  - Market share matters
  - Naimi (Dec, 2014): *'If I reduce, what happens to my market share? The price will go up and the Russians, the Brazilians, US shale oil producers will take my share'*.
  - Presence in key markets important for a large producer
  - Maintain relationship with customers in a much more competitive market
  - Get prepared for tougher OPEC negotiations ahead (better position to negotiate from high level of production)

Saudi Arabia Exports, mb/d



# US Shale has Made Crude Oil Markets More Competitive, Especially for Light Crude Oil

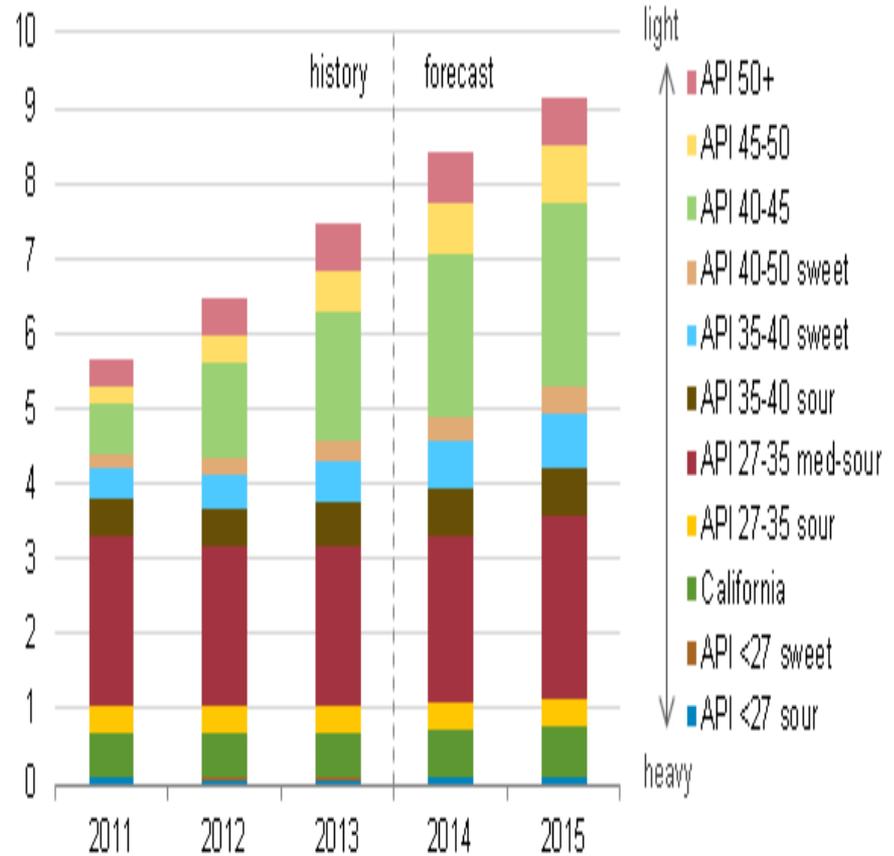
US Crude oil imports, mb/d



Source: EIA, Energy Aspects

*US crude oil imports have declined sharply over the last few years*

U.S. crude oil production by type  
million barrels per day



*....particularly imports of light crude oil as growth in production continued to be concentrated in crude with API of 40+*

# Shift in Pattern of Crude Oil Flows

## Crude Oil Imports from Nigeria (mb/d)



## Crude Oil Imports from Saudi Arabia (mb/d)

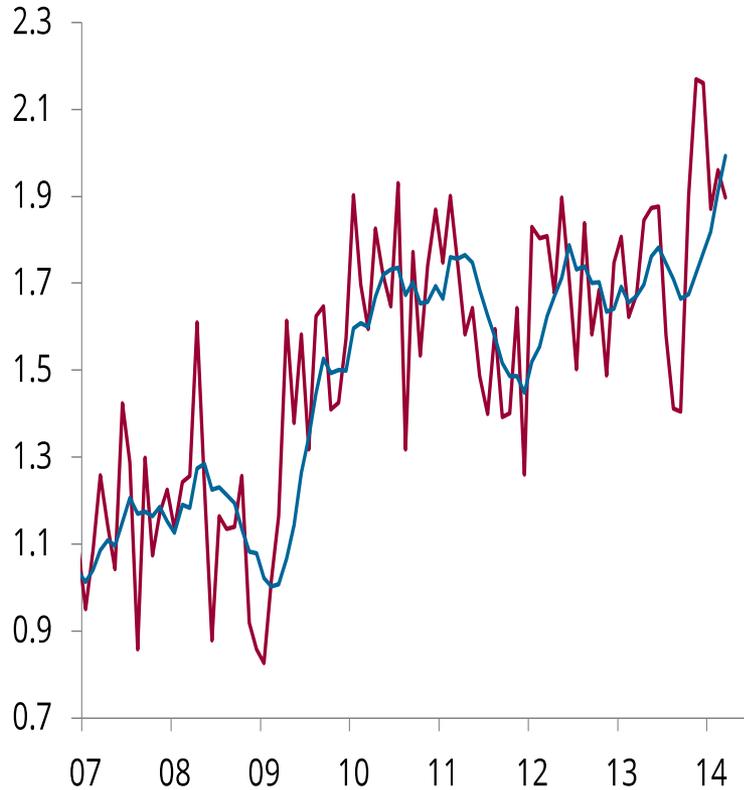


*Some traditional exporters to the US such as Nigeria have been completely backed out from the US*

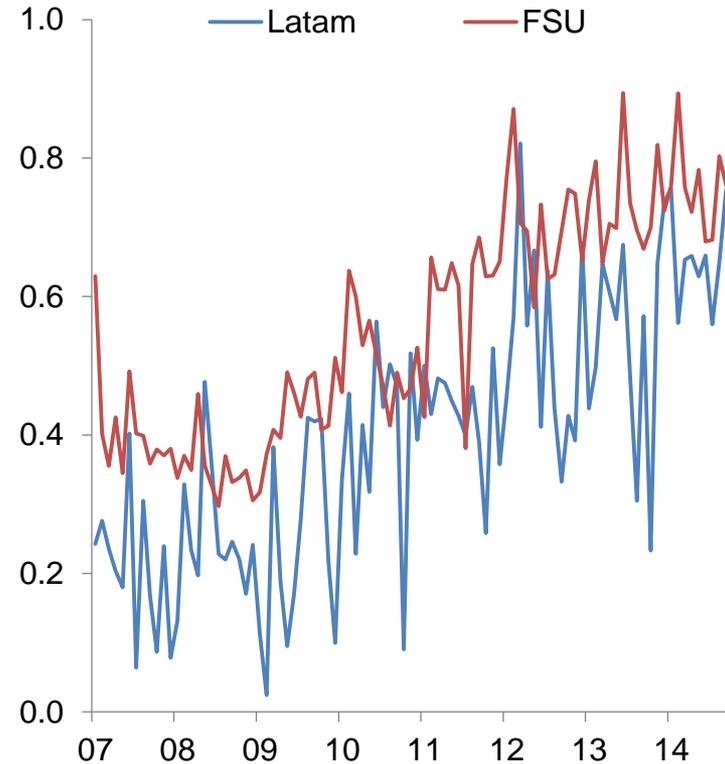
*Others such as Saudi Arabia reduced to exports to the US as US benchmarks started falling*

# Accelerated Shift of Exports to Asia

## WAF Exports to Asia (mb/d)



## Latin American and FSU exports to China mb/d

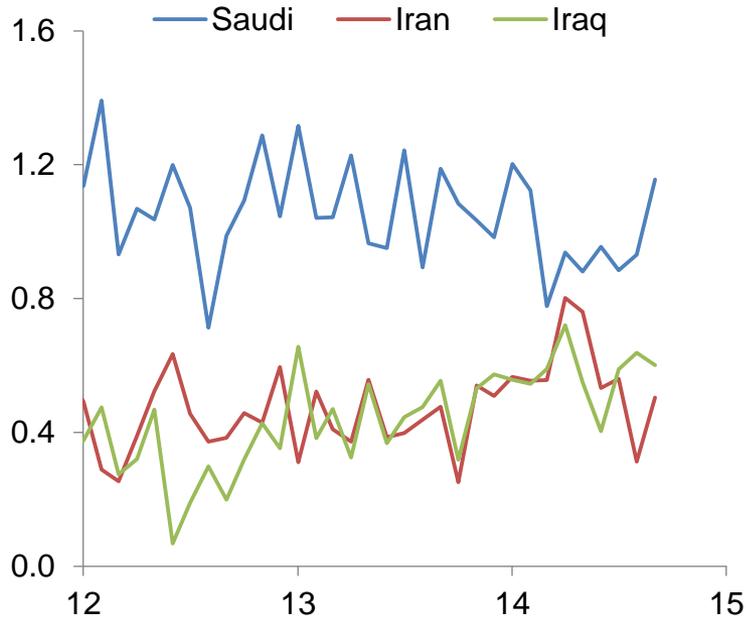


WAF producers turning to key growth market Asia to sell their cargoes

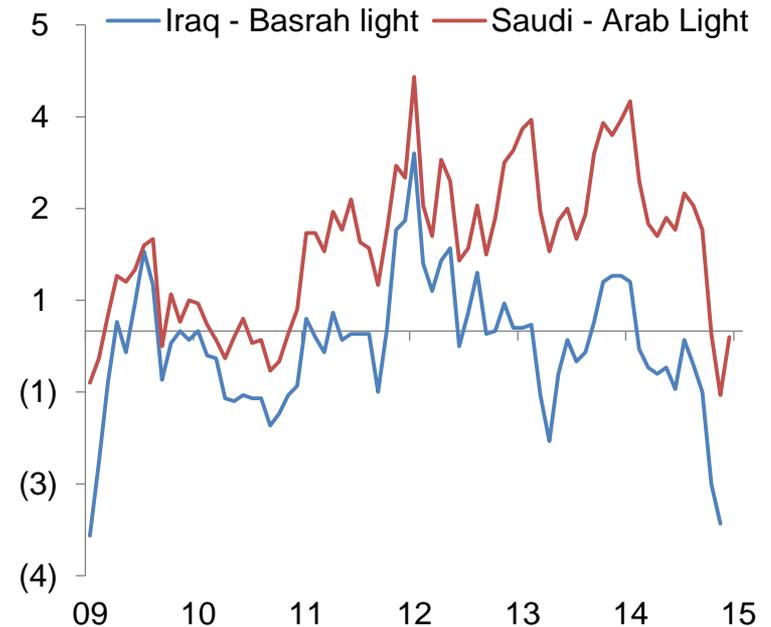
Latin American and FSU also turning to Asia

# Generating More Competitive Pressure in Asia

**Chinese imports by country**  
**Mb/d**



**Iraq and Saudi OSPs to Asia**  
**\$/barrel**



Competition intensified between Middle East producers trying to increase market share in Asia

....reflected in better terms and adjustment of price differentials

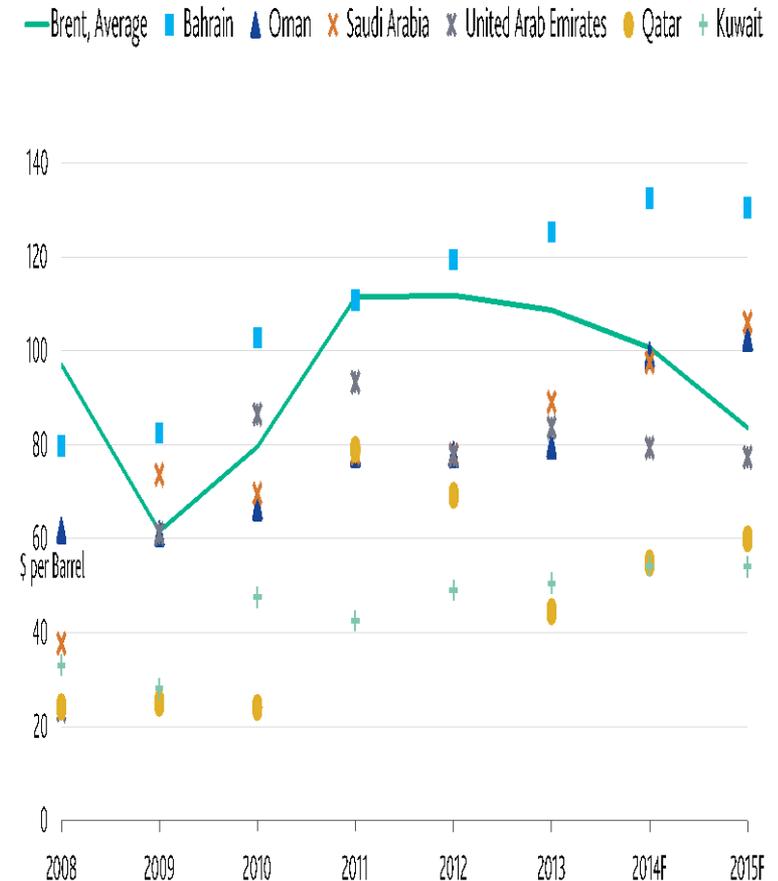
# The Perils of Market Share

- Mabro (1998): ‘It is also evident that the exporting countries' interest is in revenues, not in volume as such and not in prices as such...There is an interdependence between prices and volumes. Attempts to increase volumes against an inelastic demand would cause prices to fall by more than the volume increase. And changes in oil prices do not necessarily result in commensurate changes in oil production. For this simple reason those who persistently advocate that OPEC should pursue a market share policy come what may, that is maximise volumes without worrying about the price impact, are not offering sensible advice.
- Mabro (1998): ‘There are situations, as in 1986 for example, when the collapse in Saudi Arabia's export volumes was so significant as to require a drastic price war to improve the position on the volume front...Outside these specific instances the pursuit of market share by an oil exporter or a group of exporters is not a sensible policy because the costs involved can be very high during its implementation and the future benefits too distant and too uncertain’.

# The Limits to Price Wars

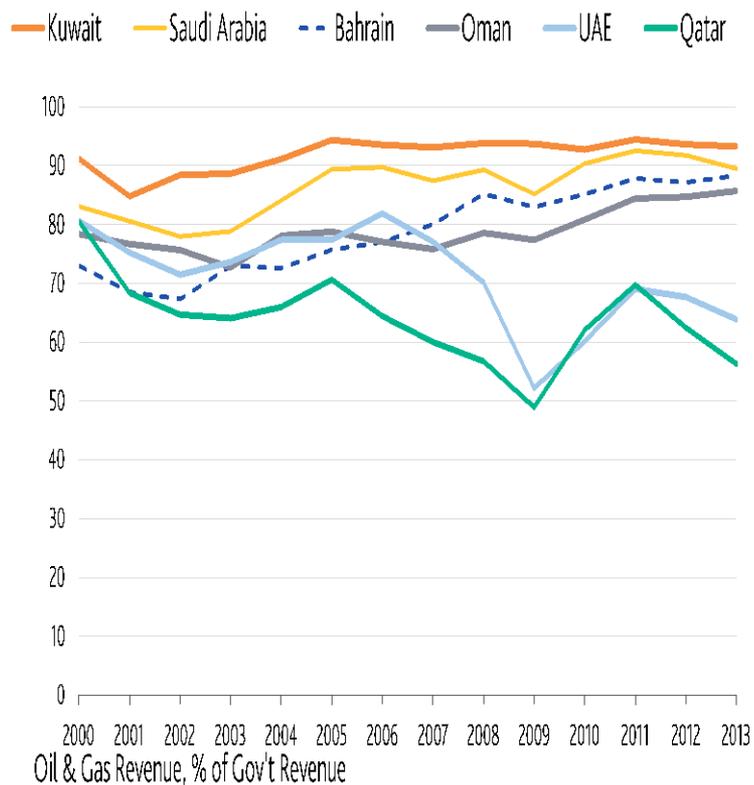
- Mabro (1998): ‘price wars ...cause huge losses and do not achieve their objective, which is to eliminate the competition. To succeed prices have to fall below costs. On their way down they will remove some marginal barrels from the market, not enough to increase the volumes supplied by the low cost producers by a proportion sufficient to compensate for the loss in price. **Prices have to fall a long way and price expectations have to remain depressed for a long time for a significant improvement of the market share of those who launch an oil price war. No oil-exporting country has the financial resources which enable it to sustain such a policy**’.

**Fiscal Break Even Price, \$/Barrel**

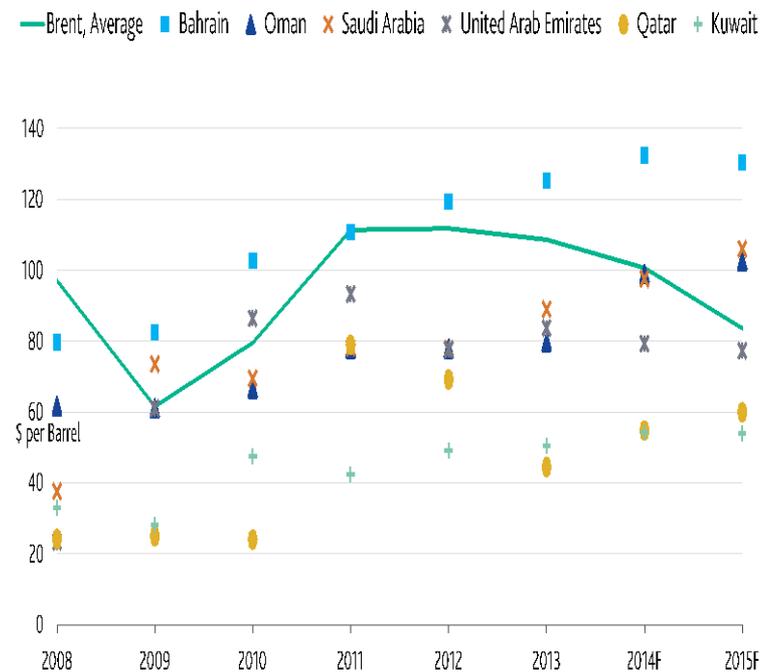


# Oil Dependency Limits Options

## Oil & Gas Revenue as a % of Gov't Revenues



## Fiscal Break Even Price, \$/Barrel

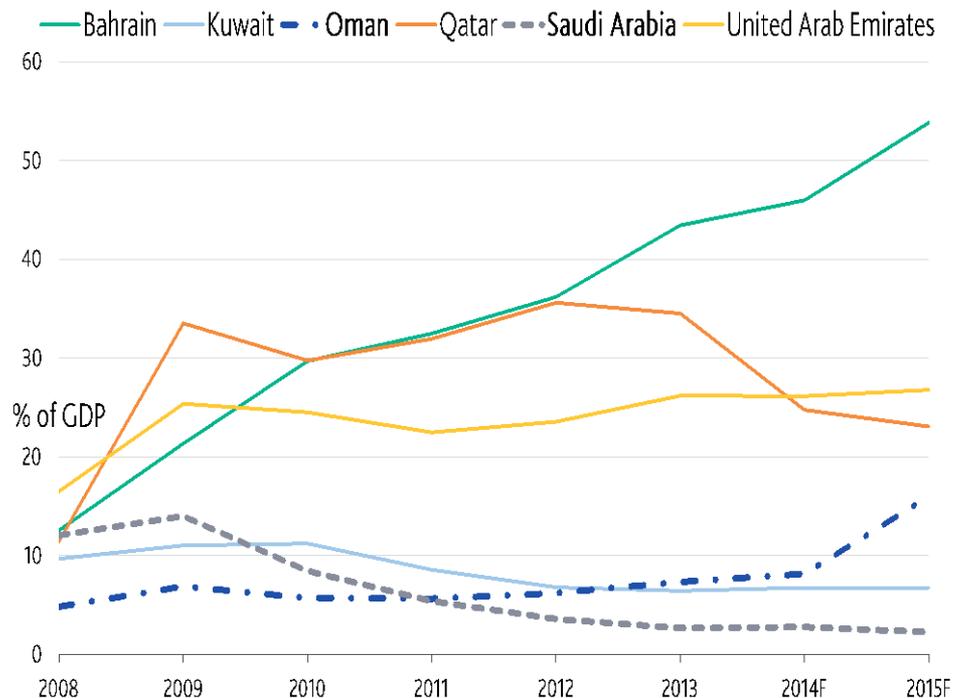


*Dependence on Oil & Gas Revenue remains high particularly for Saudi Arabia and Kuwait*

*Fiscal breakeven prices are rising as government expenditure increase, just as price of oil is falling*

# GCC Economies Have Become More Resilient

## Government debt as a % of GDP



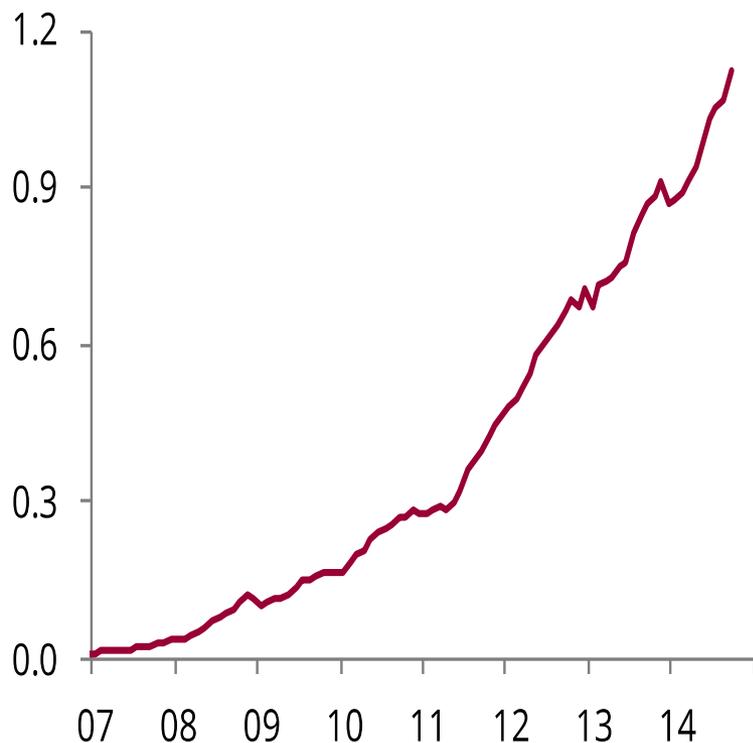
2014F	SWF Assets / Gen. Gov. Expenditures (Years)	SWF Assets / Gen. Gov. Debt (Multiples)
Kuwait	7.6	51.9
United Arab Emirates	5.1	4.4
Qatar	4.7	5.7
Saudi Arabia	2.8	35.3
Oman	1.7	9.3
Bahrain	1.2	0.8

*Most GCC countries have fiscal space to increase debt but also decrease expenditure*

*Foreign assets provide a sizable buffer for most GCC countries*

# The Nature of Challenge has Changed with the 'Shale Revolution'

## Bakken oil output, mb/d



*Tight oil growth has been phenomenal as the number of wells drilled sharply increased*

## Oil output per well , b/d



*...but also productivity improved reflected in oil output per well continues to increase*

# Key Uncertainties in the Supply Response to a Low Price Environment

- Key uncertainties
  - Magnitude
  - Timing
  - Elasticity
  - Linear or non-linear effects
  
- Break even cost highly uneven
  - ‘Well by Well’ economics
  - Least productive wells will be shelved affecting production at the margin
  - Productivity and efficiency improvements could accelerate in a low price environment
  
- How elastic is the supply curve?
  - Once the oil price is above a certain level, wells will be brought back into production (switch on, switch off)
  - Put a cap and a floor on the oil price
  
- Cash flows highly sensitive to low prices
  - Pressure on cash flows will affect capital expenditure and future supply growth
  
- Possibility of non-linear effects?
  - Is it possible below a certain price we will see some disruptive impacts?

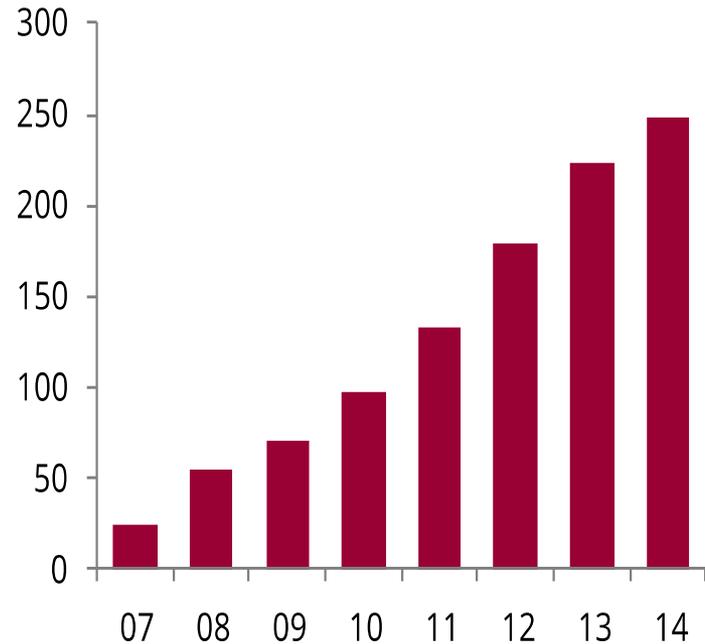
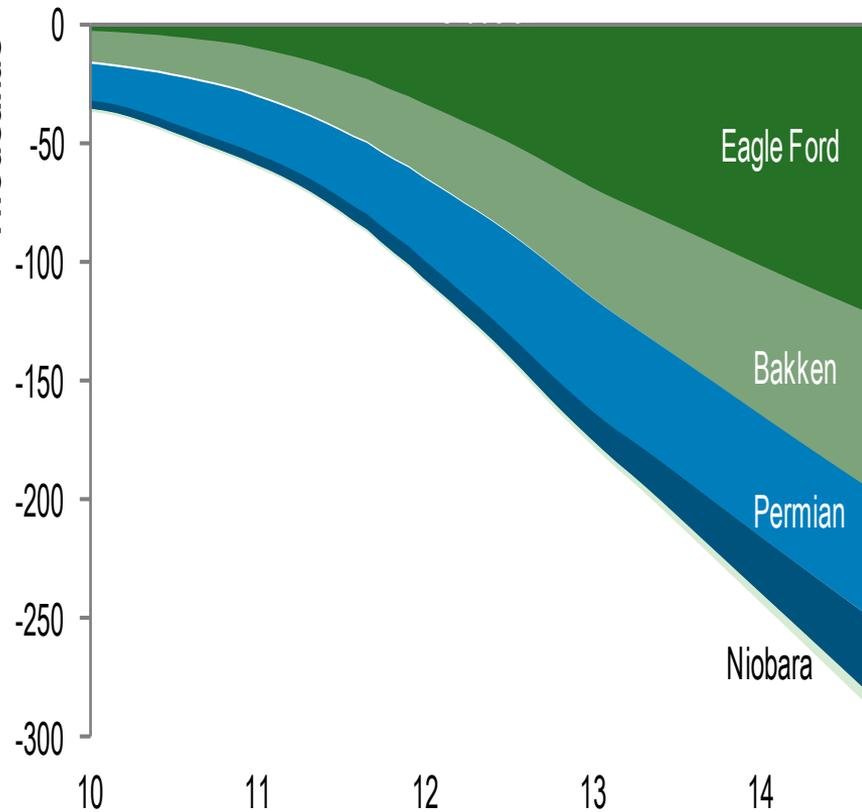
North Dakota Break-Even Oil Prices		
	Price (\$/bbl)	Rigs
McKenzie	\$28	66
Dunn	\$29	28
Stark	\$36	2
Williams	\$37	43
Mountrail	\$42	31
Bottineau-Renville	\$51	4
Billings	\$53	4
McClellan	\$73	1
Bowman-Slope	\$75	0
Golden Valley	\$77	0
Burke	\$81	3
Divide	\$85	8
<b>Average/Total</b>	<b>\$56</b>	<b>190</b>

Source: North Dakota Department of Mineral Resources

# Sharp Decline Rates and High Capex

Legacy m/m decline in output, kb/d

Cumulative Capex since 2007 for Shale Producers, \$bn



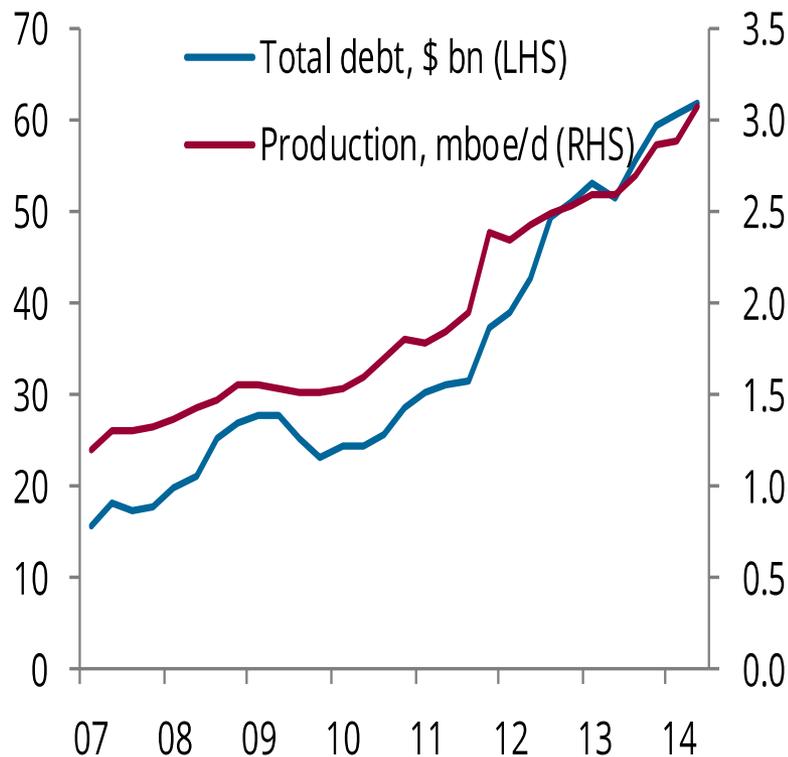
Source: Company Reports, Energy Aspects

Wells in shale plays suffer from sharp decline rates

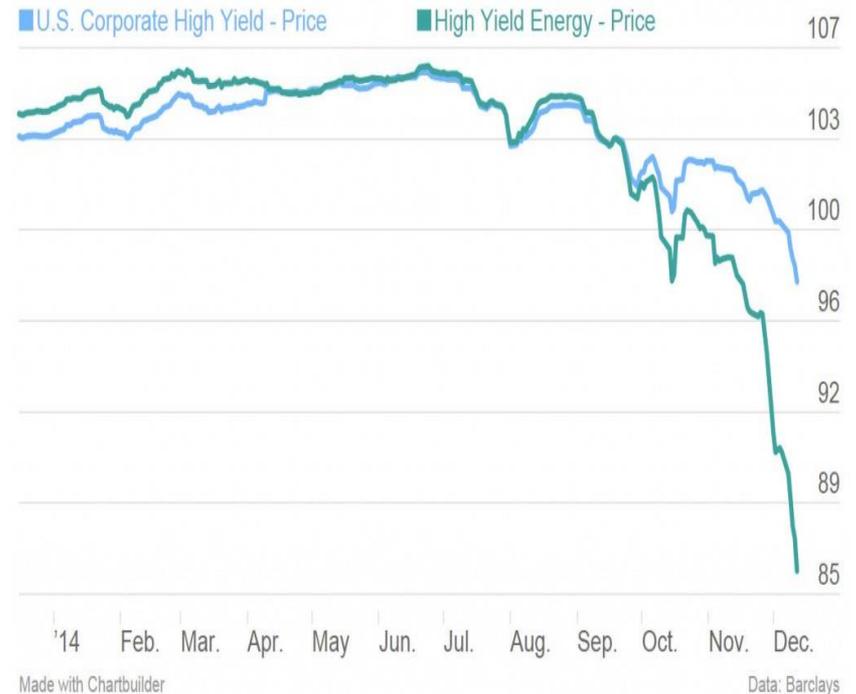
The only way to increase production is to drill more wells which is reflected in the large increase in capital expenditure

# Disruptive Effects

## Total debt and production



## Price of High Yield US Corporate Bonds



*Production increases at big cost by drilling hundred of wells and accumulating large amounts of debt*

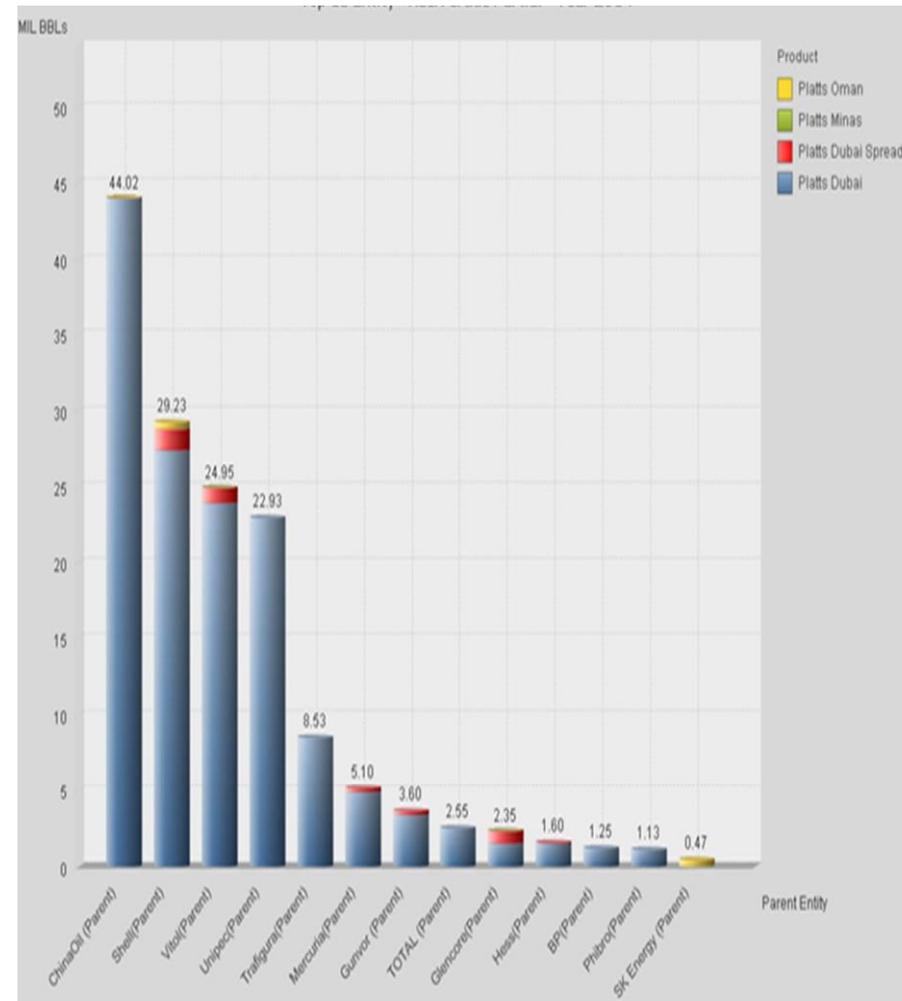
*Bankruptcies? Consolidation? Loss of interest from financial investors?...The supply response is not only about production economics; but also may end up in a more efficient and robust sector*

# OPEC and the Market

# OPEC Tools to Influence the Market

- OPEC does not set the oil price (the so called 'market' does)
- OPEC members don't participate in the futures or OTC markets
- OPEC members countries don't participate in the Platts' window
  - Asian players are becoming more assertive in the Window
- OPEC can influence the price through limited set of tools:
  - Cut production in a an over-supplied market
  - Send signals to the market (cheap talk versus credible)
  - Longer term: Limit investment in new productive capacity (affects future supplies)

## Counterparties in Platts Dubai MOC in 2014



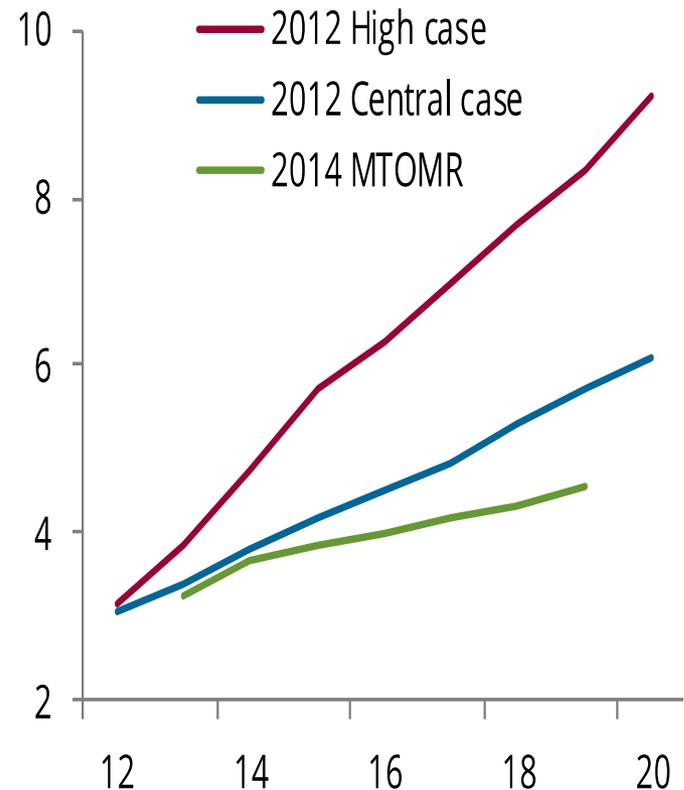
# The Importance of Communicating to the Market

- Mabro (1998):
  - ‘The presentation of a policy or an agreement is important. This requires skills and more particularly a deep understanding of how the oil market functions, how it forms its views, and how it responds to news. Exporting countries should invest in personnel with these particular talents.
  - The understanding of the market needs also to improve not only for presentation but for matters of substance....
  - Transparency may serve better the interests of oil-exporting countries than the lealung of distorted information on production, investment plans and the like.
  - The recent oil events suggest that silence has great merits when there are misunderstandings between major players. Public statements in such a situation only deepen the rift to the detriment of all parties' interests’.

# The Investment Question

- Mabro (1998): ‘An investment race would only be successful if the new capacity thus created does not exceed the increment in demand...An investment race pursued blindly can have similar effects to those of a price war....All that means that prices are of greater importance than volumes in a static world (apart from a few exceptional situations) and that investment in productive capacity is a critical factor in a growing world. **If exporting countries want to protect their revenues through co-operative action they need to address the price, the volume and the investment issues in their interaction**’.

IEA Forecast for Iraqi Output, mb/d



# Conclusion

- The nature of the challenges facing OPEC has changed so should its policies
- The inventory problem; the investment question; the market share problem; OPEC Cohesion; communicating to a more complex market
- Mabro (1998): ‘The mind set which determines the conception *of* policy has been shaped by old experiences and traditional ways of approaching problems. This mind set is far too rigid and does not appear to be sufficiently relevant to the challenges posed by the oil market’.