September 2015
CONFIDENTIAL

KIMMERIDGE
Energy

Echoes of '98

Please see the end of this presentation for important disclosures.

Summary (March 2015 Presentation)

- Current oil prices reflect the trough of a cycle. ROACE is at record lows, capital spending is being slashed, production growth is nonexistent within current cash flows and the marginal E&P operator is in need of capital to stay in business. *Unchanged*

- Much of the recent collapse in oil appears to be the result of a deceleration in demand and a strengthening of the USD. History suggests that a recovery from this trough will be demand-led and supply-supported. *Demand is now being revised up despite negative GDP news*

- Consensus expects a recovery in the second half of 2015. While this remains plausible, the risks appear to be to the downside, with a longer trough driven by a flood of new capital into the space and a weak macro backdrop. *Consensus is more bearish and liquidity is now beginning to decline*

- The increased volatility and low commodity prices are likely to be positive for long-term oil prices, lowering confidence in investment, lowering planning assumptions and instilling capital discipline in a sector where it has been lacking. This appears similar to the events of 1998, which led to a multi-year bull cycle. *Unchanged with the similarities to 1998 becoming more evident*

Summary Outlook (6-12 months)

- ROACE remains at trough levels. While demand growth is fragile (stronger in the US and weaker in emerging markets and China), supply is moderating.

- Even a moderate reduction in global liquidity is having a profound effect on the industry, with numerous E&P’s going Chapter 11 and more likely to follow. This decline in access to capital, coupled with a strengthening dollar, is also likely to impact supply from emerging market countries (Brazil, Venezuela, Mexico, Indonesia, Iraq, Nigeria, etc.).

- There is little evidence that the US “shale revolution” has been anything other than a supply boom created by cheap capital fueling marginal investment. There remains a wide dispersion between well performance in the core of a shale play (front of the cost curve) and the fringe (top of the cost curve). Operators are retreating to the core, and those positioned in the core are outperforming.

- **It appears the commodity has bottomed with the playbook echoing the script of ’98/’99**. If so, the pattern follows a continued reduction in supply, a continued stabilization in demand, a deceleration in EM supply growth with the potential for a credit/currency crisis, a reduction in US rates/return to QE and a recovery in price.

Kimmeridge Commodity Outlook Framework

- Over the long term, oil and gas prices have trended in line with the capital intensity of the industry. Since 1998, the capital intensity of the industry has expanded circa 8% per annum on a per barrel basis, despite the shale revolution.

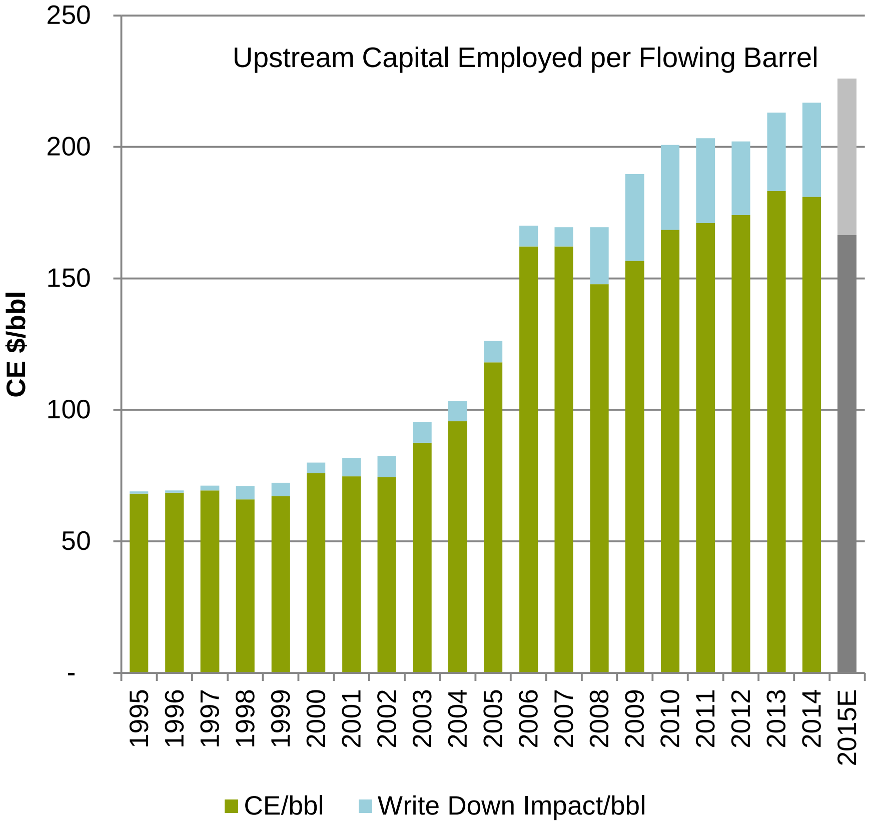
- While prices have trended with the marginal cost, they have also been reflective of near-term supply/demand trends, such that when spare capacity is tight, operators earn outsized returns and are incentivized to add production. In contrast, when demand is low, prices tend to trend below the marginal cost, leaving the high-cost players to reduce volumes.

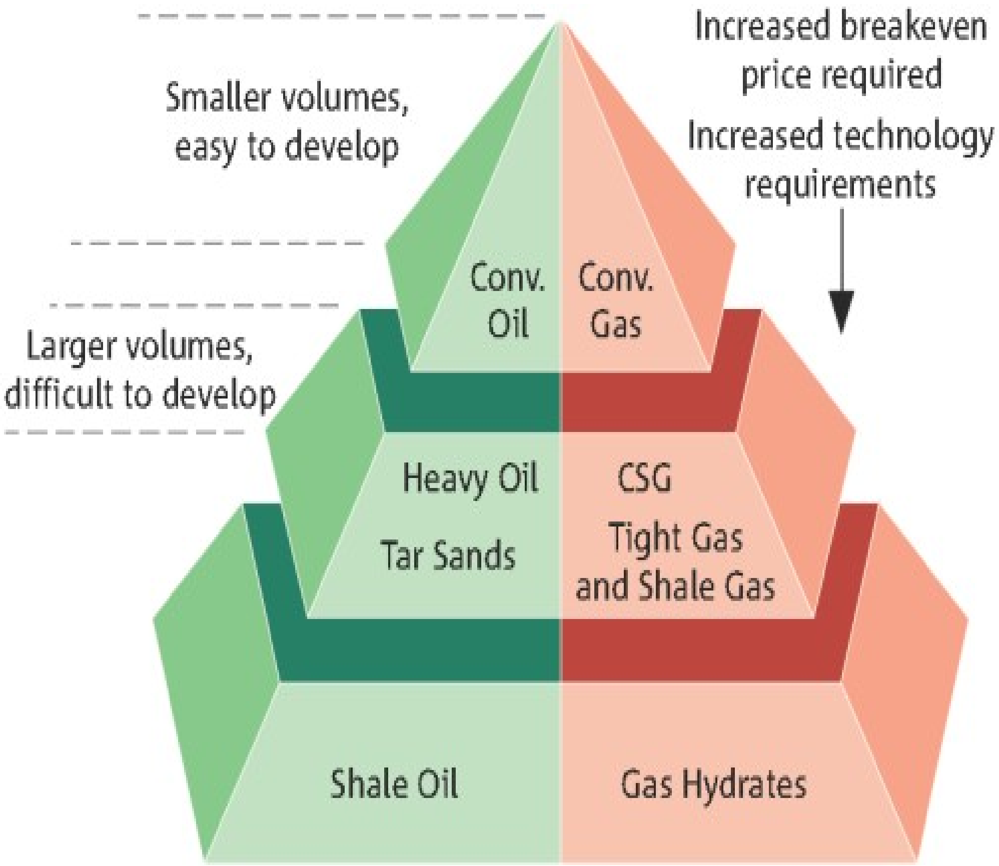
- Liquidity has also extended/compressed cycles. The loose monetary policy of the last 7 years has encouraged capital providers to accept lower returns than what they have endorsed historically.

- Today, oil and gas prices are trending below the marginal cost of supply, with prices having collapsed in the face of weak 2014 demand and stronger supply. Current pricing is unsustainable. Demand is stabilizing while supply is moderating, laying the foundations for a recovery.

What Shale Revolution? Capital Intensity Has Continued to Climb

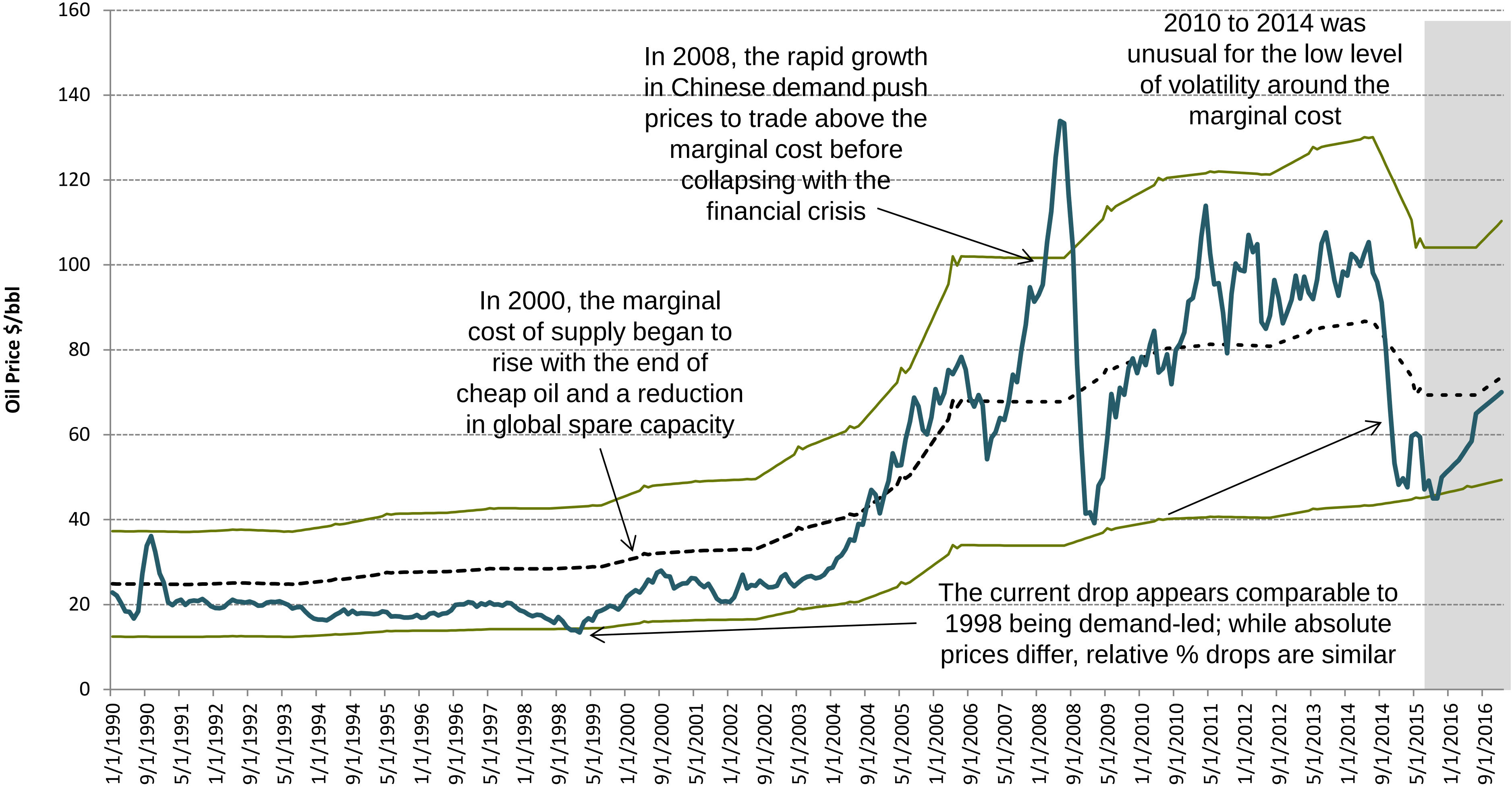
- Since 2004, the capital intensity of the US E&P industry has risen at a 6.6% CAGR excluding write-downs and 7.7% inclusive of written off capital.





Smaller volumes, easy to develop
Larger volumes, difficult to develop
Increased breakeven price required
Increased technology requirements
Conv. Oil
Conv. Gas
Heavy Oil
Tar Sands
CSG
Tight Gas and Shale Gas
Shale Oil
Gas Hydrates

Over the Long Term, Oil Prices Have Cycled Around the Marginal Cost



In 2008, the rapid growth in Chinese demand push prices to trade above the marginal cost before collapsing with the financial crisis

2010 to 2014 was unusual for the low level of volatility around the marginal cost

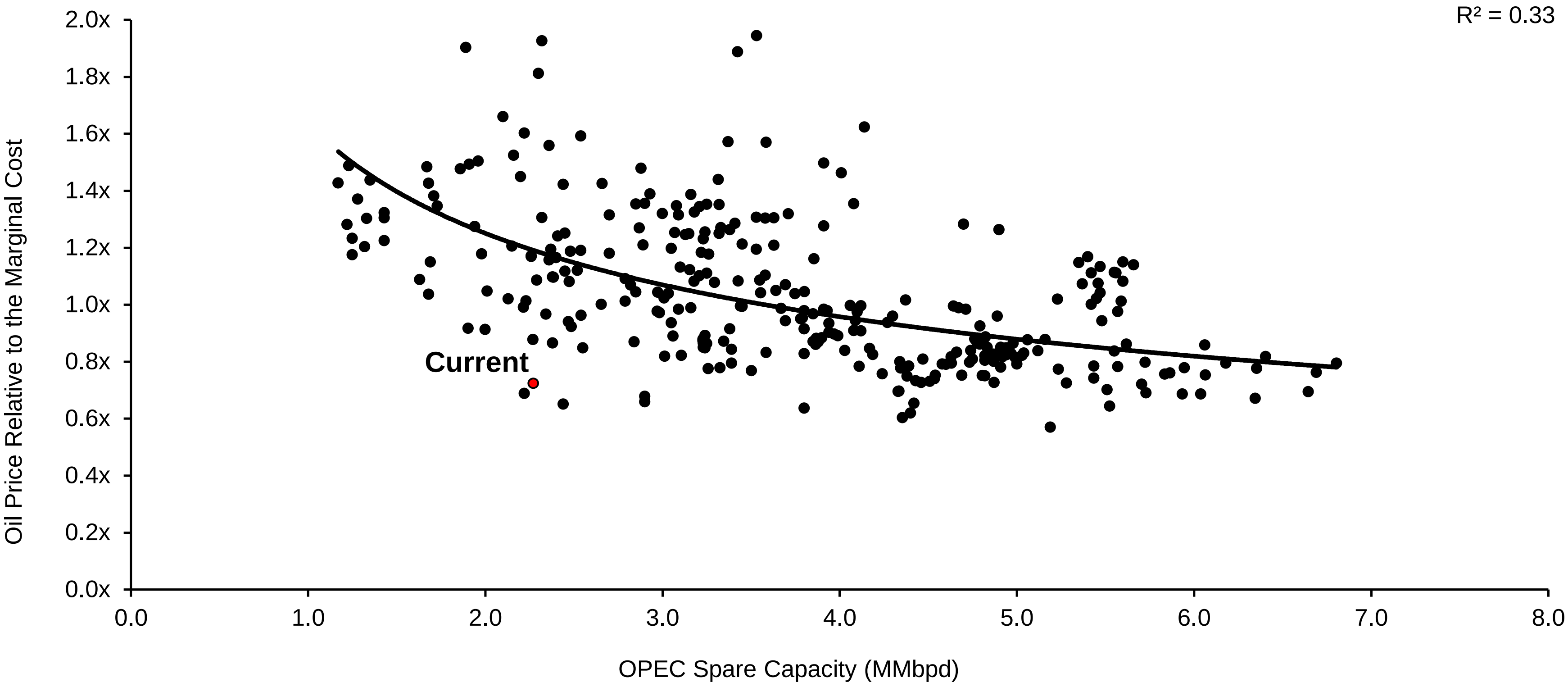
In 2000, the marginal cost of supply began to rise with the end of cheap oil and a reduction in global spare capacity

The current drop appears comparable to 1998 being demand-led; while absolute prices differ, relative % drops are similar

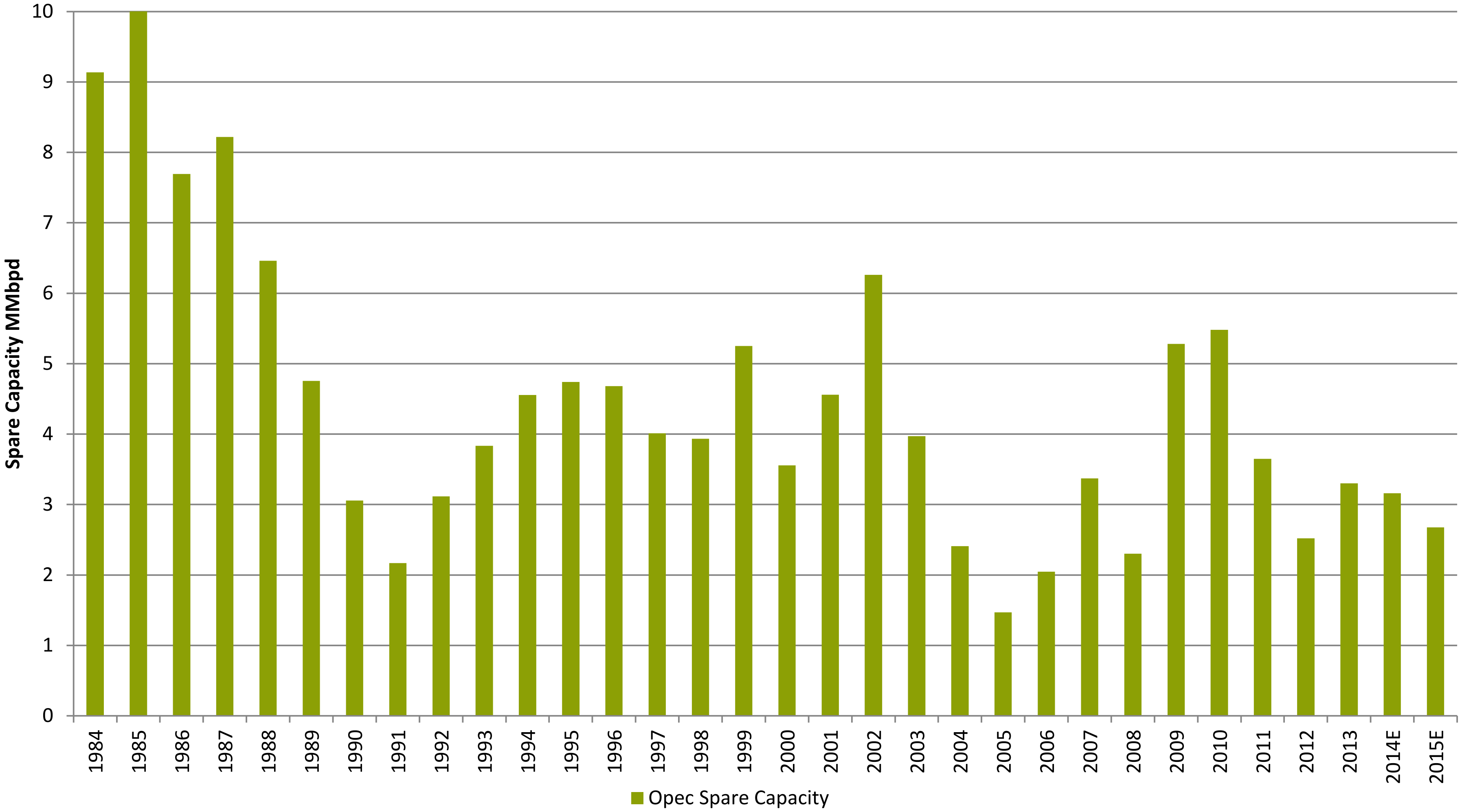
KIMMERIDGE Energy

Oil Prices Cycle Based on Near-Term Supply/Demand

- Oil prices have continued to trade around the marginal cost (adjusted for supply/demand). However, as fears grow about a deflating marginal cost and growing spare capacity, prices have trended below the line.

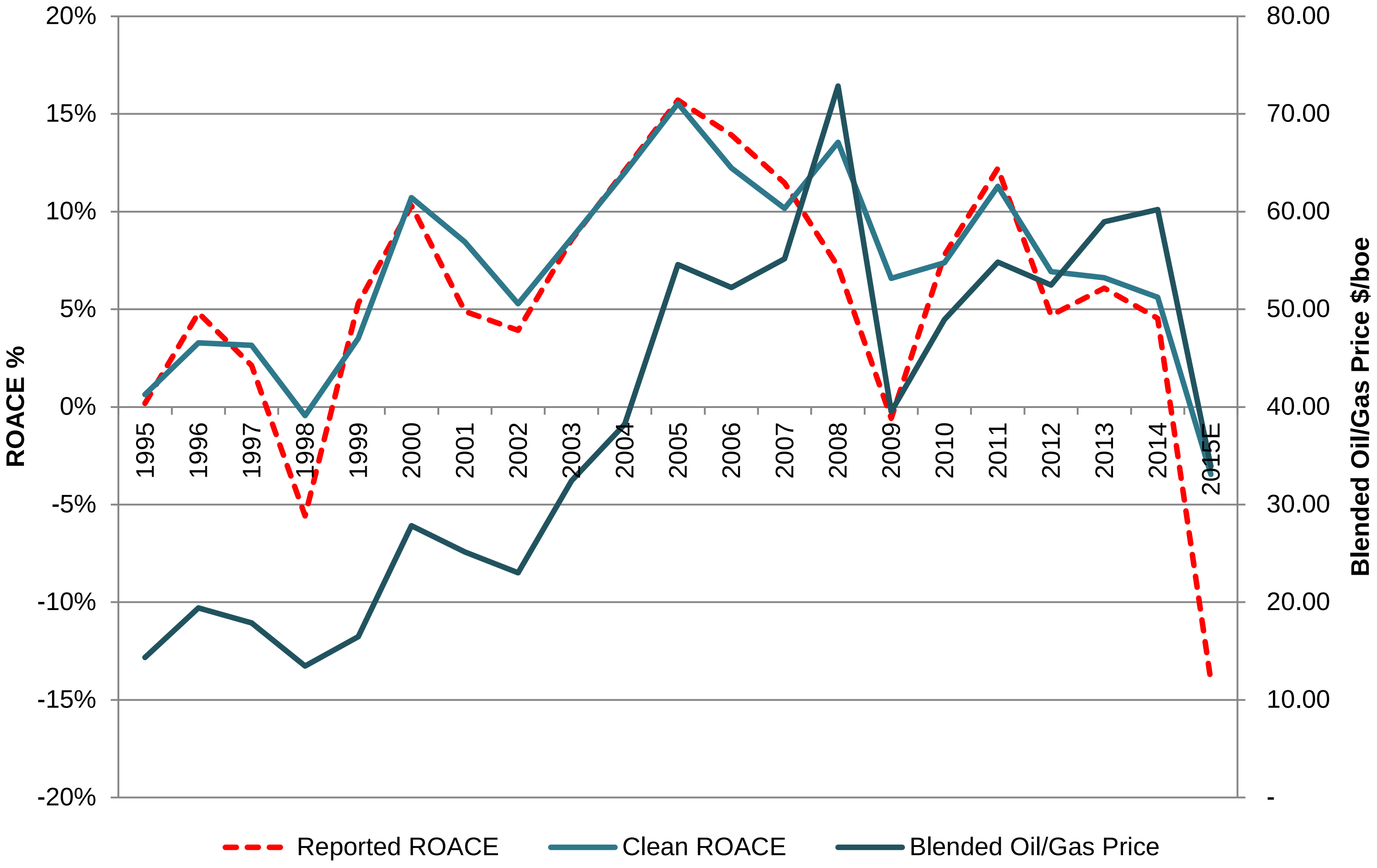


Today’s Spare Capacity is Not Unusually High; In Part Because the Physical Market is Oversupplied



2015 ROACE is Likely To Be the Lowest in 20 Years

- If the 1H2015 environment persists ($50/bbl and $3/mcf gas), then 2015 ROACE will be lowest for the peer group in 20 years (including and excluding write-downs), indicative of a cyclical trough.



A Summary of Malinvestment (75 Largest Public E&P's) Since 2004

- $1.078 trillion invested, for 23.9Bn of reserves growth at an average price of $21.22/boe; over $300Bn funded outside operating cash flow (asset sales, equity and debt)
- $137.8Bn of capital write-downs (through YE2014), with a further $37.8Bn through 1H2015, accounting for 16.2% of all capital invested
- Average clean ROACE of 6.2% and average reported ROACE of 4.02%
- 2015 annualized ROACE (taking 1H2015) of -3.4% (clean) and -14.0% (reported)
- CE/bbl growth from $51.7/boe to $217/boe (YE2014), a 7.7% growth rate

Supply Summary

- While investors have focused on US supply growth as the cause of the collapse in crude prices, the reality is that total global supply growth has not been abnormally high, due to weak non-OPEC/non-US supply.

- US supply is now contracting, as would be predicted of the marginal player. The only basin that appears to be opposing this trend is the Permian, which sits at the front of the cost curve.

- OPEC growth has been significant, driven by the return of Libya, Iraq and now Iran. Risks exist on both sides of this equation with more supply likely in the event of an Iranian resolution and less supply possible due to geopolitical unrest in Libya/Iraq/Nigeria/Venezuela and economic disruption (Brazil, Indonesia, Mexico, etc.).

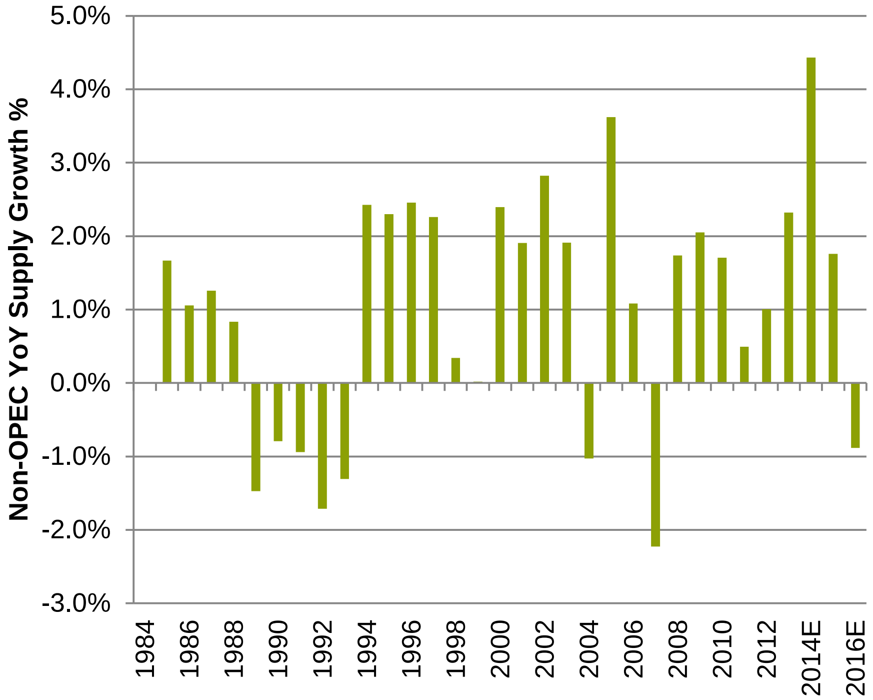
- Long-term supply is likely to be negatively impacted by the return of volatility to the crude market. This was a meaningful outcome of the 1998 downturn that we would expect to be repeated.

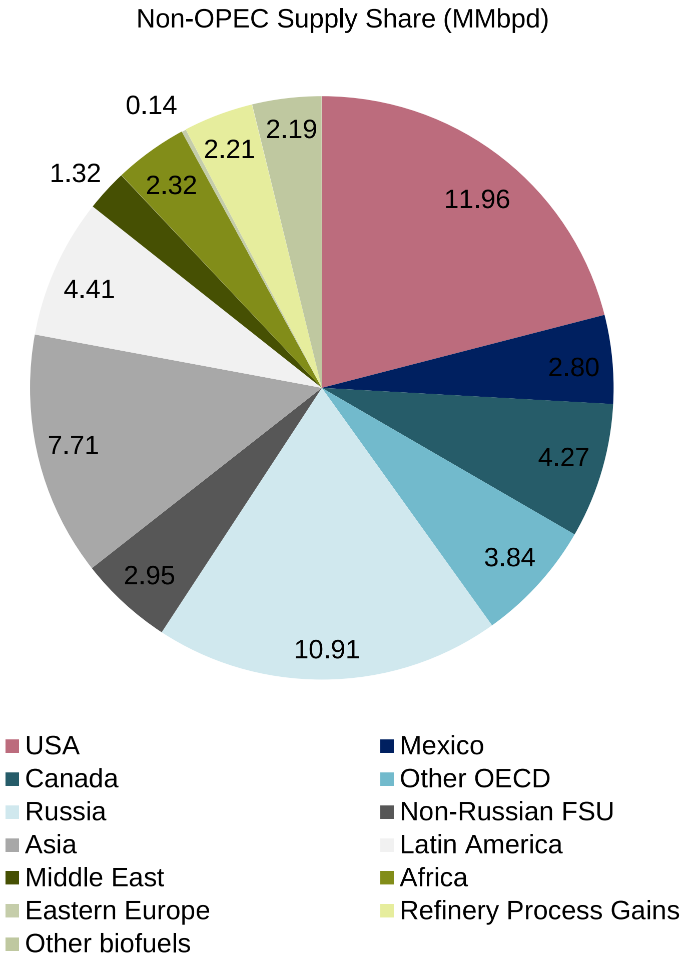
Lower Pricing and the Marginal Supplier

- The oil market has two marginal suppliers:
  - OPEC, who are a low-cost supplier (excluding social costs), but act as a swing provider; and
  - The US onshore, which is higher cost, but elastic given the short-term nature of new supply.
- As prices have collapsed, OPEC has acted counter to its market-balancing role, squeezing production at the top of the cost curve (US, offshore North Sea, Deepwater, Oil Sands, etc.)
- The surge in OPEC production coincided with GDP concerns and continued US supply growth, adding fuel to the fire of a commodity correction.

A Break Out of Non-OPEC Supply

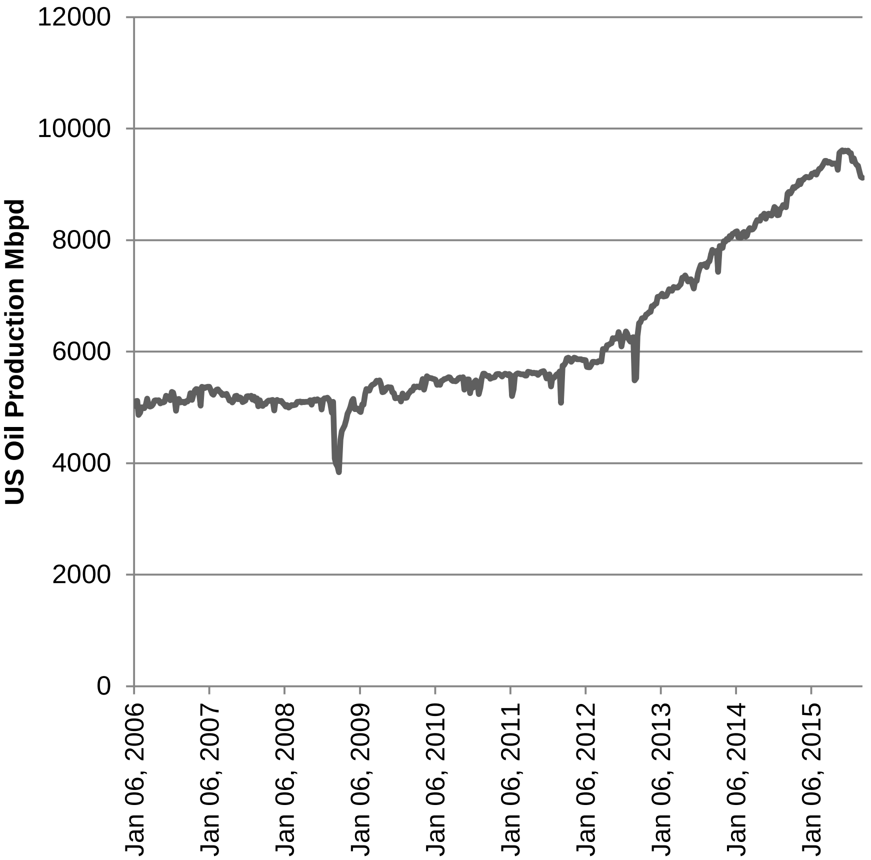
- The US has been the primary driver of non-OPEC supply growth. However, growth was not unusually strong until 2014, driven by a surge in Canadian volumes (oil sands).

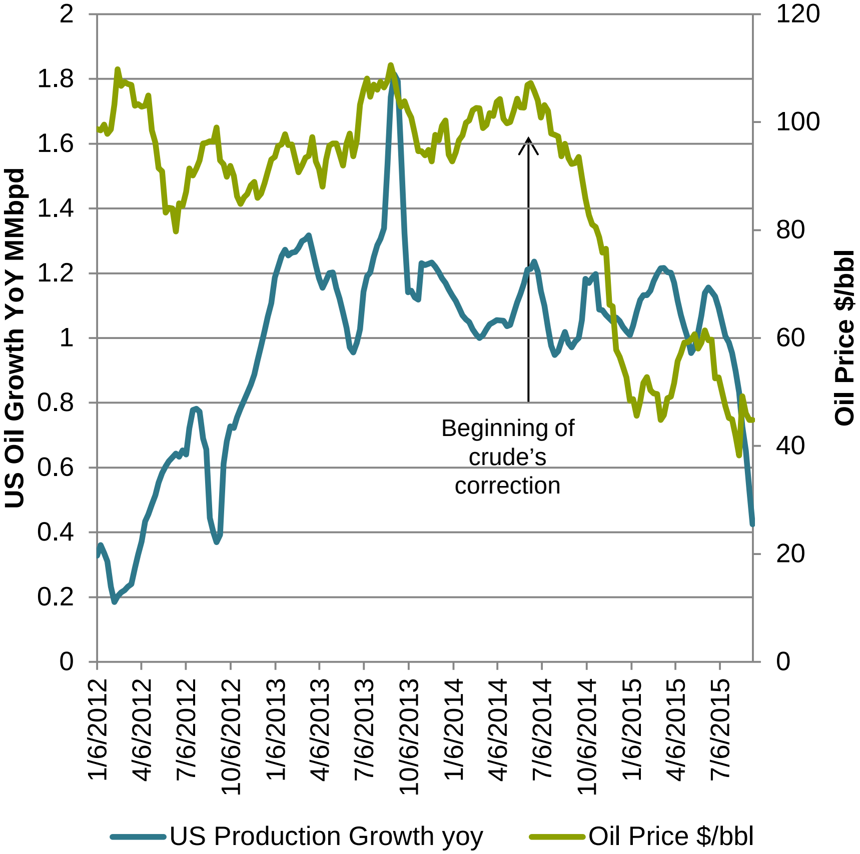




The US Tsunami Has Begun to Reverse with the Price and Liquidity Decline

- The growth in US volumes has not been the primary driver of the oil price decline. However, US supply is rapidly becoming its most affected victim.



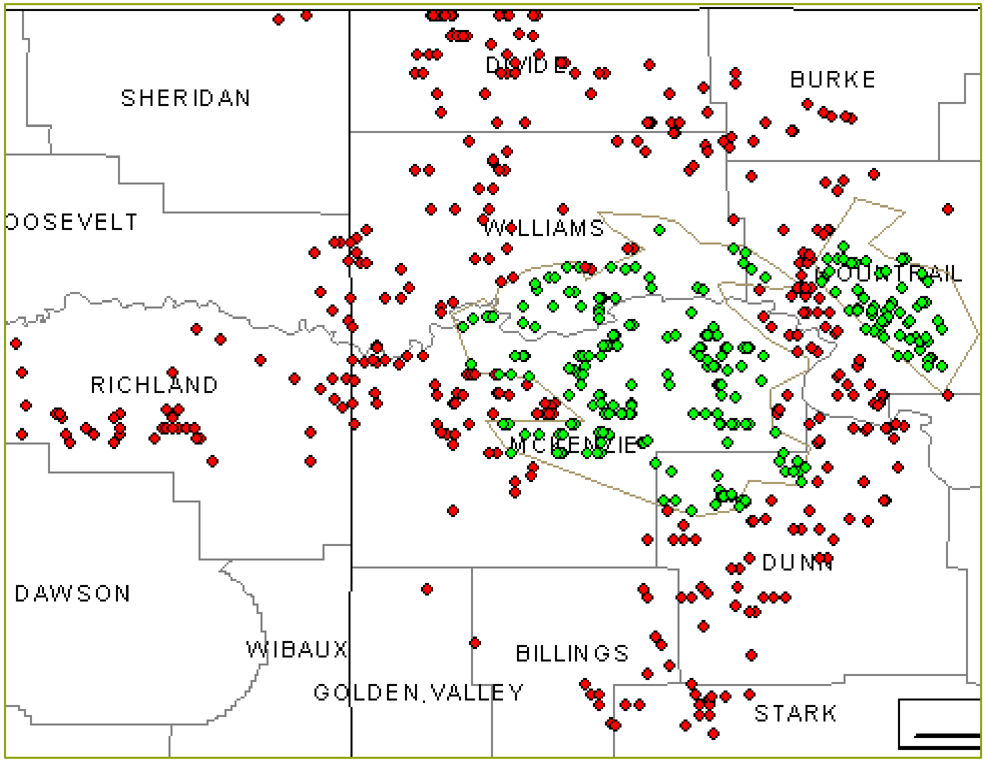


Source: EIA

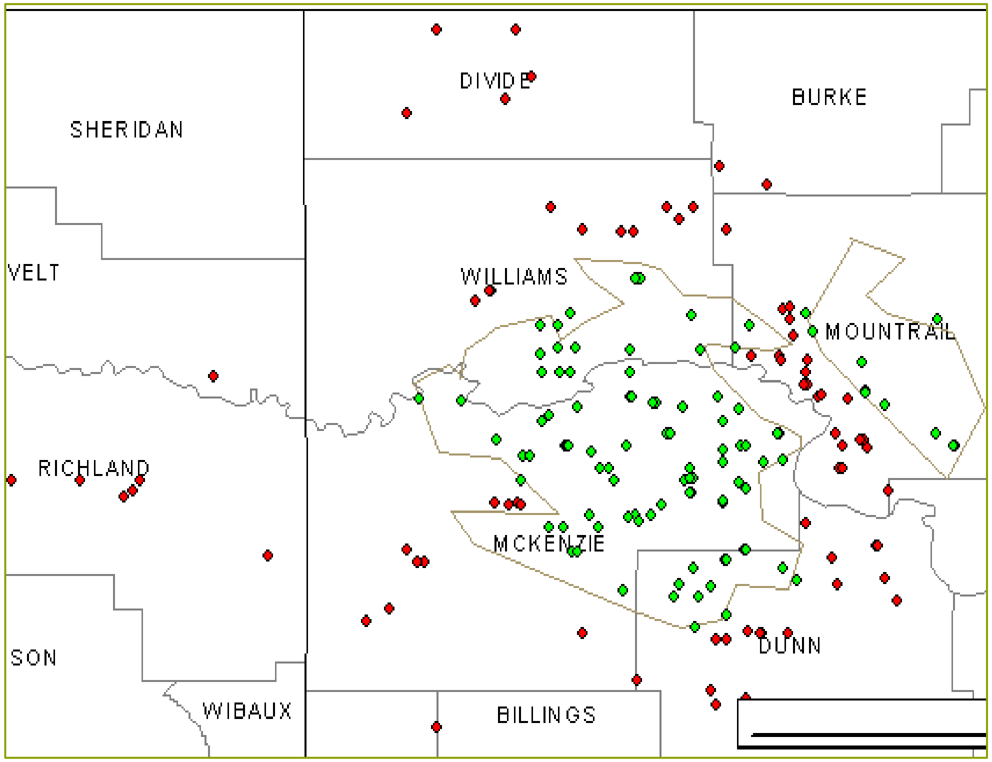
US Operators Are Retreating to the Core of the Shale Plays

- Operators are focusing drilling activity in the core of the shale plays where EUR and IP per lateral foot are superior, while abandoning marginal drilling at the fringes.

4/1/2013 – 9/1/2013: ~44% Bakken Core Wells


SHERIDAN
DIVIDE
BURKE
OOSEVELT
WILLIAMS
MOUNTRAIL
RICHLAND
MCKENZIE
DUNN
DAWSON
WIBAUX
BILLINGS
GOLDEN VALLEY
STARK

4/1/2015 – 9/1/2015: ~61% Bakken Core Wells


DIVIDE
BURKE
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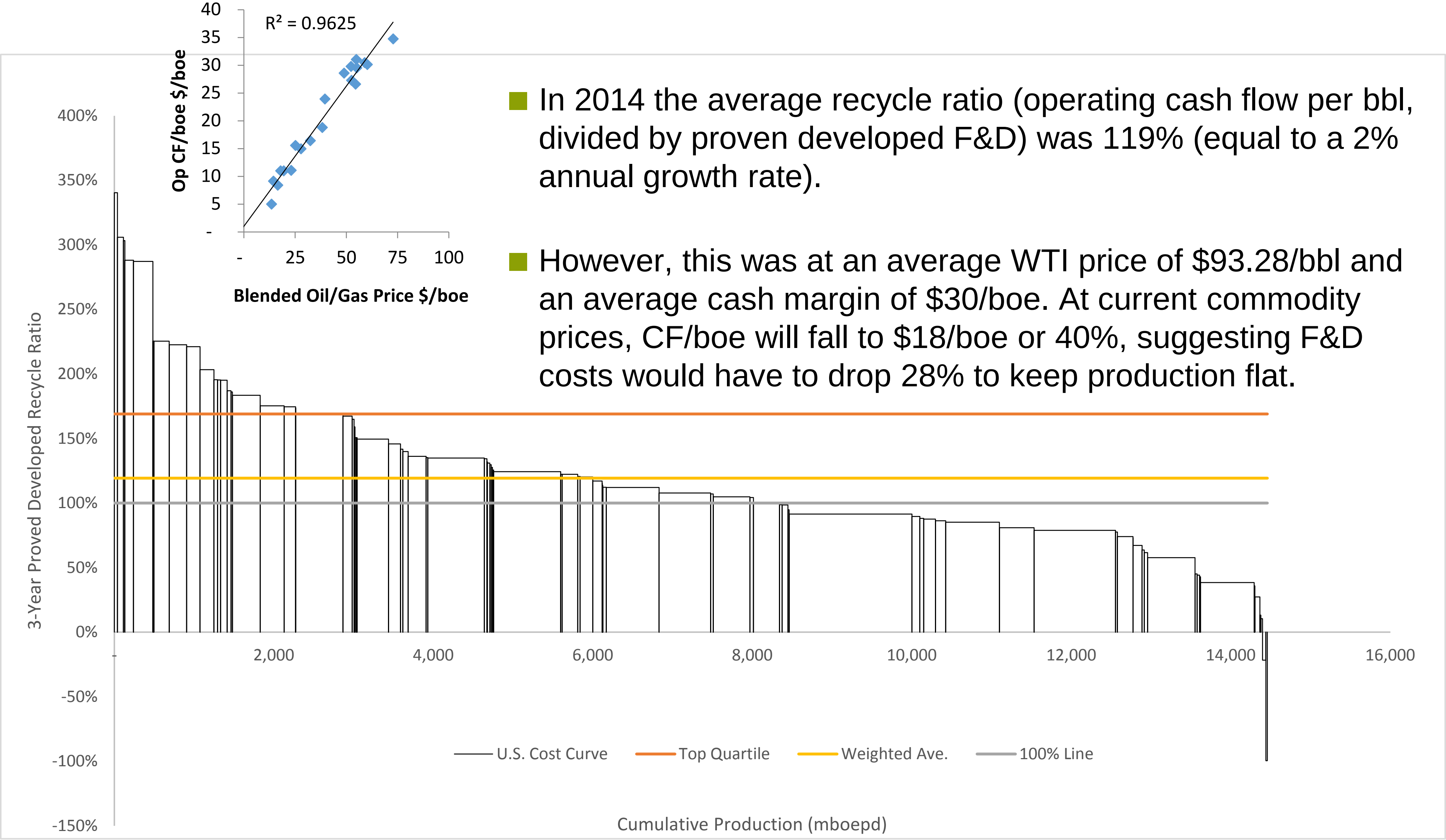
How Much Can the US Grow When Living Within Cash Flow? Zero.



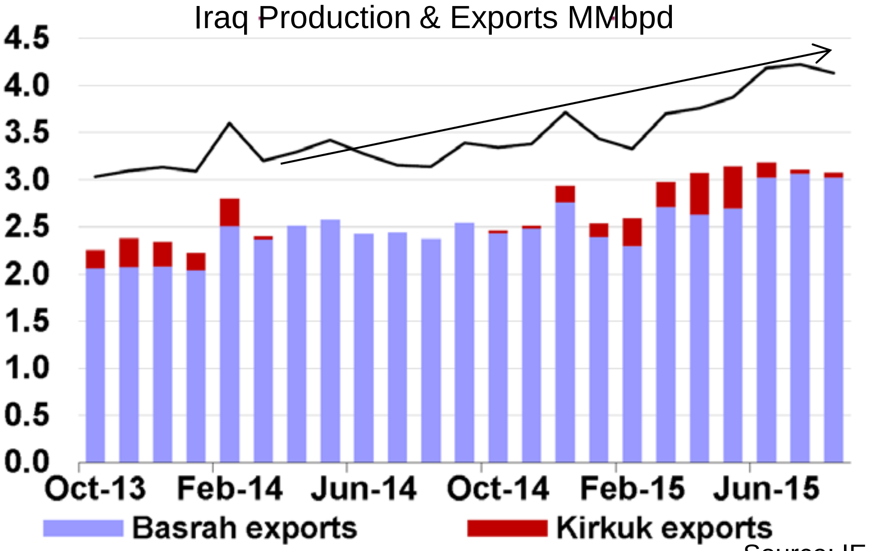
- In 2014 the average recycle ratio (operating cash flow per bbl, divided by proven developed F&D) was 119% (equal to a 2% annual growth rate).

- However, this was at an average WTI price of $93.28/bbl and an average cash margin of $30/boe. At current commodity prices, CF/boe will fall to $18/boe or 40%, suggesting F&D costs would have to drop 28% to keep production flat.

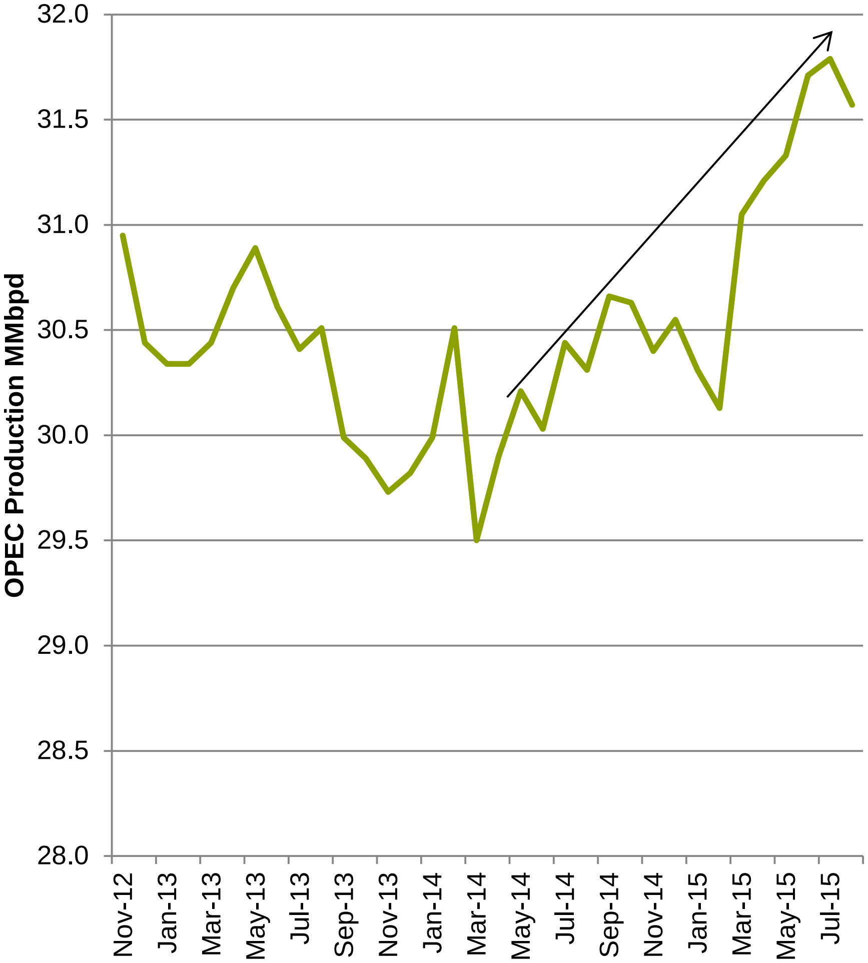
OPEC Accelerated Supply As Demand Concerns Grew

- Since March of 2014, OPEC appears to have made a conscious decision to ramp up production despite what initially appeared to be moderating demand.

- This reversed a trend of accommodating non-OPEC supply growth, further exacerbated by a ramp up in Iraqi supply/exports.

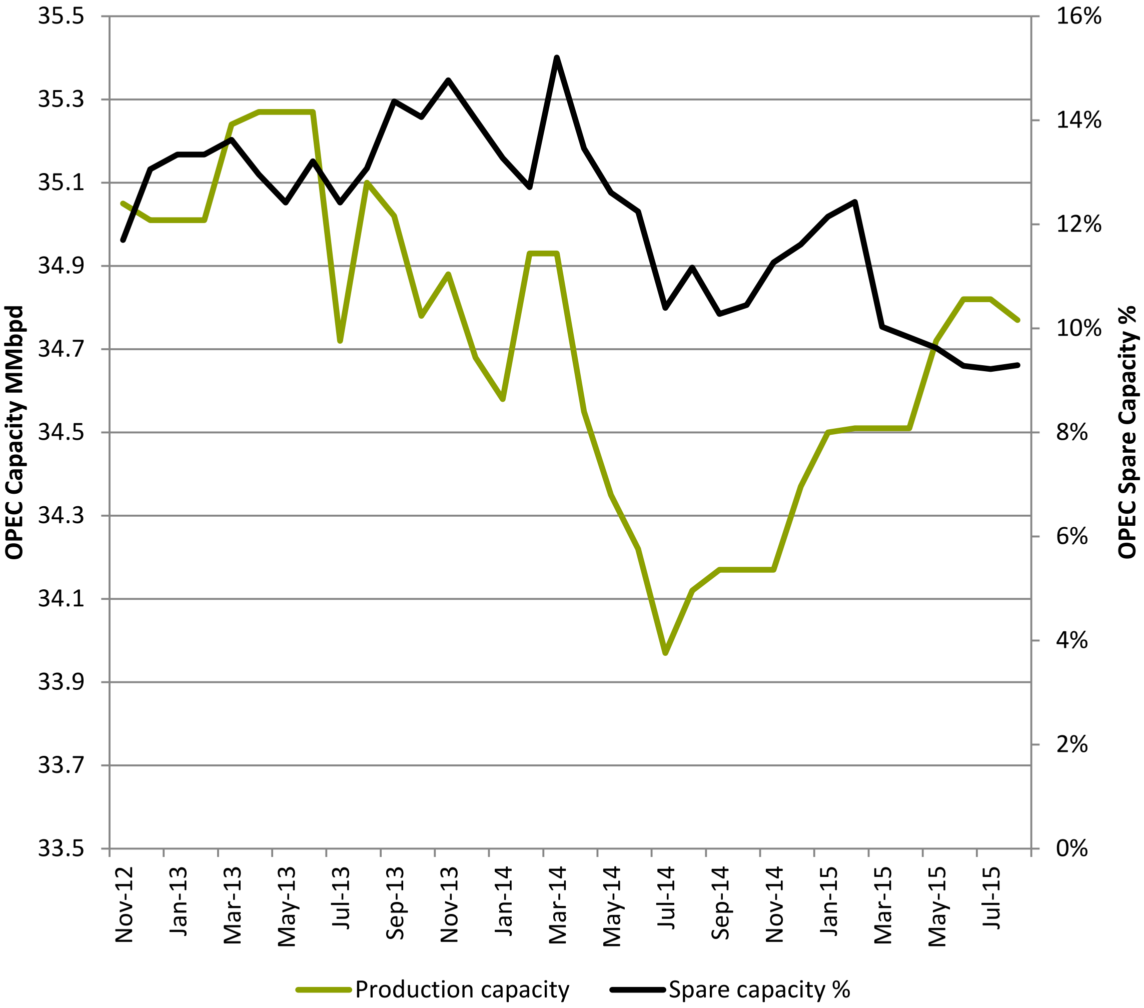


Source: IEA



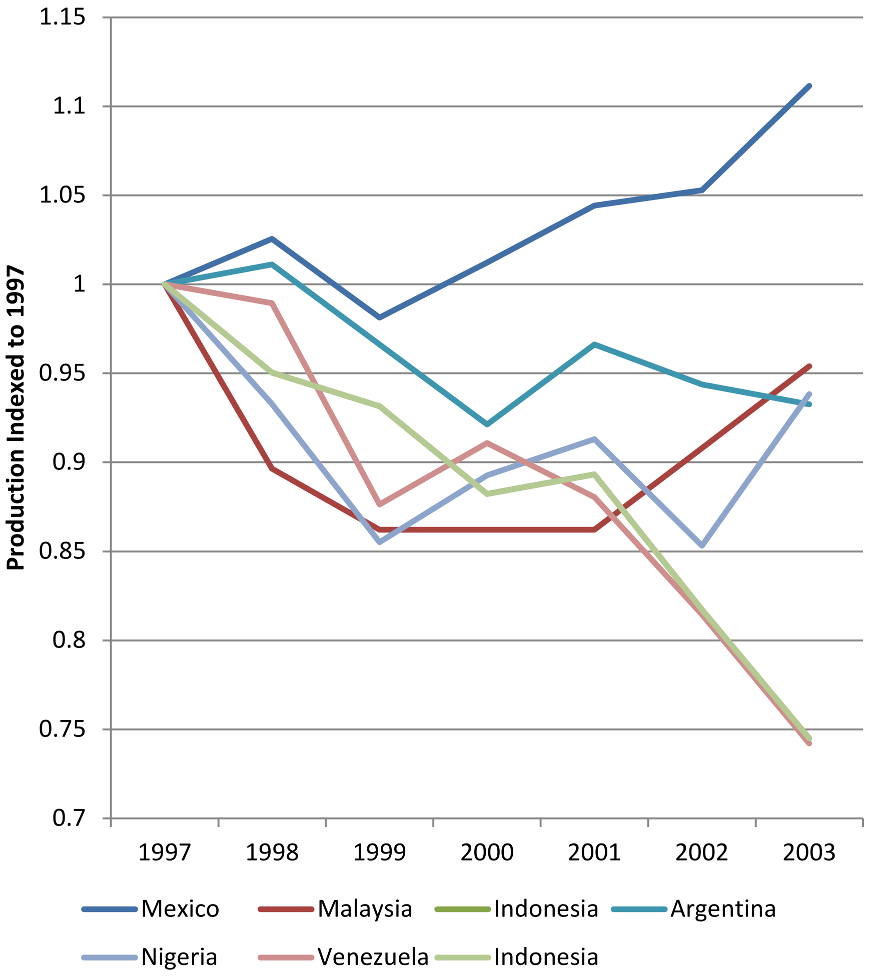
OPEC’s Supply Growth has not Followed a Capacity Expansion

- The growth in OPEC supply has not been accompanied by an expansion in productive capacity.
- As a result, should demand recover, the available spare capacity to the market is relatively limited at 3.2MMbpd (including Iraq, Nigeria and Libya) and 2.27MMbpd excluding these nations.



Supply Lessons From ’98

- One of the most notable features of the 1998 decline was the longer-term effect on supply and the impact on emerging markets.
- In Mexico, the decline reversed 4 years of growth, finally recovering in 2000, while Malaysia, Nigeria, Venezuela, Indonesia and Argentina saw declines that took years to reverse, if at all.
- In part, this trend reflected another coincidental factor, namely a stronger dollar, declining emerging market liquidity and a reduction in funding for state owned E&P’s; these dynamics are replaying today.



Demand: An Uneven Recovery

- While the primary focus of the market has been on US supply, the directional change in oil prices in 2014 appears to have been equally demand-related, with negative revisions since mid-year 2014.

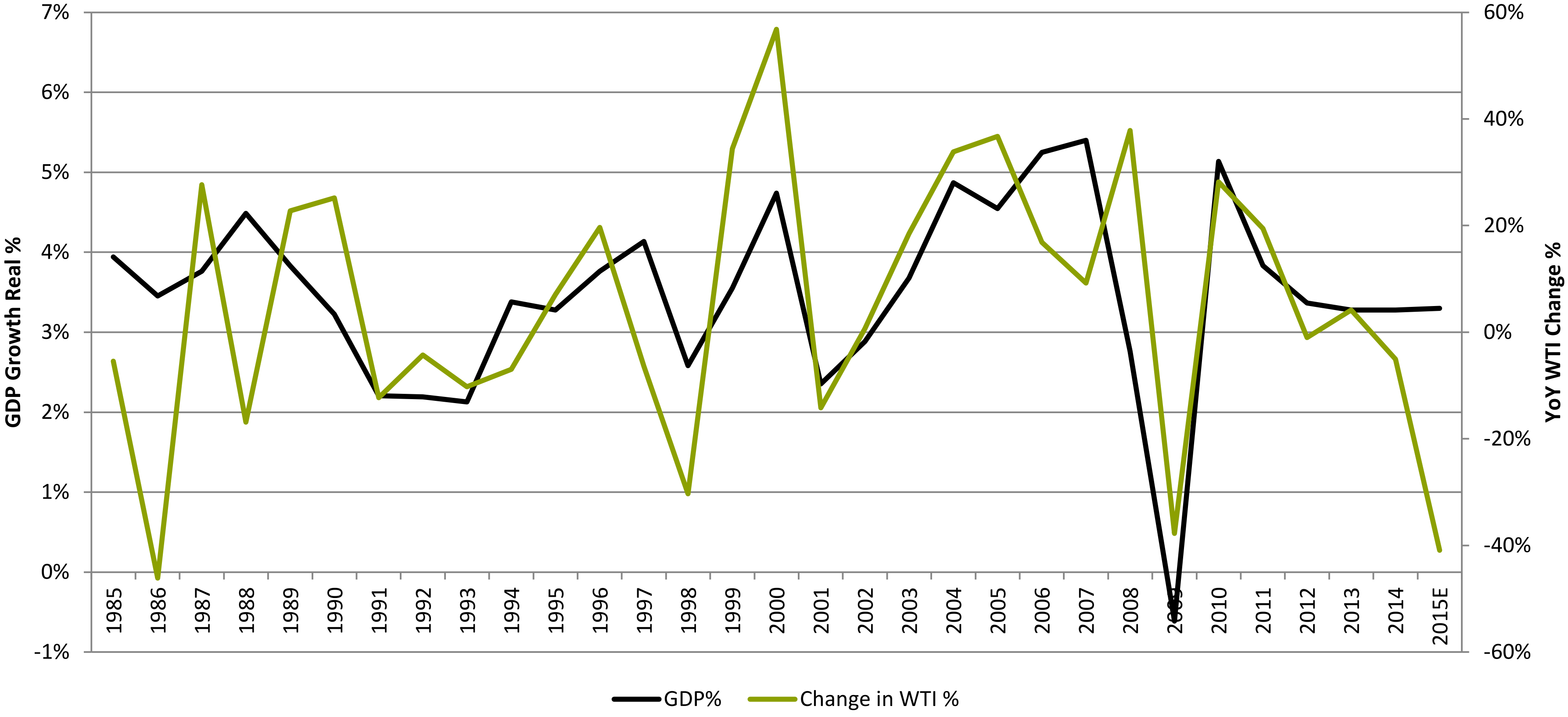
- The IMF now forecasts global GDP growth to be 3.3% in 2015. That is down from a 3.8% estimate for 2015 in its World Economic Outlook published October 2014, and a 3.5% forecast as of March 2015 (our last macro deck). This therefore reflects a deceleration from 2014 levels.

- The IMF forecasts growth picking up only slightly next year to 3.8%, albeit this number is below the initial forecast of 4%. Historically (only one in nine times to the contrary), oil prices have not risen with GDP below 3%. For a material appreciation, YoY GDP growth has averaged 4%+.

- A subtle mix shift is occurring with demand becoming more OECD-dependent as the US recovers and China stalls. Outside of these, Africa and India remain the key markets to watch.

Global GDP and the Demand Problem

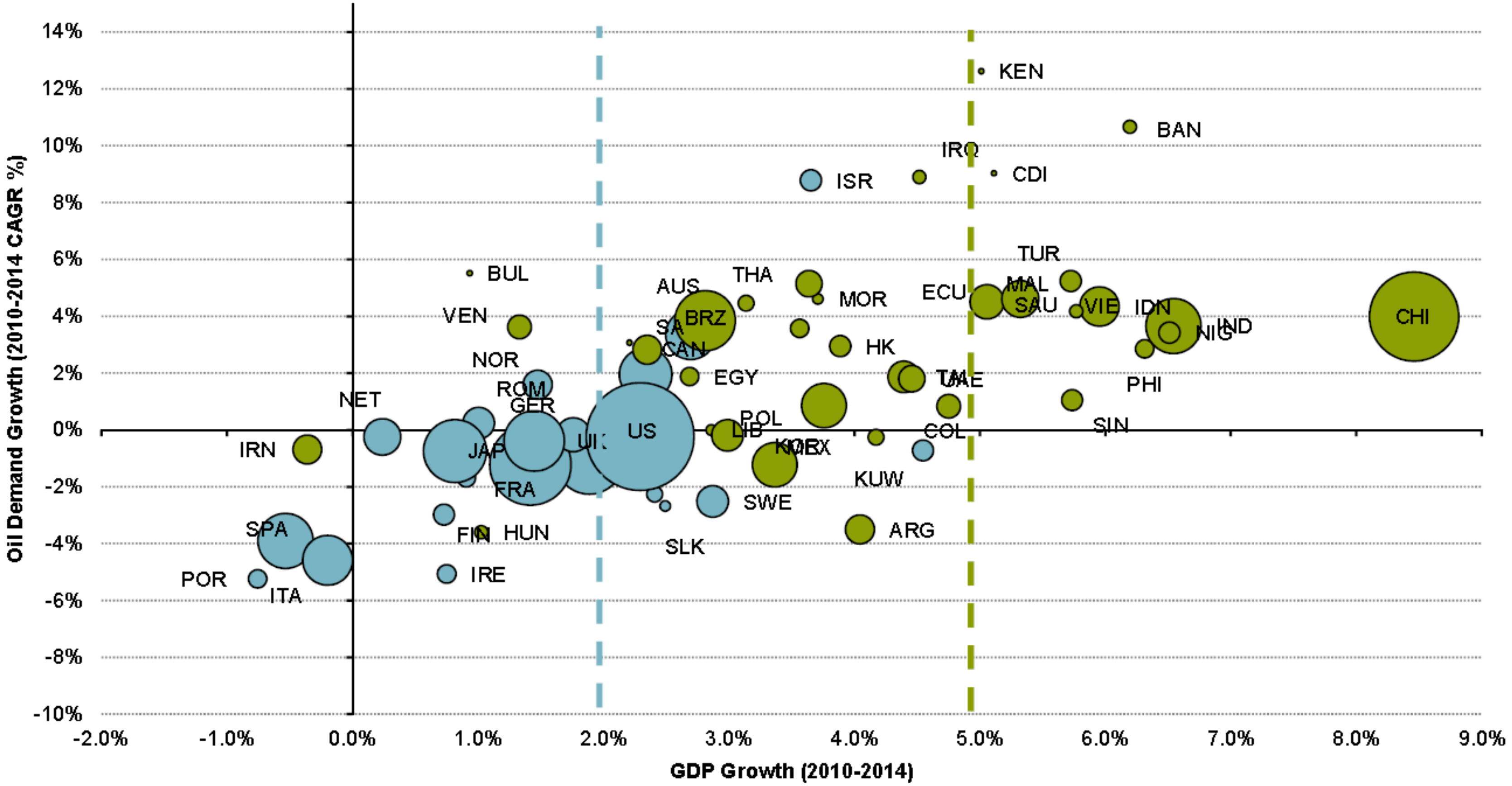
- Historically, oil prices have correlated closely with GDP growth. The recent decline in price appears overdone relative to GDP, but reflects the supply dynamics previously discussed.



Demand is Correlated to Price and GDP Across the World

Developed World:
2% GDP Growth
"Flat" Oil Demand

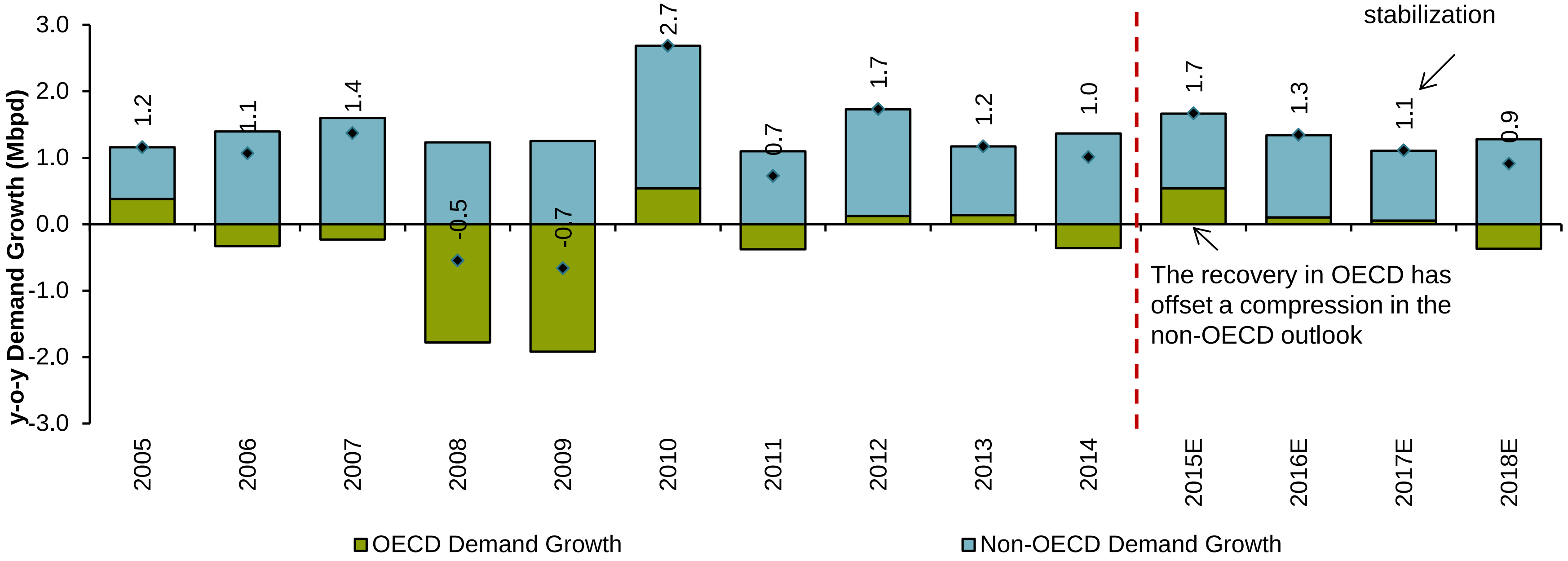
Emerging World:
4.4% GDP Growth
c3% Demand Growth



Source: IEA and Bernstein analysis.

The Stabilization of the OECD and Deceleration of the Non-OECD

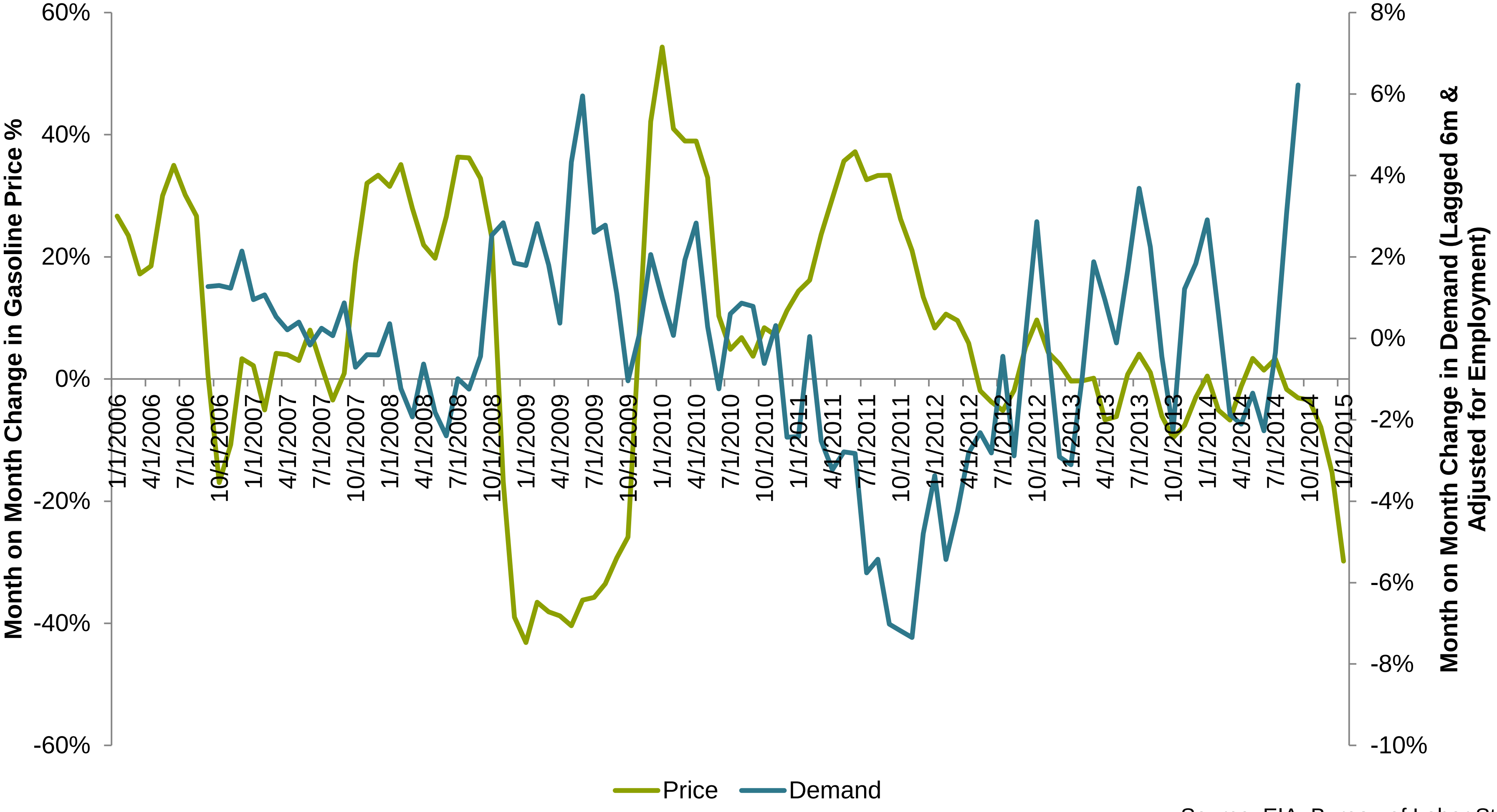
- While overall demand revisions were initially negative in late 2014/early 2015, they are now marginally positive. This reflects upward revisions to US, European and Russian demand.



2016 is likely to be revised down in the non-OECD and up in the OECD, with a potential European stabilization

The recovery in OECD has offset a compression in the non-OECD outlook

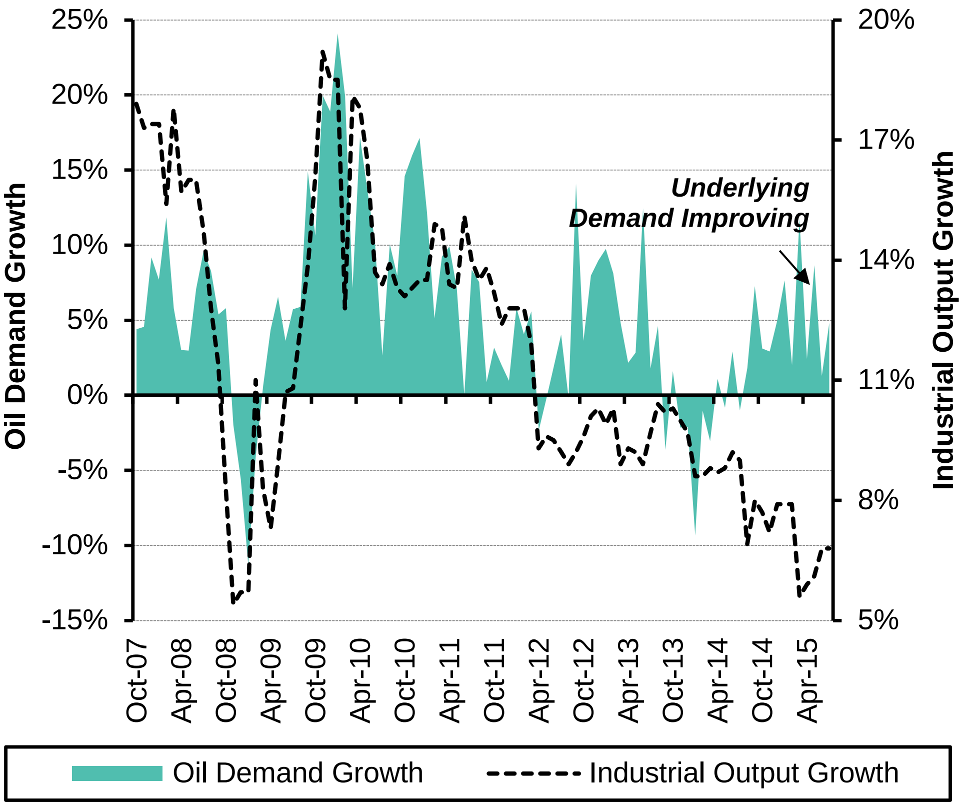
US Growth is Being Driven by Falling Unemployment and Lower Pricing



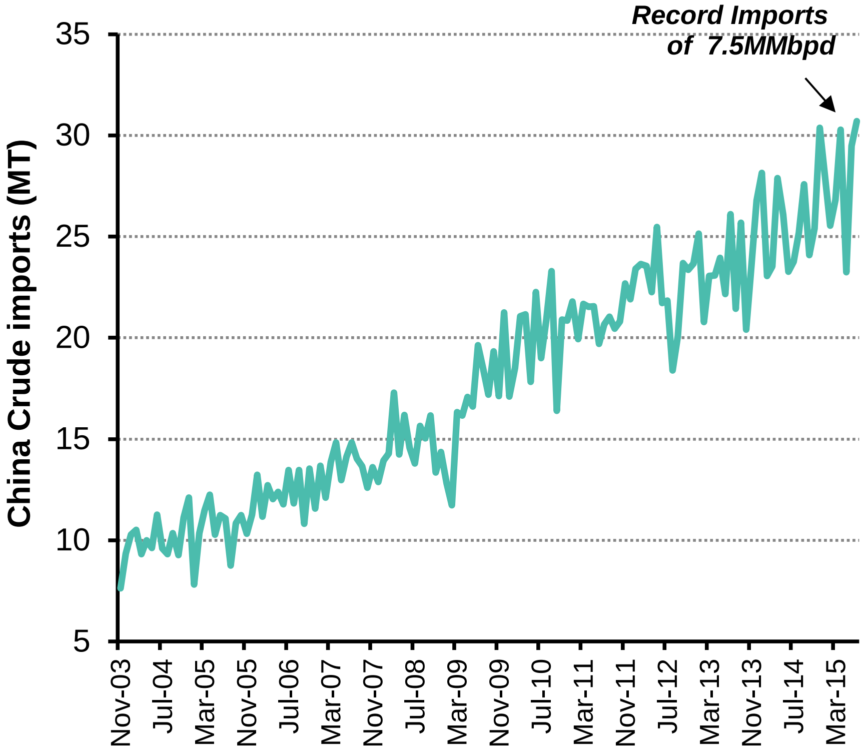
Source: EIA, Bureau of Labor Statistics

International Demand has Decelerated, Led by China

- Chinese demand has decelerated, with recent Industrial Output data raising further concerns. However, imports remain strong (as China builds the SPR) and there are indications of elasticity to lower prices.



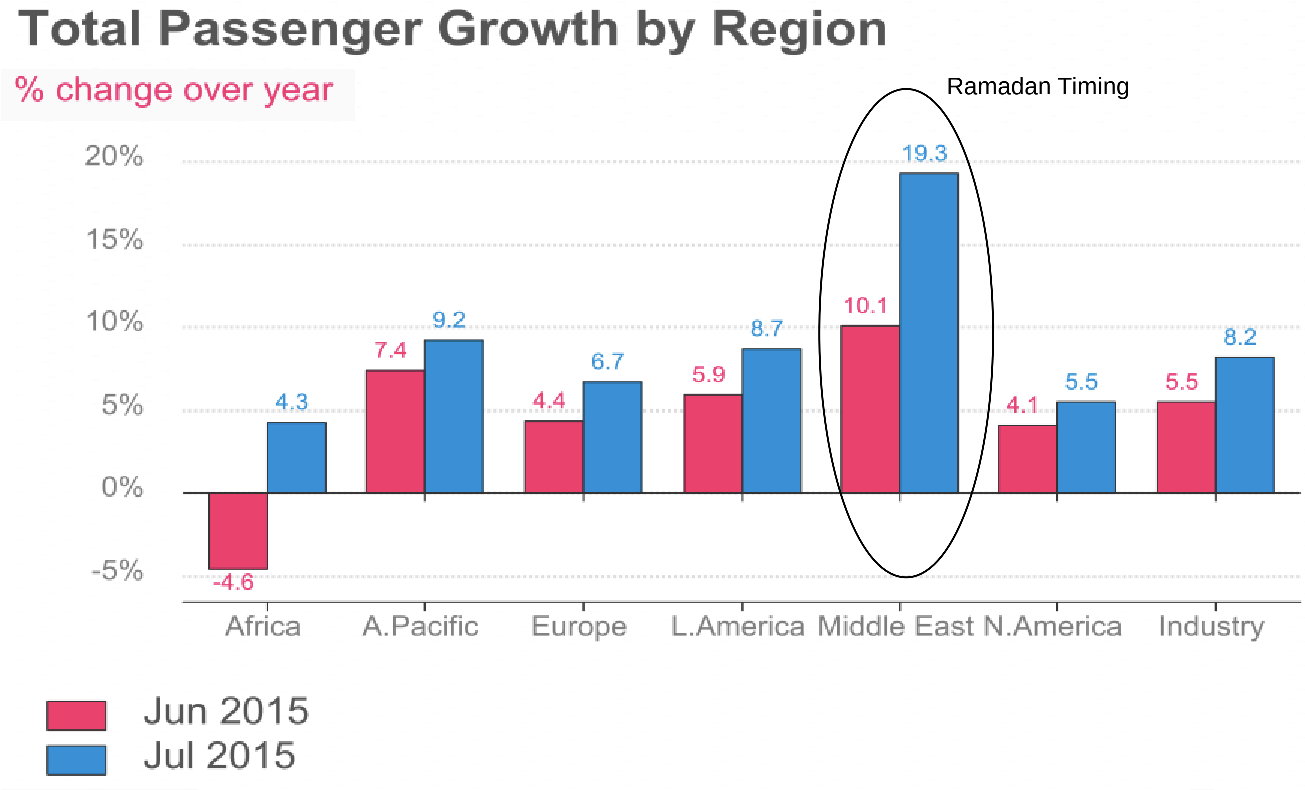
Underlying Demand Improving



Record Imports of 7.5MMbpd

Not All Oil Demand Data is Negative in the Non-OECD

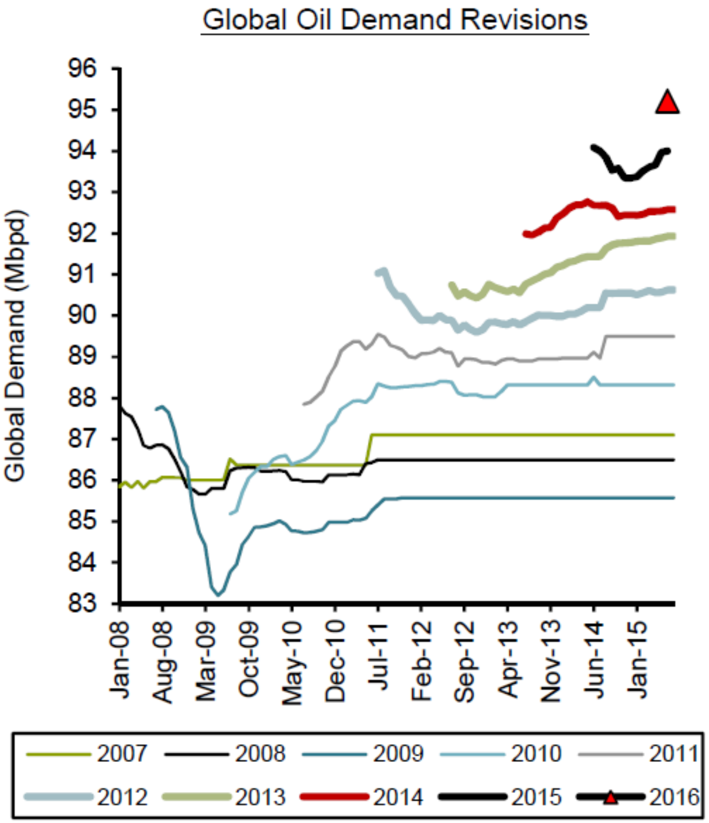
- Global aircraft passenger traffic rose 8.2% YoY in July, continuing a robust trend .
- The fall in oil prices is expected to sustain demand growth for passenger travel in 2015.
- Domestically, India had growth of 28.1%, due to improvements in its economy.
- Chinese domestic demand has been stable since April and was 10.9% YoY in July.



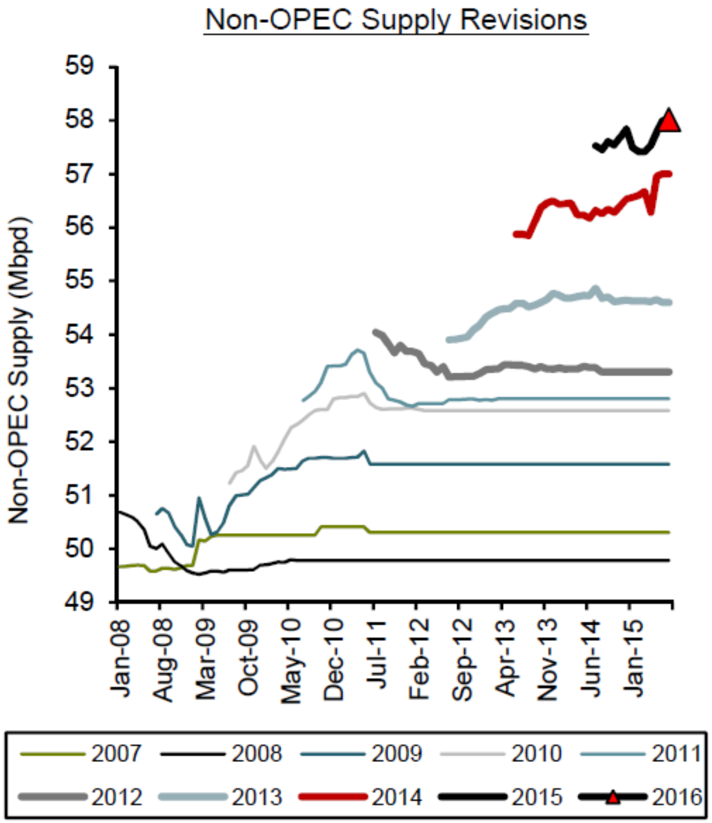
Source: IATA

Latest Demand Revisions More Bullish than Bearish

- Global oil demand revisions have been rising in 2015, while 2016 shows continued growth.
- However, while 2015 non-OPEC supply revisions have been volatile, 2016 shows little growth.



Source: IEA and Bernstein estimates



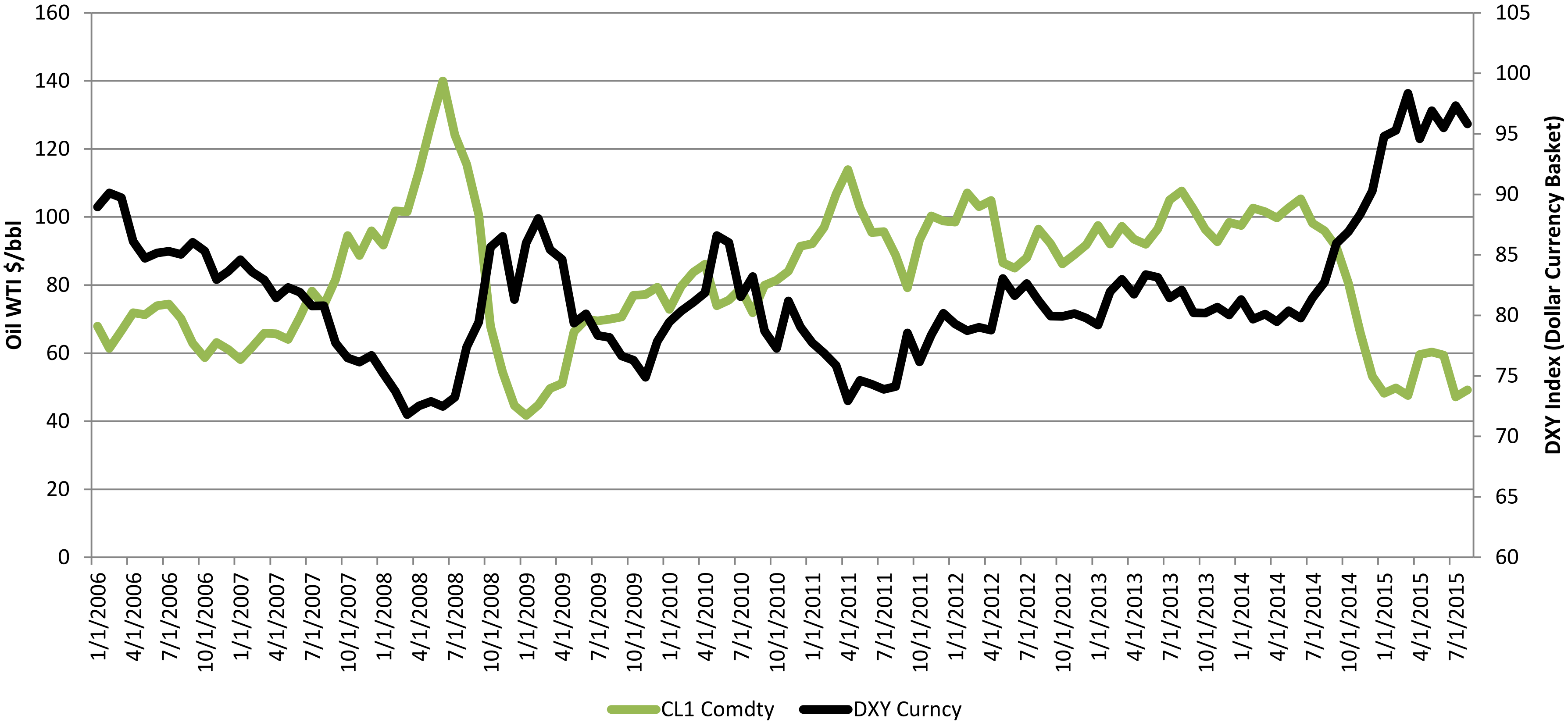
Source: IEA and Bernstein estimates

Currency, Interest Rates and Free Money

- QE appears to have been deflationary for energy, adding supply (supported by free money and malinvestment), while failing to stimulate demand.
- While currency dynamics appear to have been a contributing factor to the crude sell-off, it is most likely a reflection of declining GDP growth, QE overseas and the anticipated tightening in the US.
- Notably, historical oil corrections (1982, 1998/’99) have all been accompanied by dollar strength and emerging market financial crisis; this appears to be happening again.
- If the market echoes ’98/’99, continued strength in the dollar is likely in the near term. However, with the US importing deflation from emerging markets, and domestic growth moderating, a Fed reversal to QE(4) appears possible, especially in light of a continued market sell-off, leading to a weaker dollar and potentially stronger commodity pricing.

Relationship of WTI to the DXY Index (2006-Present)

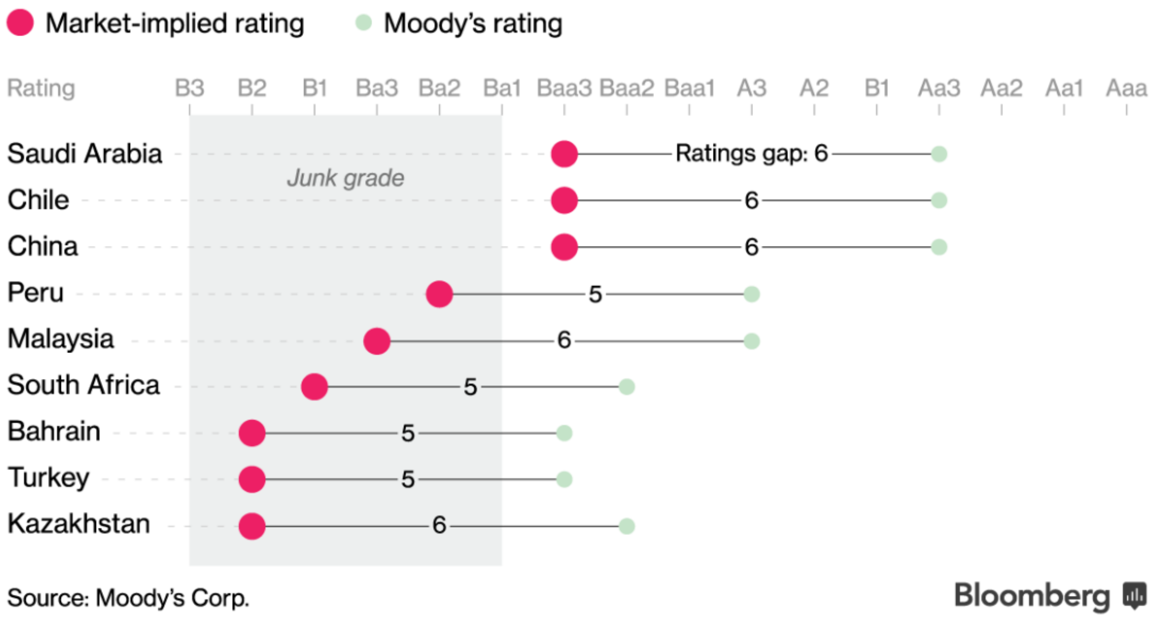
- Since 2006, crude and the dollar index have been highly correlated. However, in the long term there is a more tenuous relationship. The ’98/’99 playbook would suggest oil can bottom while the dollar continues to rise.



Source: Bloomberg

Emerging Market Currency Crisis

- Previous oil busts have been accompanied by emerging market financial crises. These events were driven by capital outflows and large USD-denominated debt piles.
- Today, multiple emerging markets are pricing in debt downgrades. These countries account for 17.7MMbpd of production, with an additional 22.15MMbpd of production from other junk-rated countries (Russia, Iran, Iraq, Angola, Colombia, Algeria and Libya) further threatening supply.



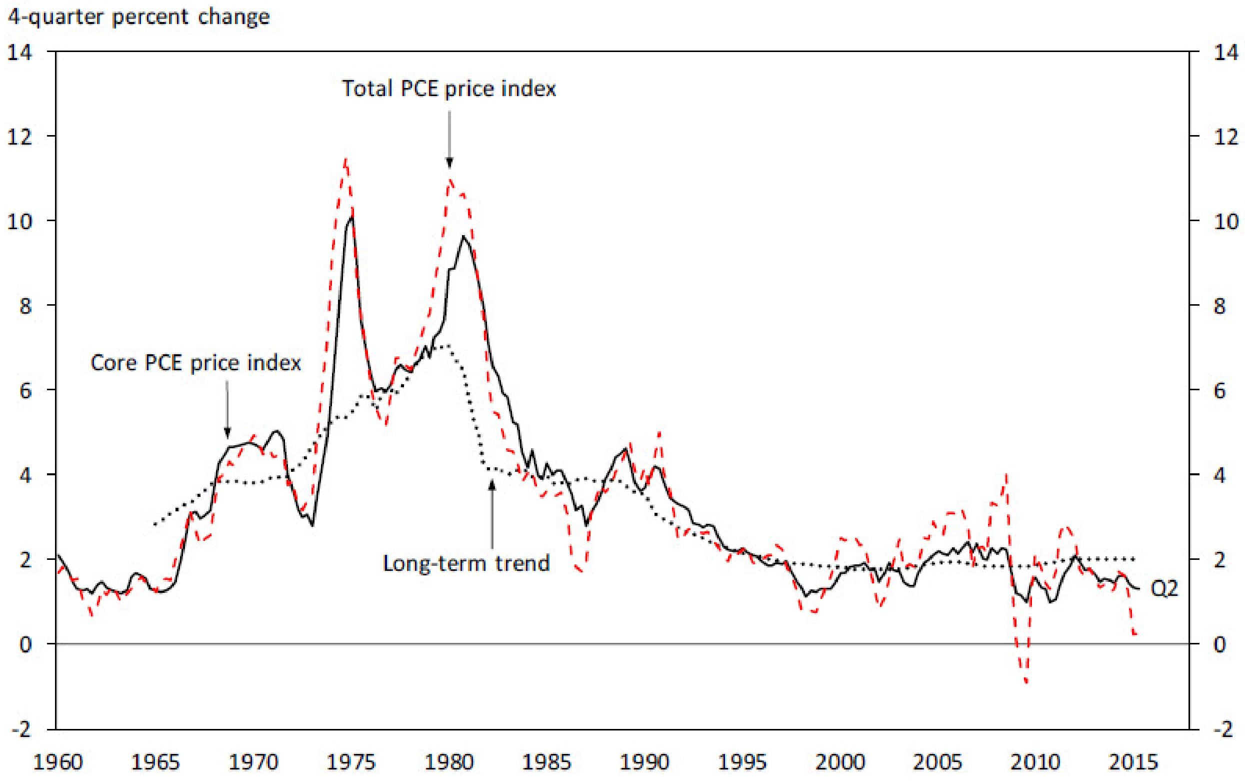
Source: Moody's Corp.

Inflation Remains Non-Existent

- In March, we suggested that with non-existent inflation, an interest rate rise was unlikely. There is little data to suggest this has changed with the PCE price index near all-time lows.

- Predicting the response to a change in direction remains challenging, however previous liquidity events have been positive for commodities.

U.S. Inflation since the 1960s

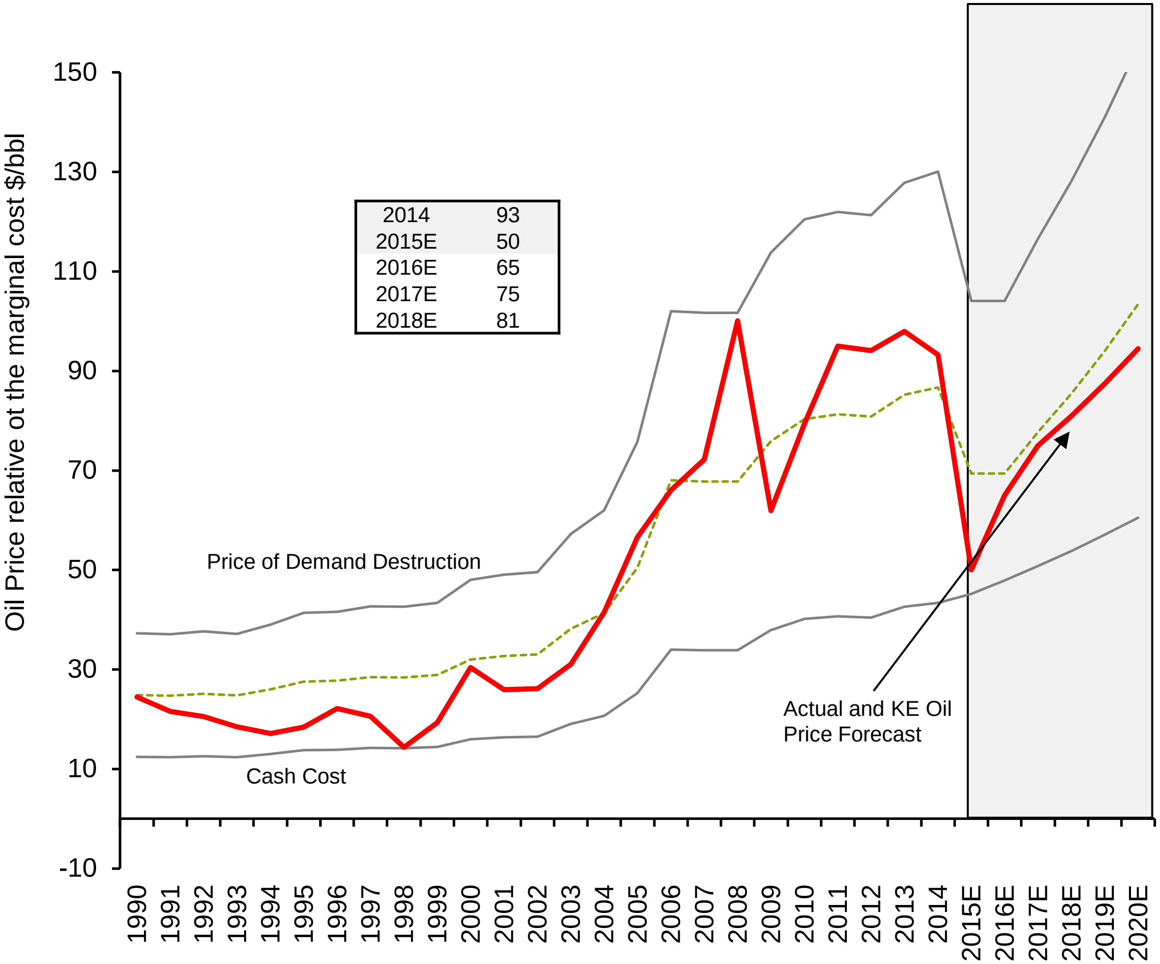


Note: The data are quarterly. The data for the long-term trend start in 1965:Q1. PCE is personal consumption expenditures.

Source: U.S. Department of Commerce, Bureau of Economic Analysis; Federal Reserve Board staff calculations (see note 3 of speech text for additional discussion).

Summary and Conclusions

- Based on current conditions, Kimmeridge believes the **risks to commodity prices are to the upside versus consensus** and that pricing in 2016 could be in the $60-70/bbl range.
- Predicting the response to a change in direction remains challenging, however previous liquidity events have been positive for commodities.
- Key factors that would alter this:
  - Continued negative revisions to GDP, particularly OECD demand
  - An early return to excess liquidity, limiting supply restrictions
  - Additional Iran volumes and a more competitive market share dynamic in OPEC



2014	93
2015E	50
2016E	65
2017E	75
2018E	81

Summary of Positive and Negative Factors

Influence	Positive for Price	Negative for Price
Marginal Cost	Capital intensity continues to rise	Material efficiency gains slowing impact of rig decline
	Service deflation bottoms	Deflation in services/materials
	Low ROACE continues limiting supply	Technological evolution to improve EUR/well
Supply Factors	Reduction in US rig count, operators live within cash flow	Iran nuclear deal (done)
	Limited new liquidity (distress in the high yield market)	Distressed capital flows into insolvent companies (declining)
	Distress in sovereign bonds (Venezuela/Russia)	Stabilization in Iraq/Libya
	Supply interruptions (Libya/Iraq/Nigeria/Venezuela)	"Full" storage
	Non-OPEC, non-US continued decline	
	OPEC decision to act (unlikely, but financial stress building)	
	Export allowance/domestic growth (reducing WTI differential)	
Demand Factors	Recovery in Global GDP (non-existent)	Deceleration in US GDP
	China and RoW Stimulus (QE in Europe)	Greek exit and European stagnation (avoided for now)
	China SPR build	China deceleration and/or credit crisis
	Industrial base expansion (chemicals)	Negative petro state revisions
		Japanese stagnation
Macro	Dollar weakening	Dollar strengthening
	US return to QE	RoW rate cutting/weakening and negative interest rates
	US deflation/rising unemployment	

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