

THE 2014 OIL PRICE COLLAPSE IMPLICATIONS FOR INFRASTRUCTURE AND EQUITY MARKETS

The oil price collapse in the second half of 2014 is likely to be seen as one of the most significant developments in the world economy since the Global Financial Crisis. This has changed oil price expectations in both the short and medium term, but there is still huge uncertainty. This note considers the change, and explores the implications for infrastructure, equities, and portfolio construction.

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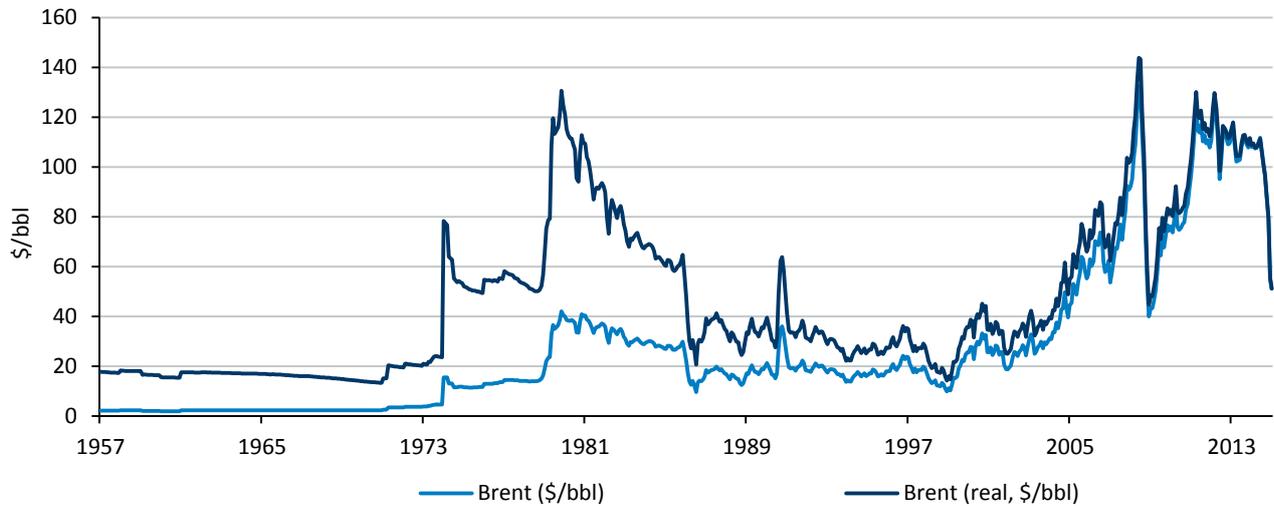
Assessing the collapse

Real oil prices rose progressively through the period of the great moderation from 2002 until the onset of the Global Financial Crisis (GFC). They then fell sharply on concerns over the global economy, rising to around USD100/bbl for the period 2010-14. If one looks at the price over a longer period, the fall at the end of 2014 can be seen to be one of the sharpest, and in particular with no obvious associated economic or geopolitical shock. But perhaps what is most interesting is the period of apparent calm in prices between 2010-14 prior to the downward shock.

The explanation of that has been set out rather clearly by Christof Ruhl (2014), formerly the Chief Economist at BP, the UK listed integrated oil company. From 2011 on, a range of disruptions affected supplies in North Africa and the Middle East, affecting supplies in particular from Libya following the onset of civil war in 2011, followed by reduced output from Iran in 2012 associated with the imposition of sanctions by western countries. The impact of these, shown in the chart below, has been 3m bbl/day. At the same time, we have witnessed a very large increase in production from Shale oil in the US. This remarkable development has meant that oil disruptions were matched by the US production increase, resulting in something of an uneasy calm. Prices remained relatively stable as a result of the coincidence of these two unrelated factors.

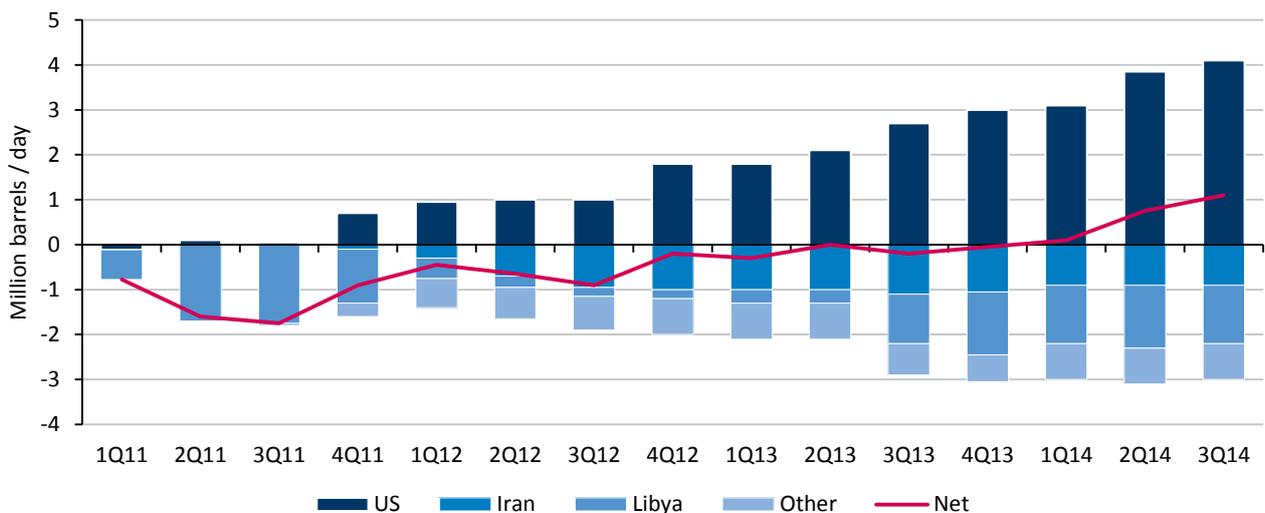
Of course, it is easy to see with hindsight that this could not last, and a reversal of the production trends would lead to over-supply, and a price fall. US production has continued to rise and Libya's production has recovered (although it has remained volatile). Had Saudi Arabia decided to accommodate the increase in supply from elsewhere by implementing production cuts in November, its traditional role in the OPEC cartel, then the fall in prices would not have been so dramatic. A different strategic logic for Saudi Arabia has prevailed, with the objective of sustaining market share in the long-term, dominating its desire for higher prices in the short-term.

Chart 1: Brent oil price in nominal US\$ and 2015\$



Source: FactSet Research Systems and RARE calculations.

Chart 2: Cumulative oil disruptions and US supply growth



Source: Ruhl (2014), BP.

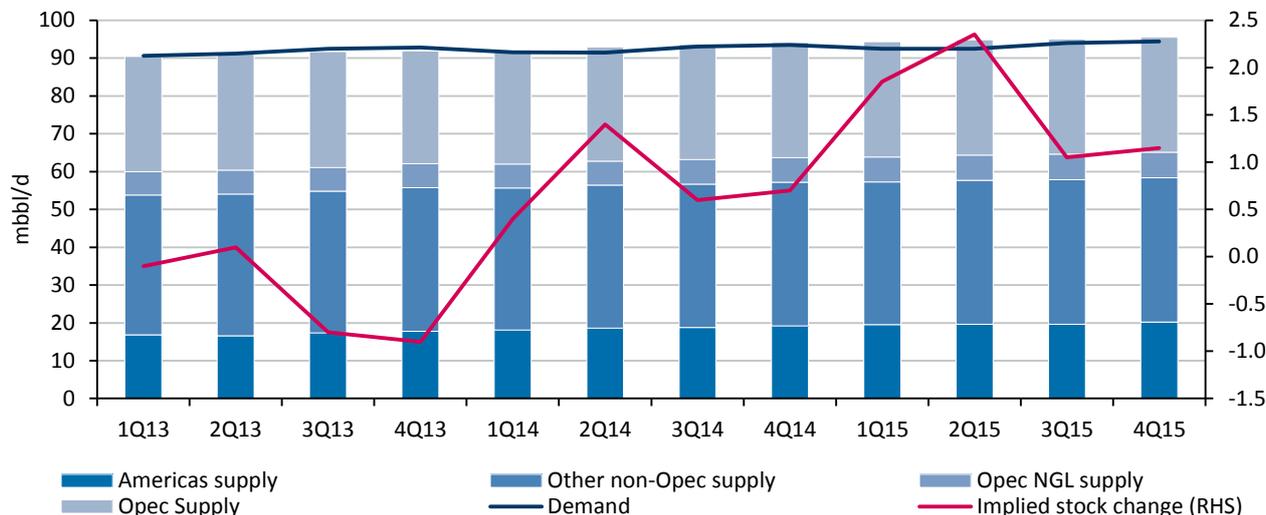
In addition to the recent story of oil supply and demand, it is also worth reflecting on the longer term price history. Throughout the late 1980s and 1990s, prices were mainly less than USD40/bbl in 2015 prices, and this was also true prior to the oil shocks in the 1970s. Periods of high oil prices have been the exception.

Prices likely to remain lower for longer

In the short-term (i.e. during 2015), the outlook is for oil prices to remain low. The easiest way to understand this is to examine the overall global demand and supply balance and assess the impact on oil stocks. The International Energy Agency (IEA) publishes regular updates of the outlook for supply and demand, assuming this background combined with OPEC production of 30.45mmb/d over 2015 gives a steady increase in stocks averaging 1.15mb/d. Of course, demand and supply are unknown, but all plausible scenarios all provide increases in net supply, leading to an increase in stocks.

The most favourable scenario for prices would be faster growth in demand (adding say 0.3 mb/d averaged over 2015), combined with a reduction in US crude production (of say 0.15 mb/d) and a cut in Saudi Arabian production (of say 0.3 mb/d). Even with this combination, though, average net supply increases by 0.4 mb/d over 2015 (see Tchilingirian & Lewis-Davies 2014). Most plausible scenarios imply a larger stock build, indicating depressed prices through 2015 and 2016.

Chart 3: Projections of future oil supply and demand



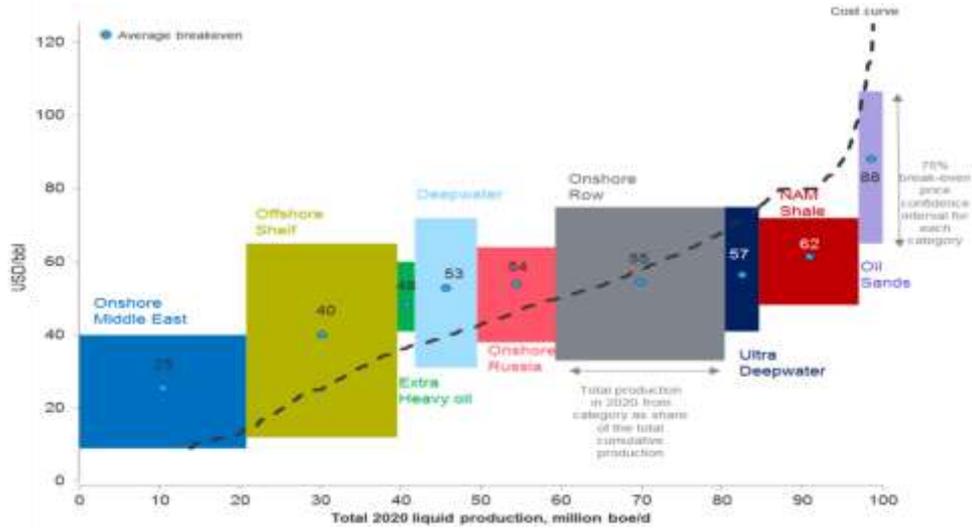
Source: IEA, BNP Paribas, RARE Analysis.

What about the longer term? Eventually production will be scaled back, or new production will come on stream more slowly, and it will make sense once again to consider prices settling at a long-term equilibrium level that is related to underlying costs. The timing of this is uncertain, but there have already been announced cuts of around 10% in exploration and development spending with further cuts expected, and in addition active oil rigs in the US have fallen from 1600 to 1500.

Many analysts produce detailed cost curves, and one of these that assesses long-term costs in 2020 is set out below. Of course these are highly uncertain: in a lower price environment, oil companies find ways to cut costs; data is commercially in confidence and so relies on detailed analyst assessment of costs. However, the evidence is that the oil price at the time of writing at January 2015, at around USD50/bbl, is below the long-term cost of supply. So while short-term demand conditions mean that prices could fall further, the prices in the long-term will need to rise to facilitate investment in new capacity.

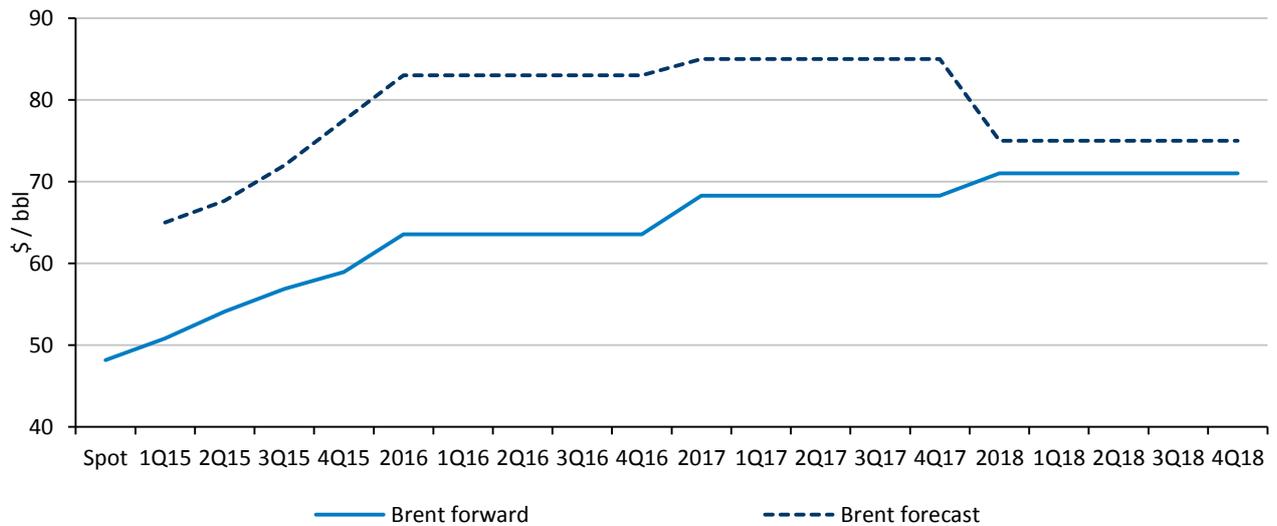
Where on the cost curve prices finally fall is dependent on the extent to which companies can control costs, as well as any changes to the actions of OPEC members and particularly Saudi Arabia. A long-term price in the region USD75-85/bbl is plausible, but a combination of weaker demand and continued strong OPEC production could easily lead to substantially lower prices. As at January 2015, there is a difference of around USD15/bbl between forward prices and consensus forecast prices.

Chart 4: Global oil supply cost curve



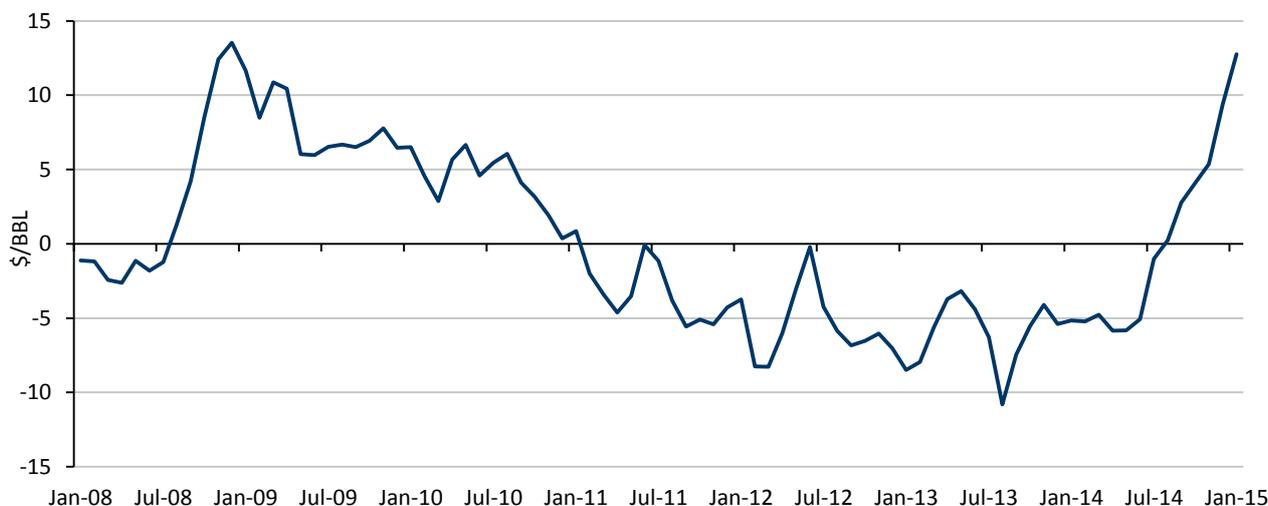
Source: Rystad Energy, quoted in Arezki & Blanchard (2014).

Chart 5: Brent oil forward and consensus forecast prices



Source: Bloomberg, as at 15 January 2015

Chart 6: Spread between one year forward and current price



Source: FactSet Research Systems and RARE calculations.

A boost to global growth...

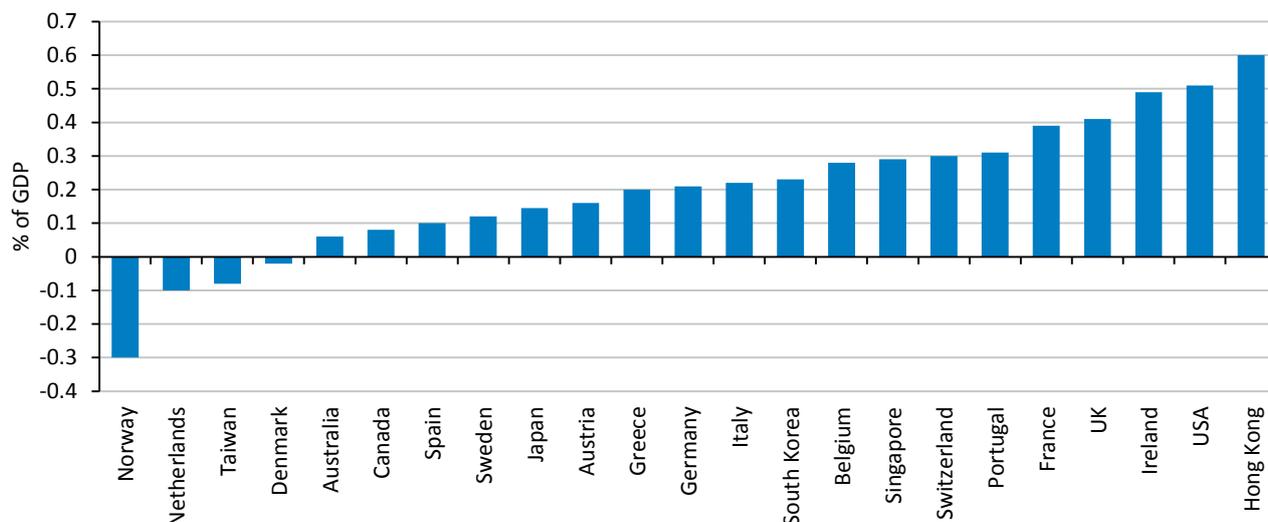
A fall in oil prices is a net positive for the global economy. Although profitability of oil producing companies falls, and investment in the oil sector falls on lower expected profits, these are more than offset by a rise in consumption and of manufacturing in particular in more energy intensive industries. The overall impact of USD20 lower oil prices on global GDP would be 40bp, which is very significant. Consumer spending shifts away from energy and increases for other goods. Likewise, there is an improvement in manufacturing in particular of more energy-intensive products.

Oxford Economics (2014) has simulated the impact on the global economy of a USD20 sustained fall in oil prices. Their scenario assumes a USD64/bbl average Brent price in 2016, rising progressively to an average USD86/bbl price in 2019, which is compared to a base case with prices at USD84 in 2016 rising to USD106 in 2019. In the scenario, global GDP would increase to 40bp above the baseline forecasts by 2017, but countries are differentially affected. Oil exporters such as Norway would be hit hard (see chart below) and with energy accounting for 25% of its GDP, there would also be a material negative impact on Russia, which is already facing the prospect of recession. In contrast the UK and USA can be expected to perform well, with an estimated impact on growth of around 50bp for these countries. For Eurozone countries, the impact would be somewhat less, but at 20-40bp it is still material. There are also strong differentials between the impacts on emerging economies. The oil price collapse would be very positive for countries like the Philippines, India and China, and the simulation indicates that GDP levels in these countries would benefit by more than 50bp.

The move in oil prices would also have a material impact on inflation. A USD20 oil price reduction would lower inflation by a cumulative 100bp by 2017 in most European countries. This would push a number of countries into negative inflation, and Oxford Economics estimates that even at a price of USD60 in 2015 (well above current levels) the Eurozone as a whole will experience negative inflation.

The low level of inflation is likely to influence monetary policy. In the US, the FOMC (the body which determines monetary policy) sees the oil price fall as what it is, a fall in the level of the price of one commodity. This suggests in turn that the fall in oil prices would have a limited impact on the timing of rate rises in the US. In the Eurozone, however, the impact of lower oil prices is one of the factors that is likely to have influenced the ECB in its decision to launch quantitative easing (QE) in January 2015, an attempt to reverse entrenched low or negative inflation.

Chart 7: Impact of USD20 fall in oil price on GDP level in 2015-17, developed countries



Source: Oxford Economics.

...but risks have increased

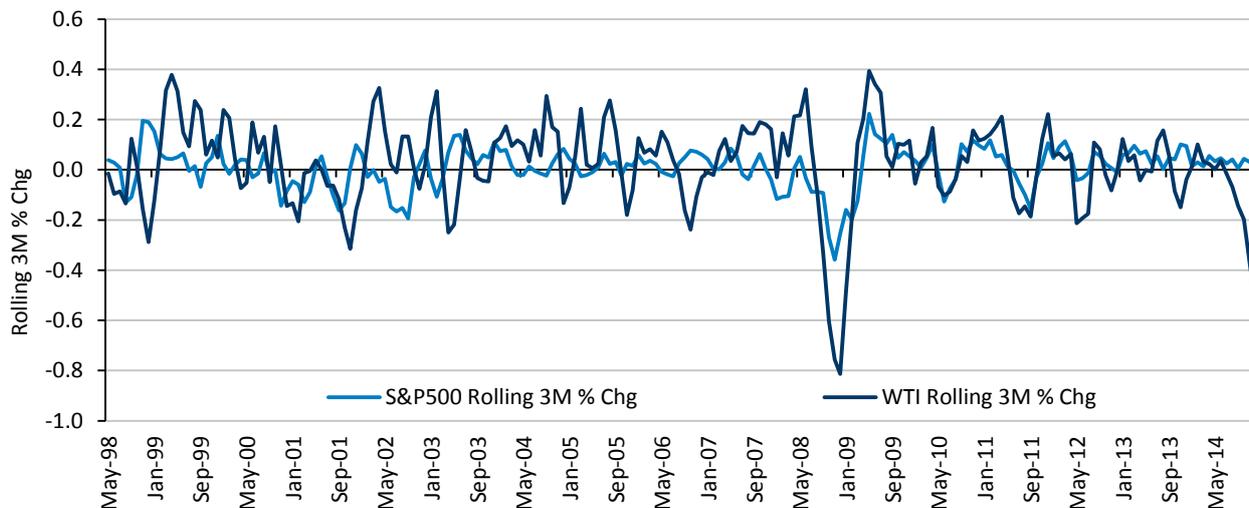
The change in the oil price clearly heightens geopolitical risks as countries which are negatively affected are in places where there are already tensions, including Russia and the Middle East. Events in response to a large fall in prices are of course hard to forecast but a severe change in economic situation will exacerbate current instability. In addition, the fall in the oil price will lead to many governments in affected countries facing fiscal deficits as revenues are oil price related. Kazakhstan, UAE, Azerbaijan, Oman, Iraq and Saudi Arabia are estimated to move into fiscal deficit with a price of somewhere between USD60/bbl and USD100/bbl, with Libya, Bahrain, Algeria, Iran and Yemen the breakeven point is at over USD100/bbl (see Arezki & Blanchard (2014)).

Large moves in oil prices have also had significant currency impacts. While banks are now better capitalised than before the GFC, there remains the possibility that there are concentrations of risk that may materialise unexpectedly.

Such tail-risks are hard for investors to assess, but heightened volatility in equity markets is more straightforward to assess. Chart 8 below shows the quarterly move in oil prices and equities (measured by the S&P 500) for the last 15 years. Large moves in both have typically been correlated and the relationship has been remarkably close since 2008. The correlation between these movements is not perfect, but there are underlying factors (e.g. demand resulting from the change in prospects for the global economy) that affect both variables similarly. The surprise from the two series is how the recent sharp move down in oil prices has not been reflected in equity markets. Of course, this can be explained away by the strong growth outlook combined with accommodative monetary policy, but nevertheless it is normally the case that increases in oil price volatility are associated with equity market volatility.

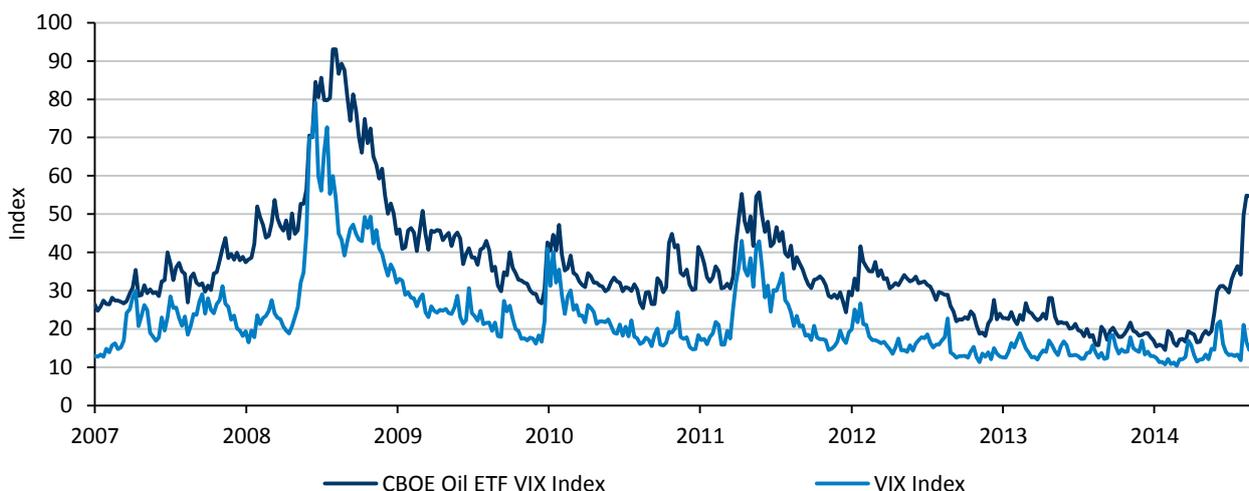
This can be seen in the Chart 9, which shows market assessments of volatility in equities and oil prices reflected in the VIX indices. These do not always move together, but there has been a close relationship most of the time in recent years. Heightened oil market risk and increased volatility in equities normally go hand in hand. Equity market valuations do not reflect this at present.

Chart 8: Rolling quarterly change in oil and equity prices



Source: FactSet Research Systems and RARE calculations.

Chart 9: Equity and oil VIX indices



Source: FactSet Research Systems and RARE calculations.

Most significant effects on infrastructure

There are three main mechanisms through which listed infrastructure securities are exposed to the change in oil markets:

- ◆ First, through the effect of changing oil prices on economic growth and other economic variables.
- ◆ Second, through the direct impact of fossil fuel prices on the markets which infrastructure companies serve.
- ◆ Third, indirect effects. Companies and governments will respond to an environment of lower oil prices which will have longer term structural implications for the opportunities for infrastructure companies.

It is worth noting that the universe of stocks in which RARE invests, the RARE 200, is designed to ensure that there is limited commodity exposure, and thus there is a relatively limited direct effect from the oil price fall. Companies will, however, be exposed to the GDP and indirect effects.

The economy

The impact on infrastructure companies of the economy will depend on whether companies are regulated utilities, or user pay assets that benefit from economic growth. For most utility companies, regulatory frameworks typically ensure that there is a limited impact from a change in economic growth. There would be a relatively small transitional effect from temporarily low inflation. A change in long-term interest rate expectations will be broadly neutral, as over long time horizons these changes are reflected in regulatory parameters and required returns.

In contrast, stronger growth will have a meaningful effect on user-pay infrastructure, in particular in transport such as rail, toll roads and airports.

Direct effects

The direct effects of the oil price fall will depend on the detailed nature of the underlying assets. For many infrastructure companies there will be no cash flow impact from the change in the oil price. This is because they are “network” companies, and it is the users of the network rather than the owners of it that are affected by the commodity exposure. Even where companies are integrated, the regulatory or contractual framework often insulates the business from commodity price risk.

The main areas where there may be effects are:

- ❖ **Electricity.** Integrated electricity companies or generators exposed to wholesale prices will typically have revenues and profits which are related to gas prices, which in turn depend on oil prices. The oil price fall therefore translates into lower valuations.
- ❖ **Gas.** Companies exposed to gas processing, such as many companies in the midstream gas industry in the US, can expect to have reduced profits.
- ❖ **Transport.** In addition to the effect of improved economic growth noted above, growth should be further boosted by the lower fossil fuel prices as prices for air travel and use of cars will fall, increasing throughput.

The extent of the impact requires detailed assessment of individual assets. It is beyond the scope of this paper to examine all these effects in detail but an example illustrates the effects and further details are included in the case studies at the end of the paper.

In the US, the share prices of rail companies have fallen along with the price of oil so there is a perceived relationship. The fall in prices may lead to a drop in volumes of crude oil transported over the rail network. It is also possible that at the margin the use of trucks could become more economic and therefore increase the competition to the rail industry. However, these effects are likely to be minor in the context of the companies: revenues for crude oil transportation account for less than 5% of revenues for the Class 1 rail companies; and labour costs and service quality make rail the most economic for hauls over a few hundred miles. The longer term structural impact of a sustained higher level of GDP is likely to be more significant, in our view.

Indirect effects

The sustained higher oil prices observed since the onset of the GFC have led to an expectation of continued high oil prices. Company business plans, current and planned infrastructure, and government policy on energy and infrastructure have all been developed in that context and are at least in part contingent on higher oil prices.

It is too early now to give a full assessment of what a “lower for longer” oil price scenario might do to these plans, but two immediately come to mind.

- ❖ **Gas.** Lower oil prices are likely to change the economics of US exports of hydrocarbons. This makes further expansion of LNG facilities both in the US and elsewhere potentially less valuable. Companies which are developing such facilities may expect lower returns from any future expansion opportunities. Likewise, expansion of gas and oil networks, while still necessary, may also be less pressing and offer lower prospective returns.
- ❖ **Renewables.** Investment in a range of renewables technologies has grown strongly recently, with a growth of 16% to USD310bn between 2013 and 2014 according to Bloomberg New Energy Finance. Renewable technology has become more competitive in recent years, but still relies on government subsidies and related policies to

make it sufficiently attractive to investors. With lower oil prices, the relative cost of increasing renewables will be higher, and it is possible that governments may be less willing to support these, slowing the uptake of these technologies. Much will depend on the extent to which climate change commitments dominate other priorities in governments' policy development.

Conclusion

The collapse in oil prices in the second half of 2014 is very large in a historical context, with very few such material moves having been observed in the last fifty years. This is likely to boost economic growth, but there are winners and losers and the transition to a new equilibrium level for oil prices is unlikely to be smooth. Forward rates in the oil market are lower than forecasts, and there is an uneasy calm in equity markets which is rare when oil prices are volatile. Structural change in response to the price collapse is also likely, and the results will be unexpected. Increased volatility and risk premia are likely to be the consequence.

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Case study 1 - Hong Kong Electric

Hong Kong Electric (HKE) is a vertically integrated electricity business serving Hong Kong and Lamma Islands with approximately 568,000 customers. The company has 3.8GW of installed capacity with a mix of 2.5GW coal, 0.7GW gas and 0.6GW oil.

Changes in oil price will have minimal impact on the IRR as the majority of production is from coal. Fuel costs for the 1.2GW of oil and gas generation will change but do not affect company earnings as they are passed through to consumers. When the electricity tariff is determined at the start of each year, fuel costs for production are also estimated and any variations in this amount are paid into / withdrawn from a fuel tariff stabilisation account.

There is little to no effect on the IRR to changes in GDP as electricity usage in Hong Kong is relatively stable and insulated from broader economic fluctuations. This is due to Hong Kong's economic growth depending more on the services, rather than the industrial sector which is less affected by short-term economic fluctuations.

Long-term changes to fuel cost, coupled with environmental effects are likely to alter the Hong Kong governments preferred fuel generation mix. Under the current Hong Kong electricity pricing agreement, HKE is permitted to make a return on its capital investments, so any investment in new plant build would be positive for the company as it would increase permitted returns.

In summary, the prospects and value of Hong Kong Electric are relatively immune to oil price and other commodity price changes.

Case study 2 - Union Pacific

Union Pacific (UNP) is one of the leading US rail companies with a network of 32,000 km focused on 23 states in the western USA.

US rail companies including UNP reacted negatively to the oil price collapse in late 2014. Our assessment, however, is that the direct impact is relatively limited. There are three main effects. First, fuel costs are passed through to customers via surcharges. These account for around 8% of revenue, and the oil price fall combined with the lag in the reduction in the surcharge is a short-term positive for the companies. Second, the transportation of crude oil by rail may fall. However, we see at most a limited risk here because: investments made by the rail companies are supported by contractual commitments from shippers and the overall contribution to revenue is only 4.1% for UNP. Third, there may be a slowdown in shippers switching the use of trucks to rail as trucks become more competitive for intermodal volumes (19% of revenues). However, rail costs are well below those of trucks, so any change in switching rates is likely to relate to service quality rather than costs, and this conclusion is supported by the limited change to switching observed in 2008/09. Overall we see the impact from these effects to affect UNP's IRRs by less than 2%.

In contrast, we do see a positive effect for the rail companies from the boost to GDP from the oil price fall. Rail company volumes are cyclical and we estimate that the increase in volumes would more than offset any negative effects. This GDP effect is also likely to lead to increases in capital expenditure to increase capacity to support the increased volumes. A sustained lower oil price may partially offset this with slower growth in intermodal volumes.

Case study 3 - Kinder Morgan

Kinder Morgan (KMI) is a North American energy infrastructure company with interests in natural gas pipelines connecting all the major gas fields in the US, it is the largest independent transporter of petroleum products in the US, and the largest operator of bulk and liquids terminals. It also has a limited production of crude oil using CO₂ oil recovery technology.

KMI's oil production business (15% of revenues) is directly affected by the oil price fall. However, the short-term impact is mitigated as 80% and 50% of revenues in 2015 and 2016 respectively are hedged at USD80/bbl. We estimate an impact of 4% on distributable cash flows if we were to mark oil prices to market for 2015, which doesn't materially affect our IRR estimate.

KMI's businesses would benefit from higher GDP growth to the extent that it leads to increased oil demand. However, the gearing is relatively limited: an increase in gasoline volumes would increase distributable cash flow by around 30bps, and thus have an immaterial impact on our estimate of the IRR.

There are likely to be material affects from the oil price decline on the opportunities for KMI. There will be reduced investment in oil production, and as a result KMI recently deferred USD730m of capex until oil prices recover (out of a USD3.6bn capex program). An important part of KMI's strategy, however, following the acquisition of minority stakes in its subsidiaries, is further M&A activity. The turbulence is likely to generate additional opportunities for value enhancement which we see as positive.

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