جدوى للإستثمار
Jadwa Investment

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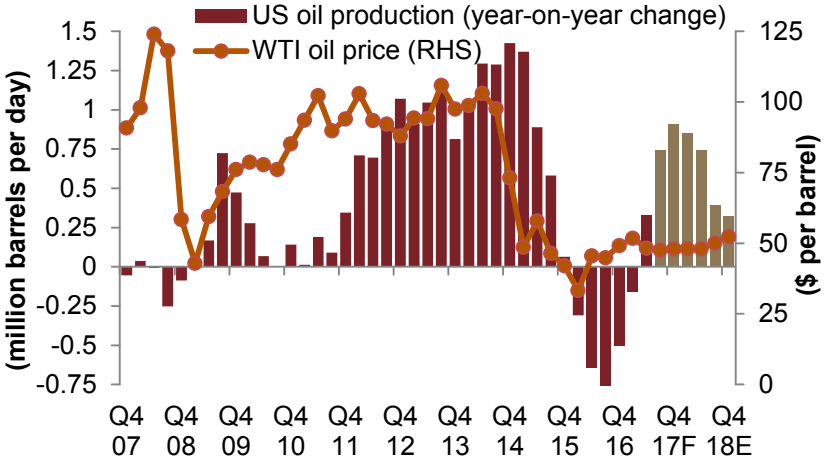
Shale Oil 2.0

Summary

- The recently observed uptick in oil prices has given many US shale oil producers the opportunity to expand production. Latest forecasts from the Energy Information Administration (EIA) see US oil production rising by 10 percent year-on-year in 2017, and 3.3 percent in 2018.
- Alongside the rise in shale oil production, the financial health of US shale companies has also improved. In addition to the pace of bankruptcies declining noticeably during 2017, there has also been a rebound in the issuance of high-yield debt.
- Nevertheless, shale oil exploration and production (E&P) companies face a number of potential 'bumps in road' that could hinder their progress and recovery in the near-to-medium term.
- Throughout the period of high oil prices during 2010-2014, access to cheap finance, due to record low US interest rates, helped to sustain US shale oil production rises. Going forward, lower interest rates are not likely to persist, with the US Federal Reserve (Fed) already hiking interest rates three times in the last two years.
- Besides higher borrowing costs, shale oil producers also face the possibility of constrained capacity leading to inflated operating costs. One area where costs are likely to rise is related to oilfield services, which includes the cost of rigs, equipment and personnel.
- Therefore, despite shale oil operators cutting costs in the last two years, not all of these reductions will be carried forward. As a result, breakeven prices of shale oil are projected to rise for first time in five years, in 2017.

Figure 1: Year-on-year change in US crude oil production and West Texas Intermediate (WTI) oil price*



*Forecasts based on EIA data

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Overview

The latest forecasts from the EIA points to sizable rises in US crude oil production in both 2017 and 2018.

The latest forecasts from the US based Energy Information Administration (EIA) point to sizable rises in US crude oil production in both 2017 and 2018. According to EIA data, US oil production will rise by 10 percent year-on-year in 2017, and 3.3 percent in 2018 (Figure 1). Although much slower than the average growth of 14 percent seen between 2012-15, it still represents a potentially strong rebound, especially after a decline in yearly production in 2016. The rebound, seen since the start of 2017, has come entirely from unconventional (or shale) oil sources and has been encouraged by a recovery in oil prices following an agreement between OPEC and certain non-OPEC countries.

The rebound in oil production is expected to come from unconventional oil sources.

Recent Trends

The recent trends seen in the US shale oil sector are a mirror opposite of those highlighted last year.

Around mid-year last year, after a recovery from record lows earlier in 2016, oil prices had stabilized to around $40-45 per barrel (pb). Nevertheless, the effects of uncapped supply from OPEC and modest global oil demand were maintaining pressure on oil prices. As a result, a significant reduction in the US rig count, despite improving well productivity, saw the big three shale oil fields, Bakken, Permian and Eagle Ford, output declining *(for more details please see Recovery in Oil Prices: Rebound in US Shale Oil? published June 2016).* The trends being seen in the US shale oil sector currently are, in many respects, a mirror opposite of those highlighted last year. For example, in its August monthly report, the EIA stated that total US crude oil rose to 9.4 million barrels per day (mbpd) in July 2017, an 11 percent rise compared to the same period last year. Since conventional US oil production has remained fairly flat in the last year, the main contributor to this rise has been unconventional oil (Figure 2). In fact, two out of the big three shale oil fields, which account for 90 percent of total unconventional production, have seen a sizable recovery in output. Although Bakken's output dropped by 1 percent year-on-year in July 2017, Eagle Ford's output rose by 14 percent, whilst Permian saw a staggering 21 percent rise since July 2016 (Figure 3).

The EIA states that total US crude oil rose to 9.4 mbpd in July 2017, an 11 percent rise compared to the same period last year…

...with two out of three major shale plays seeing sizable yearly growth in oil output.

Similarly, whereas lower oil prices squeezed shale oil operators and led to significant reductions in the rig count last year, there has been a reversal of this in recent months. Having fallen to multi-year lows

Figure 2: Recent US crude oil production rises almost entirely a result of shale oil

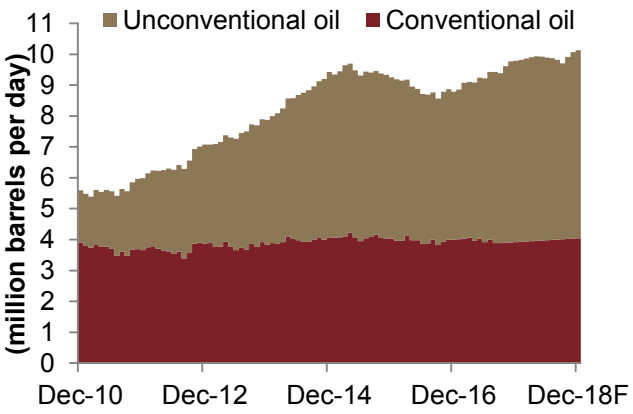
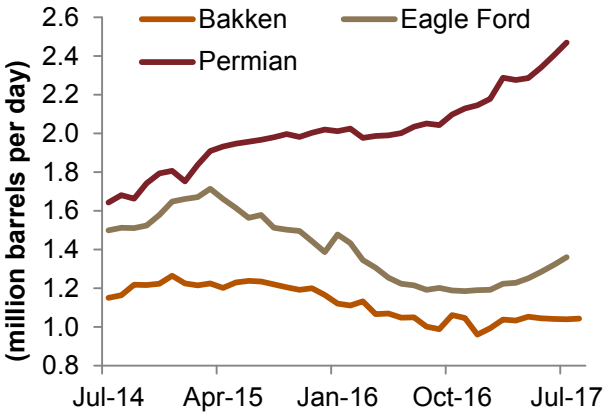


Figure 3: Crude oil production at Bakken, Eagle Ford and Permian



Higher oil prices have resulted in a rise in the rig count...

...but well productivity has declined.

back in May 2016, to 190, the rig count had recovered to 511 in July 2017. That said, shale oil companies have been unable to maintain well productivity levels, with production per rig declining by 2.5 percent over the same period (Figure 4). A higher rig count but falling rig productivity suggests that shale operators have began to branch out from their most productive core wells to less productive areas in order to generate higher revenue and cash flow as oil prices have improved.

Shale Financing

The financial health of shale E&Ps has also recently improved...

Alongside the recently observed rise in unconventional oil production, the financial health of shale E&Ps has also improved. Firstly, the number and value of bankruptcies seen in the US oil sector in the previous two years has declined noticeably in 2017. During 2015, when WTI prices averaged $49 pb, the US oil sector saw bankruptcies totaling $17.4 billion. During 2016, bankruptcies rose to a total of $55 billion as WTI prices slumped to $43 pb during the year. With oil prices improving since the start of 2017, averaging $50 pb in H1 2017, this has led to a sizable drop in bankruptcies, to only $5 billion over the same period (Figure 5).

...with cash flow rebounding by 77 percent year-on-year in H1 2017…

...although the historical problem faced by shale E&Ps with regards to a funding gap, is likely to persist going forward...

This rise in oil prices has also helped improve E&Ps' cash flows. In the last few years, lower oil prices, more restrictive lending practices and the higher cost of borrowing, due to bankruptcies, pushed E&Ps' cash flows to record lows *(for more details please see Recovery in Oil Prices: Rebound in US Shale Oil? published June 2016)*. After dropping 55 percent year-on-year in 2015, cash flow from operations (CFO) of 56 listed US E&P companies dropped by further 37 percent year-on-year in 2016, to multi-year lows of $38.7 billion. More recently, as a result of improved oil prices together with a rebound in oil output, CFO during H1 2017 rebounded by a sizable 77 percent year-on-year. Nevertheless, the historical problem faced by shale E&Ps, with regards to a funding gap, is likely to persist going forward.

...consequently, as in the past, the sector will be reliant on financing…

Higher oil prices and the resultant rebound in rig count and subsequent higher oil output all require higher capital expenditure (capex). Consensus forecasts currently expect US listed E&P companies' capex to rise by 7 percent year-on-year in 2017, the first such rise since 2014, with another yearly rise in 2018, by 12 percent (Figure 6). However, considering that even during the period of high

Figure 4: Rig count and production per rig at Bakken, Eagle Ford and Permian

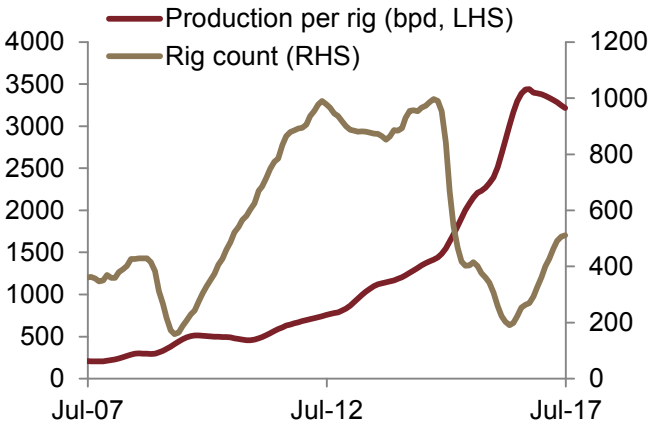
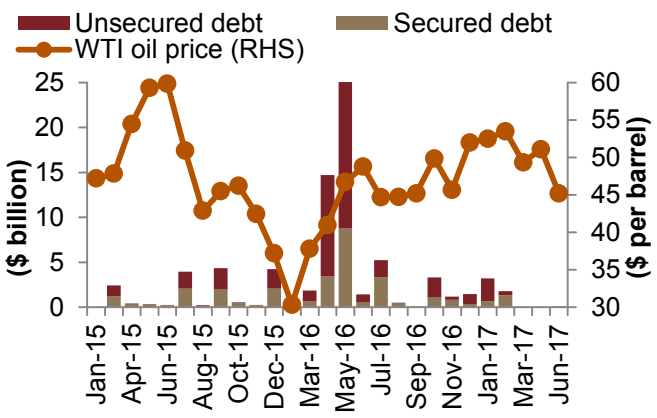


Figure 5: Bankruptcies have decreased in 2017



...from equity markets, high-yield bonds or secured/unsecured lending.

oil prices between 2010-14, many E&P companies' could not plug the funding gap between CFO and capex, it remains highly unlikely they will be able to do so in a lower oil price environment, going forward. Ultimately, as in the past, the US shale oil sector will be reliant on financing, either through equity markets, high-yield bonds or secured/unsecured lending. In fact, latest data shows an uptick in high-yield bond issuances in the last year, which has coincided with an improvement in oil prices. Non-investment grade E&P companies, the recipients of such financing, returned to the high-yield bond market as issuances rose to highs of $15 billion in Q4 2016, whilst H1 2017 issuances were up 80 percent year-on-year (Figure 7).

The improvement in both oil prices and financial health of US E&Ps, points to higher oil output...

The improvement in both oil prices and the relative financial health of US E&P companies points to higher oil output from the US. The latest EIA short term energy outlook (STEO) forecast expects US oil output to grow by 10 percent year-on-year in 2017, and 3.3 percent in 2018, helping push total crude oil production to record levels, at 10 mbpd. When looking at longer term forecasts, the EIA points to even further growth. Taking the 'high resource and technology' case under the EIA's annual energy outlook (AEO) 2017 report, which assumes WTI oil prices of $68 pb by 2020, total US crude oil production is expected to rise to 11.3 mbpd by the end of the decade. Of course, the problem with such forecasts, especially so in the case of shale oil, is that they often present a circular argument. That is, if US oil output does rise, this in itself would raise global oil supply, and, in turn, pressure oil prices lower. Besides this, there are also a number of developments that have the potential to dent US oil production in the next few years. Below we asses some of the key developments that could impact shale oil supply.

...with EIA forecasting total US crude oil production rising to 11.3 mbpd by the end of the decade...

...although a number of developments have the potential to dent US oil production in the next few years.

Risks to US Oil Production

The main risk to US oil production relates to lower oil prices and the associated risk of lower priced hedges…

The main risks to US oil production in the near-to-medium term include; lower oil prices and, with it, the associated risk of lower priced hedges, higher borrowing costs and rising operating costs.

….as well as higher borrowing and operating costs.

Higher costs:

Despite a downturn in shale oil output in 2016, productivity gains and cost reductions helped producers maintain output at levels higher than some industry forecasts. Falling oil prices resulted in increased rig productivity, heavy cost-cutting measures and technological improvements, which drove down break even prices of shale oil

Figure 6: Listed US E&P companies expected to maintain historical funding gap*

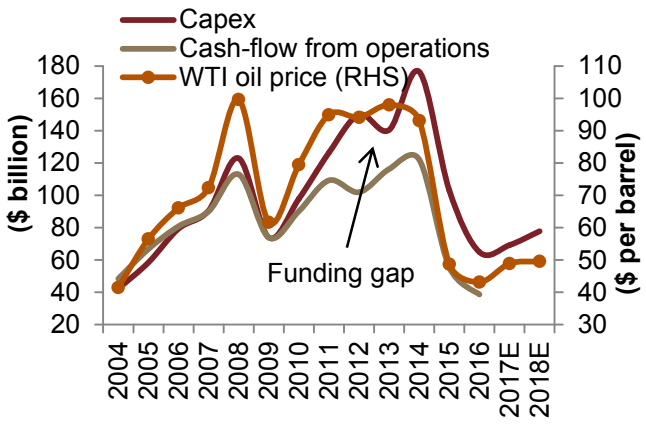
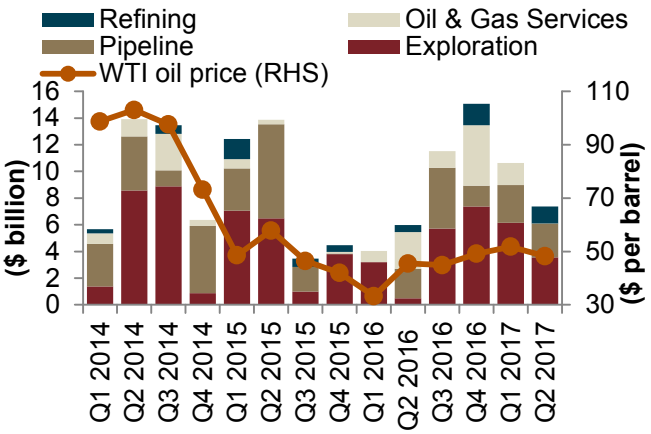


Figure 7: US high yield bond issuances have recovered



*WTI oil price forecasts based on EIA data

Over the past three years, many shale oil producers pushed oilfield service companies to accept lower prices…

….via fixed contracts.

The expiration of such contracts should allow prices for higher demanded services related to drilling and operating wells, to rise…

...as a result, breakeven prices of shale producers' are projected to rise for first time in five years in 2017.

production. However, these cost reductions and efficiencies are not permanent, some are cyclical. One area where costs are likely to rise is related to oilfield services, which includes the cost of rigs, equipment and personnel. Over the past three years, many shale oil producers pushed oilfield service companies to accept lower prices, via fixed contracts, which service companies agreed to since they needed cash flow to cover their own expenses. The expiration of such contracts over the coming year should, in turn, allow prices for higher demanded services related to drilling and operating wells, to rise.

When oil prices started their decline from mid-2014 onwards, many E&P producers kept drilling wells, but did not extract oil from these wells (such wells are referred to as drilled uncompleted wells or DUCs). Normally, DUCs can produce oil within a two to three week period, which gives shale oil producers the option of leaving oil inventory underground until more favorable prices transpire. As such, during 2015 and 2016 a predictable pattern emerged. That is, following an upward movement in oil prices, the number of DUCs either declined or flattened and, conversely, as oil prices dropped, the number of DUCs increased. Since late 2016, however, this pattern seems to have be broken. Latest available data shows that DUCs have risen consistently since December 2016, despite a sizable rise in oil prices (Figure 8). One reason for this rise could be related to some shale companies holding bullish expectations of oil prices in the future, therefore prompting them to delay bringing DUCs online. Another reason for the build up most likely relates to a drop in supply of oilfield services personnel (fracking crews) to complete such wells. In fact, the oilfield services sector has seen the largest proportion, at 44 percent, of total global oil & gas lay-offs since the start of the oil price downturn. Consequently, as shale oil producers raise oil production, a smaller number of readily available fracking crews, following previous dismissals, is resulting in pushing up costs, with some reports suggesting a 60-70 percent rise in cost of crews, compared to a year ago.

Therefore, despite shale oil operators cutting costs in the last two years, not all of these reductions will be able to be carried forward. As a result, breakeven prices of shale oil are projected to rise for first time in five years in 2017, to an average of $36.5 pb, although they are still 50 percent lower than their peak in 2012 (Figure 9).

Figure 8: Since late 2016, DUCs have been rising despite an uptick on oil prices

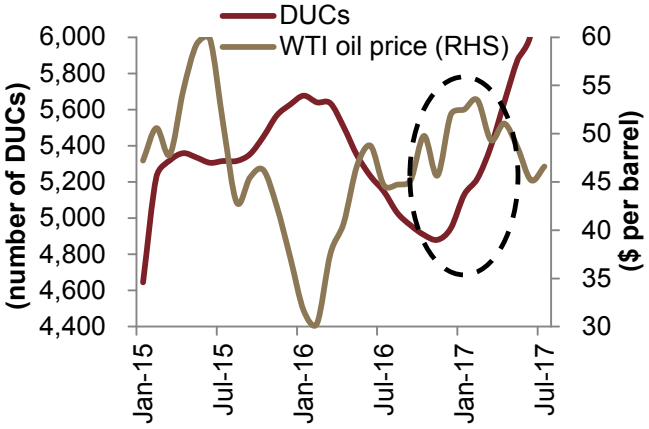
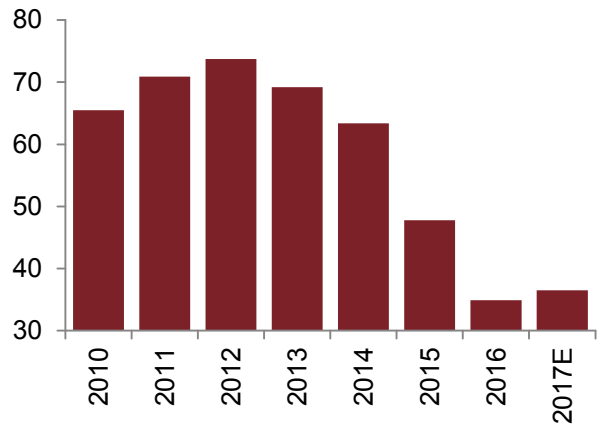


Figure 9: Shale oil breakeven prices expected to rise for the first time in five years in 2017



Higher borrowing costs:

Low interest rates are not expected to persist, with the US Fed having already hiked rates three times in the last year.

As we highlighted in our previous report on *US Shale Oil at an Inflection Point (published October 2015),* shale oil requires a very high level of drilling activity to prevent steep decline rates. When considering that the sector is made up of a large number of small and medium-sized companies, the relative upfront costs associated with such intensive drilling can be significant. We have also seen that the inability of US E&P companies to cover capex through their own means has resulted in them turning to equity and debt markets in order to raise cash. In the past, many E&P companies were able to gain access to cheap finance, due to record low US interest rates, all of which played an important role in sustaining US shale oil production throughout the high oil price period of 2010-2014 (Figure 10). Going forward, however, low interest rates are not expected to persist with the US Federal Reserve (Fed) having already hiked rates three times in the last two years.

A sharper than expected rise in interest rates could see steeper rises in the cost of borrowing.

Recently released US economic data shows an uptick in inflation alongside a decline in US unemployment to below pre-2008 levels. Such factors are likely to push the Fed into continuing with interest rate tightening. Latest survey data shows a 40 percent chance of 25 basis points (bps) rise, and a 20 percent chance of 50 bps interest hike in the year ahead. That said, a sharper than expected rise in interest rates could see steeper rises in the cost of borrowing, something which has already occurred due to the higher level of risk related to the sector. Figure 11 shows that net debt of 56 listed US E&P companies rose by 62 percent, whilst interest expenses rose by 48 percent, between 2010-2016. As interest expenses reached record levels in 2015, many companies sold off non-core assets and deleveraged. Tellingly, however, whilst net debt decreased by 17 percent year-on-year in 2016, interest expenses declined by only 5 percent (Figure 11). Moving forward, it seems that many companies would have to engage in further deleveraging in order to reduce their interest expense, but this would be difficult to implement without negatively impacting oil output levels.

Many shale oil companies would have to engage in further deleveraging in order to reduce their interest expense…

…but this would be difficult to implement without negatively impacting oil output levels.

Shale oil companies engaged in borrowing from high-yield debt markets face an even higher exposure to rising debt servicing costs. In most cases, small-to-medium sized operators have turned to high-yield debt markets, and, as we have highlighted above, this segment of finance has rebounded recently, with outstanding debt rising by

Figure 10: US shale oil companies saw record low interest rates and high oil prices during 2010-14

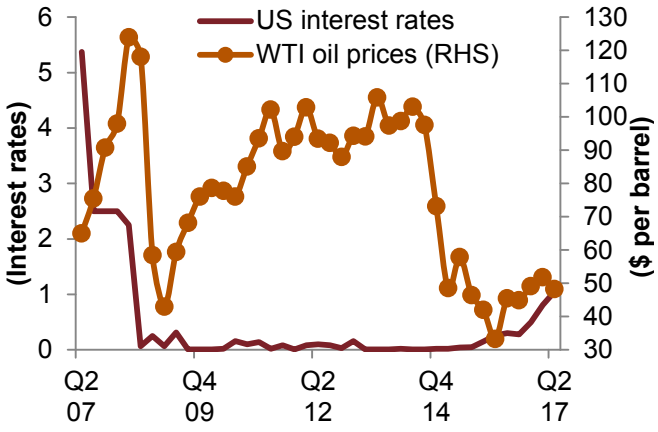
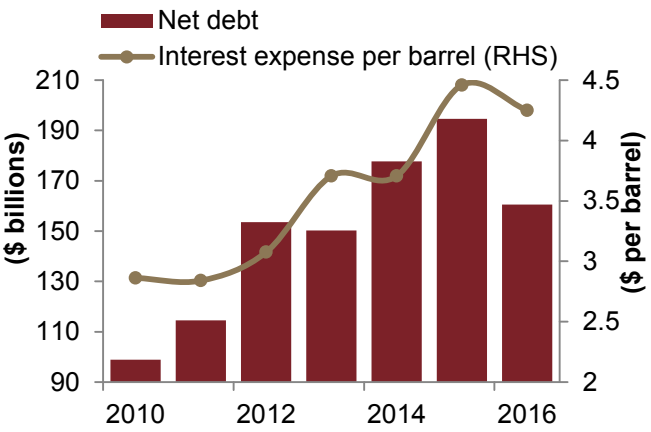


Figure 11: Net debt and interest expenses of listed US E&Ps



Shale oil companies engaged in borrowing from high yield debt markets face an even higher exposure to rising debt servicing costs.

$128 billion in last three and a half years. Consequently, the ability of such smaller companies to service principal and interest payments, as interest rates rise, will become increasingly difficult. Such a situation could, in the very least, reduce the amount of cash available for investing in drilling oil, and, at worst, result in another round of defaults and bankruptcy filings. The situation would, of course, be compounded if oil prices fell further below current levels.

Lower oil prices:

Major uncertainly relates to what OPEC and non-OPEC countries choose to do after the agreement expires in March 2018.

Since the beginning of 2017, OPEC and certain non-OPEC members have agreed to cut 1.8 mbpd in output compared to October 2016 levels, back when the cut was agreed. As a result, both daily global oil balances and commercial crude stocks have declined gradually, helping lift prices. Whilst there has been a drop in OPEC compliance in recent months, which could jeopardize the agreement during the next few months *(for more details please see our Quarterly oil market update- Q2 2017: (OPEC Discipline Waning?) published July 2017),* another major uncertainly relates to what OPEC and non-OPEC countries choose to do after the agreement expires in March 2018. Currently, there seems no real consensus to extend cuts, but the worse case scenario, where production levels are restored to levels prior to the cut agreement, would put global oil balances back into large surpluses and pressure oil prices.

The worse case scenario would be where OPEC production levels are restored to levels prior to the cut agreement…

Holding all other factors constant, and assuming both OPEC and non-OPEC countries engaged in cuts revert to their October 2016 production levels after the deal expires, a global oil balance surplus of 1.3 mbpd would be expected for the whole of 2018 (Figure 12). Such a situation would be worse than the period of intense OPEC competition and global oil over-supply seen during H2 2015 and H1 2016, where WTI oil prices averaged just above $40 pb. This period also coincided with a steepest declines in US shale oil production, with shale oil declining by 500 tbpd, or 10 percent, in the 12 months to June 2016.

...which would bring oil prices down and impact shale oil producers.

Hedges:

The recent uptick in prices has seen a return in hedging activity. Data from 37 listed E&P companies, which account for around 75 percent of total US shale oil production, shows a steep rise in

Figure 12: Global oil balances could slip into surpluses if OPEC does not roll over cuts in 2018

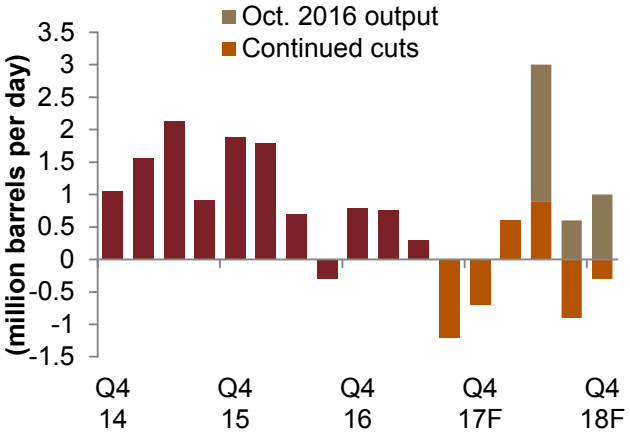
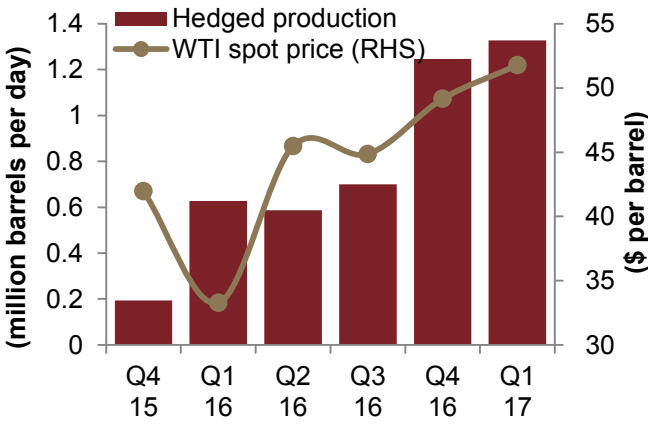


Figure 13: A rise in WTI oil prices led to a rise in the quantity of hedged shale oil production



The recent uptick in prices has seen a return in hedging activity…

hedges in the last few months.

Back in Q4 2015, around 193 tbpd of expected 2017 shale oil output had been hedged, but this total increased alongside the rise in oil prices. Following the OPEC's announcement in October 2016, that a cut in oil production had been agreed, WTI prices jumped 10 percent quarter-on-quarter to $49 pb in Q4 2016. Over the same period, US shale oil companies hedged an additional 545 tbpd, pushing total hedged production close to 1.25 mbpd. As of Q1 2017, a total of 1.3 mbpd, roughly 22 percent of expected 2017 shale oil production, had been hedged, at an average price of $50.3 pb (Figure 13). That said, latest available data shows that only 466 tbpd of shale output has been hedged in 2018, with a declining number of hedges through to 2020. If prices were to decline, then we would expect to see a slow down in hedging activity through to 2020, conversely, a rise in oil prices would encourage additional hedges at higher price levels, to be taken out.

...with a total of 1.3 mbpd, roughly 22 percent of expected 2017 shale oil production, having been hedged, at an average price of $50.3 pb.

A higher level of hedged oil production is likely to lead to increased lines of credit for shale E&Ps. For example, the amount of secured lending a shale operator receives depends on the value of their proved developed producing (PDP) oil reserves (i.e. the amount of oil expected to be recovered from open and producing reserves). Since hedges lock in future oil price, they lock-in the value of PDP for a set period of time and, as such, allow leveraged producers to minimize the risk of interest payments if oil prices decline. Accordingly, following the downturn in oil prices since 2014, many banks inserted debt covenants in secured lending which stipulated that a certain some percentage of oil production must be hedged.

A higher level of hedged oil production will lead to increased lines of credit for shale E&Ps.

Outlook

The recently observed uptick in oil prices has given many shale oil producers the opportunity to expand production, and, based on EIA medium-term projections, these rises could continue until at least 2020. Nevertheless, shale oil E&P companies face a number of potential 'bumps in road' that could hinder their progress and recovery in the near-to-medium term. Besides lower oil prices, shale oil producers also face the possibility of higher borrowing costs, constrained capacity leading to inflated operating costs, and, as a result, continued financial pressure.

Overall, a number of potential 'bumps in road' could hinder shale oil's progress and recovery in the near-to-medium term.

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