End of Oil Greatly Exaggerated

Of all the global risk sources at the tail end of 2017, a sudden oil price shock arguably poses the greatest risk to institutional portfolios both in terms of its likelihood and the severity of impact. But perhaps the most troublesome factor is the complacency or lack of attention towards this risk; if anything, investors' concern is over sharply lower oil prices.

The reasons for complacency could be traced to the widespread belief that the days of significance of oil as key commodity are numbered, and that we have already seen the beginning of marginalization of oil as energy source. The reality cannot be farther from the truth:

- the world is using more oil than ever before,
- electrification of transport will not matter at least until 2025,
- traditional oil producers have underinvested,
- shale oil producers face limits to productivity gains.

All of the above prompted us to carry out a 75% price hike scenario analysis using LINKS Mira ABM. Our conclusion is that the resulting environment will be toxic for fixed income instruments due to the inflationary pressure, but there will be bright spots to hedge with.

Download a public version of LINKS Mira Agent Based Model (ABM): a class of models for simulating the interactions of organizations or groups with a view to assessing their effects on the system as a whole:
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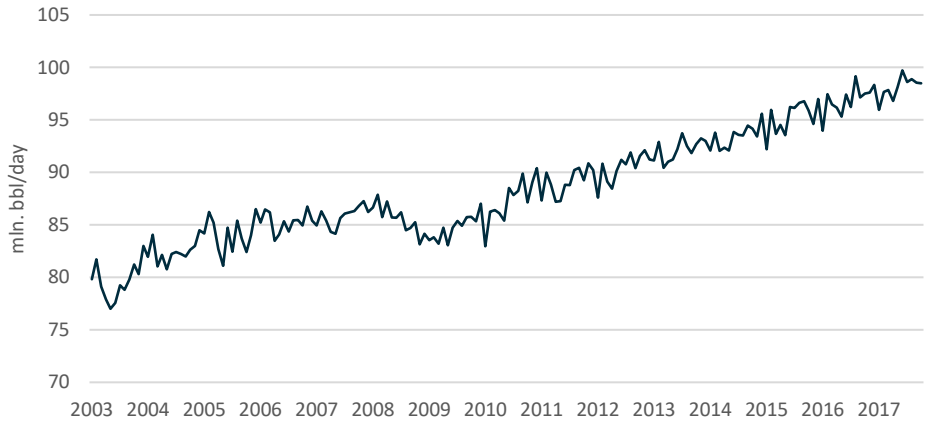
The Demand Keeps Growing

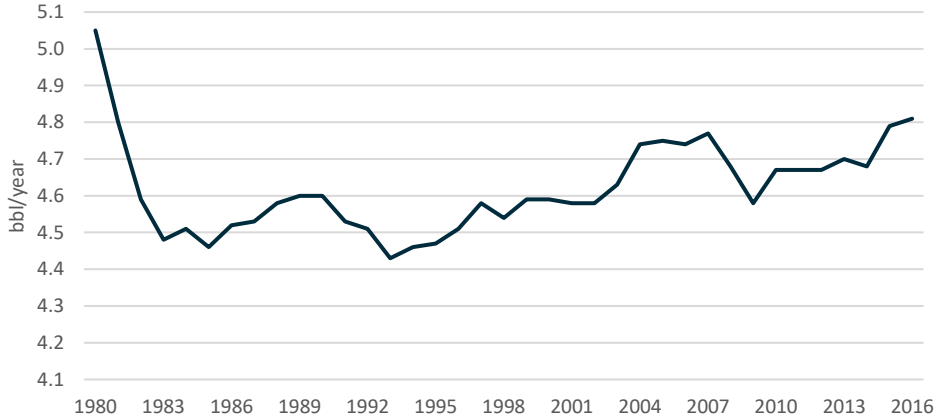
Despite what we are often led to believe by newspaper headlines, demand for oil and related products has been steadily increasing over the last decade. The total world consumption reached nearly 100 mln. barrels per day (Figure 1) after a decade-long increase following a brief post-crisis fall in 2007-2008.

Figure 1: World oil consumption, Source: US EIA



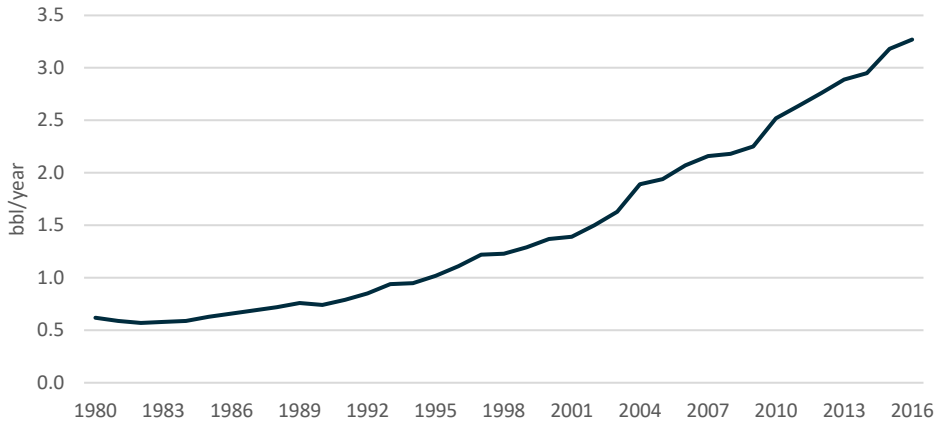
What is more, the pace of consumption increase is higher than overall population growth, as per capita consumption reached 4.8 barrels a year (Figure 2) from 4.6 barrels in 2000 and 4.4 barrels in the 1990s.

Figure 2: Per capita oil consumption, Source: US EIA



Predictably, bulk of the increases have come from the emerging markets, as per capita consumption has more than doubled in China alone since 2000 (Figure 3).

Figure 3: Per capita oil consumption in China, Source: US EIA



Electrification of Transport Will be Gradual

Of course, media headlines correctly highlight the "rapid" transition that is taking place in the transportation industry from fossil fuels to electrified transport. What is usually mishandled and misunderstood is the pace of this transition and the massive hurdles lying ahead. The automotive industry is many steps closer to full electrification, and compared to the 1980s, we now have practical electric vehicles with broad appeal that are produced at near mass scale.

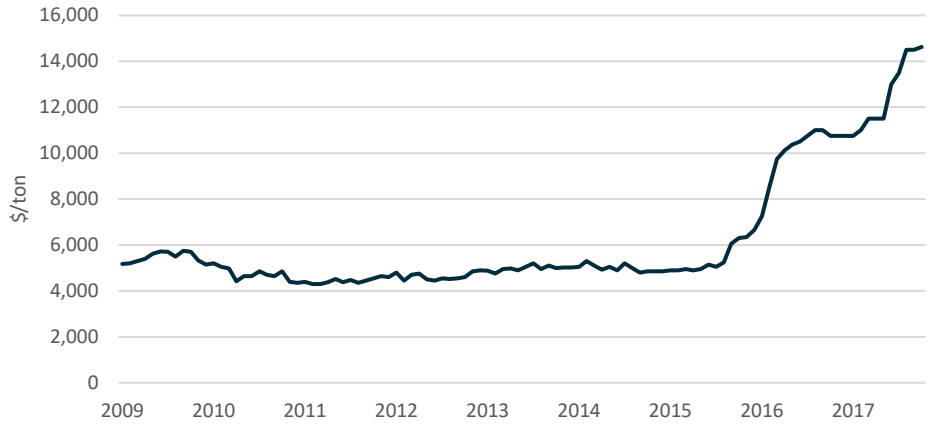
However, the industry will require at least two more decades to iron out the economics of supply chain issues of mass manufacturing electric vehicles at a reasonable cost. The best-known brand of electric vehicles is Tesla, which has achieved success with Model S. It is priced at over $100,000 – well over the US average car price of ~$35,000. This magic level of the average car price was the key anchor for the announcement of Tesla's aspiring mass market offering – Model 3's price.

The problem with manufacturing vehicles that cost less than $35 thousand is that the margins are razor-thin, and whether the manufacturer will eventually make money or not will depend on how stable and lean the supply chain is.

As an illustration, take Model 3: the price was set in the beginning of 2016, when lithium carbonate[1] price was ~$6500 per ton (Figure 4). The production will start in early 2018, at the most recent lithium carbonate price of $14,650 per ton, or $8,150 more expensive. Since Model 3 consumes about 150kg of lithium carbonate, Tesla will make $1,222 (0.15 x 8150) less per vehicle than originally planned. And this is only lithium; prices of cobalt, aluminium and copper have all been consistently up over the last year.

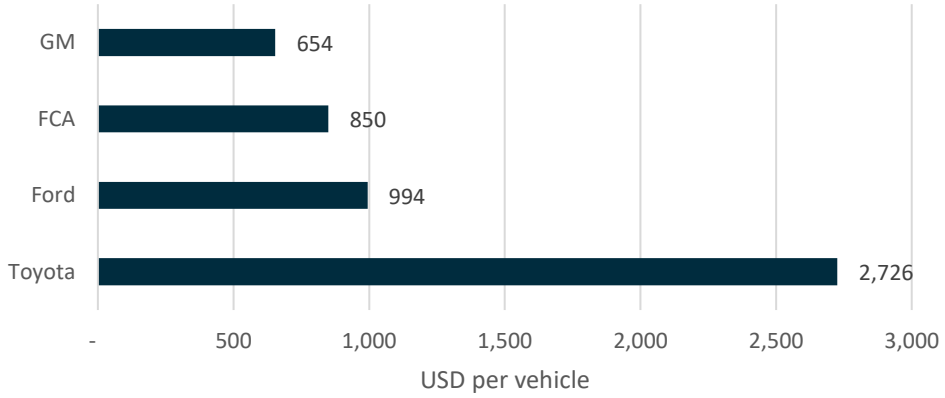
[1] Actual supplies may be either lithium carbonate or hydroxide and there may be slightly longer-term price arrangements, but they seldom remove the fundamental problem.

Figure 4: Lithium Carbonate Price, Source: Bloomberg



Loss of 1200 -1500 per vehicle may not appear much, until it is compared to the actual earnings per vehicle for major vehicle manufacturers (Figure 5). A bill of materials change of $1,500 easily wipes out profit per vehicle for most of the already efficient car manufacturers, and for some of them – several times over.

Figure 5: After tax margin per vehicle produced, Source: IHS



The challenge for the electric drivetrain is its heavy reliance on materials, such as lithium and cobalt that are still to be scaled to supply the volumes required at a price that is sufficiently stable. At present and in the foreseeable future there are no substitutes for lithium and cobalt. In comparison, the conventional ICE vehicle manufacturing base has had decades to innovate and find substitutes for most of the critical materials.

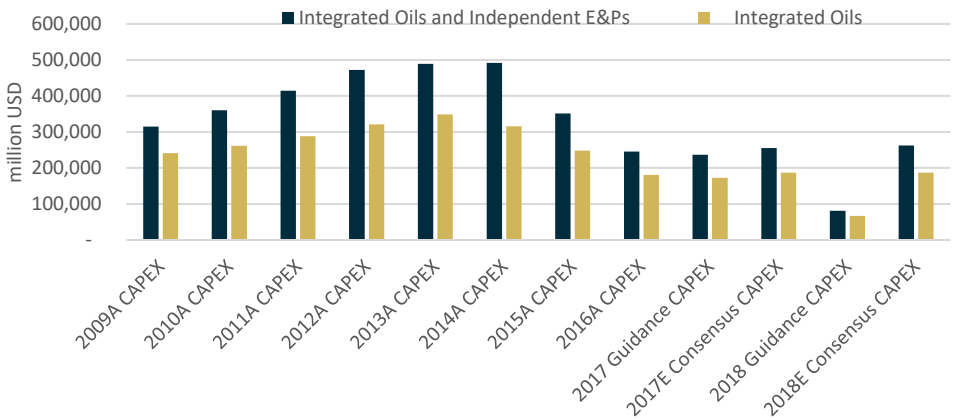
To be clear, it is fair to assume that the electric drivetrain will eventually replace the ICE engine, but the process will last longer than most expect and will have many challenges ahead. In the meantime, according to IEA[2] the total stock of electric vehicles was only 0.2% of all light vehicles on the road in 2016, expected to increase to 5-7% by 2025. We can conclude therefore that as far as demand for oil in the next decade is concerned, the EV market is not as relevant as one might expect.

[2] Global EV Outlook 2017, EIA

Traditional oil capex down

Following the abrupt decline in oil prices, capital expenditure in the oil industry fell. Since the peak of capital expenditure in 2013, the annual capex has fallen nearly six-fold to reach the level of $ 81 billion based on guidance in 2018 (Figure 6). Shrinking capital expenditure can be bad news for oil production in the coming decade. This concern led the International Energy Agency (IEA) to announce that there may be a supply crunch by 2020, as production spare capacity will reach a 14-year low.

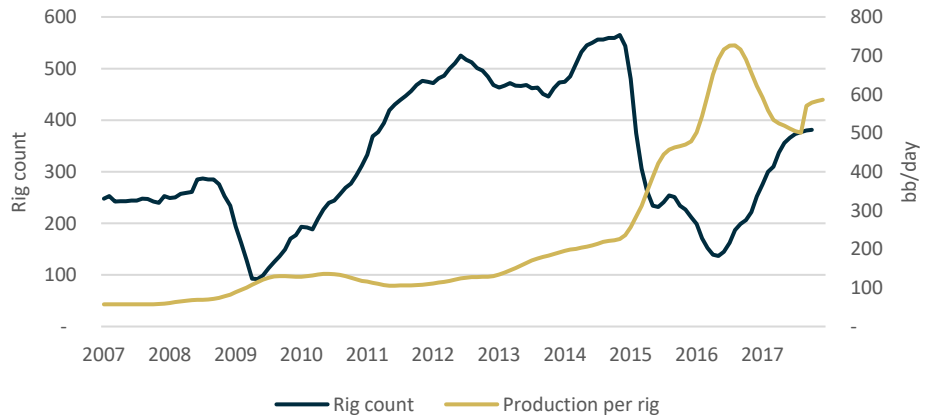
Figure 6: Capital expenditure by year, Source: Bloomberg Analytics



Shale Oil Close to Peaking?

A valid question is whether the US shale production, which caused the recent low oil prices in the first place, will be able to fill the gap. Until recently, shale oil production has all been about the technological improvements that allow for production of greater volumes of oil from a single well. This has been the reason why production in the US increased dramatically, despite falling number of oil rigs. However, since September last year the situation has reversed itself, with a drastic decline of production per rig (Figure 7). With the efficiency of shale operation peaking, there is a real risk of production not being able to catch up with demand.

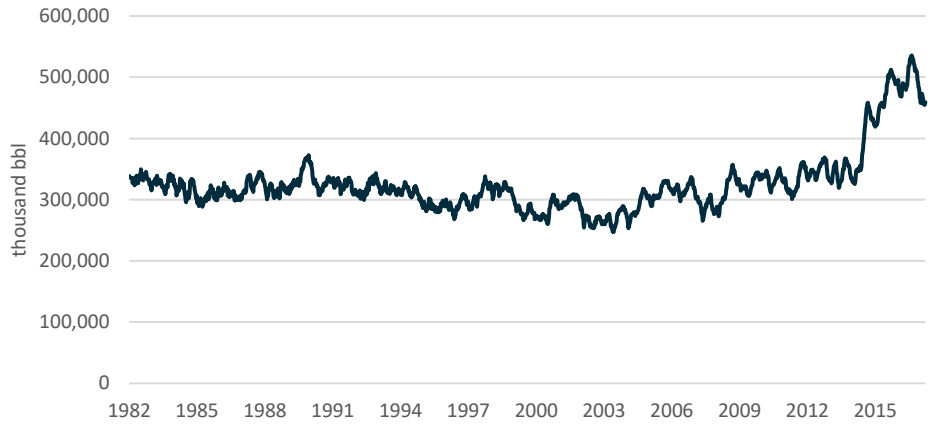
Figure 7: Oil production statistics Permian region US, Source: US EIA



Other Risk Factors

Given the supply and demand dynamic, the industry is clearly vulnerable to minor shocks such as a temporary production cut or regional unrest. The US oil inventory numbers have begun to fall, albeit remaining at levels above historical average (Figure 8).

Figure 8: US crude inventories, Source: US EIA

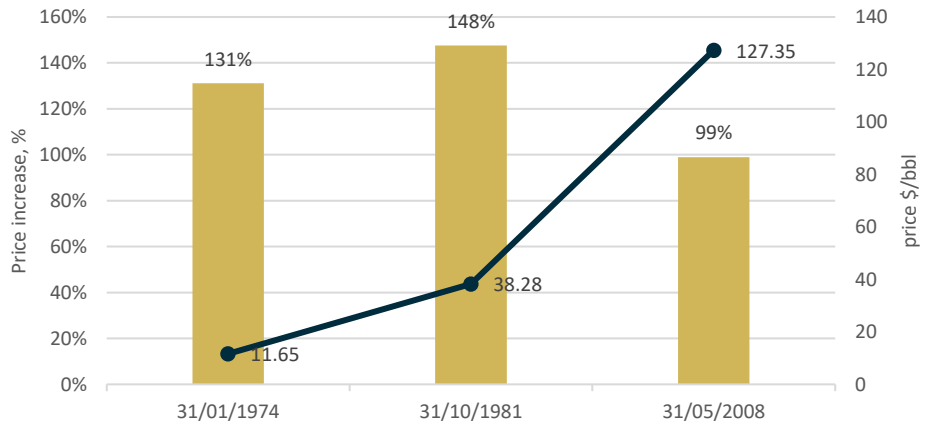


One significant geopolitical risk remains the Middle East, where the balance of power between two regional heavy weights – Saudi Arabia and Iran, is being tested on multiple fronts. Any escalation of conflict in the region is bound to cause supply disruptions and higher prices.

Size of the Shock and Impact on Asset Classes

We have elected to look at a hypothetical 75% increase in price in a short period of time (up to 3 months). In the historical context, such an increase is relatively mild. The price increase during the first oil crisis of 1974 was ~130%, while the somewhat more extended over time price increase during the second oil crisis in 1980-82 was closer to 150% (Figure 10). Oil prices increased by 100% in the pre-2008 crisis period.

Figure 9: Oil price increases and prices during previous oil crises, Source: Bloomberg, LINKS calculations



We have used LINKS Mira ABM to simulate a moderate oil crisis and its impact on a typical asset mix of a pension fund[3]. Our assumption is that the global oil price increases by 75% within three months. The impact of such a rapid oil price increase will be felt across asset classes and unfortunately there will be no respite in safer asset classes such as bonds. Equities in such an inflationary environment will fare better. However, US and European bonds will post significant declines.

UK and EM equities are relatively safe; however, it should be noted that the ABM framework does not consider any liquidity spill-over and sentiment factors that may in fact drive UK and EM equity prices lower. The extent of losses, however, should be less pronounced.

Conclusion

A combination of falling capital expenditure at oil majors, increasing demand for oil and tapering productivity at shale oil producers in the US creates all the preconditions for a potential oil price shock. Such a shock could be triggered by any unexpected small supply cut or a more serious geopolitical disruption. Despite the rapid growth of electrified transport solutions, their adoption pace is not significant enough to avert any oil price risk at least before 2025.

A sudden price increase of 75%, which compared to historical oil price crises is rather modest, would result in falling bond prices in an environment that is best described as stagflation. Emerging market equities and other commodity-related asset classes would perform considerably better in such a scenario.

Although the oil shock scenario at this point is still hypothetical, it is by no means improbable; in fact, given the expected gap between supply and demand and ever increasing geopolitical tensions in the oil producing countries, such a scenario has non-trivial probability to occur.

[3] You can download LINKS Mira ABM to check for sensitivities or carry out analysis that on fund-specific asset mix.

About LINKS:

LINKS Analytics B.V. has a focused offering of industry leading systemic risk management solutions for institutional investors. Our unique and proven methodology of estimating the degree of systemic risk is based on the assessment of asset valuation dislocations globally (Graham Risk) and the degree of interconnectedness and concentration.

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