Shale oil

Three years ago, the world was caught unawares by an unexpected and especially large drop in crude oil prices. That price dropped from more than USD 100 per barrel in the summer of 2014 to USD 50 a half year later. In early 2016, it even fell briefly to USD 30. This meant a decrease by more than 75% in a year and a half. Excluding periods of extreme global recessions and large movements in oil prices relating to geopolitical events, perhaps only the price decline in the mid-1980s may come close to the drop of 2014–2016.

Although the low oil price suits consumers and oil-importing countries just fine, those states that are vitally dependent on oil extraction probably have quite the opposite sentiments. Of course, the entire energy sector also absorbed a heavy blow. Its profitability has diminished dramatically, and many companies are operating in losses at the current price of oil.

Why has the oil price actually dropped so low? It certainly was not due to lower demand for crude oil. Global demand stood at 91–92 million barrels per day in 2013–2014, at which time the price was still above USD 100 per barrel. In the following years it continued on its long-term growth trend (supported also by the low price), and this year it will be somewhere around 96–97 million barrels. The answer, therefore, lies rather on the supply side. During 2014–2016, oil extraction substantially exceeded its consumption – sometimes by as much as 2 million barrels per day.

When we look at graphs of extraction for the individual countries, many of them have problems even maintaining the current level of extraction. In some countries, extraction has been in long-term freefall. The exceptional graph is that of extraction in the US, where oil output peaked in 1984 at 9 million barrels per day. Thereafter it plummeted, and by 2008 it was only 5 million barrels. From that point on, however, the graph breaks out unexpectedly to the upside and continues to grow. In the summer of 2015, it hit a new high of 9.5 million barrels. It has been holding at between 8.5 and 9.5 million barrels ever since.

What caused this? In about 2007, extraction of so-called shale oil began to develop significantly in the US. Shale oil is crude which is found in fragmented rock and is extracted using such unconventional methods as pyrolysis, hydrogenation, and thermal melting. It is demanding both technologically and energetically. While conventional extraction consists of drilling a hole in the ground from which oil is pumped, shale oil is extracted by pumping an immense amount of water, chemicals, and sand into the rock, thereby fracturing the rock, and releasing the crude oil and/or gas collected there. This method is termed hydraulic fracking and it is mostly used in connection with horizontal wells, which better fracture the rock. Shale oil has been known for a long time, but its extensive extraction was enabled by a combination of technological advances and higher oil prices.

The US has immense reserves of shale oil and several large oil fields. The three biggest of these are Bakken, Permian, and Eagle Ford. The volume of shale oil production in the US gradually increased from around 1 million barrels in 2007 to more than 5 million barrels a day in early 2016. Although it has been slightly decreasing since that time, its large increase is considered one of the main reasons that global supply exceeded demand during 2014–2016.

The most interesting thing is that extraction of shale oil in the US is not now and essentially never has been profitable. In our estimates and based upon data from Bloomberg, US companies extracting shale oil have over the past ten years issued stock valued at approximately USD 130 billion. Through the same period, they invested into the extraction approximately USD 100 billion more than they made on the extracted oil. The negative free cash flow has been increasing in the past 4 years and now exceeds USD 15 billion per year. The cash flows were negative even at a time when the oil price was over USD 100. In 2014, the "cash burn" was more than USD 20 billion.

Meanwhile, the frackers have tried to confound investors by presenting EBITDAX values when they cannot show profits and positive free cash flow, insisting that depreciation and amortization (DA) should be ignored because they are non-cash items and that capital expenses (X) need not be taken into account because they are financing future growth. It is incomprehensible for us that investors fall for this type of argumentation again and again even though frackers' capital expenditures consume around 75% of revenues. According to our rough estimate, most frackers are losing about USD 10 per barrel they extract. This does not mean, however, that a USD 10 higher oil price would resolve everything. Oil producers do not receive the entire price of oil. They receive a little less due to their own production mix and also because they pay part of the transportation cost. Moreover, it makes no sense to do business only to receive back the cash one invests (for that we have government bonds). A sensible business undertaking must also cover the costs of the invested capital and bring returns to compensate the risks taken on. All of this, too, should take into account the time value of money. We do not dare to try and estimate this exactly, but the price of oil would apparently have to be tens of dollars higher in order for the frackers' business to satisfy these requirements.

As we have written elsewhere, necessity is not the mother of invention on Wall Street, and neither are benefits to society. Rather, it is the opportunity to sell something. Unfortunately, this perverse characteristic of markets is fully demonstrated in the case of financing companies involved in shale oil extraction. Wall Street will support financing of shale oil extraction as long as investors will blindly believe the fairy tale that this revolutionary method of extraction is economically expedient. Once the market realises that it is throwing money down a black hole and loses its willingness to continue financing extraction companies, then Wall Street will turn its gaze elsewhere and what will remain will be a number of companies – some even quite large – with an uneconomical business model and large debts. Shale oil extraction has a high so-called depletion rate, meaning that it requires large capital expenditures just to continue operating. As soon as frackers lose access to financing, and inasmuch as they do not generate cash themselves, investments into new extraction will drop, extraction will shrink sharply, and that will be the end it.

We as investors can draw three conclusions from this story:

1. Avoid investing into stocks and bonds of firms extracting shale oil.

2. The current oil price is probably too low to provide sufficient motivation for making investments necessary to maintain global production at its current volume.

3. An increasing crude oil price has an appreciable influence on global inflation.

Invest with care!

Daniel Gladiš, 25 September 2017

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