Pzena Investment Management
Fourth Quarter 2015 Commentary

U.S. shale economics were marginal at $100 oil, and are dismal today. Supermajors offer far more compelling valuations and an improving cash flow picture regardless of oil price.

We last wrote about the global energy industry in the fourth quarter of 2014. At that time, oil had fallen by 50% and we highlighted that we were entering a cyclical downturn in energy likely to drag on longer than anticipated and to be characterized by significant volatility. The situation today is strikingly similar. Oil has fallen by another 30-40%, and although demand growth is robust and non-OPEC supply is beginning to contract, the pace of the market rebalance has been slower than many investors hoped. Our long-term view remains that supply-side economics drive the long-term oil price and that the data continue to suggest a $60-$80 normal oil price.

As long-term investors, we endeavor to find investment opportunities amid controversy. We believe that, while the duration of the oil price downturn is unknowable, there is an economic argument on which we can base the final oil price range. That is, the normal oil price is not the key controversy.

Instead, we believe that energy investors currently struggle with two issues:

1. Does U.S. shale production work at a $50 oil price?
2. Are the returns on capital of the supermajors permanently depressed?

Shale at $50 Oil – The Claims and the Reality

U.S. shale is the resource whose economics we view as having the most significant implications for the duration of the oil price downturn, for longer-term oil prices, and on the relative attractiveness of non-shale resources. There are two factors underlying this reasoning:

- The spare production capacity of OPEC represents about 3% of global production. Since global production naturally declines by about 5% every year and demand grows by about 1% every year, this spare capacity is insufficient to grow production sufficiently to keep prices low.
- U.S. shale production has shown an ability to grow rapidly over a short time span. Over the past several years, U.S. shale has accounted for some 85% of non-OPEC global production growth. In absolute terms, shale's year-on-year growth is second only to Saudi Arabia. Thus, despite representing only 5% of global production, U.S. shale is the marginal producer and has an outsized impact on any forward view of oil prices.

To listen to U.S. shale management teams, the growth in U.S. shale production has been driven by its superior economics, which many management teams claim remain resilient well below $50 oil. If these claims are true, shale production could continue to grow to satisfy demand at sub-$50 oil, effectively putting a ceiling price on the commodity until U.S. reserves were exhausted. Furthermore, international assets, which by the admission of their management teams do not provide adequate returns at such low oil prices, should command lower relative valuations given their higher position on the cost curve. It is thus very important to understand U.S. shale economics.

After careful analysis, we believe that the purported economics of shale are overstated. When discussing returns, U.S. shale management teams almost exclusively refer to half-cycle economics, or the marginal cost to get a barrel of oil out of the ground. This non-GAAP accounting framework ignores much of the capital and operating costs required to sustain the business as a whole and thus meaningfully overstates the economics of shale. Rather than U.S. shale being a highly economic resource that works at low oil prices, we believe that it is a relatively high-cost resource with voracious ongoing capital needs whose recent growth is due to the short-cycle nature of its production. Said differently, dollars invested convert to production with a unique rapidity in shale, but the full-cycle economics indicate value-destruction.

To explore this idea, we created a hypothetical "super shale" company comprising six of the top companies in the space and looked at their 2014 cash return on capital employed (ROCE) profile in a $100 oil environment (Figure 1 on next page). At $100 oil, these businesses generated approximately $60 of revenue per barrel produced[1] and made about $28.50 per barrel in adjusted gross cash profit. At maintenance capital spending (the ongoing finding and development cost to replace produced reserves) levels of about $20 per barrel, the businesses earned about $8 per barrel in adjusted maintenance free cash flow. These businesses had about $94/barrel of adjusted capital employed, which means that our "super shale" company earned an 8.6% cash ROCE at $100 oil. This is slightly above what we consider investment-level returns but does not provide much buffer to accommodate a lower oil price environment.

We then examined how the hypothetical "super shale" company has actually performed in a low oil price environment. We used the third quarter of 2015 operating results of our hypothetical "super shale" company as a snapshot to capture

[1] Not all production is oil; shale also produces natural gas liquids and natural gas which sell at much lower prices.

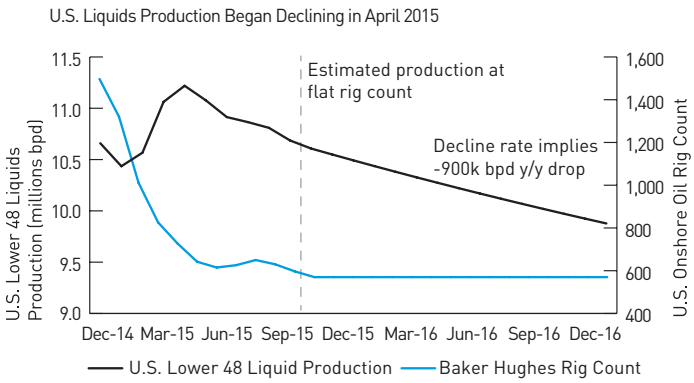
shale economics at $50 oil (Brent was $50.72 during the quarter) after a year of operating and capital cost deflation. The results demonstrate what we suspected from the 2014 analysis; a business whose economics barely work at $100/bbl oil is unlikely to make sense at $50. Our "super shale" company made just under $30 in revenue per barrel and about $15 in adjusted gross cash profit per barrel. The capital employed by the business did not change much, as an increase in debt levels was largely offset by book value write-downs. Assuming a 40% drop in maintenance capital requirements, the "super shale" company earned just under $3 per barrel in adjusted maintenance free cash flow per barrel, or a 3.1% cash ROCE (Figure 1).

It's also worth noting that the capital expenditure requirements may be higher than the $12 per barrel we estimate. In the third quarter, the "super shale" company actually spent $25 per barrel, relying on one-time cash benefits from asset sales, hedging, and additional capital raises to fund spending. What is clear is that at $50 oil, these companies need to reduce actual capital expenditures by a further $10 per barrel (or 40%) from Q3 2015 levels in order to be free cash flow neutral. For companies already struggling to maintain production levels, this pressure to further reduce capital spending should further lower drilling activity, perhaps resulting in a vicious cycle of production and operating cash flow declines on fixed debt expenses. As production declines, the cash inflow of the business also declines whereas the debt expense remains fixed. This leaves even less cash for the business to drill new wells, further exacerbating production declines and creating a negative cycle that can potentially bankrupt the company.

We're already seeing emergent production declines in the lower 48 U.S. states. Depending on the data source, U.S. shale production began to decline in either April or August of 2015. Again, this decline is due to the fact that, even with some 50% of production hedged at $80 oil in 2015 and significant equity and debt issuance, at $50 oil U.S. shale resource generates inadequate returns and cash to maintain production (Figure 2).

Better understanding these shale economics gives us comfort in our view of higher longer-term oil prices and that other non-shale resources are more economically attractive than current valuations suggest. (continued on page 20)

Figure 2: U.S. Production Rolls Over



Source: International Energy Agency, Baker Hughes Rig Count, Pzena Analysis

Figure 1: U.S. Shale Economics Requires Greater than $50 Oil to Work

	2014	Q3 2015	Comments
Revenue per Barrel Production	$60.26	$29.87	Blended realized price of crude, natural gas, and natural gas liquids per barrel of oil equivalent production
Less: Adjusted Cash Cost per Barrel Production	($31.78)	($14.80)	Operating cash outflow associated with production
Adjusted Gross Cash Profit per Barrel Production	$28.48	$15.07	Adjusted operating cash flow per barrel of oil equivalent production
Less: Maintenance Capital Cost per Barrel Production	($20.42)	($12.25)	5-year average cost to find and replace a barrel of reserves; 2015 is assumed to be 60% of 5-year average
Adjusted Maintenance Free Cash Flow per Barrel Production	$8.05	$2.82	
Total Capital Employed per Barrel Production	$130	$126	Debt + Equity
Less: Non-Producing Capital	($36)	($35)	Unproved Property Capital and Proved Undeveloped Reserve Finding Costs
Adjusted Capital Employed per Barrel	$94	$91	Debt + Equity - Capital associated with non-producing reserves and acreage
Cash Return on Capital Employed	8.6%	3.1%	Adjusted Maintenance Free Cash Flow divided by Adjusted Capital Employed

Source: Factset, Company Filings, Pzena Analysis

Supermajors – Still Super or Clark Kent?

Over the past decade, the return on capital of the supermajors has fallen significantly even as the commodity price quadrupled. At face value, this would seem to indicate a deficiency in the operating model of the supermajors. However, we believe there is another explanation: "pre-productive" capital.

Using Royal Dutch Shell as a typical example, Figure 3 shows the growth of pre-productive capital since 2000. This is capital dedicated to projects whose construction time and anticipated production life are materially longer than in prior cycles; the supermajors are building liquefied natural gas projects, ultra-deepwater platforms, and Canadian oil sands developments, all of which take years to complete but have very stable production rates and require very little sustaining capital thereafter. Upon completion, these projects have high free cash flow with production that is cheap to sustain.

The capital allocated to these pre-production projects represents nearly 40% of the balance sheet of supermajors today and currently produces no revenue, depressing returns on capital and cash generation.

Over the next few years, we expect these long-dated capital projects to begin production, causing material declines in pre-productive capital spending. This should result in something unique to supermajors within the energy space: production growth and improvement in operating and free cash flow even if oil prices stay low.

As pre-productive capital begins to produce, we expect the operating cash flow of the supermajors to increase. At the same time, the discretionary capital expenditures of the business (some 60% of upstream spending) would fall materially without a meaningful impact on near term production. The net effect should be increasing free cash flow and production for the supermajors.

Ironically, without significant write-downs, the accounting return on capital of the supermajors may not improve during this time due to an expected increase in depreciation expense as the pre-productive capital becomes active. However, cash return on capital should materially improve.

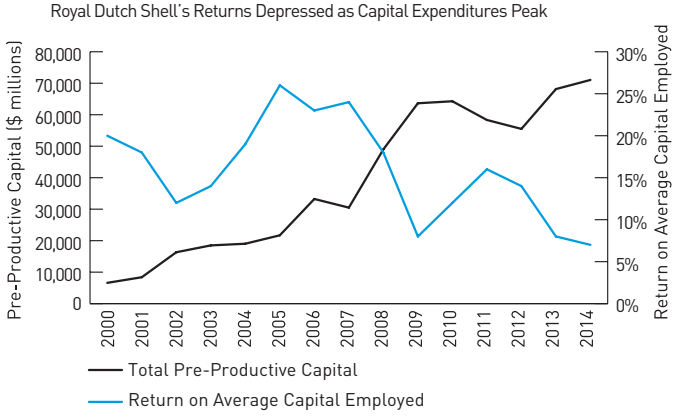
We're just beginning to see these dynamics play out in the announced 2016 and 2017 capital budgets and production guidance of the supermajors. Production is forecast to continue to grow through 2018 while spending continues to fall. Going forward, we expect that the supermajors can further reduce spending beyond announced levels without significantly impacting their near-term production profile.

Exploiting the Controversy with an Uncertain Oil Price

The shares of integrated oil companies have been beaten down by years of declining returns and the collapse of oil prices in 2014. Today, they trade at their lowest relative book multiple to the market in the past fifty years (Figure 4).

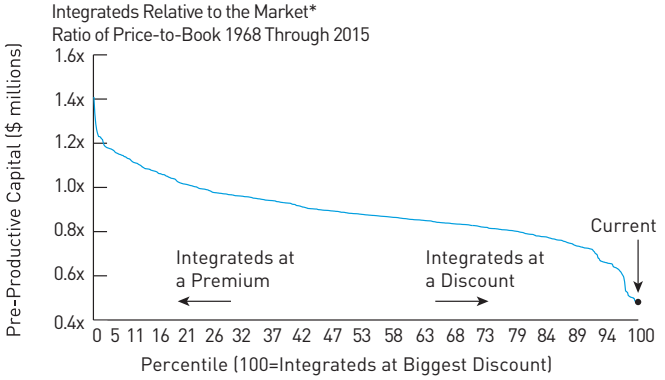
They also trade at meaningful discounts to their energy peer companies. Figure 5 shows the relative composition of the enterprise value of integrated oil and E&P companies of proved reserves at $50 oil. Proved reserves are governed by accounting standards and third party verification whereas unproved reserves are unverified. The fact that at $50 oil 80% of the value of supermajors is represented by proved reserves we believe demonstrates their lower risk profile. Moreover, Figure 5 shows that even the risky part of the valuation of

Figure 3: Pre-Productive Capital Impacts Return on Capital Employed



Source: Royal Dutch Shell, Pzena Analysis.

Figure 4: Integrated Energy is at its Cheapest Relative Valuation in 47 Years



*Drawn from largest 1,500 U.S. stocks; capitalization-weighted data.
Source: Corporate Reports, Empirical Research Partners, Pzena Analysis.

supermajors, the unproved reserves, trades at book value. Contrast this to E&P, whose unproved reserves comprise 43% of its valuation and trade at a whopping 7.1x book value!

Figure 5: Independents: Paying Much More for the Unknown

	Integrateds	Independents
Proved Reserve Value at $50 Oil as a Percentage of Enterprise Value	80%	57%
Liquidation Value of Proved Reserves at $50 Oil Relative to Book Value of Proved Reserves	1.7x	1.3x
Implied Value of Unproved Reserves at $50 Oil Relative to Book Value of Unproved Reserves	1.0x	**7.1x**

Source: Company reports, Factset, Pzena analysis

We're at a point in the capital investment cycle where supermajors should demonstrate significant growth in free cash flow as pre-productive capital projects come on-line and capital intensity falls due to an increase in the mix of project with long production lives. This stands in contrast to the anticipated contraction in shale-exposed company production levels due to higher-than promoted full economic costs and a voracious appetite for capital to sustain production. As supermajor production grows and capital intensity declines, even if oil prices don't go up, the valuation of the supermajors should improve. In addition, these companies offer historically high dividend yields as we wait for the cycle to play out. ■

DISCLOSURES

Past performance is no guarantee of future results. The historical returns of the specific portfolio securities mentioned in this commentary are not necessarily indicative of their future performance or the performance of any of our current or future investment strategies. The investment return and principal value of an investment will fluctuate over time.

The specific portfolio securities discussed in this commentary were selected for inclusion based on their ability to help you understand our investment process. They do not represent all of the securities purchased, sold or recommended for our client accounts during any particular period, and it should not be assumed that investments in such securities were, or will be, profitable.