

Assessing the impact of two recessions on the oil and gas industry: severity of declines and future outlook

Oil and gas companies have learnt to respond faster to slumps in oil prices. Waleska Rodrigues^{1,2} and Ruud Weijermars^{1*} show that shareholders in the 2014/2015 oil price decline, by holding on to their stocks, have avoided the steep slump in share prices of 2008/2009. However, profitability of the industry continues to decline after peaking a decade ago and further consolidation of the petroleum business seems inevitable.

Six years after the Great Recession of 2008/2009, the oil and gas industry is afflicted by a new crisis: OPEC’s global oil price war. Many see the 2014/2015 oil price plunge as a test of financial endurance between OPEC and US shale producers. Shale producers have added 4 million barrels of crude per day to global oil supply since 2010, and reduced the US need for Saudi imports. Canadian tar sand producers added nearly another 4 million barrels per day in less than a decade. Rising output of US shale oil and Canadian tar sand producers threatened to erode the OPEC market share. All growth in global oil demand has over the past decade led to a rise in market share only for non-OPEC producers. That is what Saudi Arabia and its OPEC associates wanted to stop. In an effort to put the new entrants (unconventional oil producers) out of business, the 2014/2015 oil price plunge has been deliberately prolonged by OPEC, which continues to over-supply the market by more than 1.5 million barrels per day. Unlike today, OPEC helped in 2008/2009 to restore oil prices rapidly by steep production cuts in response to lagging oil demand owing to the global recession.

In this article, we compare the severity of the impact brought on by the two most recent oil price crises on the various types of oil companies. Tracking timely market capitalization and P/E ratios (share price per earnings)

of the oil majors covering the 2008 epoch of oil price decline confirmed that oil company KPIs recovered rapidly during the second quarter of 2009 (Weijermars, 2010; 2011). An update of the analysis of key performance indicators (KPI) over the past decade provides insight into how companies are affected by poor market conditions. We examine the periods before the two recessions, and include post-2014 data after the beginning of the current oil price war.

This study tracks the impact of economic downturns on 26 upstream oil and gas companies. In order to facilitate the analysis of the data for the 26 companies tracked on this study, they were split into peer groups based on shareholder structure, size of the corporation, degree of vertical integration and the types of oil/gas production most commonly performed by the company. The five different peer groups

studied are majors, independents, US shale producers, Canadian oil sand producers and public private partnerships (PPP). The five peer groups and their respective companies are presented in Table 1.

The KPIs chosen for our study are share prices, market capitalization and return on capital employed (ROCE). These were tracked annually, quarterly and daily between 2005 and 2014, and for the first half of 2015 with information available until completion of our study (July 2015).

Oil prices, market capitalization and share prices

Company performance is determined by internal efficiency and organizational intelligence (Weijermars, 2012), as well as by changes in the global business environment. Oil and gas industry recessions are generally associated with declining oil prices. The impact of oil

Peer Group	Companies
Majors	Exxon, Chevron, Shell, Total, Petrochina, Lukoil
Independents	Apache, Occidental, Hess, Marathon, Devon
US shale producers	EOG, Chesapeake, Southwestern, Range, Whiting
Canadian oil sand producers	Suncor, Canadian Oil Sands, Canadian Natural Resources, Imperial Oil, Cenovus
Public Private Partnership (PPP)	Petrobras, Statoil, ENI, Repsol, Galp

Table 1 Peer groups and companies sampled for this study.

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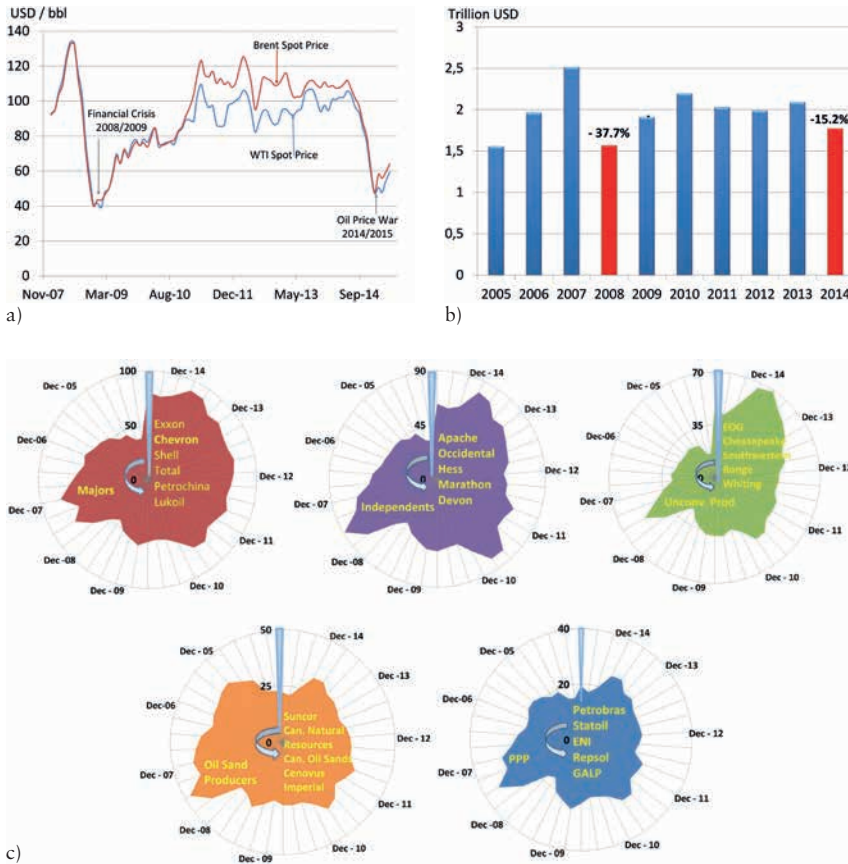


Figure 1 a) Oil price (in USD per barrel) for EU North Sea Brent and US West Texas Intermediate (courtesy EIA). b) Annual changes in market capitalization (trillion USD) for a combined peer group of 26 companies studied. c) Share price development (USD) for each peer group between March 2005 and May 2015 (share prices from Yahoo Finance).

prices on market capitalization and the share prices of individual companies and their profitability were reviewed. The variations in the price of US West Texas Intermediate oil and European Brent Blend are closely correlated and behave similarly during periods of recession but with varying price differentials, particularly from 2010 onwards (Figure 1a). Crude oil spot prices rose to a peak until mid-2008, and then dropped dramatically in the second half of 2008 and reached the bottom for this period during the first quarter of 2009. After that, the oil price gradually recovered, with Brent reaching values above \$120/barrel in 2011/2012. The current oil price war started in mid-2014, with Brent and WTI price differentials narrowing when the downward slide began. A modest recovery of oil prices occurred during the first half of 2015, but a sustained price recovery had still not occurred

when our study was completed (July 2015) nor when this article went to press (December 2015).

Market capitalization is defined as the total dollar market value of all of a company's outstanding shares, and is calculated by multiplying the shares outstanding by the current market price of one share. The market capitalization for each of the 26 companies was tracked on a yearly basis. A 2004-2014 time-series of market capitalization shows the impact on market capitalization of both downturns (Figure 1b). The market value of all companies together peaked in 2007, when it was slightly greater than \$ 2.5 trillion, and bottomed out in 2008, resulting in shrinkage of 37.7%. After 2008, the companies began to recover their market values with small variations until 2014, when again a significant drop is noticed, with market capitalization falling 15.2% compared to 2013.

The drop in market capitalization was calculated in percentage relative to the market capitalization of the first year of each financial crisis with the year immediately before, comparing 2008 and 2007 and then, 2014 and 2013 (Figure 1b).

The daily share prices for each company were abstracted from financial websites and averages were calculated for each peer group. The 'Antarctica-map-resembling' plots were introduced to track the impact of the financial crisis on oil majors in 2008-2009 (Weijermars, 2010). We adopt this type of plot to track share price development over the past decade, starting in January 2005 and ending in May 2015. Quarterly averages of the monthly share prices were calculated for each company and the same procedure was performed to obtain the quarterly share price variation for each peer group (Figure 1c).

The plots of Figure 1c reveal that share prices for all peer groups first rose between 2005 and Q1 of 2008 and began to slide after the peak in June 2008. The low point and beginning of recovery from the financial recession in the first and second quarter of 2009 also clearly match on the graphs for all peer groups. The share price decline due to the recent oil price war can be identified after the peak in share price in June 2014. The overall share price erosion was least significant for the oil majors. For the other peer groups, the Q1 2015 share price decline was also slighter than during the great recession of 2008-2009. A modest recovery of share prices was beginning to emerge after the first quarter of 2015.

Peer group analysis

In order to better compare the impacts on share price, the profitability (ROCE) each of the peer groups was analyzed two by two according to similarities of their share price range and the most applicable oil price benchmark (either WTI or Brent, depending on principal production region and size of corporation). Share prices and ROCEs of majors and independents are analyzed



Figure 2 Comparison between majors / independents average share price (in USD) and oil price. (in USD per barrel) for EU North Sea Brent (June 2008 – May 2015). (Primary data source: EIA and Yahoo Finance).

in the first section. The second section compares US shale producers and Canadian oil sand producers. Public Private Partnerships (PPP) are studied separately in a last section.

Majors and independents

The share price performance of individual majors and independents was tracked between January 2008 and May 2015 (Figure 2a). The average share price trend of each of the two peer groups is compared with just one of the oil price benchmarks (Brent, Figure 2), because it is the most influential benchmark for the markets of the majors and independents. The share prices of the oil majors and independents track each other closely and follow similar trends until 2012, after which a significant gap began to develop, with the majors performing with higher share prices than independents (Figure 2). The decreasing Brent price during the financial recession is clearly followed

by decreasing share prices for both peer groups. However, the share price of majors and independents experienced a relatively small impact from the recent oil price war in comparison to the steep decline of the actual oil price. This is a sign that the market was positive about the measures taken by the companies to mitigate the impact of the latest oil price slump.

The polar plots of share price / profitability of the individual companies in each peer group (Figures 3a and 3b) show that the impact of the 2008-2009 financial crisis generally was more severe on the share price of independents than for the oil majors. The share prices of the majors also recovered faster, which is verified by the quick response of increasing share prices in 2009. Most of the independents, excluding Apache and Occidental, presented a notable recovery only at the end of 2010 or the beginning of 2011, more than one year after the recession and thus a full year later than the majors. Share prices of all companies recovered well from the 2008-2009 recession.

A new, but lesser drop in share prices began in September 2014. Exxon, Hess and Total felt the effects of the oil price war earlier, at the end of the second quarter of 2014. Analyzing the data for the first five months of 2015, almost all companies see already some recovery of their share prices (Figure 3). Although share prices did not erode as fast as in the 2008/2009 recession, the profitability of the oil majors has declined to the lowest values of the

decade. The return on capital employed (ROCE) expresses the capacity of a company to generate profits. In order to avoid divergences between methods of ROCE calculation from company to company, EBIT was used as the basis for calculating net capital employed for all companies (see Appendix A). The ROCE for most of the companies in the two peer groups reached the maximum value in 2008, and then steeply declined the following year. The impact on profitability of capital employed for majors and independents (Figures 4a,b) was largest one year after the beginning of the recession in 2009 when the share prices were already starting to recover. Among the 11 companies in the peer groups, only the ROCE for Apache and Devon bottomed out already in 2008 (Figure 4b). With the advent of the current oil price war, all majors follow the same downward trend (Figure 4a). The ROCE quickly resumed their decline after a brief recovery in 2010 and 2011, and again continued to decline in 2012 (with exception of Exxon) and slid further in 2013 (including Exxon). Remarkably, year-on-year decline for 2014 is smaller than in 2009. For independents, a more mixed behaviour is observed, but ROCE typically are below 5% in 2014 (Figure 4b), while the ROCE of the majors are still above 5% (Figure 4a).

US shale producers and Canadian oil sand producers

The effect of the variation of West Texas’ intermediate oil price on the

a) oil majors

(b) independents

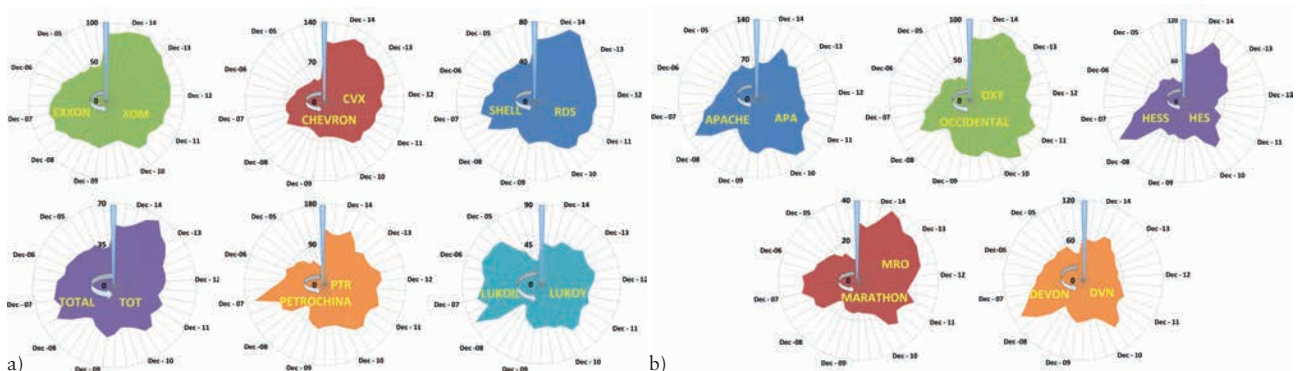


Figure 3 Share price rise and fall for (a) oil majors and (b) independents between March 2005 and May 2015 (Yahoo Finance).

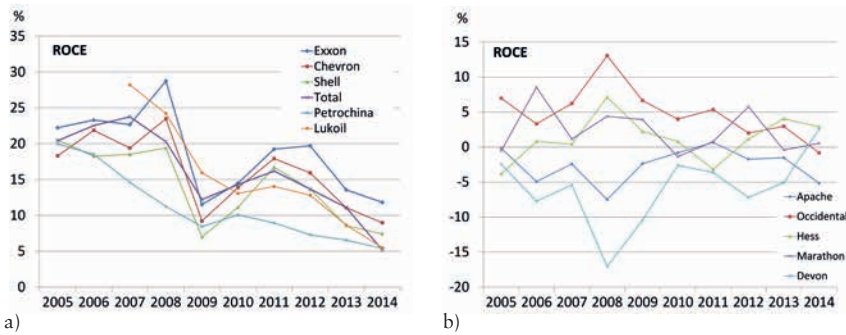


Figure 4 a) Annual ROCE for oil major peer group and b) independents peer group (2005 – 2014). (Method explained in Appendix A).

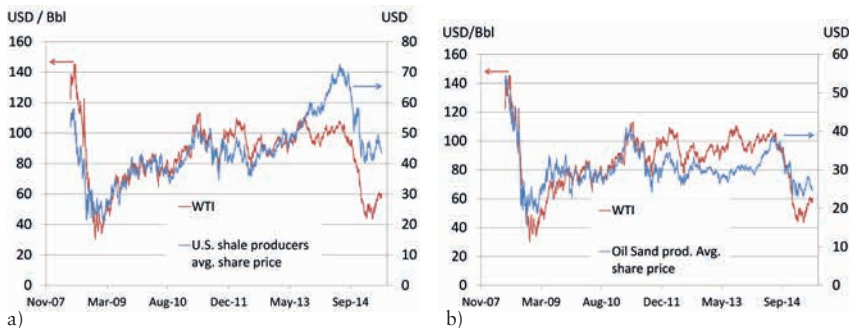


Figure 5 Comparison between oil price (in USD per barrel, left axis) for West Texas intermediate and a) US shale producers average share price (in USD, right axis) and b) Canadian oil sand producers average share price (in USD, right axis), (June 2008 – May 2015) (Yahoo Finance and EIA).

average share prices of US shale producers and Canadian oil sand producers is assessed in Figures 5a and 5b. Although there are significant declines in both 2008 and 2014, the bottom price for both groups is observed in 2008, reaching values as low as \$ 23 and \$ 16, for US shale producers and Canadian oil sand producers, respectively. After recovering from the recession, US shale producers showed a strong performance, specifically after mid-2013, with an upward trend of

share prices growing faster than the WTI oil price until mid 2014.

Time-series for share prices of the US shale producers and Canadian oil sand producers (Figures 6a and 6b) reveal that the 2008/2009 recession had the greatest impact on their share price of the last decade, which exceeded the effects of the 2014/2015 oil price war (as of May 2015).

Additional analysis of the companies' ROCE reveals a volatile pattern for US shale and Canadian oil sand

producers (Figures 7a and b) similar to those of the majors and independents (Figures 4a and b). Excluding Southwestern Energy, which experienced a big ROCE drop in 2012, all of the unconventional peer group companies experienced the lowest ROCE values in 2009, one year after the beginning of the recession (Figure 7a). A smaller impact of the 2014 oil price recession can be confirmed by a higher ROCE for most of the companies. Even for those where the ROCE decreased, the drop was not as significant as in 2009. What also becomes apparent is that the ROCEs for majors and unconventional producers in our peer groups (oil sands and US shale) all converge to a narrow bandwidth and in 2014 mostly ranged between 5 and 10%. Their profitability was generally better than that of the independents, which have significantly lower ROCE, ranging between -5 and +5% since 2010 (Figure 4b).

Public Private Partnership (PPP)

The variation in PPP's average share price between the recessionary periods shows a clear influence from the slide in the Brent oil price similar to that for the oil majors (PPP plots not printed here for brevity). Share prices also showed the same pattern as for the other companies: the impact on share prices of the great recession crisis (2008-2009) was more intense than that of the current oil price war (2014-2015). The drop observed for the share price was less significant than the oil price decline, which indicates

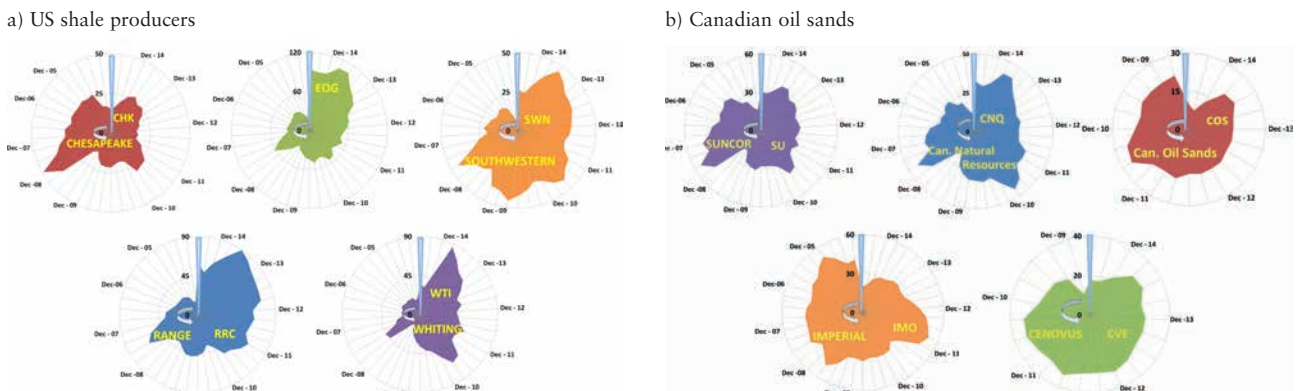


Figure 6 Share price development for a) US shale producers and b) Canadian oil sand producers between March 2005 and May 2015 (for Canadian Oil Sands and Cenovus the data was available just after September and December 2009, respectively) (Yahoo Finance).

PPP companies were perceived favourably by investors despite the difficult market conditions during recessional periods. However, the impact of the oil price slump on the profitability of the PPP companies was similar to that of the other peer groups; PPP profitability has contracted to a ROCE range between -2 and +8% (Figure 8). For all of the PPP, ROCEs reached bottom in 2014 and the decline is slightly steeper than for the oil majors (Figure 4a).

Profitability benchmark

In order to better highlight the marked differences in profitability the average ROCE for each peer group was separately offset relative to the overall industry ROCE from 2005 to 2014. First, the overall ROCE development of all 26 companies was assessed by calculating the average ROCE for each year over the past decade (Figure 9). The years with the smallest ROCE values during this time-series are 2009 and 2014, which confirms the effects of the impacts of the two recessional periods. While the decline in share price was much more significant in 2008/2009, the ROCE in 2014 is the worst of the last decade, being 1%

smaller than in 2009 when the impact of the financial crisis was felt strongest by the oil and gas industry.

Further study of the ROCE trend for each peer group shows the profitability spread above and below that of the industry average of all companies combined (Figure 10a-e), using the approach of Weijermars (2012). For example, the oil majors have consistently outperformed other peer groups on profitability during the entire decade. ROCEs of the oil majors are well above the combined peer group mean each year. Majors still delivered robust profits during the financial recession of 2008-2009 (Figure 10a) when they reached the peak of their profitability. However, the crisis of 2014 delivered the worst profits for the peer group of oil majors over the last decade.

Over the past decade, the independents persistently exhibited some of the lowest ROCE among the peer groups (Figure 10b). These companies had profits just above the average in 2005 and 2006, and ROCE started to decline after that faster than the industry average, reaching the bottom in 2008, with ROCE 5% below the sector’s average. The independents’ profitability began

to recover, but a new low occurred in 2013, and the ten-year time series ends in 2014 with their ROCE 3% below the overall industry’s average.

US shale producers presented the lowest ROCE of all peer groups (Figure 10c). In 2006 and 2007, the peer group showed ROCE as low as

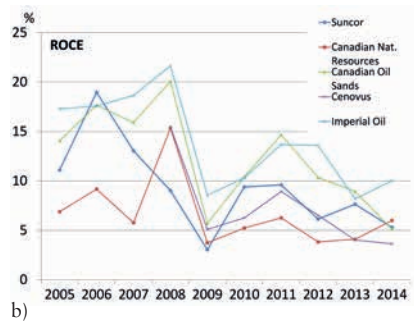
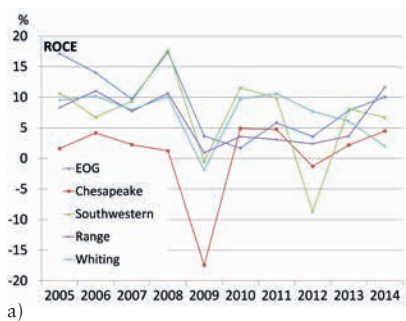


Figure 7 Annual ROCE for a) US shale producers and b) Canadian oil sand producers (2005-2014).

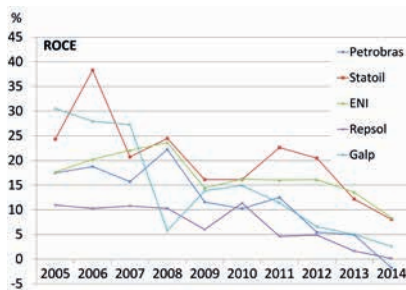


Figure 8 Annual ROCE for PPP oil peer group (2005-2014).

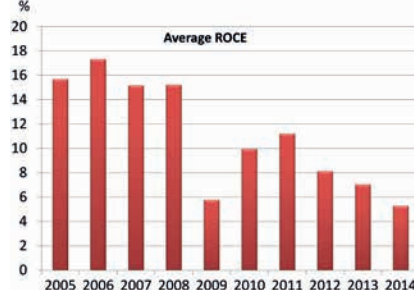


Figure 9 Annual average ROCE for all peer groups (2005-2014) using method explained in Appendix A.

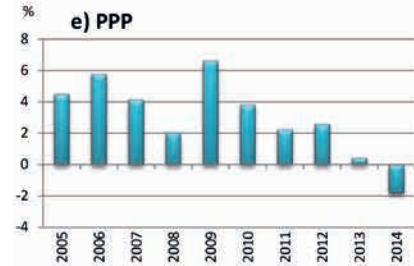
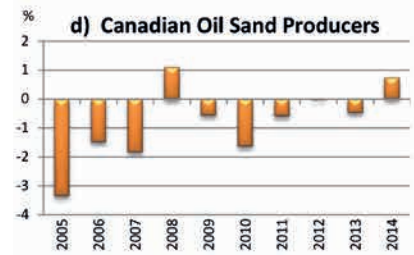
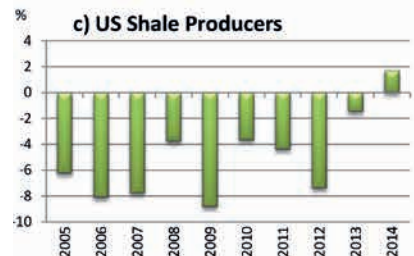
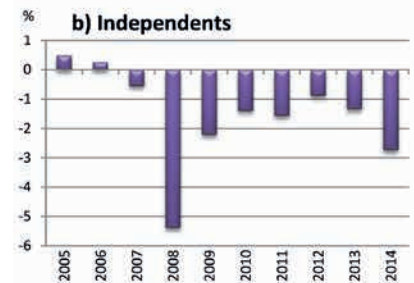
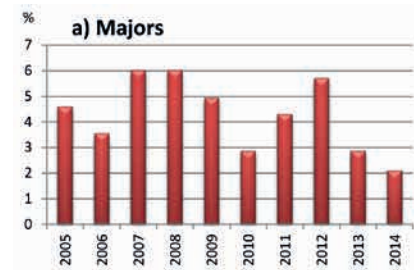


Figure 10 Spread above and below the industry average ROCE (2005-2014) based on the 26 companies analyzed.

8% below the average. However, some recovery occurred in 2008, when the difference with respect to the mean ROCE decreased to 4%. The bottom was reached in 2009, but below-average ROCE were realized until 2013. Remarkably, 2014 is the only year that US shale producers had a ROCE above the average, comparable to the majors (5% for all peer groups plus 2% above). In spite of their poor profitability in terms of return on capital employed, investor support and speculation lifted the share prices of US shale producers between 2012 and 2014 (Figure 5a).

The profits of Canadian oil sand producers have shifted considerably over the past ten years (Figure 10d). During the three first years of the time series, these companies had weak profits, but stronger profits are observed in 2008 with a peak ROCE. After the effects of the 2008 recession, the ROCE fell below the average, but in 2014 this peer group exhibited its second best value of the decade, which resulted from streamlining of operations.

The PPP oils achieved the second best overall ROCE performance among the peer groups (Figure 10e). However, the 2014 value was the second lowest result of the decade among all peer groups. The ROCE was higher in 2009 than in 2008, which is an atypical result, since for most peer groups, the drop in profitability began to appear on 2009.

Discussion and conclusions

Recessions bear significant impact on the performance of oil and gas companies. For the two recent downturns analyzed in this study, we can conclude that the impacts were clearly different in intensity. A more significant shrinkage of share prices occurred for all the companies in 2008, as compared with the drop in 2014. As a consequence, the decline in market capitalization was also much more severe in 2008 as compared to 2014. Share price and market capitalization are two very tight indicators, whose development reflects the shareholder valuation of

the companies past performance and future expectations.

Analyzing ten-year ROCE time-series for all companies, we established that the most significant profit decline (year-over-year) occurred in 2009, as an effect of the financial crisis (2008-2009). Most of the companies had their ROCE decline in 2014, but year-over-year decline was slighter as compared to 2008. However, the overall trend over the past decade for all companies is a decline in profitability towards a level which is below the weighted average cost of capital (WACC). For example, the 2015 WACC (before income tax) is 13.46% using data from a peer group of 18 representative US operators (Hegar, 2015). The widening gap between ROCE (~5%) and WACCs (~13.46%) means the corporate debt-gearing is on the rise, and bankruptcies or forced M&As may follow for those companies who are already over-gear. The ongoing adjustments of the petroleum industry, mostly head count reduction to reduce opex and project delays to cut capex, are required to minimize the adverse effects of volatile commodity prices and to restore corporate profitability.

The ROCE spreads of individual peer groups above and below the total sample group's average ROCE is an effective way to compare the relative performance of each peer group. The results indicate that among the five peer groups, the oil majors have always outperformed on profits, presenting the best result each year (Figure 10a), with ROCEs never-ending below the overall sector's average ROCE (Figure 9). The size of the corporation also seems to play an important role on the stability of the profits of a company. For example, oil majors and PPP oils develop similar types of exploration and production, which means similar types of investments. The spread of profitability shows that both majors (Figure 10a) and PPP oils (Figure 10e) have the better profits of all peer groups.

On the other hand, the US shale producers had the worst corporate profitability of the five peer groups over

the past decade, with ROCE below the average on nine of the ten years (Figure 10c). Meanwhile, US shale producers and Canadian oil sand producers (Figure 10d) had reduced cost through technology and workflow innovations, which brought them to profitabilities for 2014 at par with the oil majors. The share prices of the shale producers have shown phenomenal growth over the past decade (Figure 5a) and unconventional companies still delivered the better total shareholder returns of all peer groups (Bressan and Weijermars, in prep.).

One outlook for the future is that recovery from the current epoch of depressed oil prices may be mirror imaged in the recovery from the recession of 2008-2009. However, that requires production curbs from producers to avoid oversupplying demand to the current extent that is responsible for the present oil price decline. The market is now seeking a price floor to reverse the recessional trend in oil profits. Without such a turnaround of oil prices, new projects will have to be stalled to make it easier to recoup the cost of corporate financing. The delay of new projects will eventually lead to lesser oil supply but the higher price volatility means only companies that are prepared to accept such price risks can maintain their production output. Further consolidation of the industry seems inevitable.

Appendix A: ROCE Calculations

The results achieved in this study are based on calculations and/or performance analysis using information available from financial websites and company reports. Financial websites used were Yahoo Finance, Gurufocus, Y-charts and Wikinvest, which present time series of financial indicators exhibited annually or quarterly. When divergences were found between the values presented a detailed comparison was made in order to identify the values matching the primary financial data available from SEC filings of each company. The resulting data was used in the final time series of our analysis. The

return on capital employed (ROCE) was calculated using primary data as explained below.

Return on capital employed (ROCE) was used as a measure to gauge the companies' ability to generate profits, i.e., how much the company earns on the capital invested, including total assets, owners' equity and liabilities. Initially, the ROCE of each company was assessed using the values published in the annual reports. The first difficulty faced when using this method is that ROCE is not used on the reports of some companies as a key performance indicator, so it was not available for all of them. To address this problem, we researched the best way to calculate ROCE in a per year series for each company:

$$ROCE = \frac{EBIT}{(Tangible\ capital\ employed)}$$

By using EBIT (earnings before inter-

est and taxes), debt levels and taxes rates are ignored, which can vary from company to company. The denominator was calculated as the sum of adjusted net working capital and adjusted assets. Although net working capital is defined as current assets less current liabilities, in our calculations it was taken as accounts receivable, inventory and cash needed to conduct business less accounts payable. Because cash and short term debts are not used to run the current operations of the companies, they are usually excluded on the calculation of net working capital. However, excluding cash and short term debts resulted in a negative net working capital for some companies. Net fixed assets were calculated as property, plant and equipment (Net PPE) less accumulated depreciation. The method was used to calculate ROCE for all companies, even those whose ROCE was available in the reports, since it would be necessary to use the same method for all companies

in order to have a fair comparison. The required annual values for EBIT, accounts receivable, cash and short term investments, accounts payable, net PPE and accumulated depreciation were abstracted from financial websites.

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