Tracking the impact of recession on oil industry supermajors and timing of sustained recovery

Ruud Weijermars[1] assesses the impact of the 2008/2009 recession on the oil business by time-series tracking of carefully selected key performance indicators (KPIs) of the six supermajors prior to - and over - the recession period. What emerges is that business recovery has begun since May 2009 for nearly all supermajors. However, the oil industry's exceptionally high returns on capital employed of well over 20% seen immediately prior to the recession seem unlikely to recur and are argued to be non-sustainable.

Investor's equity in oil and gas companies was wiped out in the 2008/2009 financial crisis, in line with the overall downturn of the market. A peer group comprised of the six leading oil and gas companies is the focus of a study here to establish the impact of the 2008/2009 recession on our industry. A comparison of market capitalization of the supermajors for 31 December, 2007 (market high) and 31 March, 2009 (market low) shows that $675 billion of their combined stock value evaporated in the intermediate period (Fig. 1).

Tracking of the quarterly changes in market capitalization of two representative supermajors (ExxonMobil and Shell) in a time-series starting Q1 2007 up to Q2 2009 reveals that their market values peaked in Q4 of 2007, and bottomed in Q1 of 2009 (Fig. 2a). The change in market value for all supermajors prior to the recession (market high, Q4 2007) and in the apparent bottom of the recession (market low, Q1 2009) is graphed in Figure 2b. Similar shrinkage in market capitalization of some 44% has been experienced by nearly all petroleum operators.

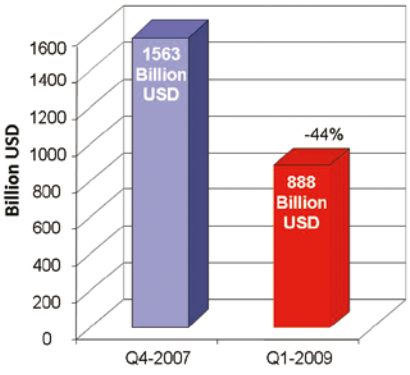

Figure 1 *Comparison of combined market values of supermajors (Exxon, Shell, BP, Chevron, Total, and ConocoPhillips) on 31 December, 2007, and 31 March, 2009 (Raw data abstracted from Bloomsberg).*

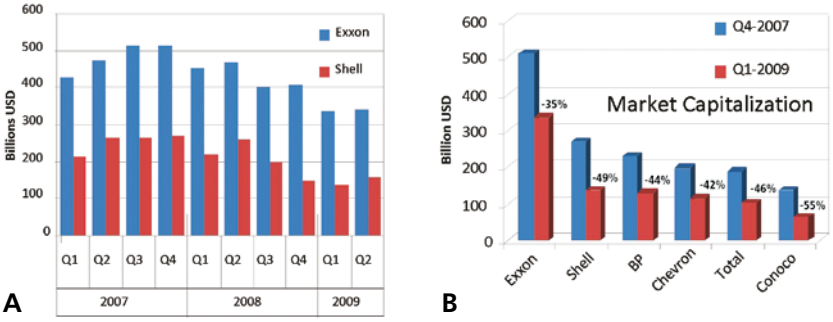

Figure 2 *(a): Quarterly changes in market capitalization for Exxon and Shell over the period of the financial crisis. (b): Individual loss in market value of supermajors (Exxon, Shell, BP, Chevron, Total, and ConocoPhillips) between 31 December, 2007, and 31 March, 2009. (Raw data abstracted from Bloomsberg).*

The 2008/2009 decline in market capitalization of oil companies has decreased investor's equity, but the value of that equity had already been capitalized by the companies. The decline in their share prices, therefore, had no immediate impact on their underlying asset values, which are rooted in fixed assets and current assets. The relationship of oil company market pricing and the underlying asset values (expressed as Tobin's Q) is examined here. The aim is to better understand how eroding share prices, and the market value lost, have affected the position of the oil and gas industry.

Tracking Q-ratios

Tobin's Q ratio, developed by Nobel Prize-winning economist James Tobin (1969), compares a company's market capitalization and the replacement cost of that company's assets (corrected for any outstanding long-term debt):

Tobin's Q=
Market Cap/(Assets-debt) (Eq. 1)

If a company's total market capitalization exceeds its replacement cost (i.e., Tobin's Q >1), this indicates that the market has overpriced that company, commonly based on a high level of expectation for its future performance. This expectation in effect then helps such high Q companies by the raised equity capital base and provides leverage for an increase in their fixed investments. The difference between the market price and the company's replacement cost will then be reduced and the new asset base generates additional cash flow.

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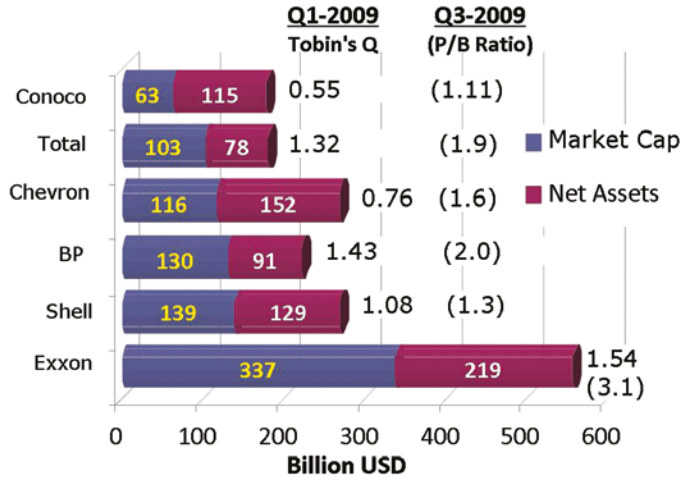


Figure 3 *Comparison of Tobin's Q values of Supermajors (Exxon, Shell, BP, Chevron, Total and ConocoPhillips) on 31 March, 2009. (Data on net assets abstracted from SEC quarterly filings).*

Figure 3 graphs Tobin's Q for the individual supermajors based upon their market capitalization and asset replacement cost at 31 March, 2009. This shows that both Chevron and ConocoPhillips had undervalued assets at the end of Q1 2009. In effect, it had become cheaper to buy these entire companies on the stock market than to build them from scratch. These Q-ratings made both companies ideal targets for corporate takeovers, because companies with low Tobin's Qs are attractive targets for M&As. At 30 September, 2009 (end of Q3), the price to book ratios (a simpler proxy for Tobin's Q[1])had returned to values larger than 1 for all supermajors (P/B values included in Figure 3).

The average Tobin's Q of 1.11 for the six supermajors at the end of Q1 2009 (the tentative bottom of the industry's recession) was still relatively high as compared to the Tobin Q average for US equities, which had dropped to 0.7 at the end of 2008 from a US total equity Tobin Q peak of 2.9 in 1999. At the end of the four largest US bear markets in 1921, 1932, 1949, and 1982, the Q ratio fell to 0.3 or lower, which led to a speculation that reaching 0.3 always signals the end of a bear market (Napier, 2005). Given the fact that Tobin's Q and P/B ratios have been steeply lowered in the 2008/2009 recession for all supermajors, one common measure taken is to postpone major fixed investments until share prices show sustained recovery. Capital expenditure that does not yield fast income tends to be delayed by all companies.

The good news is that the recovery seems to have begun for oil companies during Q2 of 2009 as can be inferred from the time-series of market capitalization in Figure 2a, and from further evidence in their recovering P/E ratios (see below).

Equity loss and P/E ratios

Share prices tend to rise again when markets regain confidence in future performance. The undervaluation of company assets will disappear and Tobin's Q will then increase again. This reflects the market's tendency to find long-term equilibrium between risk and opportunity. Although the equity drop does not affect the company performance directly, the depressed economy and declining oil consumption and associated price drops have steeply eroded oil company earnings.

Figure 4a plots the steep decline in earnings for all supermajors in Q1 of

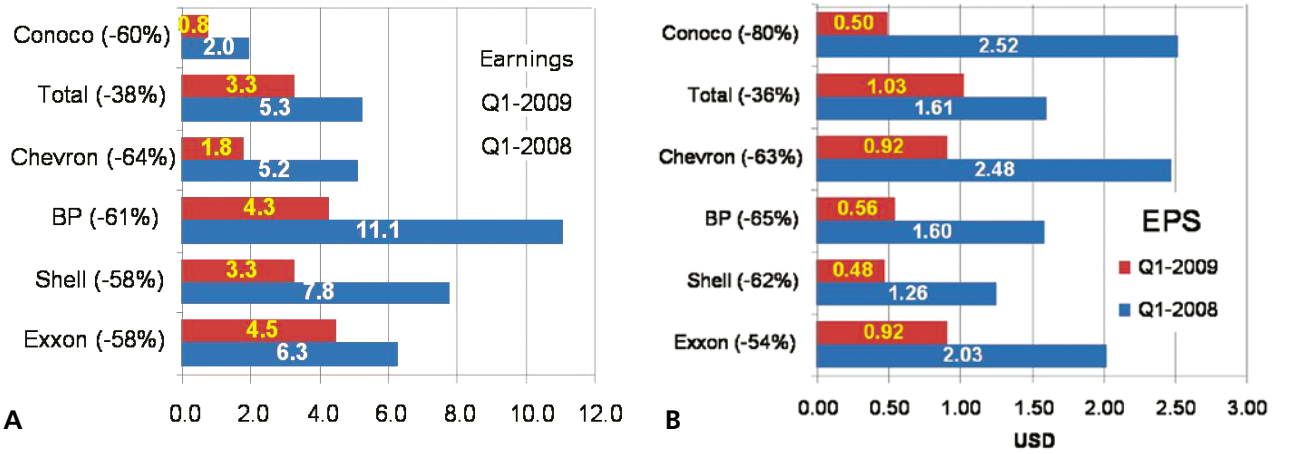


Figure 4 *(a): Quarterly changes in earnings (billion USD) of supermajors (Exxon, Shell, BP, Chevron, Total and ConocoPhillips) between 31 December, 2007, and 31 March, 2009. (b): The decline in earnings per share (EPS) mirrors the decline in corporate earnings (data from SEC filings).*

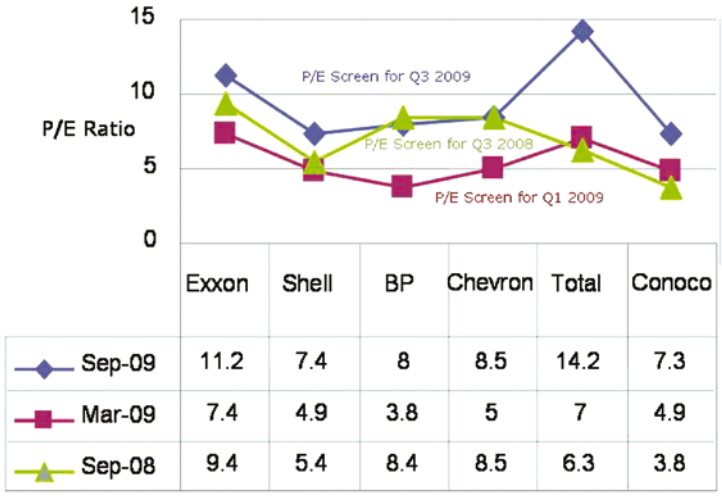
1 For companies with ageing legacy assets valuation differences may arise between Tobin's Q and P/B ratios due to the way company assets are valued: Tobin's Q uses the price of those assets at current cost of their replacement value; the P/B ratio uses the assets' book value (from a company's balance sheet), which is at depreciated cost; thus P/B ratios tend to be higher than Tobin's Q if legacy assets dominate the portfolio.

2009 as compared to Q1 of 2008. Earnings in the oil and gas business, as follows from any common sensitivity analysis, are highly affected by the market price for the oil and gas. When the oil price goes up, revenues go up and profit commonly rises but will drop in a recession, which explains the earnings dip of Figure 4a. Companies' total earnings provide the basis for current dividend payments and growth or decline in their future dividends. The profitability decline also translates to lower earnings per share (EPS) for shareholders as their EPS has dropped on average by 60% between Q1 2008 and Q1 2009 (Fig. 4b).

Figure 5 plots the P/E ratio for the oil supermajors as the 2008/2009 financial crisis evolved. The P/E ratio couples the share price to the company's underlying earnings. The level of equity loss combined with earnings loss is factored into the concurrent P/E ratios for oil majors. Figure 5 shows the remarkable recovery of P/E ratios in Q3 2009, which are all higher than prior to the recession (Q3 2008). In fact, the concurrent slide of earnings and share prices has helped to prevent a steep decline in P/E ratios in the course of 2008 and Q1 2009 (Fig. 5). Exxon's P/E ratio is almost back at its five year average of 11.3.

The absolute share prices of the supermajors, which jointly began to slide after the oil price peak in July 2008, have also regained ground during Q2 and Q3 of 2009. Figure 6 graphs the overall erosion of their absolute share prices between December 2007 and September 2009. These 'Antarctica-map-resembling' plots are a novel way to visualize share price erosion in a time-series over the 2008/2009 financial crisis. The graphs clearly show that share prices of nearly all supermajors had, by February 2009, come down by more than 30% from their Q4 2007 highs (prior to the onset of the recession). But all supermajors have begun to show upward share price movements in Q3 of 2009 (Fig. 6), a recovery which is likely to continue in Q4 in step with the oil price recovery.

Although share prices of oil majors have eroded in the recession, oil stocks commonly have shown less volatility



	Exxon	Shell	BP	Chevron	Total	Conoco
Sep-09	11.2	7.4	8	8.5	14.2	7.3
Mar-09	7.4	4.9	3.8	5	7	4.9
Sep-08	9.4	5.4	8.4	8.5	6.3	3.8

Figure 5 *P/E ratios of the Oil Supermajors bottomed during Q1 of 2009, as can be inferred from a comparison of P/E highs at the end of Q3 2008 and a recovering P/E at the end of Q3 2009 (Raw data abstracted from Bloomsberg).*

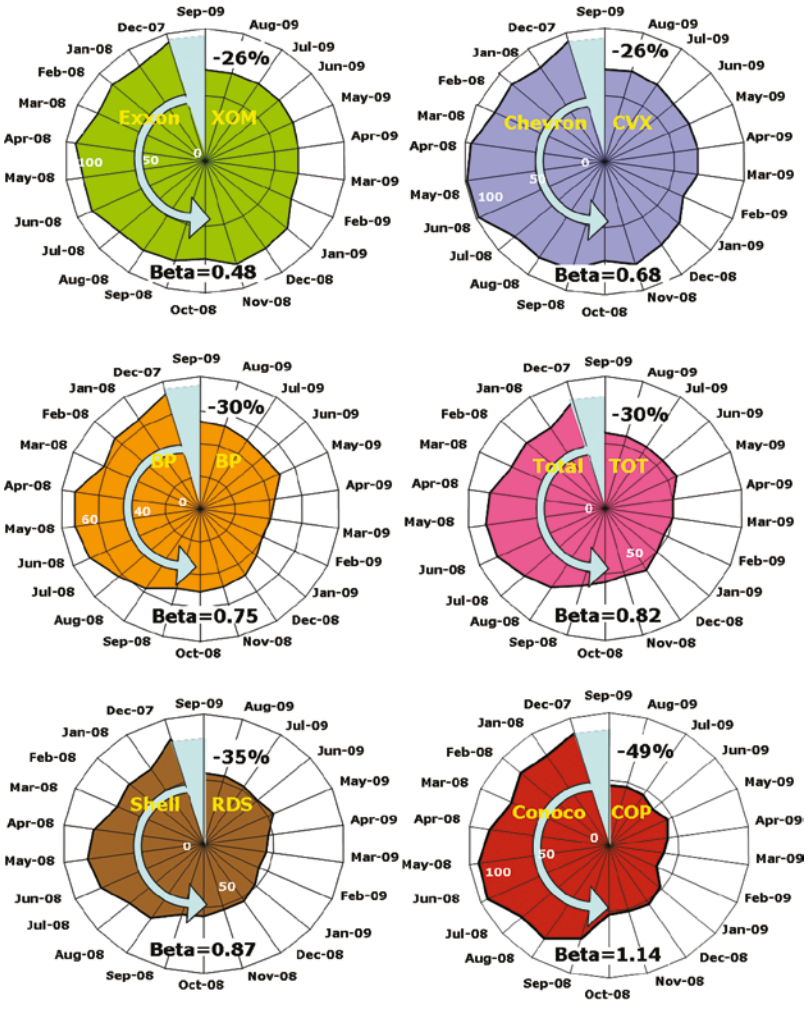


Figure 6 *Share price development (in USD) for Supermajors between December 2007 and September 2009. Exxon and Chevron show the steepest recovery (both at 74% of December 2007 highs), followed by BP and Total (both at 70%) and Shell (at 65%). The recovery of ConocoPhillips' share price lags behind the peer group, which in September 2009 still is at nearly half (51%) its value prior to the 2008/2009 recession (Raw data abstracted from Bloomsberg).*

than the market. This can be concluded from Beta values for stocks of the oil majors. Figure 6 includes the Beta values for the peer group of supermajors as per 30 September, 2009 (end Q3). Betas are a measure of stock volatility relative to the S&P index, which has Beta=1. Company stocks with Betas >1 have performed with a systematic risk higher than the market. In contrast stocks with Betas<1 have a lower volatility, meaning lower systematic risk than the market; Betas below 1 are 'less risky' than the market. Beta values traditionally relate to the relative change in a share's risk premium as compared to the 'market' portfolio (e.g., Lumby and Jones, 2003):

ROE= RF +
Market Return Premium*Beta (Eq. 2)

where ROE is return on equity and RF is the risk-free rate of return set by short-term Treasury bills. All other things being equal (*Ceteris Paribus*), Equation 2 shows that the ROE for low-Beta stocks should be lower than for high-Beta stocks. For example, if the S&P market portfolio (which has Beta=1 by definition) rises 10%, then a company like ExxonMobil with a Beta of 0.48 (on 30 September, 2009) is expected to yield returns of 4.8%. Clearly, a validated economic theory like CAPM is defeated by the stock performance of oil companies over the past five years, as they deliver ROEs that remain attractive to prudent investors at relatively low Beta values, even in times of recession.

Return on capital employed (ROCE)

The profitability of capital employed in the oil industry provides another key performance indicator (KPI) to examine how the industry has been affected by the financial crisis. The ROCEs of the oil industry are given by the ratio of earnings before interest payments and taxation (EBIT) divided by the net capital employed:

ROCE=EBIT/CAP Employed (Eq. 3)

Figure 7 plots the average ROCEs for the oil and gas industry over the past 12 years. This compilation includes earlier time-series analyses of ROCE over the period 1997 to 2002, when a first peak in oil ROCEs occurred. Such peaking trends have been confirmed by studies of Osmundsen et al. (2005, 2006) over the periods of 1997-2002 and 1990-2003, respectively. Although considered already extraordinary high at 15% in 2000 and 2001 (Antill and Arnott, 2002), Oil & Gas ROCEs for the period 2003 to 2007 have risen still further to well above 20% with a five year average value of 23% (Fig. 7). The ROCE performance evaluation of 12 major oil companies were combined (see Weijermars, 2009a, b), to arrive at the annual arithmetic average for the ROCE that is representative for the oil industry over the period 2003 to 2007. The 2008 data are based solely on the six supermajors studied here, and assumes that other oil companies follow their trend.

The capital asset pricing model (CAPM) governs investment preferences of prudent investors and has favoured the international oil and gas industry over the past decades as an industry segment with exceptionally high ROCEs. Two fundamental questions are addressed in this study: (1) What has driven the ROCEs 'explosive' growth over the past decade? and (2) Can the oil and gas ROCE's growth be sustained after recovery from the 2008/2009 financial crisis?

Relationship between oil price and ROCE

The close match between oil price rise and ROCE growth has been recognized in earlier studies (Osmundsen et al., 2005, 2006). Figure 8 plots the annually averaged oil price onto the oil industry's annually averaged ROCEs. The correlation between oil price increases and growth of oil company ROCEs, holds until 2008, when daily oil prices began to drop from the 11 July, 2008 high of $147.25/bbl (for Brent Blend) down to $36/bbl on 24 December, 2008. Oil ROCEs of over 25% for 2007 have outperformed the contemporary S&P 500 ROCEs by a factor of two. The oil industry's high ROCEs of some 15% for year 2000 and 2001 were already atypically high (Antill and Arnott, 2002); contemporary S&P average ROCEs stood at 8–9%. The high oil industry ROCEs were attributed to the impact of legacy assets on production volumes, with low book values (CAPEX already earned back), but still generating high cash flow to boost the company's net profits (Antill and Arnott, 2002). The effect was that ROCEs rose to exceptionally high values, even in the corporate history of the oil industry. Such high ROCEs also mean that the commodity demand structurally exceeded supply.

Also, any major field development investment tends to depress the ROCE,

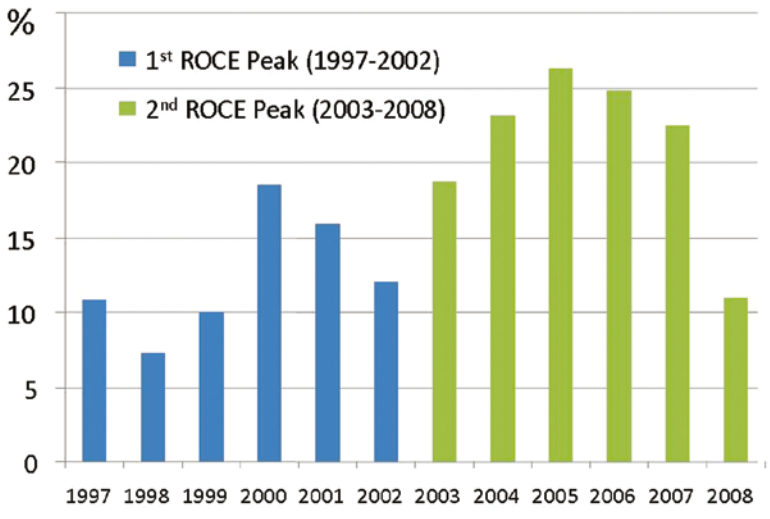


Figure 7 *ROCEs for the Oil & Gas industry shows two peaks over the study period.*

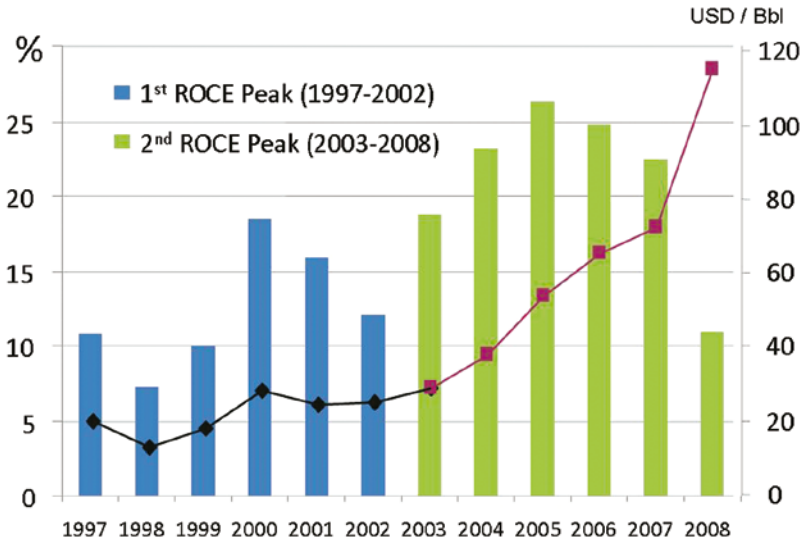


Figure 8 *Annually averaged oil price development for Brent Blend (USD/Bbls), over the period 1997 to 2008 superimposed on oil industry ROCEs (oil price after DOE/EIS and BP).*

as CAPEX goes in and profits do not begin to generate cash from such projects until production comes on stream, commonly not until 2–3 years later. This effect follows directly from financial accounting principles – as illustrated for a synthetic portfolio by Osmundsen et al. (2005). Consequently, delaying new field developments and sticking to enhanced production from legacy assets has steadily lifted oil and gas ROCEs since the turn of the Millennium. Since the late 1990s, financial analysts began to value oil companies based on short-term profitability (Osmundsen et al., 2005), supported by shareholder pressure for high returns. The focus on short-term accounting profitability rather than long-term asset performance purportedly contributed to under-investment in exploration of future reserves and gave little production growth during the first ROCE peak.

When a company has assumed in its portfolio an unusually high capital investment that does not yet generate income, ROCEs will fall. Capital employed must continually generate returns to underpin the ROCEs growth, otherwise the ROCE will drop (EBIT/total capital employed). During 2006 and 2007 operating costs in the E&P business segment rose so steeply that even the steady rise in oil price could no longer translate to higher ROCEs, but only cushioned an early decline in oil ROCEs (see Fig. 8). For example, a company like Total, similar to its peers, has experienced rapidly rising costs in its upstream operations. Between 2004 and 2008, the unit production costs of Total rose by 121% to $9.19/bbl. Similarly steep increases in production cost were experienced by Shell and BP.

Just as the rise of oil ROCEs began to stall in 2007 and 2008, the onset of the economic crisis started to depress oil demand in the second half of 2008. As a result the oil price went to the bottom of its elasticity range (hitting $36/bbl on 24 December, 2008). This completed the second ROCE peak after the turn of the Millennium (Fig. 9).

The effect of operational performance and cost management on book value of oil companies has been analyzed for US E&P companies (using data of 1993 to 1996) by Quirin et al. (2001). As an additional effect, deferral of investments in exploration to future dates has contributed to slow supply and fuelled oil price hikes (Aune et al., 2007). Sustained oil price increases in the period between 2000 and 2008 have also been ascribed to low exploration activity in the oil industry while demand for oil continued unabated (Osmundsen et al., 2007). This leads to the hypothesis that the second ROCE peak in 2005 (Fig. 9) was fuelled by high oil prices rather than deferred field development projects. The 2008/2009 recession terminated the period of exceptionally high ROCEs.

The depressed oil earnings for Q1 2009 (Fig. 4a) are mostly due to the steep decline in world oil prices since July 2008 (Fig. 10), but a steady (although slow) recovery of the oil price has started since its low of 24 December 2008. Although Q1 2009 earnings were depressed, corporate profits have started to recover in the second half of 2009 in step with

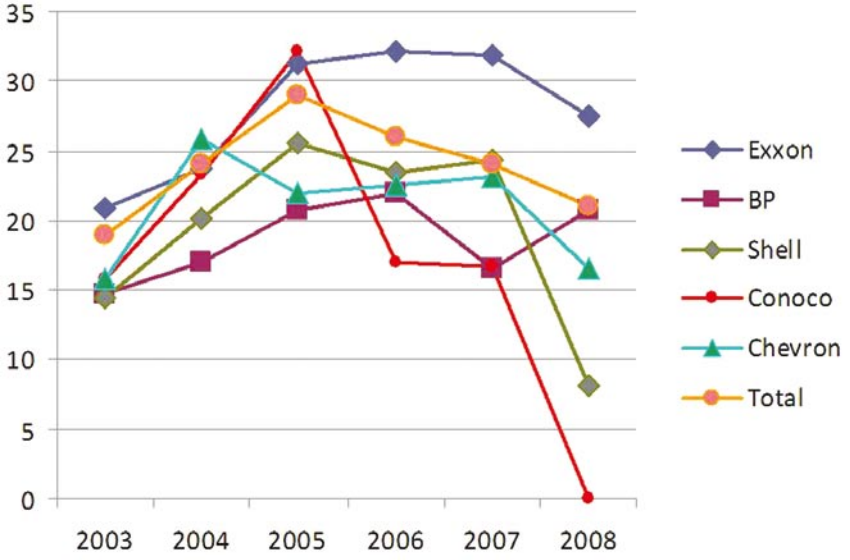


Figure 9 *The second ROCE peak was shared by all supermajors in the period 2003 to 2008 (based on data from annual reports). The ROCE for ConocoPhillips for 2008 is -28.6% but has been truncated at the X-axis to conserve plotting space.*

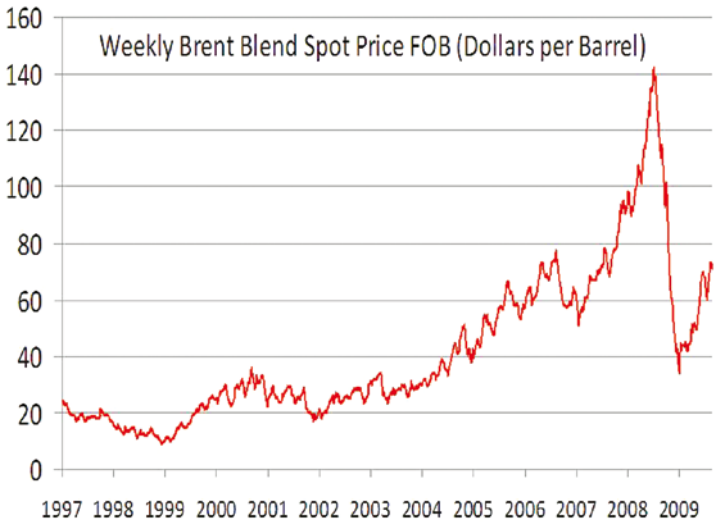


Figure 10 *Weekly averaged oil price development for Brent Blend (USD/Bbls), over the period 1997 to August 2009 (Data from DOE/EIA).*

– and reflecting – the oil price's rebound. Forward extrapolation of the positive correlation trend between oil prices and ROCEs from the historic time-series (for 1997 to 2007, Fig. 8) suggests that (in the absence of high OPEX) oil ROCEs will begin to recover from their 2008 low as oil prices continue to ascend, and companies have cut back on OPEX and CAPEX sinks.

What will the future bring?

The onset of the 2008/2009 financial crisis and the associated drop in oil price in the second half of 2008 (Fig. 10) has suppressed earnings of the oil industry (Figs. 4a&b). In fact, the oil price drop was foreseen by the US Department of Energy's Energy Information Administration which published, in June 2008 just before the steep oil price drop actually occurred, three oil price scenarios (ref, low & high) for the period 2008 to 2030 (Fig. 11). Each of the three scenarios predicted a steep price decline at the end of 2008. Their prediction was right both in its price decline and forecast trend, but the actual oil price dip was, in reality, much steeper (and slightly earlier) than in any of the three DOE/EIA scenarios. What remains open is whether the relatively fast recovery of the oil price seen in reality (Fig. 10) will be a sustainable development for the longer term.

The coupling between ROCE and oil price, and constraints following from fair ROCE market values (that follow CAPM), suggests that the oil price is unlikely to climb much beyond an annual average of $100/bbl in the next two decades, and will remain locked in a price deck between $75/bbl and $150/bbl. Although global energy demand will continue to grow over this period, investments in the development of alternative energy are now seriously competing with those in fossil energy resources. This line of reasoning is supported by the break point scenario concept of CERA (2006, Yergin, 2008), which predicts global policy-makers will act to prevent daily oil prices from rising beyond $150/bbl.

The oil industry's ROCEs cannot stay above market values for the long-term, because market forces will encourage energy alternatives to develop rapidly into maturity, especially when returns on investment on such alternatives become overly attractive by raised energy prices (and helped by tax credits and subsidies). Increasingly, new legislation favours renewable energy sources. An example may be the new American Clean Energy and Security Act of 2009, also known as the Waxman-Markey cap-and-trade bill after its prime senatorial backers, which passed the US House of Representatives on 26 June, 2009. Although the impact of this new US legislation may lead to a fuel switch from coal weighed down by carbon emission taxes to cleaner natural gas, it also stimulates the development of renewables.

Therefore, the energy market is unlikely to sustain outbreaks above the oil price deck's upper limit of $150/bbl in the next 20 years. This also means that the development of complex and expensive oilfields will increasingly be postponed and growing number of discoveries may never be developed at all. Such projects simply remain unprof-

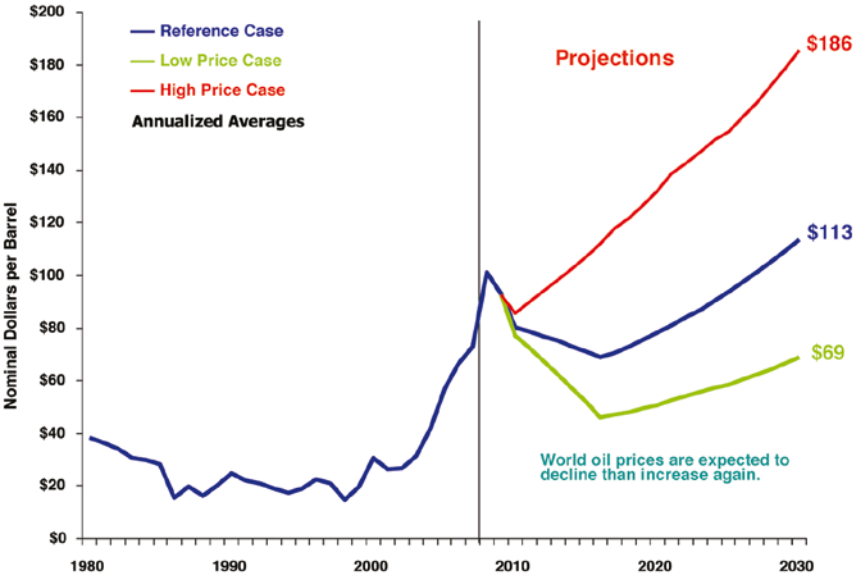


Figure 11 *Oil price scenarios published by the US Energy Information Administration just before the actual price drop occurred (DOE/EIA, June 2008).*

itable in the next two decades when the long-term corporate hurdle rates for new projects continue to calculate NPVs using conservative project validation hurdle rate oil prices of between $30/bbl to $50/bbl.

The oil business may weather the shorter term financial and economic crisis (2-5 years), will then continue to compete head-on with alternative energy resources for the mid-term (next 10 years, resuming a process already started before headlines on the energy crisis were overshadowed by the economic crisis), and will remain fully engaged in a long-term battle against the environmental crisis (next 50 years).

Recommendations and conclusions

Oil reserves from the easy-to-develop conventional sources (2000 Gbbls; USGS inventory 2000; Laherrere & Wingert, 2008) can satisfy our oil consumption rate trend (85 million bbls/d or 30 Gbbls/y in 2008; IEA data) for the next 20 years. Non-conventional fossil fuel sources can extend this period – and more so when oil price rises stimulate recovery of costly fields. However, the maturation of concurrent energy alternatives will continue and create a ceiling for energy price elasticity over the next two decades; the upper limit is considered here and in other studies at $150/bbl of oil equivalent.

That competitive scenario also means 'historically' sustainable ROCEs for the hydrocarbon industry can be scaled forward over the next two decades to predict future ROCEs. The corellation between oil industry's time-series performance of the return on capital employed (ROCE) and of the annualized averaged oil price for the period 1997 to 2002 inferred in earlier studies (Osmundsen et al., 2007), is here supported by time-series analysis for the period 2003 to 2007. Forward modelling of the oil price /ROCE correlation in historic time-series (Fig. 8) over the next two decades suggests ROCEs are likely to remain below 20% and the oil price will plateau near $100/bbl, and remain within a price deck of $75/bbl to $150/bbl.

Oil companies that momentarily earn less than before the 2008/2009 recession have commonly adjusted their operations to quickly balance reduced income with more conservative CAPEX and OPEX policies. Such conservation policies include:

1. Delaying capital investments in projects that tie up cash for too long before delivering positive cashflow returns.
2. Reducing operating expenditure by reducing payroll for redundant tasks when field development projects are stalled.
3. Balancing lower oil prices by mothballing subeconomic activities such as heavy oil projects and development of risky unconventional resources.

Companies that are well placed to buffer lowered income may explore strategic targets for M&A's, because market values of certain companies are now low and in some cases below replacement cost; this even briefly applied to two supermajors (Chevron and ConocoPhillips), but that opportunity seems now passed due to the recovery of their P/B ratios (Fig. 3).

In conclusion, it can be stated that the oil industry has taken a hit in the 2008/2009 financial crisis, but has been quick to respond and is now set to recover. Future trends in recovery cannot be fully predicted, as always, but some suggestions follow from the past performance trends analyzed here.

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