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Althaqeb, Saud

## Article

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### Provided in Cooperation with:

International Journal of Energy Economics and Policy (IJEPP)

*Reference:* Althaqeb, Saud (2017). Survey of energy finance on the corporate world. In: International Journal of Energy Economics and Policy 7 (6), S. 153 - 158.

This Version is available at:

<http://hdl.handle.net/11159/1411>

### Kontakt/Contact

ZBW – Leibniz-Informationszentrum Wirtschaft/Leibniz Information Centre for Economics  
Düsternbrooker Weg 120  
24105 Kiel (Germany)  
E-Mail: [rights\[at\]zbw.eu](mailto:rights[at]zbw.eu)  
<https://www.zbw.eu/econis-archiv/>

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## Survey of Energy Finance on the Corporate World

**Saud Althaqeb\***

Kuwait University, Kuwait. \*E-mail: [salthaqeb@gmail.com](mailto:salthaqeb@gmail.com)

### ABSTRACT

This literature review surveys some of the main topics regarding energy finance in the field of empirical corporate finance. The basic goal is to conduct literature surveys on some of the major studies in the field that focus on energy finance. The primary focus is on corporate governance, capital structure, risk management, and hedging in relation to energy finance. This review will study the effect of accounting differences in corporate finance, initial public offerings, and mergers and acquisitions. This is done by summarising some of the existing literature in these areas with regard to energy finance in order to synthesize this research and examine the impact on corporate financial decision making.

**Keywords:** Energy Finance, Corporate, Corporate Governance, Capital Structure, Risk Management Initial Public Offering and Mergers and Acquisitions

**JEL Classifications:** F30, F39

### 1. INTRODUCTION

Energy firms occupy central positions in many economies. Oil and gas firms face many issues that are similar to those faced by firms in other industries, but the impact may be different because of the dynamics of the industry. Energy finance is a very dynamic field that is growing exponentially by various means. Along with this growth, the field is also changing rapidly. The changes in the dynamics of this field are derived from a recent renaissance along with technological advancement, specialization, and new regulations. All of these factors guide and attract many researchers to explore and study the field of energy finance. This also provides some explanation for many unanswered questions. Therefore, exploring this field is an essential tool to enhance our understanding of the dynamics of financial markets and can provide a clearer picture of the relationship between the market players. This literature review surveys some of the main topics in light of the theoretical and conceptual findings from other articles relating to energy finance.

My primary focus is on energy finance and how can it affect corporate financial decision making. This will be accomplished by reviewing some of the major work done in five areas of oil and gas firms: Corporate governance; capital structure; accounting policies; initial public offerings (IPOs), mergers, and acquisitions;

and risk management and hedging. I consider the theoretical and empirical evidence behind these phenomena before analysing the effect of the new regulations and reforms.

The paper is organized as follows. The next section will show how corporate governance can influence firms' decisions in the energy sector. Section III will discuss capital structure theories in relation to the oil and gas sector. Section IV will study the effect of accounting differences in energy finance. Section V will investigate the IPOs, mergers, and acquisitions in this industry; and Section VI will review some of risk management and hedging in the field. Each section will be analysed in turn before presenting concluding remarks, and a summary of the literature will be examined in the concluding section.

### 2. CORPORATE GOVERNANCE

Corporate governance has a major influence on the valuation of companies, especially firms in the oil and gas sector. The literature in general questions the impact of corporate governance on the field of energy finance and how it effects the corporate decisions in this industry. Black et al. (2006) compared the valuation of the Russia-based Gazprom, the largest oil and gas company in the world, on the basis of proven reserves against those of western oil firms, They found that western firms were valued about 18 times

that of Gazprom if the amount of proven reserves is used as a valuation measure. The same study stated that Russian price controls and political risk had negative impacts on the valuation of Gazprom, but the major factors for the discount in value was the relative lack of firm-level governance. With poor protection of shareholder rights, firm-level governance is a major issue in Russia. The problem becomes more acute when the firm is large, works in a strategic sector, and the government has a majority stake.

This issue is especially pronounced for areas of ownership structure, which are of greater importance for managers. One of the main aspects of corporate governance is the ownership structure (Dayanandan and Donker, 2011). Wolf (2009) analysed a dataset of oil and gas companies covering both privately and publicly owned firms from 1987 to 2006 and found that private ownership encouraged better performance and greater efficiency than state ownership of oil and gas companies. This is expected since private owners are more interested in monitoring the actions of management so as to protect their wealth. In the case of publicly owned energy firms, the strategic goals may not be focused mainly on profits. The government may control the amount it pays to the state-owned firm so as to improve the public-sector budget. This is also likely to be one of the main reasons behind the lower valuation of Gazprom as compared to private oil and gas companies.

Another finding in this area is that independent directors is integral to good corporate governance. Though Enron had many 'independent' directors on its board, many of them had relationships with Enron and its management team, which clouded their consciences (Downes and Russ, 2005). Directors were collecting fees from Enron for services rendered, and some were even on retainer for legal and consulting services, which may have diminished their ability to question management's activities (Downes and Russ, 2005). This indicates that the independence of directors should be followed in fact as well as in spirit for effective corporate governance.

Another important aspect is corporate social responsibility. Frynas (2005) states that the oil and gas sector has been among the leading industries in improving corporate social responsibility. Oil companies have initiated, funded, and implemented community development Schemes A detailed analysis of measures adopted by multinational oil companies, however, shows that they may be inappropriate for addressing social problems in developing countries and may divert attention from broader political, economic, and social solutions for such problems (Frynas, 2005). This suggests that the corporate social responsibility practices adopted by some companies in the energy sector are designed more to achieve social acceptance rather than genuinely attempting to help local communities.

Corporate governance is important for firms in the oil and gas sector because of its impact on valuation. The literature provides significant information that valuation of firms in the oil and gas sector is linked to their ownership structure; that is, firms with higher state ownership have lower valuation. At the same time, there is evidence from the literature that the industry has taken a

leading position in corporate social responsibility, but the efforts seem to be focused more on presenting a good corporate image rather than genuinely attempting to solve local problems.

### 3. CAPITAL STRUCTURE

There are two main capital structure theories: Trade-off and pecking order. In trade-off theory, firms choose a capital structure by weighing the benefits and costs of additional debt. The benefits of debt include tax deductibility of interest and a reduction in the free cash flow problem, whereas negative effects include the expected financial distress costs and the costs arising from agency conflict between shareholders and bondholders (Ovtchinnikov, 2010). The pecking order theory suggests that a firm uses internally generated cash before raising external finance for expansion (Chen, 2004).

The capital structure of a firm is linked to its investment decisions. The amount of profits generated by large oil and gas companies is high. However, the amount of cash required for investment is also high. Boyer and Filion (2007) state that oil and gas companies are very capital intensive since they need enormous capital to purchase, develop, and operate properties. The firms also must spend large amounts on normal business activities and on equipment maintenance costs, particularly for oil sands and offshore activities. In addition to that, oil and gas companies invest in renewing and finding reserves to meet their growth and cash flow objectives (Boyer and Filion, 2007). The high amount of capital required for capital projects, exploration, and maintenance has consequences for the firms' financial structures in the sense that external financing is unavoidable. The problem is more acute in the case of small firms. Weljermars (2011) analysed cash flows of oil and gas companies from 2004 to 2008 and found that the operational income of smaller oil and gas companies is commonly insufficient to fund new capital expenditures. This implies that small oil and gas companies are more reliant on external debt for financing their growth. The use of debt by energy sector companies indicates that interest rate variations represent an important risk factor.

As discussed above, the high reliance by energy firms on external capital implies that they are under more scrutiny by shareholders, lenders, and analysts. International oil and gas companies are under increasing pressure to maintain strict capital discipline (Osmundsen et al., 2007). One of the main reasons found in the literature behind this is that risky investments by energy companies are typically funded by internal accruals (Osmundsen et al., 2007). This is expected because of the high asymmetry of information between management and external providers of finance in the case of risky investments such as exploration. One of the negative impacts of higher capital discipline is that oil and gas companies may have to reduce their willingness to invest in exploration for future reserves and production growth (Osmundsen et al., 2007).

The high risk of capital investments by oil and gas companies suggest that credit rating agencies may have an important role in determining the capital structure of firms in the industry. Credit ratings are useful when investors feel that they do not have

adequate skills to assess the financial position of a company/investment. Given the level of complexity involved in exploration and development of oil and gas fields, investors are likely to rely on credit ratings to form an economic opinion about a company. Weljermars (2011) states that credit ratings profoundly affect the structural gearing of oil companies. The ascent of oil companies from small-cap to mid-cap and finally large-cap is commonly supported by incremental improvements in their credit ratings (Weljermars, 2011). Thus, smaller companies with lower credit ratings find it difficult to raise external debt and/or have to pay a higher interest rate. This suggests that larger oil and gas companies are better placed to assume debt on their balance sheets.

The main observation from the literature review of capital structure regarding oil and gas companies is that they need external loans because of high investments in exploration, capital expenditures, and maintenance. This section as a whole demonstrates that smaller firms are more dependent on loans to finance their operations. As a result, a high amount of debt results in greater public scrutiny by investors and analysts. This is supported to some extent by the fact that credit ratings of firms also influence their leverage structures.

#### 4. ACCOUNTING DIFFERENCES

Accounting policies are very important in understanding oil and gas companies and guides many researchers to explore this field. This section analyses the effect of accounting differences in energy finance. Evidence shows that analysts and companies place exaggerated weight on accounting profitability (Osmundsen et al., 2007). This can be explained by the fact that some analysts may be using multiples based on accounting profits for valuing and comparing firms. Since price-to-earnings is one of the most commonly used valuation multiples, companies will focus on accounting profits to attract investors.

One of the major accounting differences in energy finance is that companies in the oil and gas sector could choose between 'full costing' and 'successful efforts' accounting approaches. The full-costing method allows all costs incurred from exploration activities to be capitalised and subsequently amortised according to the unit-of-production depreciation method. The successful-efforts approach allows only costs incurred from successful exploration activities to be capitalised and subsequently amortised according to the unit-of-production depreciation method (Misund et al., 2008). Hence, Deakin (1979) states that the use of full-cost accounting, through the deferral of costs associated with unsuccessful projects, tends to show higher and smoother earnings for companies that are expanding their exploration activities. Given the weight placed by managements on earnings, oil and gas sector firms are expected to prefer the use of full-cost accounting. Smooth earnings through the use of full-cost accounting will result in a higher valuations. The preference for full-cost accounting in the oil and gas sector was observed in July 1977 when the U.S. Financial Accounting Standards Board proposed the adoption of a uniform financial accounting rule based on the successful-efforts concept (Deakin, 1979). A number of oil and gas firms appealed that they should be allowed to use the full-costing system because of their inherent characteristics. Currently, both methods are used in the energy

finance industry. Most of the large firms use full-cost accounting, whereas most small firms use successful-cost accounting.

Statement of Financial Accounting Standard No. 19 requires oil and gas companies to disclose supplementary data about their assets as a result of the perceived inadequacy of historical cost accounting for purposes of evaluating oil and gas assets (Harris and Ohlson, 1987). This requirement ensures transparency and equal opportunities for all market players. One of the most useful accounting measures for valuing oil and gas assets is book value, and this has been supported by empirical results (Harris and Ohlson, 1987). When book value is compared with other approaches, it is found that book values are in fact no less important than the present-value measure (Harris and Ohlson, 1987). The Harris and Ohlson (1987) study shows that book value is a better measure for valuation than future net cash flows, direct profit margin, or quantity of proved reserves. These measures did not result in statistical significance when the regression included book and present values. Therefore, book value appears to be the best valuation measure for this industry.

The book value of assets of oil and gas companies includes reserves of oil. Future cash flows are influenced by the quantity and quality of their reserves. Therefore, the demand from shareholders and lenders for accounting disclosure about reserves could be expected to increase with leverage (Craswell and Taylor, 1992).

The accounting policy used by a particular company is also influenced by managements' desire to avoid accounting methods that lead to probable violations of borrowing covenants expressed in terms of accounting numbers (Craswell and Taylor, 1992). This is expected because avoiding bankruptcy is one of the main tasks of a management team, especially after what happened in Enron case.

#### IPOS, MERGERS, AND ACQUISITIONS

The high amount of capital investment required by oil and gas companies implies that they need to raise external capital from both debt and equity. In this section, I investigate IPOs, mergers, and acquisitions in the energy finance industry. Ritter (1991) found that the mean age of issuing firm was smallest for oil and gas companies as compared to firms in other sectors. He found that the median age of oil firms going public was just two years, which is small considering the time it takes for a business to establish itself. This can be explained because of the need to spend a high amount of capital on exploration and infrastructure before any production can begin. In terms of post-IPO performance, the results are strongly influenced by the measurement period. Initial post-IPO returns of firms in the oil and gas sector was best among a number of sectors. The three-year post-IPO performance was worst in his study. Ritter mentioned that the period of the study included the phase when oil prices declined substantially, or what is referred to as the oil crash of 1973. The fluctuation in earnings for oil and gas companies because of oil prices plays a major role in post-IPO performance.

This argument is supported to a certain extent by Dunning and Lundan (2008), who stated that the main corporate motive for

mergers and acquisitions is to increase market share/resources, acquisition of strategic assets, technology-seeking, and gains in efficiency. One of the reasons for mergers and acquisitions is the achievement of resources. Large oil and gas companies find it difficult to maintain their return and reserve replacement ratio, mainly because of the difficulty in finding and developing new fields (Weljermars, 2011). Moreover, the overall arguments are in line with the broadly accepted theory that many of the mergers and acquisitions in the oil and gas industry from 1998 to 2001 were driven by the desire by firms to increase their earnings by benefitting from synergies between firms (Searle, 2010).

At the same time, there is evidence from the literature that the technology or knowledge-seeking motive for mergers and acquisitions is important when acquirers want access to technology/knowledge that can be readily used for their own growth (Chung and Alcácer, 2002). In order to stimulate growth in their earnings and meet shareholder expectations, large energy firms have acquired several smaller companies that excel at biofuels, unconventional gas production, and/or oil sands, and that commonly have poor cash flow but attractive technology and expertise (Weljermars, 2011). Acquisition of these firms gives large firms ready access to technology that they can exploit for their own growth. The acquisition allows large firms to make a positive impact on cash flows in the medium term instead of in the long term when investing in exploration on their own. Given the pressure from markets and analysts to deliver earnings growth, acquisition of smaller companies is a strategic investment by large firms. Also, the higher difficulty faced by smaller firms in raising external finance suggests that they are prone to become merger and/or acquisition targets.

Nevertheless, the failure of mergers and acquisitions to achieve significant positive returns for shareholders of acquiring firms is well documented, and there is little consensus on whether expectations at the time of mergers and acquisitions are actually realised in the longer term (Danzon et al., 2007). Investors support this view by showing significant differences in the returns of target and acquirer firms at the time of merger and acquisition announcements. The shareholders of target firms earn substantial returns at the time of announcement, but shareholders of the acquiring firm typically face negative or slightly positive returns (Fuller et al., 2002). In an analysis of value changes in the nine major oil industry mergers from 1998 to 2001, Searle (2010) found that shareholders of target firms gained returns about six times higher than shareholders of the acquirers. This supports the general empirical evidence in mergers and acquisitions that target firms' shareholders earn substantial returns, whereas gains of shareholders of acquirers are either small or negative at the time of the announcement of the transaction.

One feature of mergers and acquisitions is that they tend to occur in clusters or waves, and that within a wave mergers and acquisitions are typically limited by industry (Andrade et al., 2001). The high value of mergers and acquisitions in the late 1990s suggests the application of the wave or cluster theory. The cluster tendency is influenced by share prices. Many firms use their overvalued shares

during stock market booms to undertake mergers and acquisitions by exchanging their shares for assets of other companies (Schleifer and Vishy, 2003). This approach protects shareholders of the acquiring firm if share prices drop substantially in the future. The high share prices of companies from 1998 to 2001 supports the use of 'overvalued' shares for mergers and acquisitions by oil and gas companies.

The main observations from this survey of mergers and acquisitions are that companies engage in such activities because of their desire to increase reserves for future earnings, as well as to gain access to technology that can increase revenues from non-oil and gas energy sources. Target firm shareholders were found to gain substantially more from merger and acquisitions. Also, mergers and acquisitions follow a cluster trend and many are financed by the equity of the acquiring firm.

## RISK MANAGEMENT AND HEDGING

In this section, I review research on the risk management perspective of the energy finance industry, including hedging in oil and gas companies. Risk can be defined as "randomness of uncertainty of future outcomes that can be expressed numerically by a distribution of outcomes" (Dobler, 2008, p. 187). Beretta and Bozzolan (2004, p. 269) define risk disclosure as the 'communication of information concerning firms' strategies, characteristics, operations, and other external factors that have the potential to affect expected results'. The Deepwater Horizon oil spill in the Gulf of Mexico shows the magnitude of risks faced by energy firms (Spence, 2011). Oil and gas companies face a number of risks: Environmental, health and safety, liability, and reputational (Spence, 2011). Environmental risk is high as companies go into difficult terrains in their search for new reserves of energy. The Deepwater Horizon oil spill shows the environmental and technical challenges of oil and gas exploration. The high amount of fines paid by BP because of the spill illustrates the importance of risk management in the oil and gas sector.

The main product of oil companies is oil, and therefore it is expected that changes in oil prices are a significant determinant of returns in the sector. Mohanty and Nandha (2011) analysed the oil price risk exposure of the U.S. oil and gas sector and found a positive and significant result. Given the greater capital structure scrutiny by analysts, it is expected that the hedging practices of oil and gas firms may be linked to their capital structures. Haushalter (2000) studied the hedging policies of oil and gas producers between 1992 and 1994 and found that the extent of hedging was related to financing costs; that is, companies with higher gearing manage price risk more extensively. This is expected because firms have to meet leverage covenants in terms of earnings-to-interest ratios as well as cash flows to loan repayments. In other words, without hedging, a firm is exposed to greater risk from changes in oil prices, which can increase its chances of bankruptcy and financing costs. In terms of determining whether to hedge, Haushalter (2000) found that the likelihood for hedging is greater for firms with more total assets. This can be explained by the assumption that large firms are able to achieve better economics of scale and thus lower their costs of hedging.

An analysis of the hedging practices of energy firms is important because of the extent of dependence of their profits on oil prices. Demand for oil is comparatively inelastic, and oil prices have asymmetric and nonlinear effects on real activity (Hooker, 2002). Oil price increases are followed by severe economic dislocations, which suggests that there is a link between oil price shocks and recession (Kilian, 2008). Substantial changes in oil prices can have a major impact on the profits of energy companies, and therefore one can expect that firms may use some hedging to improve the predictability of their cash flows. At the same time, investors can be argued to take positions with oil producers to gain from exposure to oil prices. Therefore oil firms may not necessarily benefit from hedging oil price risk (Jin and Jorion, 2006). In their study, Jin and Jorion (2006) demonstrate that theories of hedging based on market imperfections imply that hedging should increase the firm's market value. They analysed the hedging activities of 119 U.S. oil and gas producers from 1998 to 2001 and found that hedging reduces the firm's stock price sensitivity to oil and gas prices.

The usefulness of hedging is also viewed from the perspective of industries where oil is a major input cost. Oil is a substantial percentage of total operating costs in the airline industry. Carter et al. (2006) studied the fuel hedging activity of 28 U.S. airlines during the period of 1992–2003 to see whether fuel hedging added value to the airlines. They found that jet fuel hedging is positively related to airline firm values. On analysing the factors that result in higher valuations of airlines using oil price hedging instruments, they found that the higher the proportion of future fuel requirements hedged, the larger the valuation premium. They explained their findings by the fact that higher hedging of fuel requirements results in greater clarity of cash flows in the future, which can be used by the firm to take advantage of investment opportunities that arise when fuel prices are high and airline operating cash flows are down.

The main conclusion from this section, the review of risk management perspective, is that oil and gas companies face many risks: Environmental, health and safety, oil price, and interest rate risks. Oil and gas firms engage in hedging to improve their predictability of cash flows. The extent of hedging is positively linked to gearing. Firms where oil is a major cost also engage in oil price risk hedging.

## 7. CONCLUSION

Energy is one of the main drivers of any economy. Improving our understanding of the dynamics of energy finance markets can provide a clearer picture of the whole economy and the relationships between market players. This literature review surveys some of the main topics in light of the theoretical and conceptual findings from other articles relating to energy finance. Energy finance is a very dynamic field that is growing and changing exponentially by different means. The changes in the dynamics of this field are derived by the recent renaissance along with technological advancements. Literature in five areas – corporate governance; capital structure; accounting policies; IPOs, and mergers, and acquisitions; and risk management and hedging – was reviewed with specific attention on oil and gas firms.

Corporate governance is important for firms in the oil and gas sector for many reasons. For example, Russia is a major producer of oil and gas but its corporate governance structure is poor. The evidence indicates that state ownership of oil and gas firms has a negative influence on corporate governance. Also, independence of directors will have more effect if it is followed in spirit. In addition, oil and gas companies have initiated many community development actions, but they are designed more to achieve social acceptance rather than being genuine attempts.

The main observation from this literature review of the capital structure of oil and gas companies is that they rely on external finance due to high capital expenditures. With firms under more public scrutiny, capital expenditures on exploration may be curtailed to improve firms' financial position. This argument is supported to a certain extent by the idea that high amounts of capital expenditures and information asymmetry between managers and shareholders implies that credit rating agencies have an important role in determining the capital structure of these firms.

At the same time, there is evidence from the literature that understanding accounting policies is very important for oil and gas companies to have a better understanding of their financial situations. The full-costing system can be used to smooth earnings and thereby achieve higher market valuations, but it does not reflect the true value of assets of an oil firm. Oil and gas firms are required to disclose additional data to help investors make better economic decisions. The evidence indicates that the new regulations have significantly improved the understanding of accounting in the energy finance industry. Moreover, this has been done to ensure transparency and equal opportunities for all market players.

This study as a whole demonstrates that high capital expenditures also have an impact on the time taken by energy companies to file for IPOs. Furthermore, the overall arguments are in line with findings that the median age at the time of IPO for oil and gas firms was lowest among different sectors. Also, energy firms undertake mergers and acquisitions to increase their revenue, reduce costs, and gain access to technologies that can help them grow in the non-oil energy sources sector. As is the case in other industries, the gains of shareholders of target firms were many times that of acquiring firms' shareholders.

The final important factor to consider as a driver of energy finance is risk management and hedging. Oil and gas companies face many risks: Environmental, health and safety, oil price, and interest rate risks. Also, the evidence indicates that risk management is important in energy firms since changes in oil prices can have a substantial impact on their earnings and ability to manage capital expenditure. Companies with higher gearing make more use of hedging to minimize their risk. Nevertheless, a number of financial instruments are used by firms to hedge against changes in oil prices.

These issues are unresolved by the current literature and thus need to be investigated in future research. The overall analysis of the research covered in this literature review shows how energy finance is a very dynamic field that is growing and changing quickly. The changes in the dynamics of this field are derived

mainly by the recent renaissance. All of this attracts researchers to explore this field and provides some explanation for some unanswered questions.

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