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Bid-ask spread, information asymmetry and acquisition of oil and gas assets



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ABSTRACT

There are few empirical tests that support the existence of information asymmetry. We add to this literature using bid-ask spread to capture differences in the level of information asymmetry just prior to the announcement of an open market acquisition of acreage or reserves by U.S. oil and gas firms over the period 1993 to 2011. Acreage is an area of land that is believed to contain reserves and so information asymmetry is expected to be greater around announcement of acreage than for reserve acquisition. We find that for an oil and gas producer, the bid-ask spread just prior to announcement of acquisition of acreage is greater than the bid-ask spread just prior to the announcement of an acquisition of reserves. We then split the sample into firms with share price less than \$4.00 (small share price firms) and the remainder (high share price firms). We find that this effect is associated with small share price firms and not high share price firms. Thus, for the firms with share price less than \$4.00, the level of information asymmetry associated with an oil and gas firm varies with the type of asset acquisition announcement though this is not so apparent for the firms having a share price of \$4.00 or more.

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1. Introduction

While the concept of information asymmetry in financial markets is well established in the literature, there is little empirical evidence to support its existence. This paper contributes to this literature. It investigates how the market reacts to differences in the level of information asymmetry associated with the emergence of new information for oil and gas firms listed on the US stock market. Bid-ask spread is relied upon to test for differences in information asymmetry just prior to an oil and gas firm announcing acquisition of acreage or reserves. It is found that the bid-ask spread is narrower just before announcement of acquisition of reserves than it is on announcement of acquisition of acreage. The intuition is as follows: during periods of high information asymmetry, a dealer who is a specialist in a firm's shares may be relatively uninformed about the value of the acreage (Venkatesh and Chiang, 1986). Thus, the dealer sets the bid-ask spread to compensate for the cost of trading with informed traders. We also find evidence of an increase in trading volume just prior to acquisition announcements, consistent with greater market interest in the stock around the time of these announcements.

The oil and gas industry is an important part of the world economy and exploration and development activities in this industry are sensitive to changes in economic conditions¹. When oil and gas producers expand their exploration and

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¹ The variation in total footage drilled is particularly telling over the period from 2005 to 2010. (See Table 5.2 on page 78 of the U.S. Energy Information Administration, Monthly Energy Review, August 2013.)

development opportunities they can either develop leases or purchase acreage or reserves through open market transactions. Previous studies investigate the impact of exploration and development expenditures on the share price of oil and gas firms (McConnell and Muscarella, 1985; Boyce and Nøstbakken, 2011), though little attention has been paid to analysis of open market acquisitions of acreage and reserves on the share price of these firms². Open market purchases are an economically important part of oil and gas firm capital expenditures. For example, the Ernst and Young global oil and gas transaction review in 2012 (data from IHS Herold) find that open market asset acquisitions accounted for 85% of the total deals in the global oil and gas industry, with the remaining 15% covered by corporate acquisition³.

We argue that open market acquisition of acreage (believed to contain reserves) and reserves should be associated with differing levels of information asymmetry. Acquisition of acreage is part of the exploration process (Fagan, 1997) and is naturally more complex and less certain than acquisition of reserves (Coleman, 2005). Thus, it is likely there will be some traders in the share market who are better informed about the true value of the acreage the firm is to acquire, than other market participants. This issue would be less important for acquisition of reserves as there is greater disclosure concerning the value of reserves. Thus, the spread observed just prior to announcement of reserves acquisition will tend to be less than the spread observed just prior to announcement of acreage to reflect the higher level of information asymmetry associated with acreage (See Table A1 in Appendix A for examples of the acquisition of acreage and acquisition of reserves).

The bid-ask spread is used to capture the impact of information asymmetry existing between uninformed and informed traders in a range of studies in the literature (Copeland and Galai, 1983; Glosten and Milgrom, 1985; Easley and O'hara, 1987; Glosten and Harris, 1988). Further, recent examples of firm specific studies include analysis of changes in information asymmetry around earning announcements (Brooks, 1994) and around merger announcements (Conrad and Niden, 1992; Chakravarty and McConnell, 1997). This paper is organised as follows. Methodology and data are discussed in Section 2, followed by results in Section 3. Finally, conclusions are reported in the last section.

2. Methodology and data

Multiple regression is used in analysis of the impact of information asymmetry on oil and gas firm bid-ask spread, following Affleck-Graves et al. (2000) and Beneish et al. (2008), though we extend this model to include crude oil returns (Sklavos et al., 2013), crude oil volatility and dummy variables to capture the impact of changes in regulation. The final model takes the form:

$$\begin{aligned} \text{quoted spread}_t = & \alpha + \beta_1 \text{EVENT}_{-1, -2} + \beta_2 \text{RESERVE}_t + \beta_3 \text{EVENT}_{-1, -2} \times \text{RESERVE}_t + \beta_4 \text{Price}_{t-1} \\ & + \beta_5 \text{volume}_{t-1} + \beta_6 \text{range}_{t-1} + \beta_7 \text{OILRET}_{t-1} + \beta_8 \text{VOLOIL}_{t-1} + \beta_9 D_{\text{Pre-1997}} \\ & \beta_{10} D_{2001-2005} + \beta_{11} D_{2001-2005} + \varepsilon_t \end{aligned} \quad (1)$$

The dependent variable quoted spread_t is the spread quoted at the end of trading day t. This is collected for a period of up to 279 trading days, from t_{aa} – 268 to t_{aa} + 10, for each announcement included in the study, with t_{aa} referring to the date of the asset acquisition announcement.

The indicator variable used to capture the impact of the acquisition announcement *EVENT*_{-2, -1} is set to one for trading days in the event period (–2, –1) with a value of zero for the remaining days around the announcement date (–268, +10). *RESERVE* is an indicator variable which is set to one where the deal refers to acquisition of reserves, and zero otherwise. *EVENT* × *RESERVE* is the interaction term between *EVENT* and *RESERVE*. This interaction term is included in the model to capture the difference in spread between the announcement of acquisition of reserves and the announcement of acquisition of acreage.

The control variables, price and volume observed on the trading days prior to spread observation date, t, are included to control for the impact of inventory and order cost effects, respectively (Affleck-Graves et al., 2000; Beneish et al., 2008). The volume measure for share trading used in this study is the average volume over the prior three trading days and it is expressed in terms of millions of trades per day.

$$\text{volume}_t = \frac{V_{t-1} + V_{t-2} + V_{t-3}}{3} \quad (2)$$

The share price range (high price less low price) for a trading day is also used as a control variable and calculated for use in analysis reported below. The range is scaled by the average of the high and low price for the trading day, t.

$$\text{range}_t = \frac{(\text{high price}_t - \text{low price}_t)}{((\text{high price}_t + \text{low price}_t)/2)} \quad (3)$$

The share price range is calculated for the prior trading day, t – 1. This is included in the analyses to allow for the possibility that equity price volatility may explain variation in bid-ask spread (Venkatesh and Chiang, 1986).

² One exception is where open market acquisition of reserves is investigated as a motive for takeover activity in the oil and gas industry (Ferguson and Popkin, 1982; Ng and Donker, 2013).

³ [http://www.ey.com/Publication/vwLUAssets/Global_oil_and_gas_transactions_review_2012/\\$FILE/Global_O&G_transactions_2012.pdf](http://www.ey.com/Publication/vwLUAssets/Global_oil_and_gas_transactions_review_2012/$FILE/Global_O&G_transactions_2012.pdf).

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