Standard forside

HANDELSHØGSKOLEN VED UIS

MASTEROPPGAVE

STUDIEPROGRAM: Master i regnskap og revisjon	ER OPPGAVEN KONFIDENSIELL? Ja

TITTEL: Valuation of oil and gas companies

ENGELSK TITTEL: : Valuation of oil and gas companies

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Universitetet i Stavanger

Avtale om båndlegging av bachelor- og masteroppgaven

mellom

Johan Bernhard Christie Berle .... 29.09.1991 ....

....

Studenten(e)s navn fødselsdato

og

Marius Sikveland .... Handelshøgskolen ved UiS ....

Navn på fagansvarlig v/UiS institutt

og

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Bedriftens navn bedriftens kontaktperson

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Valuation of oil and gas companies ....

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Studenten(e): For bedriften:

navn: Johan Bernhard Christie Berle navn: ....

navn: .... tittel: ....

navn: ....

Bernhard Berle
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underskrift *underskrift*

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Abstract:

The purpose of this thesis is to look at the effect on corporate valuation associated with the choice of accounting method. Drilling companies[1] have two available accounting methods for the exploration and development cost of oil wells: full cost accounting and successful efforts accounting. To investigate the differences both earnings response coefficient and value relevance analysis is used in this paper. The earnings response coefficient analysis is based on research by Gabrielsen, Garmlich & Plenborg (2002), Bandyopadhyay (1994) and Holthausen & Verrecchia (1988). The value relevance analysis is based on the methodology of Ohlson (1995) and previous research by Midsund, Osmundsen & Sikveland (2015).

This paper contributes to existing literature because it includes new variables to better highlight the differences in the two accounting methods. Both analyses are run on data from 1991-2015 and subsets based on oil prices. The period between 2002 and 2007 is defined as the oil boom, 1991-2001 as pre-boom and 2008-2015 as post boom. The findings from the earnings response coefficient analysis are consistent with pervious research. I observe a similar adjusted r^2 and the variables react to the changes in oil price in the same way Bandyopadhyay observes. The findings from the earnings response coefficient analysis are also inline with previous research, with a adjusted r^2 to the one Misund, Osmundsen & Sikveland find. I observe some differences in significance, which is likely due to stricter robustness tests.

New findings come from the inclusion of variables not previously investigated in the literature. These variables are based on drilling success rate. In the earnings response coefficient- and the value relevance model I find that higher drilling success rate is indicative of a higher return for full cost companies and insignificant for successful efforts companies. This is as expected based on the two accounting methods. I also include a change in drilling success rate has an explanatory variable. By analyzing change in drilling success rate I find that improving drilling success rate is indicative of higher returns for successful efforts companies in the value relevance analysis, but insignificant for full cost companies, and insignificant in the earnings response coefficient analysis. This is expected if current information is handled correctly in the market valuation, but previous information is misunderstood. I further include an explanatory variable based on the historic diversion from

[1] By drilling companies, I mean any oil company occuring costs directly related to drilling.

100% drilling success rate. I observe a lower return for full cost companies in both analysis, but positive results for successful efforts companies. This is surprising because previous years drilling success is known information and should not impact the expected stock return in a later period.

The findings imply that analysts are able incorporate current information adequately, but unable to correctly assess how drilling success rate is accrued in the financial statements.

The drilling success rate has not been analyzed in previous research, therefore these findings add new information to the field and the results suggest that it should play an important role in the further discussions on full cost and successful efforts accounting.

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1. Introduction

1.1 Set the scene

Companies in the oil industry are allowed to choose between two accounting methods for the exploration and development cost of oil wells, successful efforts and full cost. Although there are some minor differences, the major difference in these methods is how they account for dry wells drilled. Under full cost accounting, a company capitalizes the relevant costs related to wells and depreciates these assets over time, regardless of whether oil is found or not. Under successful efforts accounting, only wells where oil is found gets capitalized and depreciated over time, investments in empty wells are regarded as costs. For successful efforts companies there are firm specific choices, as in when they confirm that they will not produce from an oil well etc., but overall, companies with full cost will have a higher balance and lower expenses due to capitalizing the expenses of empty wells as an asset, not treating it as a a cost.

This directly influences the bottom line of financial reports. Successful efforts companies will incur the costs earlier and have lower assets than full cost companies. Consequently full cost companies look more favorable to investors (Baker 1976). This is used as an argument for why companies should be allowed to use it, as it encourages investments into oil companies. Successful efforts accounting is considered to give a more accurate representation of the firm (Baker 1976).

In this thesis I will not focus on which method should be used, but rather if there are any unwanted effects from having both methods be legal. By analyzing the earnings response coefficient and the value relevance, I seek to contribute to the existing knowledge on valuation of full cost- and successful efforts firms.

1.2 Motivation

There are several research reports that focus on comparing the differences between successful efforts and full cost in value relevance and earnings response coefficient analysis. However, these focus less on the implications and long-term effect of these differences. In addition, previous studies do not included lagged variables, nor how earlier years drilling success might impact the current year. I discuss this in chapter two.

This study replicate the methodology from previous research on earnings response coefficient (Teoh and Wong 1993) and value relevance (Misund, Osmundsen, and Sikveland 2015), and conduct the analysis on a more recent dataset. The thesis expands upon this research by adding new variables. This include drilling success and number of net wells drilled. By adding these variables the study enables a more detailed analysis of differences between full cost and successful efforts companies, and provides a deeper understanding of how the different type of accounting affects investor's opinions of the companies. I find it highly motivating to put a new spin on the existing literature, and include new variables that have yet to be analyzed.

1.3 Problem Statement

The main purpose of this thesis is to create deeper insight into the effects from having both successful efforts and full cost accounting. In order to fit this purpose into a statement that can be applied for both my value relevance and earnings response coefficient analysis, I have chosen to answer a fairly general problem statement.

"How does full cost and successful efforts accounting affect the link between book values and market values?"

In order to answer this overarching statement and to structure the thesis, I will provide answers to the following sub-questions.

- *Does oil price behavior affect value relevance and earnings response coefficients analysis?*
- *How does drilling success affect the accuracy of current and future value relevance and earnings response coefficients analysis?*
- *Is oil price change an important variable in value relevance and earnings response coefficients analysis?*
- *Are value relevance and earnings response coefficients analysis comparable?*

1.4 Delimitations

During the process of my master thesis it has been necessary to make several delimitations in order to focus on the primary issues and make the process manageable. In order to present reliable, robust and relevant results I have taken the following delimitations.

- The datasets used for earnings response coefficient and value relevance analysis are different, due to lack of data in some observations and the earnings response coefficient only consists of firms traded as of year end 2015, and the value relevance analysis consists of all firms where that has reported sufficient data for one or more years between 1991 and 2015.

- The datasets have been edited; I have removed the 0.5% highest and lowest observations in both analyses. This is to remove any problems caused by outliers (Zimmerman 1994; 1995; 1998).
- No weighting is used, to simplify the thesis I have not weighted any variables, regardless of them benefiting from weighting. This means some of the findings might be less significant then what optimized variables would find.
- Data inconsistencies, I have found some faults in the data from Reuters, I cannot be absolutely sure that I have found and corrected all the faults.

Because of data inconsistencies, I have only used traded firms in my earnings response coefficient analysis. The reason for not including firms that are no longer traded in the earnings response coefficient analysis is because the data from these companies is poor. In short, finding the correct trading data from firms going through bankruptcy, mergers and acquisitions proved difficult. This is because firms continued on the same ticker after mergers & acquisitions, making it hard to know if the ticker is correct, or if it is the relevant information form the balance sheet information gathered from IHS Markets. I also experienced several problems with errors in Reuter's data from old firms. Faults such as the annual report date being set to the 31.12, instead of the day the report was actually publicized, was common. This problem is not present in the value relevance analysis because I am only using IHS Market data in the value relevance analysis.

1.5 Structure of the Thesis

The rest of this paper is organized as follows: In chapter two I give a brief overview of the background and previous research. In chapter three I give a quick overview of the more advanced methodology used to create robust results. In chapter four I present the earnings response coefficient analysis and findings, this includes methodology; data, analysis and discussions related to my earnings response coefficient findings. In chapter five I do the same for the value relevance analysis; here I present methodology, data, analysis and discussions related to my value relevance findings. Following this in chapter seven I present a summary discussion and conclusion of what the findings indicate. Finally in chapter eight I give my recommendations for further research.

2. Background and literature

The problem statement in my thesis is *"How does full cost and successful efforts accounting affect the link between book values and market values?"* and I intend to investigate this based on earnings response coefficient- and value relevance literature. The reason for using two different theoretical frameworks is to provide an in-depth analysis of market reactions to the full cost and successful efforts companies. The earnings response coefficient analysis will provide insight market reactions as financial reports are published. The value relevance analysis will provide insight into the yearly returns. Combined, they provide insight into the immediate and the long-term reaction to successful efforts and full cost accounting.

When applying the methodology I lean on previous research and findings. Bandyopadhyay (1994) explores the differences in earnings response coefficient between full cost and successful efforts companies. The main finding from his study is that on average successful efforts companies have shown higher earnings response coefficient then full cost companies, however this finding was only true on average. In the period from 1986-1990, a period of relative decline in drilling activity due to a dramatic oil price decline in 1986, the difference is no longer significant. In my research I have divided my dataset from 1991 - 2015[2] into four subsets. This is done to account for the years 2002-2007, a period of continuous oil price growth. One sample is before the oil boom (1991-2001), one is the during the oil boom (2002-2007), one is after the oil boom (2008-2015) and one is before and after the oil boom (1991-2001 & 2008-2015).

Findings from Harris and Ohlson (1987) and Sunder (1976) indicate that successful efforts companies have higher market to book coefficients then full cost companies. Which is consistent with more conservative asset values. Because of this, I have included market to book variables when conducting my earnings response coefficient, in addition to several other of their variables.

Misund, Osmundsen & Sikveland (Misund, Osmundsen, and Sikveland 2015) runs two regressions, one on the differences between the accounting methods of full cost and successful efforts companies, and one on distinguishing between the firms operations, whether they solely focus on production or operate as integrated companies. In the accounting methods research they find that full cost companies have higher value relevance on net income. I incorporate this into my research, and I control for their variables.

[2] I use the IHS Herold dating back to 1991

In addition to leaning on previous research I also expand upon their study and include variables based on drilling success rate. I include these variables because drilling success rate is linked to the main difference between success full efforts and full cost companies, meaning that if all companies drilled no empty wells, there would be no significant differences between full cost and successful efforts companies.

Incorporating variables based on drilling success rates does not break with any restrictions in the models, nor is it unprecedented to incorporate these kinds of variables. I will explain why it does not brake with the theory when I review the relevant literature for each model.

3. Methodology and data

This section gives an overview of analytical tools common for both the earnings response coefficient and the value relevance analysis, as well as describing the reasoning behind adding new variables used in both data sets. The methodology that is not shared by the two methods are separated into the to chapters four and five.

3.1 Quantile – regression

In my models I want to check if there are any interesting conditional quantiles. By this, I am referring to instances where one would expect different coefficient values based on differences in observation values. An interesting conditional quantile in the value relevance model would be to see how the drilling success coefficient changes when looking at firms with low drilling success contra firms with high drilling success. This is interesting because we know that drilling success directly affects whether the asset value of a full cost firm are inflated or not.

To control for this, I plot the quantile coefficient estimates of my final model and display the results for every variable. I plot quantile coefficients by running regression on the overall regression on every quantile of every variable, and plotting the results with 0,05 tau confidence bands. These bands make it easy to see how the coefficient moves over time, and how accurately it is represented by the current coefficient. An alternative to this is to run analysis of variance (Anova) regressions to determine which variables that might have quantile differences. However, with the band plots it is easy illustrate the data and see where quantile problems may exist, and would require many Anova regressions per variable to replicate. This is also a technique that has been used in previous research by Machado & Mata (2005) among others.

After determining whether there are quantile differences, I optimize the model accordingly. This does not imply that I will always split the variables into quantiles to compensate for the differences, but rather that I will investigate whether including such variables are optimal for the overall regression. To determine if quantiles are needed I use the adjusted R^2 and if this measurement is improved by quantiles, the quantiles are included.

3.2 Multicollinearity

Collinearity is when one of the variables is highly correlated with one of the other variables; multicollinearity is when one of the variables is linearly predicted by a function of the other variables. In a linear model this can create problems such as a too high R^2, and variables becoming significant due to correlations with other variables and not because they contribute to explaining the dependent variable in themselves.

A Variance Inflation Factor-test (VIF-test) is used to check for this, this can be illustrated in the following example:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon \text{(Equation 3.1a)}$$

To calculate the VIF number for X_1 in this function, one creates another regression where X_1 is expressed by the other variables.

$$X_1 = \alpha + \gamma_1 X_2 + \gamma_2 X_3 + \varepsilon \text{(Equation 3.1b)}$$

Lastly one uses the R^2 from equation 3.1b, as input into the final function (3.1c).

$$VIF = \frac{1}{1-R^2} \text{(Equation 3.1c)}$$

To interpret the VIF number it is common to use a rule of thumb where a VIF number higher than 10 indicates departure from the assumptions of the linear regression model, this gives quite a lot of leeway considering this requires an R^2 of 0,9 and above. Because of this some researchers (insert reference) argue that a VIF of 5 is enough to be worried (R^2 of 0,8). I will therefore comment on any VIF above 5.

3.3 Heteroskedasticity

Heteroskedasticity is simply the absence of homoscedasticity. More precisely homoscedasticity tells us if variance is uniform across all observations. This means that all observations are expected to have the same levels of variance. Heteroskedasticity exists when the variance deviates between different subgroups. This is particularly relevant to thesis. I am using observations from different periods, therefore there is a chance that some years, or periods have different expected variance than other years. To control for this I run a Breusch–Pagan test (Breusch and Pagan 1979), which checks whether the variance of the error term is dependent on the values of the independent variables, which would be the case if there is heteroskedasticity.

Starting with the same expression as before,

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon \text{(Equation 3.2a)}$$

We assume that the OLS conditions are met (insert reference to where OLS is explained), therefore e= 0, The independence of the error term can be verified by through an auxiliary regression.

$$\hat{\varepsilon} = \alpha + \gamma_1 X_1 + \gamma_2 X_2 + \gamma_3 X_3 + \epsilon \text{(Equation 3.2b)}$$

Further it uses probability based on Chi-Squared distribution to confirm if the variables are equal to 0

H_0 = ($\gamma_1 = \gamma_2 = \gamma_3 = 0$)

If H_0 is rejected, there is evidence of heteroskedasticity.

3.4 White Standard Errors

To adjust for heteroskedasticity I am using heteroskedasticity-consistent (HC) errors. More precisely I am using the HC1 model proposed by Mackinnon and White in 1985 (MacKinnon and White 1985). The reason for using these is because it is slightly more complex the simplest HC0 model, and better suited for small samples (Zeileis 2004). While at the same time being fairly common and used as the standard heteroskedasticity-consistent errors in programs such as STATA (Long and Ervin 2000). The function for the HC1 model is as follows.

$$HC1 = w_i = \frac{n}{n-k} * \hat{u}_i^2 \text{(Equation 3.3)}$$

Where $\hat{u}_i^2$ is the residuals, *n* is the number of observations and *n-k* is the degrees of freedom (White 1980). These standard errors also work as a quick fix for multicollinearity, by binding the errors the chance for multicollinearity to affect the results is reduced (Aslam 2014).

3.5 New variables

The key differences between full cost and successful efforts accounting, is how they account for drilling cost. In order to analyze this difference as thoroughly as possible several variables based on the drilling success rate are used. The first variable is change in drilling success rate based on average drilling success rate from previous years. This variable is meant to highlight how drilling success rate affects successful efforts companies, because if all else was equal, an increase in drilling success in the current year will make the current year's bottom line look better, because more of the drilling expenses gets capitalized instead of expensed in the current year. The second variable is a variable based on any diversion from 100% drilling success rate. This is to highlight the differences caused by drilling success rate in full cost accounting. Because all costs of drilling wells is capitalized by full cost companies, the higher diversion from 100% drilling success rate, the more non cash generating assets are placed in the balance sheet. In this thesis lagged variables based on 1-3 previous years are used for both variables. The reason for using 1-3 previous years is decided after considering several arguments, it seems probable that analyst might consider more then just the pervious year when predicting future profits, therefore it is reasonable to include more then one year. However because of depreciation any historical diversion is decreasing in relevance the older the accounting data is. Ultimately the data used in this thesis have few companies with more then 3 years of historical drilling success rate observations. Therefore it is unreasonable to include more then 3 years of past drilling success rate in this thesis.

4. Earnings Response Coefficient

The earnings response coefficient is a measure of the stock return around the earnings announcement (Book reference). Research into this field has theorized that a high correlation between the earnings response coefficient and unexpected earnings, works as a proxy for how credible the earnings report is. Previous research into this field has had mixed results while trying to link auditor size (if the auditor is one of the big 8 auditor firms (now Big 4)) to earnings report credibility. Teoh & Wong (1993), found that a big 8 auditor had higher credibility than non big 8 auditors. While other research has found that this might be more related to other factors, such as litigation exposure (Khurana and Raman 2004).

4.1 Methodology

Both the previously cited reports base their model on Holthausen & Verrecchias paper *"The Effect of Sequential Information Releases on the Variance of Price Changes in an Intertemporal Multi-Asset Market"* (Holthausen and Verrecchia 1988).

The paper theorizes how a company with known trading data (variance and price), reacts to release of dividend information. The theoretical model does not account for factors such as firm risk, earnings persistence, earnings predictability, and other time series characteristics. However, these factors are controlled for in the statistical model.

The theoretical model states that at time = 0 the firm value is set to the conditional expectation of the firm value given all available information. The unknown value of the firm is called $\tilde{u}$ and has a mean of m and a variance of v. In mathematical terms this means;

$$P^0 = E[\tilde{u}] = m \text{(Equation 4.1a)}$$

Here P^0 is equal to the expected termination value of the firm.

In P^1 the earnings get released which means the market gets knowledge of the true value of the firm with noise. This true value is set to $\tilde{\epsilon}: \tilde{x} = \tilde{u} + \tilde{\epsilon}$ where the $\tilde{\epsilon}$ is a random variable with normal distribution, zero-mean and a variance of η. In this setting x – m, becomes a measurement of earnings surprise.

Mathematically this means the function gets slightly more complex, P^1 is now equal to

$$P^1 = E[\tilde{u}|\tilde{x} = x] = m + \frac{v}{(v+\eta)}(x - m) \text{(Equation 4.1b)}$$

And the price response will therefore be

$$\delta = P^1 - P^0 = \frac{v}{(v+\eta)}(x - m) \text{(Equation 4.1c)}$$

δ is a function that measures the earnings surprise from the earnings announcement.

The earnings response coefficient is the ratio $\frac{v}{(v+n)}$, based on the difference in expected earnings m and reported earnings x. By doing a partial derivation on v and η, they get

$$\frac{\partial ERC}{\partial v} = \frac{\eta}{(v+\eta)^2} > 0 \text{(Equation 4.1d)}$$

$$\frac{\partial ERC}{\partial \eta} = -\frac{\eta}{(\upsilon + \eta)^2} < 0 \text{(Equation 4.1e)}$$

This is interpreted as an increase in υ, in other words an increase in how uncertain the market is in its valuation of the company. Increases the earnings response coefficient, meaning if all else is equal a company that is considered risky, or difficult to price, will have a higher earnings response coefficient then a company which is less risky, or easier to price.

In function XX, an increase in η, which is the uncertainty of the announced earnings, reduces the earnings response coefficient. Meaning that if all else is equal a company where the earnings are trusted (in other words a high quality of earnings), will see a higher earnings response coefficient then a company where the earnings are not trusted (high variance).

In practice this is fairly intuitive, P^0 is the price before earnings are announced, P^1 is the price after the earnings are announced, x is what the earnings per share was announced to be, and m was what the market expected the earnings to be. If the stock is valued with a high level of uncertainty, investors will put more emphasis into the reported earnings and the earnings response coefficient will be larger. If the reported earnings are not considered reliable, then investors will put less emphasis on reported earnings and earnings response coefficient will be smaller.

4.2 Data

This thesis is based on data from public oil companies all over the world. My source for trading data, oil prices and other non-accounting data is Thomson Reuters DataStream. Earnings estimates were gathered from The Institutional Brokers' Estimate System (IBES), a data service currently owned by Thomson Reuters. Detailed accounting data from the oil companies is extracted from IHS Markit.

I use IHS Markit data to extract which firms used what accounting method in any given year. I merged this data with corresponding trading data using excel**.** I only extracted data from firms currently listed on a stock exchange, this does not include non-listed but OTC traded firms or derivatives. Firms no longer listed are also not used in the data set. The main reason for not accepting derivatives or OTC traded is that these did not have enough trading data. I did not extract data from that are no longer traded because of problems with the data, as stated in the introduction. I have not differentiated the dataset based on stock market, country of origin or currency. This is because many companies are listed on several stock exchanges, operate outside their country of origin, and publish their annual reports in USD. In addition, the vast majority of companies in the study are listed in the US and I do not have enough observations to check for country differences in a reliable way. However CAPM beta and expected market returns for any company are based on their primary stock exchange, extracted from DataStream.

The model I use is a multiple regression model of abnormal stock returns, controlling for earning surprise and other firm and market variables. The model deviates slightly from the methodology used by Teoh and Wong (Teoh and Wong 1993), because of correlation issues. The issue comes from multiplying unexpected earnings with other variables that are expected to stay within a certain range, such as the natural logarithm of market value, one devided by the number of analysts, market to book value and beta, which are all used in both mine and Teoh and Wong´s research. Teoh and Wong acknowledge this causes correlation problems in their findings. For my study I found these correlation issues to be highly prominent which is reflected in the high value inflation numbers, this might be because I focus on only one sector, in any case it made my data impossible to interpret. Because of this I adapt the model to use unexpected earnings as a single variable, this is similar to previous research (Bartov, Givoly, and Hayn 2002). The new variables I have added are also correlated, I have therefore derived the model in to three versions with different variables. In addition to these models, I also replicate the simplest model from Bandyopadhyay (1994), which provides additional benchmarking for my unexpected earnings coefficient. The reason for using the simplest and not the more advanced regression from Bandyopadhyay is also because of correlation issues.

Model 1 (eq.4,2), is a single year model based on the research from Teoh and Wong, this will give insight into how current information affects the market reaction to earnings announcements.

$$
\begin{aligned}
CAR = \beta_0 + \beta_1 UE + \beta_2 B + \beta_3 LMV\ 1^{st} quantile + \beta_4 LMV\ 2^{nd} quantile \\
+ \beta_5 LMV\ 3^{rd} quantile + \beta_6 LMV\ 4^{th} quantile + \beta_7 MTB + \beta_8 Brent + \beta_9 N \\
+ \beta_{10} DSR + \alpha_0 * D + \alpha_1 UE * D + \alpha_2 B * D + \alpha_3 LMV\ 1^{st} quantile * D \\
+ \alpha_4 LMV\ 2^{nd} quantile * D + \alpha_5 LMV\ 3^{rd} quantile * D \\
+ \alpha_6 LMV\ 4^{th} quantile * D + \alpha_7 MTB + \alpha_8 Brent * D + \alpha_9 N * D + \alpha_{10} DSR \\
+ \varepsilon_{it} \text{(Equation 4.2)}
\end{aligned}
$$

(UE = Unexpected Earnings, B = Beta, LMV= Log Market Value of the n^{th} quartile, MTB = Market To Book ratio, N = one divided by Number of analysts, Brent = Changes in Brent oil price during the period, DSR = Drilling Success Rate,)

Model 2 (eq.4,3) is an extension from the single year model, focusing on any impact caused by a change in drilling success rate. This provides insight into how full cost and successful efforts companies differ when controlling for this years drilling success rate, compared to historical drilling success rate. Because the model focuses on change, the change in number of wells drilled is also included.

$$CAR = \beta_0 + \beta_1 UE + \beta_2 B + \beta_3 LMV + \beta_4 MTB + \beta_5 Brent + \beta_6 N + \beta_7 \Delta DSR_n + \beta_8 \Delta WD_n + \alpha_0 * D + \alpha_1 UE * D + \alpha_2 B * D + \alpha_3 LMV * D + \alpha_4 MTB + \alpha_5 Brent * D + \alpha_6 N * D + \alpha_7 \Delta DSR_n + \alpha_8 \Delta WD_n + \varepsilon_{it} \text{ (Equation 4.3)}$$

(UE = Unexpected Earnings, B = Beta, LMV= Log Market Value, MTB = Market To Book ratio, N = one divided by Number of analysts, Brent = Changes in Brent oil price during the period, ΔDSR_n = Change in Drilling Success Rate with n lags, ΔWD_n = Change in number of Wells Drilled with n lags)

Model 3 (eq.4,4) is the last extension from the single year model, this time focusing on any diversion from optimal drilling success rate, in other words if a company did not have 100% drilling success during the last n years. This will provide insight into how full cost and successful efforts accounting differs when controlling for historical drilling success rates.

$$CAR = \beta_0 + \beta_1 UE + \beta_2 B + \beta_3 LMV + \beta_4 MTB + \beta_5 Brent + \beta_6 N + \beta_7 DODSR_n + \alpha_0 * D + \alpha_1 UE * D + \alpha_2 B * D + \alpha_3 LMV * D + \alpha_4 MTB + \alpha_5 Brent * D + \alpha_6 N * D + \alpha_7 DODSR_n + \varepsilon_{it} \text{ (Equation 4.4)}$$

(UE = Unexpected Earnings, B = Beta, LMV= Log Market Value, MTB = Market To Book ratio, N = one divided by Number of analysts, Brent = Changes in Brent oil price during the period, $\Delta DODSR_n$ = Diversion from Optimal Drilling Success Rate with n lags)

CAR	=	continuously compounded abnormal returns for firms
UE	=	unexpected earnings, equation XX
D	=	dummy variable 0 for successful efforts, 1 for full cost
B	=	beta coefficient for the firms
LMV 25%	=	natural log of market value, quantile regressed with a proportion of in each quantile
MTB	=	Market to book value equity

Brent = the price change of Brent oil continuously compounded during the period

N = number of analysts covering the firm when the consensus forecast was made

DSR = current drilling success rate

ΔDSR_n = change in drilling success rate from last n years to current

ΔWD_n = change in number of wells drilled from last n years to current

$DODSR_n$ = diversion from optimal drilling success during the last n years

ε = error term assumed to be distributed $N(0,\sigma^2)$

Model 4, is the simplest Bandyopadhyay regression from his 1994 paper, and it is expressed in following regression:

$CAR = \beta_0 + \beta_1 UE + \alpha_0 * D + \alpha_1 UE * D + \varepsilon_{it}$ (Equation 4.5)

CAR = continuously compounded abnormal returns for firms

UE = unexpected earnings, equation XX

D = dummy variable 0 for successful efforts, 1 for full cost

ε = error term assumed to be distributed $N(0,\sigma^2)$

For simplicity reasons I am using the term β to represent SE coefficients and α to represent full cost coefficients. Because of this I am interested in how α_1 corresponds to β_1 in all regressions, the rest of the variables I have included are controls and not relevant for the null hypothesis, but the findings are still relevant as they describe factors which affects the stock price reaction to the financial report.

Based on previous described theories we expect α_1 to be lower than β_1 because it implies that SE companies produce more reliable income statements. This means that our null hypothesis is that α_1 will be lower then 0, and our alternative hypothesis is that α_1 will be higher then 0.

$H_0: \alpha_1 \geq 0$

$H_a: \alpha_1 \leq 0$

The raw Earnings Response Coefficient is calculated as the stock return between one week after and two weeks prior to the earnings announcement, if the earnings were published during the weekend, the period was moved forward, as if the announcement happened on the upcoming Monday. To adjust for market movements I have calculated cumulative, continuously compounded abnormal returns (CAR) as described by Teoh and Wong (Teoh and Wong 1993). The period of two weeks prior and one week after the earnings announcement is a longer period then previous research has used (Bandyopadhyay 1994). The reason for using a longer period is to compensate for any over- or under-reaction and isolate the consensus price change due to the earnings announcement.

There is an argument to be made for including the oil price in the CAR calculation in addition or as a substitute to market returns, because of the correlation between oil price and oil companies' stock prices. This was considered but after testing it was obvious that not all oil price changes are created equal, and large movements are significantly different to small movements in relation to the earnings response coefficient as illustrated later. Because of this we decided to include it as a control variable in the model instead.

CAR is calculated as

$$CAR = \sum_{t=YY}^{XX} \ln\left(1 + R_{it} - R_{mt}\right) \text{ (Equation 4.4a)}$$

This CAR estimation is the same as Teoh and Wong (Teoh and Wong 1993).

Unexpected earnings are calculated as the difference between the consensus earnings per share estimate from IBES and the actual EPS reported by the firm, divided by the share price on the reporting date:

$$UE = \frac{Actual\ Earnings - Expected\ Earnings}{Price} \text{(Equation 4.5)}$$

Beta is calculated using daily observations from the previous year, starting from the day before the earning announcement when calculating the variance and covariance. I have the following formula for the calculation:

$$\beta = \frac{Cov(R_i, R_m)}{Var(R_m)} \text{ (Equation 4.6)}$$

The natural logarithm of firm value is calculated from end year data, this makes it comparable to other accounting data in my analysis. I could also have used the price on reporting date and either should work well as a proxy for size, this would make it more comparable to the trading data. Either way the months between the year-end and the reporting date should not be enough to turn a big company into a small company and vice versa, and therefore this choice should not impact the results.

$$LMV = LN(MarketCapitalEndYear) \text{ (Equation 4.7)}$$

Based on a quantile regression I decided to split LMV into quantiles of 25%, to better control for firm size. The quantile regressions and control regressions where LMV is not split can be found in appendix (4.3 Quantile Regressions).

Market to book is calculated based on end of year data, because at this time I have accurate book values. The findings have been comparing them to other ratios from Reuters and gurufocus in other to validate the accuracy.

$$MTB = \frac{Market\ capital}{Book\ value\ equity} \text{(Equation 4.8)}$$

I am including oil price as a variable, despite no other research have included it. This is because I find it difficult to understand why one would not include oil price as a variable, when it clearly affects how an oil company's price will change during a given time period. Initially I wanted to control for the changes in oil price using the West Texas Intermediate, because most of the companies in our dataset are from the US. However I found that the sample was more correlated to Brent and therefore I use Brent. I have calculated the continuously compounded Brent price from two weeks prior to one week after the announcement. This is the same period used in the CAR calculation.

$$Brent = \sum_{t=YY}^{XX} \ln(1 + Brent_{it}) \text{ (Equation 4.9)}$$

I include a variable of one divided by number of analysts in my analysis. The number of analysts is set to the maximum number of analysts that provided any earnings estimates during the last 150 days. This is normally not a big change, the general trend is that more analysts starts to follow a company close to the reporting date, however sometimes the number of analysts would drop a few weeks prior to the final consolidated estimate. Because I find no good reason for why the number of analysts would spike and then fall off prior to the final estimate, I am using the highest number to compensate for any discrepancies in the number of reported analyst and the real number of analysts. I adjust the variable to be one divided by this number of analysts, because this is used in previous research by Teoh and Wong (1993), and because it makes sense. If I were to keep the number of analysts unadjusted, it would imply that the accuracy increase by adding one more analyst would be the same from 1 to 2, as from 50 to 51. By using one divided by the number of analysts the interpretation changes to every increase in number of analysts, reduces the coefficient by an amount relative to their participation compared to the group. Meaning that an increase from 1 to 2 would half the coefficient, while an increase from 50 to 51 would barely change it. Because of this adjustment, the variable highlights if the number of analysts affect the CAR.

$$N = \frac{1}{Number\ of\ analysts} \text{(Equation 4.10)}$$

DSR is the Drilling success rate for current year is a variable provided by IHS Markit.

$$\mathrm{D}SR = \ Drilling\ Success\ Rate \text{(Equation 4.11)}$$

ΔDSR is calculated as this year's drilling success rate over last year's drilling success rate. This measurement is particularly relevant for exploring the differences between successful efforts and full cost accounting, because it directly measures the key difference in the two accounting methods. Meaning if drilling success rate were 100% in every year, there would be no difference between successful efforts and full cost accounting.

$$\Delta DSR = \frac{Drilling\ Success\ Rate_t}{Drilling\ Succes\ Rate_{t-1}} - 1 \text{(Equation 4.12)}$$

I also apply this year's drilling success rate over the average drilling success the last n years.

$$\Delta DSR_{\mathrm{n}} = \frac{Drilling\ Success\ Rate_t}{\left(\frac{\sum_{t-n}^{t-1} Drilling\ Success\ Rate}{n}\right)} - 1 \text{(Equation 4.13)}$$

$DODSR_n$ is calculated in a similar fashion to ΔDSR_n but differs in measurement. Diversion from Optimal Drilling Success Rate measures historical difference in drilling success rate, where the optimal is 100% drilling success and if there is any diversion from this, it is measured in here. This variable controls how many dry wells that are included in full cost companies balance sheets.

$$DODSR_{\mathrm{n}} = \frac{100\%}{\left(\frac{\sum_{t-n}^{t-1} Drilling\ Success\ Rate}{n}\right)} - 1 \text{(Equation 4.14)}$$

Lastly I include the change in number of wells drilled, considering an increase in wells drilled might also affect the importance of drilling success rate. In order to make the comparison fair, this is also calculated in a similar fashion to ΔDSR_n.

$$\Delta WD = \frac{Net\ number\ of\ wells\ drilled_t}{\left(\frac{\sum_{t-n}^{t-1} Net\ number\ of\ wells\ drilled}{n}\right)} \quad \text{(Equation 4.15)}$$

4.2.1 Robustness tests

Before running the final model I have controlled for several statistical errors and unexpected results. I have controlled for multicollinearity, heteroskedasticity, I have plotted the variables and I have calculated summary statistics, to see if there is any reason to believe the data or results are invalid. A minor finding from this is that models 1 and 2 have a higher adjusted R^2 then previous research. This is mostly due to including change in oil price as a variable, and excluding this variable creates similar results to previous research, which is discussed later.

When analyzing variance inflation, I only include cumulative results not divided on accounting method. This is due to statistical errors stemming from the way dummy variables interact with the VIF-regression. The VIF-regression overvalues the correlation for variables multiplied with a dummy, because the input is the same for both the original variable and the variable multiplied with the dummy.

From the variance inflation test on Model 1 I found no evidence of multicollinearity, results from subsamples can be found in appendix (4.1.1).

Table 4.1

Variable	UE	B	LMV	MTB	DSR	Brent	N
CAR	1,0347	1,0579	1,2278	1,0047	1,0812	1,2758	1,0258

(UE = Unexpected Earnings, B = Beta, LMV= Log Market Value of the n^{th} quartile, MTB = Market To Book ratio, DSR = Drilling Success Rate, N = one divided by Number of analysts, Brent = Changes in Brent oil price during the period)

For Model 2 I observed no multicollinearity, the results of the analysis is shown in table 4,2.

Model 2 VIF

Variable	UE	B	LMV	MTB	N	Brent	ΔDSR	ΔWD
N = 2	1,0463	1,0368	1,258	1,0147	1,2862	1,0711	1,0458	1,0323

N = 3	1,0595	1,0454	1,3036	1,0159	1,3433	1,0138	1,0949	1,0086
N = 4	1,05	1,061	1,2812	1,0168	1,3681	1,0096	1,1255	1,016

(Table 4.2) (UE = Unexpected Earnings, B = Beta, LMV= Log Market Value, MTB = Market To Book ratio, N = one divided by Number of analysts, Brent = Changes in Brent oil price during the period, ΔDSR_n = Change in Drilling Success Rate with n lags, ΔWD_n = Change in number of Wells Drilled with n lags)

For Model 3 I found no multicollinearity in the cumulative sample, the results are displayed in table 4.3.

Model 3 VIF

Variable	UE	B	LMV	MTB	N	Brent	DODSR
N = 2	1,0341	1,0393	1,2137	1,0049	1,3022	1,0222	1,078
N = 3	1,0406	1,0434	1,2168	1,005	1,2771	1,0157	1,0661
N = 4	1,0539	1,0468	1,2228	1,0056	1,282	1,0143	1,0722

(Table 4.3) (UE = Unexpected Earnings, B = Beta, LMV= Log Market Value, MTB = Market To Book ratio, N = one divided by Number of analysts, Brent = Changes in Brent oil price during the period, $\Delta DODSR_n$ = Diversion from Optimal Drilling Success Rate with n lags). More results from sub samples of model 3 can be found in appendix (4.1.1).

From the Breusch-Pagan test I found heteroskedasticity on aggregate and in most subsamples of models 1, 2, and, 3 appendix (4.1.2). This has been corrected by using white standard errors.

For model 1, 2, and, 3 I found evidence of quantile differences for LMV in CAR1 (appendix 4.3), I have included quantiles to compensate for the differences in LMV. For model 4 I have not found anything interesting regarding quantile differences (4.3).

4.3 Results

The results of model 1 are reported in table 4.4. In table 4.5 I have controlled for different time periods. The results from model 2 are reported in tables 4.6 and the results from model 3 are reported in table 4.7, 4.8 and 4.9. In table 4.10 I have run the third model, replicating Bandyopadhyay (Bandyopadhyay 1994).

From model 1 I can conclude that my null hypothesis is not rejected on aggregated data and there are in general no significant differences between the unexpected earnings of successful efforts companies and full cost companies. However I do observe one exception to this in one of the subsets. I find a significantly lower unexpected earnings coefficient for full cost companies during the oil boom from 2003 to 2007, this is in line with previous findings (Bandyopadhyay 1994).

In the control variables I observe two significant differences between successful efforts and full cost companies. The first one is not really a difference; I observe that MTB coefficient for successful efforts companies is of similar size to the negative coefficient for full cost companies. Because of how the model is structured this simply implies that MTB is significant for successful efforts companies and not significant for full cost companies. The second difference I find is that DSR has a positive and significant coefficient for full cost companies. This implies that a higher drilling success rate for this year is indicative of a higher return for full cost companies.

Model 1 has a higher adjusted R^2 then previous research, which is mostly due to including changes in oil prices during the observation period. The results show that unlike my hypothesis, unexpected earnings not statistically different between successful efforts and full cost companies. This implies that reported earnings from successful efforts companies are not considered more accurate then reported full cost earnings in the period between 1991-2015.

Model 1

$$CAR = \beta_0 + \beta_1 UE + \beta_2 B + \beta_3 LMV\ 1^{st} quantile + \beta_4 LMV\ 2^{nd} quantile + \beta_5 LMV\ 3^{rd} quantile + \beta_6 LMV\ 4^{th} quantile + \beta_7 MTB + \beta_8 Brent + \beta_9 N + \beta_{10} DSR + \alpha_0 * D + \alpha_1 UE * D + \alpha_2 B * D + \alpha_3 LMV\ 1^{st} quantile * D + \alpha_4 LMV\ 2^{nd} quantile * D + \alpha_5 LMV\ 3^{rd} quantile * D + \alpha_6 LMV\ 4^{th} quantile * D + \alpha_7 MTB + \alpha_8 Brent * D + \alpha_9 N * D + \alpha_{10} DSR + \varepsilon_{it} \text{ (Equation 4.2)}$$

CAR = cumulative market-adjusted return (F-statistic = 7,577 $\overline{R}^2$= 0,1338)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	0,030085	0,021425	1,4042	0,16061
UE	0,17372	0,094831	1,8319	0,06731*
B	0,0031512	0,0030781	1,0237	0,30624
LMV_{1st}	-0,013662	0,0096321	-1,4184	0,15644
LMV_{2nd}	-0,013327	0,0064135	-2,078	0,038**
LMV_{3rd}	-0,0092333	0,0053399	-1,7291	0,08414*

LMV_{4th}	-0,0072756	0,0038564	-1,8866	0,05954*
MTB	0,002454	0,0013738	1,7863	0,0744*
DSR	-0,000095607	0,00011818	-0,809	0,41875
N	0,003683	0,012367	0,2978	0,76592
Brent	0,39068	0,057524	6,7915	2,1E-11***
D	-0,053657	0,054425	-0,9859	0,32446
D:UE	-0,033792	0,14866	-0,2273	0,82023
D:B	-0,0041407	0,0057806	-0,7163	0,47399
D:LMV25	0,013918	0,02311	0,6023	0,54716
D:LMV50	0,0071254	0,017066	0,4175	0,67639
D:LMV75	0,0050899	0,014626	0,348	0,72792
D:LMV100	0,002606	0,011984	0,2175	0,8279
D:MTB	-0,0023189	0,0013749	-1,6866	0,09204*
D:DSR	0,00042836	0,00022346	1,917	0,05557*
D:N	0,0044554	0,041011	0,1086	0,91351
D:Brent	0,1447	0,10238	1,4134	0,15789

(Table 4.4) (UE = Unexpected Earnings, B = Beta, LMV= Log Market Value of the n^{th} quartile, MTB = Market To Book ratio, DSR = Drilling Success Rate, N = one divided by Number of analysts, Brent = Changes in Brent oil price during the period)

From the subsets regressions I find that unexpected earnings for full cost companies have a significant negative coefficient during the oil boom, meaning that investors place significantly less emphasis on the reported earnings for full cost companies during this period. This is not surprising, considering the opposite have been observed during an oil recession in previous research (Bandyopadhyay 1994). In my control variables I find several coefficients changing significance across the subset, this underlines how difficult earnings response coefficient studies are and why different analysis sometimes find different results. However I do find two relatively stable findings. The first finding is that market to book is positive for successful efforts companies, while being insignificant for full cost companies. This implies the market to book ratio does not affect the stock price reaction for full cost companies, while a higher market to book ratio is indicative of a stronger reaction for successful efforts companies. The second finding is that drilling success rate is positive for full cost companies while being insignificant for successful efforts companies, this suggests that a higher drilling success rate is indicative of a higher return for full cost companies.

Model 1

$$CAR = \beta_0 + \beta_1 UE + \beta_2 B + \beta_3 LMV + \beta_4 MTB + \beta_5 Brent + \beta_6 N + \beta_7 DSR + \alpha_0 * D\alpha_1 UE * D + \alpha_2 B * D + \alpha_3 LMV * D + \alpha_4 MTB + \alpha_5 Brent * D + \alpha_6 N * D + \alpha_7 DSR + \varepsilon_{it}$$ (Equation 4.2)

Variable	All	Before boom	Oil boom	After boom	Before & after boom
Intercept	0,0043606	0,00313267	0,01171476	-0,014575	-0,0040632
UE	0,15877*	0,24949321	0,20522405	0,16544	0,18257
B	0,0034521	-0,00563305	-0,00408793	0,0067775*	0,0053519
LMV	-0,0024127	0,00244055	-0,00161155	-0,0010882	-0,0023484
MTB	0,0026508*	0,00390641	0,00221451	0,0036031	0,0034929*
N	0,0040703	0,0567248**	-0,01234996	0,00029143	0,016014
Brent	0,38891***	0,310435***	0,505668***	0,39511***	0,36951***
DSR	-0,000095849	-0,00031297	-0,00010951	-8,047E-06	-0,000055164
D	-0,033011	-0,079509**	-0,05092475	-0,0014838	-0,031658
D:UE	-0,0057317	-0,13778277	-1,195974***	0,042526	0,01712
D:B	-0,0033832	0,0056858	0,00932952	-0,005523	-0,0043861
D:MTB	-0,0025486*	-0,0044998	-0,00032766	-0,0035189	-0,003406*
D:N	0,016388	0,06207744	-0,08622907*	0,043677	0,039383
D:Brent	0,15147	0,07240076	0,09597237	0,077317	0,10368
D:DSR	0,00039613*	0,0008799**	0,00069795*	0,00007618	0,00036712

(Table 4.5) (UE = Unexpected Earnings, B = Beta, LMV= Log Market Value, MTB = Market To Book ratio, N = one divided by Number of analysts, Brent = Changes in Brent oil price during the period, DSR_n = Drilling Success Rate, D = Dummy for full cost companies)

In model 2 the findings are broadly the same, because I find no significant responses to change in drilling success rate I choose not to go into to much depth, considering I am analyzing the largely the same control variables in model 3. The only consistent difference is that full cost companies have a significantly higher Brent coefficient. This suggests that oil price movement affects full cost companies stronger then successful efforts companies. This will be discussed in more details in the subsets.

Model 2

$$CAR = \beta_0 + \beta_1 UE + \beta_2 B + \beta_3 LMV + \beta_4 MTB + \beta_5 Brent + \beta_6 N + \beta_7 \Delta DSR_n + \beta_8 \Delta WD_n + \alpha_0 * D + \alpha_1 UE * D + \alpha_2 B * D + \alpha_3 LMV * D + \alpha_4 MTB + \alpha_5 Brent * D + \alpha_6 N * D + \alpha_7 \Delta DSR_n + \alpha_8 \Delta WD_n + \varepsilon_{it} \text{(Equation 4.3)}$$

Variable	N=2	N=3	N=4
Intercept	-0,0132442	-0,0086124	-0,0030927
UE	0,1353628**	0,1469165	0,1474716
B	0,003961	0,0041947	0,0027314
LMV	-0,000521	-0,0014696	-0,0024456
MTB	0,002814**	0,0024468*	0,0026901*
N	0,0093969	0,0091014	0,0045195
Brent	0,3621304***	0,349526***	0,3526499***
ΔDSR_n	0,0042215	0,0150766	0,0072364
ΔWD_n	-0,0006623	-0,0019285	-0,0033804
D	0,0254423	0,022572	0,0148016
D:UE	0,0087291	-0,0098756	-0,0542851
D:B	-0,0028234	-0,0021843	-0,0019564
D:LMV	-0,0058715	-0,0052311	-0,003556
D:MTB	-0,002698*	-0,0023333*	-0,0025743*
D:N	-0,0021889	-0,0213636	-0,0159876
D:Brent	0,1881143**	0,2586398**	0,2531963**
D:ΔDSR_n	0,0048521	-0,0012029	0,0189373
D:ΔWD_n	-0,0001328	0,0012304	0,0024914

(Table 4.6) (UE = Unexpected Earnings, B = Beta, LMV= Log Market Value, MTB = Market To Book ratio, N = one divided by Number of analysts, Brent = Changes in Brent oil price during the period, ΔDSR_n = Change in Drilling Success Rate with n lags, ΔWD_n = Change in number of Wells Drilled with n lags, D = Dummy for full cost companies)

The findings from model 3 are similar to model 2 with some differences; this is expected because the dataset is the same. The results differs in unexpected earnings were I observe significant results in one subset but not on aggregate. In the new variable in model 3, diversion from drilling success ratio I observe significantly negative coefficients for full cost companies, which means that if all else equal, the lower historical drilling success a full cost company has, the lower is the expected stock return. This might sound reasonable, however as I will discuss later it is highly unexpected. Comparing the findings from Brent to the previous cumulative findings from the previous equation table, I observe a very similar coefficient and probability, but the finding is only significant on aggregated data. This creates questions to how robust the finding that full cost companies have a stronger reaction to oil price movement is.

For n=2, I observe changes in significance based on the difference in time periods. Interestingly, the oil boom period seems to be the one with the least connection between accounting numbers and stock movement. This period is also the only one were I observe a significant variable for Unexpected Earnings. This finding is in line with the results from Bandyopadhyay (Bandyopadhyay 1994).

Model 3

$$CAR = \beta_0 + \beta_1 UE + \beta_2 B + \beta_3 LMV + \beta_4 MTB + \beta_5 Brent + \beta_6 N + \beta_7 DODSR_2 + \alpha_0 * D + \alpha_1 UE * D + \alpha_2 B * D + \alpha_3 LMV * D + \alpha_4 MTB + \alpha_5 Brent * D + \alpha_6 N * D + \alpha_7 DODSR_2 + \varepsilon_{it} \text{(Equation 4.4)}$$

Variable	All periods	Before oil boom	Oil boom	After oil boom	Before & after boom
Intercept	-0,01393402	-0,0209435	-0,00016251	-0,0334778**	-0,02039613
UE	0,13347084	0,2645432*	0,18465341	0,1284244	0,15116166
B	0,00416211	-0,0045607	-0,00344974	0,0080087**	0,00591624*
LMV	-0,00050648	0,0010445	-0,00131781	0,0027488	0,00013452
MTB	0,00281414**	0,0028802	0,00206114	0,0042316*	0,00367474*
N	0,00775547	0,0472233	-0,00921168	0,0084044	0,01919508
Brent	0,3631743***	0,2944128***	0,50510254***	0,3620517***	0,3353492***
$DODSR_2$	0,00446181	0,0157372*	0,00209117	-0,0030477	0,00194686
D	0,03008842	-0,0497265	-0,02576851	0,0512414*	0,03663348
D:UE	0,00483865	-0,1460989	-1,14304289***	0,0583651	0,02568372
D:B	-0,003244	0,0096176	0,00760892	-0,0069865	-0,00419335
D:LMV	-0,00656515	0,0172441	0,0088711	-0,0115503	-0,00861124
D:MTB	-0,0026952**	-0,004157	0,00031258	-0,0041179**	-0,00356421*
D:N	0,0027352	0,1268067	-0,05597577	0,0308859	0,02940867

D:Brent	0,17638661*	0,0595256	0,14919392	0,104401	0,12785497
D:DODSR$_2$	-0,01857222*	-0,0446737**	0,01786036	-0,0143119	-0,0265767**

(Table 4.7) (UE = Unexpected Earnings, B = Beta, LMV= Log Market Value, MTB = Market To Book ratio, N = one divided by Number of analysts, Brent = Changes in Brent oil price during the period, ΔDODSR$_n$ = Diversion from Optimal Drilling Success Rate with n=4, D = Dummy for full cost companies)

The same tendencies are observed for n=3, the sample size is slightly less, but the major findings are still the same.

Model 3

$$CAR = \beta_0 + \beta_1 UE + \beta_2 B + \beta_3 LMV + \beta_4 MTB + \beta_5 Brent + \beta_6 N + \beta_7 DODSR_3 + \alpha_0 * D + \alpha_1 UE * D + \alpha_2 B * D + \alpha_3 LMV * D + \alpha_4 MTB + \alpha_5 Brent * D + \alpha_6 N * D + \alpha_7 DODSR_3 + \varepsilon_{it}$$ (Equation 4.4)

Variable	All periods	Before oil boom	Oil boom	After oil boom	Before and after oil boom
Intercept	-0,0110165	-0,02256851	0,001527	-0,022972	-0,01612777
UE	0,1433376	0,28813124*	0,178717	0,139500	0,16157005
B	0,0046522	-0,00981187	-0,002508	0,007234*	0,00625653*
LMV	-0,0012355	0,00220066	-0,001568	0,000766	-0,00075948
MTB	0,0023908*	0,00043745	0,001799	0,003871	0,00287565
N	0,0073366	0,04405493**	-0,009890	0,003374	0,01749445
Brent	0,3534166***	0,28570752**	0,509131***	0,337840***	0,32291167***
DODSR$_3$	0,0099574	0,04050553**	-0,001818	0,000017	0,00849123
D	0,0322284	-0,07774334	-0,024986	0,033864	0,02752255
D:UE	-0,0114439	-0,09790339	-1,122414***	0,043596	0,01885551
D:B	-0,0033193	0,0103254	0,005725	-0,004787	-0,00445641
D:LMV	-0,006625	0,02923453	0,008760	-0,007930	-0,00600729
D:MTB	-0,0022717	-0,00235583	0,000517	-0,003754	-0,00276485
D:N	-0,0115348	0,15301655	-0,056130	0,062288	0,04378319
D:Brent	0,2412213**	0,06716896	0,149022	0,184150	0,17815336
D:DODSR$_3$	-0,0368773**	-0,09847664***	0,019449	-0,049796	-0,05346944***

(Table 4.8) (UE = Unexpected Earnings, B = Beta, LMV= Log Market Value, MTB = Market To Book ratio, N = one divided by Number of analysts, Brent = Changes in Brent oil price during the period, $\Delta DODSR_n$ = Diversion from Optimal Drilling Success Rate with n=4, D = Dummy for full cost companies)

For the final set of regressions in model 3 n=4, the sample size is even smaller, but the findings are broadly the same. MTB is still significant for successful efforts companies and insignificant for full cost companies, Brent is on aggregate more significant for full cost companies, and diversion from optimal drilling success is still the significantly negative for full cost companies.

Model 3

$$CAR = \beta_0 + \beta_1 UE + \beta_2 B + \beta_3 LMV + \beta_4 MTB + \beta_5 Brent + \beta_6 N + \beta_7 DODSR_4 + \alpha_0 * D + \alpha_1 UE * D + \alpha_2 B * D + \alpha_3 LMV * D + \alpha_4 MTB + \alpha_5 Brent * D + \alpha_6 N * D + \alpha_7 DODSR_4 + \varepsilon_{it}$$ (Equation 4.4)

Variable	All periods	Before oil boom	Oil boom	After oil boom	Before and after oil boom
Intercept	-0,007728	-0,02093509	0,0167664	-0,0266683*	-0,0160263
UE	0,1401978	0,29563649*	0,1510578	0,1346751	0,1629511
B	0,0032767	-0,01256511	-0,0048497	0,006873*	0,0053187
LMV	-0,0017532	0,00200885	-0,0042159	0,0015683	-0,0006907
MTB	0,0025335*	0,00072484	0,0016497	0,0041872	0,0031173
N	0,0033678	0,05002513**	-0,0220445	0,0011684	0,0168953
Brent	0,3606366***	0,2710026**	0,5406203***	0,342198***	0,3257697***
$DODSR_4$	0,0096823	0,03525616	-0,0093038	-0,0026736	0,0066579
D	0,0248135	-0,10192445**	-0,030695	0,0336624	0,0215371
D:UE	-0,0502561	-0,6623478**	-1,1476399***	0,0315106	-0,0100834
D:B	-0,0029742	-0,01833844	0,0109058	-0,0059631	-0,0055956
D:LMV	-0,0049969	0,03917564**	0,0082152	-0,0077234	-0,004411
D:MTB	-0,0024121*	-0,00162145	0,0012261	-0,0040732	-0,0030031
D:N	-0,0046261	0,14993304*	-0,0506667	0,069088	0,0559038
D:Brent	0,2339079**	0,0086931	0,0938973	0,187846	0,1759403
D:$DODSR_4$	-0,0328763*	-0,10525412**	0,0257128	-0,0433179	-0,0507494**

(Table 4.9) (UE = Unexpected Earnings, B = Beta, LMV= Log Market Value, MTB = Market To Book ratio, N = one divided by Number of analysts, Brent = Changes in Brent oil price during the period, $\Delta DODSR_n$ = Diversion from Optimal Drilling Success Rate with n=4, D = Dummy for full cost companies)

In my replication of the simplest model used by Bandyopadhaya I find no signs of heteroskedasticity the Oil Boom subset. However, I have decided to include the white-standard errors to make the results more comparable. The results from the Breusch-Pagan test and detailed regressions can be found in attachments.

The results from the simplified regressions are in line with the findings from previous tests. The only subset where I observe a significant difference between successful efforts and full cost companies is the Oil Boom subset, as stated previously this is in line with the findings from Bandyopadhyay (Bandyopadhyay 1994). The adjusted R^2 is also on par with Bandyopadhyay's findings; adjusted R^2 varies between 1%-3% in my replication, and 1%-4% in his.

Model 4

$CAR = \beta_0 + \beta_1 UE + \alpha_0 * D + \alpha_1 UE * D + \varepsilon_{it}$ (Equation 4.5)

CAR	All	Pre Boom	Oil Boom	Post Boom
Intercept	0,00101163	-0,0029785	0,0041952	0,0021678
D	0,00047624	0,0016151	0,0040391	-0,0057938
UE	0,04947312	0,0709906	0,0769097	0,1134977
D:UE	0,04881675	-0,0270837	-0,8581745**	0,1909462

(Table 4.10) (UE = Unexpected Earnings, D = Dummy for full cost companies)

4.4 Discussion

In this chapter I examine the earnings response coefficient differences between successful efforts and full cost companies. I control for variables previously applied in similar research, in addition to other variables. I also replicate previous research models in my dataset.

The findings from all my models suggest that there have been no significant differences between the earnings response coefficient for full cost and successful efforts accounting in the period between 1991-2015. This is not true for all periods; between 2002-2007 I observe a higher earnings response coefficient for successful efforts companies. This period coincides with a continuous boom in oil prices. There were no relevant changes in accounting regulations that were implemented and removed in this period; it is therefore likely that the change in emphasis was due to market psychology and not accounting specific factors. This notion is supported by previous research from Bandyopadhyay (Bandyopadhyay 1994). The control variables in model 1 I find that drilling success rate is indicative of a higher return for full cost companies, while not affecting successful efforts companies. It is logical that drilling success rate does not affect successful efforts companies because for these companies a change in drilling success rate directly affects the cost, and thus already is affecting the regressions through higher income. Similarly it makes sense that drilling success rate is affecting full cost companies, because unless a well starts producing oil in the same year a higher drilling success rate will not affect full cost companies in any other way measured in the regression.

From the lagged drilling success rate regressions I find that change in drilling success rate is not significant in a majority of the regressions. This is expected because previous drilling success is known prior to the period beginning, so this variable should be insignificant according to the efficient market hypothesis.

Looking at the diversion form optimal drilling success rate I observe that it is insignificant for successful efforts companies, but significantly negative for full cost companies. This finding might seem logical in because it is expected that a company with oil containing wells in the balance sheet, would out preform one with empty wells. However finding it in this regression is surprising, past drilling success is already public and should be incorporated in the price prior to the announcement period I measure. Finding it to be negative, only for full cost companies and while controlling for new information in the annual report, indicates that previous drilling success is not adequately incorporated into the balance sheet. In other words analysts are expecting higher returns because of the inflated assets caused by using full cost accounting, and they are not adequately incorporating this information into the earnings forecast, resulting in the variable $DODSR_n$ to be negative for full cost companies.

Looking at all my findings from my earnings response analysis regressions, I conclude that analysts are reacting to current year drilling success in an expected manner. However, they are inadequately assessing the prevailing effect drilling success has on financial reports, this leads to a significant diversion in the expected stock price return for full cost companies.

5. Value Relevance

Value Relevance is defined as the ability of information disclosed in the financial statement to capture and summarize the firm value (Kargin 2013). I use the Ohlson model (Ohlson 1995) to analyze whether financial statements ability to capture firm value is affected by a companies accounting method.

5.1 Methodology

Previous research into this field has focused on accounting information in relation to market capital. Expanding upon previous research by Misund, Osmundsen & Sikveland (Misund, Osmundsen, and Sikveland 2015) I apply their theories whilst also focusing on some new variables, specifically to capture the difference between successful efforts and full cost companies. The new variables are based on the same logic as Lisa Bryants describes in her Timeliness of Alternative Accounting Methods section (Bryant 2003). However, instead of directly controlling for changes in income and oil reservoirs, I control for changes in variables that affect income and oil reservoirs, more specifically I control for drilling success rate, number of wells drilled, and oil price. By measuring changes in oil price, I create an extra variable that influences net income while not being directly related to net income. Changes in drilling success rate is particularly relevant for exploring the differences between successful efforts and full cost accounting, because it directly measures the key difference in the two accounting methods. This implies that if drilling success rate were 100% in every year, there would be no difference between successful efforts and full cost accounting. I am also including changes in number of wells drilled as a variable, because an increase in number wells drilled might also affect the importance of drilling success rate.

Changes in drilling success rate and number of wells drilled should supplement the oil reservoir variable, as they both measure oil findings. For interpretation the number of wells drilled will measure the markets reaction to increased drilling activity, whilst an increase in drilling success rate will measure the markets reaction to an increase in drilling efficiency.

These extra variables fits with Ohlson's theory of value relevance (Ohlson 1995), which tells us that Market Capitalization of a firm can be explained as a function of book values (BV), abnormal earnings (NI) and value-relevant events that have yet to impact the financial statements (v). Mathematically the Ohlson model looks as follows:

$$Market\ Capitalization_t = BV_t + \beta_1 NI_t^a + \beta_2 v_t \text{(Equation 5.1a)}$$

Derived from this we can make a statistical estimation function:

$$Market\ Capitalization_{it} = \beta_0 + \beta_1 BV_{it} + \beta_2 NI_{it} + \beta_3 v_{it} + \varepsilon_{it} \text{(Equation 5.1b)}$$

In statistical estimations, book value of equity is often used as a proxy for book values, net income is often used as a proxy for abnormal earnings, but there have been several different proxies for other value-relevant factors, which impacts the financial statements in relation to the oil sector. Bryant used the present value of oil reserve**s** (Bryant 2003) (Doran, Collins, and Dhaliwal 1988)(Harris and Ohlson 1987), whilst Misund, Osmundsen, and Sikveland (Misund, Osmundsen, and Sikveland 2015) argued that proven oil reserves has better value relevance, this is also supported by Berry et al. (2004). In my estimation I will be using proven oil reserves.

All these variables are scaled by last year's market capital to avoid statistical errors and make them comparable.

$$\Delta Market\ Capitalization_{it} = \beta_0 + \beta_1 \frac{BVE_{it}}{MC_{y-1}} + \beta_2 \frac{NI_{it}}{MC_{y-1}} + \beta_3 LN\left(\frac{OilRes}{MC_{y-1}}\right) + \varepsilon_{it} \quad \text{(Equation 5.1c)}$$

I also control for other variables that might affect changes in market capital. I measure net debt to last year's market capital, to control for the effect of financial leverage on return. I control for changes in oil price to supplement the abnormal income estimation and differentiate for whether higher oil prices creates a higher market capitalization above the direct effect on net income.

In relation to the differences between successful efforts and full cost accounting have considered many variables. I control for Net Debt to last year's market value as a control for financial leverage. I also tried to control for property, plant and equipment (PPE) to last year's market value because this post is directly affected by the choice of accounting method and thus should be different. However this variable is highly correlated with BVE and I could therefore only use one of them. To keep the model as similar to others as possible I have chosen to keep BVE.

To control for differences in accounting numbers and real values, I control for drilling success rate (DSR), this variable gives insight into how the drilling success through the year affects the stock price movements. Because drilling success affects successful efforts companies directly through costs, it is expected that this variable is more significant for full cost companies. I also control for changes in drilling success rate compared to previous years (ΔDSR). This variable controls for how changes in drilling success affects the stock price movements. Because this variable contains previous drilling success, which is known by the market and current drilling success this variable should take one of two forms. Either the market views drilling success as random, in case it should be similar to normal drilling success, or it is viewed as skill based, in case it should be viewed favorable for both successful efforts and full cost companies. To make sure change in drilling success rate is not affected by other drilling related activities, I also control for changes in net number of wells drilled (ΔWD), this will measure the impact of increased oil exploration in developed and new oil fields. I am unable to solely control for number of wells drilled because unlike drilling success rate it is not a ratio, and as a raw number it is hard interpret it. Lastly I include diversion from optimal drilling success rate (DODSR), to control for historical performance in drilling success rate, and to control for empty wells in full cost accounting specifically. The way this is controlled for is, if a firm drills no empty wells, it has no diversion from optimal drilling success rate and both full cost and successful efforts accounting would yield broadly the same results. However if the drilling success rate is not optimal (not 100%) the full cost companies will have empty wells in its balance sheet. To control for the how this affects the cash generating variables, I only look at diversion from optimal drilling success in previous years. Because the market knows this information, it should not affect the market return of full cost or successful efforts firms in the current year. All these variables are within the value relevance theoretical framework, by adding a new layer of insight into the balance values. By using them I not only estimate for the value relevance of drilling success in the current year, but also how previous years drilling success affects value relevance.

Mathematically this leaves me with three models for a company´s value, as derived from the Ohlson model (Ohlson 1995). The first includes raw numbers from the accounting statement and current years drilling success; in this way it is comparable to the earnings response coefficient model 1 analysis. The second includes growth in drilling success rate and growth in number of wells drilled and is s comparable to the earnings response coefficient model 2 analyses. Lastly, I include diversion from optimal drilling success rate, which is comparable to the third model in the earnings response coefficient analyses.

$$\Delta MC_t = \beta_0 + \beta_1 \frac{NI}{MC_{t-1}} + \beta_2 \frac{BVE}{MC_{t-1}} + \beta_3 \frac{ND}{MC_{t-1}} + \beta_4 LN\left(\frac{OilRes}{MC_{t-1}}\right) + \beta_5 \Delta Brent + \beta_6 DSR + \varepsilon_{it} (\text{Equation 5.2})$$

(NI = Net Income, BV_n = Book Value Equity of the n^{th} quartile, ND = Net Debt, LNOil = Natural logarithm of oil, DSR = Drilling Success Rate)

$$\Delta MC_t = \beta_0 + \beta_1 \frac{NI}{MC_{t-1}} + \beta_2 \frac{BVE}{MC_{t-1}} + \beta_3 \frac{ND}{MC_{t-1}} + \beta_4 LN\left(\frac{OilRes}{MC_{t-1}}\right) + \beta_5 \Delta Brent + \beta_6 \Delta DSR_n + \beta_7 \Delta WD_n + \varepsilon_{it} \text{ (Equation 5.3)}$$

(NI = Net Income, BV_n = Book Value Equity of the n^{th} quartile, ND = Net Debt, LNOil = Natural logarithm of oil, ΔDSR_n = Change in Drilling Success Rate with n lags, ΔWD_n = Change in number of Wells Drilled with n lags)

$$\Delta MC_t = \beta_0 + \beta_1 \frac{NI}{MC_{t-1}} + \beta_2 \frac{BVE}{MC_{t-1}} + \beta_3 \frac{ND}{MC_{t-1}} + \beta_4 LN\left(\frac{OilRes}{MC_{t-1}}\right) + \beta_5 \Delta Brent + \beta_6 DODSR + \varepsilon_{it} \text{ (Equation 5.4)}$$

(NI = Net Income, BV_n = Book Value Equity of the n^{th} quartile, ND = Net Debt, LNOil = Natural logarithm of oil, DODSR = Diversion from Optimal Drilling Success Rate)

5.2 Data

In this part of the thesis I have used firm data from IHS Markit and oil price data from Thomason Reuters DataStream. This is because there is no need for trading data when analyzing value relevance, only market capitalization, which is provided in the IHS Markit database. I will provide evidence of how the market prices oil companies, based on oil price and accounting data. In doing this and controlling for accounting method, I am able to further test whether analysts have a more favorable view of oil Full Cost oil companies. This is something that has only been hypostasized and tested in controlled environment, were researchers simulated identical full cost and successful efforts companies over 10 years and found the full cost companies to look more favorable (Johnson 1972).

To do this I will use the three models described in the methodology section above.

The simple version does not include any lagged variables.

$$\Delta MC_t = \beta_0 + \beta_1 \frac{NI}{MC_{t-1}} + \beta_2 \frac{BVE}{MC_{t-1}} + \beta_3 \frac{ND}{MC_{t-1}} + \beta_4 LN\left(\frac{OilRes}{MC_{t-1}}\right) + \beta_5 \Delta Brent + \beta_6 DSR + D*\alpha_0 + D*\alpha_1 \frac{NI}{MC_{t-1}} + D*\alpha_2 \frac{BVE}{MC_{t-1}} + D*\alpha_3 \frac{ND}{MC_{t-1}} + D*\alpha_4 LN\left(\frac{OilRes}{MC_{t-1}}\right) + D*\alpha_5 \Delta Brent + D*\alpha_6 DSR + \varepsilon \text{ (Equation 5.5)}$$

The advanced model includes several control variables. The full version as displayed under will not always be used, as there are high correlation issues between some variables. The correlation tests can be found in appendix (5.1.1 & 5.2.4).

$$\Delta MC_t = \beta_0 + \beta_1 \frac{NI}{MC_{t-1}} + \beta_2 \frac{BVE}{MC_{t-1}} + \beta_3 \frac{ND}{MC_{t-1}} + \beta_4 LN\left(\frac{OilRes}{MC_{t-1}}\right) + \beta_5 \Delta Brent + \beta_6 \Delta DSR_n + \beta_7 \Delta WD_n + D * \alpha_0 + D * \alpha_1 \frac{NI}{MC_{t-1}} + D * \alpha_2 \frac{BVE}{MC_{t-1}} + D * \alpha_3 \frac{ND}{MC_{t-1}} + D * \alpha_4 LN\left(\frac{OilRes}{MC_{t-1}}\right) + D * \alpha_5 \Delta Brent + D * \alpha_6 \Delta DSR_n + D * \alpha_7 \Delta WD_n + \varepsilon \text{ (Equation 5.6)}$$

$$\Delta MC_t = \beta_0 + \beta_1 \frac{NI}{MC_{t-1}} + \beta_2 \frac{BVE}{MC_{t-1}} + \beta_3 \frac{ND}{MC_{t-1}} + \beta_4 LN\left(\frac{OilRes}{MC_{t-1}}\right) + \beta_5 \Delta Brent + \beta_6 DODSR_n + D * \alpha_0 + D * \alpha_1 \frac{NI}{MC_{t-1}} + D * \alpha_2 \frac{BVE}{MC_{t-1}} + D * \alpha_3 \frac{ND}{MC_{t-1}} + D * \alpha_4 LN\left(\frac{OilRes}{MC_{t-1}}\right) + D * \alpha_5 \Delta Brent + D * \alpha_6 DODSR_n + \varepsilon \text{ (Equation 5.7)}$$

ΔMC	=	Change in Market Capitalization from year-1 to year 0.
NI	=	Net Income, adjusted for last years Market Cap in the formula
BVE	=	Book Value Equity, adjusted for last years Market Cap in the formula
ND	=	Net Debt, adjusted for last years Market Cap in the formula
LNOilRes	=	Natural Logarithm of Net Oil Reserves adjusted for last years Market Cap
ΔBrent	=	Change in Brent oil price compared to last years Brent oil price
DSR	=	Current years Drilling Success Rate
ΔDSR	=	Change in Drilling Success Rate as calculated in equation (XX)
ΔWD	=	Change in net number of wells drilled as calculated in equation (XX)
DODSR	=	Diversion from Optimal Drilling Success Rate
ε	=	error term assumed to be distributed $N(0,\sigma^2)$

If there is no difference in accounting method, we expect there to be no difference in the interaction terms α_{0-7}.This means that our null hypothesis is that α_{0-7} equal to 0, and our alternative hypothesis is that α_{0-7} is not equal to 0.

$H_0: \alpha_{0-8} = 0$

$H_a: \alpha_{0-8} \neq 0$

ΔMC is calculated as current market cap over last years market cap. This variable has been used in previous research.

$$\Delta MC = \frac{MC_t}{MC_{t-1}} \text{ (Equation 5.8)}$$

NI is calculated as this years net income over last years market cap. This variable has also been used in previous research.

$$NI = \frac{NI_t}{MC_{t-1}} \text{ (Equation 5.9)}$$

BVE is calculated as the book value of total shareholder equity over last years market cap. This variable has also been used in previous research.

$$BVE = \frac{Book\ Value\ Equity_t}{MC_{t-1}} \text{ (Equation 5.10)}$$

ND is calculated as current years net debt over last years market cap. This variable has not been used in previous research on successful efforts and full cost accounting to my knowledge, but it has been used in previous research on value relevance (Beisland, 2009).

$$ND = \frac{Net\ Debt_t}{MC_{t-1}} \text{ (Equation 5.11)}$$

LNOil is calculated as the natural logarithm of net oil reserves over last year's market capital. This variable has been used in previous research.

$$LNOil = LN\left(\frac{Net\ Oil\ Reserves_t}{MC_{t-1}}\right) \text{ (Equation 5.12)}$$

ΔMC is calculated as this year's oil price over last year's oil price. This variable has not been included in previous research on successful efforts and full cost companies, to my knowledge. However the oil price is likely to affect the market return of the companies and thus should be accounted for in my opinion.

$$\Delta Brent = \frac{Brent\ Price_t}{Brent\ Price_{t-1}} - 1 \text{ (Equation 5.13)}$$

ΔDSR is calculated as this years drilling success rate over last years drilling success rate. This measurement is particularly relevant for exploring the differences between successful efforts and full cost accounting, because it directly measures the key difference in the two accounting methods. Meaning if drilling success rate were 100% in every year, there would be no difference between successful efforts and full cost accounting.

$$\Delta DSR = \frac{Drilling\ Success\ Rate_t}{Drilling\ Succes\ Rate_{t-1}} - 1 \text{(Equation 5.14)}$$

I also apply this years drilling success rate over the average drilling success for the last n years. This provides insight into how change in drilling success affects value relevance, as explained earlier.

$$\Delta DSR_{\mathrm{n}} = \frac{Drilling\ Success\ Rate_t}{\left(\frac{\sum_{t-n}^{t-1} Drilling\ Success\ Rate}{n}\right)} - 1 \text{(Equation 5.15)}$$

I include the change in number of wells drilled, considering an increase in wells drilled might also affect the importance of drilling success rate. In order to make the comparison fair, this is also calculated in a similar fashion to ΔDSR_n.

$$\Delta WD = \frac{Net\ number\ of\ wells\ drilled_t}{\left(\frac{\sum_{t-n}^{t-1} Net\ number\ of\ wells\ drilled}{n}\right)} \text{ (Equation 5.16)}$$

$DODSR_n$ is calculated in a similar fashion to ΔDSR_n but differs in measurement. Diversion from Optimal Drilling Success Rate measures historical difference in drilling success rate. This variable controls how many dry wells that are included in full cost companies balance sheets.

$$DODSR_{\mathrm{n}} = \frac{100\%}{\left(\frac{\sum_{t-n}^{t-1} Drilling\ Success\ Rate}{n}\right)} - 1 \text{(Equation 5.17)}$$

5.2.1 Robustness tests

Before running the final model I controlled for several departures from the assumptions of linear regression. In the variance inflation test on the cumulative dataset, I found no significant signs of multicollinearity. In the subsets this might change slightly, however only for BV and ND. Looking at the results and running them individually I see that BV has a positive coefficient and ND has a negative, both individually and in the full model. This means the model does not have major collinearity issues, however there is a chance that the over all explanatory power from BV and ND might be overstated. The VIF analysis from the subsets is presented in the appendix (5.1.1).

VIF	NI	BV	ND	LNOil	ΔBrent	ΔDSR_n	ΔWD_n
VR_2	1,1576	3,5559	3,739	1,2841	1,0383	1,0055	1,0229
VR_3	1,1869	3,5078	3,7153	1,3094	1,0507	1,0169	1,0467
VR_4	1,2059	3,5334	3,818	1,3298	1,0542	1,0177	1,0568

(NI = Net Income, BV_n = Book Value Equity, ND = Net Debt, LNOil = Natural logarithm of oil, ΔDSR_n = Change in Drilling Success Rate with n lags, ΔWD_n = Change in number of Wells Drilled with n lags)

(Table 5.2)

Model 3

VIF	NI	BV	ND	LNOil	ΔBrent	$\Delta DODSR_n$
VR_2	1,1621	3,4733	3,6962	1,2792	1,0311	1,0047
VR_3	1,1797	3,4209	3,675	1,2964	1,039	1,0053
VR_4	1,1864	3,519	3,8031	1,3138	1,0448	1,0079

(NI = Net Income, BV_n = Book Value Equity, ND = Net Debt, LNOil = Natural logarithm of oil, DODSR = Diversion from Optimal Drilling Success Rate calculated with n lags)

(Table 5.2)

From my Breusch-Pagan tests I find signs of heteroskedasticity in my model and in my subsets. This has been corrected by using white standard errors (HC1), and the results are presented in appendix (5.1.2). I also find evidence of quantile differences for book value of equity (appendix 5.3); to correct this I have included quantiles to compensate for the BV variable. I have not included quantiles in the subsets, because I do not have sufficient data in every subset to feel confident whether there are quantile differences or not.

5.3 Results

In model one I observe similar findings to the earnings response coefficient analysis. None of the variables show unexpected results, every coefficient is positive, but ND which is expected to be negative. The results show no significant differences between full cost and successful efforts companies; therefore I cannot reject the null hypothesis in this model.

The results from equation 5.5 are summarized below.

Value relevance model 1

$$\Delta MC_t=\beta_0+\beta_1\frac{NI}{MC_{t-1}}+\beta_2\frac{BVE}{MC_{t-1}}+\beta_3\frac{ND}{MC_{t-1}}+\beta_4 LN\left(\frac{OilRes}{MC_{t-1}}\right)+\beta_5\Delta Brent+\beta_6 DSR+$$
$$D*\alpha_0+D*\alpha_1\frac{NI}{MC_{t-1}}+D*\alpha_2\frac{BVE}{MC_{t-1}}+D*\alpha_3\frac{ND}{MC_{t-1}}+D*\alpha_4 LN\left(\frac{OilRes}{MC_{t-1}}\right)+D*\alpha_5\Delta Brent+D*\alpha_6 DSR+\varepsilon \quad \text{(Equation 5.5)}$$

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	0,02556516	0,15511297	0,1648	0,8690982
NI	0,32004102	0,14137777	2,2637	0,023653**
BV_{1st}	0,49486074	0,19056899	2,5968	0,0094512***
BV_{2nd}	0,398031	0,1285639	3,096	0,0019775***
BV_{3rd}	0,34468052	0,09816369	3,5113	0,0004517***
BV_{4th}	0,36373566	0,07470091	4,8692	1,17E-06***
ND	-0,35707892	0,09633134	-3,7068	0,0002132***
LNOil	0,2949815	0,05216897	5,6543	1,69E-08***
ΔBrent	0,26339942	0,0356626	7,3859	1,89E-13***
DSR	0,00084391	0,00104753	0,8056	0,4205193
D	0,10421999	0,24309131	0,4287	0,6681483
D:NI	0,14422108	0,16890327	0,8539	0,3932379
D:BV_{1st}	-0,22195497	0,30939042	-0,7174	0,4731797
D:BV_{2nd}	-0,13431991	0,20009944	-0,6713	0,5020965
D:BV_{3rd}	-0,05509491	0,14843289	-0,3712	0,7105285
D:BV_{4th}	-0,01818881	0,10445628	-0,1741	0,8617748
D:ND	0,05420676	0,1222442	0,4434	0,6574826
D:LNOil	0,07743734	0,07553169	1,0252	0,3053271
D:ΔBrent	0,0236913	0,05680183	0,4171	0,676641
D:DSR	0,001476	0,00165346	0,8927	0,3720966

(NI = Net Income, BV_n = Book Value Equity of the n^{th} quartile, ND = Net Debt, LNOil = Natural logarithm of oil, DSR = Drilling Success Rate, D = Dummy for full cost companies)

From model two the results are different, and I observe a significant contrast between full cost and successful efforts companies. I therefore conclude that the null hypothesis is rejected. The differences are mostly described by changes in drilling success rate. For full cost companies the coefficient for changes in drilling success rate is negative and almost the same size as it is positive for successful efforts companies, this means that changes in drilling success rate is insignificant for full cost companies. I am therefore able to conclude that an increase in drilling success rate increases the expected return for successful efforts companies, while being insignificant to full cost companies.

While the only significant difference in all datasets is that changes in drilling success rate are significant for successful efforts companies cost companies, I also observe a positive coefficient for changes in net number of wells drilled for full cost companies. This difference is positive in one of the subsets, this implies that increasing the number of wells drilled might be more beneficial to full cost companies. More detailed regressions can be found in attachments.

Value relevance model 2

$$\Delta MC_t=\beta_0+\beta_1\frac{NI}{MC_{t-1}}+\beta_2\frac{BVE}{MC_{t-1}}+\beta_3\frac{ND}{MC_{t-1}}+\beta_4 LN\left(\frac{OilRes}{MC_{t-1}}\right)+\beta_5\Delta Brent+\beta_6\Delta DSR_n+\beta_7\Delta WD_n+ D^*\alpha_0+D^*\alpha_1\frac{NI}{MC_{t-1}}+D^*\alpha_2\frac{BVE}{MC_{t-1}}+D^*\alpha_3\frac{ND}{MC_{t-1}}+D^*\alpha_4 LN\left(\frac{OilRes}{MC_{t-1}}\right)+D^*\alpha_5\Delta Brent+D^*\alpha_6\Delta DSR_n+D^*\alpha_7\Delta WD_n+\varepsilon$$

Variable	n = 2	n = 3	n = 4
Intercept	0,1356386	0,1670368	0,2180354*
NI	0,3471431**	0,3305284**	0,5407281***
BV_{1st}	0,4310524**	0,4284832**	0,2979961*
BV_{2nd}	0,3332948***	0,3228097**	0,2488193**
BV_{3rd}	0,2852965***	0,27844***	0,1898204**
BV_{4th}	0,3184843***	0,3184813***	0,2670314***
ND	-0,3101868***	-0,3351781***	-0,2458658***
LNOil	0,3246473***	0,3580686***	0,3431178***
ΔBrent	0,2574681***	0,2614523***	0,235809***
ΔDSR_n	0,1854187***	0,3276498***	0,4448345***
ΔWD_n	0,0727098***	0,1023242***	0,0937398***
D	-0,024411	-0,0435485	-0,067027
D:NI	0,0995198	0,1237611	-0,0710084

D:BV_{1st}	-0,0099969	-0,131943	-0,016094
D:BV_{2nd}	0,0261018	-0,0333141	0,0521515
D:BV_{3rd}	0,050782	-0,0011607	0,0775597
D:BV_{4th}	0,0504578	0,0273337	0,0785882
D:ND	0,0329847	0,0714754	-0,0059562
D:LNOil	-0,0235507	-0,0715316	-0,0308525
D:ΔBrent	0,050523	0,0576615	0,0589984
D:ΔDSR_n	-0,199021**	-0,3306505**	-0,4897951**
D:ΔWD_n	0,0191159	0,0668053*	0,0607844

(NI = Net Income, BV_n = Book Value Equity of the n^{th} quartile, ND = Net Debt, LNOil = Natural logarithm of oil, ΔDSR_n = Change in Drilling Success Rate with n lags, ΔWD_n = Change in number of Wells Drilled with n lags, D = Dummy for full cost companies)

Taking a more detailed look at the results I observe no unexpected findings any control variable, this is in line with the results from model 1. The only significant difference in all datasets is changes in drilling success rate, which is still insignificant for full cost companies. I also observe that for n=2, oil boom is the only subset with a significant drilling success based variable. For n=3 and n=4, the subsets that have significant coefficients for drilling success based variables changes, for full cost companies these changes seems rather random, but for successful efforts companies the subsets were change in drilling success rate is significant are reversed. Meaning that the only time when change in drilling success rate is significant during the oil boom subset, is when n=2, in other words when looking at changes in drilling success rate from the previous year only.

Value relevance differentiated by time periods, value relevance model 2, n=2

$$\Delta MC_t=\beta_0+\beta_1\frac{NI}{MC_{t-1}}+\beta_2\frac{BVE}{MC_{t-1}}+\beta_3\frac{ND}{MC_{t-1}}+\beta_4 LN\left(\frac{OilRes}{MC_{t-1}}\right)+\beta_5\Delta Brent+\beta_6\Delta DSR_2+\beta_7\Delta WD_2+ D^*\alpha_0+D^*\alpha_1\frac{NI}{MC_{t-1}}+D^*\alpha_2\frac{BVE}{MC_{t-1}}+D^*\alpha_3\frac{ND}{MC_{t-1}}+D^*\alpha_4 LN\left(\frac{OilRes}{MC_{t-1}}\right)+D^*\alpha_5\Delta Brent+D^*\alpha_6\Delta DSR_2+D^*\alpha_7\Delta WD_2+\varepsilon$$

Variable	All periods	After oil boom	Oil boom	Before oil boom	Before & after boom
Intercept	0,139724*	0,084009	0,466717***	0,016471	0,071366
D	-0,046375	-0,163648	-0,143632	-0,10575	-0,048424
NI	0,352067**	0,127593	-0,556532	0,786219	0,407226***
BV	0,305988***	0,306524***	0,327627***	0,357876***	0,312309***

ND	-0,299817***	-0,45993***	-0,331631*	-0,222019***	-0,300319***
LNOil	0,306494***	0,24289***	0,401628***	0,28844**	0,280048***
ΔBrent	0,26016***	0,507678***	0,022025	-0,035254	0,231424***
ΔDSR_2	0,183036**	0,105545	0,367906**	0,049308	0,091293
ΔWD_2	0,072187***	0,059746*	0,119617***	0,042229	0,057017***
D:NI	0,094551	0,221624	1,787114**	-0,087873	-0,044653
D:BV	0,061139	-0,048337	-0,142453	0,199449	0,092638
D:ND	0,027108	0,382091*	0,387926	-0,262517*	-0,017455
D:LNOil	-0,014567	-0,102006	-0,126059	-0,011883	0,016474
D:ΔBrent	0,04544	0,128797	0,007817	0,02568	0,045856
D:ΔDSR_2	-0,196501**	-0,111134	-0,388069***	-0,019926	-0,068103
D:ΔWD_2	0,020184	-0,016324	0,113058*	0,020184	0,015747

(NI = Net Income, BV = Book Value Equity, ND = Net Debt, LNOil = Natural logarithm of oil, ΔDSR_2 = Change in Drilling Success Rate with 2 lags, ΔWD_2 = Change in number of Wells Drilled with 2 lags, D = Dummy for full cost companies)

Value relevance differentiated by time periods, value relevance model 2, n=3

$$\Delta MC_t=\beta_0+\beta_1\frac{NI}{MC_{t-1}}+\beta_2\frac{BVE}{MC_{t-1}}+\beta_3\frac{ND}{MC_{t-1}}+\beta_4 LN\left(\frac{OilRes}{MC_{t-1}}\right)+\beta_5\Delta Brent+\beta_6\Delta DSR_3+\beta_7\Delta WD_3+$$
$$D^*\alpha_0+D^*\alpha_1\frac{NI}{MC_{t-1}}+D^*\alpha_2\frac{BVE}{MC_{t-1}}+D^*\alpha_3\frac{ND}{MC_{t-1}}+D^*\alpha_4 LN\left(\frac{OilRes}{MC_{t-1}}\right)+D^*\alpha_5\Delta Brent+D^*\alpha_6\Delta DSR_3+D^*\alpha_7\Delta WD_3+\varepsilon$$

Variable	All periods	After oil boom	Oil boom	Before oil boom	Before & after boom
Intercept	0,162826**	0,062674	0,442587***	0,058548	0,077508
D	-0,099696	-0,182106	-0,065103	-0,244586	-0,1151
NI	0,333385**	0,132495	-0,602925	0,88497**	0,438487***
BV	0,307111***	0,292303***	0,395252***	0,35532***	0,302112***
ND	-0,325286***	-0,433575**	-0,494219***	-0,210559**	-0,280918***
LNOil	0,338033***	0,221087**	0,377761***	0,365367***	0,295025***
ΔBrent	0,264404***	0,506228***	-0,111574	-0,035239	0,240668***
ΔDSR_3	0,32567***	0,241886*	0,254351	0,365788***	0,354135***

ΔWD_3	0,101697***	0,063971	0,167399***	0,034317	0,059443**
D:NI	0,116202	0,217978	2,06818**	-0,029167	-0,064623
D:BV	0,046026	-0,03551	-0,243891	0,241049	0,089161
D:ND	0,064266	0,367675*	0,630865**	-0,316233**	-0,020585
D:LNOil	-0,054242	-0,115794	0,014384	-0,118676	-0,052059
D:ΔBrent	0,054418	0,130374	0,149171	0,059611	0,071331
D:ΔDSR_3	-0,32896**	-0,522669	-0,536485*	-0,296441	-0,306486*
D:ΔWD_3	0,068777*	0,040699	0,078262	0,141121**	0,093242**

(NI = Net Income, BV = Book Value Equity, ND = Net Debt, LNOil = Natural logarithm of oil, ΔDSR_3 = Change in Drilling Success Rate with 3 lags, ΔWD_3 = Change in number of Wells Drilled with 3 lags, D = Dummy for full cost companies)

Value relevance differentiated by time periods, value relevance model 2, n=4

$$\Delta MC_t = \beta_0 + \beta_1 \frac{NI}{MC_{t-1}} + \beta_2 \frac{BVE}{MC_{t-1}} + \beta_3 \frac{ND}{MC_{t-1}} + \beta_4 LN\left(\frac{OilRes}{MC_{t-1}}\right) + \beta_5 \Delta Brent + \beta_6 \Delta DSR_4 + \beta_7 \Delta WD_4 + D^*\alpha_0 + D^*\alpha_1 \frac{NI}{MC_{t-1}} + D^*\alpha_2 \frac{BVE}{MC_{t-1}} + D^*\alpha_3 \frac{ND}{MC_{t-1}} + D^*\alpha_4 LN\left(\frac{OilRes}{MC_{t-1}}\right) + D^*\alpha_5 \Delta Brent + D^*\alpha_6 \Delta DSR_4 + D^*\alpha_7 \Delta WD_4 + \varepsilon$$

Variable	All periods	After oil boom	Oil boom	Before oil boom	Before & after boom
Intercept	0,1785888**	0,0076544	0,347639*	0,079588	0,09475
D	-0,0900893	-0,1697616	0,024076	-0,248819	-0,096504
NI	0,5348434***	0,2574108**	0,408721	0,881736**	0,54811***
BV	0,2641461***	0,2139625***	0,330088**	0,348789***	0,262993***
ND	-0,239920***	-0,2404193*	-0,393476**	-0,203592**	-0,196547***
LNOil	0,3266306***	0,1486395	0,302782***	0,354639**	0,287391***
ΔBrent	0,2393372***	0,5050287***	-0,169767	-0,03434	0,230492***
ΔDSR_4	0,439615***	0,2313904*	0,247561	0,737753**	0,53604
ΔWD_4	0,0924312***	0,0708272**	0,156613***	0,017177	0,05835
D:NI	-0,0696968	0,0740213	1,170819	0,141619	-0,157829
D:BV	0,0888233	0,0386803	-0,196779	0,30637*	0,128536
D:ND	-0,0094136	0,1930621	0,595249*	-0,375795**	-0,099304

D:LNOil	-0,0177968	-0,0718554	0,100276	-0,060887	-0,019654
D:ΔBrent	0,0554488	0,1250785	0,114561	0,026244	0,070929
D:ΔDSR_4	-0,4812902**	-0,3261279	-0,217882	-0,853302***	-0,618108***
D:ΔWD_4	0,0614621	0,0850865	0,035647	0,114235**	0,086077**

(NI = Net Income, BV_n = Book Value, ND = Net Debt, LNOil = Natural logarithm of oil, ΔDSR_4 = Change in Drilling Success Rate with 4 lags, ΔWD_4 = Change in number of Wells Drilled with 4 lags, D = Dummy for full cost companies

From model the on aggregated data I find that the only significant difference between successful efforts and full cost companies is the diversion from optimal drilling success. Successful efforts companies have significant positive reaction to diversion from optimal drilling success, meaning that if a successful efforts company have historically low drilling success, it is expected to out preform a similar company with high drilling success on the stock market if all else is equal. Full cost companies have a contrary reaction with a significantly negative coefficient, implying that a full cost company with a high historical drilling success rate will outperform a full cost company with a low historical drilling success rate. As mentioned before, neither of this makes any logical sense in an efficient market, because this is already known historical information. To get some perspective, in the efficient market hypothesis, including this information in the stock price is a requirement for a market to be considered semi-efficient (Fama 1969).

Value relevance model 3

$$\Delta MC_t=\beta_0+\beta_1\frac{NI}{MC_{t-1}}+\beta_2\frac{BVE}{MC_{t-1}}+\beta_3\frac{ND}{MC_{t-1}}+\beta_4 LN\left(\frac{OilRes}{MC_{t-1}}\right)+\beta_5\Delta Brent+\beta_6\Delta DODSR_n+$$
$$D^*\alpha_0+D^*\alpha_1\frac{NI}{MC_{t-1}}+D^*\alpha_2\frac{BVE}{MC_{t-1}}+D^*\alpha_3\frac{ND}{MC_{t-1}}+D^*\alpha_4 LN\left(\frac{OilRes}{MC_{t-1}}\right)+D^*\alpha_5\Delta Brent+D^*\alpha_6\Delta DODSR_n+\varepsilon$$

Variable	n = 2	n = 3	n = 4
Intercept	0,178072	0,2137486	0,251199**
NI	0,394339**	0,3916324	0,599783***
BV_{1st}	0,393002**	0,3889154**	0,256265
BV_{2nd}	0,311705**	0,3017945**	0,221677*
BV_{3rd}	0,271859***	0,2635626**	0,185111**
BV_{4th}	0,31963***	0,309069***	0,257351***
ND	-0,31222***	-0,3266931***	-0,239828***
LNOil	0,333521***	0,3740964***	0,369632***

ΔBrent	0,238514***	0,2320164***	0,206801***
$DODSR_n$	0,055138*	0,1166572**	0,236506***
D	0,139415	0,2056407	0,071008
D:NI	0,065177	0,1063748	-0,100196
D:BV_{1st}	-0,135976	-0,2810625	0,058785
D:BV_{2nd}	-0,060869	-0,1327572	0,089943
D:BV_{3rd}	-0,011072	-0,071086	0,099356
D:BV_{4th}	0,018075	-0,0056955	0,092183
D:ND	0,032301	0,0637207	-0,035435
D:LNOil	0,030878	0,0136384	0,024119
D:ΔBrent	0,033092	0,0393459	0,076751
D:$DODSR_n$	-0,060195*	-0,2180577**	-0,447441***

(NI = Net Income, BV = Book Value Equity of the n^{th} quartile, ND = Net Debt, LNOil = Natural logarithm of oil, $\Delta DODSR_n$ = Diversion from Optimal Drilling Success Rate with n lags, D = Dummy for full cost companies)

Dividing the model into subsets, I observe that different subsets might have differences in significance, but the aggregated results hold true. The only significant difference between full cost and successful efforts companies is diversion from optimal drilling success. When n = 2 I observe that this difference is almost canceled out, making it seem like the diversion from optimal drilling success might be insignificant for full cost companies. This is not the case for n = 3 and n = 4.

Value relevance differentiated by time periods, value relevance model 3, n=2

$$\Delta MC_t=\beta_0+\beta_1\frac{NI}{MC_{t-1}}+\beta_2\frac{BVE}{MC_{t-1}}+\beta_3\frac{ND}{MC_{t-1}}+\beta_4 LN\left(\frac{OilRes}{MC_{t-1}}\right)+\beta_5\Delta Brent+\beta_6\Delta DODSR_2+ D^*\alpha_0+D^*\alpha_1\frac{NI}{MC_{t-1}}+D^*\alpha_2\frac{BVE}{MC_{t-1}}+D^*\alpha_3\frac{ND}{MC_{t-1}}+D^*\alpha_4 LN\left(\frac{OilRes}{MC_{t-1}}\right)+D^*\alpha_5\Delta Brent+D^*\alpha_6\Delta DODSR_2+\varepsilon$$

Variable	All periods	After oil boom	Oil boom	Before oil boom	Before & after boom
Intercept	0,161333**	0,094192	0,486422***	0,0341039	0,0968118
NI	0,394454***	0,143382	-0,457679	0,8037948**	0,4394849***
BV	0,312325***	0,309913***	0,341426**	0,3640062***	0,3158988***

ND	-0,304245***	-0,468485***	-0,351041*	-0,2235314***	-0,3006558***
LNOil	0,316692***	0,247283***	0,369149***	0,2936641***	0,2969574***
ΔBrent	0,24153***	0,496074***	-0,072232	-0,0379985	0,2162633***
$\Delta DODSR_2$	0,054397	0,043909	0,087271	0,0034705	0,0306538
D	0,084799	-0,057283	0,046546	-0,0220439	0,0911485
D:NI	0,060753	0,203813	1,608115*	-0,183708	-0,0704419
D:BV	0,034509	-0,120043	-0,125964	0,2169509*	0,0524213
D:ND	0,027716	0,44533	0,305359	-0,2952776**	0,0968118
D:LNOil	0,050389	-0,059428	-0,015816	0,040425	0,0911485
D:ΔBrent	0,029525	0,159058*	-0,022488	-0,0049643	0,4394849
D:$\Delta DODSR_2$	-0,059379*	0,127737	-0,093086	-0,0195408	0,3158988

(NI = Net Income, BV = Book Value Equity, ND = Net Debt, LNOil = Natural logarithm of oil, $\Delta DODSR_n$ = Diversion from Optimal Drilling Success Rate with 2 lags, D = Dummy for full cost companies)

For n=3 I observe a much clearer difference. For successful efforts companies this implies that a firm with longer history of low drilling success, is expected to out preform a company with a short history of low drilling success, if all else is equal. For full cost companies, longer history with low drilling success implies a more empty wells in the balance sheet, meaning that a company with a high percentage of empty wells is likely to perform poorer on the stock market then one with a low percentage of empty wells.

Value relevance differentiated by time periods, value relevance model 3, n=3

$$\Delta MC_t=\beta_0+\beta_1\frac{NI}{MC_{t-1}}+\beta_2\frac{BVE}{MC_{t-1}}+\beta_3\frac{ND}{MC_{t-1}}+\beta_4 LN\left(\frac{OilRes}{MC_{t-1}}\right)+\beta_5\Delta Brent+\beta_6\Delta DODSR_3+ D^*\alpha_0+D^*\alpha_1\frac{NI}{MC_{t-1}}+D^*\alpha_2\frac{BVE}{MC_{t-1}}+D^*\alpha_3\frac{ND}{MC_{t-1}}+D^*\alpha_4 LN\left(\frac{OilRes}{MC_{t-1}}\right)+D^*\alpha_5\Delta Brent+D^*\alpha_6\Delta DODSR_3+\varepsilon$$

Variable	All periods	After oil boom	Oil boom	Before oil boom	Before & after boom
Intercept	0,19802**	0,076458	0,454137***	0,0718747	0,0985325
D	0,108908	-0,089888	0,166599	-0,0746561	0,1025276
NI	0,391915***	0,160564	-0,562854***	0,9007654**	0,4671092***
BV	0,301201***	0,287507***	0,409762***	0,3570423***	0,3023895***
ND	-0,318393***	-0,425541**	-0,520285***	-0,2152733**	-0,2821373***

LNOil	0,355937***	0,23127**	0,347814***	0,3771637***	0,3155162***
ΔBrent	0,234976***	0,492102***	-0,098722	-0,0506036	0,2122522***
$\Delta DODSR_3$	0,116467**	0,077289	0,078441	0,0844341	0,1070945**
D:NI	0,095815	0,203831	1,85894**	-0,2239761	-0,0628151
D:BV	0,020759	-0,106246	-0,215797	0,2852701*	0,0353337
D:ND	0,056639	0,426805**	0,53771*	-0,3688552**	0,0053921
D:LNOil	0,043005	-0,089703	0,091259	-0,058628	0,049693
D:ΔBrent	0,03847	0,15593*	0,014972	0,0012726	0,0569909
D:$\Delta DODSR_3$	-0,220376**	0,126537	-0,39068*	-0,2307681*	-0,1191386

(NI = Net Income, BV = Book Value Equity, ND = Net Debt, LNOil = Natural logarithm of oil, $\Delta DODSR_n$ = Diversion from Optimal Drilling Success Rate with 3 lags, D = Dummy for full cost companies)

In the final model were n=4 I observe the most significant difference in diversion from optimal drilling success for both successful efforts companies and full cost companies. This further strengthens the previous findings and emphasizes that a longer period with low drilling success is indicative of a higher result for successful efforts companies and lower results for full cost companies.

Value relevance differentiated by time periods, value relevance model 3, n=4

$$\Delta MC_t=\beta_0+\beta_1\frac{NI}{MC_{t-1}}+\beta_2\frac{BVE}{MC_{t-1}}+\beta_3\frac{ND}{MC_{t-1}}+\beta_4 LN\left(\frac{OilRes}{MC_{t-1}}\right)+\beta_5\Delta Brent+\beta_6\Delta DODSR_4+$$
$$D^*\alpha_0+D^*\alpha_1\frac{NI}{MC_{t-1}}+D^*\alpha_2\frac{BVE}{MC_{t-1}}+D^*\alpha_3\frac{ND}{MC_{t-1}}+D^*\alpha_4 LN\left(\frac{OilRes}{MC_{t-1}}\right)+D^*\alpha_5\Delta Brent+D^*\alpha_6\Delta DODSR_4+\varepsilon$$

Variable	All periods	After oil boom	Oil boom	Before oil boom	Before & after boom
Intercept	0,203236**	0,044134	0,415673***	0,07645	0,097887
D	0,06907	-0,176147	0,308778	-0,139362	0,024893
NI	0,590617***	0,289283***	0,572441	0,913971*	0,57169***
BV	0,258896***	0,197775***	0,300105**	0,355881***	0,266621***
ND	-0,23648***	-0,217637*	-0,352769*	-0,218441**	-0,204596***
LNOil	0,357225***	0,182148*	0,350735***	0,40358***	0,314844***
ΔBrent	0,210177***	0,495032***	-0,120297	-0,056562	0,198304***
$\Delta DODSR_4$	0,234748***	0,164732	0,176387	0,248657*	0,244643**

D:NI	-0,094603	0,055846	0,819413	0,082705	-0,161151
D:BV	0,095684	0,038973	-0,10622	0,309695*	0,115576
D:ND	-0,035634	0,182582	0,428906	-0,374997**	-0,093738
D:LNOil	0,032492	-0,081808	0,161936	-0,150927	0,012092
D:ΔBrent	0,073082	0,131802	-0,018313	0,034291	0,086684
D:$\Delta DODSR_4$	-0,449578***	0,124576	-0,851886***	-0,457644**	-0,309225**

(NI = Net Income, BV = Book Value Equity, ND = Net Debt, LNOil = Natural logarithm of oil, $\Delta DODSR_n$ = Diversion from Optimal Drilling Success Rate with 4 lags, D = Dummy for full cost companies)

Because the previous findings and additional regressions found in appendix (5.2.1-5.2.3) pointed to change in drilling success rate being more relevant to successful efforts companies, and diversion from optimal drilling success rate being more relevant to full cost companies, I created a model to fit this. The combined model has change in drilling success rate for only successful efforts companies, and diversion from optimal drilling success for only full cost companies.

The results from this combined model clearly show how these two variables stay significant for every value of N. This is the same pattern as seen in variables such as net income and change in oil price, indicates the importance of these two variables. Their importance is further supported by them representing the only significant difference between full cost and successful efforts companies in this model that also includes dummies for every other variable.

Combined DSR & DODSR

$$\Delta MC_t=\beta_0+\beta_1\frac{NI}{MC_{t-1}}+\beta_2\frac{BVE}{MC_{t-1}}+\beta_3\frac{ND}{MC_{t-1}}+\beta_4 LN\left(\frac{OilRes}{MC_{t-1}}\right)+\beta_5\Delta Brent+\beta_6\Delta DSR_{SEn}+\beta_7\Delta WD_n+$$
$$D^*\alpha_0+D^*\alpha_1\frac{NI}{MC_{t-1}}+D^*\alpha_2\frac{BVE}{MC_{t-1}}+D^*\alpha_3\frac{ND}{MC_{t-1}}+D^*\alpha_4 LN\left(\frac{OilRes}{MC_{t-1}}\right)+D^*\alpha_5\Delta Brent+D^*\alpha_6\Delta DODSR_{FCn}+D^*\alpha_7\Delta WD_n+\varepsilon$$

Variable	N = 2	N = 3	N = 4
Intercept	0,13563857	0,1670368	0,2180354***
NI	0,34714309**	0,3305284**	0,5407281***
BV_{1st}	0,43105243**	0,4284832**	0,2979961*
BV_{2nd}	0,33329479***	0,3228097**	0,2488193**
BV_{3rd}	0,28529653***	0,27844***	0,1898204**

BV_{4th}	0,31848433***	0,3184813***	0,2670314***
ND	-0,3101868***	-0,3351781***	-0,2458658***
LNOil	0,32464729***	0,3580686***	0,3431178***
ΔBrent	0,2574681***	0,2614523***	0,235809***
ΔDSR_{SE}	0,18541874**	0,3276498***	0,4448345***
ΔWD_n	0,07270981***	0,1023242***	0,0937398***
D	-0,02382598	-0,012349	-0,0208991
D:NI	0,09946928	0,1255378	-0,0690824
$D:BV_{1st}$	-0,00957522	-0,1195315	0,0046122
$D:BV_{2nd}$	0,0261331	-0,0254988	0,0639063
$D:BV_{3rd}$	0,05061928	0,0053472	0,0868674
$D:BV_{4th}$	0,0502342	0,0313561	0,0830121
D:ND	0,03371545	0,0680769	-0,0105349
D:LNOil	-0,02347288	-0,058643	-0,0123527
D:ΔBrent	0,0507782	0,0593338	0,0665526
$\Delta DODSR_{FC}$	-0,00528466***	-0,1331112**	-0,208508**
$D:\Delta WD_n$	0,01906105	0,0684806*	0,0608662

(NI = Net Income, BV = Book Value Equity of the n^{th} quartile, ND = Net Debt, LNOil = Natural logarithm of oil, ΔDSR_{SE} = Change in Drilling Success Rate with n lags for successful efforts companies, $\Delta DODSR_{FC}$ = Diversion from Optimal Drilling Success Rate with n lags for full cost companies, ΔWD_n = Change in number of Wells Drilled with n lags, D = Dummy for full cost companies)

Looking at the model for n=2 in different time periods, I observe that the drilling success coefficients are only significant in the oil boom subset.

Value relevance differentiated by time periods, VR_2

$$\Delta MC_t=\beta_0+\beta_1\frac{NI}{MC_{t-1}}+\beta_2\frac{BVE}{MC_{t-1}}+\beta_3\frac{ND}{MC_{t-1}}+\beta_4 LN\left(\frac{OilRes}{MC_{t-1}}\right)+\beta_5\Delta Brent+\beta_6\Delta DSR_{SE2}+\beta_7\Delta WD_2+$$
$$D^*\alpha_0+D^*\alpha_1\frac{NI}{MC_{t-1}}+D^*\alpha_2\frac{BVE}{MC_{t-1}}+D^*\alpha_3\frac{ND}{MC_{t-1}}+D^*\alpha_4 LN\left(\frac{OilRes}{MC_{t-1}}\right)+D^*\alpha_5\Delta Brent+D^*\alpha_6\Delta DODSR_{FC2}+D^*\alpha_7\Delta WD_2+\varepsilon$$

Variable	All periods	After oil boom	Oil boom	Before oil boom	Before & after boom
Intercept	0,13972364*	0,084009	0,4667169***	0,016471	0,071366

D	-0,04564862	-0,147042	-0,1423203	-0,091999	-0,039775
NI	0,35206732**	0,127593	-0,5565317	0,786219**	0,407226***
BV	0,30598826***	0,306524***	0,3276273***	0,357876***	0,312309***
ND	-0,29981678***	-0,45993***	-0,3316307*	-0,222019***	-0,300319***
LNOil	0,30649358***	0,24289***	0,4016284***	0,28844**	0,280048***
ΔBrent	0,26016037***	0,507678***	0,0220251	-0,035254	0,231424***
ΔDSR_{SE}	0,18303626**	0,105545	0,3679064**	0,049308	0,091293
ΔWD_2	0,07218667***	0,059746*	0,1196174***	0,042229	0,057017***
D:NI	0,09451609	0,223601	1,7837124**	-0,094808	-0,044128
D:BV	0,06086902	-0,056469	-0,142288	0,203178	0,09408
D:ND	0,02785312	0,388038*	0,3876544***	-0,267972**	-0,020202
D:LNOil	-0,01455773	-0,082266	-0,1260911	-0,010959	0,021
D:ΔBrent	0,04567753	0,131382	0,0071211	0,027904	0,046272
$\Delta DODSR_{FC}$	-0,00523443***	0,175626	-0,0068519***	-0,036527	-0,018077
D:ΔWD_2	0,02012809	-0,015967	0,1127059*	0,035072	0,016265

(NI = Net Income, BV = Book Value Equity, ND = Net Debt, LNOil = Natural logarithm of oil, ΔDSR_{SE} = Change in Drilling Success Rate with 2 lags for successful efforts companies, $\Delta DODSR_{FC}$ = Diversion from Optimal Drilling Success Rate with 2 lags for full cost companies, ΔWD_2 = Change in number of Wells Drilled with 2 lags, D = Dummy for full cost companies)

For n=3 I observe that the findings from n=2, are significantly different for successful efforts companies. In this subset the only period were I do not observe a significant coefficient for successful efforts companies, is the oil boom period. The findings for full cost companies are unchanged from previous findings.

Value relevance differentiated by time periods, VR_3

$$\Delta MC_t=\beta_0+\beta_1\frac{NI}{MC_{t-1}}+\beta_2\frac{BVE}{MC_{t-1}}+\beta_3\frac{ND}{MC_{t-1}}+\beta_4 LN\left(\frac{OilRes}{MC_{t-1}}\right)+\beta_5\Delta Brent+\beta_6\Delta DSR_{SE3}+\beta_7\Delta WD_3+$$
$$D^*\alpha_0+D^*\alpha_1\frac{NI}{MC_{t-1}}+D^*\alpha_2\frac{BVE}{MC_{t-1}}+D^*\alpha_3\frac{ND}{MC_{t-1}}+D^*\alpha_4 LN\left(\frac{OilRes}{MC_{t-1}}\right)+D^*\alpha_5\Delta Brent+D^*\alpha_6\Delta DODSR_{FC3}+D^*\alpha_7\Delta WD_3+\varepsilon$$

Variable	All periods	After oil boom	Oil boom	Before oil boom	Before & after boom
Intercept	0,162826**	0,062674	0,442587***	0,058548	0,077508

D	-0,064826	-0,189088	-0,04256	-0,225335	-0,0948
NI	0,333385***	0,132495	-0,602924	0,88497**	0,438487***
BV	0,307111***	0,292303***	0,395251***	0,35532***	0,302112***
ND	-0,325286***	-0,433575**	-0,494219***	-0,210559**	-0,280918***
LNOil	0,338033***	0,221087**	0,377761***	0,365367***	0,295025***
ΔBrent	0,264404***	0,506228***	-0,111574	-0,035239	0,240668***
ΔDSR_{SE}	0,32567***	0,241886*	0,254351	0,365788***	0,354135***
ΔWD_3	0,101697***	0,063971	0,167399***	0,034317	0,059443*
D:NI	0,118378	0,223802	2,042431**	-0,060622	-0,065625
D:BV	0,049355	-0,041843	-0,234846	0,257994	0,091747
D:ND	0,061011	0,375379*	0,64032**	-0,333535**	-0,025344
D:LNOil	-0,041815	-0,113194	-0,001937	-0,132297	-0,043256
D:ΔBrent	0,055922	0,127597	0,159372	0,056452	0,07209
$\Delta DODSR_{FC}$	-0,135203**	0,14894	-0,333223**	-0,120218	-0,063285
D:ΔWD_3	0,070408*	0,038474	0,077744	0,140792**	0,095058**

(NI = Net Income, BV = Book Value Equity, ND = Net Debt, LNOil = Natural logarithm of oil, ΔDSR_{SE} = Change in Drilling Success Rate with 3 lags for successful efforts companies, $\Delta DODSR_{FC}$ = Diversion from Optimal Drilling Success Rate with 3 lags for full cost companies, ΔWD_3 = Change in number of Wells Drilled with 3 lags, D = Dummy for full cost companies)

For n=4 the findings are on pair with n=3, for both full cost and successful efforts companies.

Value relevance differentiated by time periodes, VR_4

$$\Delta MC_t=\beta_0+\beta_1\frac{NI}{MC_{t-1}}+\beta_2\frac{BVE}{MC_{t-1}}+\beta_3\frac{ND}{MC_{t-1}}+\beta_4 LN\left(\frac{OilRes}{MC_{t-1}}\right)+\beta_5\Delta Brent+\beta_6\Delta DSR_{SE4}+\beta_7\Delta WD_4+$$
$$D^*\alpha_0+D^*\alpha_1\frac{NI}{MC_{t-1}}+D^*\alpha_2\frac{BVE}{MC_{t-1}}+D^*\alpha_3\frac{ND}{MC_{t-1}}+D^*\alpha_4 LN\left(\frac{OilRes}{MC_{t-1}}\right)+D^*\alpha_5\Delta Brent+D^*\alpha_6\Delta DODSR_{FC4}+D^*\alpha_7\Delta WD_4+\varepsilon$$

Variable	All periods	After oil boom	Oil boom	Before oil boom	Before & after boom
Intercept	0,17859**	0,0076544	0,347639*	0,079588	0,09475
D	-0,036741	-0,1700746	0,109396	-0,219646	-0,073686
NI	0,53484***	0,2574108**	0,408721	0,881736**	0,54811***
BV	0,26415***	0,2139625***	0,330088**	0,348789***	0,262993***

ND	-0,23992***	-0,2404193*	-0,393476**	-0,203592**	-0,196547***
LNOil	0,32663***	0,1486395	0,302782***	0,354639**	0,287391***
ΔBrent	0,23934***	0,5050287***	-0,169767	-0,03434	0,230492***
ΔDSR_{SE}	0,43962***	0,2313904**	0,247561	0,737753**	0,53604***
ΔWD_4	0,092431***	0,0708272**	0,156613***	0,017177	0,05835**
D:NI	-0,067015	0,0795545	1,136117	0,102025	-0,155549
D:BV	0,091964	0,0326889	-0,175287	0,318667*	0,128696
D:ND	-0,013785	0,196892	0,600992*	-0,385266**	-0,099894
D:LNOil	-0,000066	-0,0558389	0,107168	-0,088072	-0,013195
D:ΔBrent	0,062844	0,120492	0,134998	0,028435	0,073955
$\Delta DODSR_{FC}$	-0,21275***	0,3078568	-0,54654***	-0,182936	-0,09958
D:ΔWD_4	0,061598	0,0839677	0,016676	0,107243**	0,086169**

(NI = Net Income, BV = Book Value Equity, ND = Net Debt, LNOil = Natural logarithm of oil, ΔDSR_{SE} = Change in Drilling Success Rate with 4 lags for successful efforts companies, $\Delta DODSR_{FC}$ = Diversion from Optimal Drilling Success Rate with 4 lags for full cost companies, ΔWD_4 = Change in number of Wells Drilled with 4 lags, D = Dummy for full cost companies)

5.4 Discussion

In this chapter I examine the Value Relevance differences between successful efforts and full cost companies. I control for variables previously applied in similar research, in addition to new variables. The models are made as comparable to the models from the earnings response coefficient analysis as possible.

The findings suggest there have been significant differences between the value relevance of full cost and successful efforts accounting in the period between 1991-2015. I capture this difference primarily from the change in drilling success rate and diversion from optimal drilling success rate variables.

The drilling success rate results are slightly different to what I have seen in the earnings response coefficient analysis. I find no significant differences in the value relevance of successful efforts- and full cost drilling success rate, in the aggregated sample. This finding is surprising because drilling success rate impacts the accounting numbers directly for successful efforts companies, while only impacting indirectly through future income for full cost companies. One would therefore expect there to be some difference in order to capture this effect. However it appears this effect is not significant when considering the period from beginning of the year to the end of the year.

From the change in drilling success rate analysis in model 2, I find clear and highly robust results. The findings suggest that an improvement in drilling success rate is positively correlated with a higher return for successful efforts companies, while not being positively correlated with a higher return for full cost companies. This is weird because if a full cost company improves the drilling success rate from last year, the relative amount of non-empty assets should increase, when controlled for wells drilled. It would therefore stand to reason that a change in drilling success rate should generate additional explanatory power, not picked up by the book value of equity or the oil reserves variables. For successful efforts companies one would expect the change in drilling success to be an insignificant variable, because any change in drilling success rate will generate more net income (less expenses) and more assets, which are already controlled for. However the findings suggest that there are some additional benefits to increasing the drilling success rate for successful efforts companies, beyond what is accounted for by these variables. The might be a result of investors reacting to mean reversions in drilling success rate. This is described by Kahneman & Tversky, in their paper "On the psychology of predictions" (1973). In the paper they describe an experiment where the best Israelian fighter pilots were put through a challenging course, given feedback based on the results. The ones who did well were given positive feedback, which and the ones who preformed poorly were given negative feedback. This study found that pilots given negative feedback improved, while the pilots given positive feedback did not. The researchers attributed this to pilots responding to positive and negative feedback, instead of the more likely explanation, that pilots who performed well on the first day, would have problems replicating regardless of feedback. The latter explanation is also supported by the current research consensus, that positive feedback improves results, while negative feedback does the opposite. However Kahneman & Tversky finds that even thought this is correct, people still make mistakes because it is less intuitive.

Applying this finding to the oil industry, and assuming that all oil companies are highly competent and they only invest when they believe there is a high chance of finding oil. Kahneman and Tversky research suggests that a year where a company has a low drilling success is likely to be followed by a year where they improve their drilling success. They also predict people will not make a logical judgment around this.

This explanation fits perfectly with I observe, when I find that successful efforts companies that improve their drilling success have a higher return. This is also supported by regressions finding that successful efforts companies reacts negatively to past drilling success.

From diversion from optimal drilling success rate in model 3, I find similarly robust results to the change in drilling success rate analysis. The findings implies that a historical diversion from 100% drilling success rate implies a significantly lower stock return for full cost companies, and a significantly higher return for successful efforts companies. This might seem logical because if all else is equal a full cost company with a large historical diversion from optimal drilling success rate, will have more non cash generating assets (empty wells) in the balance sheet and thus generate less value then a full cost company with no historic diversion from optimal drilling success rate. However it is hard to find a logical reason for successful efforts companies with low historical drilling success out performing successful efforts companies with high drilling success if all else is equal. In addition this variable is based on historical data known before the start of the year, and should therefore not impact the year’s stock return.

Other then drilling success rate variables, the only other consistent difference between full cost and successful efforts companies in my analysis is in the change in net number of wells drilled, this variable measures an increase in drilling activity. This variable should not be affected by whether a company is using full cost or successful efforts accounting, however this is what I observe. The results shows that an increase in number of wells drilled is indicative of a higher result for both successful efforts and full cost companies, however sometimes it is significantly higher for full cost companies. This difference cannot be attributed to a fundamental difference in number of wells drilled, because change in wells drilled is almost equal for successful efforts and full cost companies This might be attributed to the differences between full cost and successful efforts accounting, because full cost companies do not occur the same cost from empty wells as successful efforts companies does. In which case the finding is to be expected and this further highlights how analysts fail to distinguish between full cost and successful efforts accounting. However this finding is not significant in every subset and other explanations in cannot be ruled out.

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Based on this analysis I find it highly unlikely that change in drilling success rate or diversion from optimal drilling success rate is in any way a statistical mistake or due to any other causal relationship not controlled for in my analysis. This is supported by my final model, which finds that change in drilling success rate is only important for successful efforts companies and that diversion from optimal drilling success rate is only important for full cost companies.

6. Summary

Earnings Response coefficient

From my earnings response coefficient analysis the findings are in line with what I expected based on the research from Bandyopadhyay, (Bandyopadhyay 1994), Harris and Ohlson (Harris and Ohlson 1987), and Sunder (Sunder 1976). I generally see no difference between full cost and successful efforts companies, except for one period where successful efforts companies have a significantly higher earnings response coefficient. This period had an unprecedented growth in oil price. This fining is in line with previous research from Bandyopadhyay, who observed the opposite during a period of falling oil price.

When exploring the new variables in the earnings response coefficient analysis, I find that only full cost companies have a significant coefficient for drilling success rate. This is expected because higher drilling success rates affect the net income for successful efforts companies, while not directly changing the income or balance statements for full cost companies. In addition, I find that diversion from optimal drilling success rate has a negative coefficient for full cost companies. This was not expected because all information in the diversion from optimal drilling success rate variable is already known, and therefore should not impact stock prices in this period, based on the efficient market hypothesis. This might indicate that unaware of the differences between successful efforts and full cost accounting.

Value Relevance

In my value relevance analysis I base my methodology on the Ohlson model (Ohlson 1995), and use many of the same variables as Misund, Osmundsen & Sikveland (Misund, Osmundsen, and Sikveland 2015). Here I do find that there are significant differences between successful efforts and full cost companies. The differences are picked up by the variables for changes in drilling success rate and change in number of wells drilled. I am also able to replicate to some degree the variables from the earnings response coefficient analysis, but I do not observe a significant drilling success rate for full cost companies nor for successful efforts.

Continuing I analyze the variables for changes in drilling success rate, change in number of wells drilled and diversion from optimal drilling success rate. I find that increasing the number of wells drilled from previous years, predicts a higher stock return this year for both full cost and successful efforts companies. Increasing the drilling success rate from previous years is predictive of a higher return for successful efforts companies, not full cost companies. While diversion from optimal drilling success rate has a positive coefficient for successful efforts companies, and a negative coefficient for full cost companies.

Based on these and other regressions I made a final model with change in drilling success rate for successful efforts companies, and diversion from optimal drilling success rate for full cost companies, as two of the control variables. In this model I found that the variables move in and out of significance in different time periods, but keep their sign whenever they are significant. This is the same behavior as other highly relevant variables have shown, such as net income and change in oil price. Furthermore, every subset has a higher adjusted R^2 then any other tested model, meaning this is likely a better representation of value relevance then the other models (Beisland 2009).

Conclusion

In summary, I find that the market reacts to current information in a rational and informed manner. It is expected that full cost companies benefit more from drilling success rates because, unlike successful efforts companies, a lower drilling success rate does not affect other posts such as net income and assets.

The findings also suggest that the market is quick to forget, and previous years accounting information is taken at face value. This is reflected in how full cost companies are reacting negatively to a high diversion from optimal drilling success in previous years, which cannot be explained by the variable picking up the effect of empty wells in the balance sheet, because the left side variable is stock return and publicly known information should be incorporated in to the stock price. The markets not being able to correctly assess previous information also fits with the finding that successful efforts companies are getting a higher return based on improving their drilling success, while not benefiting significantly from the current years drilling success. This market reaction to past information described in this thesis has also been described by previous research on prediction biases by Kahneman and Tversky (1973).

From the findings in this thesis I conclude that analysts take financial information at face value, which leads to irrational behavior in the markets. As previously discussed, these findings are surprising, but not in conflict with other research in the area of full cost and successful efforts accounting. This thesis focuses on the implications of the information contained in the accounting numbers. The findings suggest differences in accounting methods, might cause confusions for investors in a way that has previously been ignored.

7. Further research

I recommend further research to focus on drilling success rate and other variables exploring the prevailing effects of having non-cash flow generating listed as assets for oil companies and other sectors.

I recommend exploring the effect these variables might have on firm specific interest and bankruptcy rates. My research has shown a market inefficiency that can be used to create alpha for any hedge fund willing to exploit it. This is a problem for other investors, but not necessarily the firm. However if banks making similar mistakes when giving loans or a credit rating, the choice of accounting method might inadvertently affect a firms survival chance.

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Appendix

4. Earnings Response Coefficients

4.1.1 VIF

Model 3

Before Boom	UE	B	LMV	MTB	DSR	Brent	N
N = 2	1,0341	1,0393	1,2137	1,0049	1,078	1,0222	1,3022
N = 3	1,0406	1,0434	1,2168	1,005	1,0661	1,0157	1,2771
N = 4	1,0539	1,0468	1,2228	1,0056	1,0722	1,0143	1,282

Oil Boom	UE	B	LMV	MTB	DSR	Brent	N
N = 2	1,0592	1,0924	1,259	1,1385	1,0794	1,0391	1,2455
N = 3	1,0618	1,1044	1,2808	1,1633	1,1403	1,0332	1,2642
N = 4	1,0455	1,1017	1,3782	1,1759	1,2359	1,0253	1,2586

After Boom	UE	B	LMV	MTB	DSR	Brent	N
N = 2	1,0768	1,0263	1,1768	1,0061	1,2432	1,0218	1,5415
N = 3	1,0949	1,021	1,1849	1,0064	1,1944	1,0184	1,4724
N = 4	1,0937	1,0218	1,1843	1,0066	1,1709	1,014	1,4431

Before & After Boom	UE	B	LMV	MTB	DSR	Brent	N
N = 2	1,0828	1,0419	1,2324	1,005	1,1621	1,0247	1,4973
N = 3	1,1025	1,0457	1,2363	1,0054	1,1369	1,017	1,4703
N = 4	1,1175	1,0494	1,2271	1,006	1,1188	1,0174	1,4504

4.1.2 Breusch-Pagan test

Breusch-Pagan test

Test		Chi-squared	P-value
Model 1 – Cumulative		110,86	< 2,2e-16
Model 1 – After Boom		75,975	1,567e-10
Model 1 – Oil Boom		33,411	0,002512
Model 1 – Before Boom		33,276	0,002629
Model 1 – Before & After Boom		84,287	4,499e-12
Model 2 – n = 2		99,665	1,026e-13
Model 2 – n = 3		87,731	1,575e-11
Model 2 – n = 4		89,951	6,209e-12
Model 3 – Cumulative	n = 2	107,85	4,161e-16
Model 3 – After Boom	n = 2	80,998	4,586e-11
Model 3 – Oil Boom	n = 2	39,94	0,00656
Model 3 – Before Boom	n = 2	43,734	0,000121
Model 3 – Before & After Boom	n = 2	82,223	2,733e-11
Model 3 – Cumulative	n = 3	101,94	5,584e-15
Model 3 – After Boom	n = 3	81,263	4,102e-11
Model 3 – Oil Boom	n = 3	33,194	0,004409
Model 3 – Before Boom	n = 3	36,119	0,001699
Model 3 – Before & After Boom	n = 3	80,705	5,19e-11
Model 3 – Cumulative	n = 4	107,71	5,055e-16
Model 3 – After Boom	n = 4	76,994	2,466e-10
Model 3 – Oil Boom	n = 4	34,871	0,002565
Model 3 – Before Boom	n = 4	9,0795	0,8733
Model 3 – Before & After Boom	n = 4	78,632	1,241e-10
Model 4 – Cumulative		37,3	3,976e-08
Model 4 – After Boom		10,469	0,01497
Model 4 – Oil Boom		3,6883	0,2972
Model 4 – Before Boom		16,76	0,0007916

4.2.1 Detailed regression results, Model 1

Table cumulative

CAR1 = cumulative market-adjusted return (F-statistic = 10,47 $\bar{R}^2$= 0,1291)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
(Intercept)	0,0043606	0,013395	0,3255	0,74485
UE	0,15877	0,089446	1,775	0,07624*
B	0,0034521	0,002919	1,1826	0,23728
LMV	-0,0024127	0,001832	-1,3169	0,1882
MTB	0,0026508	0,0013648	1,9423	0,05242*
DSR	-0,000095849	0,00011597	-0,8265	0,40876
N	0,0040703	0,012056	0,3376	0,73573
Brent	0,38891	0,058291	6,6719	4,5E-11***
D	-0,033011	0,020641	-1,5993	0,11012
D:UE	-0,0057317	0,14945	-0,0384	0,96942
D:B	-0,0033832	0,0057275	-0,5907	0,55487
D:MTB	-0,0025486	0,0013662	-1,8655	0,06245*
D:DSR	0,00039613	0,00021345	1,8559	0,0638*
D:N	0,016388	0,035045	0,4676	0,64017
D:Brent	0,15147	0,10163	1,4903	0,1365

Table After Boom

CAR1 = cumulative market-adjusted return (F-statistic = 5,185 $\bar{R}^2$= 0,1038)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
(Intercept)	-0,014575	0,02272	-0,6415	0,52148
UE	0,16544	0,12789	1,2937	0,19639
B	0,0067775	0,003654	1,8548	0,06422*
LMV	-0,0010882	0,0029255	-0,372	0,71006
MTB	0,0036031	0,0022307	1,6153	0,10689
DSR	-8,0474E-06	0,00015759	-0,0511	0,95929
N	0,00029143	0,022169	0,0131	0,98952
Brent	0,39511	0,088239	4,4777	9,4E-06***
D	-0,0014838	0,0397	-0,0374	0,9702
D:UE	0,042526	0,18557	0,2292	0,81884
D:B	-0,005523	0,0072369	-0,7632	0,44572
D:MTB	-0,0035189	0,0022319	-1,5766	0,11553
D:DSR	0,000076188	0,00039548	0,1926	0,84732
D:N	0,043677	0,045902	0,9515	0,34181
D:Brent	0,077317	0,15157	0,5101	0,61021

Table Oil Boom

CAR1 = cumulative market-adjusted return (F-statistic = 6,351 $\bar{R}^2$= 0,2611)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
(Intercept)	0,01171476	0,02176099	0,5383	0,590949

UE	0,20522405	0,15854527	1,2944	0,197028
B	-0,00408793	0,00667178	-0,6127	0,540765
LMV	-0,00161155	0,00348039	-0,463	0,643845
MTB	0,00221451	0,00240789	0,9197	0,358855
DSR	-0,00010951	0,00020703	-0,5289	0,597443
AnalystsNMax	-0,01234996	0,01975384	-0,6252	0,532564
Brent	0,50566835	0,10889001	4,6438	6,2E-06***
D	-0,05092475	0,03648612	-1,3957	0,164359
D:UE	-1,19597441	0,40337188	-2,9649	0,0034***
D:B	0,00932952	0,01054072	0,8851	0,37718
D:MTB	-0,00032766	0,00288496	-0,1136	0,90969
D:DSR	0,00069795	0,00038509	1,8124	0,071436*
D:AnalystsNMax	-0,08622907	0,04575558	-1,8846	0,06096*
D:Brent	0,09597237	0,16904387	0,5677	0,570857

Table Before Boom

CAR1 = cumulative market-adjusted return (F-statistic = 2,691 $\overline{R}^2$= 0,1185)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
(Intercept)	0,00313267	0,02611923	0,1199	0,904681
UE	0,24949321	0,15576799	1,6017	0,111171
B	-0,00563305	0,01266293	-0,4448	0,657025
LMV	0,00244055	0,00469215	0,5201	0,60368
MTB	0,00390641	0,00394932	0,9891	0,324072
DSR	-0,00031297	0,00025377	-1,2333	0,21925
AnalystsNMax	0,05672478	0,0233201	2,4324	0,016086**
Brent	0,3104346	0,10237609	3,0323	0,002827***
D	-0,07950881	0,03431312	-2,3172	0,021747**
D:UE	-0,13778277	0,32307516	-0,4265	0,67033
D:B	0,0056858	0,02296705	0,2476	0,804786
D:MTB	-0,0044998	0,00431783	-1,0421	0,298898
D:DSR	0,00087985	0,00039103	2,2501	0,025791**
D:AnalystsNMax	0,06207744	0,05866551	1,0582	0,291558
D:Brent	0,07240076	0,20439449	0,3542	0,723634

Table Before & After Boom

CAR1 = cumulative market-adjusted return (F-statistic = 7,496 $\overline{R}^2$= 0,1177)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
(Intercept)	-0,0040632	0,016413	-0,2476	0,80455
UE	0,18257	0,1122	1,6272	0,10416
B	0,0053519	0,0032613	1,641	0,10126
LMV	-0,0023484	0,002147	-1,0938	0,27443
MTB	0,0034929	0,0018862	1,8518	0,06449*
DSR	-0,000055164	0,00013755	-0,401	0,68851
N	0,016014	0,017318	0,9247	0,35544
Brent	0,36951	0,068471	5,3965	9,45E-08***

D	-0,031658	0,024702	-1,2816	0,20044
D:UE	0,01712	0,1619	0,1057	0,91582
D:B	-0,0043861	0,0066457	-0,66	0,50949
D:MTB	-0,003406	0,0018871	-1,8048	0,07155*
D:DSR	0,00036712	0,00025337	1,4489	0,14782
D:N	0,039383	0,038776	1,0157	0,31016
D:Brent	0,10368	0,12001	0,8639	0,38796

4.2.2 Detailed regression results, Model 2

Table Model N=2

CAR1 = cumulative market-adjusted return (F-statistic = 7,88 $\bar{R}^2$= 0,12)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	-0,0132442	0,0099251	-1,334	0,1824
D	0,0254423	0,0170227	1,495	0,1354
UE	0,1353628	0,0560688	2,414	0,016**
B	0,003961	0,0030233	1,31	0,1905
LMV	-0,000521	0,0022031	-0,237	0,8131
MTB	0,002814	0,0014047	2,003	0,0455**
ΔDSR_2	0,0042215	0,0104271	0,405	0,6857
ΔWD_2	-0,0006623	0,0012247	-0,541	0,5888
N	0,0093969	0,0106912	0,879	0,3797
Brent	0,3621304	0,057109	6,341	3,72E-10***
D:UE	0,0087291	0,0886641	0,098	0,9216
D:B	-0,0028234	0,0049864	-0,566	0,5714
D:LMV	-0,0058715	0,0045082	-1,302	0,1931
D:MTB	-0,002698	0,0014115	-1,911	0,0563*
D:ΔDSR_2	0,0048521	0,0181689	0,267	0,7895
D:ΔWD_2	-0,0001328	0,0013372	-0,099	0,9209
D:N	-0,0021889	0,0217783	-0,101	0,92
D:Brent	0,1881143	0,0874676	2,151	0,0318**

Table Model N=3

CAR1 = cumulative market-adjusted return (F-statistic = 8,21 $\bar{R}^2$= 0,131)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|

Intercept	-0,0086124	0,0088363	-0,9747	0,33003
D	0,022572	0,0224846	1,0039	0,31574
UE	0,1469165	0,0896835	1,6382	0,10178
B	0,0041947	0,0029959	1,4001	0,16187
LMV	-0,0014696	0,0018151	-0,8096	0,41839
MTB	0,0024468	0,0014139	1,7305	0,08392*
ΔDSR_3	0,0150766	0,0128543	1,1729	0,24119
ΔWD_3	-0,0019285	0,0012008	-1,6061	0,10866
N	0,0091014	0,0121302	0,7503	0,45329
Brent	0,349526	0,0604582	5,7813	1,06E-08***
D:UE	-0,0098756	0,1497833	-0,0659	0,94745
D:B	-0,0021843	0,0061343	-0,3561	0,72187
D:LMV	-0,0052311	0,0057073	-0,9166	0,35965
D:MTB	-0,0023333	0,001415	-1,649	0,09955*
D:ΔDSR_3	-0,0012029	0,0225884	-0,0533	0,95754
D:ΔWD_3	0,0012304	0,0012216	1,0071	0,31417
D:N	-0,0213636	0,0432603	-0,4938	0,62156
D:Brent	0,2586398	0,1033555	2,5024	0,01253**

Table Model N=4

CAR1 = cumulative market-adjusted return (F-statistic = 7,522 $\overline{R}^2$= 0,1266

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	-0,0030927	0,0091166	-0,3392	0,73453
D	0,0148016	0,0232985	0,6353	0,52542
UE	0,1474716	0,090395	1,6314	0,10322
B	0,0027314	0,0030396	0,8986	0,36914
LMV	-0,0024456	0,0019172	-1,2756	0,20251
MTB	0,0026901	0,0014727	1,8267	0,06814*
ΔDSR_4	0,0072364	0,013344	0,5423	0,58778
ΔWD_4	-0,0033804	0,0021203	-1,5943	0,1113
N	0,0045195	0,0127743	0,3538	0,72359
Brent	0,3526499	0,0641928	5,4936	5,40E-08***

D:UE	-0,0542851	0,1718897	-0,3158	0,75223
D:B	-0,0019564	0,0063189	-0,3096	0,75694
D:LMV	-0,003556	0,0059233	-0,6003	0,54847
D:MTB	-0,0025743	0,0014738	-1,7467	0,08111*
D:ΔDSR_4	0,0189373	0,0238553	0,7938	0,42754
D:ΔWD_4	0,0024914	0,0021351	1,1669	0,24363
D:N	-0,0159876	0,0469857	-0,3403	0,73375
D:Brent	0,2531963	0,1075465	2,3543	0,01882**

4.2.3 Detailed regression results, Model 3

Model 3 cumulative sample, n=2

CAR = cumulative market-adjusted return (F-statistic = 8,945 $\overline{R}^2$= 0,1216)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
(Intercept)	-0,01393402	0,00882366	-1,5792	0,11467
D	0,03008842	0,02161938	1,3917	0,16437
UE	0,13347084	0,08657064	1,5418	0,12351
B	0,00416211	0,00293738	1,4169	0,15687
LMV	-0,00050648	0,00178715	-0,2834	0,77694
MTB	0,00281414	0,00136388	2,0633	0,03939**
$DODSR_2$	0,00446181	0,00520417	0,8574	0,39149
N	0,00775547	0,01278065	0,6068	0,54414
Brent	0,3631743	0,05901003	6,1545	1,16E-09***
D:UE	0,00483865	0,14783913	0,0327	0,9739
D:B	-0,003244	0,00585	-0,5545	0,57936
D:LMV	-0,00656515	0,00551519	-1,1904	0,23423
D:MTB	-0,00269522	0,00136499	-1,9745	0,04865**
D:$DODSR_2$	-0,01857222	0,01020731	-1,8195	0,06919*
D:N	0,0027352	0,03921455	0,0697	0,94441
D:Brent	0,17638661	0,10302374	1,7121	0,08725*

Model 3 cumulative sample, n=3

CAR = cumulative market-adjusted return (F-statistic = 9,521 $\overline{R}^2$= 0,1354)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
(Intercept)	-0,0110165	0,0087335	-1,2614	0,20753
D	0,0322284	0,0226122	1,4253	0,15447
UE	0,1433376	0,0884094	1,6213	0,10535
B	0,0046522	0,0029891	1,5564	0,12001
LMV	-0,0012355	0,0017955	-0,6881	0,49156
MTB	0,0023908	0,001399	1,7089	0,08786*
$DODSR_3$	0,0099574	0,0080292	1,2401	0,21528
N	0,0073366	0,012162	0,6032	0,54652
Brent	0,3534166	0,0599681	5,8934	5,57E-09***
D:UE	-0,0114439	0,1477213	-0,0775	0,93827
D:B	-0,0033193	0,0060777	-0,5461	0,58512
D:LMV	-0,006625	0,0057414	-1,1539	0,24888
D:MTB	-0,0022717	0,0014001	-1,6225	0,10509
D:$DODSR_3$	-0,0368773	0,0143929	-2,5622	0,01058**
D:N	-0,0115348	0,0440128	-0,2621	0,79333
D:Brent	0,2412213	0,1011094	2,3857	0,01728**

Model 3 cumulative sample, n=4

CAR = cumulative market-adjusted return (F-statistic = 8,381 $\overline{R}^2$= 0,126)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
(Intercept)	-0,007728	0,0089414	-0,8643	0,3877
D	0,0248135	0,0236174	1,0506	0,29376
UE	0,1401978	0,0893507	1,5691	0,11705
B	0,0032767	0,0030415	1,0773	0,28168
LMV	-0,0017532	0,0018586	-0,9433	0,34583
MTB	0,0025335	0,0014413	1,7578	0,07918*
$DODSR_4$	0,0096823	0,011423	0,8476	0,39692
N	0,0033678	0,0126866	0,2655	0,79073
Brent	0,3606366	0,0634255	5,686	1,86E-08***

D:UE	-0,0502561	0,1692413	-0,2969	0,76659
D:B	-0,0029742	0,0063281	-0,47	0,63849
D:LMV	-0,0049969	0,0059958	-0,8334	0,40488
D:MTB	-0,0024121	0,0014425	-1,6722	0,09491*
D:$DODSR_4$	-0,0328763	0,0180926	-1,8171	0,0696*
D:N	-0,0046261	0,0474639	-0,0975	0,92238
D:Brent	0,2339079	0,1052361	2,2227	0,02653**

Model 3 before oil boom, n=2

CAR1 = cumulative market-adjusted return (F-statistic = 2,391 $\overline{R}^2$= 0,1135)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
(Intercept)	-0,0209435	0,016878	-1,2409	0,216616
D	-0,0497265	0,0711542	-0,6989	0,48574
UE	0,2645432	0,1582596	1,6716	0,096721*
B	-0,0045607	0,0132887	-0,3432	0,731935
LMV	0,0010445	0,0046663	0,2238	0,823197
MTB	0,0028802	0,0040856	0,705	0,48194
$DODSR_2$	0,0157372	0,0087169	1,8054	0,07305*
N	0,0472233	0,0233158	2,0254	0,044626
Brent	0,2944128	0,1120757	2,6269	0,009523***
D:UE	-0,1460989	0,3311669	-0,4412	0,659738
D:B	0,0096176	0,0261878	0,3673	0,713952
D:LMV	0,0172441	0,0210382	0,8197	0,41373
D:MTB	-0,004157	0,0045452	-0,9146	0,361891
D:$DODSR_2$	-0,0446737	0,0180417	-2,4761	0,014408**
D:N	0,1268067	0,1028411	1,233	0,219518
D:Brent	0,0595256	0,2102964	0,2831	0,77753

Model 3 before oil boom, n=3

CAR1 = cumulative market-adjusted return (F-statistic = 2,815 $\overline{R}^2$= 0,1598)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|

(Intercept)	-0,02256851	0,01825084	-1,2366	0,2184578
D	-0,07774334	0,07083571	-1,0975	0,2744291
UE	0,28813124	0,15435942	1,8666	0,0641895*
B	-0,00981187	0,01308486	-0,7499	0,4546812
LMV	0,00220066	0,00505177	0,4356	0,6638287
MTB	0,00043745	0,0040547	0,1079	0,9142501
$DODSR_3$	0,04050553	0,01659756	2,4405	0,0160055**
N	0,04405493	0,02026464	2,174	0,0315038**
Brent	0,28570752	0,11645367	2,4534	0,0154655**
D:UE	-0,09790339	0,33615415	-0,2912	0,7713242
D:B	0,0103254	0,02871116	0,3596	0,7197027
D:LMV	0,02923453	0,02100655	1,3917	0,1663759
D:MTB	-0,00235583	0,00446617	-0,5275	0,5987496
$D{:}DODSR_3$	-0,09847664	0,02457139	-4,0078	0,000102***
D:N	0,15301655	0,10543875	1,4512	0,1491046
D:Brent	0,06716896	0,22400651	0,2999	0,7647648

Model 3 before oil boom, n=4

CAR1 = cumulative market-adjusted return (F-statistic = 2,576 $\overline{R}^2$= 0,1539)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
(Intercept)	-0,02093509	0,02191609	-0,9552	0,34146
D	-0,10192445	0,05225626	-1,9505	0,05355**
UE	0,29563649	0,16008764	1,8467	0,06736*
B	-0,01256511	0,0157882	-0,7959	0,42776
LMV	0,00200885	0,00567868	0,3538	0,72417
MTB	0,00072484	0,00448937	0,1615	0,87202
$DODSR_4$	0,03525616	0,02460545	1,4329	0,15461
N	0,05002513	0,02197051	2,2769	0,02464**
Brent	0,2710026	0,13336676	2,032	0,04446**
D:UE	-0,6623478	0,30062501	-2,2032	0,02957**
D:B	-0,01833844	0,03769576	-0,4865	0,62755

D:LMV	0,03917564	0,01587884	2,4672	0,01509**
D:MTB	-0,00162145	0,00464122	-0,3494	0,72746
D:$DODSR_4$	-0,10525412	0,04404413	-2,3897	0,01849**
D:N	0,14993304	0,08072575	1,8573	0,06582*
D:Brent	0,0086931	0,2119081	0,041	0,96735

Model 3 oil boom, n=2

CAR1 = cumulative market-adjusted return (F-statistic = 5,554 $\overline{R}^2$= 0,2481)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
(Intercept)	-0,00016251	0,01926614	-0,0084	0,993279
D	-0,02576851	0,04789042	-0,5381	0,59115
UE	0,18465341	0,15376748	1,2009	0,231284
B	-0,00344974	0,00696256	-0,4955	0,620835
LMV	-0,00131781	0,00335807	-0,3924	0,695175
MTB	0,00206114	0,00242901	0,8486	0,397188
$DODSR_2$	0,00209117	0,00704702	0,2967	0,766982
N	-0,00921168	0,02092804	-0,4402	0,660317
Brent	0,50510254	0,11275591	4,4796	1,28E-05***
D:UE	-1,14304289	0,38887994	-2,9393	0,003693***
D:B	0,00760892	0,01086512	0,7003	0,484583
D:LMV	0,0088711	0,01194453	0,7427	0,458576
D:MTB	0,00031258	0,00289098	0,1081	0,914012
D:$DODSR_2$	0,01786036	0,01613061	1,1072	0,269578
D:N	-0,05597577	0,0615398	-0,9096	0,364181
D:Brent	0,14919392	0,17178923	0,8685	0,386221

Model 3 oil boom, n=3

CAR1 = cumulative market-adjusted return (F-statistic = 5,33 $\overline{R}^2$ = 0,2433)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
(Intercept)	0,001527	0,019500	0,078300	0,937654
D	-0,024986	0,052647	-0,474600	0,635631

UE	0,178717	0,152869	1,169100	0,243859
B	-0,002508	0,007070	-0,354800	0,723153
LMV	-0,001568	0,003405	-0,460600	0,645636
MTB	0,001799	0,002436	0,738800	0,460970
$DODSR_3$	-0,001818	0,009178	-0,198100	0,843172
N	-0,009890	0,020912	-0,472900	0,636806
Brent	0,509131	0,113910	4,469600	0,000014***
D:UE	-1,122414	0,405262	-2,769600	0,00618 ***
D:B	0,005725	0,011170	0,512500	0,608874
D:LMV	0,008760	0,012857	0,681300	0,496535
D:MTB	0,000517	0,003052	0,169400	0,865635
D:$DODSR_3$	0,019449	0,024110	0,806700	0,420872
D:N	-0,056130	0,063664	-0,881700	0,379090
D:Brent	0,149022	0,175287	0,850200	0,396324

Model 3 oil boom, n=4

CAR1 = cumulative market-adjusted return (F-statistic = 5,625 $\bar{R}^2$= 0,2634)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
(Intercept)	0,0167664	0,0183137	0,9155	0,361154
D	-0,030695	0,0550133	-0,558	0,577571
UE	0,1510578	0,1042675	1,4488	0,149156
B	-0,0048497	0,0066423	-0,7301	0,466275
LMV	-0,0042159	0,0030701	-1,3732	0,171408
MTB	0,0016497	0,0025393	0,6497	0,51675
$DODSR_4$	-0,0093038	0,0250956	-0,3707	0,711274
N	-0,0220445	0,0209146	-1,054	0,293294
Brent	0,5406203	0,1059337	5,1034	8,47E-07***
D:UE	-1,1476399	0,3785152	-3,032	0,002791***
D:B	0,0109058	0,0110803	0,9842	0,326321
D:LMV	0,0082152	0,0136757	0,6007	0,548788
D:MTB	0,0012261	0,0031442	0,39	0,697027

D:DODSR$_4$	0,0257128	0,0366061	0,7024	0,48333
D:N	-0,0506667	0,0619584	-0,8178	0,414585
D:Brent	0,0938973	0,1680577	0,5587	0,577051

Model 3 after oil boom, n=2

CAR1 = cumulative market-adjusted return (F-statistic = 4,641 $\overline{R}^2$= 0,1001)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
(Intercept)	-0,0334778	0,0153727	-2,1777	0,02992**
D	0,0512414	0,0308496	1,661	0,09737*
UE	0,1284244	0,123431	1,0405	0,29866
B	0,0080087	0,0036629	2,1864	0,02927**
LMV	0,0027488	0,002949	0,9321	0,35175
MTB	0,0042316	0,0022247	1,9021	0,05776*
DODSR$_2$	-0,0030477	0,0061154	-0,4984	0,61846
N	0,0084044	0,0255016	0,3296	0,74188
Brent	0,3620517	0,0870492	4,1592	3,79E-05***
D:UE	0,0583651	0,1824963	0,3198	0,74925
D:B	-0,0069865	0,007697	-0,9077	0,3645
D:LMV	-0,0115503	0,0074925	-1,5416	0,12384
D:MTB	-0,0041179	0,0022254	-1,8504	0,06487**
D:DODSR$_2$	-0,0143119	0,0210374	-0,6803	0,49664
D:N	0,0308859	0,0520549	0,5933	0,55324
D:Brent	0,104401	0,1515523	0,6889	0,49124

Model 3 after oil boom, n=3

CAR1 = cumulative market-adjusted return (F-statistic = 4,745 $\overline{R}^2$= 0,1072)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
(Intercept)	-0,022972	1,46E-02	-1,5742	0,116141
D	0,033864	3,22E-02	1,0531	0,292851
UE	0,139500	1,26E-01	1,1075	0,268664
B	0,007234	3,73E-03	1,94	0,052995*

LMV	0,000766	2,91E-03	0,2638	0,792062
MTB	0,003871	2,44E-03	1,5854	0,113567
$DODSR_3$	0,000017	7,38E-03	0,0024	0,998111
N	0,003374	2,24E-02	0,1507	0,880273
Brent	0,337840	8,65E-02	3,9041	0,000109***
D:UE	0,043596	1,82E-01	0,2392	0,81109
D:B	-0,004787	7,97E-03	-0,6008	0,548256
D:LMV	-0,007930	7,85E-03	-1,0105	0,312776
D:MTB	-0,003754	2,44E-03	-1,5371	0,124964
D:$DODSR_3$	-0,049796	3,17E-02	-1,5728	0,116471
D:N	0,062288	6,37E-02	0,9774	0,3289
D:Brent	0,184150	1,54E-01	1,1993	0,231034

Model 3 after oil boom, n=4

CAR1 = cumulative market-adjusted return (F-statistic = 4,595 $\overline{R}^2$= 0,1083)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
(Intercept)	-0,0266683	0,014373	-1,8554	0,0642178*
D	0,0336624	0,0327118	1,0291	0,3040323
UE	0,1346751	0,1239662	1,0864	0,2779185
B	0,006873	0,0037946	1,8113	0,0707991*
LMV	0,0015683	0,0029433	0,5328	0,5944248
MTB	0,0041872	0,0025637	1,6333	0,1031441
$DODSR_4$	-0,0026736	0,0087279	-0,3063	0,7595071
N	0,0011684	0,0218292	0,0535	0,9573403
Brent	0,342198	0,0905069	3,7809	0,000178***
D:UE	0,0315106	0,1899148	0,1659	0,8682985
D:B	-0,0059631	0,008128	-0,7336	0,4635631
D:LMV	-0,0077234	0,0079974	-0,9657	0,3347151
D:MTB	-0,0040732	0,0025643	-1,5884	0,1129297
D:$DODSR_4$	-0,0433179	0,0395778	-1,0945	0,2743501
D:N	0,069088	0,0717674	0,9627	0,3362574

D:Brent	0,187846	0,1556842	1,2066	0,2282573

Model 3 before and after oil boom, n=2

CAR1 = cumulative market-adjusted return (F-statistic = 6,598 $\overline{R}^2$= 0,1138)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
(Intercept)	-0,02039613	0,01064282	-1,9164	0,05576
D	0,03663348	0,02390218	1,5326	0,12586
UE	0,15116166	0,10931838	1,3828	0,16722
B	0,00591624	0,00327104	1,8087	0,07097*
LMV	0,00013452	0,00217805	0,0618	0,95077
MTB	0,00367474	0,00188565	1,9488	0,05176*
$DODSR_2$	0,00194686	0,00645732	0,3015	0,76313
N	0,01919508	0,01927895	0,9956	0,3198
Brent	0,33534915	0,06933152	4,8369	1,66E-06***
D:UE	0,02568372	0,15975212	0,1608	0,87232
D:B	-0,00419335	0,00675409	-0,6209	0,53491
D:LMV	-0,00861124	0,00608316	-1,4156	0,15738
D:MTB	-0,00356421	0,00188637	-1,8895	0,05928*
D:$DODSR_2$	-0,02657667	0,01275091	-2,0843	0,03753**
D:N	0,02940867	0,04229894	0,6953	0,48715
D:Brent	0,12785497	0,11978657	1,0674	0,28621

Model 3 before and after oil boom, n=3

CAR1 = cumulative market-adjusted return (F-statistic = 6,965 $\overline{R}^2$= 0,1272)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
(Intercept)	-0,01612777	0,0103672	-1,5557	0,120319
D	0,02752255	0,02523996	1,0904	0,27596
UE	0,16157005	0,11132094	1,4514	0,147195
B	0,00625653	0,00333477	1,8761	0,061121*
LMV	-0,00075948	0,00218193	-0,3481	0,727904
MTB	0,00287565	0,00199606	1,4407	0,150202

$DODSR_3$	0,00849123	0,00897699	0,9459	0,344587
N	0,01749445	0,01745104	1,0025	0,316513
Brent	0,32291167	0,07063654	4,5715	5,89E-06***
D:UE	0,01885551	0,16002031	0,1178	0,90624
D:B	-0,00445641	0,00705689	-0,6315	0,527956
D:LMV	-0,00600729	0,00641373	-0,9366	0,349327
D:MTB	-0,00276485	0,00199675	-1,3847	0,166668
D:$DODSR_3$	-0,05346944	0,01663383	-3,2145	0,001377***
D:N	0,04378319	0,04750733	0,9216	0,357103
D:Brent	0,17815336	0,12223922	1,4574	0,145526

Model 3 before and after oil boom, n=4

CAR1 = cumulative market-adjusted return (F-statistic = 5,852 $\overline{R}^2$= 0,1125)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
(Intercept)	-0,0160263	0,0107995	-1,484	0,13838
D	0,0215371	0,0270375	0,7966	0,42604
UE	0,1629511	0,1119524	1,4555	0,14608
B	0,0053187	0,0034438	1,5444	0,12305
LMV	-0,0006907	0,0023044	-0,2997	0,76449
MTB	0,0031173	0,0020949	1,488	0,13731
$DODSR_4$	0,0066579	0,0116079	0,5736	0,56649
N	0,0168953	0,0176146	0,9592	0,33789
Brent	0,3257697	0,0750843	4,3387	1,70E-05***
D:UE	-0,0100834	0,1771614	-0,0569	0,95463
D:B	-0,0055956	0,0073934	-0,7568	0,44947
D:LMV	-0,004411	0,0068237	-0,6464	0,51826
D:MTB	-0,0030031	0,0020956	-1,4331	0,1524
D:$DODSR_4$	-0,0507494	0,0215416	-2,3559	0,01882**
D:N	0,0559038	0,0544842	1,0261	0,30531
D:Brent	0,1759403	0,1280619	1,3739	0,17003

4.2.4 Detailed regression results, Model 3

Table Simp – Cumulative

CAR1 = cumulative market-adjusted return (F-statistic = 1,523 $\bar{R}^2$= 0,0009)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
(Intercept)	0,00101163	0,00123377	0,8199	0,4124
D	0,00047624	0,00230204	0,2069	0,8361
UE	0,04947312	0,08177052	0,605	0,5452
D:UE	0,04881675	0,13707996	0,3561	0,7218

Table Simp – After Boom

CAR1 = cumulative market-adjusted return (F-statistic = 8,573 $\bar{R}^2$= 0,0241)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
(Intercept)	0,0021678	0,0018862	1,1493	0,2507
D	-0,0057938	0,0038457	-1,5066	0,1323
UE	0,1134977	0,1290537	0,8795	0,3794
D:UE	0,1909462	0,1811327	1,0542	0,2921

Table Simp – Oil Boom

CAR1 = cumulative market-adjusted return (F-statistic = 4,759 $\bar{R}^2$= 0,0278)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
(Intercept)	0,0041952	0,002608	1,6086	0,108516
D	0,0040391	0,0043243	0,934	0,350858
UE	0,0769097	0,0785354	0,9793	0,328041
D:UE	-0,8581745	0,3104559	-2,7642	0,005977***

Table Simp – Pre Boom

CAR1 = cumulative market-adjusted return (F-statistic = 0,2046 $\bar{R}^2$= -0,0063)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
(Intercept)	-0,0029785	0,0026992	-1,1035	0,2705
D	0,0016151	0,004559	0,3543	0,7233
UE	0,0709906	0,2146886	0,3307	0,7411
D:UE	-0,0270837	0,2918641	-0,0928	0,9261

4.3 Quantile regressions

UEadj = Unexpected earnings pr share / stock price

B = Beta

LMV = Log market vaule

MTB = Ln(Market Cap at the end of the year/ Book values at the end of the year)

AnalystsNMax = 1/Analysts following the firm

Brent = Current Brent oil price / Last years Brent oil price

The following regressions show how CAR2 benefits from quantile variables on LMV but not on Beta. Quantile differences on LMV can be found in Table 4.3.

Table Quantile Regressions CAR2 Beta

VR_1 = cumulative market-adjusted return (F-statistic = 5,074 $\overline{R}^2$= 0,08637)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	3,28E-02	4,17E-02	0,786	0,431825
UE	-6,84E-03	1,30E-01	-0,053	0,958051
$Beta_{1st}$	1,83E-02	1,03E-01	0,178	0,85906
$Beta_{2nd}$	-1,86E-02	2,88E-02	-0,646	0,518465
$Beta_{3rd}$	-2,49E-02	1,24E-02	-2,003	0,04546
$Beta_{4th}$	-3,27E-02	7,21E-03	-4,529	6,73E-06
LMV	-6,89E-03	5,34E-03	-1,288	0,197924
MTB	-5,86E-03	3,15E-03	-1,858	0,063503
DSR	1,75E-05	3,57E-04	0,049	0,960988
N	-2,12E-02	2,38E-02	-0,891	0,373264
Brent	4,64E-01	1,27E-01	3,666	0,000261
D	-9,77E-02	6,00E-02	-1,629	0,103633
D:UE	2,30E-01	1,96E-01	1,171	0,242014
D:$Beta_{1st}$	-1,01E-01	1,29E-01	-0,782	0,434583
D:$Beta_{2nd}$	1,45E-02	4,03E-02	0,361	0,718273
D:$Beta_{3rd}$	-6,05E-03	2,03E-02	-0,298	0,76594
D:$Beta_{4th}$	-1,03E-02	1,20E-02	-0,859	0,39058
D:LMV	-3,39E-03	1,03E-02	-0,33	0,741239
D:MTB	6,35E-03	3,17E-03	2,003	0,0455
D:DSR	8,03E-04	5,44E-04	1,477	0,140109
D:N	6,54E-02	4,84E-02	1,352	0,176568
D:Brent	3,00E-01	1,93E-01	1,554	0,12053

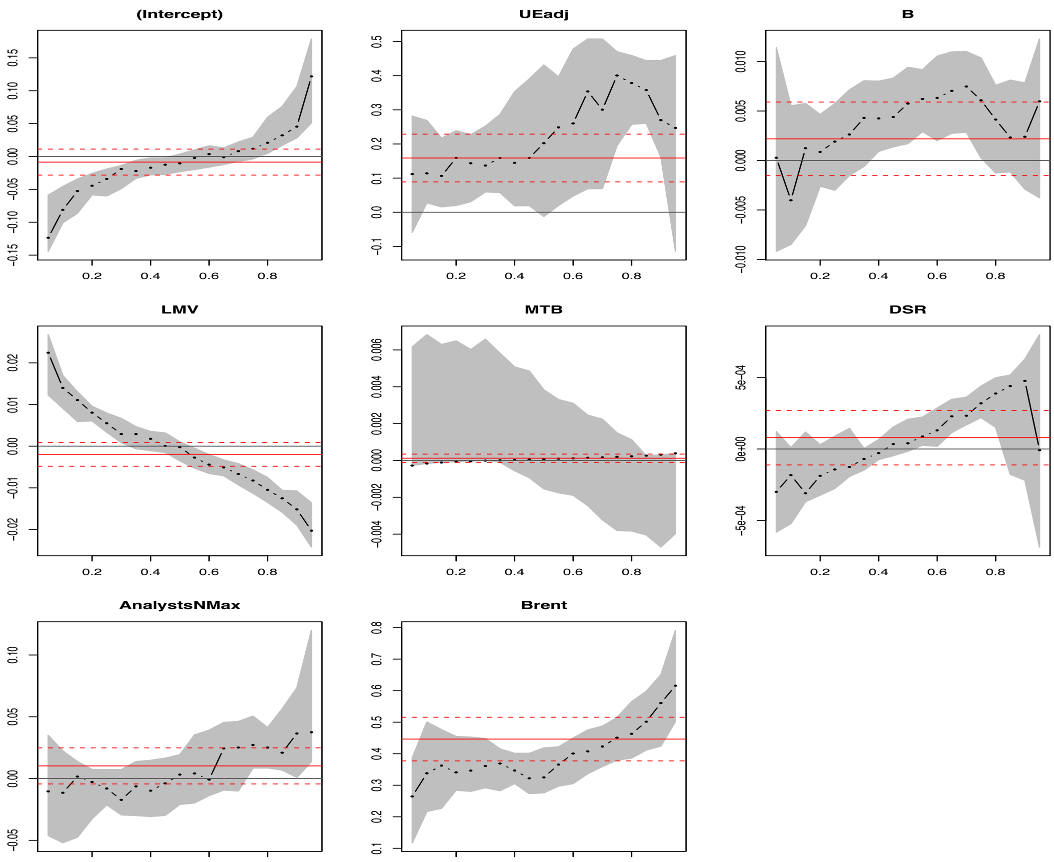
Table Quantile CAR2 Beta

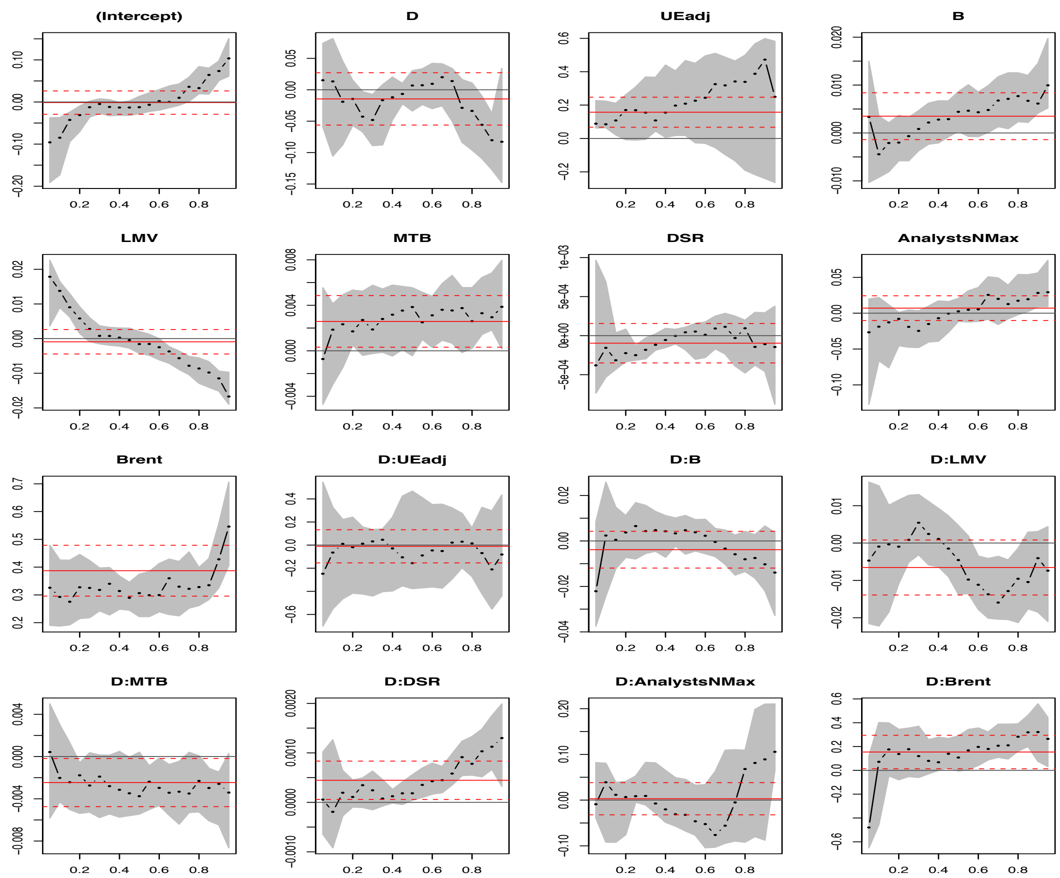
VR_1 = cumulative market-adjusted return (F-statistic = 6,891 $\overline{R}^2$= 0,08896)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|

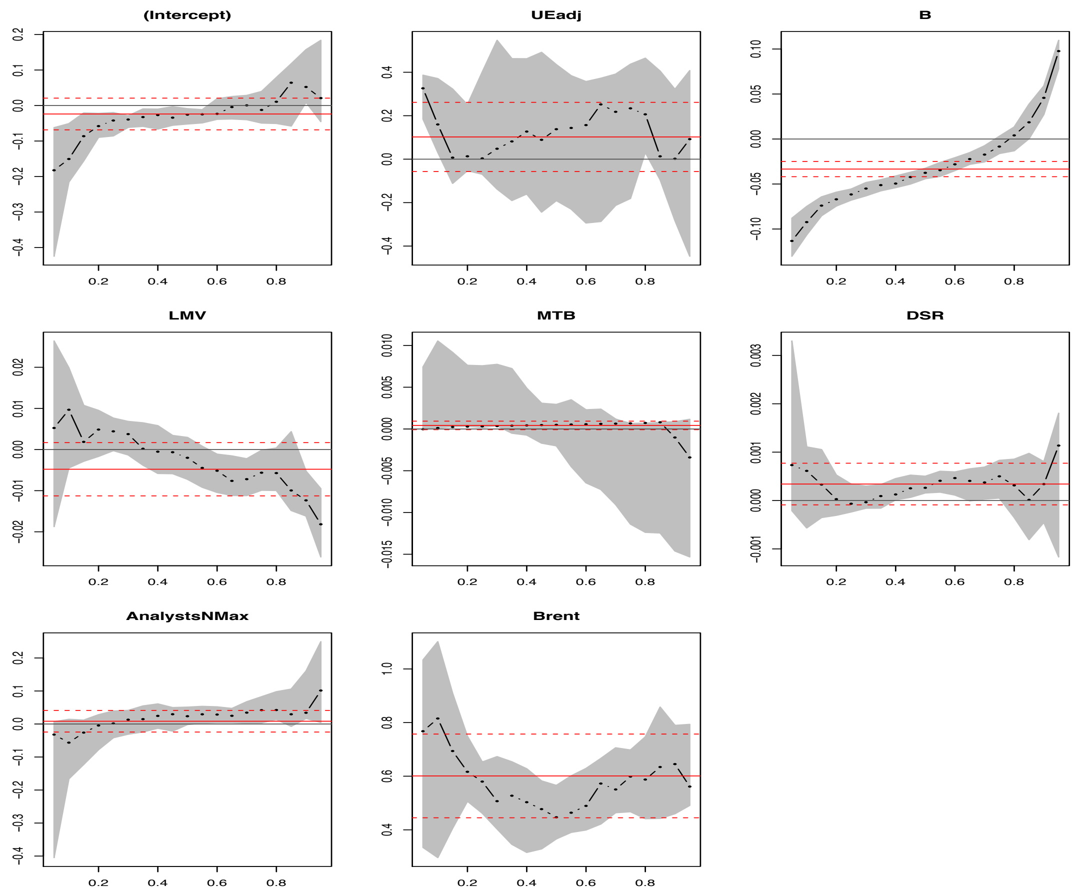
Intercept	4,11E-02	3,80E-02	1,081	0,280168
UE	-4,98E-04	1,29E-01	-0,004	0,996916
B	-3,29E-02	6,80E-03	-4,833	1,58E-06
LMV	-6,61E-03	4,88E-03	-1,353	0,176328
MTB	-5,63E-03	3,14E-03	-1,795	0,072991
DSR	-4,96E-05	3,46E-04	-0,143	0,885994
N	-2,14E-02	2,36E-02	-0,907	0,364589
Brent	4,61E-01	1,26E-01	3,669	0,000258
D	-1,06E-01	5,71E-02	-1,861	0,063111
D:UE	2,30E-01	1,95E-01	1,181	0,237829
D:B	-9,24E-03	1,11E-02	-0,832	0,405688
D:LMV	-4,07E-03	1,00E-02	-0,407	0,683816
D:MTB	6,12E-03	3,15E-03	1,942	0,052477
D:DSR	9,56E-04	5,31E-04	1,802	0,071831
D:N	6,57E-02	4,81E-02	1,365	0,172708
D:Brent	2,91E-01	1,92E-01	1,517	0,12966

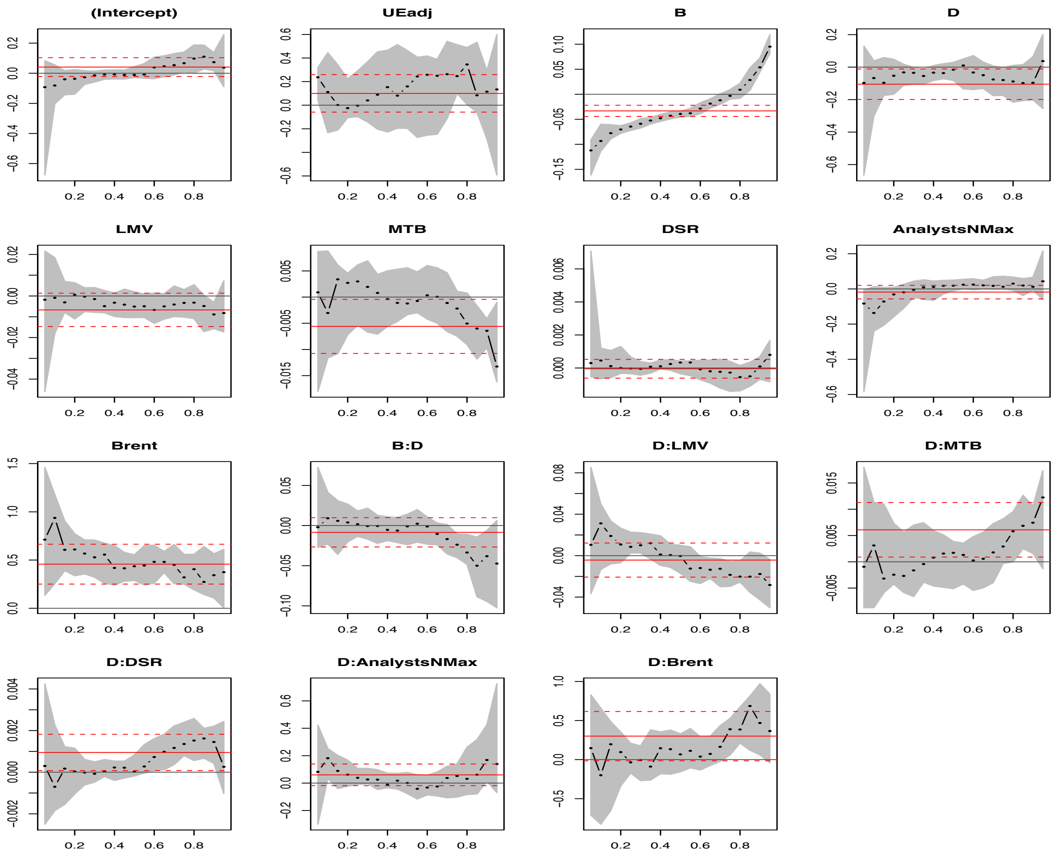
Quantile regressions CAR 1





Quantile regressions CAR 1





(Intercept)
UEadj
B
D
LMV
MTB
DSR
AnalystsNMax
Brent
B:D
D:LMV
D:MTB
D:DSR
D:AnalystsNMax
D:Brent

5. Value Relevance

5.1.1 VIF

Model 2

Before Boom	NI	BV	ND	LNOil	Brent	DSR_n	WD_n
N = 2	1,1058	4,0311	3,8516	1,4076	1,0558	1,0124	1,0403
N = 3	1,1585	4,861	4,4711	1,4905	1,1051	1,0413	1,0601
N = 4	1,1783	5,1614	4,8036	1,5319	1,102	1,0328	1,0516

Oil Boom	NI	BV	ND	LNOil	Brent	DSR_n	WD_n
N = 2	1,2728	4,7771	4,839	1,2017	1,0272	1,0327	1,0215
N = 3	1,3362	4,4251	4,5153	1,1902	1,0217	1,0422	1,0228
N = 4	1,4904	4,8579	5,1942	1,1803	1,0225	1,0236	1,0339

After Boom	NI	BV	ND	LNOil	Brent	DSR_n	WD_n
N = 2	1,2991	3,3498	3,9259	1,4991	1,0642	1,0152	1,0169
N = 3	1,3462	3,3807	4,0095	1,5202	1,0702	1,0101	1,053
N = 4	1,3754	3,3235	4,0266	1,5147	1,076	1,0028	1,0748

Before & After Boom	NI	BV	ND	LNOil	Brent	DSR_n	WD_n
N = 2	1,1528	3,3685	3,5785	1,3331	1,0605	1,009	1,0287
N = 3	1,179	3,4381	3,665	1,3762	1,0892	1,0187	1,0691
N = 4	1,1853	3,4517	3,7256	1,4011	1,0902	1,0167	1,0706

Model 3

Before Boom	NI	BV	ND	LNOil	Brent	$DODSR_n$
N = 2	1,1482	3,9317	3,8384	1,421	1,0391	1,0234
N = 3	1,2167	4,8499	4,4796	1,5215	1,0521	1,0515
N = 4	1,2113	5,2153	4,7681	1,5613	1,0665	1,0507

Oil Boom	NI	BV	ND	LNOil	Brent	$DODSR_n$
N = 2	1,2636	4,6881	4,7485	1,2017	1,016	1,0296

N = 3	1,305	4,3667	4,4068	1,1842	1,021	1,0171
N = 4	1,4918	4,8442	5,1077	1,1734	1,022	1,0428

After Boom	NI	BV	ND	LNOil	Brent	$DODSR_n$
N = 2	1,2919	3,3542	3,9587	1,5561	1,0653	1,0538
N = 3	1,3046	3,3955	4,0376	1,6112	1,0652	1,0761
N = 4	1,3444	3,3336	4,0162	1,6029	1,0579	1,0711

Before & After Boom	NI	BV	ND	LNOil	Brent	$DODSR_n$
N = 2	1,1598	3,2678	3,5313	1,3237	1,0539	1,0047
N = 3	1,1673	3,3053	3,5911	1,3501	1,0659	1,0055
N = 4	1,1648	3,4288	3,7082	1,3823	1,0713	1,0105

5.1.2 Breusch-Pagan test

Breusch-Pagan test

Test		Chi-squared	P-value
Model 1 – VR_1		417,41	< 2,2e-16
Model 2 – VR_2	n = 2	389,51	< 2,2e-16
Model 2 – VR_3	n = 3	340,39	< 2,2e-16
Model 2 – VR_4	n = 4	307,34	< 2,2e-16
Model 2 – Cumulative	n = 2	374,57	< 2,2e-16
Model 2 – After Boom	n = 2	101,84	5,851e-15
Model 2 – Oil Boom	n = 2	39,94	< 2,2e-16
Model 2 – Before Boom	n = 2	43,734	< 2,2e-16
Model 2 – Before & After Boom	n = 2	82,223	< 2,2e-16
Model 2 – Cumulative	n = 3	325,85	< 2,2e-16
Model 2 – After Boom	n = 3	97,026	4,765e-14
Model 2 – Oil Boom	n = 3	163	< 2,2e-16
Model 2 – Before Boom	n = 3	163,72	< 2,2e-16
Model 2 – Before & After Boom	n = 3	225,52	< 2,2e-16
Model 2 – Cumulative	n = 4	293,52	< 2,2e-16

Model 2 – After Boom	n = 4	69,049	6,594e-09
Model 2 – Oil Boom	n = 4	168,42	< 2,2e-16
Model 2 – Before Boom	n = 4	142,35	< 2,2e-16
Model 2 – Before & After Boom	n = 4	180,79	< 2,2e-16
Model 3 – Cumulative	n = 2	407,52	< 2,2e-16
Model 3 – After Boom	n = 2	103,57	< 2,2e-16
Model 3 – Oil Boom	n = 2	172,15	< 2,2e-16
Model 3 – Before Boom	n = 2	171,18	< 2,2e-16
Model 3 – Before & After Boom	n = 2	281,13	< 2,2e-16
Model 3 – Cumulative	n = 3	348,37	< 2,2e-16
Model 3 – After Boom	n = 3	111,43	4,765e-14
Model 3 – Oil Boom	n = 3	142,4	< 2,2e-16
Model 3 – Before Boom	n = 3	174,36	< 2,2e-16
Model 3 – Before & After Boom	n = 3	247,72	< 2,2e-16
Model 3 – Cumulative	n = 4	304,74	< 2,2e-16
Model 3 – After Boom	n = 4	70,219	6,594e-09
Model 3 – Oil Boom	n = 4	173,47	< 2,2e-16
Model 3 – Before Boom	n = 4	145,34	< 2,2e-16
Model 3 – Before & After Boom	n = 4	179,97	< 2,2e-16

5.2.1 Detailed regression results, Model 2

Model 2 cumulative 1991-2015, n=2

VR_2 = cumulative market-adjusted return (F-statistic = 66,75 $\overline{R}^2$= 0,3025)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	0,1356386	0,1178144	1,1513	0,2496999
NI	0,3471431	0,1428848	2,4295	0,0151737**
BV_{1st}	0,4310524	0,1844041	2,3375	0,019473**
BV_{2nd}	0,3332948	0,1235698	2,6972	0,0070292***
BV_{3rd}	0,2852965	0,0952368	2,9957	0,0027598***
BV_{4th}	0,3184843	0,0724796	4,3941	1,15E-05***
ND	-0,3101868	0,0931809	-3,3289	0,000882***
LNOil	0,3246473	0,0526291	6,1686	7,77E-10***

ΔBrent	0,2574681	0,0343351	7,4987	8,33E-14***
ΔDSR	0,1854187	0,0825664	2,2457	0,0247925**
ΔWD	0,0727098	0,0200801	3,621	0,0002981***
D	-0,024411	0,190446	-0,1282	0,8980161
D:NI	0,0995198	0,1682373	0,5915	0,5541982
D:BV_{1st}	-0,0099969	0,3031252	-0,033	0,973693
D:BV_{2nd}	0,0261018	0,1963426	0,1329	0,8942491
D:BV_{3rd}	0,050782	0,1455797	0,3488	0,7272429
D:BV_{4th}	0,0504578	0,1026217	0,4917	0,6229741
D:ND	0,0329847	0,1195958	0,2758	0,7827186
D:LNOil	-0,0235507	0,0745372	-0,316	0,752054
D:ΔBrent	0,050523	0,0552072	0,9152	0,3601815
D:ΔDSR	-0,199021	0,0826476	-2,4081	0,0160941**
D:ΔWD	0,0191159	0,0272528	0,7014	0,4830862

Model 2 cumulative 1991-2015, n=3

VR_3 = cumulative market-adjusted return (F-statistic = 63,14 $\overline{R}^2$= 0,3123)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	0,1670368	0,1174517	1,4222	0,1550851
NI	0,3305284	0,1486099	2,2241	0,0262174**
BV_{1st}	0,4284832	0,1857092	2,3073	0,0211105**
BV_{2nd}	0,3228097	0,1265137	2,5516	0,0107753**
BV_{3rd}	0,27844	0,0976936	2,8501	0,0044014***
BV_{4th}	0,3184813	0,0759282	4,1945	2,82E-05***
ND	-0,3351781	0,1016973	-3,2958	0,0009933***
LNOil	0,3580686	0,0567924	6,3049	3,33E-10***
ΔBrent	0,2614523	0,0350893	7,4511	1,22E-13***
ΔDSR	0,3276498	0,1048248	3,1257	0,0017917***
ΔWD	0,1023242	0,0280786	3,6442	0,000273***
D	-0,0435485	0,1933748	-0,2252	0,8218378
D:NI	0,1237611	0,1708089	0,7246	0,468782

D:BV_{1st}	-0,131943	0,3046813	-0,4331	0,6650093
D:BV_{2nd}	-0,0333141	0,1994122	-0,1671	0,8673333
D:BV_{3rd}	-0,0011607	0,1476654	-0,0079	0,9937288
D:BV_{4th}	0,0273337	0,105549	0,259	0,7956791
D:ND	0,0714754	0,1269043	0,5632	0,5733273
D:LNOil	-0,0715316	0,0805977	-0,8875	0,3748771
D:ΔBrent	0,0576615	0,0562086	1,0258	0,3050496
D:ΔDSR	-0,3306505	0,1403922	-2,3552	0,0185805**
D:ΔWD	0,0668053	0,0403217	1,6568	0,097668*

Model 2 cumulative 1991-2015, n=4

VR_4 = cumulative market-adjusted return (F-statistic = 58,76 $\overline{R}^2$= 0,3208)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	0,2180354	0,1225851	1,7786	0,075417*
NI	0,5407281	0,1206839	4,4805	7,77E-06***
BV_{1st}	0,2979961	0,171922	1,7333	0,08316*
BV_{2nd}	0,2488193	0,1166264	2,1335	0,032981**
BV_{3rd}	0,1898204	0,087007	2,1817	0,029225**
BV_{4th}	0,2670314	0,0662396	4,0313	5,71E-05***
ND	-0,2458658	0,0841996	-2,92	0,003531***
LNOil	0,3431178	0,0555403	6,1778	7,54E-10***
ΔBrent	0,235809	0,0344887	6,8373	1,01E-11***
ΔDSR	0,4448345	0,1652288	2,6922	0,007144***
ΔWD	0,0937398	0,0239728	3,9103	9,46E-05***
D	-0,067027	0,2028043	-0,3305	0,741048
D:NI	-0,0710084	0,1495236	-0,4749	0,634901
D:BV_{1st}	-0,016094	0,3077497	-0,0523	0,958297
D:BV_{2nd}	0,0521515	0,2010193	0,2594	0,79532
D:BV_{3rd}	0,0775597	0,146024	0,5311	0,595365
D:BV_{4th}	0,0785882	0,1023866	0,7676	0,442818
D:ND	-0,0059562	0,1160613	-0,0513	0,959075

D:LNOil	-0,0308525	0,0838466	-0,368	0,712931
D:ΔBrent	0,0589984	0,0580662	1,0161	0,309701
D:ΔDSR	-0,4897951	0,2063588	-2,3735	0,017694**
D:ΔWD	0,0607844	0,0375026	1,6208	0,105183

Model 2 – subsets
Model 2 after oil boom 1991-2015, n=2

VR_2 = cumulative market-adjusted return (F-statistic = 92,98 $\overline{R}^2$= 0,3024)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	0,139724	0,080062	1,7452	0,0810491*
D	-0,046375	0,129343	-0,3585	0,7199606
NI	0,352067	0,13804	2,5505	0,0108042**
BV	0,305988	0,062573	4,8901	1,06E-06***
ND	-0,299817	0,089946	-3,3333	0,0008681***
LNOil	0,306494	0,053045	5,7779	8,30E-09***
ΔBrent	0,26016	0,034125	7,6237	3,24E-14***
ΔDSR_2	0,183036	0,083442	2,1936	0,0283391**
ΔWD_2	0,072187	0,02007	3,5968	0,0003271***
D:NI	0,094551	0,163633	0,5778	0,5634255
D:BV	0,061139	0,088254	0,6928	0,4885145
D:ND	0,027108	0,116011	0,2337	0,8152563
D:LNOil	-0,014567	0,077507	-0,1879	0,8509374
D:ΔBrent	0,04544	0,055374	0,8206	0,4119381
D:ΔDSR_2	-0,196501	0,083521	-2,3527	0,0186973**
D:ΔWD_2	0,020184	0,02733	0,7385	0,4602501

Model 2 after oil boom 1991-2015, n=3

VR_3 = cumulative market-adjusted return (F-statistic = 87,71 $\overline{R}^2$= 0,3116)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	0,162826	0,082563	1,9721	0,0486898**
D	-0,099696	0,131747	-0,7567	0,4492775

NI	0,333385	0,14305	2,3306	0,019846**
BV	0,307111	0,066062	4,6488	3,49E-06***
ND	-0,325286	0,098066	-3,317	0,0009213***
LNOil	0,338033	0,056839	5,9472	3,06E-09***
ΔBrent	0,264404	0,0349	7,5761	4,78E-14***
ΔDSR_3	0,32567	0,105521	3,0863	0,002046***
ΔWD_3	0,101697	0,028021	3,6293	0,0002892***
D:NI	0,116202	0,165801	0,7008	0,483454
D:BV	0,046026	0,090834	0,5067	0,6124064
D:ND	0,064266	0,122978	0,5226	0,6013061
D:LNOil	-0,054242	0,082723	-0,6557	0,5120661
D:ΔBrent	0,054418	0,05654	0,9625	0,3358945
$D{:}\Delta DSR_3$	-0,32896	0,140875	-2,3351	0,0196057**
$D{:}\Delta WD_3$	0,068777	0,040286	1,7072	0,087889*

Model 2 after oil boom 1991-2015, n=4

VR_4 = cumulative market-adjusted return (F-statistic = 81,35 $\bar{R}^2$= 0,3194)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	0,1785888	0,084374	2,1166	0,0343874**
D	-0,0900893	0,1378008	-0,6538	0,5133222
NI	0,5348434	0,1189291	4,4972	7,19E-06***
BV	0,2641461	0,0575666	4,5885	4,68E-06***
ND	-0,2399202	0,0818184	-2,9324	0,003394***
LNOil	0,3266306	0,0583721	5,5957	2,43E-08***
ΔBrent	0,2393372	0,0342498	6,988	3,55E-12***
ΔDSR_4	0,439615	0,1649922	2,6645	0,0077597***
ΔWD_4	0,0924312	0,0241079	3,8341	0,0001291***
D:NI	-0,0696968	0,1477487	-0,4717	0,6371629
D:BV	0,0888233	0,0882409	1,0066	0,3142225
D:ND	-0,0094136	0,1130225	-0,0833	0,9336276
D:LNOil	-0,0177968	0,0873506	-0,2037	0,8385734

D:ΔBrent	0,0554488	0,0582452	0,952	0,341192
D:ΔDSR_4	-0,4812902	0,2070758	-2,3242	0,0201917**
D:ΔWD_4	0,0614621	0,0377016	1,6302	0,1031773

Model 2 after oil boom 2008-2015, n=2

VR_2 = cumulative market-adjusted return (F-statistic = 46,88 $\bar{R}^2$= 0,359)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	0,084009	0,138338	0,6073	0,543782
D	-0,163648	0,224845	-0,7278	0,46686
NI	0,127593	0,117107	1,0895	0,276129
BV	0,306524	0,095216	3,2193	0,001319***
ND	-0,45993	0,169144	-2,7192	0,006638***
LNOil	0,24289	0,089729	2,7069	0,006886***
ΔBrent	0,507678	0,049515	10,253	2,20E-16***
ΔDSR_2	0,105545	0,088993	1,186	0,235856
ΔWD_2	0,059746	0,03543	1,6863	0,091989*
D:NI	0,221624	0,148763	1,4898	0,136542
D:BV	-0,048337	0,117553	-0,4112	0,681005
D:ND	0,382091	0,203063	1,8816	0,060124*
D:LNOil	-0,102006	0,135535	-0,7526	0,451827
D:ΔBrent	0,128797	0,080193	1,6061	0,108517
D:ΔDSR_2	-0,111134	0,206947	-0,537	0,591352
D:ΔWD_2	-0,016324	0,04094	-0,3987	0,690162

Model 2 after oil boom 2008-2015, n=3

VR_3 = cumulative market-adjusted return (F-statistic = 45,72 $\bar{R}^2$= 0,368)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	0,062674	0,150083	0,4176	0,676319
D	-0,182106	0,233088	-0,7813	0,434803
NI	0,132495	0,123191	1,0755	0,282366
BV	0,292303	0,096421	3,0315	0,002488***

ND	-0,433575	0,175721	-2,4674	0,013756**
LNOil	0,221087	0,101789	2,172	0,030061**
ΔBrent	0,506228	0,05122	9,8834	2,20E-16***
ΔDSR_3	0,241886	0,13344	1,8127	0,070142*
ΔWD_3	0,063971	0,043484	1,4711	0,14153
D:NI	0,217978	0,154889	1,4073	0,159608
D:BV	-0,03551	0,118277	-0,3002	0,764059
D:ND	0,367675	0,208863	1,7604	0,078614*
D:LNOil	-0,115794	0,14519	-0,7975	0,425306
D:ΔBrent	0,130374	0,081738	1,595	0,110985
D:ΔDSR_3	-0,522669	0,320181	-1,6324	0,102868
D:ΔWD_3	0,040699	0,059962	0,6787	0,497436

Model 2 after oil boom 2008-2015, n=4

VR_4 = cumulative market-adjusted return (F-statistic = 41,7 $\overline{R}^2$= 0,3615)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	0,0076544	0,1593736	0,048	0,961703
D	-0,1697616	0,2423958	-0,7003	0,483863
NI	0,2574108	0,1030631	2,4976	0,012654**
BV	0,2139625	0,0696103	3,0737	0,002168***
ND	-0,2404193	0,1325562	-1,8137	0,070003*
LNOil	0,1486395	0,1004601	1,4796	0,13928
ΔBrent	0,5050287	0,0505842	9,9839	2,20E-16***
ΔDSR_4	0,2313904	0,1252445	1,8475	0,064951*
ΔWD_4	0,0708272	0,030547	2,3186	0,020604**
D:NI	0,0740213	0,1384799	0,5345	0,593088
D:BV	0,0386803	0,0983725	0,3932	0,694249
D:ND	0,1930621	0,174265	1,1079	0,268171
D:LNOil	-0,0718554	0,1465476	-0,4903	0,624008
D:ΔBrent	0,1250785	0,0815731	1,5333	0,125492
D:ΔDSR_4	-0,3261279	0,3327305	-0,9802	0,327232

D:ΔWD_4	0,0850865	0,0556849	1,528	0,126811

Model 2 oil boom 2002-2007, n=2

VR_2 = cumulative market-adjusted return (F-statistic = 23,68 $\bar{R}^2$= 0,2997)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	0,466717	0,152276	3,0649	0,0022522***
D	-0,143632	0,280611	-0,5119	0,608897
NI	-0,556532	0,51603	-1,0785	0,2811496
BV	0,327627	0,119646	2,7383	0,0063163***
ND	-0,331631	0,177668	-1,8666	0,0623364*
LNOil	0,401628	0,10089	3,9809	7,51E-05***
ΔBrent	0,022025	0,123686	0,1781	0,8587126
ΔDSR_2	0,367906	0,14704	2,5021	0,0125505**
ΔWD_2	0,119617	0,035125	3,4054	0,0006943***
D:NI	1,787114	0,804765	2,2207	0,0266602**
D:BV	-0,142453	0,183746	-0,7753	0,4384148
D:ND	0,387926	0,300469	1,2911	0,1970623
D:LNOil	-0,126059	0,166128	-0,7588	0,4481997
D:ΔBrent	0,007817	0,189796	0,0412	0,967158
D:ΔDSR_2	-0,388069	0,147211	-2,6361	0,0085524***
D:ΔWD_2	0,113058	0,066885	1,6903	0,0913652*

Model 2 oil boom 2002-2007, n=3

VR_3 = cumulative market-adjusted return (F-statistic = 23,42 $\bar{R}^2$= 0,3181)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	0,442587	0,15114	2,9283	0,0035177***
D	-0,065103	0,294848	-0,2208	0,8253109
NI	-0,602925	0,505687	-1,1923	0,2335489
BV	0,395252	0,123306	3,2055	0,0014092***
ND	-0,494219	0,177449	-2,7851	0,005494***
LNOil	0,377761	0,102227	3,6953	0,0002366***

ΔBrent	-0,111574	0,129332	-0,8627	0,3886011
ΔDSR_3	0,254351	0,206304	1,2329	0,2180255
ΔWD_3	0,167399	0,060061	2,7871	0,0054605***
D:NI	2,06818	0,868326	2,3818	0,0174922**
D:BV	-0,243891	0,185884	-1,3121	0,1899262
D:ND	0,630865	0,320817	1,9664	0,0496402**
D:LNOil	0,014384	0,18532	0,0776	0,9381537
D:ΔBrent	0,149171	0,196064	0,7608	0,4470152
D:ΔDSR_3	-0,536485	0,275493	-1,9474	0,0518872*
D:ΔWD_3	0,078262	0,094473	0,8284	0,4077187

Model 2 oil boom 2002-2007, n=4

VR_4 = cumulative market-adjusted return (F-statistic = 21,93 $\bar{R}^2$= 0,3244)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	0,347639	0,182353	1,9064	0,057047*
D	0,024076	0,295893	0,0814	0,935175
NI	0,408721	0,641662	0,637	0,524371
BV	0,330088	0,135498	2,4361	0,015118**
ND	-0,393476	0,193601	-2,0324	0,042526**
LNOil	0,302782	0,114085	2,654	0,008152***
ΔBrent	-0,169767	0,139756	-1,2147	0,224917
ΔDSR_4	0,247561	0,27363	0,9047	0,36595
ΔWD_4	0,156613	0,049188	3,184	0,001523***
D:NI	1,170819	1,010332	1,1588	0,246952
D:BV	-0,196779	0,203614	-0,9664	0,334194
D:ND	0,595249	0,346377	1,7185	0,08619*
D:LNOil	0,100276	0,167439	0,5989	0,549462
D:ΔBrent	0,114561	0,215767	0,5309	0,595639
D:ΔDSR_4	-0,217882	0,457924	-0,4758	0,634377
D:ΔWD_4	0,035647	0,101753	0,3503	0,726209

Model 2 before oil boom 1991-2002, n=2

VR_2 = cumulative market-adjusted return (F-statistic = 43,4 $\overline{R}^2$= 0,3547)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	0,016471	0,153472	0,1073	0,914554
D	-0,10575	0,210289	-0,5029	0,615148
NI	0,786219	0,369518	2,1277	0,033577
BV	0,357876	0,095445	3,7496	0,000186***
ND	-0,222019	0,085835	-2,5866	0,009816***
LNOil	0,28844	0,121986	2,3645	0,01822**
ΔBrent	-0,035254	0,045965	-0,767	0,443253
ΔDSR_2	0,049308	0,064852	0,7603	0,447228
ΔWD_2	0,042229	0,026873	1,5715	0,116354
D:NI	-0,087873	0,433357	-0,2028	0,839349
D:BV	0,199449	0,136356	1,4627	0,143823
D:ND	-0,262517	0,135113	-1,943	0,052267*
D:LNOil	-0,011883	0,15438	-0,077	0,938658
D:ΔBrent	0,02568	0,071973	0,3568	0,721306
D:ΔDSR_2	-0,019926	0,129501	-0,1539	0,87774
D:ΔWD_2	0,020184	0,02733	0,7385	0,4602501

Model 2 before oil boom 1991-2002, n=3

VR_3 = cumulative market-adjusted return (F-statistic = 41,23 $\overline{R}^2$= 0,3768)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	0,058548	0,169502	0,3454	0,7298571
D	-0,244586	0,234253	-1,0441	0,2966911
NI	0,88497	0,438868	2,0165	0,044021**
BV	0,35532	0,10386	3,4211	0,0006493***
ND	-0,210559	0,09417	-2,2359	0,0255791**
LNOil	0,365367	0,139501	2,6191	0,0089517***
ΔBrent	-0,035239	0,050992	-0,6911	0,4896875
ΔDSR_3	0,365788	0,132556	2,7595	0,0058966***

ΔWD_3	0,034317	0,040956	0,8379	0,4022863
D:NI	-0,029167	0,49418	-0,059	0,9529474
D:BV	0,241049	0,154453	1,5607	0,1189258
D:ND	-0,316233	0,146799	-2,1542	0,0314676**
D:LNOil	-0,118676	0,169817	-0,6988	0,4848123
D:ΔBrent	0,059611	0,076783	0,7764	0,4377261
D:ΔDSR_3	-0,296441	0,19638	-1,5095	0,1314854
D:ΔWD_3	0,141121	0,058772	2,4012	0,016528**

Model 2 before oil boom 1991-2002, n=4

VR_4 = cumulative market-adjusted return (F-statistic = 36,98 $\bar{R}^2$= 0,3929)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	0,079588	0,186344	0,4271	0,669417
D	-0,248819	0,267831	-0,929	0,353156
NI	0,881736	0,447292	1,9713	0,049029**
BV	0,348789	0,102496	3,403	0,000699***
ND	-0,203592	0,099025	-2,056	0,040102**
LNOil	0,354639	0,166483	2,1302	0,033454**
ΔBrent	-0,03434	0,052084	-0,6593	0,509881
ΔDSR_4	0,737753	0,292042	2,5262	0,011718**
ΔWD_4	0,017177	0,038964	0,4409	0,659435
D:NI	0,141619	0,533804	0,2653	0,790844
D:BV	0,30637	0,174638	1,7543	0,07975*
D:ND	-0,375795	0,166809	-2,2528	0,024533**
D:LNOil	-0,060887	0,200699	-0,3034	0,76168
D:ΔBrent	0,026244	0,077517	0,3386	0,735027
D:ΔDSR_4	-0,853302	0,324339	-2,6309	0,008676***
D:ΔWD_4	0,114235	0,052609	2,1714	0,030187**

Model 2 before and after oil boom 1991-2001 & 2008-2015, n=2

VR_2 = cumulative market-adjusted return (F-statistic = 74,24 $\bar{R}^2$= 0,3152)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	0,071366	0,090206	0,7911	0,4289385
D	-0,048424	0,139174	-0,3479	0,7279172
NI	0,407226	0,120252	3,3865	0,0007196***
BV	0,312309	0,071325	4,3787	1,25E-05***
ND	-0,300319	0,101566	-2,9569	0,0031384***
LNOil	0,280048	0,054573	5,1316	3,11E-07***
ΔBrent	0,231424	0,036684	6,3086	3,35E-10***
ΔDSR_2	0,091293	0,065959	1,3841	0,1664641
ΔWD_2	0,057017	0,021626	2,6365	0,0084322***
D:NI	-0,044653	0,143398	-0,3114	0,7555291
D:BV	0,092638	0,093854	0,987	0,3237254
D:ND	-0,017455	0,126177	-0,1383	0,8899836
D:LNOil	0,016474	0,083418	0,1975	0,8434611
D:ΔBrent	0,045856	0,059284	0,7735	0,4393063
D:ΔDSR_2	-0,068103	0,119328	-0,5707	0,568244
D:ΔWD_2	0,015747	0,0278	0,5664	0,5711488

Model 2 before and after oil boom 1991-2001 & 2008-2015, n=3

VR_3 = cumulative market-adjusted return (F-statistic = 67,8 $\overline{R}^2$= 0,3178)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	0,077508	0,100036	0,7748	0,4385452
D	-0,1151	0,147855	-0,7785	0,4363787
NI	0,438487	0,127352	3,4431	0,0005861***
BV	0,302112	0,073448	4,1133	4,05E-05***
ND	-0,280918	0,101856	-2,758	0,0058655***
LNOil	0,295025	0,062194	4,7436	2,24E-06***
ΔBrent	0,240668	0,038526	6,2469	5,04E-10***
ΔDSR_3	0,354135	0,095378	3,713	0,0002101***
ΔWD_3	0,059443	0,030556	1,9454	0,0518592**
D:NI	-0,064623	0,146785	-0,4403	0,6597975

D:BV	0,089161	0,094675	0,9418	0,3464219
D:ND	-0,020585	0,126371	-0,1629	0,8706208
D:LNOil	-0,052059	0,09141	-0,5695	0,5690701
D:ΔBrent	0,071331	0,060868	1,1719	0,2413691
D:ΔDSR_3	-0,306486	0,160506	-1,9095	0,0563322*
D:ΔWD_3	0,093242	0,044145	2,1122	0,0347881**

Model 2 before and after oil boom 1991-2001 & 2008-2015, n=4

VR_4 = cumulative market-adjusted return (F-statistic = 61,49 $\overline{R}^2$= 0,3217)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	0,09475	0,105337	0,8995	0,368501
D	-0,096504	0,158145	-0,6102	0,541787
NI	0,54811	0,125716	4,3599	1,37E-05***
BV	0,262993	0,062409	4,214	2,63E-05***
ND	-0,196547	0,074489	-2,6386	0,008393***
LNOil	0,287391	0,069567	4,1311	3,77E-05***
ΔBrent	0,230492	0,038166	6,0392	1,86E-09***
ΔDSR_4	0,53604	0,186626	2,8723	0,004121***
ΔWD_4	0,05835	0,025593	2,2799	0,022725***
D:NI	-0,157829	0,146343	-1,0785	0,280956
D:BV	0,128536	0,088996	1,4443	0,148822
D:ND	-0,099304	0,107544	-0,9234	0,355927
D:LNOil	-0,019654	0,101088	-0,1944	0,845868
D:ΔBrent	0,070929	0,062374	1,1372	0,255615
D:ΔDSR_4	-0,618108	0,232076	-2,6634	0,007801***
D:ΔWD_4	0,086077	0,039442	2,1824	0,029204**

5.2.2 Detailed regression results, Model 3

Model 3 cumulative 1991-2015, n=2

VR_2 = cumulative market-adjusted return (F-statistic = 97,37 $\overline{R}^2$= 0,275)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|

Intercept	0,161333	0,081216	1,9865	0,0470629**
D	0,084799	0,134074	0,6325	0,5271173
NI	0,394454	0,14173	2,7831	0,0054142***
BV	0,312325	0,063201	4,9418	8,13E-07***
ND	-0,304245	0,09154	-3,3236	0,0008983***
LNOil	0,316692	0,053452	5,9248	3,45E-09***
ΔBrent	0,24153	0,033378	7,2362	5,72E-13***
$DODSR_2$	0,054397	0,033672	1,6155	0,1063029
D:NI	0,060753	0,168551	0,3604	0,7185401
D:BV	0,034509	0,089795	0,3843	0,7007781
D:ND	0,027716	0,117674	0,2355	0,813811
D:LNOil	0,050389	0,07916	0,6365	0,5244627
D:ΔBrent	0,029525	0,05538	0,5331	0,5939766
D:$DODSR_2$	-0,059379	0,033684	-1,7628	0,0780221*

Model 3 cumulative 1991-2015, n=3

VR_3 = cumulative market-adjusted return (F-statistic = 87,31 $\bar{R}^2$= 0,2735)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	0,19802	0,085156	2,3254	0,020118**
D	0,108908	0,139968	0,7781	0,436574
NI	0,391915	0,14664	2,6726	0,007567***
BV	0,301201	0,066777	4,5105	6,72E-06***
ND	-0,318393	0,09976	-3,1916	0,00143***
LNOil	0,355937	0,05858	6,0761	1,39E-09***
ΔBrent	0,234976	0,033792	6,9536	4,36E-12***
$DODSR_3$	0,116467	0,053239	2,1876	0,028773**
D:NI	0,095815	0,170936	0,5605	0,575161
D:BV	0,020759	0,092595	0,2242	0,822622
D:ND	0,056639	0,125419	0,4516	0,65159
D:LNOil	0,043005	0,087398	0,4921	0,622713
D:ΔBrent	0,03847	0,056224	0,6842	0,493891

D:DODSR$_3$	-0,220376	0,08891	-2,4787	0,013243**

Model 3 cumulative 1991-2015, n=4

VR_4 = cumulative market-adjusted return (F-statistic = 85,96 $\overline{R}^2$= 0,2934)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	0,203236	0,08733	2,3272	0,0200284**
D	0,06907	0,140457	0,4918	0,6229367
NI	0,590617	0,124992	4,7252	2,42E-06***
BV	0,258896	0,056915	4,5488	5,64E-06***
ND	-0,23648	0,077855	-3,0374	0,0024093***
LNOil	0,357225	0,058361	6,1209	1,07E-09***
ΔBrent	0,210177	0,033783	6,2214	5,71E-10***
DODSR$_4$	0,234748	0,088805	2,6434	0,008256***
D:NI	-0,094603	0,154759	-0,6113	0,5410583
D:BV	0,095684	0,087765	1,0902	0,2757081
D:ND	-0,035634	0,11079	-0,3216	0,7477578
D:LNOil	0,032492	0,086618	0,3751	0,7076075
D:ΔBrent	0,073082	0,05724	1,2768	0,2018018
D:DODSR$_4$	-0,449578	0,120671	-3,7256	0,0001989***

Model 3 after oil boom 2008-2015, n=2

VR_2 = cumulative market-adjusted return (F-statistic = 50,3 $\overline{R}^2$= 0,3404)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	0,094192	0,140146	0,6721	0,501648
D	-0,057283	0,231603	-0,2473	0,804692
NI	0,143382	0,113981	1,2579	0,20865
BV	0,309913	0,096365	3,216	0,001334***
ND	-0,468485	0,171118	-2,7378	0,006275***
LNOil	0,247283	0,091325	2,7077	0,006868***
ΔBrent	0,496074	0,050405	9,8418	2,20E-16***
DODSR$_2$	0,043909	0,041945	1,0468	0,295385

D:NI	0,203813	0,148503	1,3724	0,170174
D:BV	-0,120043	0,121514	-0,9879	0,323398
D:ND	0,44533	0,206993	2,1514	0,031637
D:LNOil	-0,059428	0,139156	-0,4271	0,66941
D:ΔBrent	0,159058	0,085276	1,8652	0,062389*
D:$DODSR_2$	0,127737	0,191965	0,6654	0,505909

Model 3 after oil boom 2008-2015, n=3

VR_3 = cumulative market-adjusted return (F-statistic = 48,25 $\overline{R}^2$= 0,3458)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	0,076458	0,150136	0,5093	0,610667
D	-0,089888	0,23946	-0,3754	0,707448
NI	0,160564	0,112424	1,4282	0,153507
BV	0,287507	0,096161	2,9898	0,002851***
ND	-0,425541	0,175523	-2,4244	0,015487**
LNOil	0,23127	0,105717	2,1876	0,028898**
ΔBrent	0,492102	0,050806	9,686	2,20E-16***
$DODSR_3$	0,077289	0,067885	1,1385	0,255137
D:NI	0,203831	0,149077	1,3673	0,171803
D:BV	-0,106246	0,121448	-0,8748	0,381849
D:ND	0,426805	0,210895	2,0238	0,043223**
D:LNOil	-0,089703	0,151942	-0,5904	0,555057
D:ΔBrent	0,15593	0,08654	1,8018	0,071835*
D:$DODSR_3$	0,126537	0,31033	0,4077	0,683534

Model 3 after oil boom 2008-2015, n=4

VR_4 = cumulative market-adjusted return (F-statistic = 45,67 $\overline{R}^2$= 0,3478)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	0,044134	0,157592	0,2801	0,779489
D	-0,176147	0,243144	-0,7245	0,468942
NI	0,289283	0,099629	2,9036	0,003764***

BV	0,197775	0,066465	2,9756	0,002989***
ND	-0,217637	0,129504	-1,6805	0,093144*
LNOil	0,182148	0,10454	1,7424	0,081728*
ΔBrent	0,495032	0,051285	9,6526	2,20E-16***
$DODSR_4$	0,164732	0,110182	1,4951	0,135185
D:NI	0,055846	0,139716	0,3997	0,68945
D:BV	0,038973	0,098157	0,397	0,69141
D:ND	0,182582	0,171286	1,0659	0,286688
D:LNOil	-0,081808	0,151611	-0,5396	0,58959
D:ΔBrent	0,131802	0,087105	1,5131	0,130537
D:$DODSR_4$	0,124576	0,356751	0,3492	0,72701

Model 3 oil boom 2002-2007, n=2

VR_2 = cumulative market-adjusted return (F-statistic = 20,59 $\overline{R}^2$= 0,2356)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	0,486422	0,159914	3,0418	0,0024274***
D	0,046546	0,281563	0,1653	0,8687393
NI	-0,457679	0,598579	-0,7646	0,4447261
BV	0,341426	0,13392	2,5495	0,0109713**
ND	-0,351041	0,197462	-1,7778	0,0758162*
LNOil	0,369149	0,10412	3,5454	0,0004144***
ΔBrent	-0,072232	0,121979	-0,5922	0,5539052
$DODSR_2$	0,087271	0,086466	1,0093	0,3131282
D:NI	1,608115	0,880406	1,8266	0,0681324*
D:BV	-0,125964	0,193865	-0,6498	0,5160362
D:ND	0,305359	0,31566	0,9674	0,3336495
D:LNOil	-0,015816	0,165279	-0,0957	0,9237859
D:ΔBrent	-0,022488	0,182935	-0,1229	0,9021953
D:$DODSR_2$	-0,093086	0,0865	-1,0761	0,2821836

Model 3 oil boom 2002-2007, n=3

VR$_3$ = cumulative market-adjusted return (F-statistic = 21,54 $\overline{R}^2$= 0,2612)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	0,454137	0,15652	2,9015	0,0038242***
D	0,166599	0,293406	0,5678	0,5703348
NI	-0,562854	0,578838	-0,9724	0,3311756
BV	0,409762	0,133993	3,0581	0,0023077***
ND	-0,520285	0,191955	-2,7105	0,0068744***
LNOil	0,347814	0,10517	3,3072	0,0009879***
ΔBrent	-0,098722	0,128346	-0,7692	0,4420262
DODSR$_3$	0,078441	0,116958	0,6707	0,5026329
D:NI	1,85894	0,875338	2,1237	0,034027**
D:BV	-0,215797	0,195385	-1,1045	0,2697472
D:ND	0,53771	0,320397	1,6783	0,0937167*
D:LNOil	0,091259	0,180793	0,5048	0,6138698
D:ΔBrent	0,014972	0,187344	0,0799	0,9363236
D:DODSR$_3$	-0,39068	0,228801	-1,7075	0,088146*

Model 3 oil boom 2002-2007, n=4

VR$_4$ = cumulative market-adjusted return (F-statistic = 23,21 $\overline{R}^2$= 0,2959)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	0,415673	0,179877	2,3109	0,0211407***
D	0,308778	0,301232	1,0251	0,3057063
NI	0,572441	0,680291	0,8415	0,4003862
BV	0,300105	0,143186	2,0959	0,0364627**
ND	-0,352769	0,201985	-1,7465	0,0811779*
LNOil	0,350735	0,11478	3,0557	0,002334***
ΔBrent	-0,120297	0,137634	-0,874	0,3824106
DODSR$_4$	0,176387	0,18179	0,9703	0,3322557
D:NI	0,819413	0,996441	0,8223	0,4111741
D:BV	-0,10622	0,215059	-0,4939	0,6215301
D:ND	0,428906	0,34569	1,2407	0,2151392

D:LNOil	0,161936	0,168719	0,9598	0,3374999
D:ΔBrent	-0,018313	0,199209	-0,0919	0,9267837
D:$DODSR_4$	-0,851886	0,234079	-3,6393	0,0002943***

Model 3 before oil boom 1991-2001, n=2

VR_2 = cumulative market-adjusted return (F-statistic = 49,97 $\bar{R}^2$= 0,3407)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	0,0341039	0,1427046	0,239	0,81116
D	-0,0220439	0,1978536	-0,1114	0,911305
NI	0,8037948	0,3690947	2,1777	0,029616**
BV	0,3640062	0,0891269	4,0841	4,71E-05***
ND	-0,2235314	0,083331	-2,6825	0,007407***
LNOil	0,2936641	0,1121454	2,6186	0,008939***
ΔBrent	-0,0379985	0,0425361	-0,8933	0,37186
$DODSR_2$	0,0034705	0,0355293	0,0977	0,922202
D:NI	-0,183708	0,4230416	-0,4343	0,66418
D:BV	0,2169509	0,1261475	1,7198	0,085719*
D:ND	-0,2952776	0,1309308	-2,2552	0,024296**
D:LNOil	0,040425	0,1492784	0,2708	0,786589
D:ΔBrent	-0,0049643	0,0679973	-0,073	0,941813
D:$DODSR_2$	-0,0195408	0,0578255	-0,3379	0,735476

Model 3 before oil boom 1991-2001, n=3

VR_3 = cumulative market-adjusted return (F-statistic = 43,36 $\bar{R}^2$= 0,3415)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	0,0718747	0,1720586	0,4177	0,6762274
D	-0,0746561	0,2356098	-0,3169	0,7514104
NI	0,9007654	0,4501405	2,0011	0,0456414**
BV	0,3570423	0,1040881	3,4302	0,0006266***
ND	-0,2152733	0,0956896	-2,2497	0,0246743**
LNOil	0,3771637	0,1332455	2,8306	0,0047349***

ΔBrent	-0,0506036	0,0449339	-1,1262	0,260347
$DODSR_3$	0,0844341	0,0767185	1,1006	0,2713361
D:NI	-0,2239761	0,5071102	-0,4417	0,658818
D:BV	0,2852701	0,1602879	1,7797	0,0754086*
D:ND	-0,3688552	0,1559622	-2,365	0,0182098**
D:LNOil	-0,058628	0,1702249	-0,3444	0,7306035
D:ΔBrent	0,0012726	0,0715836	0,0178	0,9858194
D:$DODSR_3$	-0,2307681	0,126516	-1,824	0,0684329*

Model 3 before oil boom 1991-2001, n=4

VR_4 = cumulative market-adjusted return (F-statistic = 40,02 $\bar{R}^2$= 0,3652)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	0,07645	0,208327	0,367	0,713729
D	-0,139362	0,269082	-0,5179	0,604647
NI	0,913971	0,479808	1,9049	0,057127*
BV	0,355881	0,11087	3,2099	0,001377***
ND	-0,218441	0,103121	-2,1183	0,034433**
LNOil	0,40358	0,153191	2,6345	0,008576***
ΔBrent	-0,056562	0,047672	-1,1865	0,235755
$DODSR_4$	0,248657	0,145773	1,7058	0,088406*
D:NI	0,082705	0,565483	0,1463	0,883754
D:BV	0,309695	0,177663	1,7432	0,081659*
D:ND	-0,374997	0,168886	-2,2204	0,026648**
D:LNOil	-0,150927	0,187985	-0,8029	0,42227
D:ΔBrent	0,034291	0,071244	0,4813	0,630412
D:$DODSR_4$	-0,457644	0,192167	-2,3815	0,017457**

Model 3 before and after oil boom 1991-2001 & 2008-2015, n=2

VR_2 = cumulative market-adjusted return (F-statistic = 78,87 $\bar{R}^2$= 0,2903)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	0,0968118	0,0907488	1,0668	0,286162

D	0,0911485	0,1491789	0,611	0,541255
NI	0,4394849	0,1215611	3,6153	0,000306***
BV	0,3158988	0,0710977	4,4432	9,26E-06***
ND	-0,3006558	0,1018913	-2,9508	0,0032***
LNOil	0,2969574	0,0543151	5,4673	5,03E-08***
ΔBrent	0,2162633	0,0357485	6,0496	1,67E-09***
$DODSR_2$	0,0306538	0,0276912	1,107	0,268407
D:NI	-0,0704419	0,1471522	-0,4787	0,632194
D:BV	0,0524213	0,1000129	0,5241	0,600225
D:ND	-0,0022697	0,1299179	-0,0175	0,986063
D:LNOil	0,0835209	0,0858936	0,9724	0,330959
D:ΔBrent	0,0334567	0,0593105	0,5641	0,572742
D:$DODSR_2$	-0,0262026	0,0496763	-0,5275	0,597918

Model 3 before and after oil boom 1991-2001 & 2008-2015, n=3

VR_3 = cumulative market-adjusted return (F-statistic = 68,16 $\overline{R}^2$= 0,2819)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	0,0985325	0,1005629	0,9798	0,3272873
D	0,1025276	0,160043	0,6406	0,5218324
NI	0,4671092	0,1274874	3,664	0,0002542***
BV	0,3023895	0,073721	4,1018	4,25E-05***
ND	-0,2821373	0,1023172	-2,7575	0,0058728***
LNOil	0,3155162	0,062265	5,0673	4,37E-07***
ΔBrent	0,2122522	0,0366453	5,7921	7,94E-09***
$DODSR_3$	0,1070945	0,0539007	1,9869	0,0470583**
D:NI	-0,0628151	0,1496319	-0,4198	0,6746742
D:BV	0,0353337	0,1026822	0,3441	0,7307985
D:ND	0,0053921	0,131983	0,0409	0,9674155
D:LNOil	0,049693	0,0965803	0,5145	0,6069363
D:ΔBrent	0,0569909	0,0603145	0,9449	0,3448161
D:$DODSR_3$	-0,1191386	0,0974039	-1,2231	0,2214071

Model 3 before and after oil boom 1991-2001 & 2008-2015, n=4

VR_4 = cumulative market-adjusted return (F-statistic = 64,91 $\overline{R}^2$= 0,2964)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	0,097887	0,112663	0,8688	0,385037
D	0,024893	0,164567	0,1513	0,879783
NI	0,57169	0,128614	4,445	9,28E-06***
BV	0,266621	0,063655	4,1885	2,93E-05***
ND	-0,204596	0,071526	-2,8605	0,004275***
LNOil	0,314844	0,068943	4,5667	5,26E-06***
ΔBrent	0,198304	0,037493	5,289	1,37E-07***
$DODSR_4$	0,244643	0,098676	2,4792	0,01325**
D:NI	-0,161151	0,151805	-1,0616	0,288562
D:BV	0,115576	0,089732	1,288	0,197893
D:ND	-0,093738	0,105703	-0,8868	0,375293
D:LNOil	0,012092	0,100785	0,12	0,904512
D:ΔBrent	0,086684	0,06159	1,4074	0,159454
D:$DODSR_4$	-0,309225	0,13705	-2,2563	0,024162**

5.2.3 Detailed regression results, Model 4

Model 4 cumulative sample 1991-2015, n=2

VR_2 = cumulative market-adjusted return (F-statistic = 93,04 $\overline{R}^2$= 0,3025)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	0,13972364	0,08006223	1,7452	0,0810491*
D	-0,04564862	0,12940229	-0,3528	0,724288
NI	0,35206732	0,13803971	2,5505	0,0108042**
BV	0,30598826	0,06257316	4,8901	1,06E-06***
ND	-0,29981678	0,08994595	-3,3333	0,0008681***
LNOil	0,30649358	0,05304541	5,7779	8,30E-09***
ΔBrent	0,26016037	0,03412523	7,6237	3,24E-14***
ΔDSR_{SE}	0,18303626	0,08344235	2,1936	0,0283391**
$\Delta DODSR_{FC}$	-0,00523443	0,00094623	-5,5319	3,43E-08***

ΔWD_2	0,07218667	0,0200696	3,5968	0,0003271***
D:NI	0,09451609	0,16361711	0,5777	0,5635305
D:BV	0,06086902	0,0882666	0,6896	0,4904936
D:ND	0,02785312	0,11602944	0,2401	0,8103054
D:LNOil	-0,01455773	0,07753816	-0,1877	0,8510853
D:ΔBrent	0,04567753	0,05537767	0,8248	0,4095264
D:ΔWD_2	0,02012809	0,0273238	0,7367	0,4613895

Model 4 cumulative sample 1991-2015, n=3

VR_3 = cumulative market-adjusted return (F-statistic = 88,24 $\overline{R}^2$= 0,313)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	0,162826	0,082563	1,9721	0,0486898**
D	-0,064826	0,133106	-0,487	0,6262762
NI	0,333385	0,14305	2,3306	0,019846***
BV	0,307111	0,066062	4,6488	3,49E-06***
ND	-0,325286	0,098066	-3,317	0,0009213***
LNOil	0,338033	0,056839	5,9472	3,06E-09***
ΔBrent	0,264404	0,0349	7,5761	4,78E-14***
ΔDSR_{SE}	0,32567	0,105521	3,0863	0,002046***
$\Delta DODSR_{FC}$	-0,135203	0,060946	-2,2184	0,0266048**
ΔWD_3	0,101697	0,028021	3,6293	0,0002892***
D:NI	0,118378	0,165632	0,7147	0,4748503
D:BV	0,049355	0,090721	0,544	0,5864595
D:ND	0,061011	0,122982	0,4961	0,6198658
D:LNOil	-0,041815	0,083084	-0,5033	0,6148027
D:ΔBrent	0,055922	0,056425	0,9911	0,321729
D:ΔWD_3	0,070408	0,040323	1,7461	0,0809007*

Model 4 cumulative sample 1991-2015, n=4

VR_4 = cumulative market-adjusted return (F-statistic = 82,1 $\overline{R}^2$= 0,3214)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|

Intercept	0,17859	0,084374	2,1166	0,0343874**
D	-0,036741	0,1407	-0,2611	0,794016
NI	0,53484	0,11893	4,4972	7,19E-06***
BV	0,26415	0,057567	4,5885	4,68E-06***
ND	-0,23992	0,081818	-2,9324	0,003394***
LNOil	0,32663	0,058372	5,5957	2,43E-08***
ΔBrent	0,23934	0,03425	6,988	3,55E-12***
ΔDSR_{SE}	0,43962	0,16499	2,6645	0,0077597***
$\Delta DODSR_{FC}$	-0,21275	0,08116	-2,6214	0,0088092***
ΔWD_4	0,092431	0,024108	3,8341	0,0001291***
D:NI	-0,067015	0,14757	-0,4541	0,6497751
D:BV	0,091964	0,088072	1,0442	0,2964951
D:ND	-0,013785	0,11297	-0,122	0,9028885
D:LNOil	-0,000066	0,08786	-0,0008	0,9994012
D:ΔBrent	0,062844	0,058119	1,0813	0,2796668
$D{:}\Delta WD_4$	0,061598	0,037541	1,6408	0,1009593

Model 4 after oil boom 2008-2015, n=2

VR_2 = cumulative market-adjusted return (F-statistic = 47,09 $\overline{R}^2$= 0,36)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	0,084009	0,138338	0,6073	0,543782
D	-0,147042	0,22761	-0,646	0,518383
NI	0,127593	0,117107	1,0895	0,276129
BV	0,306524	0,095216	3,2193	0,001319***
ND	-0,45993	0,169144	-2,7192	0,006638***
LNOil	0,24289	0,089729	2,7069	0,006886***
ΔBrent	0,507678	0,049515	10,253	2,20E-16***
ΔDSR_{SE}	0,105545	0,088993	1,186	0,235856
$\Delta DODSR_{FC}$	0,175626	0,180724	0,9718	0,331346
ΔWD_2	0,059746	0,03543	1,6863	0,091989*
D:NI	0,223601	0,148259	1,5082	0,131769

D:BV	-0,056469	0,118693	-0,4758	0,634331
D:ND	0,388038	0,202726	1,9141	0,055843*
D:LNOil	-0,082266	0,13767	-0,5976	0,550242
D:ΔBrent	0,131382	0,080301	1,6361	0,102072
D:ΔWD_2	-0,015967	0,040866	-0,3907	0,696085

Model 4 after oil boom 2008-2015, n=3

VR_3 = cumulative market-adjusted return (F-statistic = 45,6 $\bar{R}^2$= 0,3674)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	0,062674	0,150083	0,4176	0,676319
D	-0,189088	0,236027	-0,8011	0,423224
NI	0,132495	0,123191	1,0755	0,282366
BV	0,292303	0,096421	3,0315	0,002488***
ND	-0,433575	0,175721	-2,4674	0,013756**
LNOil	0,221087	0,101789	2,172	0,030061**
ΔBrent	0,506228	0,05122	9,8834	2,20E-16***
ΔDSR_{SE}	0,241886	0,13344	1,8127	0,070142*
Δ$DODSR_{FC}$	0,14894	0,284772	0,523	0,601066
ΔWD_3	0,063971	0,043484	1,4711	0,14153
D:NI	0,223802	0,155748	1,4369	0,151008
D:BV	-0,041843	0,119661	-0,3497	0,726646
D:ND	0,375379	0,208726	1,7984	0,072375*
D:LNOil	-0,113194	0,148222	-0,7637	0,445217
D:ΔBrent	0,127597	0,081652	1,5627	0,118403
D:ΔWD_3	0,038474	0,059855	0,6428	0,520497

Model 4 after oil boom 2008-2015, n=4

VR_4 = cumulative market-adjusted return (F-statistic = 41,96 $\bar{R}^2$= 0,3631)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	0,0076544	0,1593736	0,048	0,961703
D	-0,1700746	0,2420312	-0,7027	0,482399

NI	0,2574108	0,1030631	2,4976	0,012654**
BV	0,2139625	0,0696103	3,0737	0,002168***
ND	-0,2404193	0,1325562	-1,8137	0,070003*
LNOil	0,1486395	0,1004601	1,4796	0,13928
ΔBrent	0,5050287	0,0505842	9,9839	2,20E-16***
ΔDSR_{SE}	0,2313904	0,1252445	1,8475	0,064951**
$\Delta DODSR_{FC}$	0,3078568	0,3347837	0,9196	0,358007
ΔWD_4	0,0708272	0,030547	2,3186	0,020604**
D:NI	0,0795545	0,1385598	0,5742	0,565986
D:BV	0,0326889	0,0994089	0,3288	0,742347
D:ND	0,196892	0,1733264	1,136	0,256229
D:LNOil	-0,0558389	0,1480197	-0,3772	0,706071
D:ΔBrent	0,120492	0,0811538	1,4847	0,13791
D:ΔWD_4	0,0839677	0,0554498	1,5143	0,130246

Model 4 oil boom 2002-2007, n=2

VR_2 = cumulative market-adjusted return (F-statistic = 23,7 $\bar{R}^2$= 0,2999)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	0,4667169	0,1522764	3,0649	0,0022522***
D	-0,1423203	0,2803941	-0,5076	0,6118969
NI	-0,5565317	0,5160298	-1,0785	0,2811496
BV	0,3276273	0,1196456	2,7383	0,0063163***
ND	-0,3316307	0,1776683	-1,8666	0,0623364*
LNOil	0,4016284	0,10089	3,9809	7,51E-05***
ΔBrent	0,0220251	0,1236862	0,1781	0,8587126
ΔDSR_{SE}	0,3679064	0,1470405	2,5021	0,0125505**
$\Delta DODSR_{FC}$	-0,0068519	0,0023108	-2,9651	0,0031181***
ΔWD_2	0,1196174	0,0351253	3,4054	0,0006943***
D:NI	1,7837124	0,8045106	2,2171	0,0269011**
D:BV	-0,142288	0,1837389	-0,7744	0,4389268
D:ND	0,3876544	0,3003133	1,2908	1,97E-01***

D:LNOil	-0,1260911	0,1661446	-0,7589	0,4481276
D:ΔBrent	0,0071211	0,189948	0,0375	0,970104
D:ΔWD_2	0,1127059	0,0668709	1,6854	0,0923064*

Model 4 oil boom 2002-2007, n=3

VR_3 = cumulative market-adjusted return (F-statistic = 24,14 $\bar{R}^2$= 0,325)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	0,442587	0,15114	2,9283	0,0035177***
D	-0,04256	0,291989	-0,1458	0,8841544
NI	-0,602924	0,505687	-1,1923	0,2335489
BV	0,395251	0,123306	3,2055	0,0014092***
ND	-0,494219	0,177449	-2,7851	0,005494***
LNOil	0,377761	0,102227	3,6953	0,0002366***
ΔBrent	-0,111574	0,129332	-0,8627	0,3886011
ΔDSR_{SE}	0,254351	0,206304	1,2329	0,2180255
$\Delta DODSR_{FC}$	-0,333223	0,140742	-2,3676	0,0181717**
ΔWD_3	0,167399	0,060061	2,7871	0,0054605***
D:NI	2,042431	0,825506	2,4742	0,0135891**
D:BV	-0,234846	0,185482	-1,2661	0,20588
D:ND	0,64032	0,307733	2,0808	0,0378156**
D:LNOil	-0,001937	0,184909	-0,0105	0,9916448
D:ΔBrent	0,159372	0,196011	0,8131	0,4164495
D:ΔWD_3	0,077744	0,09606	0,8093	0,4185991

Model 4 oil boom 2002-2007, n=4

VR_4 = cumulative market-adjusted return (F-statistic = 23,08 $\bar{R}^2$= 0,3361)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	0,347639	0,182353	1,9064	0,0570466*
D	0,109396	0,295822	0,3698	0,7116519
NI	0,408721	0,641662	0,637	0,5243709
BV	0,330088	0,135498	2,4361	0,015118**

ND	-0,393476	0,193601	-2,0324	0,0425259**
LNOil	0,302782	0,114085	2,654	0,008152***
ΔBrent	-0,169767	0,139756	-1,2147	0,2249167
ΔDSR_{SE}	0,247561	0,27363	0,9047	0,3659505
$\Delta DODSR_{FC}$	-0,54654	0,146986	-3,7183	0,0002182***
ΔWD_4	0,156613	0,049188	3,184	0,0015234***
D:NI	1,136117	0,98744	1,1506	0,2503401
D:BV	-0,175287	0,207255	-0,8458	0,3980068
D:ND	0,600992	0,341877	1,7579	0,0792402*
D:LNOil	0,107168	0,166391	0,6441	0,5197598
D:ΔBrent	0,134998	0,215744	0,6257	0,5317116
D:ΔWD_4	0,016676	0,101644	0,1641	0,8697361

Model 4 oil boom 1991-2001, n=2

VR_2 = cumulative market-adjusted return (F-statistic = 43,47$\overline{R}^2$= 0,3551)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	0,016471	0,153472	0,1073	0,914554
D	-0,091999	0,209425	-0,4393	0,660533
NI	0,786219	0,369518	2,1277	0,033577**
BV	0,357876	0,095445	3,7496	0,000186***
ND	-0,222019	0,085835	-2,5866	0,009816***
LNOil	0,28844	0,121986	2,3645	0,01822**
ΔBrent	-0,035254	0,045965	-0,767	0,443253
ΔDSR_{SE}	0,049308	0,064852	0,7603	0,447228
$\Delta DODSR_{FC}$	-0,036527	0,050132	-0,7286	0,466391
ΔWD_2	0,042229	0,026873	1,5715	0,116354
D:NI	-0,094808	0,433471	-0,2187	0,826909
D:BV	0,203178	0,136201	1,4917	0,136042
D:ND	-0,267972	0,135064	-1,984	0,047491**
D:LNOil	-0,010959	0,156011	-0,0702	0,944012
D:ΔBrent	0,027904	0,071898	0,3881	0,698013

D:ΔWD_2	0,035072	0,03805	0,9217	0,356869

Model 4 oil boom 1991-2001, n=3

VR_3 = cumulative market-adjusted return (F-statistic = 43,39 $\overline{R}^2$= 0,3777)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	0,058548	0,169502	0,3454	0,7298571
D	-0,225335	0,232654	-0,9685	0,3330124
NI	0,88497	0,438868	2,0165	0,044021**
BV	0,35532	0,10386	3,4211	0,0006493***
ND	-0,210559	0,09417	-2,2359	0,0255791**
LNOil	0,365367	0,139501	2,6191	0,0089517***
ΔBrent	-0,035239	0,050992	-0,6911	0,4896875
ΔDSR_{SE}	0,365788	0,132556	2,7595	0,0058966***
$\Delta DODSR_{FC}$	-0,120218	0,095587	-1,2577	0,208807
ΔWD_3	0,034317	0,040956	0,8379	0,4022863
D:NI	-0,060622	0,497546	-0,1218	0,9030491
D:BV	0,257994	0,156888	1,6445	0,1004026
D:ND	-0,333535	0,148451	-2,2468	0,0248761**
D:LNOil	-0,132297	0,171695	-0,7705	0,4411662
D:ΔBrent	0,056452	0,076855	0,7345	0,462803
D:ΔWD_3	0,140792	0,057797	2,436	0,0150278**

Model 4 oil boom 1991-2001, n=4

VR_4 = cumulative market-adjusted return (F-statistic = 47,19 $\overline{R}^2$= 0,3943)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	0,079588	0,186344	0,4271	0,669417
D	-0,219646	0,264876	-0,8292	0,40721
NI	0,881736	0,447292	1,9713	0,049029**
BV	0,348789	0,102496	3,403	0,000699***
ND	-0,203592	0,099025	-2,056	0,040102**
LNOil	0,354639	0,166483	2,1302	0,033454**

ΔBrent	-0,03434	0,052084	-0,6593	0,509881
ΔDSR_{SE}	0,737753	0,292042	2,5262	0,011718**
$\Delta DODSR_{FC}$	-0,182936	0,123353	-1,483	0,138452
ΔWD_4	0,017177	0,038964	0,4409	0,659435
D:NI	0,102025	0,539932	0,189	0,850172
D:BV	0,318667	0,178662	1,7836	0,074854*
D:ND	-0,385266	0,169225	-2,2767	0,023064**
D:LNOil	-0,088072	0,20262	-0,4347	0,663921
D:ΔBrent	0,028435	0,077555	0,3666	0,713979
D:ΔWD_4	0,107243	0,051855	2,0682	0,038939**

Model 4 before and after oil boom 1991-2001 & 2008-2015, n=2

VR_2 = cumulative market-adjusted return (F-statistic = 74,25 $\overline{R}^2$= 0,3152)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	0,071366	0,090206	0,7911	0,4289385
D	-0,039775	0,139795	-0,2845	0,7760313
NI	0,407226	0,120252	3,3865	0,0007196***
BV	0,312309	0,071325	4,3787	1,25E-05***
ND	-0,300319	0,101566	-2,9569	0,0031384***
LNOil	0,280048	0,054573	5,1316	3,11E-07***
ΔBrent	0,231424	0,036684	6,3086	3,35E-10***
ΔDSR_{SE}	0,091293	0,065959	1,3841	0,1664641
$\Delta DODSR_{FC}$	-0,018077	0,046859	-0,3858	0,6997019
ΔWD_2	0,057017	0,021626	2,6365	0,0084322***
D:NI	-0,044128	0,143441	-0,3076	0,7583827
D:BV	0,09408	0,093669	1,0044	0,3152963
D:ND	-0,020202	0,12609	-0,1602	0,872723
D:LNOil	0,021	0,083754	0,2507	0,8020403
D:ΔBrent	0,046272	0,059228	0,7813	0,434733
D:ΔWD_2	0,016265	0,027804	0,585	0,5586268

Model 4 before and after oil boom 1991-2001 & 2008-2015, n=3

VR_3 = cumulative market-adjusted return (F-statistic = 67,86 $\overline{R}^2$= 0,318)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	0,077508	0,100036	0,7748	0,4385452
D	-0,0948	0,149994	-0,632	0,5274381
NI	0,438487	0,127352	3,4431	0,0005861***
BV	0,302112	0,073448	4,1133	4,05E-05***
ND	-0,280918	0,101856	-2,758	0,0058655***
LNOil	0,295025	0,062194	4,7436	2,24E-06***
ΔBrent	0,240668	0,038526	6,2469	5,04E-10***
ΔDSR_{SE}	0,354135	0,095378	3,713	0,0002101***
$\Delta DODSR_{FC}$	-0,063285	0,07931	-0,7979	0,4249894
ΔWD_3	0,059443	0,030556	1,9454	0,0518592*
D:NI	-0,065625	0,146668	-0,4474	0,6546041
D:BV	0,091747	0,094503	0,9708	0,3317422
D:ND	-0,025344	0,126444	-0,2004	0,8411577
D:LNOil	-0,043256	0,09194	-0,4705	0,6380584
D:ΔBrent	0,07209	0,060818	1,1853	0,2360144
$D{:}\Delta WD_3$	0,095058	0,044045	2,1582	0,0310243**

Model 4 before and after oil boom 1991-2001 & 2008-2015, n=4

VR_4 = cumulative market-adjusted return (F-statistic = 61,58 $\overline{R}^2$= 0,322)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	0,09475	0,105337	0,8995	0,368501
D	-0,073686	0,161827	-0,4553	0,64892
NI	0,54811	0,125716	4,3599	1,37E-05***
BV	0,262993	0,062409	4,214	2,63E-05***
ND	-0,196547	0,074489	-2,6386	0,008393***
LNOil	0,287391	0,069567	4,1311	3,77E-05***
ΔBrent	0,230492	0,038166	6,0392	1,86E-09***
ΔDSR_{SE}	0,53604	0,186626	2,8723	0,004121***

$\Delta DODSR_{FC}$	-0,09958	0,095085	-1,0473	0,295104
ΔWD_4	0,05835	0,025593	2,2799	0,022725**
D:NI	-0,155549	0,146197	-1,064	0,28748
D:BV	0,128696	0,088978	1,4464	0,148238
D:ND	-0,099894	0,10762	-0,9282	0,353417
D:LNOil	-0,013195	0,101992	-0,1294	0,897077
D:ΔBrent	0,073955	0,062384	1,1855	0,235972
D:ΔWD_4	0,086169	0,039353	2,1897	0,02867**

5.2.4 Value relevance diversified by time periods

Breusch-Pagan test		
Test	**Chi-squared**	**P-value**
VR_1 Before oil boom	**173.46**	**< 2,2e-16**
VR_2 Before oil boom	**163,72**	**< 2,2e-16**
VR_3 Before oil boom	**142,35**	**< 2,2e-16**
VR_1 Oil boom	**184,91**	**< 2,2e-16**
VR_2 Oil boom	**163**	**< 2,2e-16**
VR_3 Oil boom	**168,42**	**< 2,2e-16**
VR_1 After oil boom	**101,84**	**5,851e-15**
VR_2 After oil boom	**97,026**	**4,765e-14**
VR_3 After oil boom	**69,049**	**6,594e-09**
VR_1 Before & after oil boom	**249,86**	**< 2,2e-16**
VR_2 Before & after oil boom	**237,1**	**< 2,2e-16**
VR_3 Before & after oil boom	**193,67**	**< 2,2e-16**

VIF	**NI**	**BV**	**ND**	**LNOil**	**ΔBrent**	**ΔDSR2**	**ΔWD2**
VR_1 Before oil boom	1,1058	4,0311	3,8516	1,4076	1,0558	1,0124	1,0403
VR_2 Before oil boom	1,1585	4,861	4,4711	1,4905	1,1051	1,0413	1,0601
VR_3 Before oil boom	1,1783	5,1614	4,8036	1,5319	1,102	1,0328	1,0516
VR_1 Oil boom	1,2728	4,7771	4,839	1,2017	1,0272	1,0327	1,0215
VR_2 Oil boom	1,3362	4,4251	4,5153	1,1902	1,0217	1,0422	1,0228
VR_3 Oil boom	1,4904	4,8579	5,1942	1,1803	1,0225	1,0236	1,0339

VR_1 After oil boom	1,2991	3,3498	3,9259	1,4991	1,0642	1,0152	1,0169
VR_2 After oil boom	1,3462	3,3807	4,0095	1,5202	1,0702	1,0101	1,053
VR_3 After oil boom	1,3754	3,3235	4,0266	1,5147	1,076	1,0028	1,0748
VR_1 Before & after oil boom	1,1531	3,424	3,6105	1,3128	1,0589	1,012	1,0304
VR_2 Before & after oil boom	1,1793	3,5043	3,7156	1,3524	1,0843	1,0251	1,0726
VR_3 Before & after oil boom	1,1844	3,5255	3,7787	1,375	1,0865	1,0218	1,0712

Table Before Oil Boom 1991-2001 VR_1

VR_1 = cumulative market-adjusted return (F-statistic = 43,4 $\overline{R}^2$= 0,3547)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	0,016471	0,153472	0,1073	0,914554
NI	0,786219	0,369518	2,1277	0,033577**
BV	0,357876	0,095445	3,7496	0,000186***
ND	-0,222019	0,085835	-2,5866	0,009816***
LNOil	0,28844	0,121986	2,3645	0,01822**
ΔBrent	-0,035254	0,045965	-0,767	0,443253
ΔDSR_1	0,049308	0,064852	0,7603	0,447228
ΔWD_1	0,042229	0,026873	1,5715	0,116354
D	-0,10575	0,210289	-0,5029	0,615148
D:NI	-0,087873	0,433357	-0,2028	0,839349
D:BV	0,199449	0,136356	1,4627	0,143823
D:ND	-0,262517	0,135113	-1,943	0,052267*
D:LNOil	-0,011883	0,15438	-0,077	0,938658
D:ΔBrent	0,02568	0,071973	0,3568	0,721306
D:ΔDSR_1	-0,019926	0,129501	-0,1539	0,87774
D:ΔWD_1	0,033723	0,038171	0,8835	0,377162

Table Before Oil Boom 1991-2001 VR_2

VR_2 = cumulative market-adjusted return (F-statistic = 41,23 $\overline{R}^2$= 0,3768)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	0,058548	0,169502	0,3454	0,7298571
NI	0,88497	0,438868	2,0165	0,044021**
BV	0,35532	0,10386	3,4211	0,0006493***
ND	-0,210559	0,09417	-2,2359	0,0255791**
LNOil	0,365367	0,139501	2,6191	0,0089517***
ΔBrent	-0,035239	0,050992	-0,6911	0,4896875
ΔDSR_2	0,365788	0,132556	2,7595	0,0058966***
ΔWD_2	0,034317	0,040956	0,8379	0,4022863
D	-0,244586	0,234253	-1,0441	0,2966911
D:NI	-0,029167	0,49418	-0,059	0,9529474
D:BV	0,241049	0,154453	1,5607	0,1189258
D:ND	-0,316233	0,146799	-2,1542	0,0314676**
D:LNOil	-0,118676	0,169817	-0,6988	0,4848123
D:ΔBrent	0,059611	0,076783	0,7764	0,4377261
D:ΔDSR_2	-0,296441	0,19638	-1,5095	0,1314854
D:ΔWD_2	0,141121	0,058772	2,4012	0,016528**

Table Before Oil Boom 1991-2001 VR_3

VR_3 = cumulative market-adjusted return (F-statistic = 36,98 $\overline{R}^2$= 0,3929)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	0,079588	0,186344	0,4271	0,669417
NI	0,881736	0,447292	1,9713	0,049029**
BV	0,348789	0,102496	3,403	0,000699***
ND	-0,203592	0,099025	-2,056	0,040102**
LNOil	0,354639	0,166483	2,1302	0,033454**
ΔBrent	-0,03434	0,052084	-0,6593	0,509881
ΔDSR_3	0,737753	0,292042	2,5262	0,011718**
ΔWD_3	0,017177	0,038964	0,4409	0,659435
D	-0,248819	0,267831	-0,929	0,353156

D:NI	0,141619	0,533804	0,2653	0,790844
D:BV	0,30637	0,174638	1,7543	0,07975*
D:ND	-0,375795	0,166809	-2,2528	0,024533**
D:LNOil	-0,060887	0,200699	-0,3034	0,76168
D:ΔBrent	0,026244	0,077517	0,3386	0,735027
D:ΔDSR_3	-0,853302	0,324339	-2,6309	0,008676***
D:ΔWD_3	0,114235	0,052609	2,1714	0,030187**

Table Oil Boom 2002-2007 VR_1

VR_1 = cumulative market-adjusted return (F-statistic = 23,68 $\overline{R}^2$= 0,2997)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	0,466717	0,152276	3,0649	0,0022522***
NI	-0,556532	0,51603	-1,0785	0,2811496
BV	0,327627	0,119646	2,7383	0,0063163***
ND	-0,331631	0,177668	-1,8666	0,0623364*
LNOil	0,401628	0,10089	3,9809	7,51E-05***
ΔBrent	0,022025	0,123686	0,1781	0,8587126
ΔDSR_1	0,367906	0,14704	2,5021	0,0125505**
ΔWD_1	0,119617	0,035125	3,4054	0,0006943***
D	-0,143632	0,280611	-0,5119	0,608897
D:NI	1,787114	0,804765	2,2207	0,0266602**
D:BV	-0,142453	0,183746	-0,7753	0,4384148
D:ND	0,387926	0,300469	1,2911	0,1970623
D:LNOil	-0,126059	0,166128	-0,7588	0,4481997
D:ΔBrent	0,007817	0,189796	0,0412	0,967158
D:ΔDSR_1	-0,388069	0,147211	-2,6361	0,0085524***
D:ΔWD_1	0,113058	0,066885	1,6903	0,0913652*

Table Oil Boom 2002-2007 VR_2

VR_2 = cumulative market-adjusted return (F-statistic = 23,42 $\overline{R}^2$= 0,3181)

Variable	Parameter	Std. Error	t-value	Probability

	Estimate			>|t|
Intercept	0,442587	0,15114	2,9283	0,0035177***
NI	-0,602925	0,505687	-1,1923	0,2335489
BV	0,395252	0,123306	3,2055	0,0014092***
ND	-0,494219	0,177449	-2,7851	0,005494***
LNOil	0,377761	0,102227	3,6953	0,0002366***
ΔBrent	-0,111574	0,129332	-0,8627	0,3886011
ΔDSR_2	0,254351	0,206304	1,2329	0,2180255
ΔWD_2	0,167399	0,060061	2,7871	0,0054605***
D	-0,065103	0,294848	-0,2208	0,8253109
D:NI	2,06818	0,868326	2,3818	0,0174922**
D:BV	-0,243891	0,185884	-1,3121	0,1899262
D:ND	0,630865	0,320817	1,9664	0,0496402**
D:LNOil	0,014384	0,18532	0,0776	0,9381537
D:ΔBrent	0,149171	0,196064	0,7608	0,4470152
D:ΔDSR_2	-0,536485	0,275493	-1,9474	0,0518872*
D:ΔWD_2	0,078262	0,094473	0,8284	0,4077187

Table Oil Boom 2002-2007 VR_3

VR_3 = cumulative market-adjusted return (F-statistic = 21,93 $\bar{R}^2$= 0,3244)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	0,347639	0,182353	1,9064	0,057047*
NI	0,408721	0,641662	0,637	0,524371
BV	0,330088	0,135498	2,4361	0,015118**
ND	-0,393476	0,193601	-2,0324	0,042526**
LNOil	0,302782	0,114085	2,654	0,008152***
ΔBrent	-0,169767	0,139756	-1,2147	0,224917
ΔDSR_3	0,247561	0,27363	0,9047	0,36595
ΔWD_3	0,156613	0,049188	3,184	0,001523***
D	0,024076	0,295893	0,0814	0,935175
D:NI	1,170819	1,010332	1,1588	0,246952

D:BV	-0,196779	0,203614	-0,9664	0,334194
D:ND	0,595249	0,346377	1,7185	0,08619*
D:LNOil	0,100276	0,167439	0,5989	0,549462
D:ΔBrent	0,114561	0,215767	0,5309	0,595639
D:ΔDSR_3	-0,217882	0,457924	-0,4758	0,634377
D:ΔWD_3	0,035647	0,101753	0,3503	0,726209

Table After Oil Boom 2008-2015 VR_1

VR_1 = cumulative market-adjusted return (F-statistic = 46,88 $\overline{R}^2$= 0,359)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	0,084009	0,138338	0,6073	0,543782
NI	0,127593	0,117107	1,0895	0,276129
BV	0,306524	0,095216	3,2193	0,001319***
ND	-0,45993	0,169144	-2,7192	0,006638***
LNOil	0,24289	0,089729	2,7069	0,006886***
ΔBrent	0,507678	0,049515	10,253	2,20E-16***
ΔDSR_1	0,105545	0,088993	1,186	0,235856
ΔWD_1	0,059746	0,03543	1,6863	0,091989*
D	-0,163648	0,224845	-0,7278	0,46686
D:NI	0,221624	0,148763	1,4898	0,136542
D:BV	-0,048337	0,117553	-0,4112	0,681005
D:ND	0,382091	0,203063	1,8816	0,060124*
D:LNOil	-0,102006	0,135535	-0,7526	0,451827
D:ΔBrent	0,128797	0,080193	1,6061	0,108517
D:ΔDSR_1	-0,111134	0,206947	-0,537	0,591352
D:ΔWD_1	-0,016324	0,04094	-0,3987	0,690162

Table After Oil Boom 2008-2015 VR_2

VR_2 = cumulative market-adjusted return (F-statistic = 45,72 $\overline{R}^2$= 0,368)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|

Intercept	0,062674	0,150083	0,4176	0,676319
NI	0,132495	0,123191	1,0755	0,282366
BV	0,292303	0,096421	3,0315	0,002488***
ND	-0,433575	0,175721	-2,4674	0,013756**
LNOil	0,221087	0,101789	2,172	0,030061**
ΔBrent	0,506228	0,05122	9,8834	2,20E-16***
ΔDSR_2	0,241886	0,13344	1,8127	0,070142*
ΔWD_2	0,063971	0,043484	1,4711	0,14153
D	-0,182106	0,233088	-0,7813	0,434803
D:NI	0,217978	0,154889	1,4073	0,159608
D:BV	-0,03551	0,118277	-0,3002	0,764059
D:ND	0,367675	0,208863	1,7604	0,078614*
D:LNOil	-0,115794	0,14519	-0,7975	0,425306
D:ΔBrent	0,130374	0,081738	1,595	0,110985
$D:\Delta DSR_2$	-0,522669	0,320181	-1,6324	0,102868
$D:\Delta WD_2$	0,040699	0,059962	0,6787	0,497436

Table After Oil Boom 2008-2015 VR_3

VR_3 = cumulative market-adjusted return (F-statistic = 41,7 $\overline{R}^2$= 0,3615)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	0,0076544	0,1593736	0,048	0,961703
NI	0,2574108	0,1030631	2,4976	0,012654**
BV	0,2139625	0,0696103	3,0737	0,002168***
ND	-0,2404193	0,1325562	-1,8137	0,070003*
LNOil	0,1486395	0,1004601	1,4796	0,13928
ΔBrent	0,5050287	0,0505842	9,9839	2,20E-16***
ΔDSR_3	0,2313904	0,1252445	1,8475	0,064951*
ΔWD_3	0,0708272	0,030547	2,3186	0,020604**
D	-0,1697616	0,2423958	-0,7003	0,483863
D:NI	0,0740213	0,1384799	0,5345	0,593088
D:BV	0,0386803	0,0983725	0,3932	0,694249

D:ND	0,1930621	0,174265	1,1079	0,268171
D:LNOil	-0,0718554	0,1465476	-0,4903	0,624008
D:ΔBrent	0,1250785	0,0815731	1,5333	0,125492
D:ΔDSR_3	-0,3261279	0,3327305	-0,9802	0,327232
D:ΔWD_3	0,0850865	0,0556849	1,528	0,126811

Table Before and after oil boom 1991-2001 & 2008-2015, VR_1

VR_1 = cumulative market-adjusted return (F-statistic = 79,09$\overline{R}^2$= 0,318)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	0,11530267	0,08368123	1,3779	0,1683639
NI	0,42453387	0,11950587	3,5524	0,0003888***
BV	0,30198044	0,06903368	4,3744	1,27E-05***
ND	-0,30140115	0,09946216	-3,0303	0,0024681***
LNOil	0,30490719	0,05242277	5,8163	6,78E-09***
ΔBrent	0,24591753	0,03675568	6,6906	2,73E-11***
ΔDSR_1	0,17886092	0,09400839	1,9026	0,0572069*
ΔWD_1	0,06870476	0,02243758	3,062	0,0022218***
D	-0,06199529	0,13388978	-0,463	0,6433816
D:NI	-0,04822557	0,14228982	-0,3389	0,7346948
D:BV	0,09623217	0,09165634	1,0499	0,2938547
D:ND	-0,01023075	0,12354108	-0,0828	0,9340072
D:LNOil	0,00053274	0,08087248	0,0066	0,9947446
D:ΔBrent	0,04610788	0,05914297	0,7796	0,4357
D:ΔDSR_1	-0,16361545	0,13601839	-1,2029	0,2291321
D:ΔWD_1	0,00413959	0,0281489	0,1471	0,8830963

Table Before and after oil boom 1991-2001 & 2008-2015, VR_2

VR_2 = cumulative market-adjusted return (F-statistic = 73,88 $\overline{R}^2$= 0,3257)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	0,0993749	0,0912165	1,0894	0,2760766

NI	0,4358263	0,1255591	3,4711	0,0005281***
BV	0,2977719	0,0709716	4,1956	2,83E-05***
ND	-0,2904808	0,1007604	-2,8829	0,0039779***
LNOil	0,3055281	0,0585345	5,2196	1,96E-07***
ΔBrent	0,2627333	0,038815	6,7689	1,65E-11***
ΔDSR_2	0,4283183	0,1245332	3,4394	0,0005937***
ΔWD_2	0,0989553	0,0338837	2,9204	0,0035302***
D	-0,1046581	0,1407467	-0,7436	0,4572008
D:NI	-0,0499854	0,1447436	-0,3453	0,7298729
D:BV	0,0900136	0,0920561	0,9778	0,3282718
D:ND	-0,0076163	0,1245212	-0,0612	0,9512336
D:LNOil	-0,0430465	0,0880678	-0,4888	0,6250394
D:ΔBrent	0,054501	0,0607317	0,8974	0,369598
D:ΔDSR_2	-0,3969496	0,1775643	-2,2355	0,0254807**
D:ΔWD_2	0,0518388	0,0455176	1,1389	0,2548768

Table Before and after oil boom 1991-2001 & 2008-2015, VR_3

VR_3 = cumulative market-adjusted return (F-statistic = 67,73 $\overline{R}^2$= 0,3316)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	0,130321	0,096812	1,3461	0,1784153
NI	0,548151	0,124565	4,4005	1,14E-05***
BV	0,257154	0,060067	4,2811	1,95E-05***
ND	-0,209004	0,07947	-2,63	0,0086048***
LNOil	0,306168	0,067256	4,5523	5,63E-06***
ΔBrent	0,252615	0,038741	6,5206	8,84E-11***
ΔDSR_3	0,70584	0,209764	3,3649	0,0007801***
ΔWD_3	0,090385	0,029734	3,0397	0,0023984***
D	-0,1012	0,151137	-0,6696	0,5031961
D:NI	-0,146971	0,144763	-1,0152	0,3101098
D:BV	0,130865	0,086476	1,5133	0,1303583
D:ND	-0,082589	0,109783	-0,7523	0,451963

D:LNOil	-0,01907	0,098509	-0,1936	0,8465171
D:ΔBrent	0,05415	0,062378	0,8681	0,3854396
D:ΔDSR$_3$	-0,810633	0,24727	-3,2783	0,0010621***
D:ΔWD$_3$	0,05372	0,041602	1,2913	0,1967593

5.3 Quantile regressions

NImc = Net Income / Market Cap at the beginning of the year

BVmc5 = Book Value Equity / Market Cap at the beginning of the year

NDmc = Net Debt / Market Cap at the beginning of the year

LogOilMC = Ln(Oil reserves / Market Cap at the beginning of the year)

OilPriceBrentChange = Change in Brent prices from last year

DSR2Div = Drilling success rate / Last years drilling success rate

DSR3Div = Drilling success rate / Last two years average drilling success rate

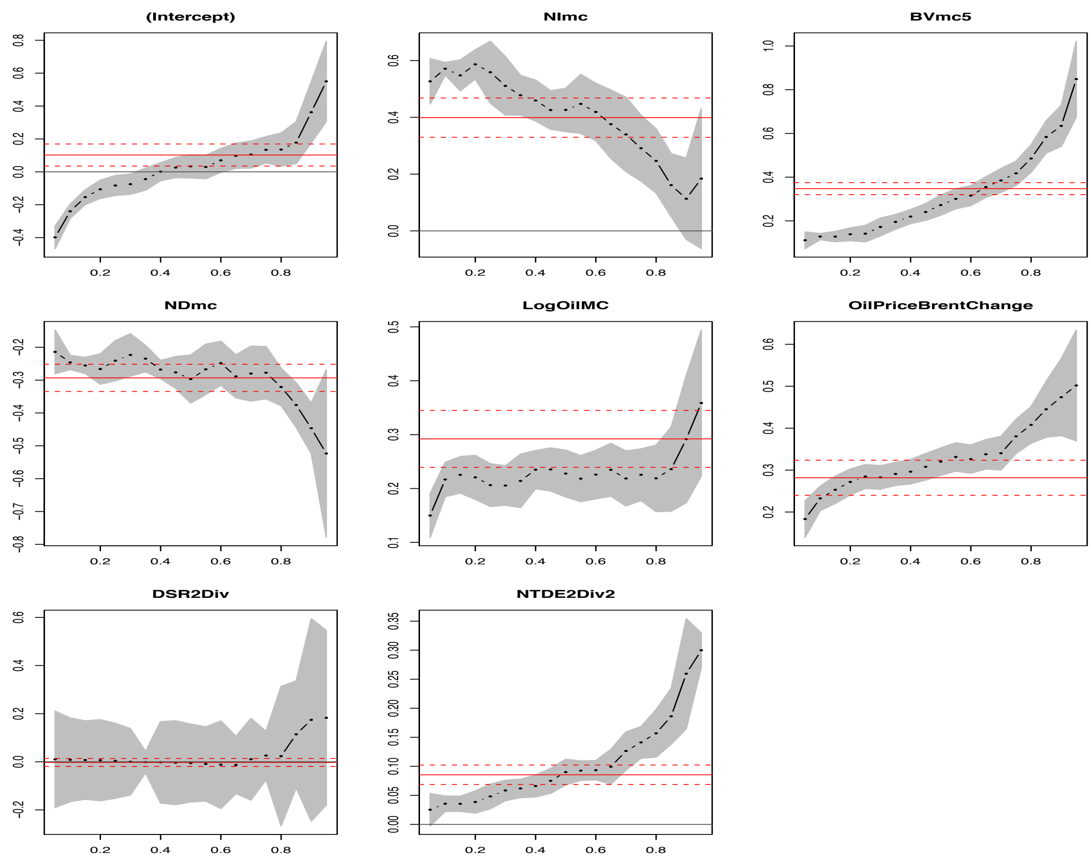
DSR4Div = Drilling success rate / Last three years average drilling success rate

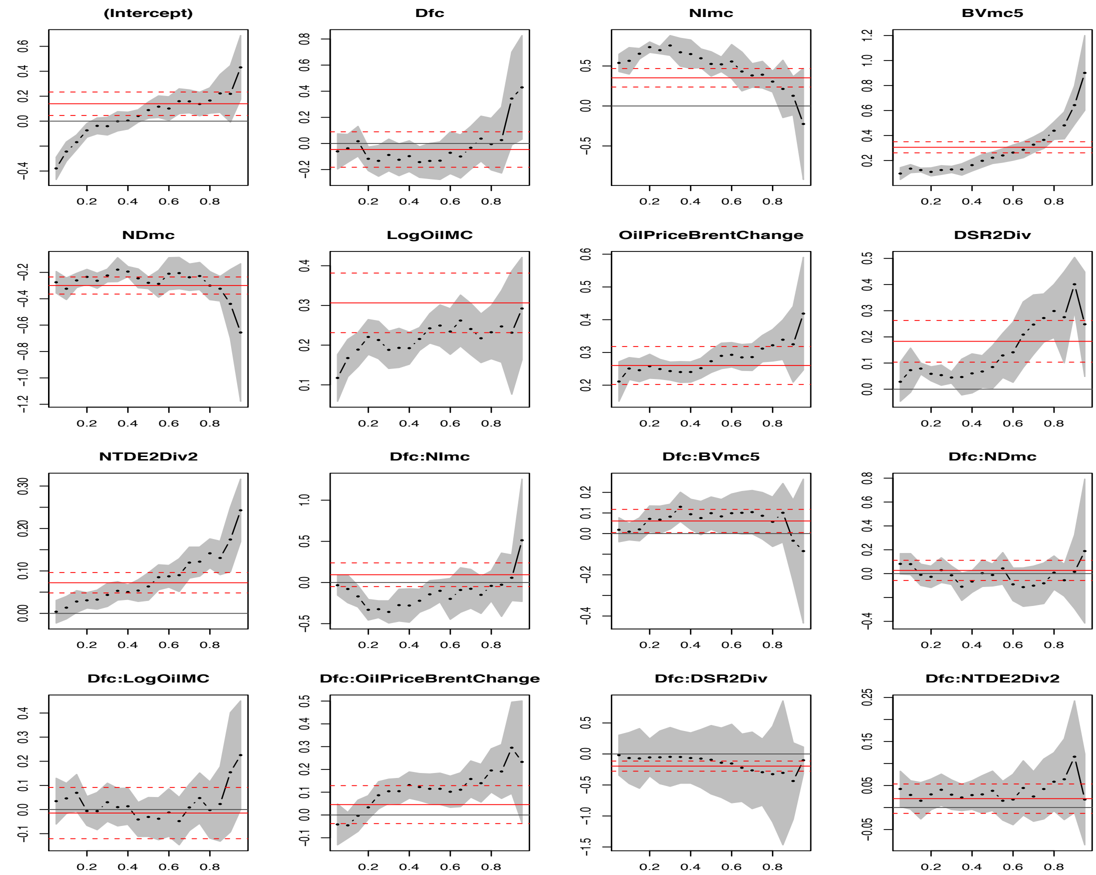
NTDE2Div2 = Wells drilled / Last years wells drilled

NTDE3Div2 = Wells drilled / Last two years average wells drilled

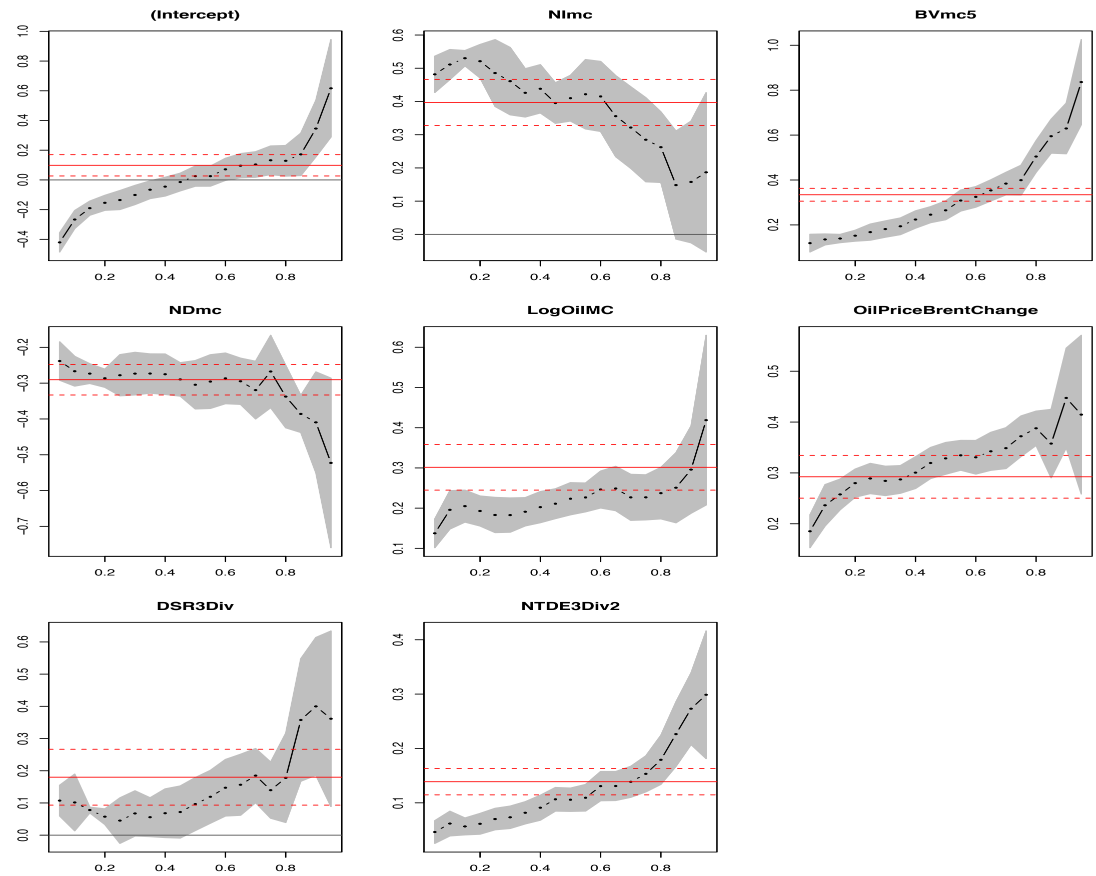
NTDE4Div2 = Wells drilled / Last three years average wells drilled

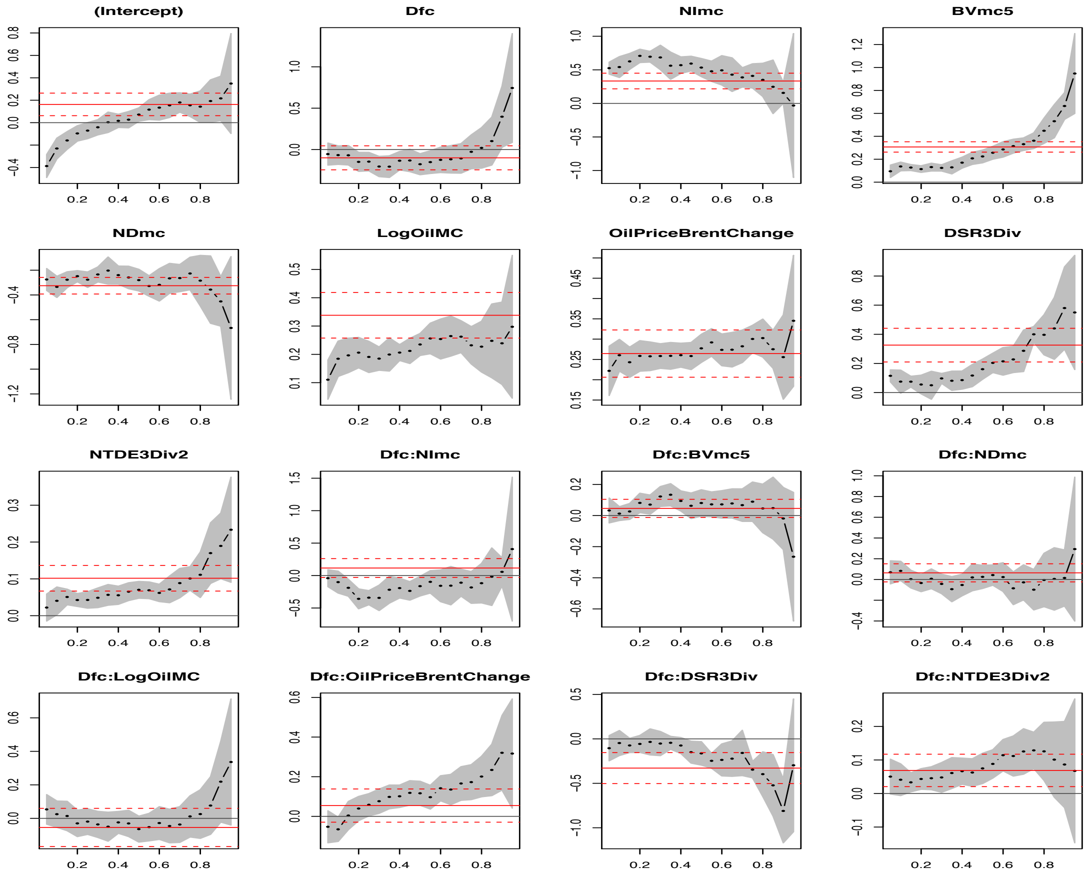
Quantile regressions DRS$_2$, WD$_2$



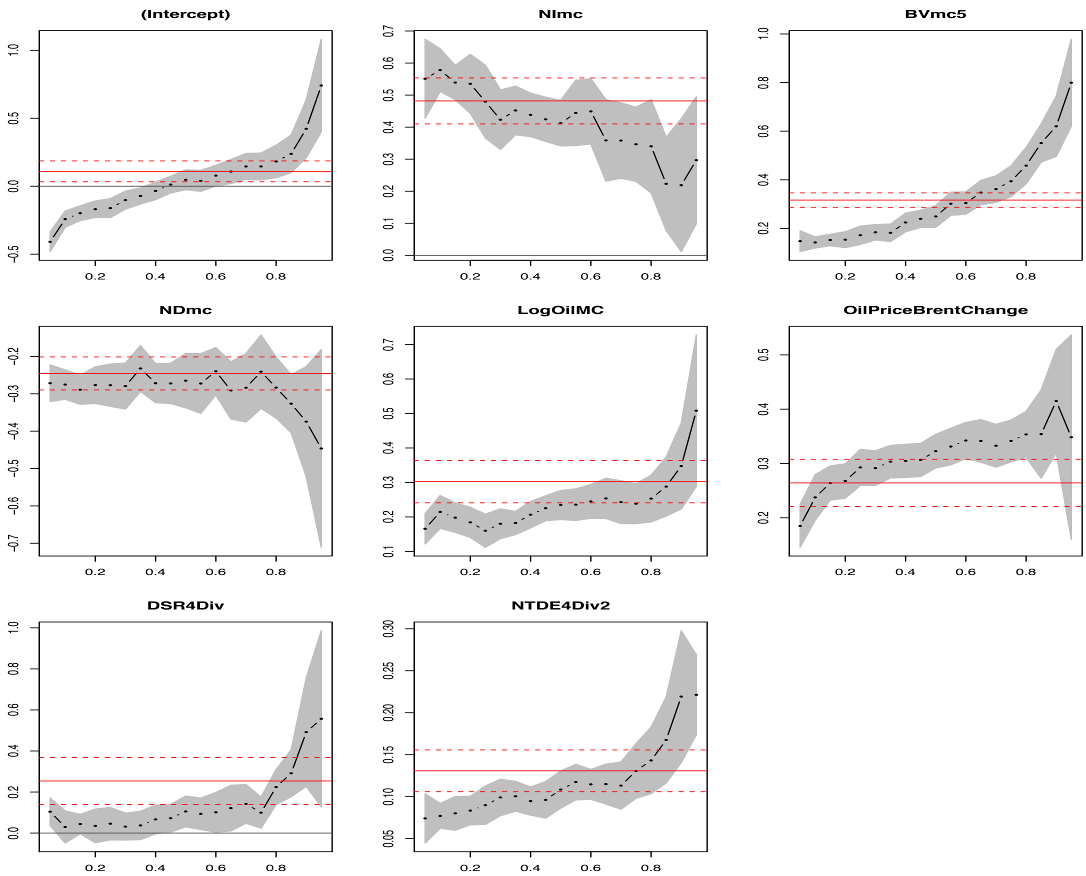


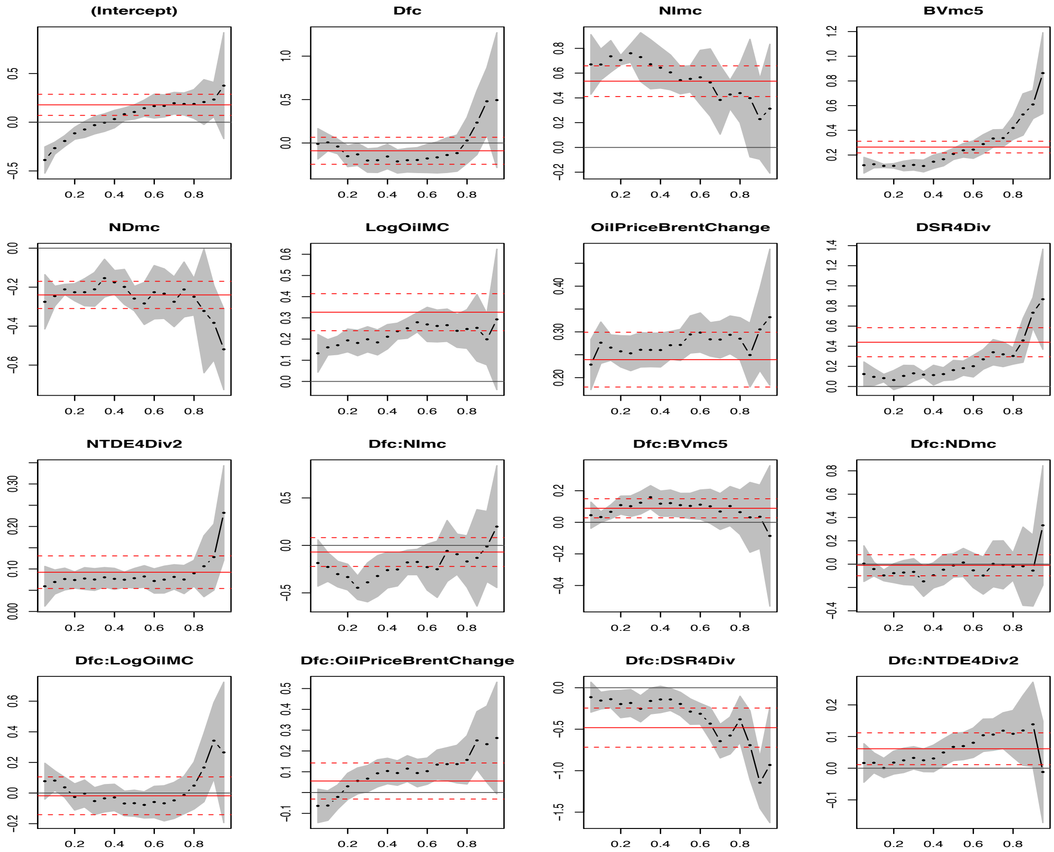
Quantile regressions DRS_3, WD_3





Quantile regressions DRS_4, WD_4




(Intercept)
Dfc
NImc
BVmc5
NDmc
LogOilMC
OilPriceBrentChange
DSR4Div
NTDE4Div2
Dfc:NImc
Dfc:BVmc5
Dfc:NDmc
Dfc:LogOilMC
Dfc:OilPriceBrentChange
Dfc:DSR4Div
Dfc:NTDE4Div2

5.4 Extended

Value Relevance

I have looked at but not discussed the possibility of interactions between drilling success rates and wells drilled. I considered including a variable of ΔDSR*ΔWD, to control for interactions. However I dropped this idea based on difficulty interpreting situations when both changes were negative. To show that this has been considered I have included extended regressions with this variable here.

Breusch-Pagan test		
Test	**Chi-squared**	**P-value**
VR_2 total	**375,35**	**< 2,2e-16**
VR_3 total	**321,22**	**< 2,2e-16**
VR_4 total	**293,28**	**< 2,2e-16**

VIF	NI	BV	ND	LNOil	ΔBrent	ΔDSR2	ΔWD2	ΔDSR2*ΔWD2
VR_2	1,1576	3,5559	3,739	1,2851	1,0383	1,6536	1,0594	1,6952
VR_3	1,1874	3,5081	3,7155	1,3105	1,0526	1,0932	1,098	1,1404
VR_4	1,2061	3,5358	3,8186	1,3331	1,0558	1,0695	1,1775	1,1987

Table cumulative

VR_2 = cumulative market-adjusted return (F-statistic = 82,24 $\bar{R}^2$= 0,3026)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	0,1398983	0,0798731	1,7515	0,0799554*
NI	0,350883	0,1379679	2,5432	0,0110307**
BV	0,3059136	0,0626891	4,8799	1,11E-06***
ND	-0,2998626	0,0901367	-3,3268	0,000889***
LNOil	0,3051678	0,0527982	5,7799	8,20E-09***
ΔBrent	0,2604576	0,0341154	7,6346	2,98E-14***
$ΔDSR_2$	0,1464546	0,0571128	2,5643	0,010384**
$ΔWD_2$	0,0692151	0,019685	3,5161	0,000444***
$ΔDSR_2*ΔWD_2$	0,0258854	0,039461	0,656	0,5118883
D	-0,0490521	0,1290836	-0,38	0,703969
D:NI	0,0961833	0,1635729	0,588	0,5565644
D:BV	0,0620147	0,0883624	0,7018	0,4828417
D:ND	0,0263159	0,1162141	0,2264	0,8208715
D:LNOil	-0,0159004	0,0771544	-0,2061	0,8367374
D:ΔBrent	0,0447118	0,0553397	0,808	0,419179
D:$ΔDSR_2$	-0,1737017	0,0602312	-2,8839	0,003954***

D:ΔWD$_2$	0,0197067	0,0271929	0,7247	0,4686881
D:ΔDSR$_2$*ΔWD$_2$	0,0015371	0,0551141	0,0279	0,9777522

Table cumulative

VR_3 = cumulative market-adjusted return (F-statistic = 78,39 $\overline{R}^2$= 0,3141)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	0,155921	0,082927	1,8802	0,060181*
NI	0,329114	0,143316	2,2964	0,0217236**
BV	0,306014	0,066668	4,5901	4,62E-06***
ND	-0,32261	0,099371	-3,2465	0,001182***
LNOil	0,327549	0,05695	5,7515	9,78E-09***
ΔBrent	0,259824	0,034661	7,4961	8,72E-14***
ΔDSR$_3$	0,226368	0,089271	2,5357	0,0112744**
ΔWD$_3$	0,086726	0,026058	3,3281	0,000885***
ΔDSR$_3$*ΔWD$_3$	0,168257	0,053993	3,1163	0,001850***
D	-0,093178	0,131933	-0,7063	0,4800866
D:NI	0,121583	0,166121	0,7319	0,4642919
D:BV	0,047493	0,091337	0,52	0,6031202
D:ND	0,061383	0,124044	0,4948	0,6207444
D:LNOil	-0,043924	0,082739	-0,5309	0,5955473
D:ΔBrent	0,058249	0,056525	1,0305	0,3028631
D:ΔDSR$_3$	-0,232818	0,126085	-1,8465	0,0649212*
D:ΔWD$_3$	0,081424	0,039569	2,0578	0,0397027**
D:ΔDSR$_3$*ΔWD$_3$	-0,139475	0,090562	-1,5401	0,1236428

Table cumulative

VR_4 = cumulative market-adjusted return (F-statistic = 65,23 $\overline{R}^2$= 0,3251)

Variable	Parameter Estimate	Std. Error	t-value	Probability >|t|
Intercept	0,178267	0,084458	2,1107	0,0348938**
NI	0,536425	0,118839	4,5139	6,66E-06***
BV	0,26161	0,058209	4,4943	7,29E-06***
ND	-0,237464	0,08187	-2,9005	0,003757***
LNOil	0,323243	0,057911	5,5817	2,63E-08***
ΔBrent	0,23617	0,033651	7,0182	2,87E-12***
ΔDSR$_3$	0,405786	0,172385	2,354	0,018650**
ΔWD$_3$	0,080594	0,021694	3,715	0,00021***
ΔDSR$_3$*ΔWD$_3$	0,141318	0,165266	0,8551	0,3925803
D	-0,09003	0,137835	-0,6532	0,5137044
D:NI	-0,071168	0,147668	-0,4819	0,6298857
D:BV	0,091355	0,088683	1,0301	0,3030474
D:ND	-0,011914	0,113073	-0,1054	0,9160931
D:LNOil	-0,014788	0,087146	-0,1697	0,8652622
D:ΔBrent	0,058516	0,057864	1,0113	0,311984
D:ΔDSR$_3$	-0,450485	0,212879	-2,1161	0,034429**
D:ΔWD$_3$	0,072321	0,037127	1,9479	0,0515348*

D:$\Delta DSR_3 * \Delta WD_3$	-0,127582	0,210889	-0,605	0,5452501