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The Stock Market's Reaction to Contract Announcements

An Empirical Study of Companies in the Maritime Industry Listed on Oslo Stock Exchange

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Preface

This master's thesis marks the completion of our Master of Science in Economics and Business Administration at the Norwegian School of Economics. We have both majored in finance and have studied contract announcements on Oslo Stock Exchange to learn more about financial topics and hone our skills in statistical analysis.

Contract announcements on stock exchanges provide an interesting topic to study, and one that has seen surprisingly little research. One might expect the stock prices to increase as the announcements constitute an expectation of growth in future earnings. But what determines the magnitude of the stock price increase? Are there signs of information leakages prior to the announcement or price drifts after the event? These are some of the questions that intrigued us, and given the dearth of research on the subject, we decided on studying it further.

Writing on this topic has been challenging. Getting to leave the theoretical confines of school and dealing with real world finance has been particularly interesting and educational. In addition, learning how to use Stata and LaTeX effectively has been especially valuable and will likely be a great asset in future endeavors.

The idea for the thesis' topic was born out of discussion with our supervisor, Professor Tommy Stamland, to whom we would like to express our gratitude towards. His expertize in event studies and finance has been inspirational and has taught us much. His help and support along the way has been invaluable. Lastly, we would like to thank our families and friends for the support they have given us throughout our years at the Norwegian School of Economics.

Bergen, May 24, 2018

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Abstract

The research question of the thesis is “how does the stock market react to contract announcements by companies in the maritime industry listed on Oslo Stock Exchange?”. This is answered using the event study methodology as described by MacKinlay (1997). The sample consists of 208 contract announcements by 28 companies in the maritime industry listed on Oslo Stock Exchange from January 1, 2014, to December 31, 2017.

The primary objective is to ascertain whether contract announcements lead to a cumulative average abnormal return that is significantly different from zero on the event day. In addition, the thesis will attempt identify the determinants of the stock market’s response, investigate if there are signs of information leakage prior to the announcement, and examine if there are any post-event stock price drifts.

The analysis finds cumulative average abnormal returns on the event day ranging from 2.47 % to 2.56 % using four different normal performance models. They are all significant at a 1 % level. There are no significant effects in the pre-event day window or the post-event day window. Given that no evidence of information leakage or post-event stock price drift is found, the market appears to be efficient on the semi-strong form according to the efficient market hypothesis.

The cross-sectional analysis finds that, everything else equal, the cumulative abnormal return on average increases between 7.02 and 8.22 percentage points when relative contract size increases by 1. This is intuitive as larger contracts relative to the size of the company are stronger signals of increased future earnings than smaller contracts. Furthermore, Tobin’s q is negative and significant as expected. This variable being negative is argued to be explained by the market being more surprised when low Tobin’s q firms announce contracts as it is expected that they are less able to extract value out of their assets. No other variables are found to be significant in explaining event day cumulative abnormal returns in the cross-sectional analysis.

Lastly, the results obtained in the analysis appear to be robust to the choice of significance test, normal performance model, and outliers. In addition, the assumptions of OLS does not seem to be violated to the degree that the general inference is altered.

Contents

1 Introduction

Contracts between companies are frequently announced in the stock market and are a key feature in the world of business. Sometimes these contracts are quite large and an announcement is typically associated with an increase in the company's stock price. However, the determinants of the stock market's reaction are not quite clear. This section provides the background and the motivation for examining the research question. Furthermore, the thesis' place in the existing literature is explained as well as how the results may be useful for other parties. Thereafter, the research methodology that is used to investigate the topic is described. Lastly, the structure of the thesis is outlined.

1.1 Background and Motivation

Contract announcements provide the market with new information about future earnings for the company in question. Given that the semi-strong form of the efficient market hypothesis holds, one expects the stock market to react rapidly and adjust accordingly to the details in the announcement. Following financial news, one may see that large contracts do not necessarily mean that the stock price sees a distinct increase. Hence, there are some questions concerning the stock market's response. What are the determinants of the stock market's reaction to contract announcements? It is prudent to assume that the relative contract size is important, but there might be additional characteristics that have an impact. Furthermore, does Oslo Stock Exchange adjust rapidly to contract announcements, or are there signs of information leakages prior to the event? Ultimately, this leads to the research question of the thesis:

How does the stock market react to contract announcements by companies in the maritime industry listed on Oslo Stock Exchange?

1.2 Thesis Contribution to the Existing Literature

There is a wealth of studies on corporate announcements such as mergers and acquisitions, capital structure changes, and changes in dividend payouts. However, the amount of studies on contract announcements has been very limited. Furthermore, to the authors' knowledge there have been no similar studies on companies in the maritime industry listed on Oslo Stock Exchange. Hence, it would be interesting to investigate the Norwegian stock market's response to such announcements. Given the dearth of research, the thesis contributes by expanding the general knowledge on the topic.

1.3 Methodology

The research question will be examined using the event study methodology as described by MacKinlay (1997). A period of 200 to 20 days before the event day is selected as the estimation window to estimate normal performance of the stock. Various event windows in the time frame [-10,10] in relation to the contract announcement are used to test for information leakages and post-event stock price drifts. The primary event window is the event day, also referred to as day 0, and will receive the most attention. If the efficient market hypothesis holds, the cumulative average abnormal returns in the pre-event day window and the post-event day window are not expected to be significantly different from zero.

Four different methods are utilized to gauge how sensitive the cumulative average abnormal returns are to the choice of normal performance model. These are the Constant Mean Return model, the Market model, CAPM and the Fama-French Three-Factor model. Ideally, there are no significant differences between the normal performance models. To test if the cumulative average abnormal returns on the event day are significantly different from zero, both a parametric test and a nonparametric test are conducted.

To investigate the determinants of the cumulative abnormal returns, the existing literature on the subject is reviewed to find factors that are previously found to be relevant. The primary variable is, intuitively, relative contract size. The other factors that are included in the thesis are company size, Tobin's q, and return on equity. In addition, a variable representing the frequency of contract announcements and an oil shock dummy is controlled for. The objective of the analysis is to determine which variables are significant in explaining the cumulative abnormal returns.

1.4 Structure

The thesis has ten sections. The first starts off by introducing the topic as well as presenting the research question. The second section reviews the existing literature and establishes a point of reference for which variables may be significant. The third section describes in short the maritime industry and the legal provisions for contract announcements by companies listed on Oslo Stock Exchange. The fourth section presents the theoretical background for the arguments revolving around how the stock market reacts to contract announcements. The fifth section presents the event study methodology. The sixth section defines the selection criterion and details how the financial data was retrieved. The seventh section presents the analysis and the results. The eighth section examines the robustness of the findings in the analysis. Section nine discusses the limitations of the sample and the methodology. Lastly, the tenth section summarizes the most important findings of the thesis and makes recommendations of future research on the topic.

2 Literature Review

In this section follows a discussion of relevant research on similar topics, as well as an attempt to motivate where the thesis fits into the existing literature. Generally, there have been few studies on contract announcements. However, this section will examine the existing papers, show the established practices in such research, and generate a baseline of results for which the findings of this paper will be compared to. To the authors knowledge, there have been no previous studies on contract announcements by companies in the maritime industry listed on Oslo Stock Exchange.

2.1 Studies on Contract Announcements

Elayan and Pukthuanthong (2004) investigates the determinants of the US stock market's reaction to contract announcements using the event study methodology. The cumulative abnormal returns are analyzed with respect to several factors. These include the contract announcements' characteristics, firm size, historical profitability, nationality, and industry. Some of these factors are associated with the degree of asymmetrical information facing the investors of the firms. The study finds, among other things, that relative contract size is positive and significant in explaining cumulative abnormal returns, while Tobin's q, and return on equity are negative and significant. In addition, the study finds that while the contractors (i.e. companies being awarded a contract) see significant positive cumulative abnormal returns, the principals (i.e. companies awarding a contract) do not. Consequently, the thesis will solely examine contract announcements by contractors.

The rationale for including Tobin's q is that its value is an indication of how well the market expects the companies to utilize their assets (Elayan & Pukthuanthong, 2004). A value greater than 1 implies that the market expects the firm to be able to extract more value out of their total assets than what the book value suggest. This follows by its formula market value of equity divided by the book value of the assets. The variable is expected to be negatively correlated with cumulative abnormal returns since low Tobin's q firms are not expected to be as successful as their counterparts.

In addition, firms with low return on equity being awarded a contract was argued by Elayan and Pukthuanthong (2004) to see higher cumulative abnormal returns as the contract may increase the firms' earning power. Therefore, return on equity is included to account for this expectation. The degree of research and development was also significant for contractors, but this variable is not included in the thesis as sufficiently accurate data is difficult to obtain for the companies in the sample.

Furthermore, Elayan, Pukthuanthong, and Roll (2006) argues that contract announcements convey information about the management's expectations of future earnings potential. On the basis of agents being profit maximizing, companies would not enter into contracts that they do not expect would increase their profits. Hence, contract announcements are powerful information signals of increased future earnings for contactors. They do not find similar effects for principals.

Lonkani, Changchit, and Satjawathee (2012) examine the effect of being awarded contracts in Thailand using the event study methodology. They find significant cumulative abnormal returns on the event day, and in the [-3,3] and [-10,10] day intervals surrounding the announcement day. The paper also finds that the relationship between small and large contract sizes are nonlinear and decreasing in relation to cumulative abnormal returns.

Hayes, Hunton, and Reck (2000) argue that smaller size firms who announce contracts are more positively received in the market than larger size firms due to the greater information asymmetry faced by investors. Smaller size firms tend to disclose information between financial reports less frequently than larger firms. Hence, more information is publicly available and is scrutinized more deeply for larger size firms. Consequently, there is a greater element of surprise in the event that smaller size firms announce news regarding their business.

According to Flannery (1986), industries with greater degrees of secrecy lead to greater information asymmetry. In such industries, the market is forced to deduce the true state of the companies through various signals based on their behavior. While the paper primarily dealt with debt issuance, the findings may be transferable to studies examining contract announcements. Consequently, firms in industries or segments with higher degrees of information asymmetry may see higher cumulative abnormal returns than their counterparts when they announce new contracts.

Farrell and Shapiro (1989) suggested that in contracting situations where there are significant relationship-specific assets, contractors and principals worry about lock-in. In this context, lock-in is understood as committing time, resources and capacity for a significant time period. By engaging in long-term contracts the parties signal that lock-in is not concerning. Put differently, through a costly evaluation process the contractor is conveying good news to the market. Hence, the length of the contract is expected to be have a positive impact on the cumulative abnormal return.

2.2 Other Studies with Relevant Findings

Eckbo and Smith (1998) investigates the performance of insider trades on Oslo Stock Exchange in the period ranging from 1985 to 1992. The study finds no evidence of positive cumulative abnormal returns by insiders. The paper concludes by suggesting that perhaps traders on Oslo Stock Exchange rarely possess inside information or that the value of trading on inside information is offset by maintaining corporate control benefits. The financial regulations and surveillance have been substantially improved in the period after the banking crisis in the late 1980s and the financial crisis in 2008. This suggests that it is less likely that illegal insider trading is prevalent today.

Daniel, Hirshleifer, and Subrahmanyam (1998) finds that the market overreacts to private information signals and underreacts to public information signals. The study also suggests that there are greater inefficiencies for small value assets due to greater costs related to learning about the assets, and for low liquidity assets because it is easier to cover the aforementioned costs. This suggests that cumulative abnormal returns will be greater for contract announcements by smaller firms due a greater surprise factor.

2.3 Summary of Literature Review

The existing literature on companies announcing they have been awarded contracts is sparse. In particular, there seem to have been no such studies on companies listed on Oslo Stock Exchange. Therefore, the thesis contributes to the literature by investigating the determinants of the stock markets reaction to contract announcements in the maritime industry on Oslo Stock Exchange.

The aforementioned literature stresses three categories of determinants of the stock market reaction: basic characteristics of the contract and the firm, degree of information asymmetry, and past profitability.

The first category deals with variables such as relative contract size, contract length, and Tobin's q. The second category has to do with the degree of asymmetry, which is a somewhat intangible factor that is related to the characteristics of the firm. This varies between which segment the firm belongs to and its size. The last category is the firms' past profitability which is captured by the past year's return on equity.

The latter two categories deal with the surprise factor of the contract announcement as the market struggles to infer future performance in the face of information asymmetry and positively receives news of higher future earnings when the past profitability has been low. This ties into the efficient market hypothesis in that the market is generally expected to be efficient on the semi-strong form. Hence, news regarding company performance is expected to lead to a rapid adjustment of the market.

In addition, the findings of Eckbo and Smith (1998) suggests that there should not be significant amounts of insider trading influencing Oslo Stock Exchange.

3 Background

In the following section some background information of the maritime industry and laws regarding contract announcements will be provided. The first subsection will describe the different segments of the maritime industry. The references in this part is retrieved from Fiksdahl and Wamstad (2016), and hence the structure builds on their thesis. The second subsection will discuss the relevant legal provisions for disclosure of contract awards for companies listed on Oslo Stock Exchange.

3.1 The Maritime Industry

According to Jakobsen (2011) the maritime industry can be defined as companies that own, operate, design, build, supply equipment or specialist services to all types of vessels and other floating installations. This is a broad definition, and includes companies that do not have maritime operations as their primary activities. Hence, the maritime industry consists of a range of different companies that to a varying degree are involved in maritime activities. Furthermore, Jakobsen (2011) defines four main segments in his report. These are shipping companies, shipyards, maritime equipment suppliers, and maritime service providers. In the following subsections the four main segments will be described.

Shipping companies

Shipping companies are characterized as owners and operators of ships or other floating installations (Jakobsen, 2011). This definition covers companies with a range of different operating activities. Hence, shipping companies can be broken down into four subsegments. The four subsegments are deep sea shipping, short sea shipping, offshore service, and offshore contractors.

Deep sea shipping is defined as the transportation of goods across regions (Stopford, 2009). Hence, deep sea shipping is major contributor to the world trade as it involves buying and selling goods and services between two or more countries. Deep sea shipping can be divided into different categories depending on what type of cargo they transport. Dry bulk (i.e. transportation of raw materials such as iron, coal, and aluminum), container (i.e. transportation of goods in containers), tank (i.e. transportation of liquids or gases such as crude oil, LPG, and LNG), and ro-ro (i.e. transportation of rolling cargo such as cars, trucks, and trailers) are examples of such categories.

Short sea shipping is defined as the transportation of goods within regions (Stopford, 2009). Companies that operate in this segment often distribute cargo from regional centers such as Hong Kong and Rotterdam. Generally, the ships are just smaller versions of the vessels in deep sea shipping. Since short sea shipping often involves transportation of goods over relatively short distances, it is often in direct competition with land-based transport (e.g. railway transport and trucks). The services offered in short sea shipping are usually similar to those offered in deep sea shipping.

Offshore service includes every company, except those involved in drilling and production, that participate in the activities on a continental shelf. Oil service, subsea, and seismic companies are the most important players in the offshore service industry (Jakobsen, 2011). Oil service companies facilitate drilling rigs and production platforms. Transportation of supplies and equipment, as well as anchor handling are among the services they provide. Subsea companies run installations in deep ocean or on the seabed (Lehmkoster, 2014). Pipes that extract and transport oil and gas to an existing drilling rig, production platform or an onshore facility are examples of such installations. Lastly, seismic companies provide technology that enable drilling and production companies to find oil and gas reservoirs.

Offshore contractors refer to companies that extract and store oil and gas. Offshore contractors can be divided into two segments. These segments are drilling and production. Drilling comprise rigs and drillships, while production refers to floating production units (Jakobsen, 2011). Rigs and drillships extract oil and gas from the reservoirs through drilling wells. The oil and gas can then be stored in floating production units (e.g. FPSO). An FPSO is designed to store oil and gas received from drilling rigs or subsea facilities. The oil is processed, and then loaded on to a tanker or transported through a pipe to an onshore facility.

Shipyards

Shipyards refer to companies that are engaged in new building, maintenance, repairs, and modifications of vessels and other floating units (Jakobsen, 2011). Norwegian shipyards concentrate their services around four main types of ships. These are offshore vessels, advanced fishing vessels, passenger and car ferries, and specialized coastal vessels (NAV, 2015). The activity within the shipyard industry is heavily affected by the condition of the world economy as their business is initiated by contracts from the shipping companies. Hence, the industry is volatile by nature (Hossain & Zakaria, 2017).

Maritime Equipment Suppliers

Maritime equipment suppliers comprise every company that manufacture all forms of specialized equipment being used in vessels or other floating units (Jakobsen, 2011). It is a broad term and can cover everything from propulsion and control systems to painting and screws. Maritime equipment suppliers can be divided into two main categories and six associated subcategories (Mellbye, Helseth, & Jakobsen, 2016). The two main categories are ship equipment and drilling and offshore equipment. Mechanical equipment, electrical and electronic equipment, design, other operating equipment, and trade are the subcategories associated with the former, while drilling and offshore equipment for ships and rigs are the subcategory associated with the latter.

Maritime Service Providers

Maritime service providers is the broadest segment within the maritime industry. This segment covers all the services that are necessary for transporting goods from one place to another. The maritime service providers can be divided into four main categories. These categories are financial and legal, technological, port and logistic, and trade (Jakobsen, 2011). Within financial and legal one will find services offered from ship brokers, financial advisors, banks, insurance companies, and lawyers. The technological category refers to services offered within design, engineering, classification, research and development, and installations. Port and logistic services are most commonly conducted by port operators and freight forwarders (i.e. a person that, among other things, acts as an intermediary between shipping companies and land-based transport companies) (Popovych, Shyriaieva, & Selivanova, 2016). Lastly, trade involves services such as wholesale and retailing of ship equipment.

Summary of the Maritime Industry

This subsection has given a short introduction of the maritime industry. As described, it consists of a wide range of companies that to varying degrees are involved in maritime activities. Broadly speaking, the companies in the maritime industry can be placed in the following categories: shipping, shipyards, maritime equipment suppliers, and maritime service providers. How the market reacts to contract announcements by companies in these segments may vary. In the following subsection, legal provisions for contract announcements on Oslo Stock Exchange will be reviewed.

3.2 Legal Provisions for Contract Announcements on Oslo Stock Exchange

According to Oslo Stock Exchange a well-functioning capital market is characterized by good flow of information from the listed companies (Borchgrevink & Ølstad, 2016). It is important that the investors have access to accurate, precise and complete information concerning the listed companies so that they can make well-informed and qualified investment decisions. To make sure that the investors have equal access to such information simultaneously it is necessary with laws and regulations regarding disclosure of information that can affect stock prices.

Companies listed on Oslo Stock Exchange are regulated by the Norwegian Securities Trading Act. These regulations require that companies make inside information public through stock exchange announcements. Chapter 5 of the act covers ongoing and periodic information requirements. According to § 5-1, this chapter applies to "issuers whose financial instruments are quoted, or for which admission to quotation has been requested on a Norwegian regulated market". Thus, companies listed on Oslo Stock Exchange are obligated to adhere to these regulations (Securities Trading Act, 2007).

§ 5-2 subsection (1) of the Securities Trading Act (2007) states that "an issuer shall without delay and on his own initiative publicly disclose inside information which concerns the issuer directly [...]". According to § 3-2 subsection (1), inside information is defined as not commonly known information related to financial instruments that is "likely to have a significant effect on the price of those financial instruments or of related financial instruments". Examples of such information could be contract awards that are likely to affect the value of the company, sale and purchase of stocks from primary insiders (e.g. the management of a company), and decisions regarding repurchase or issue of new stocks or bonds.

Previously, § 5-2 was interpreted as the publication should take place immediately, but only if the event took place in Oslo Stock Exchange's trading hours. If the inside information occurred after the stock exchange had closed, the company could wait until the following trading day to disclose the information (Oslo Stock Exchange, 2015). However, an announcement from Oslo Stock Exchange (2017) notified changes to this practice. From now on, listed companies should disclose inside information immediately also outside the trading hours. It was changed due to the fact that securities listed on Oslo Stock Exchange could be available on other market places with different trading hours. Hence, the interpretation of the regulation was changed to prevent information leakage.

§ 5-2 is particularly relevant for the thesis as it makes sure that companies listed on Oslo Stock Exchange disclose information of contract awards immediately after the contract is signed. Thus, investors get access to the same information at the same time. Consequently, the stock market is expected not to react before the event day. However, information leakage may still occur and therefore effects prior to the event will also be examined.

According to § 5-3 subsection (1), companies can delay disclosure if the information could "prejudice his legitimate interests" (Securities Trading Act, 2007). This section is relevant for example in the event of bigger transactions (e.g. mergers and acquisitions). In such cases it would be more likely to observe changes in the stock price prior to the event as the probability of information leakage is higher.

Furthermore, § 5-12 subsection (1) third sentence, states that inside information "shall at the same time as it is made public be communicated electronically to the regulated market concerned which shall store it in an adequate manner" (Securities Trading Act, 2007). According to Oslo Stock Exchange (2007) this information is stored and publicized on NewsWeb (i.e. a database for stock exchange announcements). Hence, the date of the stock exchange announcement retrieved from this database is the first official publication date of the event. If the information concerning the contract announcements was published somewhere else beforehand, it would be more difficult to estimate the stock market's reaction to contract announcements.

Based on the stock exchange announcements disclosed on NewsWeb, it does not appear to be a mandatory template on how these should be designed or what information they should contain. It varies whether the companies in question specify the size of the contract. In addition, there are only some companies that specify which company they have entered into the agreement with. The former is also confirmed through email correspondence with the communications manager at Oslo Stock Exchange, who writes that "there are no written guidance on whether the companies should report the contract size. This depends on the industry, type of contract, customer, and a number of other conditions" (Aase, 2018). In addition, he writes that it is not all contracts that are defined as inside information, and that some companies "have a communicated policy that contracts over a given size will be disclosed". The latter may explain why large companies announce relatively few contracts.

4 Financial Theory

This section describes two financial theories which are used as a basis for the thesis' arguments. In the first subsection the asset pricing theory is presented in short to explain how investors generally value stocks. In the second subsection the efficient market hypothesis is detailed to explain how the market is expected to react to new information.

4.1 Asset Pricing Theory

There are two main ways for an investor to compute the value of a company, and they may yield somewhat different results (Berk & DeMarzo, 2013). One is to look at the fundamentals, while the other is to compare the company in question to similar companies and decide on the relative value. The former includes methods such as the Dividend Discount model and the Discounted Free Cash Flow model. The latter would entail using multiples obtained in the stock market and in the companies' financial statements.

In this subsection, the most important valuation methods will be presented. Furthermore, it will be demonstrated how changes in expected future earnings for a company following a contract announcement would lead the market to re-evaluate their understanding of the company's stock price.

Dividend Discount Model

In the Dividend Discount model, one calculates the present value of all future dividends to find the stock price (Berk & DeMarzo, 2013). The rationale for this model is that the dividends represent the cash flows paid out to the investors holding the stock, and thus the present value of all future dividends is the fair value of the investment. The stock price at the time of the investment, P_0, is given by equation 4.1.

$$P_0 = \frac{DIV_1}{r_E - g} \tag{4.1}$$

In equation 4.1, DIV_1 is the dividend paid out at time 1, which is assumed to grow at a constant growth rate, g, for all future periods. Furthermore, r_E is the required rate of return on equity for an investor in the company's stock and is usually found using CAPM. This model will be presented in subsection 5.2.

The simple Dividend Discount model is fairly unrealistic as it assumes that the company will always pay out dividends which increase in size with a fixed growth rate and that the required rate of return on equity is constant (Berk & DeMarzo, 2013). A more realistic model would allow for forecasting dividends and for selling the stock in the future. The expanded model is given by equation 4.2.

$$P_0 = \frac{DIV_1}{1+r_E} + \frac{DIV_2}{(1+r_E)^2} + \cdots + \frac{DIV_T}{(1+r_E)^T} + \frac{P_T}{(1+r_E)^T} \tag{4.2}$$

In equation 4.2, T is the final time period at which the stock is sold. Otherwise, the notation is the same as in equation 4.1.

Discounted Free Cash Flow Model

The Discounted Free Cash Flow model uses the present value of all future expected free cash flows to estimate the combined value of equity and debt of a company (Berk & DeMarzo, 2013). The advantage is that it allows for valuing companies that do not pay out dividends regularly. Commonly, you would forecast the cash flows a few years ahead and then calculate a terminal value for the free cash flows beyond this time period. The present value is then considered to be the enterprise value of the company. Formally, the Discounted Free Cash Flow model is expressed by equation 4.3.

$$DFCF = \frac{FCF_1}{1+r_{WACC}} + \frac{FCF_2}{(1+r_{WACC})^2} + \cdots + \frac{FCF_T + V_T}{(1+r_{WACC})^T} \tag{4.3}$$

$$V_T = \frac{FCF_{T+1}}{r_{WACC} - g_{FCF}}$$

In equation 4.3, $DFCF$ is the discounted free cash flow. FCF_1 is the free cash flow at time 1, while r_{WACC} is the weighted average cost of capital. V_T is the terminal value of the free cash flows beyond time period, T, and at this point the free cash flows grows at a constant rate equal to g_{FCF}.

Multiples Approach

The Multiples Approach is based on the law of one price which states that companies that are similar should trade for the same price (Berk & DeMarzo, 2013). The most common valuation multiples are equity multiples and enterprise value multiples. The former includes ratios such as P/E (i.e. price to earnings ratio) and P/S (i.e. price to sales ratio), while the latter includes ratios such as $EV/EBITDA$ (i.e. enterprise value to EBITDA ratio) and EV/S (i.e. enterprise value to sales ratio). The idea is to estimate an industry ratio for firms with comparable characteristics as the company in question. The computed multiple is then multiplied by the relevant number in the company's financial statement to retrieve an estimate of the firm's equity or enterprise value.

Relevance for Contract Announcements

All of the models presented above implement earnings in some way. The rationale is that, everything else equal, the nominator in the Dividend Discount model and the Discounted Free Cash Flow model will increase if earnings increases. On a similar note, the number that is multiplied by the industry ratio in the multiples approach will increase if earnings increases. As most companies are considered to be profit maximizing, a contract award is likely to be a signal of increased expected future earnings. Consequently, investors in the stock market may reconsider their understanding of the company's stock price following a contract announcement.

4.2 Efficient Market Hypothesis

The efficient market hypothesis states that the stock market incorporates and reflects all relevant information to a degree, of which there are three: weak, semi-strong, and strong (Fama, 1970). The weak form states that one cannot earn excess returns by undertaking technical analyses on past prices and volumes. The semi-strong form states that the weak form holds and that one cannot earn excess returns by performing fundamental analyses using public information that indicate future performance. The strong form holds that prices reflect all information, both public and private.

Though disputed by some, it is generally accepted that the market is approximately efficient on the semi-strong form (Fama, 1991). The market reacts quickly and accurately to new information regarding company fundamentals. Consequently, it should be impossible to consistently achieve higher risk-adjusted returns than the market by using the same information that is publicly available. As discussed in the previous section, news of higher future earnings should lead to an immediate increase in the stock price as investors will re-evaluate their understanding of the value of the company. Conversely, information that suggests that the company will perform worse than previously expected should lead to an instant decrease in the stock price.

5 Empirical Methods

The event study methodology is a tool used to measure the impact of a specific event on the value of a company (MacKinlay, 1997). It builds on the semi-strong form of the efficient market hypothesis, which assumes that the stock market incorporates all publicly available information as detailed in the previous section.

The following five subsections will describe the building blocks of an event study, and highlight the theory behind the methods used in the thesis. The first part will detail the essence of the event study methodology. Furthermore, the second part will explain the four normal performance models used to estimate the normal return of the companies in the sample. The third part describes the significance tests conducted throughout the analysis, and why those specific tests were used. In the fourth part the cross-sectional analysis will be explained. Lastly, the assumptions of OLS are described in the fifth part.

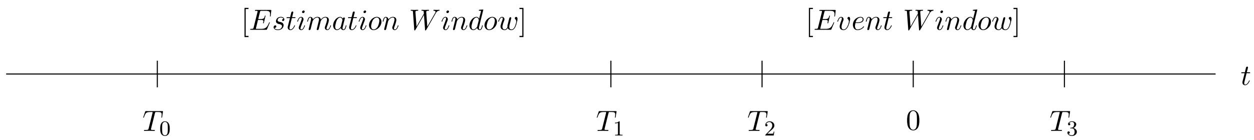
5.1 Event Study Methodology

In an event study the researcher starts by defining an event, in this case contract announcements in the maritime industry for companies listed on Oslo Stock Exchange (MacKinlay, 1997). The idea is to measure how such announcements affect the stock price of a given company. To simplify the process, it is necessary to establish a selection criterion. For example, only contract announcements that were disclosed between January 1, 2014, to December 31, 2017, will be included in the sample. A selection criterion limits the scope of the sample, and prevents the researcher from including events that are not relevant for the research question.

The next step is to retrieve stock prices corresponding to the selected events in the sample (MacKinlay, 1997). In this study, stock prices between January 1, 2013, and December 31, 2017, have been gathered. It is necessary to obtain stock prices before the event day to allow for estimating the normal performance of the company in question.

Furthermore, the event and the estimation window need to be defined (MacKinlay, 1997). Typically, the event window is chosen to be the day of the announcement. However, it is customary to expand the event window to allow for examination of the days surrounding the event. After the event window has been defined, the estimation window must be chosen. This period is used to estimate the normal performance of the stock in absence of the event. Generally, the estimation window is not overlapping the event window to prevent the event from affecting the estimation of the normal return. There is no straight answer to how long the estimation window should be. It is up to the discretion of the researchers to decide what would provide the best representation of a given company's normal performance. Figure 5.1 represents the timeline of an event study.

Figure 5.1: Event Study Timeline



T_0 and T_1 represent the starting point and ending point of the estimation window, while T_2 and T_3 mark the starting point and the ending point of the event window. 0 is the day of the event. The figure is a modification of the one presented by MacKinlay (1997).

In figure 5.1, the estimation window and the event window have been plotted over the timeline of the events. In the thesis, T_0 is equal to -200, while T_1 is set to -20. Hence, the estimation window consists of 181 days of stock returns in the days prior to the event. Furthermore, T_2 is equal to -10, while T_3 is set to 10. This means that the event window comprises 21 days of stock returns. To allow for investigation of information leakage and post-event price drifts, the event window has been split into three parts. These three parts are the pre-event day window, the event day window, and the post-event day window. The first part consists of the days [-10,-6] and [-5,-1], and will let the researcher test for effects in the days prior to the event. The second part solely includes day [0], and will allow for examination of the effects on the event day. The third part consists of the days [1,5] and [6,10], and will let the researcher investigate effects after the event.

Once the event and estimation window have been defined, the normal performance of the companies in the sample must be computed (MacKinlay, 1997). This will allow the researcher to estimate the company's stock price in absence of the event. Subtracting the actual stock price in the event window by the estimated normal performance of the stock, yields the abnormal return. The abnormal return is a measure of the event's impact on the value of the company. Aggregating abnormal return across time yields the cumulative abnormal return, and is expressed by equation 5.1.

$$CAR_i = \sum_{t=T_j}^{T_v} AR_{it} \tag{5.1}$$

In equation 5.1, CAR_i is the cumulative abnormal return for event i and AR_{it} is the abnormal return for event i at time t. Hence, the cumulative abnormal return is the sum of abnormal returns for event i across time. T_j and T_v indicates which part of the event window that is being investigated.

Aggregating the cumulative abnormal returns for each stock and dividing by the number of observations in the sample, generates the cumulative average abnormal return (MacKinlay, 1997). Formally, cumulative average abnormal return is derived by equation 5.2.

$$CAAR = \frac{1}{N}\sum_{i=1}^{N} CAR_i \qquad (5.2)$$

In equation 5.2, $CAAR$ is the cumulative average abnormal return for all events. The cumulative average abnormal return is equal to the sum of the cumulative abnormal returns for event i divided by the number of observations in the sample N.

Lastly, it will be tested whether the cumulative average abnormal return is significantly different from zero (MacKinlay, 1997). If this is true, it indicates that the events in the sample on average have a significant impact on the overall value of the companies.

5.2 Estimating Normal Performance

MacKinlay (1997) presents two main categories of models for estimating normal performance: statistical and economic.

The statistical models are derived from statistical assumptions concerning asset behavior (MacKinlay, 1997). The assumptions for the statistical models is that the assets are jointly multivariate normal, as well as independently and identically distributed. He mentions two statistical models which will be used in the thesis: the Constant Mean Return model and the Market model. The former assumes that the normal performance of an asset is equal to the average return of the asset in the past, while the latter assumes the normal performance of an asset is a linear function of the market return.

The economic models rely both on arguments about statistics and investor behavior to estimate normal performance (MacKinlay, 1997). The most common economic models are the Capital Asset Pricing Model (CAPM) and the Arbitrage Pricing Theory (APT). CAPM is an equilibrium theory where the expected return of an asset is determined by its covariance with the market portfolio, while in APT the expected return of a stock is a linear combination of multiple risk factors. In the thesis, however, the Fama-French Three-Factor model will be used instead of APT. This model will be detailed later in this section.

Constant Mean Return Model

In the Constant Mean Return model the asset's normal performance is the average return of the asset over a predefined period in the past (MacKinlay, 1997). The estimation of the Constant Mean Return model is given by equation 5.3.

$$R_{it} = \mu_i + \epsilon_{it} \tag{5.3}$$

$$\mu_i = \frac{1}{k}\sum_{t=T_0}^{T_1} R_{it} \qquad E(\epsilon_{it}) = 0 \qquad Var(\epsilon_{it}) = \sigma^2_{\epsilon_i}$$

From equation 5.3, one can see that R_{it} is the predicted normal performance for event i at time t. μ_i is the average return of event i over the estimation period, while k is the number of days in the estimation window. ϵ_{it} is the error term, which has an expected value of zero and a variance equal to $\sigma^2_{\epsilon_i}$.

Market Model

The Market model is a statistical model in which the normal performance of the asset is a linear function of the market portfolio (MacKinlay, 1997). The estimation of the Market model is expressed by equation 5.4.

$$R_{it} = \alpha_i + \beta_i R_{mt} + \epsilon_{it} \tag{5.4}$$

$$E(\epsilon_{it}) = 0 \qquad Var(\epsilon_{it}) = \sigma^2_{\epsilon_i}$$

In equation 5.4, R_{it} is the predicted normal return for event i at time t, while R_{mt} is the return on the market portfolio at time t. ϵ_{it} is the error term, which has an expected value of zero and a variance equal to $\sigma^2_{\epsilon_i}$.

According to MacKinlay (1997), the benefit of the Market model over the Constant Mean Return model is that the proportion of the return that is tied to variation in the market return is removed. Hence, the variance of the abnormal return of an asset is reduced. Consequently, the ability to detect effects on the stock price following an event may be increased.

Capital Asset Pricing Model

CAPM is an economic model commonly used to price securities. According to Sharpe (1964) and Lintner (1965), the return of the asset in the model is a linear combination of the risk free rate, and the asset's covariance with the market portfolio. The estimation of CAPM is given by equation 5.5.

$$R_{it} - rf_t = \alpha_i + \beta_i(R_{mt} - rf_t) + \epsilon_{it} \tag{5.5}$$

$$E(\epsilon_{it}) = 0 \qquad\qquad Var(\epsilon_{it}) = \sigma^2_{\epsilon_i}$$

From equation 5.5, one can see that $R_{it} - rf_t$ is the predicted normal risk premium for event i at time t, while $R_{mt} - rf_t$ is the risk premium of the market portfolio at time t. ϵ_{it} is the error term, which has an expected value of zero and a variance equal to $\sigma^2_{\epsilon_i}$.

Fama-French Three-Factor Model

The Fama-French Three-Factor model expands upon CAPM by introducing two additional systematic risk factors: size and value (Fama & French, 1993). The model is a result of the empirical findings made by Fama and French that indicated that these factors would increase the explanatory power of CAPM, and thus enhance its ability to explain asset returns. The estimation of the Fama-French Three-Factor model is expressed by equation 5.6.

$$R_{it} - rf_t = \alpha_i + \beta_{im}(R_{mt} - rf_t) + \beta_{iSMB}SMB_t + \beta_{iHML}HML_t + \epsilon_{it} \tag{5.6}$$

$$E(\epsilon_{it}) = 0 \qquad\qquad Var(\epsilon_{it}) = \sigma^2_{\epsilon_i}$$

In equation 5.6, $R_{it} - rf_t$ is the predicted normal risk premium for event i at time t, while $R_{mt} - rf_t$ is the risk premium of the market portfolio at time t. SMB_t and HML_t are the return on small minus big market capitalization stocks and high minus low book-to-market ratio stocks at time t, respectively. ϵ_{it} is the error term, which has an expected value of zero and a variance equal to $\sigma^2_{\epsilon_i}$.

5.3 Significance Testing

After employing the aforementioned models, one must investigate whether the estimated cumulative average abnormal return is significantly different from zero. In other words, the question is if the contract announcements induce a change in the stock prices that is different than what would presumably have happened in absence of the events.

There are two main categories of significance tests: parametric and nonparametric tests (MacKinlay, 1997). A somewhat overly simplified distinction of the two is that the former relies on the assumption that the data follows a specific distribution, while the latter does not.

Boehmer, Masumeci, and Poulsen (1991) finds that the typical significance tests employed in empirical research, such as the Students t-test, too often reject the null hypothesis when events cause an increase in the volatility. Hence, the Cross-Sectional test will be conducted throughout the thesis as it allows for event-induced variance (Boehmer et al., 1991). Wilcoxon's Signed-Rank test will examine the robustness of these results.

Cross-Sectional Test

The Cross-Sectional test is a parametric test, and a modified version of the Student's t-test (MacKinlay, 1997). The test follows a t-distribution, and the t-statistic is computed by dividing the cumulative average abnormal return on its corresponding standard error. The standard error in the Cross-Sectional test is corrected to account for event-induced variance as discussed in the previous subsection. In order for the test to be consistent it is required that the cumulative abnormal returns are uncorrelated in the cross section. According to MacKinlay (1997), it is sufficient that the events are not clustered.

Given the nature of contract announcements, increased volatility is expected around the event day. Thus, the Cross-Sectional test will be conducted in place of the customarily used Student's t-test. Formally, the Cross- Sectional test is expressed by equation 5.7 (MacKinlay, 1997).

$$T = \frac{CAAR}{\sqrt{Var(CAAR)}} \tag{5.7}$$

$$Var(CAAR) = \frac{1}{N^2}\sum_{i=1}^{N}(CAR_i - CAAR)^2$$

In equation 5.7, CAR_i is the estimated cumulative abnormal return for event i, while $CAAR$ is the average of this value. CAR_i and $CAAR$ are derived using equation 5.1 and 5.2, respectively. N is equal to the number of observations in the sample.

Wilcoxon's Signed-Rank Test

According to MacKinlay (1997), the sign and rank tests are the most well-specified nonparametric tests for event studies. Hence, the nonparametric Wilcoxon's Signed-Rank test will be used to examine the robustness of the results given by the Cross-Sectional test.

Wilcoxon's Signed-Rank test compares the median of the sample against a hypothesized value to test whether they are significantly different from each other (Berenson, Levine, & Krehbiel, 2011). The benefit of the test is that it considers both the sign and the magnitude of the cumulative abnormal returns (Dutta, 2014). It works by finding the absolute values of the differences between the cumulative abnormal returns and the hypothesized value, and ranks the size of those differences from smallest to highest (Berenson et al., 2011). The test statistic W is then equal to the sum of ranks where the differences were positive. W is standardized by subtracting the probability of observing W under the current null hypothesis and dividing by the standard deviation. The resulting Z-statistic follows a standard normal distribution. Formally, Wilcoxon's Signed-Rank test is given by equation 5.8.

$$Z = \frac{W - E(W)}{\sqrt{Var(W)}} \tag{5.8}$$

$$W = \sum_{i=1}^{N} I_i R_i \qquad E(W) = \frac{N(N+1)}{4} \qquad Var(W) = \frac{N(N+1)(2N+1)}{24}$$

In equation 5.8, W is the test statistic of the test, while $E(W)$ is the probability of observing this value under the current null hypothesis. $Var(W)$ is the variance of the test statistic W. I_i is an dummy variable that is equal to 1 if the difference between the cumulative abnormal returns and the hypothesized value is positive, and zero otherwise. R_i is the rank of the absolute value of this difference.

5.4 Cross-Sectional Analysis

According to MacKinlay (1997), one can extract deeper insights into the drivers of cumulative abnormal returns by examining its relation with firm specific characteristics relevant for the companies in the sample. He argues that such an analysis will be useful when multiple sources of cumulative abnormal returns may exist. Formally, the cross-sectional analysis is expressed by equation 5.9.

$$CAR_i = \delta_0 + \delta_1 x_{li} + \delta_2 x_{2i} + \cdots + \delta_M x_{Mi} + \epsilon_i \tag{5.9}$$

$$E(\epsilon_i) = 0 \qquad Var(\epsilon_i) = \sigma^2_{\epsilon_i}$$

In equation 5.9, CAR_i is the cumulative abnormal return for event i, while x_{li} indicates firm specific characteristic l for event i. ϵ_i is the error term, which has an expected value of zero and a variance equal to $\sigma^2_{\epsilon_i}$.

MacKinlay (1997) discusses issues with interpretation of cross-sectional regressions. Often the cumulative abnormal returns will be correlated with firm specific characteristics both through a valuation effect, but also an anticipation effect by investors utilizing firm specific characteristics to predict future cumulative abnormal returns. In these cases, the observed valuation effects may be different from their true values.

Prabhala (1997) argued that ideally one also has data on companies whom the market anticipated would announce a contract, but did not (i.e. non-event data). However, the paper showed that the conventional event study methodology still yields statistically valid inferences in the face of the anticipation effect and that the effect is proportional to the true effect. The associated t-statistics in the regressions are then considered to be conservative lower bounds of their true values. Given that data on non-event observations would be quite difficult to obtain, the thesis will only utilize actual event data. Thus, the interpretation of the significance of the variables will have to take into account that the results may be somewhat conservative.

5.5 OLS Assumptions

In the cross-sectional analysis, Ordinary Least Squares (OLS) will be used to estimate the unknown parameters of the regression model. The reader is assumed to be familiar with OLS, but the assumptions of the method will be presented as some of them will be tested in the robustness analysis. The theory behind the methods used to test whether the assumptions hold will not be covered in the thesis.

[A1] Linear in Parameters

The first assumption is that the regression model is linear in parameters (Wooldridge, 2013). This means that the explained variable can be estimated as a linear function of the explanatory variables and an error term. If this assumption is violated the model will produce erroneous results, and the predictions will be unreliable. Formally, the assumption can be expressed by equation 5.10.

$$y_i = \delta_0 + \delta_1 x_{li} + \delta_2 x_{2i} + \cdots + \delta_M x_{Mi} + \epsilon_i \tag{5.10}$$

In equation 5.10, y_i is the explained variable for observation i, while x_{li} indicates the explanatory variable l for observation i. δ is the unknown parameters of the model, while ϵ_i is the error term.

It is important to bear in mind that even though the model is assumed to be linear in parameters, it does not mean that the individual explanatory variables must be linear (Wooldridge, 2013). If the relationship between the explained variable and the explanatory variables is in fact nonlinear, it may be correct to change the specification of the variables.

[A2] Random Sampling

The second assumption is that the sample is drawn randomly from the population in question (Wooldridge, 2013). This means that the observations in the sample should not be correlated with each other. If this assumption is violated, the estimated parameters will not be equal in expectation to the true population parameters. In other words, the coefficients will be biased. Whether this assumption holds is a question of how the sample was constructed.

[A3] Zero Conditional Mean

The third assumption is that the error terms must have a zero conditional mean (Wooldridge, 2013). This entails that the mean of the error terms should have an expected value of zero independent of the explanatory variables. If this assumption is violated the estimated coefficients will be biased. Formally, the assumption is given by equation 5.11.

$$E(\epsilon_i|x_{li}) = 0 \tag{5.11}$$

From equation 5.11, ϵ_i is the error term for observation i, while x_{li} indicates the explanatory variable l for observation i. E is the expected value of the given expression.

[A4] No Multicollinearity

The fourth assumption is that there should be no linear relationship between the explanatory variables (Wooldridge, 2013). This means that it should not be possible to linearly predict one of the explanatory variables in the model in terms of another. If this assumption is violated the regression model is said to be having a problem with multicollinearity. If this is the case, the regression model may be used to predict the explained variable, but the estimated coefficients of the correlated variables will be biased. According to O'brien (2007), one of the most common methods to test whether the regression has a problem with multicollinearity is by reviewing the Variation Inflation Factors (VIF).

[A5] Homoscedasticity

The fifth assumption is that the error terms should be homoscedastic (Wooldridge, 2013). This means that the variance of the error terms should be constant independent of the explanatory variables. If this assumption is violated the regression model is said to be having a problem with heteroscedasticity. If the error terms display heteroscedasticity, OLS is no longer efficient. The estimated coefficients are still unbiased, but the standard errors will be wrong. Hence, the inference will be invalid. Violations of this assumption may be tested by running a White test and a Breusch-Pagan/Cook-Weisberg test. Formally, the assumption can be expressed by equation 5.12.

$$Var(\epsilon_i|x_{li}) = \sigma^2 \tag{5.12}$$

In equation 5.12, ϵ_i is the error term for observation i, while x_{li} indicates the explanatory variable l for observation i. Var is the variance of the given expression, and σ^2 is its corresponding parameter.

6 Sample

The sample consists of 208 contract announcements from 28 companies in the maritime industry listed on Oslo Stock Exchange from January 1, 2014, to December 31, 2017. The sample is constructed using data gathered from four main sources: NewsWeb, Thomson Reuters Datastream, Norges Bank, and Bernt Arne Ødegaard's website. NewsWeb is a collection of stock exchange announcements from companies engaged in activities on either Oslo Stock Exchange, Oslo Axess, Nordic ABM, or Merkur Market (NewsWeb, 2018). Thomson Reuters Datastream is a database that covers global financial instruments and key economic indicators for stock markets worldwide (Thomson Reuters Datastream, 2018). Norges Bank provides, among other things, yields on Norwegian treasury bills (Norges Bank, 2018). Bernt Arne Ødegaard's website provides data on the systematic risk factors for companies listed on Oslo Stock Exchange from 1980 to 2017 (Ødegaard, 2018).

The following two subsections will elaborate on how the data from these four sources was collected and structured before it was analyzed in Stata. Lastly, the most important features of the sample are described in the third subsection.

6.1 Selection Criterion

In the following subsection the criterion that defines which contract announcements that were chosen will be described. This is important as it limits the scope to a particular type of events, and prevents the selection of contracts that are irrelevant for the research question of the thesis.

Stock Market Selection

As mentioned, NewsWeb provide stock exchange announcements for companies listed on Oslo Stock Exchange, Oslo Axcess, Nordic ABM, and Merkur Market. Companies listed on these markets enter into hundreds of contracts each year. Hence, it is not expedient to include every contract available on NewsWeb. Nordic ABM was excluded for obvious reasons as it is a market place for bonds (Oslo Stock Exchange, 2018). Hence, the choice was between Oslo Stock Exchange, Oslo Axcess, and Merkur Market. In the sample, contract announcements for companies listed on Oslo Stock Exchange were chosen for two main reasons. Firstly, this would limit the number of contract announcements available. Secondly, the financial data for companies listed on Oslo Stock Exchange is more accessible than the corresponding data for companies listed on the remaining two market places.

Company Selection

The thesis selects shipping companies, shipyards, maritime equipment suppliers, or maritime service providers that enter into contracts to provide a service for another party. As discussed in subsection 2.1, Elayan and Pukthuanthong (2004) found that contractors see significant positive cumulative abnormal returns following contract announcements, while principals do not. Hence, only contract awards to contractors will be examined.

Contract Announcement Selection

In the sample, contract announcements with overlapping event windows have been excluded to prevent the bias of misestimating the effect prior to or after the event (MacKinlay, 1997). Furthermore, only announcements that contain the contract size are included in the sample as this will enable examining the effect of relative contract size on the stock price.

Event Day Selection

As discussed in subsection 3.2, inside information regarding companies listed on Oslo Stock Exchange will first be disclosed through a stock exchange announcement on NewsWeb. It will not be possible to retrieve publicly available information regarding a specific contract announcement before this day, which means that the announcement date on NewsWeb safely can be used as the event day in the thesis. For contract announcements disclosed outside Oslo Stock Exchange's opening hours, the following trading day has been chosen as the event day since investors cannot act on the information before the stock exchange reopens.

6.2 Financial Data

In the following subsection the reason behind the choice of the specific financial variables will be explained, as well as their role in the analysis.

Stock Prices

The thesis uses five years of stock prices ranging from January 1, 2013, to December 31, 2017. The data gathered from Thomson Reuters Datastream are the adjusted closing prices for each stock. The adjusted closing prices are chosen to account for any corporate actions, such as dividends and stock splits, that will affect the value of the stock from one day to another (Yahoo! Finance, 2018).

The stock prices are used, in combination with the normal performance models, to estimate the cumulative abnormal return of each individual event.

Risk-Free Asset

The risk-free rate is used to compute the market premium in CAPM and the Fama-French Three-Factor model, and hence needs to be estimated. The risk-free rate is defined as the rate of return on an asset where "the expected rate of return is known with certainty" (Boskovska, 2013). In theory, the maturity of the risk-free rate should equal the investment horizon. However, in reality the maturity of the risk-free asset is often chosen to be rather short to prevent currency and inflation risk. For longer maturities, the risk of changes in currency rates and inflation would be present, and the asset would in fact not be risk-free. Generally, government treasury bills (i.e. original maturity of less than one year) and government bonds (i.e. original maturity of more than one year) are chosen as the risk-free asset. In the thesis the daily yield on 3-month treasury bills issued by the Norwegian government are used as a proxy for the risk-free asset. Norwegian treasury bills are selected as the thesis investigates the Norwegian stock market, and a 3-month horizon is chosen as it is unlikely that significant changes in currency rates and inflation will occur over such a short period of time.

Systematic Risk Factors

The Fama-French Three-Factor model is used as one of four models to estimate the normal performance for the companies in absence of the events. Hence, it was necessary to obtain data on the systematic risk factors for companies listed on Oslo Stock Exchange. The model includes the market premium, as well as the two systematic risk factors: size and value (Fama & French, 1993). The data on these factors were obtained through Bernt Arne Ødegaard's website.

Benchmark

The Market model, CAPM, and the Fama-French Three-Factor model requires a proxy for the market portfolio. According to Roll (1977), and a part of what is sometimes referred to as Roll's critique, a truly diversified market portfolio is infeasible as it would require a value-weighted portfolio of every asset in the world. Furthermore, he adds that choosing the wrong proxy for the market portfolio can lead to spurious results. Næs, Skjeltorp, and Ødegaard (2008) recognize this problem, and argue that a market index tracking the global stock market is usually treated as the market portfolio in modern empirical literature. However, they claim that when analyzing the stock market in a specific country the market portfolio should reflect the local stock market. In addition, looking from the perspective of an investor that limits its investments to stocks listed on Oslo Stock Exchange, it is appropriate to use OSEBX as a proxy for the market portfolio. The adjusted closing prices for the index are gathered from Thomson Reuters Datastream.

Explanatory variables

Total assets, return on equity, and Tobin's q are used as explanatory variables in the cross-sectional analysis, and the variables are collected using Thomson Reuters Datastream. Total assets is the combined book value of all assets owned by a company. Return on equity is equal to the net income divided by the book value of the shareholders' equity, and is a measure of a company's profitability. Tobin's q is defined as the ratio between the firm's market capitalization and the replacement cost of the firm's assets (Elayan & Pukthuanthong, 2004). As the replacement cost of the firm's assets is difficult to compute, total assets is used as an approximation. Total assets, return on equity, and Tobin's q are obtained from the companies' financial statements, while the market capitalization can be observed in the market on a daily basis. In the analysis, total assets is applied as a proxy for the size of a company, and in combination with the reported value of a given contract announcement, used as a measure of relative contract size.

The literature review also found that the length of the contract and which segment the companies belong to may be significant in explaining cumulative abnormal returns. However, information regarding contract length is not precise enough and not always reported in the stock exchange announcements. In addition, most of the companies in the sample belong to the same two segments (i.e. offshore service and offshore contractors), while there are only some observations for the remaining subsectors. Consequently, there would have been too few observations for most of the segments in the maritime industry to draw meaningful inferences. Hence, these variables are not accounted for in the analysis.

Oil Price

From the start of 2014 until the end of 2017 the global crude oil spot price peaked at $115.19 a barrel in June 2014 and reached its bottom at $26.00 a barrel in January 2016. During this period the stock prices of the companies within the maritime industry listed on Oslo Stock Exchange declined substantially.[1] This implies that the companies in this sector were heavily affected by the oil price level. Therefore, the global crude oil spot price in this period is used to control for different effects on the stock price following a contract announcement depending on the level of the oil price. The global crude oil spot price was obtained from Thomson Reuters Datastream.

[1] The energy index on Oslo Stock Exchange, namely OSLENX, peaked at 188.28 in June 2014 and reached its bottom at 86.86 in January 2016.

6.3 Descriptive Statistics

Relative Contract Size

Table 6.1 shows the number of observations, as well as median, average, minimum, and maximum values for absolute contract size, total assets, and relative contract size.

Table 6.1: Absolute Contract Size, Total Assets, and Relative Contract Size

	Observations	Median	Average	Minimum	Maximum
Absolute Contract Size	208	167.50	809.99	6.23	13691.90
Total Assets	208	2982.28	9147.81	251.98	35688.46
Relative Contract Size	208	3.96 %	11.77 %	0.05 %	140.64 %

Absolute contract size and total assets are meassured in MNOK. Relative contract size is measured as absolute contract size divided by total assets at the end of the year when the event occurred.

From table 6.1 one can see that the median absolute contract size amounts to 167.50 MNOK, while the average absolute contract size is 809.99 MNOK. This pattern is similar for total assets and relative contract size. The fact that the median is so much smaller than the average indicates a skewness in the distribution. The majority of the contracts are relatively small, but there are some large contracts that increase the average. Furthermore, the relative contract size ranges from 0.05 % to 140.64 %, which means that the companies in the maritime industry announce very small as well as very large contracts relative to their size. It may appear strange that a contract can amount to almost 1.5 times the company's total assets. However, large contracts generally extend over several years, so the contract as a whole is usually not recorded in the same year as it was announced. The variation in the relative contract size makes it interesting to investigate whether it has an impact on the cumulative abnormal returns.

Frequency of Contract Announcements

Table 6.2 shows the number of contracts announced per company in the period ranging from January 1, 2014, to December 31, 2017. In this period some of the companies in the sample went bankrupt, and some got listed. Hence, not every company was present the whole time.

Table 6.2: Number of Contracts Announced per Company

	Contracts		Contracts
Akastor	4	Ocean Yield	3
Aker Solutions	4	Odfjell Drilling	9
Archer	2	Prosafe	9
Bergen Group	8	Reach Subsea	3
BW Offshore Limited	1	REM Offshore	2
Deep Sea Supply	2	SeaBird Exploration	8
DOF	11	Seadrill	6
Electromagnetic Geoservices	35	Sevan Marine	1
EMAS Offshore	6	Siem Offshore	2
Farstad Shipping	7	Solstad Farstad	2
Fred. Olsen Energy	3	Subsea 7	23
Havyard Group	11	TTS Group	29
Kongsberg Gruppen	7	Wallenius Wilhelmsen	1
Kværner	8	Wilson	1

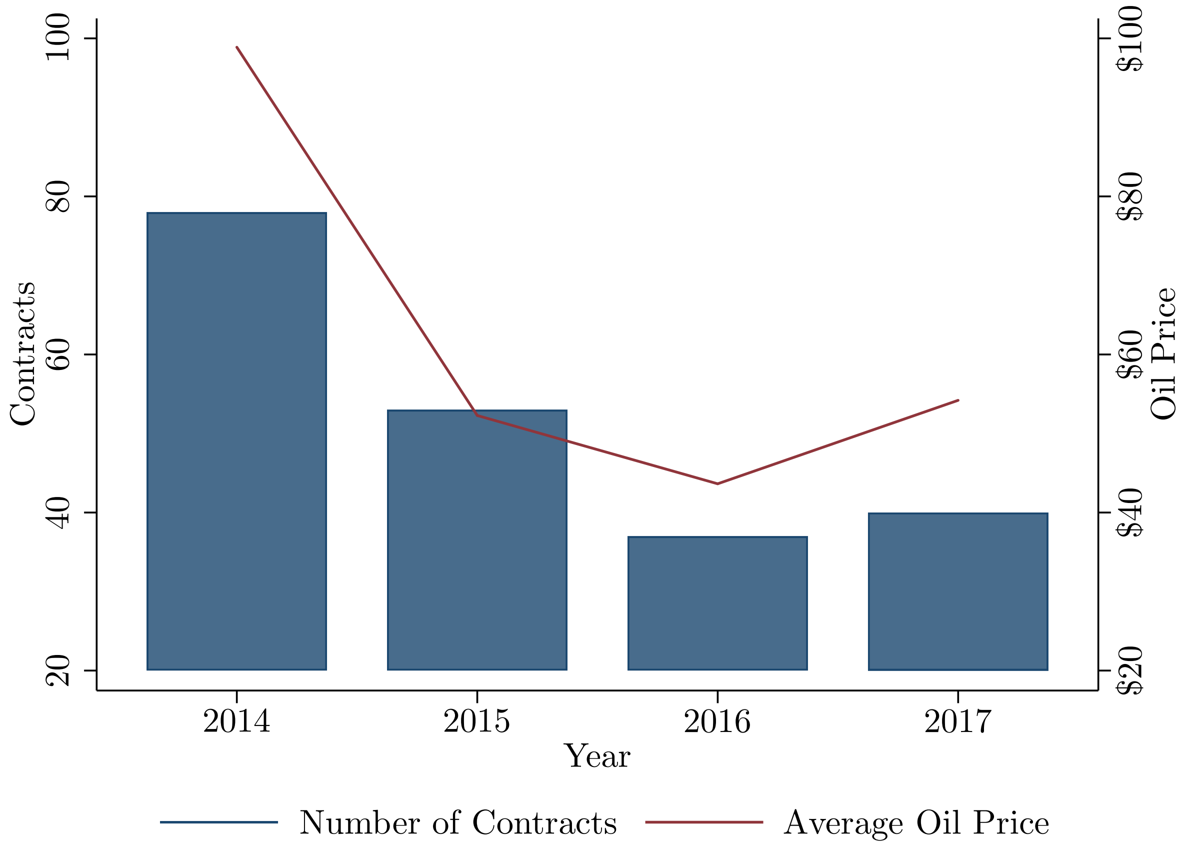
The numbers indicate the amount of contracts announced per company from January 1, 2014, to December 31, 2017.

Table 6.2 shows that the variation in the amount of contracts the companies announce is fairly high. A few companies seem to announce many contracts regularly, while some have only announced a single contract that includes the contract size during the period. If contract announcements become a regular occurrence, the market might expect the company to announce contracts and preemptively price expected contracts into the stock price. On the other hand, unexpected contract announcements may boost the stock price. To account for this, the difference in cumulative abnormal return depending on the frequency of contract announcements will be investigated.

Oil Shock

Figure 6.1 shows the number of contract announcements per year and the average global crude oil spot price in the period from 2014 to 2017.

Figure 6.1: Number of Contract Announcements and Average Global Crude Oil Spot Price



The left y-axis measures the number of contracts, while the right y-axis is the global crude oil spot price measured in USD per barrel. The x-axis is the corresponding year.

Intuitively, it seems like the number of contracts announced are positively correlated with the oil price. Starting in the second half of 2014 the oil price fell dramatically. The oil price was more than halved and many businesses that operated within the maritime industry struggled. This is supported by the fact that the number of contracts was approximately halved from 2014 to 2017. Hence, the oil price seems to be a relevant variable.

Cross-Classification

Table 6.3 shows a cross-classification of relative contract size against frequency of contract announcements and the oil shock. Relative contract size is measured as contract size divided by total assets at the end of the year when the event occurred. The variable is split into three percentiles: small, medium, and large. Frequency of contract announcements is divided into two groups based on the number of contracts announced per year in the sample. A company is classified as high if it announced more than five contracts per year, and low if it announced five or less. Contracts announced before June 23, 2014, is categorized as being before the oil shock, those who were announced after this date are classified as being after the oil shock.

Table 6.3: Cross-Classification: Relative Contract Size against Frequency and Oil Shock

Relative Contract Size:	Small	Medium	Large
Frequency:			
Low	30.58 % (37)	33.88 % (41)	35.54 % (43)
High	37.93 % (33)	32.18 % (28)	29.89 % (26)
Oil Shock:			
Before	27.50 % (11)	42.50 % (17)	30.00 % (12)
After	35.12 % (59)	30.95 % (53)	33.93 % (57)

The table shows the groups proportion of the row total, and hence each row sums to 100 %. The absolute number of contracts within parentheses.

From table 6.3, one can see that the proportion of contracts categorized as large drops from 35.54 % to 29.89 % when moving from companies that less frequently announce contracts to companies that do it more often. In general, the table indicates that relative contract size and frequency of contract announcements are negatively correlated. For the oil shock the tendency is not that present. However, the proportion of medium and large contracts drops from 72.50 % before the oil shock to 64.88 % after. These relationships are interesting and will be further investigated in the following section.

7 Analysis

The aim of the analysis is to answer the following research question "how does the stock market react to contract announcements by companies in the maritime industry listed on Oslo Stock Exchange". The research question will be examined using the event study methodology as described by MacKinlay (1997).

In each subanalysis the following null hypothesis will be tested against the alternative hypothesis:

$$H_0 : The\ cumulative\ average\ abnormal\ return\ is\ = 0.$$

$$H_A : The\ cumulative\ average\ abnormal\ return\ is\ \neq 0.$$

The numbers within the square brackets in the regression output tables indicate which days relative to the event day that have been tested. 0 is the event day, while negative values is the number of days prior to this date and positive values is the number of days after this date. In the analysis the main focus will be on the event day as this is defined as time frame which the events are scheduled to occur. However, the cumulative average abnormal return for the pre-event day window and the post-event day window will also be reported.

According to Schwert and Seguin (1990), stock returns exhibit time-varying variance. This means that the error terms in the regressions may have a problem with heteroscedasticity, which violates the fifth assumption of OLS. Hence, two formal tests for homoscedasticity are performed in section 8.4. The results from these tests suggest that the error terms display heteroscedasticity. Consequently, robust standard errors will be employed throughout the analysis.

The analysis contains several parts. The first part will examine the stock market's reaction to contract announcements by companies in the maritime industry listed on Oslo Stock Exchange. The second part will add to this analysis by investigating the effect of relative contract size. The third part will explore whether the frequency of contract announcements affect the stock market's reaction to new contracts. The fourth part will examine the impact of the oil shock. Lastly, in the fifth part a cross-sectional analysis will be conducted to extract deeper insight into the stock market's reaction to contract announcements, and to analyze the effect of firm specific characteristics.

7.1 The Stock Market's Reaction to Contract Announcements

Table 7.1 shows the cumulative average abnormal return for the event day, the pre-event day window, and the post-event day window. The normal performance for a given stock is estimated using the Constant Mean Return model, the Market model, CAPM, and the Fama-French Three-

Factor model. Four models are reported to illustrate how the cumulative average abnormal return depend on the choice of normal performance model.

Table 7.1: Cumulative Average Abnormal Return: Normal Performance Models

	(1) Constant Mean	(2) Market Model	(3) CAPM	(4) Fama-French
Event Day:				
[0]	0.0255***	0.0256***	0.0256***	0.0247***
	(6.43)	(6.60)	(6.61)	(6.40)
Pre-Event Day Window:				
[-5,-1]	0.0022	0.0019	0.0022	0.0022
	(0.45)	(0.42)	(0.47)	(0.48)
[-10,-6]	-0.0044	-0.0080	-0.0078	-0.0076
	(-0.68)	(-1.25)	(-1.21)	(-1.20)
Post-Event Day Window:				
[1,5]	-0.0049	-0.0030	-0.0028	-0.0022
	(-0.93)	(-0.59)	(-0.54)	(-0.44)
[6,10]	0.0038	0.0037	0.0039	0.0028
	(0.64)	(0.64)	(0.68)	(0.48)
Observations	208	208	208	208

The numbers within the square brackets indicate which days relative to the event day that have been tested. T-statistics in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

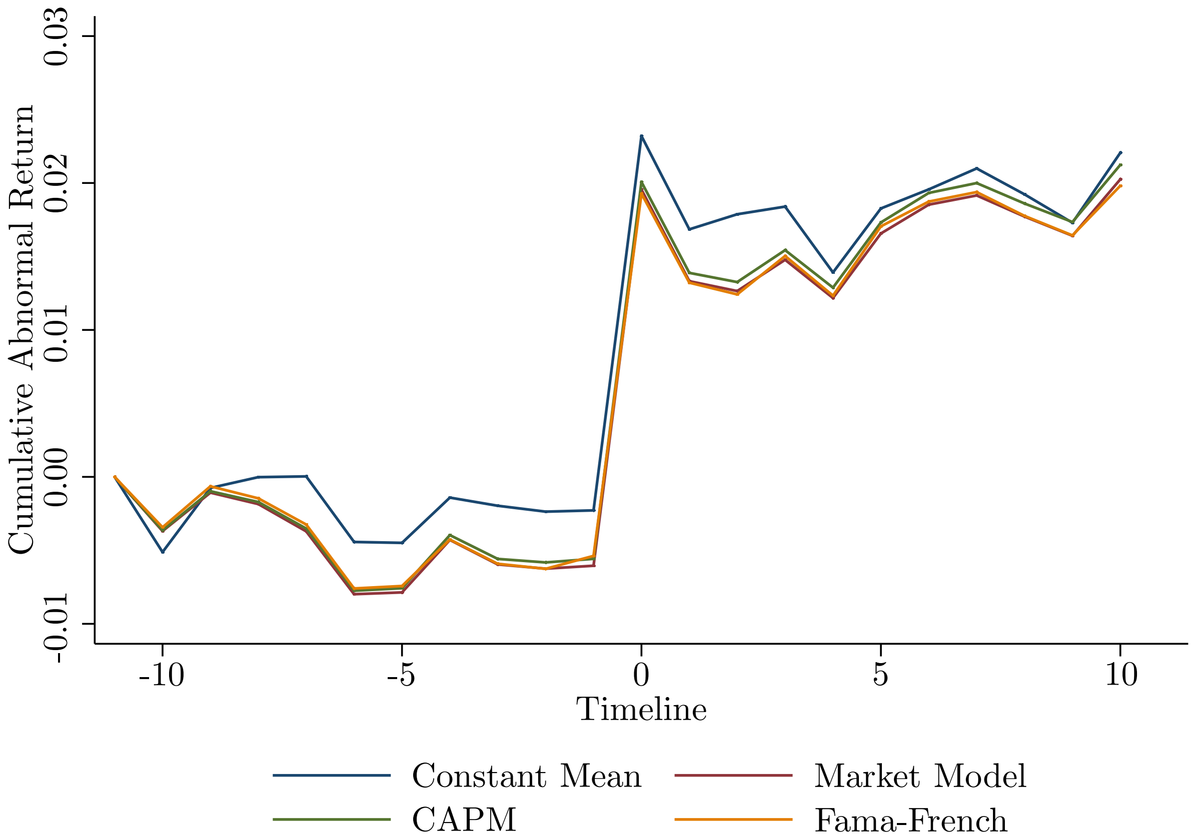
Table 7.1 shows that for the event day the cumulative average abnormal return is significantly different from zero at a 1 % level for all four models. The average increase in the stock price for a given company due to a contract announcement ranges from 2.47 % to 2.56 % depending on which model that was used to estimate the normal performance.

The cumulative average abnormal return for the pre-event day window and the post-event day window are not significantly different from zero. This indicates that there is no information leakage prior to the events, and it appears that the stock market reacts rapidly to new information. Hence, there are no signs of insider trading, and the stock market seem to be efficient on the semi-strong form as described in subsection 4.2.

Illustration of the Stock Market's Reaction

The cumulative abnormal return can be plotted in a graph to better illustrate how it develops over the timeline of the events. Figure 7.1 shows the cumulative abnormal return for the Constant Mean Return model, the Market model, CAPM, and the Fama-French Three-Factor model. The figure illustrates how the stocks perform prior to, at, and after the event.

Figure 7.1: Cumulative Abnormal Return: Normal Performance Models



The x-axis is the number of days relative to the event day, while the y-axis illustrates the cumulative abnormal return.

From figure 7.1 one can see that the cumulative abnormal return increases on the event day, but only fluctuates slightly prior to and after this date. This indicates that the abnormal return is positive on the event day, but approximately equal to zero before and after the event. Moreover, there are no signs of the cumulative abnormal returns drifting upwards or downwards at any point on the timeline. This illustrates the results observed in table 7.1, where the models indicated that the cumulative average abnormal returns were significantly different from zero on the event day, but not significantly different from zero prior to and after the event. Furthermore, the behavior of the cumulative abnormal returns only differ slightly when moving from one model to another.

This implies that the results are rather robust to the choice of normal performance model.

Explanation of the Stock Market's Reaction

A possible explanation to the observed results in figure 7.1 could be that contract announcements represent real changes to the overall value of a given company. It is fair to assume that the company in most cases would not agree to sign a contract if the costs exceeded the income. Hence, an announcement of a new contract would increase the net income of the company. Provided that the company does not raise more equity, for example to finance the contractual obligations, this means that the return on equity for the company would increase. This would in turn increase the growth, g, in the Dividend Discount model in subsection 4.1, and hence lead to a higher stock price for the company announcing the contract.

The investors are aware of this chain of reactions, and immediately incorporate the new information following a contract announcement as a sign of a real increase in the value of the company. This entails that at the time of the event the investors would automatically value the company at a higher price. Hence, a rapid increase in the stock price is expected given that the market is at least efficient on the semi-strong form.

7.2 The Effect of Contract Size

Table 7.2 shows the cumulative average abnormal return for the event day, the pre-event day window, and the post-event day window. Column (1)–(3) represent small, medium, and large relative contract sizes, respectively. Relative contract size is measured as contract size divided by the company's total assets at the end of the year when the event occurred. Column (4) shows the cumulative average abnormal return for all observations using the Market model as an estimator for the normal performance of the stocks.

Table 7.2: Cumulative Average Abnormal Return: Relative Contract Size

	(1) Small	(2) Medium	(3) Large	(4) All
Event Day:				
[0]	0.0133***	0.0301***	0.0336***	0.0256***
	(3.32)	(4.61)	(3.87)	(6.60)
Pre-Event Day Window:				
[-5,-1]	-0.0078	0.0001	0.0137*	0.0019
	(-0.85)	(0.01)	(1.82)	(0.42)
[-10,-6]	0.0048	-0.0120	-0.0169	-0.0080
	(0.43)	(-1.59)	(-1.23)	(-1.25)
Post-Event Day Window:				
[1,5]	-0.0069	-0.0008	-0.0013	-0.0030
	(-0.72)	(-0.09)	(-0.15)	(-0.59)
[6,10]	0.0088	0.0015	0.0006	0.0037
	(0.84)	(0.14)	(0.07)	(0.64)
Observations	70	69	69	208
Relative Contract Size	1.15 %	4.36 %	29.96 %	11.77 %

The numbers within the square brackets indicate which days relative to the event day that have been tested. T-statistics in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

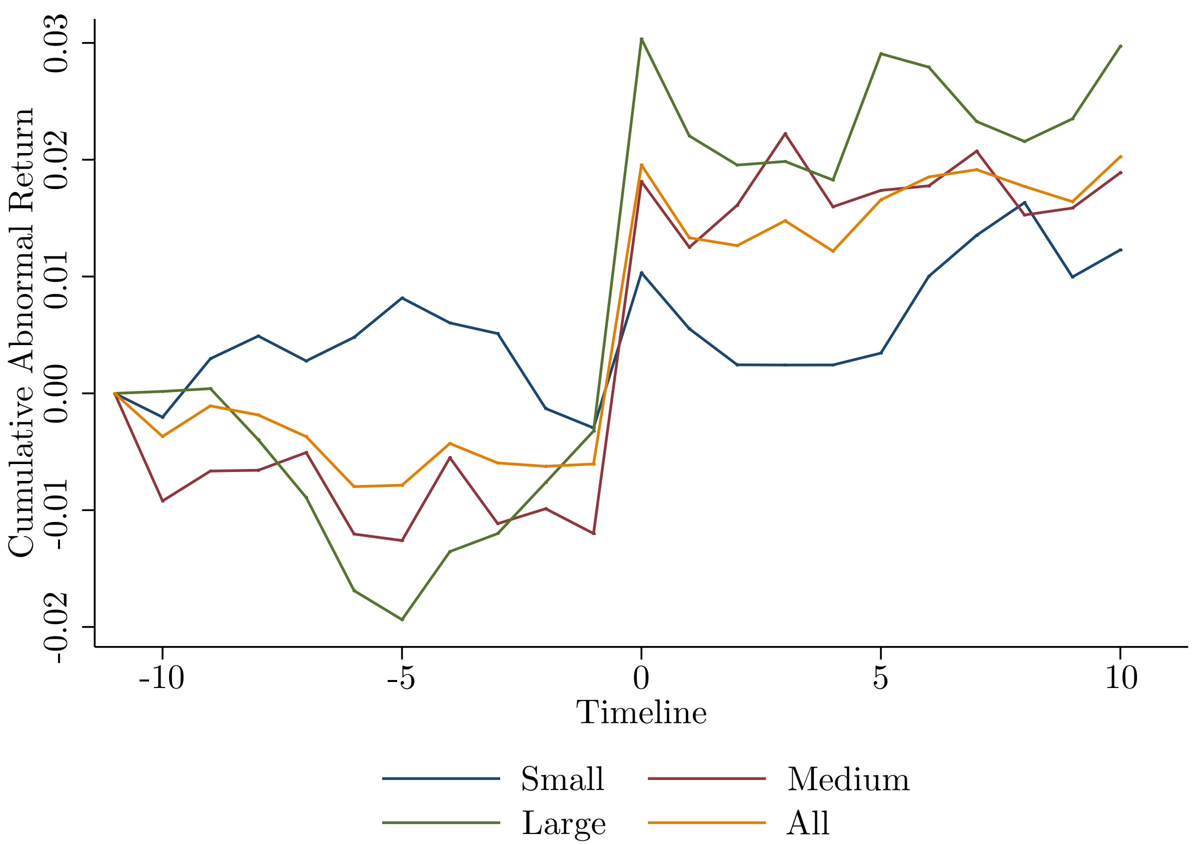
Table 7.2 shows that for the event day the cumulative average abnormal returns are significantly different from zero for small, medium, and large relative contract sizes at a 1 % level. The corresponding estimates are 1.33 %, 3.01 %, and 3.36 %, respectively. Hence, the cumulative average abnormal return is increasing as the relative contract size increases. For all observations the increase in cumulative average abnormal return is 2.56 %. Furthermore, the cumulative average abnormal return is positive and significantly different from zero at a 10 % level for large relative contract sizes in pre-event day window [-5,-1]. This can be an indication of some information leakage prior to the announcement of larger contracts. However, only 1 out of 12 cumulative average abnormal returns in the pre-event day window and the post-event day window are significantly different from zero at a 10 % level. This is less than what one would expect under the current null hypothesis. Consequently, not much weight should be put on this observation.

The table also shows that the average relative contract size is 1.15 % for the small percentile, 4.36 % for the medium percentile, and 29.96 % for the large percentile. This indicates that the sample consists of a majority of relatively small contracts and a few rather large contracts. It also implies that that the relationship between the cumulative average abnormal return on the event day and relative contract size is nonlinear, and decreasing as the relative contract size increases. That being said, larger contracts can be associated with other events, such as equity issuance to be able to meet contractual obligations. Hence, the true relationship might be more linear than what table 7.2 suggests.

Illustration of the Stock Market's Reaction

In figure 7.2, the cumulative abnormal return for small, medium, and large relative contract sizes are plotted over the timeline of the events. This will allow visualizing the results found in table 7.2, as well as investigating if there are any signs of upwards or downwards drifting trends prior to and after the event that are different across the three groups. The figure also reports the cumulative abnormal return for all observations.

Figure 7.2: Cumulative Abnormal Return: Relative Contract Size



The x-axis is the number of days relative to the event day, while the y-axis illustrates the cumulative abnormal return.

Figure 7.2 shows that the cumulative abnormal return behaves differently for the three groups.

For small relative contract sizes, the increase in cumulative abnormal return is quite small on the event day and otherwise only fluctuates slightly. This is as expected and according to the results found in table 7.2, where only a small significant effect on the event day was found. For medium contract sizes the cumulative abnormal return drifts slightly downwards in the days prior to the event. However, the effect is not significant. On the event day, the cumulative abnormal return increases rapidly, and the increase is stronger than for small relative contract sizes. The significant positive effect for large relative contract sizes in the pre-event day window [-5,-1] found in table 7.2 seem to be canceled out by the downward drifting trend in window [-10,-6]. This implies that this effect could be a result of coincidences. Furthermore, the increase in cumulative abnormal return at the event day is stronger than for the two other groups, and illustrates that the relative size of the contract matters for investors in the stock market when they make their investment decisions. In the post-event day window, the cumulative abnormal return for the three groups seem to converge. However, this effect is not significant.

Explanation of the Stock Market's Reaction

Large contracts represent greater income than small contracts. However, the costs of large contracts are most likely also higher than the costs for small contracts. Hence, it is not certain that the net income is higher. That being said, if it is assumed that the profit margin is independent of the size of the contract, large contracts would entail a greater increase in net income. Assuming that equity remains the same, the positive effect on return on equity is higher for large contracts, which in turn would lead to higher growth, g. Thus, the Dividend Discount model would predict a stronger increase in the stock price after large contract announcements than following small contract announcements.

The investors are aware of the fact that large contracts represent greater positive changes in a given company's value than smaller contracts. Hence, if the market is at least efficient on the semi-strong form, they would rapidly adjust their expectations of the stock price according to their new understanding of the company's value. This means that after a large contract announcement the new equilibrium price would be higher than the new equilibrium price following a small contract announcement.

7.3 The Effect of Frequency of Contract Announcements

Table 7.3 shows the cumulative average abnormal return for companies that are grouped based on the frequency of which they announce contracts. Column (1) and (2) represent low and high frequency, respectively. Low is defined as having announced five or less contracts per year in the sample, while high is defined as having announced more than five. Column (3) shows the cumulative average abnormal return for all observations using the Market model as an estimator for the normal performance of the stocks.

Table 7.3: Cumulative Average Abnormal Return: Frequency of Contract Announcements

	(1) Low	(2) High	(3) All
Event Day:			
[0]	0.0304***	0.0190***	0.0256***
	(5.42)	(3.81)	(6.60)
Pre-Event Day Window:			
[-5,-1]	0.0023	0.0013	0.0019
	(0.39)	(0.19)	(0.42)
[-10,-6]	-0.0125	-0.0017	-0.0080
	(-1.37)	(-0.20)	(-1.25)
Post-Event Day Window:			
[1,5]	-0.0053	0.0003	-0.0030
	(-0.76)	(0.04)	(-0.59)
[6,10]	0.0050	0.0019	0.0037
	(0.65)	(0.22)	(0.64)
Observations	121	87	208

Frequency is computed as the number of contracts per company divided by the number of days the company is in the sample. This number is then multiplied by 365 to retrieve the frequency of contracts announced per year. The numbers within the square brackets indicate which days relative to the event day that have been tested. T-statistics in parentheses.

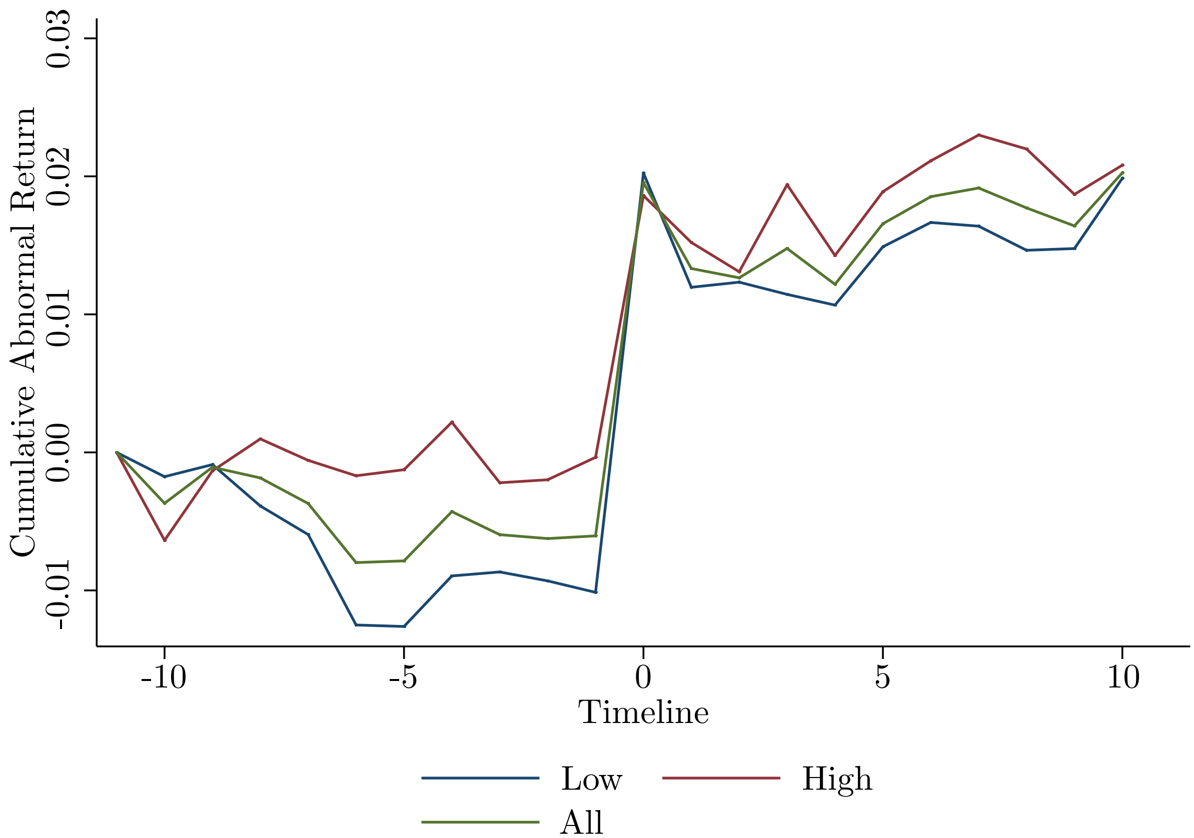
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 7.3 shows that on the event day the increase in cumulative average abnormal return for companies that announced five or less contracts per year is 3.04 %, and for companies that announced more than five contracts per year the increase is 1.90 %. Both variables are significantly different from zero at a 1 % level. For all observations the increase in cumulative average abnormal return was 2.56 %. These results imply that the cumulative average abnormal return and the number of contracts announced per company per year in the sample is negatively correlated. There are no significant effects in the pre-event day and post-event day window.

Illustration of the Stock Market's Reaction

It will also be interesting to see how the cumulative abnormal returns for companies with few contract announcements per year develop over the timeline of the events compared to those who announce contracts more frequently. This will allow visualizing the results found in table 7.3, as well as investigate if there are any signs of upwards or downwards drifting trends prior to and after the event day that differ between the two groups. Figure 7.3 shows the development of the cumulative abnormal return for the variables low and high frequency as described in the previous part. The figure also reports the cumulative abnormal return for all observations.

Figure 7.3: Cumulative Abnormal Return: Frequency of Contract Announcements



The x-axis is the number of days relative to the event day, while the y-axis illustrates the cumulative abnormal return.

From figure 7.3 one can see that the cumulative abnormal return for low frequency companies tend to drift downwards before the event. It is hard to explain this observation, and it could be due to coincidences as the effect is not significant. For high frequency companies the cumulative abnormal return only seems to display random fluctuations in the pre-event day window, implying no signs of information leakage. Furthermore, on the event day the increase in cumulative abnormal return is strongest for companies that announce few contracts per year in the sample, and weakest for those who announce contracts more frequently. This is in accordance with the results found in table 7.3. In the post-event day window, there seem to be random fluctuations in the cumulative abnormal returns, and the effects are not significant for either of the two groups.

Explanation of the Stock Market's Reaction

The efficient market hypothesis and differences in relative contract size offer explanations for why a negative relationship is observed between the cumulative average abnormal return and the number of contracts announced per company.

As pointed out in subsection 4.2, stock markets that are at least efficient on the semi-strong form will incorporate all publicly available information relevant to investors. This means that news related to for example contract announcements, earning calls, and CEO turnovers already will be reflected in the stock price. Hence, an investor will not be able to create a profitable strategy that involves trading on such news at the time of the announcement. Furthermore, if an investor is able to predict that it is likely that a company is going to publicize information that will affect the company's stock price, it is fair to assume that some of this information already will be reflected in the stock price at the time of the announcement. A company could be building a reputation for regularly announcing contracts. The investors might anticipate this and preemptively price expected contracts into the company's stock price. This removes the element of surprise, and thus the effect on the stock price will be smaller for companies that frequently announce new contracts.

That being said, it will also be interesting to investigate the differences in contract size between the two groups. Table 7.4 shows the average absolute contract size and the average relative contract size for low and high frequency companies. The table also reports the contract sizes for all observations.

Table 7.4: Average Contract Size: Frequency of Contract Announcements

	Low	High	All
Absolute Contract Size	991.91	556.98	809.99
Relative Contract Size	13.43 %	9.46 %	11.77 %
Observations	121	87	208

Absolute contract size is measured in MNOK. Relative contract size is computed as contract size divided by total assets at the end of the year when the event occurred.

From table 7.4 one can see that the average absolute contract size and average relative contract size decrease as the frequency of contract announcements increases. This implies that companies that regularly announce contracts have a lower threshold for announcing contracts of low value. Alternatively, the business model of these firms may rely on getting smaller and more frequent contracts. In subsection 7.2 it was found that cumulative average abnormal returns increased as the relative contract sizes got larger. Hence, the difference in cumulative average abnormal return found in table 7.3 between low and high frequency companies could also be due to differences in relative contract size.

Whether the difference in the stock market's reaction discovered in table 7.3 is due to differences in frequency of contract announcements or differences in relative contract size, will be further examined in the cross-sectional analysis in subsection 7.5.

7.4 The Effect of the Oil Shock

This subsection will investigate how the oil shock, that started during the second half of 2014, affected the stock market's reaction to contract announcements. In this context, the oil shock is a term used to describe the collapse in the global crude oil spot price starting in the second half of 2014. Table 7.5 shows the cumulative average abnormal return before and after the oil shock. Column (1) tests whether the cumulative average abnormal return for contracts announced before June 23, 2014 is significantly different from zero, while column (2) tests the contracts announced after this date. Column (3) reports the cumulative average abnormal return for all observations.

Table 7.5: Cumulative Average Abnormal Return: Oil Shock

	(1) Before Oil Shock	(2) After Oil Shock	(3) All
Event Day:			
[0]	0.0353***	0.0233***	0.0256***
	(3.52)	(5.60)	(6.60)
Pre-Event Day Window:			
[-5,-1]	-0.0035	0.0032	0.0019
	(-0.52)	(0.59)	(0.42)
[-10,-6]	0.0018	-0.0103	-0.0080
	(0.21)	(-1.35)	(-1.25)
Post-Event Day Window:			
[1,5]	-0.0168*	0.0003	-0.0030
	(-1.87)	(0.05)	(-0.59)
[6,10]	-0.0010	0.0048	0.0037
	(-0.13)	(0.70)	(0.64)
Observations	40	168	208

The numbers within the square brackets indicate which days relative to the event day that have been tested.
T-statistics in parentheses.

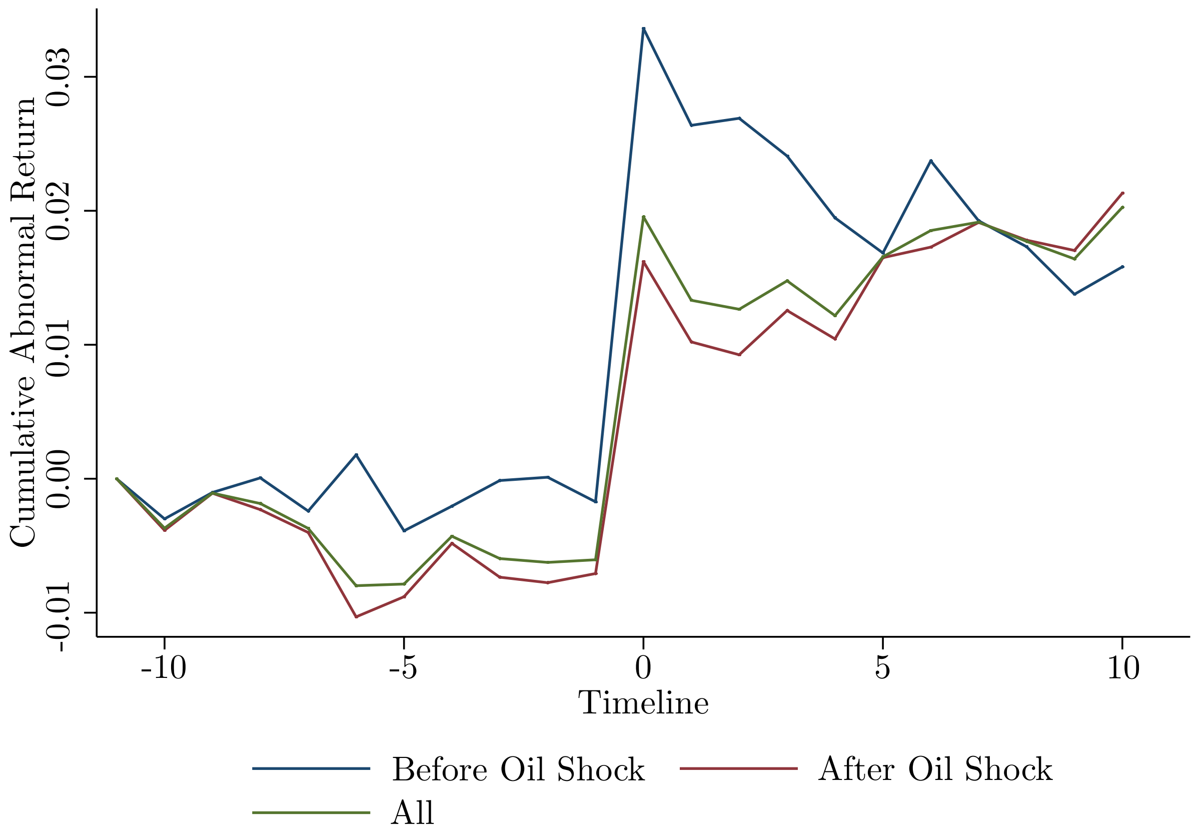
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 7.5 shows that the cumulative average abnormal return on the event day is 3.53 % before the oil shock and 2.33 % after. Both variables are significantly different from zero at a 1 % level. Thus, the effect on the stock price following a contract announcement seem to be stronger before the oil price collapsed. For all observations the increase in cumulative average abnormal return was 2.56 %. Furthermore, before the oil shock the cumulative average abnormal return in post-event day window [1,5] is negative and significantly different from zero at a 10 % level. However, only 1 out of 12 cumulative average abnormal returns in the pre-event day window and the post-event day window are significantly different from zero at a 10 % level. This is less than what one would expect under the current null hypothesis. Consequently, not much weight should be put on this observation.

Illustration of the Stock Market's Reaction

Figure 7.4 shows how the cumulative abnormal return develops over the timeline of the events before and after the oil shock. This will allow visualizing the results found in table 7.5, as well as investigating if there are any signs of upwards or downwards drifting trends prior to and after the event that are different across the three groups. The figure also reports the cumulative abnormal return for all observations.

Figure 7.4: Cumulative Abnormal Return: Oil Shock



The x-axis is the number of days relative to the event day, while the y-axis illustrates the cumulative abnormal return.

From figure 7.4 one can see that the stock market's reaction on the event day is stronger before the oil shock than after. In the pre-event day window there are no significant effects. In the post-event day window, the figure seems to display a slightly upward drifting trend after the oil shock. This effect is not significant. Furthermore, the figure indicates that it is a general overreaction to contract announcements before the oil shock. However, as discussed below table 7.5, this could be a false rejection. Figure A.1 in appendix A shows the cumulative abnormal raw returns before and after the oil shock. In this figure one can see that the cumulative abnormal raw returns do not converge after the event for the two groups. Hence, the general overreaction indicated by figure 7.4 is due to the market factor in the Market model performing better before the oil shock relative to after. This strengthens the argument that the general overreaction to contract announcements in due to a coincidence.

Explanation of the Stock Market's Reaction

The difference in the stock market's reaction following contract announcements before the oil shock and after the oil shock might be explained by the oil price affecting the companies in the maritime industry negatively and by differences in relative contract size.

Before the oil shock, the global crude spot oil price was historically high and it is fair to assume that the maritime industry enjoyed a general upturn as a result. Once the oil price plummeted, their business opportunities may have decreased substantially. While contract announcements after the oil shock still constitute increased earnings, the investors on Oslo Stock Exchange may have become more pessimistic. Thus, the stock market's reaction to contract announcements may have become more subdued after the oil shock.

That being said, the differences in the stock market's reaction could also be due to differences in contract sizes. Table 7.6 shows the average absolute contract size and average relative contract size before and after the oil shock. The table also reports the contract sizes for all observations.

Table 7.6: Average Contract Size: Oil Shock

	Before Oil Shock	After Oil Shock	All
Absolute Contract Size	1075.70	746.73	809.99
Relative Contract Size	15.44 %	10.90 %	11.77 %
Observations	40	168	208

Absolute contract size is measured in MNOK. Relative contract size is computed as contract size divided by total assets at the end of the year when the event occurred.

One can see from table 7.6 that the average absolute contract size and the average relative contract size is higher before than after the oil shock. In subsection 7.2 it was found that relative contract size seemed to have a significant effect on the stock market's reaction to contract announcements. Hence, the difference in cumulative average abnormal return found in table 7.5 before and after the oil shock could also be due to differences in relative contract size.

Whether the difference in the stock market's reaction discovered in table 7.5 is due to the oil shock or differences in relative contract size, will be further examined in the cross-sectional analysis in the next subsection.

7.5 Cross-Sectional Analysis

This section will examine the relationship between the cumulative abnormal returns on the event day and the firm specific characteristics. The results are discussed in relation to the findings in the literature review and the analyses presented in the previous subsections. In addition, a cross-correlation table is reported to discuss potential problems with multicollinearity.

The Effect of Firm Specific Characteristics

Table 7.7 shows the cross-sectional regressions with cumulative abnormal returns on the event day as the explained variable and firm specific characteristics as explanatory variables. The reported regressions gradually add variables to see how it affects the estimated coefficients and their significance.

Table 7.7: Cross-Sectional Analysis: Event Day

	(1)	(2)	(3)	(4)	(5)	(6)
Rel. Con. Size	0.0702***	0.0681***	0.0818***	0.0818***	0.0822***	0.0820***
	(2.85)	(2.87)	(3.10)	(3.10)	(3.11)	(3.19)
Log Total Assets		-0.0038	-0.0029	-0.0030	-0.0029	-0.0027
		(-1.29)	(-1.01)	(-0.93)	(-0.90)	(-0.86)
Tobin's Q			-0.0070***	-0.0070***	-0.0071***	-0.0075***
			(-3.51)	(-3.41)	(-3.15)	(-3.28)
Ret. on Equity				0.0012	0.0014	0.0026
				(0.08)	(0.09)	(0.16)
Frequency					0.0001	0.0003
					(0.06)	(0.25)
Before Oil Shock						0.0115
						(1.27)
Constant	0.0173***	0.0492*	0.0458*	0.0467	0.0456	0.0410
	(4.40)	(1.96)	(1.84)	(1.64)	(1.51)	(1.41)
Observations	208	208	208	208	208	208
F	8.14	4.46	4.51	3.50	2.80	2.50
R^2	0.0663	0.0740	0.1015	0.1016	0.1016	0.1079

Rel. con. size (relative contract size) is absolute contract size divided by total assets at the end of the year when the event occurred. Log total assets is the logarithm of the total assets. Tobin's q is calculated as the company's market capitalization one day prior to the event divided by the total assets. Ret. on equity (return on equity) is equal to the net income divided by the book value of the shareholders' equity at the end of the year when the event occurred. Frequency is a variable that counts the number of contracts announced per year in the sample. Before oil shock is 1 for contract announcements occurring before June 23, 2014, and 0 otherwise. T-statistics in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Everything else equal, the cross-sectional analysis shows that the cumulative abnormal return on average increases between 7.02 and 8.22 percentage points when relative contract size increases by 1. There are two main reasons why these estimates are not higher. Firstly, the companies report total income from the contracts, and not net profit. Hence, larger contracts do not necessarily represent higher growth than smaller contracts. Secondly, the analysis does not take into account the length of the contract. Thus, larger contracts that span over several years might not represent higher net profit per year compared to smaller contracts than span over few years. These conditions could potentially reduce the estimated coefficients. That being said, relative contract size is significant at a 1 % level for all specifications of the analysis, and appears to be one of the most important variables in explaining the cumulative abnormal returns on the event day.

Log total assets is negative as expected. This is in accordance with Hayes et al. (2000) who argued that investors face greater amounts of information asymmetry with smaller size firms and are more surprised when they announce contracts. However, it is not significant with t-values between -0.86 and -1.29.

Tobin's q is negative and significant at a 1 % level. A negative sign is expected, as discussed by Elayan and Pukthuanthong (2004), firms with higher Tobin's q are more likely to have positive NPV projects. The negative coefficient implies that low Tobin's q firms who announce contracts force the market to reconsider future growth prospects and consequently the firms in question experience higher cumulative abnormal returns.

Return on equity is not significant and its signs is positive. As discussed by Elayan and Pukthuanthong (2004), the variable was expected to be negatively correlated with cumulative abnormal returns as low return on equity firms are anticipated to have less good future growth prospects. Hence, when such firms announce contracts it would represent a greater element of surprise than announcements from companies with higher return on equity. However, given that the coefficient is not significantly different from zero, its positive sign should not be lent much credence.

Although the analysis in subsection 7.3 showed over 1 percentage point difference between the cumulative average abnormal returns for low and high frequency firms, the frequency variable is far from being significant in the cross-sectional analysis. Previously, it was shown that frequency of contract announcements is correlated with absolute contract size and relative contract size. Thus, the effects found in the analysis might as well have been due to cross-correlations with these variables. Consequently, the cross-sectional analysis finds no evidence that frequency of contract announcements is significant in explaining event day cumulative abnormal returns.

The oil shock dummy is positive as expected. While the coefficient implies that the cumulative abnormal return before the oil shock on average is 1.15 percentage points higher than after the oil shock, it is not significant either. On a similar note as the frequency dummy, it was shown that absolute contract size and relative contract size were higher before the oil shock. As relative contract size is controlled for, the variable's significance level decreases. There may also be additional cross-effects with the other variables used in the regressions. Consequently, the oil shock dummy is not significant in explaining the event day cumulative abnormal returns despite showing quite different results in the analysis in subsection 7.4.

Lastly, in the cross-sectional analysis one can see that by including log total assets in the regression the constant changes noticeably. In addition, the cross-correlation table below indicates that log total assets and relative contracts size is negatively correlated. As log total assets is not significant, including this variable could potentially weaken the analysis. Thus, running similar regressions without the variable may be more representative. In table B.1 in Appendix B, the cross-sectional analysis in table 7.7 without log total assets is reported. Omitting log total assets appears to increase the coefficients of relative contract size and Tobin's q slightly in terms of absolute value. However, their corresponding t-values and significance level remains approximately constant. The F-values are also higher, which indicates that this might be a more correct specification of the model. That being said, the inference does not change by omitting log total assets. Relative contract size and Tobin's q are still the only two variables that are significant in explaining cumulative abnormal returns on the event day.

Multicollinearity of Firm Specific Characteristics

Multicollinearity may cause the estimated coefficients to be overestimated or underestimated. Table 7.8 shows the correlation between the firm specific variables used in the cross-sectional analysis that was reported in table 7.7. In the following subsection variable-pairs with correlation coefficients greater than 0.1500 and less than -0.1500 will be addressed.

Table 7.8: Cross-Correlation

	Cum. Ab. Ret.	Rel. Con. Size	Log Total Assets	Tobin's Q	Return on Equity	Freq-uency	Before Oil Shock
Cum. Ab. Ret.	1.0000						
Rel. Con. Size	0.2574	1.0000					
Log Total Assets	-0.1103	-0.0894	1.0000				
Tobin's Q	-0.0971	0.2779	0.0918	1.0000			
Return on Equity	-0.0455	-0.0166	0.3828	0.1116	1.0000		
Frequency	-0.0467	-0.1909	-0.4352	0.1203	-0.3424	1.0000	
Before Oil Shock	0.0852	0.0875	0.0130	0.1005	-0.0142	-0.1263	1.0000

A positive value signifies a positive correlation, while a negative value indicates that the variables are negatively correlated.

Frequency has correlation coefficients of -0.1909, -0.4352, and -0.3424 with relative contract size, log total assets, and return on equity, respectively. Looking at the cross-sectional analysis, when frequency is added, the coefficients and t-values of log total assets, return on equity and relative contract size remain approximately constant. Adding the frequency variable does not seem to alter the inference.

Furthermore, relative contract size and Tobin's q have a correlation coefficient of 0.2779. When Tobin's q is added to the regression, relative contract size's coefficient and corresponding t-value increases somewhat. This does not alter the general inference in that relative contract size is significant, so it appears as the correlation is not a problem. However, relative contract size's coefficient may be slightly overestimated by including Tobin's q.

Lastly, return on equity and log total assets have a correlation coefficient of 0.3828. When return on equity is added to the regression, log total assets' coefficient remains approximately the same and it is still not significantly different from zero. Hence, the correlation of the two variables does not seem to alter the inference.

While there are some variable-pairs that have correlation coefficients of more than 0.1500 and less than -0.1500, inference does not seem to be affected. A formal test for multicollinearity will be performed in the robustness section to further investigate whether the cross-sectional analysis seem to have a problem with multicollinearity.

In addition, three alternative versions of the cross-sectional analysis are reported in table B.2, B.3, and B.4 in appendix B. In these tables, the order in which the explanatory variables are introduced is different from the original cross-sectional analysis in table 7.7. The tables demonstrate that the order in which the variables are introduced does not affect which variables that are significant. This adds additional evidence for inference not being adversely affected by cross-correlation between variables.

7.6 Summary of Analysis

The analyses in subsections 7.1–7.4 finds positive cumulative average abnormal returns on the event day ranging from 2.47 % to 2.56 %. This effect is significantly different from zero at a 1 % level. However, there are no significant effects in the pre-event day window or the post-event day window. Furthermore, a positive and decreasing relationship between cumulative average abnormal return and relative contract size is discovered. A possible explanation for this observation is that firms may be issuing equity to finance contractual obligations for larger contracts. Furthermore, it also seems like companies that announce few contracts, as well as contracts announced before the oil shock started in the second half of 2014, have significantly higher cumulative average abnormal returns than their counterparts. However, whether this effect is due to relative contract size or that they actually have significantly higher cumulative average abnormal returns is uncertain.

The cross-sectional analysis in subsection 7.5 finds that, everything else being equal, the cumulative abnormal return on average increases between 7.02 and 8.22 percentage points when relative contract size increases by 1. Furthermore, the analysis shows that Tobin's q is negative and significant as expected. However, log total assets, return on equity, frequency of contract announcements, and the oil shock dummy are nonsignificant. Lastly, while the cross-correlation table reveals some noteworthy correlation coefficients, it does not seem to affect the cross-sectional analysis to the degree that the general inference are altered.

8 Robustness Analysis

In this section the robustness of the results obtained in the previous section will be investigated. More specifically, the estimates obtained in subsection 7.1 will be investigated as these lay the foundation of each subanalysis conducted in subsections 7.2–7.4. In addition, the results from the cross-sectional analysis will be examined.

The robustness analysis contains several parts. The first part will examine the significance of the results obtained in subsection 7.1. Furthermore, the second part elaborates on whether the results are robust to the choice of normal performance model. The third part will investigate the effect of excluding outliers in the sample. Lastly, the fourth part will investigate if the OLS assumptions that were suspected to be violated, namely no multicollinearity and homoscedasticity, hold in the cross-sectional analysis.

8.1 Alternative Significance Test

In the analysis a Cross-Sectional test was used to test the significance of the estimated coefficients. This test is parametric, and requires that the sample is normally distributed. Hence, a nonparametric test will be conducted to investigate if the results change when the test does not assume a particular distribution for the sample in question.

Wilcoxon's Signed-Rank Test

Table 8.1 shows the significance of the event day results from table 7.1 using the original Cross-Sectional test and Wilcoxon's Signed-Rank test. Column (1) tests whether the cumulative average abnormal return is significantly different from zero, while column (2) tests the same specification for the cumulative median abnormal return.

Table 8.1: Cross-Sectional Test and Wilcoxon's Signed-Rank Test

	(1) Cross-Sectional	(2) Wilcoxon
Constant Mean	0.0255***	0.0126***
	(6.43)	(6.81)
Market Model	0.0256***	0.0125***
	(6.60)	(6.96)
CAPM	0.0256***	0.0125***
	(6.61)	(6.98)
Fama-French	0.0247***	0.0110***
	(6.40)	(6.70)
Observations	208	208

The numbers within parentheses in column (1) are the resulting t-statistics, while the numbers within parentheses in column (2) are the resulting Z-statistics.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 8.1 shows that the observed event day cumulative average abnormal returns and cumulative median abnormal returns for the Cross-Sectional test and Wilcoxon's Signed-Rank test, respectively, are both significantly different from zero at a 1 % level for all four normal performance models. This indicates that the results from subsection 7.1 are robust to the choice of significance test. Furthermore, in large samples the t-statistic is approximately equal to the Z-statistic. As the t-values and the Z-values are pairwise roughly the same, this implies that both tests provide almost the same p-values. Hence, both the cumulative average abnormal return and the cumulative median abnormal return are more or less equally significant. This means that the results obtained from the Cross-Sectional test conducted in the analysis seem rather robust.

8.2 Alternative Normal Performance Models

Throughout the analysis the Market model has been employed as it is customarily used in event studies (MacKinlay, 1997). However, the choice of normal performance model has a potentially significant impact on the cumulative average abnormal returns. In section 7.1, a table showing the cumulative average abnormal returns for different parts of the event window were presented. This table used the Constant Mean Return model, the Market model, CAPM, and the Fama-French Three-Factor model to estimate the normal performance of the stocks. The results showed approximately the same cumulative average abnormal returns for all four models, and the estimated coefficients were all significant at a 1 % level. This implies that the analysis is robust to the choice of normal performance model.

8.3 Omitting Outliers

The cross-sectional analysis used OLS to estimate the coefficients. In OLS, observations that are far larger or smaller than the majority of the observations may skew the mean and affect the estimated regression line. Hence, samples where extreme observations are removed may give an indication of the robustness of the results obtained in the analysis.

Trimmed Sample: Normal Performance Models

Table 8.2 compares the results using the original sample from table 7.1 and a trimmed sample without extreme outliers. There is no textbook limit to set, but the objective is to examine how observations with values far from the rest of the sample impact the inferences made in the analysis.

Table 8.2: Cumulative Average Abnormal Returns: Normal Performance Models

	(1) Original Sample	(2) Trimmed Sample
Constant Mean	0.0255***	0.0216***
	(6.43)	(6.43)
Market Model	0.0256***	0.0221***
	(6.60)	(6.63)
CAPM	0.0256***	0.221***
	(6.61)	(6.64)
Fama-French	0.0247***	0.0211***
	(6.40)	(6.35)
Observations	208	198

In the trimmed sample in column (2) five observations from each tail, in terms of those with the largest and lowest cumulative abnormal returns, are removed. T-statistics in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

From table 8.2 one can see that in the sample without the ten outliers, the cumulative average abnormal returns are between 0.35 and 0.39 percentage points lower than in the original sample. However, the results are still significantly different from zero at a 1 % level for all four normal performance models. This indicates that there are no significant problems with outliers. Hence, the results obtained in table 7.1 seem rather robust to extreme observations.

Trimmed Sample: Cross-Sectional Analysis

Table 8.3 shows the cross-sectional analysis from table 7.7 using a trimmed sample without extreme outliers. The tails from the explanatory variables: relative contract size, Tobin's q, log total assets, and return on equity, as well as the explained variable, cumulative abnormal returns, are trimmed. The two largest and the two lowest observations are removed from each variable. This removes 18 observations from the sample. 20 observations were not removed since the two observations with highest return on equity also had lowest log total assets. The oil shock dummy is not trimmed as it would not make sense to remove extreme observations from an indicator variable. This also applies for the frequency variable that counts the number of contracts announced per year in the sample, and hence is not unique for each observation.

Table 8.3: Cross-Sectional Analysis: Event Day

	(1)	(2)	(3)	(4)	(5)	(6)
Rel. Con. Size	0.0904***	0.0882***	0.1055***	0.1054***	0.1068***	0.1081***
	(2.46)	(2.48)	(2.78)	(2.78)	(2.80)	(2.90)
Log Total Assets		-0.0035	-0.0024	-0.0025	-0.0029	-0.0022
		(-1.08)	(-0.75)	(-0.63)	(-0.56)	(-0.51)
Tobin's Q			-0.0079***	-0.0079***	-0.0080***	-0.0086***
			(-3.17)	(-3.14)	(-2.99)	(-3.14)
Ret. on Equity				0.0007	0.0013	0.0026
				(0.04)	(0.07)	(0.14)
Frequency					0.0002	0.0006
					(0.18)	(0.40)
Before Oil Shock						0.0126
						(1.33)
Constant	0.0155***	0.0452	0.0401	0.0407	0.0371	0.0313
	(3.45)	(1.63)	(1.46)	(1.19)	(1.04)	(0.90)
Observations	190	190	190	190	190	190
F	6.07	3.30	3.68	2.79	2.24	2.02
R^2	0.0743	0.0804	0.1102	0.1102	0.1103	0.1180

Rel. con. size (relative contract size) is absolute contract size divided by total assets at the end of the year when the event occurred. Log total assets is the logarithm of the total assets. Tobin's q is calculated as the company's market capitalization one day prior to the event divided by the total assets. Ret. on equity (return on equity) is equal to the net income divided by the book value of the shareholders' equity at the end of the year when the event occurred. Before oil shock is 1 for contract announcements occurring before June 23, 2014, and 0 otherwise. T-statistics in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

From table 8.3 one can see that relative contract size and Tobin's q still are significantly different from zero at a 1 % level. The remaining four variables are nonsignificant, which is similar to the results obtained in table 7.7. In the trimmed sample, relative contract size has increased between 2.01 and 2.61 percentage points, while Tobin's q has decreased between 0.09 and 0.11 percentage points. Additionally, the F-value is somewhat lower and R^2 is somewhat higher than in the original sample. While removing the outliers appears to change the estimated coefficients and the corresponding t-values to some extent, the inference does not seem to be altered. Consequently, the regressions in the cross-sectional analysis in table 7.7 seem to be rather robust to extreme observations.

8.4 Testing OLS Assumptions

OLS was used to estimate the unknown parameters in the regressions in section 7.5. This method builds on a number of different assumptions as mentioned in section 5.4. In the following subsection two assumptions, namely the assumptions of no multicollinearity and homoscedasticity, will be tested as the analysis indicated that they may be violated.

No Multicollinearity

In table 8.4, the variance inflation factors (VIF) are displayed for the regression in column (6) in the cross-sectional analysis in table 7.7.

Table 8.4: Variance Inflation Factors

	VIF	1 / VIF
Relative Contract Size	1.23	0.81
Log Total Assets	1.56	0.64
Tobin's Q	1.24	0.81
Return on Equity	1.33	0.75
Frequency	1.58	0.63
Before Oil Shock	1.04	0.96

VIF values above 10 or 1/VIF values below 0.10 indicate that there may be problems with multicollinearity in the regression, and thus warrant further investigation (O'brien, 2007).

Problems with multicollinearity arise when two or more explanatory variables are highly correlated. While the model can still be used to predict cumulative abnormal returns, the individual explanatory variables' coefficients and true significance are not accurate. From table 8.4 one can see that the VIF and 1/VIF values are well below 10 and above 0.10, respectively. Hence, the test does not indicate problems arising from multicollinearity in the cross-sectional analysis.

Homoscedasticity

Table 8.5 shows the results after running a White test and a Breusch-Pagan/Cook-Weisberg test for heteroscedasticity on the regression in column (6) in the cross-sectional analysis in table 7.7.

Table 8.5: White and Breusch-Pagan/Cook-Weisberg Test for Heteroscedasticity

	White	Breusch-Pagan/Cook-Weisberg
P-value	0.0710	0.0000
Chi-Square Statistic	37.25	34.28
Degrees of Freedom	26	1

The null hypothesis in the White test and the Breusch-Pagan/Cook-Weisberg test states that the variance of standard errors is constant, while the alternative hypothesis is that it is not constant.

From table 8.5, one can see that the White test rejects the null hypothesis at a 10 % significance level, while the Breusch-Pagan/Cook-Weisberg test rejects the null hypothesis at a 1 % significance level. This indicates that there are problems with heteroscedasticity in the error terms in the cross-sectional analysis. Consequently, as pointed out in section 7, robust standard errors have been used throughout the analysis. This will make them robust to heteroscedasticity.

8.5 Summary of Robustness Analysis

The alternative significance test, namely Wilcoxon's Signed-Rank test, yields approximately similar results as the Cross-Sectional test conducted throughout the analysis. This indicates that the inference is independent of whether it is assumed that the observations are normally distributed.

Furthermore, the normal performance models' effect on the results were examined. Table 7.1 showed that the Constant Mean Return model, the Market model, CAPM, and the Fama-French Three-Factor model predicted more or less the same cumulative average abnormal returns on the event day. This implies that the results are robust to the choice of normal performance model.

Under OLS, the regression coefficients will be vulnerable to outliers. Omitting extreme observations resulted in that the four normal performance models predicted cumulative average abnormal returns that were between 0.35 and 0.39 percentage points lower than in the original sample. However, the results were still significant at a 1 % level. Additionally, running the cross-sectional analysis from table 7.7 on a trimmed sample increased the coefficient of relative contract size between 2.01 and 2.61 percentage points and decreased the coefficient of Tobin's q between 0.09 and 0.11 percentage points. However, the inference was more or less the same as in the original sample. Hence, the analysis seems to be rather robust to extreme observations.

Lastly, the OLS assumptions that the analysis indicated may be violated were tested. The variance inflation factors did not indicate problems arising from multicollinearity. Furthermore, the White test and the Breusch-Pagan/Cook-Weisberg test suggested some problems with heteroscedasticity. Consequently, robust standard errors have been used throughout the analysis to make them robust to heteroscedasticity.

In conclusion, the results obtained in section 7 seem to be rather robust.

9 Critical Assessment

Event studies contain three components: the sample, the methodology, and the model. These components come with a set of assumptions, which means that the resulting model only can be viewed as an approximation of reality. This means that one should be aware of the limitations of the analysis in order to draw reliable conclusions.

9.1 Limitations of the Sample

The data gathered may not have been a perfectly random sample of contract announcements by companies in the maritime industry listed on Oslo Stock Exchange. As such, some biases may have been introduced. Therefore, the sample will be critically assessed in the following subsection.

Stock Exchange Announcements

The stock exchange announcements disclosed through NewsWeb do not have a defined template on what kind of information that must be included. More specifically, only some announcements included information such as the size of the contract. For the announcements that contained information regarding the contract size, some reported the value excluded options and some included options. Hence, contract size is not directly comparable across events. Furthermore, information regarding the length of the contract is not precise enough and not always reported, and thus not accounted for in the analysis. As a result, the estimated coefficient for relative contract size in the cross-sectional analysis will only give an indication of the true effect.

Relative Contract Size

In the thesis, the book value of total assets at the end of the year when the event occurred has been used as a proxy for company size. This method is imperfect as it will overestimate the relative contract size for companies where total assets decreased after the contract announcement, and underestimate the relative contract size for companies where total assets increased. A more correct measure would be to use market value of total assets a couple of days prior to the event day. However, this number is not observed in the market and would require the estimation of market value of debt. As the sample consists of 208 observations this would mean that the market value of debt would need to be estimated 208 times. This process would be time-consuming, and the numbers would be biased as it does not exist a perfect method for estimating this value. Hence, the book value of total assets is used as an alternative measure for company size.

Frequency of Contract Announcements

Frequency of contract announcements is measured as number of contracts announced per year the company existed in the sample. This information is not available when the investors decide whether to invest in the particular stock, and hence assumes that the number of contracts announced per year is approximately constant for each firm. It is hard to estimate the effect of the bias occurring due to this condition, but it may explain why the frequency variable is approximately equal to zero in the cross-sectional analysis.

Oil Shock

In the sample, only 40 events occurred prior to June 23, 2014. This will make the estimated effect before the oil shock particularly sensitive to outliers, and hence it may be biased. To reduce this sensitivity, further analyses could incorporate events spanning over a longer time period than the existing sample. In the thesis, however, it has been decided not to gather more data. Hence, one must take into consideration the potential bias due to the small sample size when interpreting the effect before the oil shock on the stock market's reaction.

9.2 Limitations of the Methodology

The event study methodology requires the researcher to take a number choices regarding conditions such as the length of the estimation window, definition of the event window, choice of normal performance models, and inclusion of explanatory variables in the cross-sectional analysis. There are no straight answers in these cases, and the choices made by the researcher is likely to affect the results of the analyses. Hence, it is important to be aware of these sensitivities when interpreting the results.

Estimation Window

In the thesis, a period from 200 to 20 days before the event day is selected as the estimation window to estimate the normal performance of the stocks. As the events in the study occurred between January 1, 2014, and December 31, 2017, this means that the majority of the stock prices are retrieved after the global crude oil spot price plummeted. This period is characterized by low and unstable returns for companies in the maritime industry. Hence, the normal performance models are likely to underestimate the normal performance of the stocks in the sample. This means that the cumulative abnormal returns will be overestimated, and therefore the true effect of the stock market's reaction to contract announcements may be slightly weaker that what was discovered in the analysis.

Event Window

The semi-strong form of the efficient market hypothesis assumes that the stock market reacts rapidly to new information provided to investors. If this is true, the stock prices would adjust in a matter of seconds following the announcement of a new contract. Choosing an event day window of more than one day would then lead to unnecessary noise in the estimates of cumulative abnormal returns. On the other hand, if the stock market does not react immediately to new information, the abnormal returns may be spread over several days even though the analysis indicated no significant effects in the pre-event day window and the post-event day window. As a result, it is difficult to choose a correct event day window, and thus estimate the true effect of contract announcements.

Normal Performance Models

The normal performance models used variables such as the market return, the risk-free rate, and systematic risk factors to estimate normal returns. Even though the models estimated more or less the same cumulative abnormal returns for this sample, it is likely that the results would differ if the input parameters had changed. For example, if the sample period had been expanded or if the chosen proxies for these variables had been replaced.

Anticipation Effect

Additionally, as discussed in section 5.4, the methodology has a weakness in the face of the anticipation effect (Prabhala, 1997). As investors are likely to use many of the same variables as the thesis uses to predict future returns, the observed effect and significance of the variables may be underestimated. Thus, the interpretation of the significance of the variables will have to take into account that the results may be somewhat conservative.

10 Conclusion

This section will summarize the thesis and present the most important findings. Some recommendations for future research are described at the end.

10.1 Summary of the Most Important Findings

The thesis has reviewed the research question "how does the stock market react to contract announcements by companies in the maritime industry listed on Oslo Stock Exchange". Contract announcements provide the market with new information, and given the dearth of research on the subject, it was of interest to investigate if they induce significant cumulative abnormal returns. Furthermore, the thesis has attempted to identify the determinants of the stock markets' reaction to contract announcements on Oslo Stock Exchange. In addition, signs of information leakage and stock price drifts after the event have also been examined.

Using the event study methodology, four different normal performance models were used to estimate cumulative average abnormal returns. Using the Cross-Sectional significance test, it was concluded that the event day cumulative average abnormal returns are significant at any conventional significance level and the estimates range from 2.47 % to 2.56 %. The difference between the estimated cumulative average abnormal returns are relatively small, and thus the Market model was selected as the primary normal performance model since it is customarily used in event studies (MacKinlay, 1997). None of the other windows show significant cumulative average abnormal returns and it is concluded that no evidence of information leakage or post-event price drifts are found. A nonparametric test, namely Wilcoxon's Signed-Rank test, also suggests that the event day cumulative average abnormal returns are significant.

The literature review found that relative contract size, log total assets, Tobin's q, and return on equity generally are accepted as being relevant for determining cumulative abnormal returns. In addition, subsection 6.3 indicated that the stock prices of the companies in the sample may be affected by each firm's frequency of contract announcements and the oil price level. Hence, a variable controlling for the number of contracts announced during the sample period and an oil shock dummy was included.

A positive and decreasing relationship between cumulative average abnormal return and relative contract size was discovered. A possible explanation for this observation is that firms may be issuing equity to finance contractual obligations for larger contracts. Furthermore, the cross-sectional analysis found that, everything else being equal, the cumulative abnormal return on average increases between 7.02 and 8.22 percentage points when relative contract size increases by 1.

Log total assets was assumed to be negatively correlated with cumulative abnormal returns. The idea was that smaller firms tend to disclose information between financial reports less frequently than larger companies, and hence the investors face a greater degree of information asymmetry with such firms (Hayes et al., 2000). This makes it harder for investors to preemptively anticipate contract awards, and consequently there is a greater element of surprise in the event that smaller size firms announce news regarding their business. That being said, in the cross-sectional analysis log total assets was not significant with t-values between -0.86 and -1.29.

Tobin's q was hypothesized to be negatively correlated with cumulative abnormal returns. The argument for this was that low Tobin's q firms are not expected to perform as well by the market (Elayan & Pukthuanthong, 2004). Therefore, there is a greater element of surprise when such firms announce contracts. The cross-sectional analysis showed that the variable was significant, and that an increase of Tobin's q by 1 was estimated to decrease cumulative abnormal returns between -0.70 and -0.75 percentage points.

Return on equity was also argued to be negatively correlated with cumulative abnormal returns. The reasoning was that low return on equity firms would be expected by the investors in the stock market to have fewer good investment opportunities (Elayan & Pukthuanthong, 2004). Hence, when such firms announce contracts it would represent a greater element of surprise than announcements from companies with higher return on equity. However, the variable was far from significant in explaining event day cumulative abnormal returns with t-values between 0.08 and 0.16.

Frequency of contract announcements was hypothesized to be negatively correlated with cumulative abnormal returns as the stock market might preemptively price expected contracts into the stock price. The analysis showed that higher frequency firms seem to have lower cumulative average abnormal returns compared to companies that announce contracts less frequently. However, the cross-sectional analysis showed that the frequency variable had close to zero impact on cumulative abnormal returns when controlling for other relevant variables. This can be explained by table 7.4 which showed that low frequency firms on average announce larger contracts, both in absolute and relative terms, compared to those who announce contracts more frequently.

The oil shock was assumed to generate lower cumulative abnormal returns given that the oil price slump led to a general downturn in the maritime industry on Oslo Stock Exchange. In the analysis, the cumulative average abnormal return was 1.20 percentage points higher before the oil shock, and in both time periods they were significantly different from zero at a 1 % level. However, when controlling for other variables the cross-sectional analysis showed that the oil shock dummy was not significant with a t-value of 1.27. This may be explained by table 7.6, which showed that the average relative contract size was about 40 % higher before the oil shock compared to after.

In conclusion, the findings suggest that the semi-strong form of the efficient market hypothesis holds for companies in the maritime industry listed on Oslo Stock Exchange. This is due to cumulative abnormal returns being significant almost exclusively on the event day. Furthermore, the magnitude of the market response can be explained in part by the relative contract size and by Tobin's q.

10.2 Recommendations for Future Research

As discussed in subsection 6.1, only announcements that contain the contract size are included in the sample. The market may act differently upon announcements that do not disclose contract size. Hence, it may be interesting to examine the stock market's reaction when both types of announcements are included in the sample.

Furthermore, the length of the contract were not utilized as an explanatory variable as this information was not precise enough or not always reported in the announcements. Retrieving data on contract length would allow for determining the contract earnings per year. This would improve the accuracy of the estimated coefficients.

Moreover, analyzing a longer or different time period may provide new insights into the determinants of cumulative abnormal returns following contract announcements. Especially, given that the sample only consisted of 40 observations prior to the oil shock. Expanding or changing the sample period could potentially enhance the accuracy of the estimated effect following the oil price slump.

Lastly, Prabhala (1997) argued that utilizing so called non-events, where the market expects a contract announcement, but no contract was announced, would negate the anticipation effect. Such data is more of a theoretical possibility rather than practically observable. However, in the event that such data is obtainable, the estimated coefficients and their significance levels would be closer to their true values.

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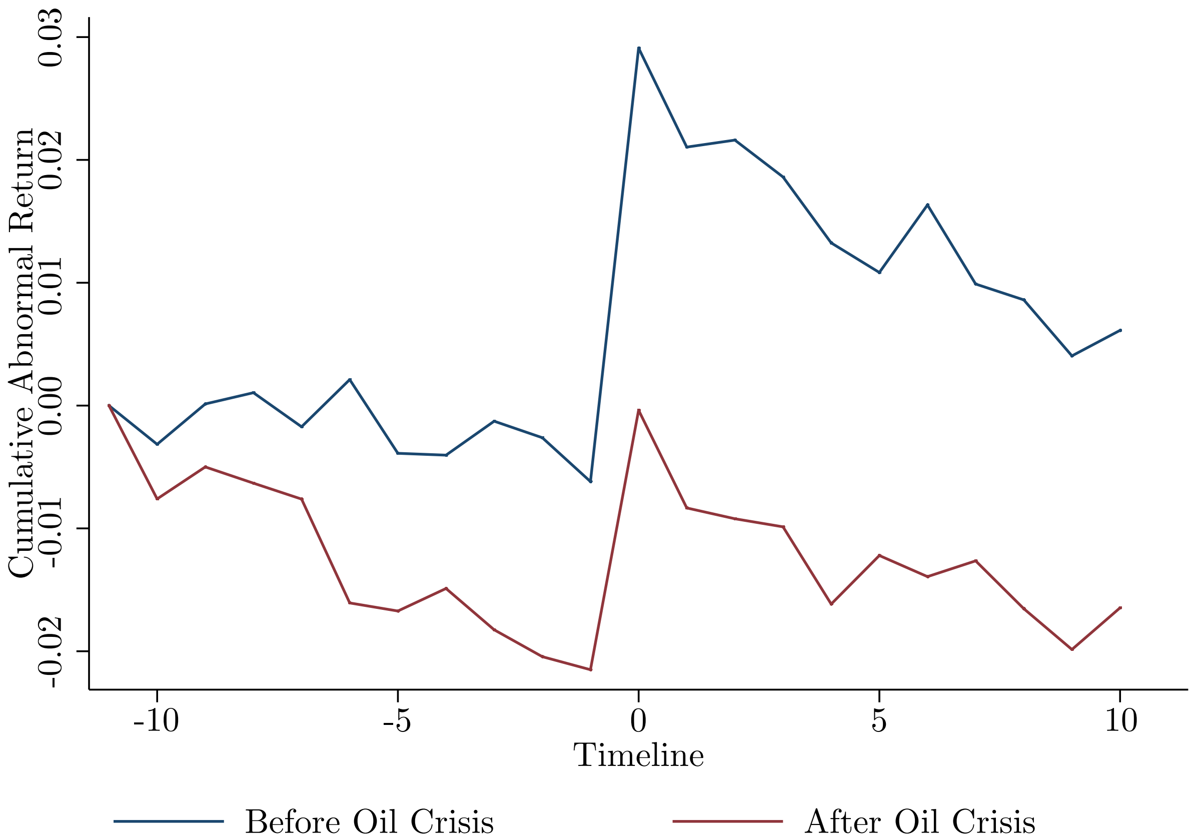
Appendix A The Effect of the Oil Shock

Figure A.1 shows the cumulative abnormal raw return for the stocks before and after the oil shock.

Figure A.1: Cumulative Abnormal Raw Return: Oil Shock



The x-axis is the number of days relative to the event day, while the y-axis illustrates the cumulative abnormal raw return.

Appendix B Cross-Sectional Analysis

Table B.1 shows the cross-sectional analysis from table 7.7 omitting log total assets.

Table B.1: Cross-Sectional Analysis: Omitting Log Total Assets

	(1)	(2)	(3)	(4)	(5)
Rel. Con. Size	0.0702***	0.0841***	0.0838***	0.0862***	0.0857***
	(2.85)	(3.10)	(3.06)	(3.07)	(3.16)
Tobin's Q		-0.0073***	-0.0072***	-0.0076***	-0.0080***
		(-3.53)	(-3.39)	(-3.16)	(-3.28)
Ret. on Equity			-0.0042	-0.0016	-0.0001
			(-0.32)	(-0.11)	(-0.01)
Frequency				0.0006	0.0008
				(0.43)	(0.59)
Before Oil Shock					0.0118
					(1.28)
Constant	0.0173***	0.0216***	0.0213***	0.0187***	0.0158**
	(4.40)	(5.12)	(4.88)	(2.83)	(2.11)
Observations	208	208	208	208	208
F	8.14	6.61	4.54	3.38	2.92
R^2	0.0663	0.0971	0.0975	0.0984	0.1051

Rel. con. size (relative contract size) is absolute contract size divided by total assets at the end of the year when the event occurred. Tobin's q is calculated as the company's market capitalization one day prior to the event divided by the total assets. Ret. on equity (return on equity) is equal to the net income divided by the book value of the shareholders equity at the end of the year when the event occurred. Frequency is a variable that counts the number of contracts announced per year in the sample. Before oil shock is 1 for contract announcements occurring before June 23, 2014, and 0 otherwise. T-statistics in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table B.2 shows the cross-sectional analysis from table 7.7 with an alternative order of the variables.

Table B.2: Cross-Sectional Analysis: Alternative Order of Variables 1

	(1)	(2)	(3)	(4)	(5)	(6)
Tobin's Q	-0.0039***	-0.0037**	-0.0035**	-0.0070***	-0.0073***	-0.0075***
	(-2.74)	(-2.56)	(-2.49)	(-3.41)	(-3.56)	(-3.28)
Ret. on Equity		-0.0072	0.0008	0.0012	0.0017	0.0026
		(-0.55)	(0.05)	(0.08)	(0.11)	(0.16)
Log Total Assets			-0.0044	-0.0030	-0.0031	-0.0027
			(-1.28)	(-0.93)	(-0.95)	(-0.86)
Rel. Con. Size				0.0818***	0.0804***	0.0820***
				(3.10)	(3.20)	(3.19)
Before Oil Shock					0.0111	0.0115
					(1.25)	(1.27)
Frequency						0.0003
						(0.25)
Constant	0.0287***	0.0282***	0.0657**	0.0467	0.0456	0.0410
	(6.21)	(5.85)	(2.09)	(1.64)	(1.61)	(1.41)
Observations	208	208	208	208	208	208
F	7.53	3.97	2.70	3.50	3.02	2.50
R^2	0.0094	0.0106	0.0198	0.1016	0.1077	0.1079

Rel. con. size (relative contract size) is absolute contract size divided by total assets at the end of the year when the event occurred. Log total assets is the logarithm of the total assets. Tobin's q is calculated as the company's market capitalization one day prior to the event divided by the total assets. Ret. on equity (return on equity) is equal to the net income divided by the book value of the shareholders equity at the end of the year when the event occurred. Frequency is a variable that counts the number of contracts announced per year in the sample. Before oil shock is 1 for contract announcements occurring before June 23, 2014, and 0 otherwise. T-statistics in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table B.3 shows the cross-sectional analysis from table 7.7 with an alternative order of the variables.

Table B.3: Cross-Sectional Analysis: Alternative Order of Variables 2

	(1)	(2)	(3)	(4)	(5)	(6)
Ret. on Equity	-0.0093	-0.0008	0.0008	0.0012	0.0017	0.00259
	(-0.72)	(-0.05)	(0.05)	(0.08)	(0.11)	(0.16)
Log Total Assets		-0.0047	-0.0044	-0.0030	-0.0031	-0.00271
		(-1.33)	(-1.28)	(-0.93)	(-0.95)	(-0.86)
Tobin's Q			-0.0035**	-0.0070***	-0.0073***	-0.0075***
			(-2.49)	(-3.41)	(-3.56)	(-3.28)
Rel. Con. Size				0.0818***	0.0804***	0.0820***
				(3.10)	(3.20)	(3.19)
Before Oil Shock					0.0111	0.0115
					(1.25)	(1.27)
Frequency						0.0003
						(0.25)
Constant	0.0251***	0.0646**	0.0657**	0.0467	0.0456	0.0410
	(6.27)	(2.06)	(2.09)	(1.64)	(1.61)	(1.41)
Observations	208	208	208	208	208	208
F	0.52	1.20	2.70	3.50	3.02	2.50
R^2	0.0021	0.0122	0.0198	0.1016	0.1077	0.1079

Rel. con. size (relative contract size) is absolute contract size divided by total assets at the end of the year when the event occurred. Log total assets is the logarithm of the total assets. Tobin's q is calculated as the company's market capitalization one day prior to the event divided by the total assets. Ret. on equity (return on equity) is equal to the net income divided by the book value of the shareholders equity at the end of the year when the event occurred. Frequency is a variable that counts the number of contracts announced per year in the sample. Before oil shock is 1 for contract announcements occurring before June 23, 2014, and 0 otherwise. T-statistics in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table B.4 shows the cross-sectional analysis from table 7.7 with an alternative order of the variables.

Table B.4: Cross-Sectional Analysis: Alternative Order of Variables 3

	(1)	(2)	(3)	(4)	(5)	(6)
Frequency	-0.0008	-0.0006	0.0002	0.0008	0.0008	0.0003
	(-0.67)	(-0.53)	(0.15)	(0.69)	(0.59)	(0.25)
Before Oil Shock		0.0114	0.0091	0.0118	0.0118	0.0115
		(1.07)	(1.01)	(1.29)	(1.28)	(1.27)
Rel. Con. Size			0.0692***	0.0858***	0.0857***	0.0820***
			(2.97)	(3.24)	(3.16)	(3.19)
Tobin's Q				-0.0080***	-0.0080***	-0.0075***
				(-3.57)	(-3.28)	(-3.28)
Ret. on Equity					-0.0001	0.0026
					(-0.01)	(0.16)
Log Total Assets						-0.0027
						(-0.86)
Constant	0.0294***	0.0264***	0.0149**	0.0157**	0.0158**	0.0410
	(4.09)	(3.72)	(2.05)	(2.19)	(2.11)	(1.41)
Observations	208	208	208	208	208	208
F	0.45	0.68	3.05	3.55	2.92	2.50
R^2	0.0022	0.0086	0.0703	0.1051	0.1051	0.1079

Rel. con. size (relative contract size) is absolute contract size divided by total assets at the end of the year when the event occurred. Log total assets is the logarithm of the total assets. Tobin's q is calculated as the company's market capitalization one day prior to the event divided by the total assets. Ret. on equity (return on equity) is equal to the net income divided by the book value of the shareholders equity at the end of the year when the event occurred. Frequency is a variable that counts the number of contracts announced per year in the sample. Before oil shock is 1 for contract announcements occurring before June 23, 2014, and 0 otherwise. T-statistics in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Appendix C List of Events

Table C.1: List of Events in the Sample

Event Number	Event Day	Company	Contract Size
1	04.09.2014	Akastor	1,792,950,000
2	09.15.2014	Akastor	2,958,748,500
3	09.29.2014	Akastor	2,500,000,000
4	02.08.2016	Akastor	5,625,000,000
5	01.21.2015	Aker Solutions	4,500,000,000
6	11.26.2015	Aker Solutions	3,200,000,000
7	02.01.2016	Aker Solutions	2,000,000,000
8	12.05.2017	Aker Solutions	4,000,000,000
9	02.04.2014	Archer	2,514,680,000
10	03.05.2014	Archer	577,977,600
11	02.17.2014	Bergen Group	60,000,000
12	03.05.2014	Bergen Group	37,500,000
13	07.08.2014	Bergen Group	55,000,000
14	10.02.2014	Bergen Group	350,000,000
15	05.12.2015	Bergen Group	70,000,000
16	02.25.2016	Bergen Group	70,000,000
17	03.24.2017	Bergen Group	17,500,000
18	06.30.2017	Bergen Group	27,500,000
19	05.02.2014	BW Offshore Limited	13,691,900,000
20	09.17.2014	Deep Sea Supply	70,415,400
21	11.06.2014	Deep Sea Supply	57,338,400
22	01.13.2014	DOF	150,000,000
23	02.13.2014	DOF	100,000,000
24	03.20.2014	DOF	100,000,000
25	05.15.2014	DOF	475,000,000
26	08.18.2014	DOF	830,000,000
27	11.14.2014	DOF	400,000,000
28	07.21.2015	DOF	900,000,000
29	09.28.2015	DOF	3,000,000,000
30	12.21.2015	DOF	270,000,000
31	04.20.2016	DOF	500,000,000
32	09.29.2016	DOF	30,600,000
33	01.21.2014	Electromagnetic Geoser.	99,617,140

Table C.2: List of Events in the Sample Continued

Event Number	Event Day	Company	Contract Size
34	03.17.2014	Electromagnetic Geoser.	49,692,100
35	04.07.2014	Electromagnetic Geoser.	20,000,000
36	05.05.2014	Electromagnetic Geoser.	10,000,000
37	06.02.2014	Electromagnetic Geoser.	31,719,970
38	06.17.2014	Electromagnetic Geoser.	25,793,550
39	06.26.2014	Electromagnetic Geoser.	47,182,520
40	07.14.2014	Electromagnetic Geoser.	16,672,230
41	08.01.2014	Electromagnetic Geoser.	27,065,490
42	09.04.2014	Electromagnetic Geoser.	6,225,000
43	09.24.2014	Electromagnetic Geoser.	22,232,350
44	11.21.2014	Electromagnetic Geoser.	10,119,150
45	12.29.2014	Electromagnetic Geoser.	13,470,300
46	01.30.2015	Electromagnetic Geoser.	19,541,750
47	02.13.2015	Electromagnetic Geoser.	19,022,750
48	03.26.2015	Electromagnetic Geoser.	31,068,000
49	06.12.2015	Electromagnetic Geoser.	20,469,540
50	07.01.2015	Electromagnetic Geoser.	15,730,000
51	08.07.2015	Electromagnetic Geoser.	34,794,060
52	09.08.2015	Electromagnetic Geoser.	21,556,340
53	10.21.2015	Electromagnetic Geoser.	57,094,100
54	11.05.2015	Electromagnetic Geoser.	132,745,860
55	12.04.2015	Electromagnetic Geoser.	35,001,700
56	12.28.2015	Electromagnetic Geoser.	34,690,800
57	05.24.2016	Electromagnetic Geoser.	32,689,800
58	09.14.2016	Electromagnetic Geoser.	17,302,530
59	10.06.2016	Electromagnetic Geoser.	16,073,200
60	11.01.2016	Electromagnetic Geoser.	67,863,200
61	12.16.2016	Electromagnetic Geoser.	17,314,000
62	03.16.2017	Electromagnetic Geoser.	16,971,800
63	05.11.2017	Electromagnetic Geoser.	30,126,950
64	06.30.2017	Electromagnetic Geoser.	20,949,000
65	08.01.2017	Electromagnetic Geoser.	14,186,340
66	09.19.2017	Electromagnetic Geoser.	9,367,080
67	12.13.2017	Electromagnetic Geoser.	11,695,040
68	03.05.2014	EMAS Offshore	603,790,000

Table C.3: List of Events in the Sample Continued

Event Number	Event Day	Company	Contract Size
69	07.10.2014	EMAS Offshore	200,174,000
70	06.11.2015	EMAS Offshore	237,993,000
71	07.07.2015	EMAS Offshore	192,859,200
72	10.20.2015	EMAS Offshore	267,986,400
73	05.11.2016	EMAS Offshore	262,944,000
74	02.14.2014	Farstad Shipping	630,000,000
75	04.22.2014	Farstad Shipping	525,000,000
76	07.24.2014	Farstad Shipping	1,750,000,000
77	08.26.2014	Farstad Shipping	375,000,000
78	10.30.2014	Farstad Shipping	180,000,000
79	12.12.2014	Farstad Shipping	350,000,000
80	07.07.2015	Farstad Shipping	600,000,000
81	06.18.2015	Fred. Olsen Energy	1,079,961,300
82	01.24.2017	Fred. Olsen Energy	51,032,600
83	04.10.2017	Fred. Olsen Energy	74,103,620
84	06.15.2015	Havyard Group	70,000,000
85	07.01.2015	Havyard Group	700,000,000
86	01.05.2016	Havyard Group	300,000,000
87	08.18.2016	Havyard Group	50,000,000
88	09.28.2016	Havyard Group	30,000,000
89	11.22.2016	Havyard Group	27,500,000
90	12.20.2016	Havyard Group	500,000,000
91	02.16.2017	Havyard Group	60,000,000
92	03.16.2017	Havyard Group	80,000,000
93	06.09.2017	Havyard Group	1,000,000,000
94	08.24.2017	Havyard Group	70,000,000
95	05.21.2014	Kongsberg Gruppen	365,000,000
96	07.18.2014	Kongsberg Gruppen	330,000,000
97	04.09.2015	Kongsberg Gruppen	175,000,000
98	25.26.2015	Kongsberg Gruppen	325,000,000
99	08.03.2016	Kongsberg Gruppen	160,000,000
100	11.23.2016	Kongsberg Gruppen	313,000,000
101	08.31.2017	Kongsberg Gruppen	185,650,000
102	01.05.2015	Kværner	360,340,800
103	06.08.2015	Kværner	6,700,000,000

Table C.4: List of Events in the Sample Continued

Event Number	Event Day	Company	Contract Size
104	10.08.2015	Kværner	1,000,000,000
105	03.02.2016	Kværner	606,704,000
106	04.04.2016	Kværner	120,000,000
107	09.14.2016	Kværner	350,000,000
108	01.31.2017	Kværner	450,000,000
109	03.17.2017	Kværner	5,000,000,000
110	02.16.2017	Ocean Yield	38,406,240
111	05.19.2017	Ocean Yield	30,425,760
112	10.09.2017	Ocean Yield	9,601,560
113	02.25.2014	Odfjell Drilling	994,933,500
114	09.10.2014	Odfjell Drilling	1,586,525,000
115	06.15.2015	Odfjell Drilling	4,438,305,000
116	09.07.2015	Odfjell Drilling	1,450,505,000
117	12.13.2016	Odfjell Drilling	505,500,000
118	03.01.2017	Odfjell Drilling	462,335,500
119	07.04.2017	Odfjell Drilling	459,734,000
120	08.10.2017	Odfjell Drilling	540,729,200
121	04.10.2017	Odfjell Drilling	1,005,766,400
122	04.14.2014	Prosafe	113,000,000
123	07.02.2014	Prosafe	2,730,253,300
124	07.31.2014	Prosafe	49,471,380
125	12.03.2014	Prosafe	58,943,640
126	06.08.2015	Prosafe	39,665,500
127	08.17.2015	Prosafe	1,851,046,400
128	03.18.2016	Prosafe	500,238,000
129	12.16.2016	Prosafe	14,716,900
130	04.26.2017	Prosafe	445,863,600
131	03.21.2014	Reach Subsea	60,717,000
132	04.15.2014	Reach Subsea	15,000,000
133	10.24.2014	Reach Subsea	65,000,000
134	01.23.2014	Rem Offshore	345,000,000
135	06.04.2014	Rem Offshore	800,000,000
136	01.15.2014	Seabird Exploration	29,313,600
137	02.03.2014	Seabird Exploration	103,300,000
138	04.02.2014	Seabird Exploration	705,250,600

Table C.5: List of Events in the Sample Continued

Event Number	Event Day	Company	Contract Size
139	07.31.2014	Seabird Exploration	68,884,200
140	08.25.2014	Seabird Exploration	67,951,400
141	11.17.2014	Seabird Exploration	13,524,000
142	12.02.2014	Seabird Exploration	42,327,000
143	12.17.2014	Seabird Exploration	28,186,125
144	02.19.2014	Seadrill	10,940,220,000
145	04.02.2014	Seadrill	1,906,567,300
146	03.23.2016	Seadrill	269,638,400
147	07.29.2016	Seadrill	1,926,990,000
148	12.29.2016	Seadrill	977,940,000
149	07.13.2017	Seadrill	214,718,400
150	02.16.2015	Sevan Marine	378,345,000
151	01.02.2014	Siem Offshore	158,732,600
152	04.07.2015	Siem Offshore	869,150,000
153	04.29.2014	Solstad Farstad	400,000,000
154	10.16.2017	Solstad Farstad	80,000,000
155	02.20.2014	Subsea 7	548,703,000
156	03.21.2014	Subsea 7	667,887,000
157	05.21.2014	Subsea 7	2,739,806,000
158	06.16.2014	Subsea 7	299,990,000
159	11.24.2014	Subsea 7	509,550,000
160	03.02.2015	Subsea 7	1,843,704,000
161	04.13.2015	Subsea 7	1,620,460,000
162	05.08.2015	Subsea 7	2,246,640,000
163	07.30.2015	Subsea 7	4,084,950,000
164	09.01.2015	Subsea 7	1,243,710,000
165	10.14.2015	Subsea 7	812,500,000
166	12.30.2015	Subsea 7	874,000,000
167	02.03.2016	Subsea 7	871,640,000
168	02.26.2016	Subsea 7	6,451,875,000
169	04.25.2016	Subsea 7	823,500,000
170	05.20.2016	Subsea 7	6,257,700,000
171	10.20.2016	Subsea 7	1,834,500,000
172	12.02.2016	Subsea 7	842,000,000
173	02.28.2017	Subsea 7	836,500,000

Table C.6: List of Events in the Sample Continued

Event Number	Event Day	Company	Contract Size
174	03.21.2017	Subsea 7	3,380,000,000
175	07.21.2017	Subsea 7	2,008,125,000
176	10.02.2017	Subsea 7	1,796,000,000
177	12.11.2017	Subsea 7	1,885,500,000
178	03.11.2014	TTS Group	50,000,000
179	04.03.2014	TTS Group	209,000,000
180	05.15.2014	TTS Group	80,000,000
181	07.01.2014	TTS Group	72,000,000
182	07.24.2014	TTS Group	60,000,000
183	08.20.2014	TTS Group	100,000,000
184	10.06.2014	TTS Group	72,000,000
185	11.06.2014	TTS Group	52,000,000
186	12.19.2014	TTS Group	120,000,000
187	02.02.2015	TTS Group	23,000,000
188	03.17.2015	TTS Group	25,000,000
189	04.14.2015	TTS Group	270,000,000
190	05.13.2015	TTS Group	120,000,000
191	06.05.2015	TTS Group	24,000,000
192	07.08.2015	TTS Group	37,000,000
193	08.21.2015	TTS Group	40,000,000
194	09.17.2015	TTS Group	112,000,000
195	12.10.2015	TTS Group	360,000,000
196	02.04.2016	TTS Group	160,000,000
197	07.01.2016	TTS Group	40,000,000
198	07.18.2016	TTS Group	28,000,000
199	12.05.2016	TTS Group	33,000,000
200	04.03.2016	TTS Group	55,000,000
201	04.28.2017	TTS Group	55,000,000
202	05.18.2017	TTS Group	240,000,000
203	06.22.2017	TTS Group	250,000,000
204	08.24.2017	TTS Group	85,000,000
205	10.03.2017	TTS Group	100,000,000
206	10.23.2017	TTS Group	50,000,000
207	01.07.2015	Wallenius Wilhelmsen	4,500,000,000
208	07.21.2015	Wilson	86,942,700