Factors Affecting the Pricing of International Oil and Gas Companies

Study of the Top 100 Stock Listed Companies

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This Master's Thesis is carried out as a part of the education at the University of Agder and is therefore approved as a part of this education. However, this does not imply that the University answers for the methods that are used or the conclusions that are drawn.

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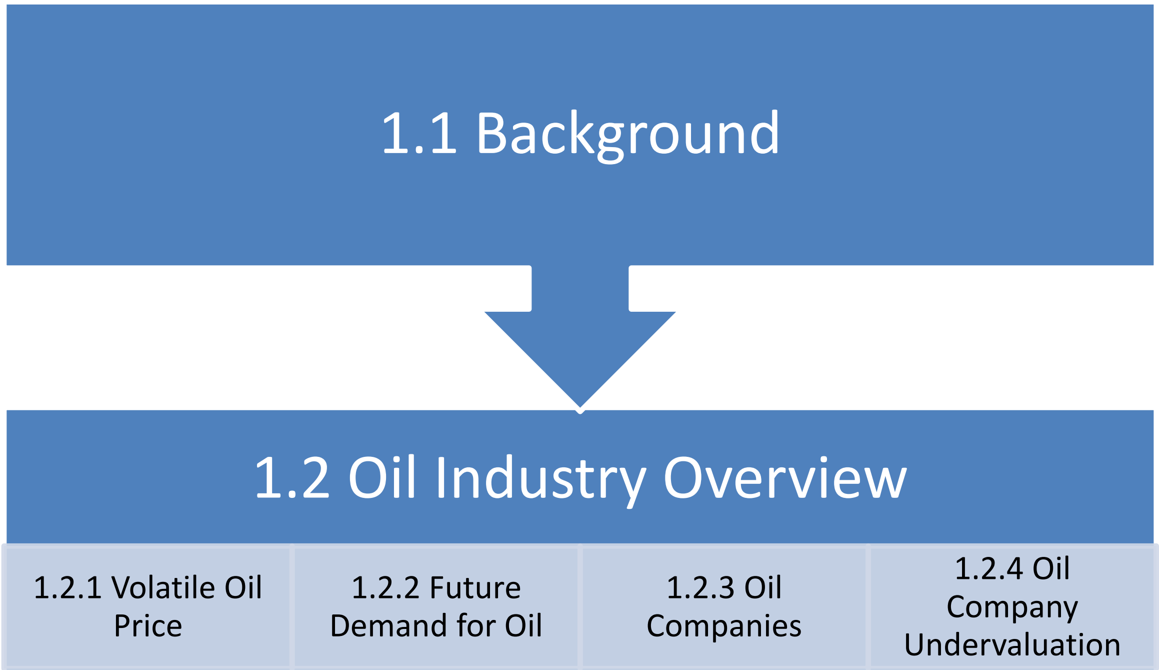
Preface

The purpose of this study is to find what effects government ownership, blockholding and country risk have on firm valuation. Theory and past research conclude that government owned companies are expected to be less efficient and hence less profitable than private companies, while blockholding and country risk can have a negative effect on firm value(Dewenter and Malatesta 2001; Thomsen, Pedersen et al. 2006).Using Tobin's q as a proxy for firm valuation the effects of these factors are tested on the market value of international oil and gas companies. Studying valuation within this industry is particularly interesting since the industry produce a commodity but the home country environments vary extensively between the countries

1.0 Introduction

This paper has a total of 7 chapters. An overview of the oil and gas industry is presented in chapter 1 to get a basic understanding before the theory and prior research in chapters 2 and 3 respectively. The following two chapters, research design (4) and method (5) explain the parameters of this study with explanation of the research variables and the methods used in the data collection and analysis. Chapter 6 has an analysis and presentation of the results with emphasis on linking them to previous research and theory. A further discussion and summary will conclude the paper in chapter 7 along with the study's limitations and suggestion for further research.

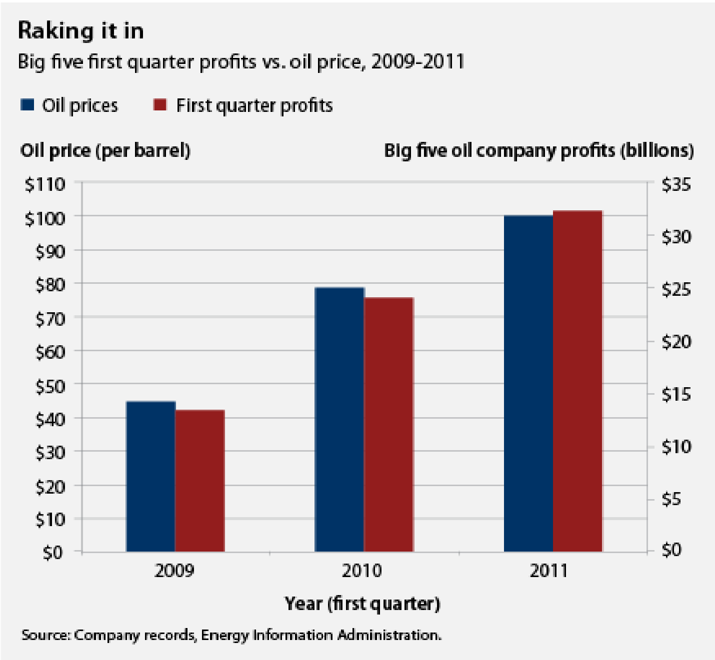
In addition, the start of each chapter has a cover sheet with the different sections in order to give a better overview of the structure and content of the paper.



1.1 Background

The oil and gas industry is associated with huge profits and the six largest stock listed oil companies reported $38 Billion in first-quarter profits for 2011(Rooney 2011). However, such high profits are mainly reserved for the largest companies as the industry average net profit margin ranked #114 of 215 total industries for the first quarter of 2011(Perry 2011). This parity in profit margin carries over to market value and stock price: The world's largest oil and gas stock for 2004 (and still is in 2012) was Exxon Mobil with stock market value of $377 billion and proven reserves of 21.2 MBOE *(*millions of barrels of oil equivalent units). Lukoil, a Russian based company, had approximately the same amount of reserves (20.0) but a stock price of $35.6 billion (figure 2). That's less than 10% of the price of Exxon Mobil! These large differences in valuation paired with a genuine interest for the oil industry are some of the reasons and motivation behind this study.

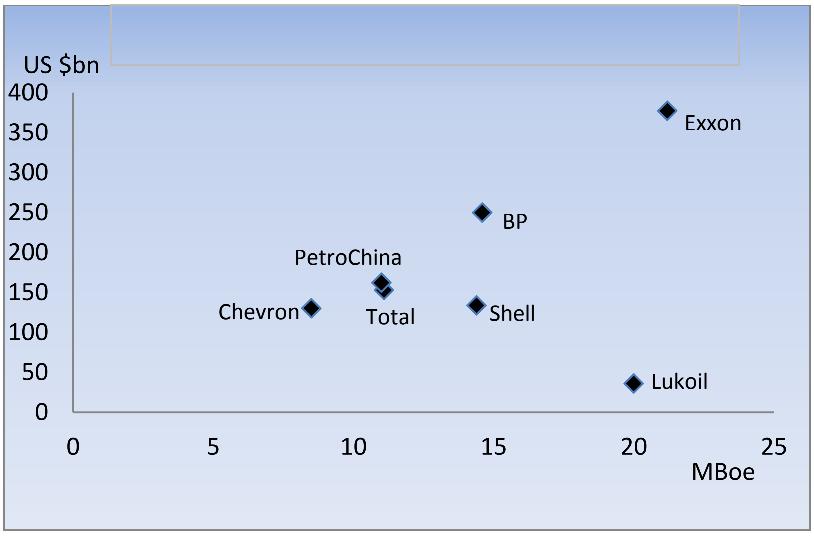
Figure 1: Big Oil Company Profits



The figure is based on data from the U.S. Energy Information Agency shows first quarter profits vs oil price for the largest oil companies, termed "Big five"(ExxonMobil, BP, Chevron, ConocoPhillips and Shell). Taken from: (Valk 2011)

Obviously there are other factors at work in determining market value, but it raises questions when two companies have basically the same amount of inventory (crude oil reserves) and the market prices one 10 times higher than the other.

Figure 2: Stock Market Value vs Reserves



The spot diagram shows reserves in MBOE(millions of barrels of oil equivalent units) and stock market value for selected oil companies in 2004. Data source:(Sjuggerud 2005). *Made by author.*

Theory and previous research identify factors such as political developments, industry, firm size, country of origin and liquidity that systematically effects stock price (King 1966; Chan, Chen et al. 1985; Bernstein and Fabozzi 1998; Datar, Naik et al. 1998; Noorderhaven and Harzing 2003). Also, specific to the oil industry are factors such as accessibility of oil reserves, crude oil price and oil spillage costs to mention a few; The effects on company valuation are many and complex. In an effort to clarify on the issue, this study identifies some basic underlying factors behind the possible under valuation of oil companies. Firstly one must take a look at the nature of the oil industry and oil prices.

1.2 Oil Industry Overview

Oil is a limited natural resource, yet seemingly used limitless as a natural essentiality for everyday life. Oil is not only used to fuel our engines and warm our homes, but components are used in pharmaceuticals, household products, plastic and cosmetics. As Steve Austin illustrates in an article for Oil-Prices.Net: “every single aspect of business and life requires some or the other form of oil”(Austin 2010). This holds true for developed nations, and with emerging economies in China and India this presumption will soon be predominant in countries around the world.

1.2.1 Volatile Oil Price

With increase in demand comes also an increase in price. However, the oil price volatility is not only a direct effect of supply and demand, rather also an intricate balance of oil investor behavior and future expectations. A point accurately illustrated in The Economist published in March 2011: "Two factors determine the price of a barrel of oil: the fundamental laws of supply and demand, and naked fear," (Johnson 2011). Trouble in the Middle East, Hugo Chavez takeovers of oil companies in Venezuela and other “geopolitical events that threatens oil supply” can spook investors and oil prices. More recent events when Iran threatened to close the Persian Gulf and actually stopped exporting oil to Britain and France lead to an increase in oil prices to $121 a barrel in February 2012, the highest since May 2011(Johnson 2011; Morh 2012).

Figure 3: Price of West Texas Intermediate Crude

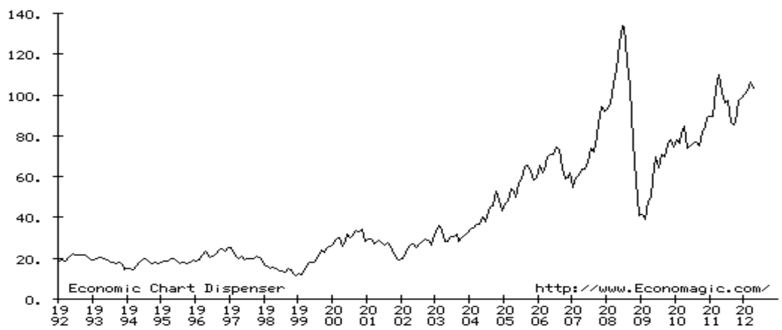


Figure shows the WTI Crude oil price by monthly NSA, dollars per barn for the last 20 years. *Taken from* (Econmagic.com 2012*)*

Further contributing to the complexity of the oil market is OPEC (Organization of Petroleum Exporting Countries) that controls 40% of world supply and used to set oil prices up until the mid-1980's. Now they just regulate the supply and is one of the reasons that the oil market is not truly competitive like other markets, according to Evans, an energy analyst at Citigroup(Johnson 2011).However now, there isn't a big producer step-in to increase production and stabilize prices like USA and Saudi Arabia in the past. According to Michael Levi in an article for Council of Foreign Affairs: "That means prices have to swing far to balance supply and demand"(Johnson 2011; Levi 2011).

1.2.2 Future Demand for Oil

The demand for oil is expected to be even higher in years to come as the population increases and countries continue to economically develop. Global energy consumption growth over the next two decades will average 1,7% per year. Non- OECD energy consumption is predicted to be 68% higher by 2030. Of which the same time OECD energy consumption is predicted to be 6% higher than today(Reliance 2012).

1.2.3 Oil Companies

Having established the complexity of oil prices, what's the effect on the oil producers and companies that have to operate in this volatile market? In terms of simple economic principles, the price of oil to an oil company has two components: The price to *acquire* the oil and the *selling* price in the market. The first component is mainly dependent on *where* the oil source is located. The production cost of drilling a well 8000m below the surface in the North Sea, or the technology needed to filter the oil sands deposits in Canada represents a vastly different cost structure than the easily accessible Ghawar field in Saudi Arabia (Browning 2007).

Figure 4: Cost of Production

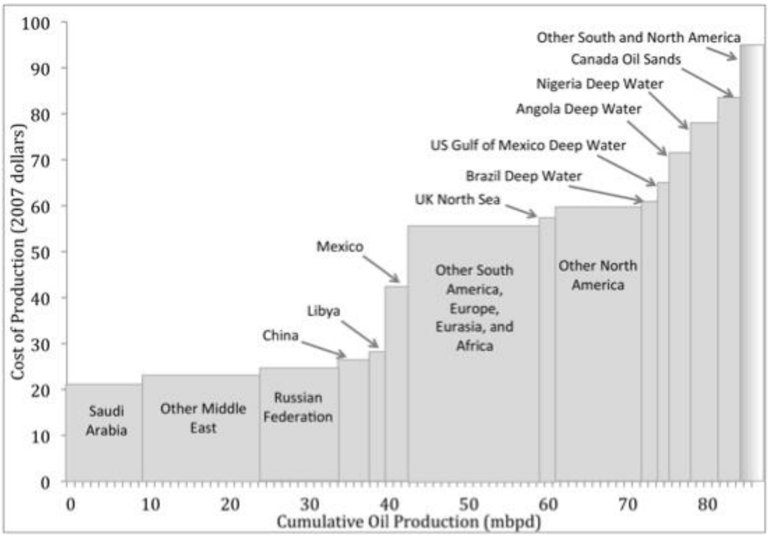


Figure illustrates the different cost structures from regions around the world. *Taken from:* (Murphy 2010)

The second component is the market price, already discussed to be dependent on the supply and demand as well as speculative investor behavior. Market price of oil has a direct correlation to company profits. Its variable price level is without a doubt a considerable factor in risk and profitability analyses of new projects. U.S annual inflation adjusted crude oil barrel prices was $87.33 in 2011, up from $16.50 in 1998(InflationData.com 2012) (Appendix 1). That is a staggering over 400% increase in just over a decade! But maybe more influential on profits was the sudden drop of $40 between 2008 and 2009, bottoming at $56.15 a barrel(InflationData.com 2012).

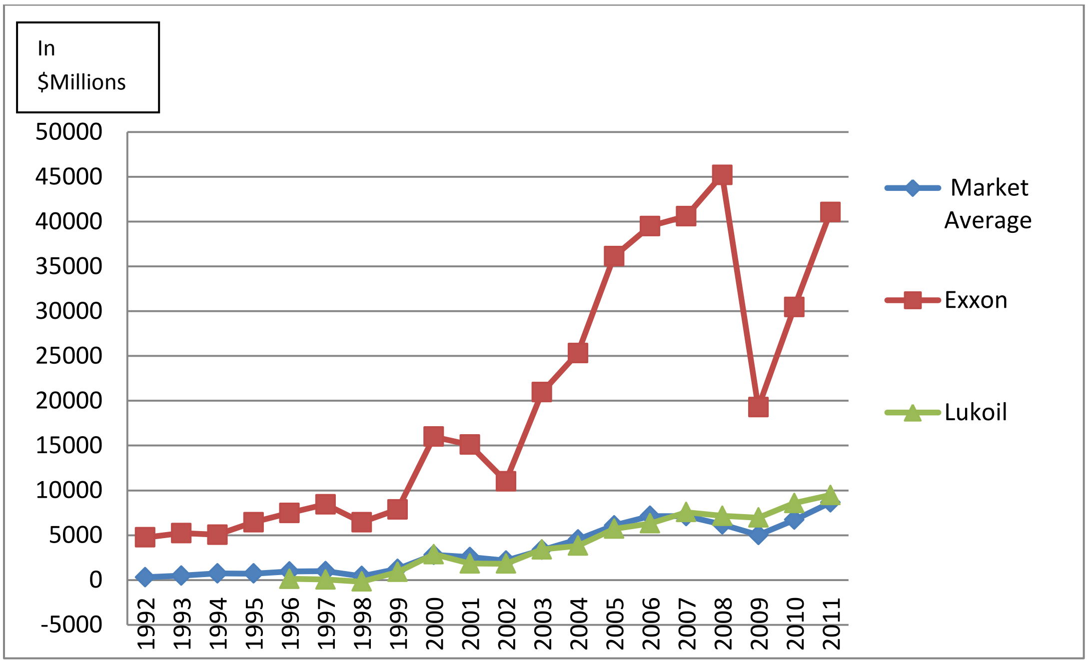
This radical change in market price is an exogenous factor universal for every oil company. The difference can be illustrated in effect vs affect. The market price of oil *effects* every company the same, but the level of which it *affects* companies' profits varies. One reason for this is contract structure. Dropping oil prices is detrimental to profits in scenarios of fixed long term contracts. A fixed long term lease of an oil rig over the next 10 years might have a break even rate requiring an oil price of $40 a barrel. If market prices drop below that, the company would operate at a loss. Likewise, a set selling price of $80 dollars a barrel would cause the company to "loose" $26 dollars of potential profits per barrel given today's oil prices. How this translates to stock value and overall profits brings up the point of market value of companies.

Figure 5: Company Margins vs Gasoline Prices

The graph illustrates varying profit margin for a sample of US oil & gas producers. *Taken from:* (Biery 2011)

The stock market behaves at times irrationally and future expectations, risk and dividends are important factors. The oil industry has however traditionally enjoyed stable profits, as illustrated by figure 6. The reasons behind this are many, a strong worldwide demand and high profit margin of acquiring crude oil from the ground are without a doubt “golden tickets” for the industry.

Figure 6: Historical Net Income



Graph shows net income the last 20 years for the world's top 50 stock listed oil companies (based on market value as of April 12, 2012). The blue line depicts average market income, which was $306M in 1992* and has increased to $8,6B in 2011. Exxon Mobil has enjoyed staggering profits while Russian based Lukoil hovers around the market average. Data acquired from (Reuters 2010). *Made by author*.

1.2.4 Oil Company Undervaluation

The NYSE Arca Oil Index (figure 7) gives a good indication of the valuation of oil company stocks as an industry. The index states the market capitalization weighted average P/E ratio of 13 major oil companies(Greenwall 2012; NYSE 2012).

*Only 22 of today's top 50 companies were in business in 1992, and several of them suffered from a negative net income contributing to the relatively low average net income for the sample.

Figure 7: NYSE Arca Oil Index

The graph shows the NYSE Arca Oil Index compromised of 13 oil and gas companies for the last 5 years. *Taken from:* (Buyupside.com 2012)

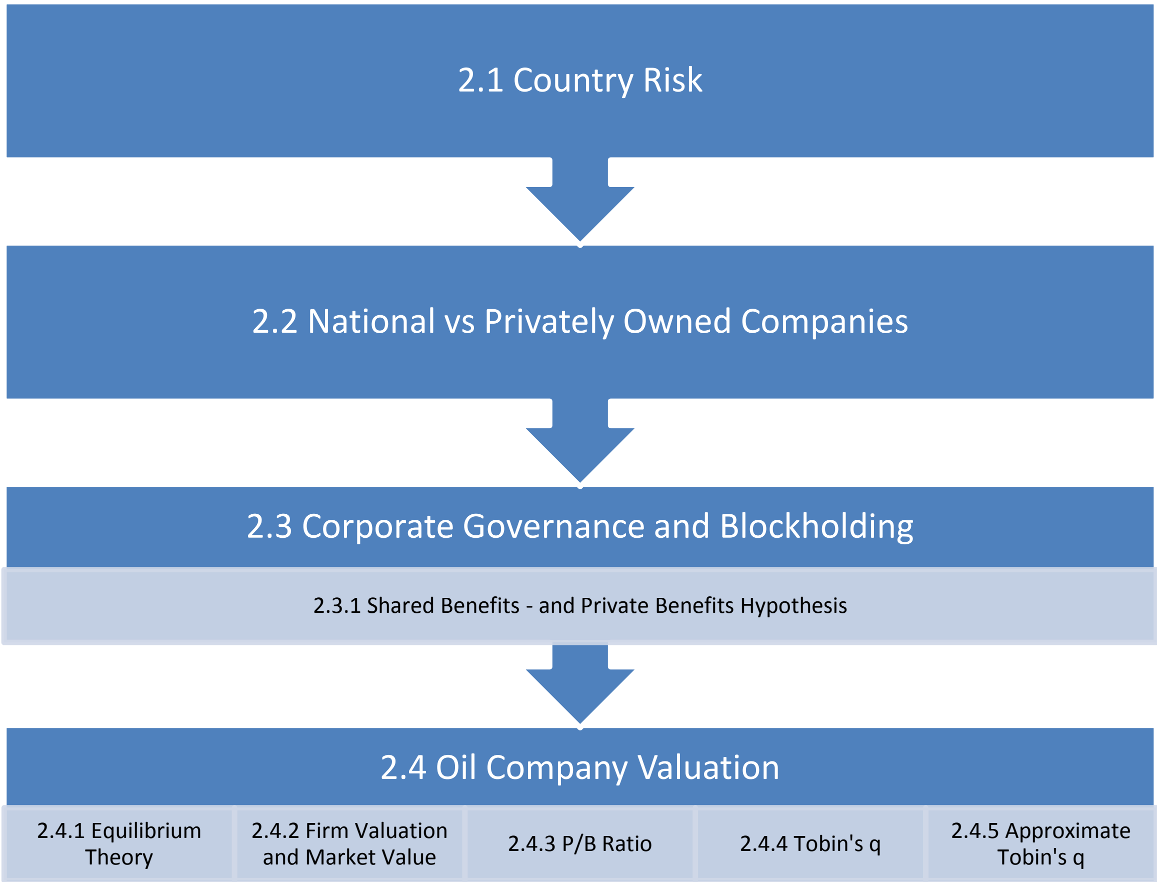
It becomes more relevant when comparing it to other industries, like Standard & Poors 500 index (Figure 8). The S&P includes 500 of the most commonly held companies in the market, including the major oil companies in the NYSE Index. Looking at previous data, the NYSE index had a month end MCWA P/E ratio of 12,3 in 2007, compared to S&P's 20,2. This means that the oil stocks were trading at a 39% discount to the general stock market(Greenwall 2012). As of March 2012, the discount is down to 37%.

Figure 8: S&P 500 Index

The graph shows the Standard&Poors 500 Index for the last 5 years. *Taken from:*(S&P 2012)

2.0 Theory

The theory will focus on valuation of oil companies and ratios used to determine the market price, with emphasis on Tobin's q. In addition theory on country risk, national vs private ownership and blockholding are described to form an overall picture of the expected relationships and the effect on market value that is presented in the prior research (3.0).



2.1 Country Risk

With oil company valuation, risk is more than often associated with the place and accessibility of oil fields and production. This implies that country risk is a factor. Country risk is according to the OECD Trade and Agriculture Directorate defined to be:

*"composed of transfer and convertibility risk (*i.e. *the risk a government imposes capital or exchange controls that prevent an entity from converting local currency into foreign currency and/or transferring funds to creditors located outside the country) and cases of force majeure (*e.g. *war, expropriation, revolution, civil disturbance, floods, earthquakes)" (OECD 2012).*

Basically it gives a clear definition and states measurable factors, thus able to compose a rank of the countries in the world. Many other organizations and rating agencies like Standard & Poors, Moodys etc. also provide country risk tables. This need has come with continuing and expanding trade with other countries around the world, accelerated by globalization and forced companies and investors to consider the impact on risk portfolios. Investing in companies like Petrobras, Gazprom and China Power is expected to yield higher returns, but the flipside also increased risk exposure(Damodaran 2003). Although it is expected that an oil company based out of Angola will have a different risk score than one from Norway, little research have been made on the effect on company valuation. That is when we consider the book value and market value of an oil company.

This impact or possible correlation between company valuation and country risk can help to further understand the international market mechanisms in one of the world's most important and profitable industries. It is especially relevant in dealing with countries with emerging economies. Donald R. Lassard (1996) mentions factors such as "currency inconvertibility, expropriation, civil unrest, and general institutional instability" in the article Incorporating Country Risk in the Valuation of Offshore Projects(Lessard 1996). Perceived unstable economies and political environment carries with them risk premiums to investments.

However, risk assessments are often arbitrary and it is very difficult to distinguish and separate the relevant grounds and facts for a correct valuation. A "historical risk premium" and “implied premium approach” are tools used for country risk, but in effect companies and investors alike often struggle to reflect objective information in their analyses and “over discount” project cash flows(Lessard 1996; Damodaran 2003). A topic for research arises when looking at potential over/under pricing of oil companies, especially for oil production in “high risk” regions.

2.2 National vs Privately Owned Companies

Government ownership is viewed to be a hybrid between concentrated and dispersed ownership: The state is considered a whole entity in which the money belongs to, and not with the individuals/political parties that have the power to influence actions of the firm(Denis and McConnell 2003). Oil fields are in many ways considered national treasure and represent a considerable(potential) source of national income. With oil originating from the land, many states righteously sit on property right and hands out licenses for oil drilling or at least have some sort of ownership in domestic oil production. The effect of which on oil company valuation has largely gone without in depth research.

In addition, the separation between state and public ownership in companies are not always as clear in emerging markets compared to western developed nations(Ghasseminejad 2011). Although arguments can be made that separating state ownership and equal opportunity in political governments decisions is problematic everywhere in the world. Political ties and favorable legislation, grants and subsidiaries could create “unfair” benefits in the market. Political scandals like the “Tree Whales” corruption case in Russia and the case of Huawei in China even proves of explicit or implicit ties to the military and security agency(Ghasseminejad 2011). To measure such effects or ties would be close to impossible, other than having it incorporated and reflected in the country risk score for investments. One can however take into account what role partial- or full state ownership in oil companies would have on market value.

Firstly, the term NOC (National Oil Companies) is widely used to describe state controlled oil and gas companies, although many of them like Statoil(Norway) and Petrobras (Brazil) have large private ownership(Victor 2012). Second, many of these national oil companies are according to energy specialist Robert Pirog in a report to the US Congress in 2007: "inefficient, with relatively low investment rates" and "tend to exploit oil reserves for short-term gain, possibly damaging oil fields"(Pirog 2007). That raises questions on the value of such companies, compared to privately owned that solely seek to maximize shareholder value. Does a state ownership share with financial backing and security necessarily translate into higher value, or are those companies at a discount in the market?

2.3 Corporate Governance and Blockholding

How a firm handles reporting and the internal control mechanisms in place to supplement legal codes and regulations, are determined by its corporate governance system. NUES (Norsk Utvalg for Eierstyring og Selskapsledelse) defines corporate governance systems as "the division of roles between shareholders, board of directors and executive management" with a goal of "strengthen confidence in companies and to enhance the greatest possible value creation over time in the best interests of shareholders, employees and other stakeholders"(NEUS 2012). The link between efficient management monitoring (in good corporate governance systems) and positive effects on firm performance is well documented(Morck 1988; Shleifer and Vishny 1997; Denis and McConnell 2003; Pacheco-de-Almeida, Hawk et al. 2008). One acknowledged measure is "Blockholding" and refers to the concentration of share ownership in a firm. A blockholder owns at least 5% of outstanding common stock and can use voting power to control and monitor the company(Pacheco-de-Almeida, Hawk et al. 2008).

Having large blockholders and concentrated ownership can be beneficial as an extra policing entity, along with board of directors and top management of a company. This checks and balances system works to ensure that firm value doesn't stray far from its potential value and hence vulnerable to outside interference(Denis and McConnell 2003).

2.3.1 Shared Benefits- and Private Benefits Hypothesis

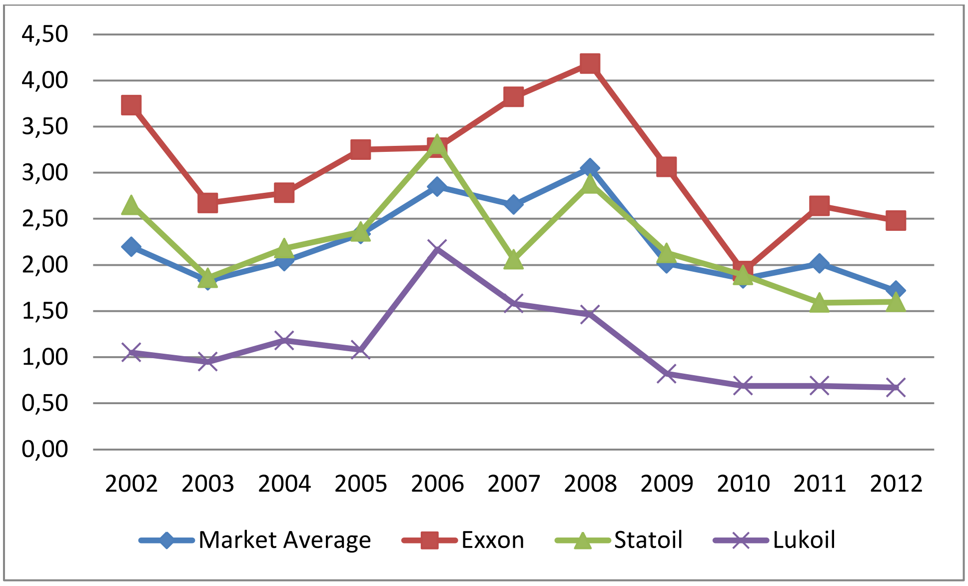
With regards to corporate governance and blockholding, there are theories supporting the benefits as well as negative effects. The shared benefits hypothesis states that all of the company's shareholders would benefit from a large blockholder with enough power to diminish the agency problem between management and shareholders(Konijn 2009) . Large blockholders that control sufficient shareholder rights can monitor and possible intervene if the company is underperforming, thus ensuring value protection for all shareholders. However, this is only true according to Pergola and Verreault (2009,) if their incentives are shared with the other independent owners. The private benefits hypothesis shows that firm value will suffer if blockholders persue their own interests rather than what is beneficial to the company, debt holders, employees, customers and other shareholders(Torrez 2006). Concentrated ownership by owners with aligned interests will improve firm governance, otherwise the agency problem is shifted between powerful blockholders and other stakeholders (LaPorta 2002; Konijn 2009; Pergola 2009).

2.4 Oil Company Valuation

Looking at company valuation, there are discrepancies in market value even between the world's largest oil companies. It's natural to attribute risk as an explanation because investors require a higher yield to compensate for the (perceived) extra risk. People are risk averse and the expected return on any investment is argued to be the risk premium plus the sum of the risk-free rate(Damadoran 2011).

Evidence of undervaluation is present for a number of private and closely held oil field service firms. In recent years their selling price have increased from a typical 4- time multiple of EBITA to more than 10 times(Mahmood 2007).Such a difference would also become evident by comparing book value to market value (figure 9) for oil and gas companies.

Figure 9: Market to Book Value



The graph shows average market to book value the last 10 years for the world's top 50 oil companies (based on market value per 13.2.2012) as well as three selected companies. Recalling the disparity of market price and proven reserves from figure 2, Exxon Mobil is rated above the market average while Lukoil is still "underperforming" with a market/book value less than 1 the last three years. Data is collected from Datastream Worldscope. *Graph made by author*

Tobin's q is one of many financial ratios available and compares market value over replacement value of assets. As opposed to market value over book value, this method rules out possible undervaluation of assets on the balance sheet and calculates real "value added" and intangibles(Knowles 2009). Tobin's q represents a more solid base to draw conclusions from, than many other commonly used tools for bench marking and valuation in the oil industry. This will be further discussed in the prior research section (3.1).

2.4.1 Equilibrium Theory

Economist James Tobin (bourn 1918) developed Tobin's q, or simply q-ratio that is the ratio of the market value of a firms capital assets and its replacement value(Petri 2004). He stated that the market value for all stock listed companies should approximately be equal to their replacement costs and net investment would largely depend on whether q is larger or less than 1(Petri 2004; Pietersz 2005-2012). If q is higher than one, firms should increase its capital expenditure as it's likely to create wealth for their shareholders. This would in turn increase asset price and reduce share price, driving q towards 1 and equilibrium. A q lower than 1, would mean the assets are worth more than the firm value making it cheaper to buy than setting up a new company. Asset price decreases and share price increases, again pushing the q back to 1(Pietersz 2005-2012).

The ratio is widely used as estimating the "fair value" of the stock market and determining whether a company is over-/underpriced(Weisenthal 2011). In fact, it has also been attributed to explain the value effect- why value stocks can outperform the market in the long run(Pietersz 2005-2012; Xing 2006).

2.4.2 Firm Valuation and Market Value

2.4.2.1 P/B Ratio

Upon start up, the value of a firm is equal to the amount of capital its owners have put into it. Establishing a market value is a process over time as the firm generates profits and potential long term returns. The market value is the discounted present value of future dividends(Agrawal 1996). The book value (based on historical costs) however tend to generally stay the same as the original investment plus additional undistributed profits. The change in firm value is then often expressed as the ratio of share price and its book value(Agrawal 1996).
Book value of equity is found by subtracting liabilities from the firms' total assets. By also including intangible assets we find the "true value" if we stripped down a company and liquidated its assets:

Equation 1 P/B Ratio

$$\text{P/B Ratio} = \frac{\text{Stock Price}}{\text{Total Assets - Intangible Assets and Liabilities}}$$

Source: (Investopedia)

The P/B ratio can also be expressed as a simplified version of Tobin's q by deeming book value to approximately equal the firms replacement cost(Agrawal 1996). This is due to the fact that it's difficult to obtain accurate values for the replacement costs and intangible assets (Carlton and Perloff 2000). As a solution, firm expenditure on advertising and research and development is widely used as control variables to correct for intangible assets (Carlton and Perloff 2000; Dowell 2000; Osmundsen, Asche et al. 2005). Tobin's q is commonly expressed similar to equation 2 below.

2.4.2.2 Tobin's q

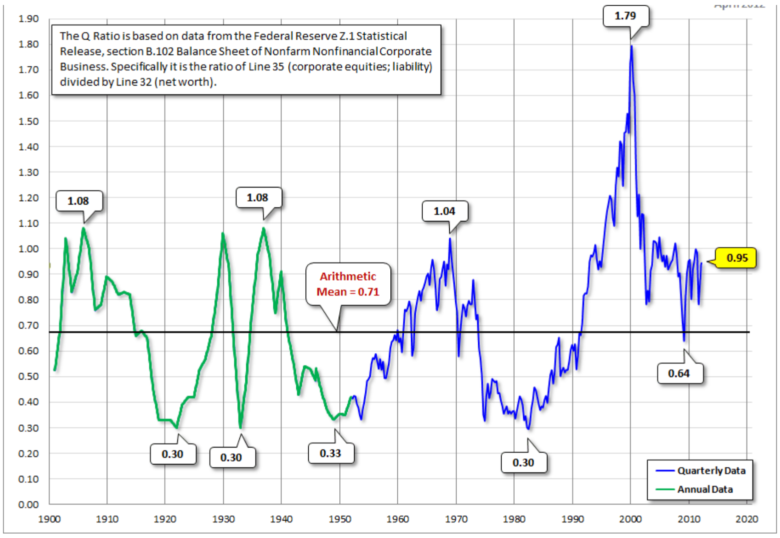
Equation 2 Tobin's q

Tobin's q: $\frac{\textbf{Total Market Value}}{\textbf{Total Asset Value}}$

Source: (StockResearchPro 2009)

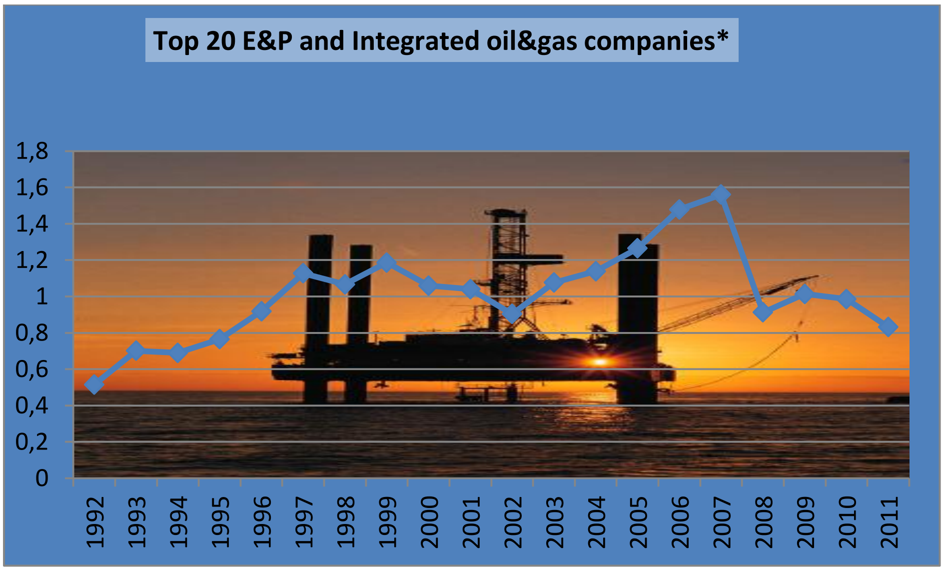
Since market value is the present value of future cash flow dividend by the replacement costs of tangible assets, no risk adjustment or normalization is required to compare q across firms, in contrast to comparisons of stock return or accounting performance measures(Lang 1994). Tobin's q has hence been used as an indicator of whether firms are fairly priced in the market as well as a measure of determining if the stock market is in equilibrium. CLSA Ltd. strategist Russell Napier predicted in 2008 that the global stock market would continue to struggle because the Standard & Poor's 500 index is too expensive according to the Tobin's q ratio(Short 2012). History has shown the Q ratio to fall to 0.3 on several occasions after financial turmoil(Rial 2008). This is illustrated in figure 10 by Doug Short (2012) as he calculated Tobin's q ratio for US firms from 1900 to present.

Figure 10: Historical Tobin’s q Average since 1900



Graph shows average historical Tobin’s q scores from firms across industries dating back to 1900’s. *Taken from:* (Short 2012)

Figure 11: Historical Tobin’s q Average since 1992



*Top 20 Exploration & Production and Integrated Oil & Gas companies based on market value per 13.04.2012

The line graph shows average Tobin’s q ratio the last 24 years. It’s based on an approximate Tobin’s q ratio (equation 6) and can therefore not be directly compared to Figure 10. Source: Data from (Reuters 2010). *Made by author.*

As we can see from figure 10, the mean value is below 1, suggesting that companies are generally undervalued. Smithers & CO explains this due to the replacement costs being overstated primarily caused by an underestimation of the economic rate of depreciation(Smithers 2012). The data was collected from the Federal Reserve's Flow of Funds Accounts and used the following presentation of Tobin's q:

Equation 3 Tobin's q (Smithers 2012)

Tobin's q: $\frac{Market\ Value}{Replacement\ Cost}$

Source:(Short 2012)

There are many different variations of Tobin's q. Pacheco-de-Almeida et al. (2008), supported by Dowell et al. (2000) calculated market value and replacement value of assets as in formula 4 below.

Equation 4 Tobin's q (Pacheco-de-Almeida et al. 2008)

Tobin's q:

$$\frac{Market\ Value\ of\ Equity+Book\ Value\ of\ Preferred\ Stock+Long\ Term\ Debt+Current\ Liabilities-Current\ Assets}{Total\ Assets-Current\ Assets-Intangibles+Book\ Value\ of\ Inventory}$$

Lindenberg and Ross (1981) worked with a similar formula:

Equation 5 Tobin's q (Lindenberg and Ross 1981)

Tobin's q=

$$\frac{\text{Preferred Stock+Market Value of shares+Long Term Debt+Book value of Current Liabilities}-\text{Net Short Term Assets}}{Book\ Value\ of\ Total\ Assets-Book\ value\ of\ Net\ Capital\ Stock+Inflation\ adjusted\ Net\ Capital\ Stock}$$

Source: (Chung and Pruitt 1994)

However, these calculations and accessing data are extremely complex and resource demanding. This makes them inconvenient and troublesome for researches and analysts to use(Chung and Pruitt 1994). In addition, Tobin's q is meant to state market value over replacement costs, and the latter is virtually impossible to state accurately. There is seldom a second hand market for which to get reference values for the replacement costs in addition to valuing the intangible assets. Precisely intangible assets is a major liability in calculating Tobin's q, as oil companies form around the world have different accounting reporting standards. Using data from Datastream Worldscope, it became evident that some companies report intangible assets while others don't. Also, the definitions vary and it's often the case that companies report the difference between buying price and market value as intangible assets when merging or acquiring another company.

2.4.3 Approximate Tobin's q

In light of these challenges, a simplified version of Tobin's q will also be used in the study. Previous research shows only a marginal difference compared to the more "theoretically advanced" measures of Tobin's q. Perfect and Wiles (1994) found correlation coefficients of 0.9315 between a simplified approximation of Tobin's q and Lindenberg and Ross'(1981) q introduced earlier. Chang and Pruitt (1994) performed a 10 year (1978-1987) cross sectional comparison of q values for more than 1,500 firms. They used the Lindenberg and Ross (1981) Tobin's q (equation 5) and an approximate Tobin's q (equation 6). The results of the OSL Regression showed that the R level never dropped below 0.966(Chung and Pruitt 1994). This is solid evidence that the approximate q' can justifiably be used in research as it explained more than 96,6% of the total variability of the more advanced measure.

Equation 6 Approximate Tobin's q (Lindenberg and Ross 1981)

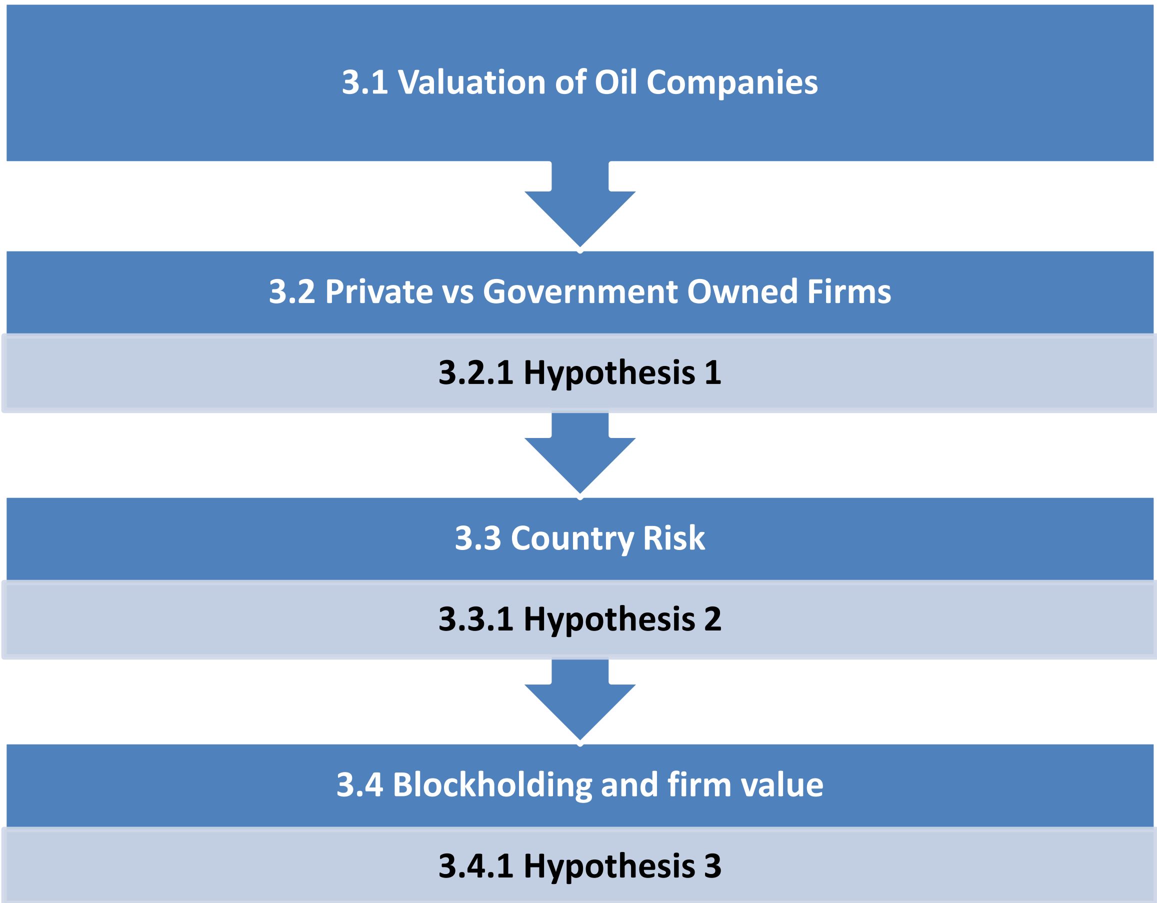
Approximate Tobin's q:

$$\frac{MVE\ (Shareprice * shares\ outstanding) + Preferred\ Stock + Short\ Term\ Liabilities - Short\ Term\ Assets}{Book\ Value\ of\ Total\ Assets}$$

Source: (Chung and Pruitt 1994)

3.0 Prior Research

My search has not revealed any research to date on the possible over/under valuation of companies in the oil industry. Little attention has also been given to effects of blockholding, country risk and government ownership in connection with the valuation of firms in the oil industry. Presented in this section will be relevant research available, starting with valuation and performance measures commonly used for the industry. This is followed by research done with the independent variables used in the study where a hypothesis is formulated after each one.



3.1 Valuation of oil companies

The oil industry inhibits certain unique operating characteristics, identified by Quirin et al. (2000): "such as the risk of drilling a dry well, the lengthy time between discovery and sale of reserves and the lack of a predictable correlation between exploration costs and reserve value" (Quirin, Berry et al. 2000). This results in problems of using historical cost accounting in the valuation of firms in the oil industry(Deakin and French 1992).

Misund, Asche and Osmundsen (2008) built on Wright and Gallun's (2005) research in explaining the reasons behind the lack of confidence in historical cost accounting:

a) Risks are high and the probability of discovering commercial reserves is often low.
b) There is often a long time lag between acquiring permits and licenses and the ultimate production of reserves.
c) There is not always a correlation between expenditures and results.
d) The underlying value of the reserves (which represents a major component of the economic worth of a company) cannot be valued reliably enough to be recorded on the balance sheet.
e) The discovery of new reserves, which cannot be valued reliably enough to be recorded as income, is a major future income-earning event.
f) High costs and risks often result in joint operations.

Taken from: (Misund, Asche et al. 2008)

Additional disclosure requirement specific for the oil and gas industry has been developed to cope with this problem, as firms also can choose between two accounting measures: Full costs (FC) and successful efforts (SE)(Quirin, Berry et al. 2000). The Standard Financial Accounting Standard (SFAS) no. 69 states what additional information oil companies has to publish(Misund, Asche et al. 2008). Several studies (Bryant (2003), Bandyopadhyay (1994)) show that the market reacts differently according to what accounting measure is used as it can have different results for book equity and net income. So what do analysts base their assumptions and valuations on, and how effective is the use of common financial valuation tools?

Osmundsen and Asche et al (2005) studied the link between RoACE (Return on Average Capital Employed) and other market based multiples to stock market valuation for international oil companies. They found EBITDA (Earnings Before Interests, Taxes, Depreciation and Amortization) to be less relevant considering the vastly different tax rates. RoACE, unit cost, reserve placement rate, production growth and proven reserves are used by financial analysts and force companies to balance between short- and long term goals(Osmundsen, Asche et al. 2005). However, research does not support a positive correlation between market multiples and RoACE and also states problems with assessing the true economic results from the accounting information given by upstream oil and gas companies.

The weak link between accounting information is not undisputed, as Harris and Ohlson (1987) proved a significant link between book value and shareholder returns. In addition Quirin et. al.(2001), Berry and Wright (2001) and Bryant (2003) showed that accounting information is relevant for US oil companies. The dominant view however, is that historical cost accounting can't be accurately used to determine a firm's financial performance (Misund, Osmundsen et al. 2005).

Chua and Woodward (1994) found proven reserves to have a positive correlation with stock price for US oil companies in the 1980's (Osmundsen, Asche et al. 2005). However, McCormack and Vytheeswaran (1998) argue for measurement errors for proven reserves, as well as problems with proven reserves stated in current oil prices. They also suggest larger companies are more conservative in reporting new oil fields and reserves. Furthermore, asymmetric information is a problem as "bad news is quickly reflected in the reserve figures whereas good news takes more time to be accounted for"(Vytheeswaran 1998; Osmundsen, Asche et al. 2005).

To supplement, Antill and Arnott (2002) explained that oil companies often have legacy assets with low book values that still generates heavy cash flow. Misund and Ache et al.

(2008) explains this as errors in the unit-of-production depreciation method, as assets is depreciated too fast.

This can be an indication of some oil and gas companies being underprized based on low book values due to the industry specific characteristics. In addition, research done by Osmundsen and Asche et al. (2005) suggest that international oil and gas companies have operated with low price assumptions and "been slow to update price expectations" after oil prices reached a low of 10 dollars per barrel in 1998(Osmundsen, Asche et al. 2005). Low book values and low internal price assumptions for investments means a potential huge upside in terms of market valuation, especially with high and rising oil prices.

3.2 Private versus government owned firms

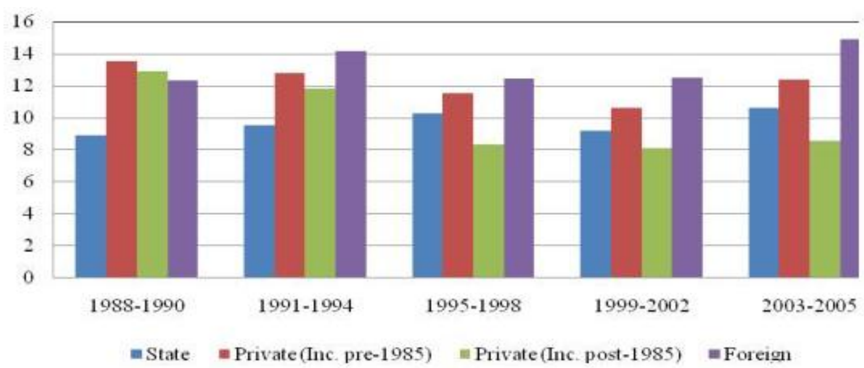
Robert Pirog (2007) reported on the role of national oil companies in the market. He stated that national oil companies and privately owned companies might have different objectives and agendas. Maximizing shareholder value is the focus for privately held international oil companies, and that entails organizing production so that profit is made both in current time and in the future. Reserve placement and making investments are necessary to ensure the company stays competitive in the long run.

State owned companies are subject to the various objectives of the national government and might not follow the traditional shareholder value maximization model. Wealth distribution, jobs programs, economic development, energy security and foreign policy are some known alternative objectives of today's state owned oil companies. The degree of commercial oriented strategies varies, Statoil of Norway and Chavez's tight grip on Venezuelan oil companies are at opposite sides of the spectrum (Pirog 2007). When focus is driven away from maximizing shareholder value and instead on short term cash profits to the local government or subsidizing local gas prices (loss of potential profits) the difference between state- and privately owned companies becomes clear.

The difference was illustrated by Eller, Hartley and Medlock (2007) where they found privately owned international oil companies to be more efficient than its national owned counterparts. The efficiency ranking was based on a model with a score 0-1, where 1.0 was the highest. The five largest privately owned oil companies had a score of 0.76 while the average for the national oil companies was 0.27. Subsidized sales and wealth distribution were found to be correlated factors as adjusting for vertical integration and government share of profits could explain the lack of efficiency for some national companies (Pirog 2007).

Furthermore, Ann Myers Jaffe (2007) showed the employment for each one million barrels of oil equivalents produced to vary distinctly more for national oil companies than privately owned. For instance; Petrochina had 257 employees while Exxon Mobil had 19!(Pirog 2007). This goes along with Eller, Hartley and Medlock (2007) in suggesting cost minimization and efficiency are generally not emphasized in national- compared to privately owned companies.

Figure 12: Average Return on Assets by Ownership Group



Alfaro and Chari (2009) researched Indian firms by ownership category. Results show that state owned companies have historically lower rate of return on assets. *Taken from:* (Alfaro and Chari 2009)

3.2.1 Hypothesis 1

Theory on the effect of government ownership leads to the following hypothesis:

H1: There is a negative relationship between government ownership and Tobin's q.

3.3 Blockholding and firm value

Shleifer and Vishny (1997) argue that the presence of a large blockholder and legal protection of investors are important for good corporate governance. Large blockholders have incentives and the power to intervene if firm value drops, as evident by Kang and Shivdasani (1995) in a study of Japanese firms. Managers of poorly performing firms were more likely to lose their jobs in the presence of a large blockholder.

However, Konijn, Kraussl and Lucas (2009) in their paper "Blockholder Dispersion and Firm Value" found a consistently negative relation between blockholder dispersion and Tobin's Q. This indicates that a high concentration of blockholding negatively effects firm value. They found the negative impact to be larger the more dispersed, so concentrated ownership is preferred on average.

In such cases where blockholding has a negative effect on firm value, Maury and Pajuste (2005) states that concentrated versus dispersed block ownership is affected by two countervailing forces. Blockholders can "act" like a single dominant blockholder by forming coalitions and share private benefits. But in reality, only a few might be able and willing to do so (Konijn 2009).

It is important to note that even Konijn, Kraussl and Lucas (2009) point out that empirical evidence of the impact of multiple blockholders and firm value is lacking. Earle (2004) also says previous research has showed mixed results, as Demetz and Lehn (1985) didn't find any effect of ownership concentration on accounting profits for US firms. Furthermore, McConnel and Servaes (1990) concluded no effect on Tobin's q but a positive relationship between ownership by corporate insiders and institutional investors (Earle, Kucsera et al. 2004).

Thomsen (2005) found a negative link between blockholder ownership and firm value for European firms. Increase in blockholding was generally associated with decreasing dividends, which again has a negative correlation with firm value. This was also the case in US companies. Thomsen concluded that conflicts of interest between minority investors and large blockholders are evident in the EU and the US, but to a larger degree in Europe(Thomsen 2005).

In corporate governance theory, the existence of large blockholders can have a positive effect by adding extra monitoring with both incentives and power to intervene in company affairs. Previous research has emphasized the role of good corporate governance practices as a whole (rather than just blockholding) in connection with firm value. Black, Yang and Kim (2003) studied the effect for 526 Korean firms and found a strong positive correlation between a devised corporate governance index and Tobin's Q.

Likewise, Black (2001) found a strong correlation between corporate governance and market value of 21 Russian firms. Black also argues for another interesting point, that the effects are stronger in developing countries because of weaker rules and lack of standard corporate governance codes. This is supported by Durney and Kim (2002) and La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1998) that found the agency problem to be larger in emerging economies lacking proper governance mechanisms (Black 2001; Black 2003; Lemmon and Lins 2003).
This argument will be used in support of the hypothesis about country risk (3.3). Firm operating out of high risk countries are more likely to have weaker corporate governance measures and in turn lower market value. The level of blockholding ownership is expected to have a negative impact of firm value as it leaves less protection to minority investors.

3.3.1 Hypothesis 2

Based on the theory presented, the following hypothesis is made:

H2: There is a negative relationship between total blockholding and Tobin's q.

3.4 Country Risk

It is common practice to add a "country risk premium" to the discount rate for investments in emerging markets. The risk refers to e.g. investment protection and the perceived stability of the country. This is not only true for emerging markets but also for developed countries and regions throughout the world. The recent downgrade of US credit rating is a perfect example that no country is immune to risk (Goldfarb 2011). Although the US isn't associated with high corruption, low investor protection or political instability those types of risk variables are associated with many countries and there many agencies and corporations that publish country risk ratings. Sabali (2008) argues that this practice is flawed:

a) not all projects and/or companies are equally exposed to country risk in every country;
b) usually the risk premium is simplistically equated to the risk of default of the developing country government;
c) the impact of country risk over time is not necessarily geometrical and;
d) when incorporating a country risk premium the implicit assumption is made that country risk is fully systematic
e) *Taken from:* (Sabali 2008)

Sabali (2008) and Wang (2009) both conclude that setting an accurate country risk score, and knowing which factors to weigh differently, are very challenging and require extensive in depth knowledge about the country.

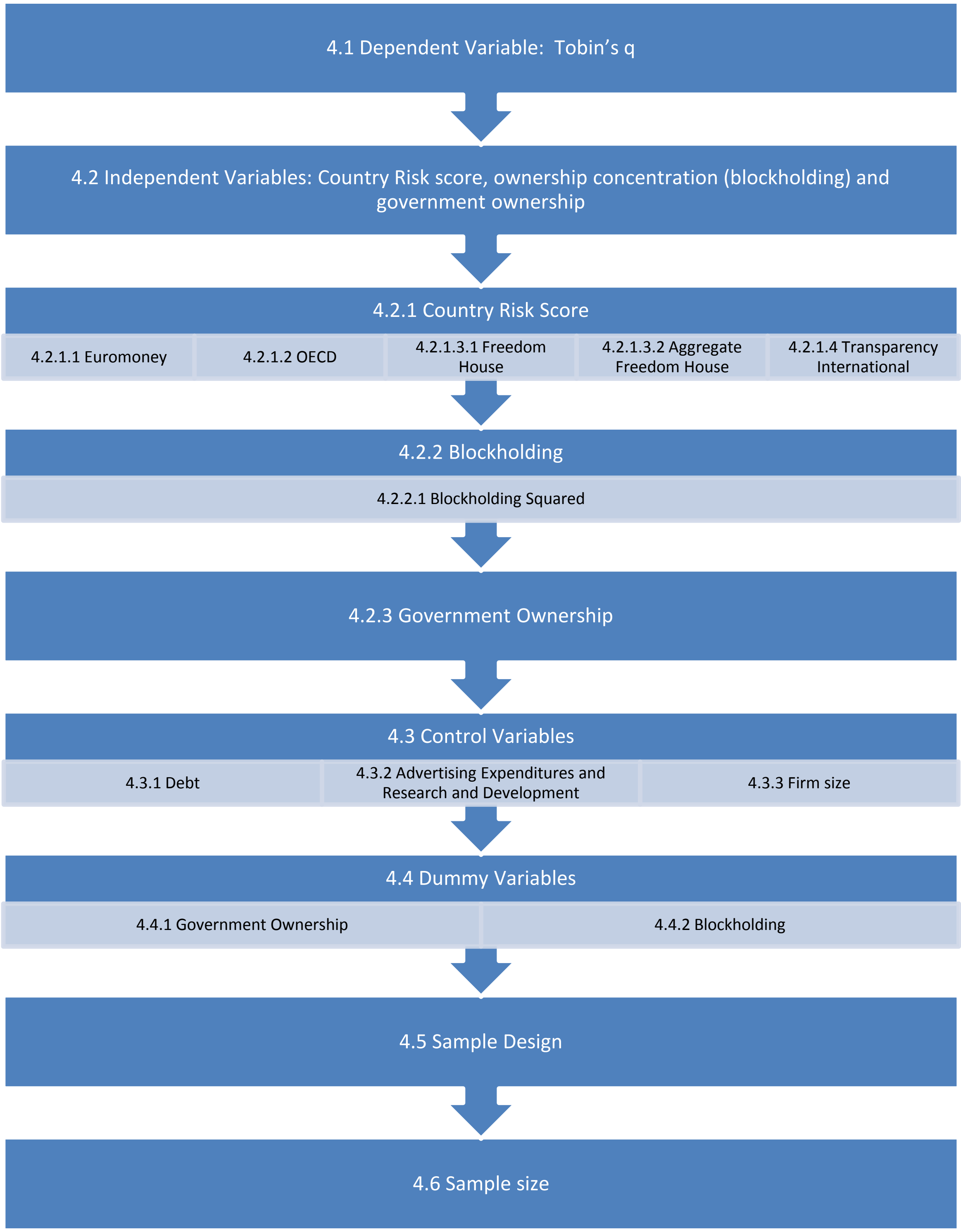
3.4.1 Hypothesis 3

The information about country risk leads to the following hypothesis:

H3: There is a negative relationship between country risk and Tobin's q.

4.0 Research Design

A quantitative method of research will be used in collecting financial information from the world's largest publicly traded oil and gas companies. Both primary- and secondary data will be used. This section will present the variables used in the study as well as sample design and sample size.



4.1 Dependent Variable:

Equation 7 Approximate Tobin's q (Lindenberg and Ross 1981)

$$\frac{\boldsymbol{MVE\ (Shareprice * shares\ outstanding) + Preferred\ Stock + Short\ Term\ Liabilities - Short\ Term\ Assets}}{\boldsymbol{Book\ Value\ of\ Total\ Assets}}$$

Source (Chung and Pruitt 1994)

Using Datastream, the following definitions for the components of Tobin's q were used and its mnemonic code:

- MVE: Market Capitalization- WC 08001 (Market price year end* common shares outstanding)
- Preferred Stock: Preferred Stock- WC 03451
- Short Term Liabilities: Current Liabilities Total- WC 03101 (Debt or other obligations expected to be paid within a year)
- Short Term Assets: Current Assets Total WC02201 (cash and other assets that are reasonably expected to be realized in cash, sold or consumed within one year or one operating cycle)
- Total Assets: Total Assets WC 02999

Source: (Reuters 2010)

4.2 Independent Variables:

Country Risk score, ownership concentration (blockholding) and government ownership.

4.2.1 Country Risk Score

Because country risk is difficult to measure and the weighting factors varies greatly from political-to country risk, five common country risk scores will be used in the study. The purpose is to possible identifying a country risk score that best fits the model and yields the highest correlation with Tobin's q.

4.2.1.1 Euromoney

Euromoneys Country Risk rating monitors political and economic stability in countries of the world. The purpose is according to Euromoney to measure investment risk such as "default on bond, loosing direct investment, global business relations" etc. (Euromoney 2012). A qualitative study is used where specific country experts and insiders are used to provide risk assessments (given 70% weighting) with three quantitative values (30%). The following factors are included in the analysis with weighting in parenthesis:

- Political Risk (30%)
- Economic performance/projections (30%)
- Structural assessments (10%)
- Debt indicators (10%)
- Credit ratings (10%)
- Access to bank finance (5%)
- Access to capital markets (5%)

Source: (Euromoney 2012).

Countries are then given a score on a nominal scale of 1-100, where 1-High Risk and 100=Low Risk.

4.2.1.2 OECD

Organization for Economic Co-operation and Development (OECD) issues an annual country risk classification published since 1999. It states on the OECD web page that the country risk is: "composed of transfer and convertibility risk (*i.e.* the risk a government imposes capital or exchange controls that prevent an entity from converting local currency into foreign currency and/or transferring funds to creditors located outside the country) and cases of force majeure (*e.g.* war, expropriation, revolution, civil disturbance, floods, earthquakes)"(OECD 2012).

A group of experts meets at least once a year to discuss recent developments and assess risk classification. They use the quantitative Country Risk Assessment Model (CRAM) consistent of "the payment experience of the participants, the financial situation and the economic situation" and then perform a qualitative check of the CRAM results filling in political risk and other factors the model might have missed (OECD 2012).

The scores ranges from 0-7 where 0=low risk and 7= high risk.

4.2.1.3.1 Freedom House

Freedom of the World is a yearly publication (since1972) from Freedom House and offers a comparative assessment of global political rights and civil liberties.

Each country is given a score from 1-7, that has two components: Political rights and civil liberties. They are based on an aggregate score with a 40% weighting for political rights and 60% for civil liberties.

The scores ranges from 1-7, where 1= Free and 7= Not Free.

Source: (FreedomHouse 2012).

4.1.1.3.2 Aggregate Freedom House

In order to further separate the country scores, the subcategories that provide the basis for the Freedom House index are added to give an aggregate country score ranging from 0-100.

0=Not free and 100=Free

Table 1 Aggregate Freedom House Components

- Electoral Process (15)
- Political Pluralism and Participation(15)
- Functioning of Government (10)
- Freedom of Expression and Belief(20)
- Associational and Organizational Rights(10)
- Rule of Law(15)
- Personal Autonomy and Individual Rights(15)

The table shows the subcategory scores for the Freedom in the World country ratings. Maximum points are stated in parenthesis, adding up to a total max score of 100. Source:(House 2011). *Made by author*

4.2.1.4 Transparency International

Transparency International (TI) publishes an annual corruption perception index, the 2011 report is used in this study. The report, according to Transparency International webpage: "ranks countries/territories based on how corrupt their public sector is perceived to be. It is a composite index, a combination of polls, drawing on corruption-related data collected by a variety of reputable institutions. The CPI reflects the views of observers from around the world, including experts living and working in the countries/territories evaluated (TransparencyInternational 2011).

In more detail, the scores are based on corruption in the public sector, involving civil servants, politicians or public officials. The data source according to TI involves “questions relating to the abuse of public power and focus on: bribery of public officials, kickbacks in public procurement, embezzlement of public funds, and on questions that probe the strength and effectiveness of anti-corruption efforts in the public sector”(TransparencyInternational 2011).

The scores ranges from 0-10, where 0=high perceived corruption and 10=low perceived corruption

4.2.2 Blockholding

Blockholding is a measure of ownership concentration. The three largest shareholders based on percentage of total shares in addition to any national government ownership are included.

4.2.2.1 Squaring the Blockholding Variable

Blockholding is not expected to be a linear function, as several researches point out that it’s beneficial up to a point and then it will have negative effects(Fama and Jensen 1983; Morck 1988; Shleifer and Vishny 1997). The solution is to add a test variable, “Blockholding Squared” in addition to blockholding to account for any curve effects.

4.2.3 Government Ownership

Government ownership is defined to be any ownership of common stock held by the national government of oil companies based in the country.

4.3 Control Variables

In order to safeguard against other effects on the relationship between Tobin's q and the independent variables, standard control variables known to influence Tobin's q are included in the analysis. Morck and Yeung (1991), Dowell (2000), Black (2003) and Pacheco-de-Almeida et al. (2008) identify capital structure, intangibles like research & development and advertising expenditures and firm size.

4.3.1 Debt

Capital structure refers to the way a firm is financed and leverage (debt) is often used as a measure. In this research, long term debt over total assets is used. The ratio is an indicator how the companies finance their operations, with debt or equity. With higher leverage comes higher risk, so to correct for any bias in market value due to a high/low debt structure the control variable is applied.

4.3.2 Advertising Expenditures and Research and Development

Advertising expenditure is not included because it's less relevant in the oil and gas industry. Pacheco-de-Almeida et al. (2008) found it to be statistically insignificant when testing the correlation between project speed and Tobin's q in the industry. Advertising can affect a firm's reputation and goodwill, and thus its market value. But in order to keep a large sample size and not filter out firms with inaccurate or incomplete advertising spending, it's left out of the equation.

The same argument is made for not including research and development (R&D). Different accounting- and reporting standards leaves questions of what companies chose to include, and in addition R&D was not available for several companies. Combined with the fact that R&D expenditures has fallen for most major oil companies since the 1980's due to a focus of acquiring new assets instead of building or developing, it is chosen to be left out of the equation as well (Neal, Bell et al. 2006).

4.3.3 Firm size

"With size comes also power", and is the reason many analysts argue for the importance of firm size in the oil industry. Osmundsen, Asche et al (2005) identify tax shifting and cream-skimming strategies in addition to "larger growth potential in their portfolios" and beneficial "reputational effect on governments' discretionary licensing decisions". This is because "large and prospective operatorship, which also are skill and resource demanding" are often favored the biggest firms (Osmundsen, Asche et al. 2005). Smaller companies however, might be more flexible, experience lower coordination costs and benefit from specialization and focus strategies(Osmundsen, Asche et al. 2005).

Shalit and Sankar (1977) point out the measurement problem as there is no ideal way of measuring firm size. They argue it depends on the purpose of the study and identify five commonly used measures: sales, total assets, employees, stockholders' equity and market value(Shalit and Sankar 1977).

This study is based on firms in the oil and gas industry so other measures such as reserve value, reserve size and oil and gas production are also available. In order to avoid previously discussed problems with published oil and gas reserves as well as challenges in interpreting other measures such as employees (regular employees vs. temps, consultants etc.), "annual oil and gas production" is chosen as proxy for firm size. This goes along with Osmundsen, Asche et al. (2005) and gives clear and objective data to be used in the calculations.

4.4. Dummy Variables

A dummy variable is introduced in order to better check for the effect on Tobin's q and government ownership % and blockholding. Using a dummy variable is a common statistical procedure (Suits 1957).

4.4.1 Government Ownership Dummy

Companies will receive a score of 1 or 0 depending if the national government owns any share in the company. 0= no government, 1= government. The objective in this case is to find out the effect of government ownership presence in international oil companies. The argument is that any government ownership share, even a very small one is expected to have a big impact on the governance and regulatory environment of the firm.

4.4.2. Blockholding Dummy

Following Thomsen and Pedersen et al. (2006) a dummy variable of total company blockholding will also be introduced. Along with the Blockholding Squared variable it is used to check for any effects of high or low blockholding. Companies with low blockholder ownership (<20%)=0 and high blockholder ownership (>20%) =1. Definitions of a controlling shareholder vary, but 20% is a common legal limit.

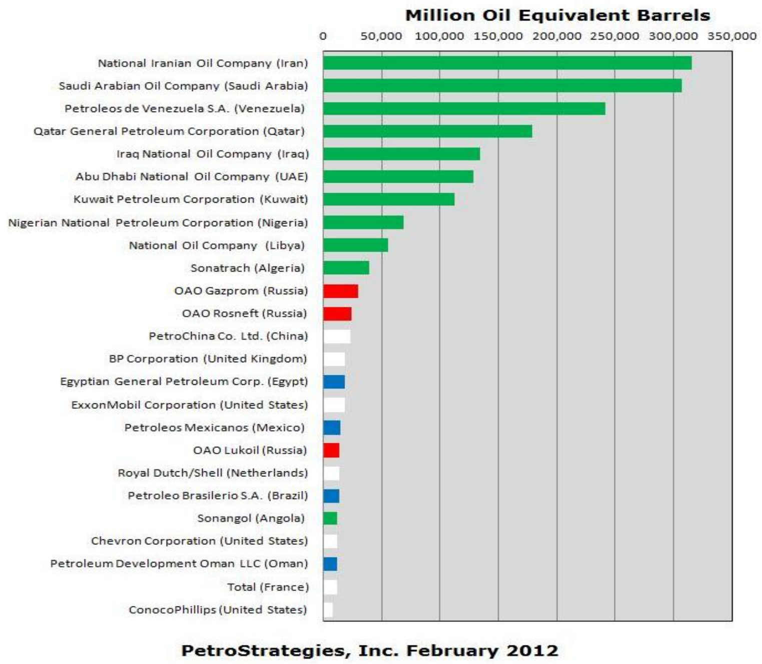
4.5 Sample Design

Sample:" Integrated Oil and Gas" and Exploration and Production" companies.

The world's largest oil companies in terms of proven reserves aren't stock listed (figure 13). In order to ensure research validity and no information parity, only stock listed companies are included in the dataset. Stock listed firms are required to publish financial information needed for the variables and control variables in this study. Only "integrated oil and gas" and "exploration and production" companies are chosen (provided by Datastream) as opposed to including "oil equipment and services" companies. Although a few of them broke into the top 50 list in terms of market value (Schlumberger, National Oilwell Varco and Halliburton. Source: Datastream), they are a supplementary service provider to the oil and gas producers and are not affected in the same way by the independent variables in this study.

All data is based on year end 2011 accounting numbers.

Figure 13: World's Largest Oil and Gas Companies

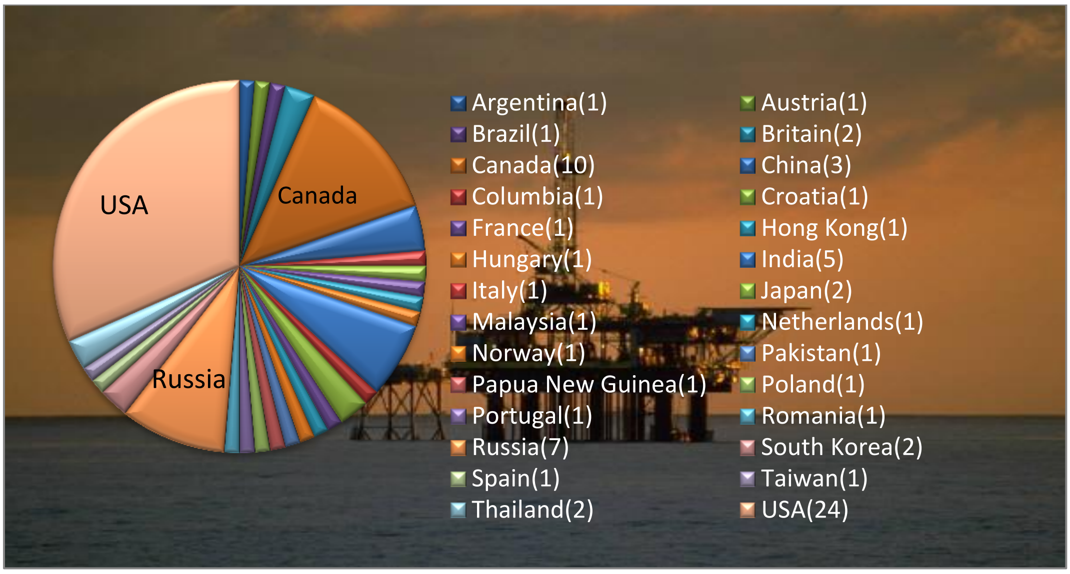


The figure shows the largest oil companies in the world based on reserves (BOE). *Taken from:* (PetroStrategies 2012)

4.6 Sample size

The top 100 stock listed O&G and E&P companies in terms of market value provided by Datastream are used in the study. To ensure homogeneity, annual production of BOE were used to filter out companies dealing with refining and processing of oil products and not producing and drilling for oil. Likewise, the Datastream results showed some split companies e.g. Petrochina 'A' and Petrochina 'H' and upon investigation of the Tobin's q calculations they were based on the same financial numbers and sorted out to one company. Total companies based out of home countries are shown in figure 14.

Figure 14: Sample Companies

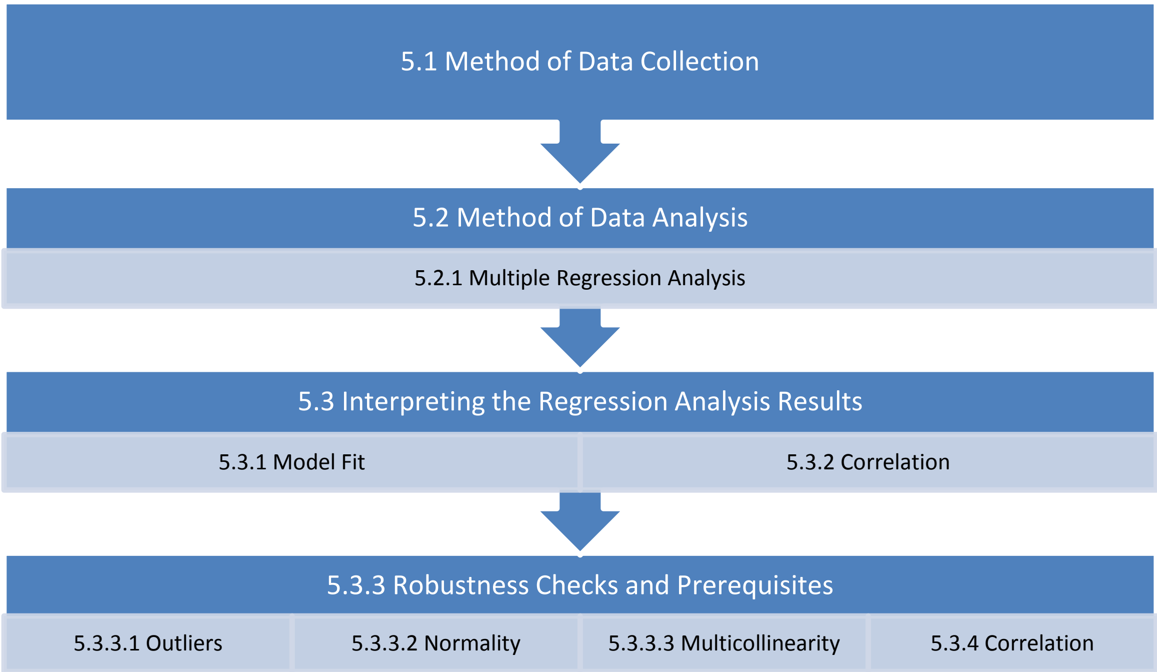


The figure shows the distribution of oil companies by home country base used in the study. The number of companies are in parenthesis. USA, Canada and Russia are heavily represented on the top 100 list. *Table made by author.*

To ensure the sample size is large enough, the method introduced by Tabchnick and Fidell of minimum 15-20 sample cases per independent variable is used (Tabchnick and Fidell 2001). With 76 companies and three independent variables, the sample size is well above that ratio.

5.0 Method

This section states the method of data collection as well as data analysis. To get a better understanding of how the data will be analyzed and processed, a brief presentation of regression analysis (5.2.1) as well as its interpretation methods (5.3) and robustness checks and prerequisites (5.3.3) are presented.



5.1 Method of Data Collection

Thomson Reuters Datastream 5.1 provides a database to collect financial information used to compute Tobin's q. Annual production in barrels of oil equivalents (BOE) was gathered from annual company reports and converted to BOE if reported in other forms*. The challenge was especially government ownership % and major shareholders as Bloomberg and other secondary data sources only lists major institutional shareholders and those were often deviant from the numbers published by the companies themselves. As a result, they were only used as reference points. The data used for the government ownership and blockholders in the study are primary data collected by looking up company websites, annual reports, proxy statements and SEC filings for all 100 companies.

5.2.1 Multiple Regression Analysis

The purpose of this study is to find any correlation between Tobin's q (4.1) and government ownership, blockholding and country risk (4.2). The control variables (4.3) are used to check for other influences on the dependent variable. The statistical tool most used to discover any relationships between variables are regression analysis (Draper and Smith 1998).

Of the many forms of regression analysis, multiple regression will be used because of its ability to accommodate many different explanatory variables and control for other factors that might simultaneously affect the independent variable(Wooldridge 2009).

Equation 8 Standard Regression Formula

$$y = \beta 0 + \beta 1x1 + \beta 2x2 + \beta 3x3 + \ldots + \beta kxk + u$$

Formula shows model for multiple regression analysis with *K* independent variables. *Source*: (Wooldridge 2009).

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*Some companies report production in million tons or cubic feet of gas etc.

5.3 Interpreting the Regression Analysis Results

5.3.1 Model Fit: $\boldsymbol{R^2}$

As a measurement of model fit or how well the independent variables are able to explain and predict the Tobin's q value in the regression equation the R^2 value is used.

Equation 9 $\boldsymbol{R^2}$

$$R^2 = \frac{ESS}{TSS} = 1 - \frac{RSS}{TSS}$$

ESS (Explained Sum of Squares) is the sum of squares explained by the regression equation while RSS (Residual Sum of Squares) is the sum not explained. TSS (Total Sum of Squares) is the total variation in Y and the squared sum of all the deviations for all observations of Y and $\bar{Y}$ (Zady 2009).

The values of R^2 are positive and ranges from $0 \leq R^2 \leq 1$. Values close to 1 means that the regression equation is a good fit and explains much of the variance, while close to 0 indicates that the equation is not able to predict the dependent variable (Brooks 2008).

Because R^2 will increase as more variables are included, one can also look at R^2adjusted to ensure that the number of independent variables are significant.

5.3.2 Correlation: P-Values and Beta Coefficients

The regression equation based in equation 8 will look like this:

Equation 10 Research's Regression Formula

Tobin's q = β0 + β1*Government Ownership* + β2*Blocholding* + β3*Country Risk + u* where,

β 0 is the intercept and β1, β2, and β3 represents the coefficients of the independent variables. The coefficients will also represent the strength of the relationship, ranging from -1 to 1. A negative value indicates an inverse relationship e.g. the higher Tobin's q score the lower government ownership stake in the company. The intercept ,β 0, states where the regression equation intersect with the y-axis. *u* represents the error term or disturbance that also affects the dependent variable. There will always be factors not included no matter how many explanatory variables are used(Wooldridge 2009).

The P-values ranges from 0-1 and states the probability of a getting a more extreme value than the one observed. It's basically the significance of the results, in this case the probability that the beta coefficients from the regression equation holds true. In general, p-values of 0,05 or less are considered statistically significant. This would indicate a 95% or higher certainty that the effects of the beta coefficients are true.

5.3.3 Robustness Checks and Prerequisites

5.3.3.1 Outliers: Z-scores.

Since regression analysis is very sensitive to outliers, the Tobin's q scores are standardized and its subsequent z-scores are calculated. This will identify any abnormal scores significantly different from the sample mean that might skew the overall results. According to standard statistical literature procedure, any Z scores larger than |3|will be excluded(Lani 2009).

5.3.3.2 Normality

SPSS Q-Q plots are used to check if the dependent variable (Tobin's q) is normally distributed. If not, the data is transformed using the natural logarithm (ln(x)). This will ensure the observations follow a more straight line, essential since a linear regression model is used.

5.3.3.3 Multicollinearity

SPSS Variance Inflation Factor (VIF) is a measure of multicollinearity. Too high values can make it difficult to attribute causation to the different independent variables as they are highly correlated. In general, a VIF score ≥ 10 indicates problems with multicollinearity (Wenstøp and Bagøien 2002).

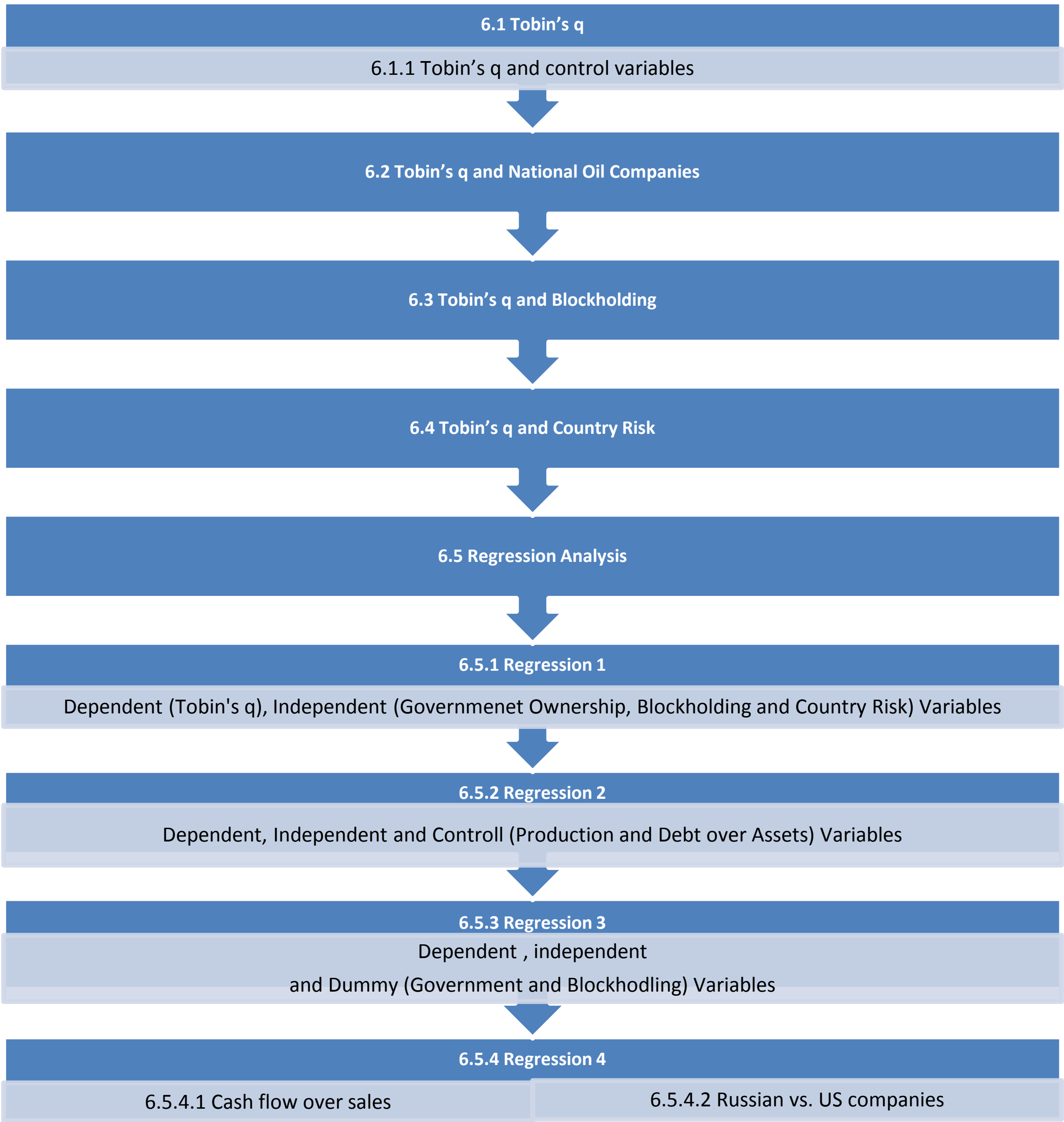
5.3.4 Correlation

Correlation between two variables is found using bivariate correlation in SPSS. Like testing for correlation in the regression model (5.3.2), beta coefficients and p-values are used to assess the strength of the relationships.

Bivariate correlations tests will be used to assess Hypothesis 1, 2 and 3.

6.0 Empirical Analysis

The empirical results will be presented along with a link to theory and previous research. A more general discussion about the results has a whole is made in chapter 7. The variables in the study are analyzed separately at first in connection with Tobin's q before the results are presented in the four different regression equations. Most notably, Regression 4 was not originally intended to be part of the study but was done in order to test for additional factors that could explain the variance in the previous regression equations.



6.1 Tobin's q

The original sample of the top 100 E&P and Integrated oil and gas companies based on market value 13.04.2012 was filtered to match the criteria for this study*. As a result, total sample size was reduced to 76 companies with the following distribution for Tobin's q:

Table 2 Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Tobin's q	76	,19	2,17	,8850	,50155
Valid N (listwise)	76				

	All Companies n=76	National** n=26	Private n=50
Average Tobin's q	0,885	0,876	0,890

Based on theory (2.4.2) it becomes clear from table 2 that the oil companies in the sample are generally undervalued with average Tobin's q < 1.

*Main factors: Non-producing companies (not directly involved in oil or gas production in 2011, chemicals, oil refining etc.) and split companies in the DataStream output. (e.g. Royal Dutch Shell A and Royal Dutch Shell B with different market value, but same values for the components of Tobin's q. In addition, missing variables for government ownership and major shareholders due to non disclosure, e.g in Russia based Surgutneftegaz reduced the sample size. Lastly, according to the methods in section 5.7.3, three companies were sorted out due to high z-scores. List of companies in the study can be seen in Appendix 2.

**National oil companies are based on the dummy variable (4.4.1) defined as any company where the national government owns a share of the outstanding stock

As explained in previous research (3.1), valuating oil companies are difficult because of unique operating characteristics, reserve measurement errors and different accounting standards used to mention a few. Average Tobin's q of 0,885 for the 76 oil and gas companies supports the previous research and theory that oil companies are trading at a discount. Recalling the NYSE Arca Oil- and S&P 500 indexes (1.3) suggesting the oil stock is undervalued, it seems to be in accordance with the average Tobin's q ratio in this study. It's important to note that a relative conclusion on undervaluation cannot be made since there are no data on the simplified q score for other industries. What can be concluded is based on Tobin's q theory of a q score less than 1, the companies are priced below actual value of assets in the market

6.1.1 Tobin's q and control variables

The control variable long term debt over total assets (4.3.1) had no significant effect* on Tobin's q. This suggests that how the companies are funded, with debt or equity have little impact on their market valuations. It's notable that the majority of the companies had low debt to assets ratios (<0,2) rendering the difference between them marginal. The coefficient was however negative, although at a very weak level (-0,03), but consistent with the theory of inverse relationship with market value.

Likewise, although significant at the 0,05 level; production (4.3.3) had low correlation score and the effects did not change qualitatively if included in the regression analysis. The relationship was found to be negative (-0,236) between production and Tobin's q, somewhat surprising that increasing BOE production was actually "punished" in the market. This is more likely to be attributed to the irregularity and inconsistency of the results with low significance rather than an actual trend. However, since production was used as a proxy for firm size and it can suggest that the market prefers smaller companies with more flexibility and less fixed costs in terms of oil rigs and other heavy equipment. Those are some of the advantages of smaller companies outlined by Osmundsen, Asche et al (2005) in section 4.3.3.

*Correlation tables can be found in appendix 8

6.2 Tobin's q and National Oil Companies

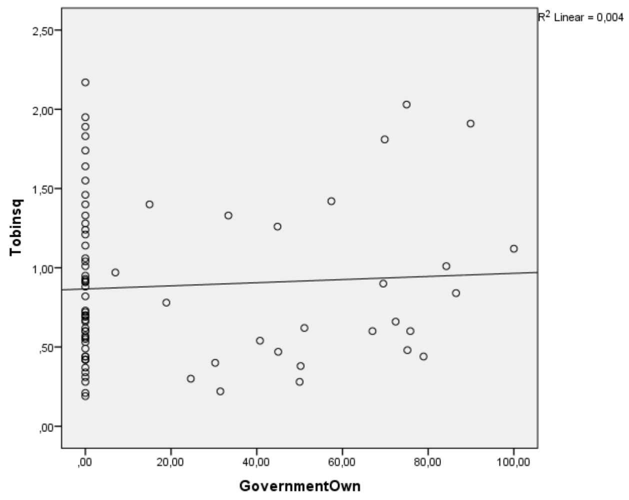
A positive (but weak) correlation between government ownership and Tobin's q were observed for the sample. Hence the market responds positively to higher degree of government control. But the results were not statistically strong, as can be seen from table 3 below with insignificant P-values and Pearson Correlation.

Table 3 Correlations for Tobin's q and Government Ownership

		Tobinsq	*Gov't ownership*
Tobin's q	*Pearson Correlation*	*1*	*,060*
	Sig. (2-tailed)		*,609*
	N	*76*	*76*
Gov't ownership	*Pearson Correlation*	*,060*	*1*
	Sig. (2-tailed)	*,609*	
	N	*76*	*76*

The weak relationship is also reflected in the scatter dot graph (figure 15) were the results are widely spread and no particular pattern can be seen between the variables. This is improved by eliminating companies with 0% government ownership share as it amplifies the effect of degree of government ownership in the statistical output (appendix 5). The correlation is stronger with 0,247 and closer to being significant.

Figure 15: Scatter Dot for Government Ownership



The percentage of government owned companies with Tobin's q score below the mean is 54% while 56% for private companies indicating a slight bottom heavy sample. Recalling the average Tobin's q scores from table 2 (national= 0,876, private= 0,890), the negative relationship becomes evident by running the analysis with the dummy variable (4.4.1). It yielded an even weaker relationship between the variables but with a negative coefficient of -0,013 (appendix 7). This negative relationship with market value was the only finding consistent with previous research (3.4) on government owned oil companies.

Robert Pirog (2007) stated the fundamental differences of national versus private owned companies, highlighted by the tendency of national governed companies to focus on social benefits and other objectives rather than maximizing shareholder value. The implications of this was showed in studies by Eller, Hartley and Medlock (2007) and Jaffe (2007) where national owned oil and gas companies turned out to be significantly less efficient than privately owned. However, this was not reflected to have any impact on firm value for the companies in this study. The dummy variable gave the "right" indication (negative) of the direction of the relationship but at an insignificant level.

The lack of support with previous research prompts questions about the companies in the sample. Looking at specific results, it's interesting to see national companies like Ecopetrol (Columbia), Oil&Gas Development (Pakistan) and Petronas (Malaysia) all have Tobin's q score of almost 2 standard deviations above the mean. Meanwhile, Statoil (Norway) is at the other end with a score of 0,61. This will be further explored in section 7.1.

Conclusion: Reject Hypothesis 3

H3: There is a negative relationship between government ownership and Tobin's q

6.3 Tobin's q and Blockholding

The relationship between blockholding and firm value came out stronger than with government ownership (table 4), although the P-values and correlation gives no reason to conclude in a significant relationship.

Table 4 Correlations for Tobin's q and Blockholding

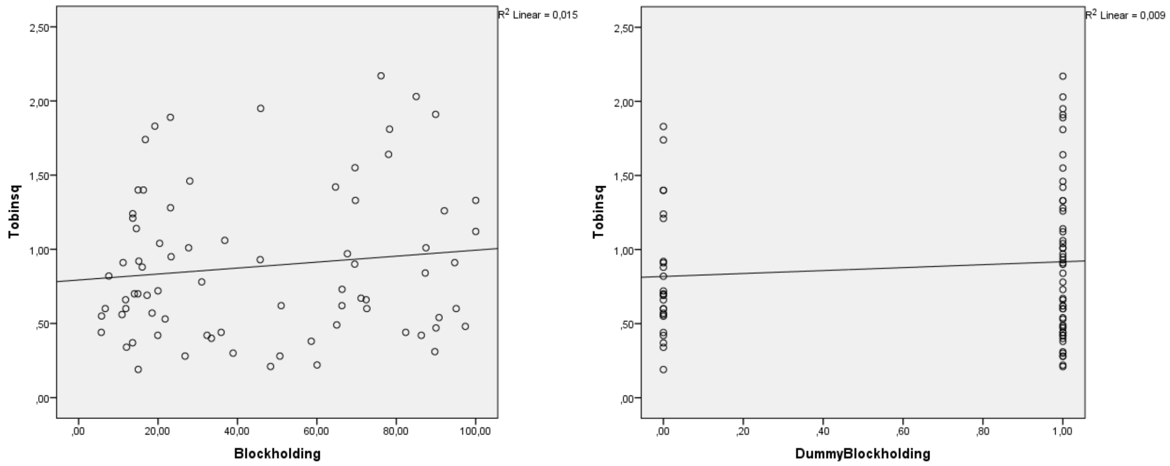
		Tobinsq	Blockholding
Tobinsq	Pearson Correlation	1	,124
	Sig. (2-tailed)		,285
	N	76	76
Block-holding	Pearson Correlation	,124	1
	Sig. (2-tailed)	,285	
	N	76	76

Previous research showed various results with blockholding ownership (3.2). However, a consensus seems to be that the presence of large blockholders is positive up to a certain point (Fama and Jensen (1983), Morck (1988) and Scleifer and Vishny (1997)). Get too much control and it increases the risk that they seek after their own interests and not that of the long term interests of the firm or minority shareholders.

Interpreting the results for this study in terms of previous research leaves questions about the effect of concentrated blockholding. Since the coefficient is positive at ,124 (table 4) it means that larger blockholder ownership is associated with higher firm value (Tobin's q). By separating into high and low blockholding using the dummy variable (4.4.2), initial increasing benefits of blockholding and later diminishing effects were expected to show.

But the coefficient was still positive (0,094) although both weaker in value and significance (see appendix 7). Looking at the scatter dot below (figure 16) the fitted line is slightly less steep, but still indicates that higher blockholding ownership results in higher Tobin's q.

Figure 16: Scatter Dot for Blockholding and Dummy Blockholding



Insignificant values along with a slight positive relationship with blockholding and Tobin's q leads to rejected the hypothesis.

Conclusion: Reject Hypothesis 2

H2: There is a negative relationship between total blockholding and Tobin's q.

6.4 Tobin's q and Country Risk

Correlation tests were done with the OECD-, Freedom House-, Aggregated Freedom House-, Euromoney- and Transparency International country risk scores, summarized in table 5 below. None of the different country risk ratings were able to explain with any statistical significance the variance in firm value.

Table 5 Correlations for Tobin's q and Country Risk

		OECD	Euromoney	Freedom House	Agg.Freedom House	Transparency International
Tobin's q	Pearson Correlation	0,204	-0,095	-0,029	0,023	-0,045
	Significance (2-tailed)	0,075	0,418	0,802	0,844	0,699
N*		75	75	76	76	75

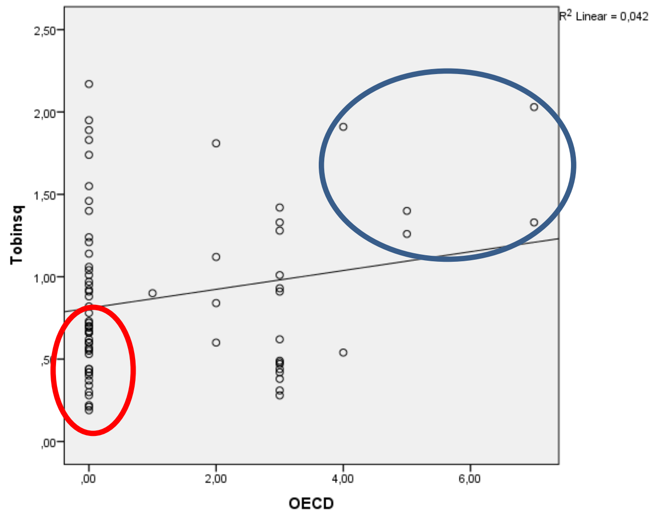
OECD risk ratings gave the strongest relationship, although not in the way expected with a positive correlation of 0,204 at a 92,5% confidence level. This implies higher OECD risk scores (0=low risk, 7= high risk) are associated with higher firm value! However, in order to interpret the result the components and definition of OECD (4.2.1.2) have to be reviewed. According to the OECD website, "High Income OECD countries and other High Income Euro-zone countries is Category 0" and the scores are not to be viewed as "sovereign risk classifications" but mere as "country ceilings"(OECD 2012).

* Sample N varies because of lack of scores for Taiwan and Hong Kong by some rating agencies. However, by excluding the two countries from all the analyses gives no significantly different outputs for correlation or p-value.

The trouble of using the OECD or other risk classifications in connection with valuation is that it's unclear *what* risk is taken into account and how it transcribes to market valuation of companies. That was precisely the point of Sabali (2008) and Wang (2009) that argued for the flaws of country risk with difficulty in knowing which factors to weigh differently and the assumption that country risk is fully systemic (3.4).

By looking at the scatter dot (figure 17) it becomes clear that the majority of the category 0 companies have Tobin's q scores below the sample mean. Combined with the relatively high firm values for some companies (Ecopetrol, Oil & Gas Development, Petronas etc) based out of perceived risky countries, they contribute to the positive correlation between Tobin's q and high country risk factor.

Figure 17: Scatter Dot for Tobin's q and OECD Risk



The graph (figure 16) shows the distribution of Tobin's q ratio and OECD country risk scores. Red circle highlights the large proportion of 0 risk classification with low Tobin's q values. In contrast, the blue circle shows the discrepancy of only high values for companies based out of high risk countries.

As with the other country risk ratings (except for Agg.Freedom House), weak negative correlations are concurrent with the theory of diminishing firm value as country risk increases. The market is expected to demand higher compensation for increased risk and less investment protection in unstable countries. But none of the country risk ratings in this study were able to explain the Tobin's q variance.

Conclusion: Reject Hypothesis 1

H1: There is a negative relationship between country risk and Tobin's q.

6.5 Regression Analysis

It's important to note that neither of the independent variables were found to have a significant correlation with the dependent variable. One can therefore question the relationship between firm value (calculated by an approximate Tobin's q) and government ownership, blockholding and country risk for the world's largest stock listed oil companies in this study. What's left to test is any combined interaction effect they might have (regression 1), the impact of the control variables (regression2) and lastly the dummy variable (regression 3) and other possible factors (regression 4).

6.5.1 Regression 1

The first analysis was performed with the basic variables in the study (4.1 and 4.2). The proxy for country risk was chosen to be OECD based on the highest correlation score. Analyses with the other country ratings were also performed, but did not come out more significant. By also adding the test variable "Blockholding Squared"(4.2.2.1) any curve effects of blockholder concentration would become apparent compared to running the analysis with just the blockolder independent variable. The result of selected output for the regression model is listed in table 6*.
As discussed in earlier section (5.3.3.2), a natural log of Tobin's q was used in order to get a more normal distribution, although it had marginal effects on the regression equation**.

*Output for the entire regression model, including robustness and prerequisite checks are given in appendix 9.
** R^2 increased by 0,001, Regression constant decreased from ,856 to ,251.

Table 6 Regression 1

Model Summary	R	R Square	Adjusted R Square	Std. Error of the Estimate		
	,194[a]	,038	-,017	,59583		
Anova		Sum of Squares	df	Mean Square	F	Sig.
	Regression	,976	4	,244	,687	,603[a]
	Residual	24,851	70	,355		
	Total	25,827	74			
Coefficients		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
	(Constant)	-,271	,211		-1,282	,204
	Blockholding	-,005	,011	-,246	-,420	,676
	BlockholdingSQ	,000	,000	,193	,318	,751
	GovernmentOwn	,000	,003	-,006	-,037	,971
	OECD	,071	,054	,214	1,315	,193

a. Predictors: (Constant), OECD, GovernmentOwn, Blockholding, BlockholdingSQ
b. Dependent Variable: LnTobin

Judging the model fit from the criteria previously stated (5.3), it's easy to conclude the regression equation from Regression 1 does not reflect any relevant relationships between the variables. The R^2 from table 6 indicate the equation covers 3,8% of the variance. This is reflected in the low Beta coefficients where the OECD risk component is the only one close to being relevant with significance of ,193. Adding the test variable Blockholding Squared didn't have any effect either, although Blockholding has a negative coefficient which is consistent with the theory.

The output for Regression 1 did not come unexpected considering the low correlation scores. It rather serves as a confirmation that other factors are at play in explaining the pricing of international oil and gas companies. That fact was established in the opening section (1.1), but the degree of which government ownership, country risk and blockholding influence market valuation was unknown.

6.5.2 Regression 2

The control variables production and debt over assets were included in the regression analysis* to check if they made a significant impact (table 7). The equation now explains 10,8% of the variance but the residual is still far too large to hold any confidence in the results. With Beta and P-values of -,586 and ,504 respectively for debt over assets and ,000 and 0,024 for production, the control variables does not qualitatively change the regression equation.

Table 7 Regression 2

Model Summary	R	R Square	Adjusted R Square	Std. Error of the Estimate		
	,328[a]	,108	,029	,58216		
Anova		Sum of Squares	df	Mean Square	F	Sig.
	Regression	2,780	6	,463	1,367	,240[a]
	Residual	23,046	68	,339		
	Total	25,827	74			
Coefficents		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
	(Constant)	-,066	,274		-,241	,810
	Blockholding	-,005	,011	-,255	-,446	,657
	BlockholdingSQ	,000	,000	,127	,213	,832
	GovernmentOwn	,001	,003	,061	,383	,703
	OECD	,079	,053	,238	1,485	,142
	DebtOverAssets	-,586	,874	-,087	-,671	,504
	Production	,000	,000	-,281	-2,307	,024

a. Predictors: (Constant), DebtOverAssets, OECD, Production, GovernmentOwn, Blockholding, BlockholdingSQ

b. Dependent Variable: LnTobin

*Full results in appendix 10

6.5.3 Regression 3

The dummy variables (4.4) for government ownership and blockholding did not have any significant impact in the regression equation (appendix 11 and 12). The purpose was to make the separation between companies with and without government ownership clearer in the hope of yielding a stronger result. The same logic followed for companies with low and high blockholding. That it had little effect only serves to justify the weak relationship between Tobin's q and blockholding and government ownership for the sample of oil companies.

6.5.4 Regression 4

A fourth analysis was done in light of the lack of explanatory power of the regression equations with the research variables in this study. The aim was to find other factors that could possible interfere or explain the nonexistent relationship between firm value and government ownership, blockholding and country risk. That entailed double checking the data to rule out measurement errors*, further examining the data to find any patterns or trends and searching through financial numbers that indicates a relationship with Tobin's q. This proved to be fruitful as two main relationships were discovered:

1. Cash flow over sales has a significant relationship with Tobin's q and substantially increases the variance if included in the regression equation (6.5.4.1)**
2. Russian based companies are valued at a 50% discount compared to US companies. This indicates a country bias in market valuation not reflected consistently in the country risk ratings used in this study (6.5.4.2)**

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*Checking for data consistency and accuracy involves examining the data sources: Datastream for Tobin's q, company websites, annual reports, risk ratings etc. for the independent variables. But discussions of measurement errors and data sources are covered in the Validity and Reliability (7.2) section.

** Full results in appendix 13, 14 and 15.

6.5.4.1 Cash flow over sales

Several financial data sources were tested against the Tobin's q value, including Net Sales, Total Dividends and Dividends per share. The reasoning being that there would be some sort of financial driver used as a benchmark for measuring a company's success that is rewarded in the market. Emphasis was placed on values not already reflected in the approximate Tobin's q ratio as that would compromise the results. Measures such as the P/E ratio were therefore excluded.

Cash flow over sales defined by Datastream to be "Funds from Operations / Net Sales or Revenues * 100" was the only significant finding. Presented in table 8 are the regression equation results.

Table 8 Cash Flow/Sales Regression

Model Summary	R	R Square	Adjusted R Square	Std. Error of the Estimate		
	,507[a]	,257	,204	,52718		
Anova		Sum of Squares	df	Mean Square	F	Sig.
	Regression	6,650	5	1,330	4,786	,001[a]
	Residual	19,177	69	,278		
	Total	25,827	74			
Coefficients		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
	(Constant)	-,974	,243		-4,004	,000
	Blockholding	,007	,010	,371	,694	,490
	BlockholdingSQ	,000	,000	-,188	-,345	,731
	GovernmentOwn	-,001	,003	-,026	-,185	,854
	OECD	,038	,049	,115	,788	,433
	CashflowOverSales	,014	,003	,513	4,518	,000

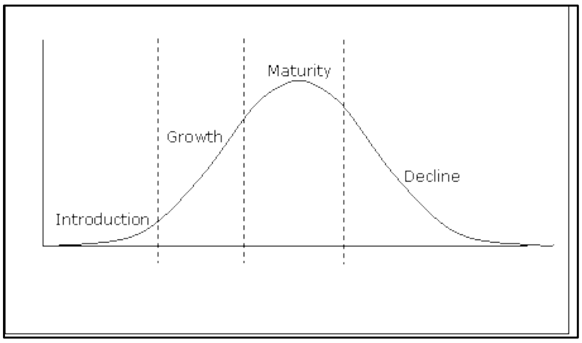
a. Predictors: (Constant), CashflowOverSales, OECD, GovernmentOwn, Blockholding, BlockholdingSQ

b. Dependent Variable: LnTobin

An R^2 value of ,257 is significantly better than ,038 without "cashflow over sales" varible. Explaining 25,7% of the variance is still "low" statistical wise, but not in a social science studies perspective. Covering ¼ of the variance with just four independent variables of something as complicated as market valuation of 76 international companies spread throughout the world indicates some credibility to the regression equation.

What Cashflow over sales being positively correlated* to Tobin's q tells us is that the market rewards companies that generates high amount of cash flow from operations relative to their sales numbers. Looking specifically at the oil industry, high cash flow over sales can indicate a mature company (figure 18) that is established in the industry with a cost structure where the large investments and equipment needed for oil drilling and production are largely paid off. They are then able to turn most of their sales into cash, which is a good sign of productivity and less risk of becoming insolvent and not being able to pay debt.

Figure 18: Industry Life Cycles



The maturity stage of an oil company represents a time where it is well established in the industry. Operating cash flow is negative in the introduction stage but as efficiency and investment increases in the growth and maturity stages, profits are maximized with a positive cash flow. The operating cash flow again turns negative in the decline stage with declining growth rate and prices (Jovanovic 1982; Wernfelt 1985). *Taken from* (VBM 2012)

*For correlation table see appendix 16.

Dickinson (2010) found cash flow patterns to predict the firm life cycle and that investors might undervalue mature firms if not recognizing the signal of the cash flow patterns (Dickinson 2010). Adjusting the cash flow for sales shows how much of the revenue is turned into cash and is perhaps valued by investors because it's more difficult to manipulate cash flow than company earnings(Investopedia).

In addition, research done by Earnst & Young showed that for a broad group of international oil and gas companies 56% of their cash flows were spend on PP&E, exploration and R&D in 2005 and 2006. Paid dividends increased as well in addition to cumulative investments and debt repayment (E&Y 2007). This establishes the link between cash flow and company actions to ensure future growth and strengthen the balance sheet that might explain the positive market reaction to cash flow over sales.

6.5.4.2 Russian vs. US companies

Compiling a list of US and Russian companies from the study, a significant difference in market valuation is apparent (table 9 below). Average Tobin's q for Russian companies are 0,48, that's less than half of US companies' 1,06.

Table 9 Russian vs US companies

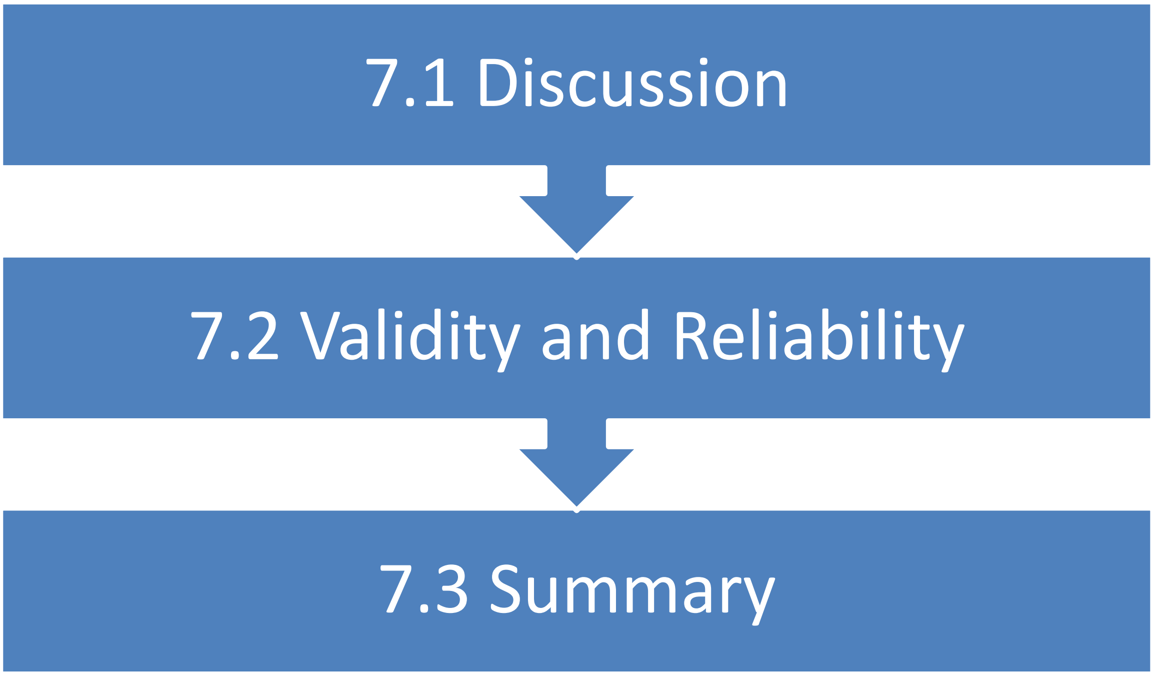
Company (USA)	Tobin's q	Production (2011 BOE)	Company (Russia)	Tobin's q	Production (2011 BOE)
ANADARKO PETROLEUM	0,7	248	BASHNEFT	0,42	95
APACHE	0,7	273,1	GAZPROM	0,28	3358,5
CABOT OIL & GAS	1,83	32,3	GAZPROM NEFT	0,47	332,1
CHEVRON	0,92	975,65	OC ROSNEFT	0,48	920,2
COBALT INTL.ENERGY	1,95	7,3	OIL COMPANY LUKOIL	0,31	833,7
CONCHO RESOURCES	1,46	23,6	TATNEFT	0,49	164,2
CONOCOPHILLIPS	0,6	1619	TNK-BP HOLDINGS	0,91	725,3
CONTINENTAL RESOURCES	2,17	15,8	**Average**	**0,48**	
DENBURY RES.	0,57	24			
DEVON ENERGY	0,55	240			
EOG RES.	1,04	154,3			
EXXON MOBIL	1,24	1644,7			
HESS	0,53	43,5			
HOLLYFRONTIER	0,28	97,9			
LINN ENERGY	0,82	23,2			
MARATHON OIL	0,69	132,5			
MARATHON PETROLEUM	0,37	504,8			
MURPHY OIL	0,72	75,3			
NOBLE ENERGY	1,01	81			
OCCIDENTAL PTL.	1,21	156,2			
RANGE RES.	1,74	11,9			
SOUTHWESTERN ENERGY	1,4	52			
TULLOW OIL	1,89	24,38			
WHITING PTL.	0,95	25,8			
Average	**1,06**				

By also looking at 2011 production in BOE it gives an indication of the size of the company. The Russian companies are producing substantial quantities even compared to its American counterparts yet priced at a 50% discount. The structure of the company, other sources of revenue, tax benefits etc. can't be ignored as possible factors. But nevertheless, a specific country risk bias has been discovered that wasn't expressed in the previous regression equations. Running an analysis with only US and Russian firms gives R^2 of 0,430 and more importantly amplifies the OECD risk effect to a coefficient of -,529 significant at the 0,01 level (appendix 14). This attributes considerable explainable power to the risk component, something that was addressed in the hypothesis and research questions for this study.

Also including cash flow over sales in the regression analysis increases R^2 to ,550 (appendix 15) meaning the equation now explains 55% of the total variance. The government ownership and blockholding variables remain relatively unchanged, implicating little relevance also for the US and Russian based oil companies.

7.0 Conclusion

The final section contains a discussion about the results (7.1) where the focus is to examine possible explanations and other factors at play. This will be partly intertwined with the discussion of validity and reliability (7.2) but will further explore possible errors and limitations of the study. Finally, a summary (7.3) of the paper and reflections for further research will be made.



7.1 Discussion

The expected relationships between firm value (Tobin's q) and government ownership, blockholding and country risk were not expressed in the regression equations. In fact, very low correlations between any of the variables were observed. Previous research like Eller, Hartley and Medlock (2007) along with Jaffe (2007) proving low efficiency for government owned oil companies and Pirog (2007) stating other objectives than maximizing shareholder value, lead to an expected negative correlation with firm valuation. Combined with the negative impact of blockholding (Fama and Jensen 1983; Thomsen, Pedersen et al. 2006; Konijn 2009) and country risk (Esterhuizen 2007) the aim of the study was to predict some of the factors behind the pricing of international oil companies. But the relationships were statistically insignificant.

Perhaps the biggest surprise was the low Tobin's q scores for perceived strong companies from stable economic regions. Norway's Statoil (0,6), Netherland's Royal Dutch Shell (0,62), France's Total (0,44), Britain's BP (0,44) and USA's ConocoPhillips (0,60) all had vales below the mean. One of the conclusions to draw from this is that country risk is not a good measure to use in assessing the market value of oil companies. Partly because much of the operations are not based in the home country, e.g. BP that are operating across 6 continents and in over 80 countries around the world (BP 2012).

Also, country risk (3.3) has already been discussed to be difficult to assess. The Columbian government has taken steps to facilitate foreign investment to ensure economic growth (Valores 2012). How well this is reflected in the country risk ratings and what weight it has been attributed compared to political rights and stability etc. is unclear. Columbia is still seen as a high risk country.

Looking at specific companies, Columbia's Ecopetrol received a Tobin's q value of 1,91 "despite" the national government controlling 88,9% of the shares. Examining its operations and recent history, some facts become imminent that in many ways reveals the shortcomings of this study: Comparing the first quarter of 2011 and 2012, production increased with 8%, sales grew 6% and a 26% rise in net income(Valores 2012). Those are staggering numbers that reflect a company on the rise, evident by high market value that only time will tell is overpriced or not. But these factors are not taken into account in this study as time and resource constraints forced to limit the scope and level of analysis.

7.2 Validity and Reliability

It's natural to also discuss the limitations of the study since the research process predominately involved collecting and analyzing primary data for the largest international oil and gas companies. As mentioned in "Valuation of Oil Companies" (3.1), precisely the fact that they are international companies from countries spread throughout the world means dealing with different accounting standard and practices. This has purposely not been considered in the analysis.

The accounting data used to calculate approximate Tobin's q were collected from Thomsen Reuters Datastream, a reliable and accredited database for financial information. Reliability is secured by running the data queries several times to check for consistency. However, the validity of using Lindenberg and Ross' (1981) approximate Tobin's q to proxy for market value over replacement value of assets can be questioned although it has been proven to be highly correlated to Tobin's q. Examining the approximate q's (equation 6) the denominator is just one variable, Total Assets, making any variations in the accounting standards have significant impact on the ratio. At first glance using book value of equity instead of total assets might seem logical since market value of equity is in the numerator. This is however an entirely different subject matter as this study is forced to rely on already established research and literature.

Reliability of the independent variables (government ownership, blockholding and country risk) is good provided either the sources are correct or no errors in the collection and processing of the data have been made. The sources for government ownership and blockholding are company websites, annual reports, proxy statements and SEC filings. All primary data that is research intensive and time consuming to acquire. The risk of errors made in the collection and processing are therefore greater. Although a random control check of 10 companies was done, the possibility of collection and processing error can't be ruled out completely.

The sample size is not random but consistent of the world's 100 largest oil and gas companies determined by market value. The data is also narrowed down to just results for the accounting year 2011(ending 31.12.2011).The results are highly relevant in terms of recent date but doesn't cover past trends or patterns. In terms of generalization, the companies with the largest market value are also by definition the companies the market deems the most successful, making it difficult to draw conclusions based on the industry as a whole.

Another factor to consider is that if government owned companies suffered from low efficiency and had other goals than to maximize shareholder profit (3.4), the market would surely "punish" them with low stock value. Since the sampling for this study is based on Top 100 stock listed companies in terms of market value, once could infer that government owned companies would not be as representative as it should for two reasons:

1. Government owned companies will have lower market value and hence be "pushed" out of the top 100.
2. The top ten oil companies based on BOE reserves (figure 13) are all government owned but not stock listed.

Of the final sample of 76 companies, 26 of them had government ownership of some degree and 50 were fully privatized. There's no available information about the exact ratio of national- and private owned oil and gas companies, although it's fairly safe to assume that private>national throughout the world. Since also no link was established between Tobin's q and government ownership a fair distribution can be assumed.

The largest companies also tend to have lower blockholder concentration* which is one of the variables in the study. In addition, companies are not to the same extent exposed to refinery margins and price fluctuations for oil and gas(Osmundsen, Asche et al. 2005). This brings up the point of company structure which hasn't been taken into account in explaining Tobin's q. High market value compared to total assets might be better explained by firm specific factors (such as already discussed with Ecopetrol) and hold no relationship with country risk or the other independent variables used.

*Holding 5% of the shares of Exxon Mobil means an investment of more than $885 Million.

Source: Stock price from (Reuters 2010)

7.3 Summary

What prompted the research question in the first place was the price discrepancy between Lukoil and Exxon Mobil (1.1). Both had similar reserve amounts in BOE but the Russian company was valued less than 10% of the American one. This lead to constructing an hypothesis of factors that could influence the market value of oil and gas companies, represented by Tobin's q. The top 100 stock listed companies based on market value of 2011 was chosen as a sample. Government ownership, blockholding and country risk were the influencing factors used as independent variables in the regression equation. 2011 production and debt over assets were used as control variables to correct for firm size and debt structure influencing market value. Dummy variables were also applied for government ownership and high and low blockholding.

The results came out insignificant, both in the regression equation and for correlations between the variables. The sample mean for Tobin's q was ,885 with standard deviation of ,502. It became clear that especially government ownership and country risk did not have the expected results*. They had little effect on market value although private companies enjoyed a slightly higher Tobin's q average (,890) than government owned (,876). Blockholding was found to go from a positive to negative influence on firm value as blockholding increased. This went along with the theory, but was not statistically significant as with the other variables.

National controlled companies from high risk regions like Oil and Gas Development (Pakistan) 2,03 and Ecopetrol (Columbia) 1,96 had high values, but inconsistent results went across the board illustrated by Statoil (Norway) 0,60 and Shell (Netherlands) 0,62. Filtering them out had no relevant impact on the regression results.

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* In theory, government ownership meant low efficiency and not maximizing shareholder value while country risk were expected to add a premium to high risk regions. All of which were expected to have a negative impact on market valuation.

The limitations of the study became imminent when examining a company like Ecopetrol further. A growth in net income of 24% from 2011 to 2012 coupled with recent government actions to facilitate foreign investment would explain a high market price and perhaps a misplaced high country risk rating(Valores 2012). By only including the largest companies and data for 2011, the analysis can't be generalized for entire industry nor does it pick up on changing trends as with the Ecopetrol example.

However, it's important to emphasize that the purpose of this study was to see what effects the government ownership, blockholding and county risk had on firm valuation. It's very difficult to explain the complexity of firm valuation with just three variables. Searching for additional factors that could help explain the variance in the regression analysis, cash flow over sales moved the R^2 from ,047 to ,257. This goes far in suggesting that companies that excel in generating sales into cash are rewarded in the market.

Additional findings are related to the first example with Lukoil and Exxon Mobil. Average Tobin's q for Russian companies were ,48 compared to 1,06 for American companies. The regression equation went from 4,7 % to 43% by narrowing the sample to US and Russian companies. Including the cash flow over sales variable caused the equation to explain 55% of the total variance. What can be derived from this result is that the research done in this study can with significant statistical confidence attribute some form of country risk affecting firm valuation and to a lesser degree government ownership and blockholding.

In order to make more general statements, further research is recommended in looking at specific company traits and structure. The lack of consistency between country risk and Tobin's q shows both the difficulty in attributing correct risk variables and generalizing conclusions of something as complex as market valuation without doing an in depth company analysis.

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Appendix

Appendix 1

Annual Average Domestic Crude Oil Prices (U.S. Average)

Year	Nominal	Inflation Adjusted
1980	$37.42	$102.61
1981	$35.75	$88.85
1982	$31.83	$74.49
1983	$29.08	$65.91
1984	$28.75	$62.47
1985	$26.92	$56.47
1986	$14.44	$29.72
1987	$17.75	$35.25
1988	$14.87	$28.42
1989	$18.33	$33.36
1990	$23.19	$39.94
1991	$20.20	$33.47
1992	$19.25	$30.96
1993	$16.75	$26.18
1994	$15.66	$23.84
1995	$16.75	$24.81
1996	$20.46	$29.42
1997	$18.64	$26.21
1998	$11.91	$16.50
1999	$16.56	$22.38
2000	$27.39	$35.88
2001	$23.00	$29.33
2002	$22.81	$28.59
2003	$27.69	$33.98
2004	$37.66	$44.96
2005	$50.04	$57.77
2006	$58.30	$65.25
2007	$64.20	$69.75
2008	$91.48	$95.57
2009	$53.48	$56.15
2010	$71.21	$73.69
2011	$87.04	$87.33

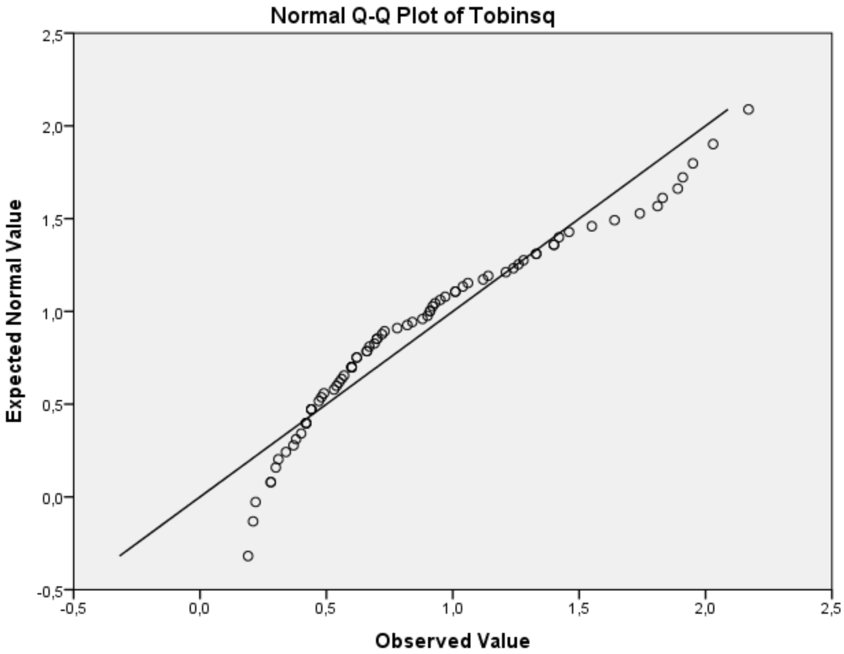
Source:(InflationData.com 2012)

Appendix 2

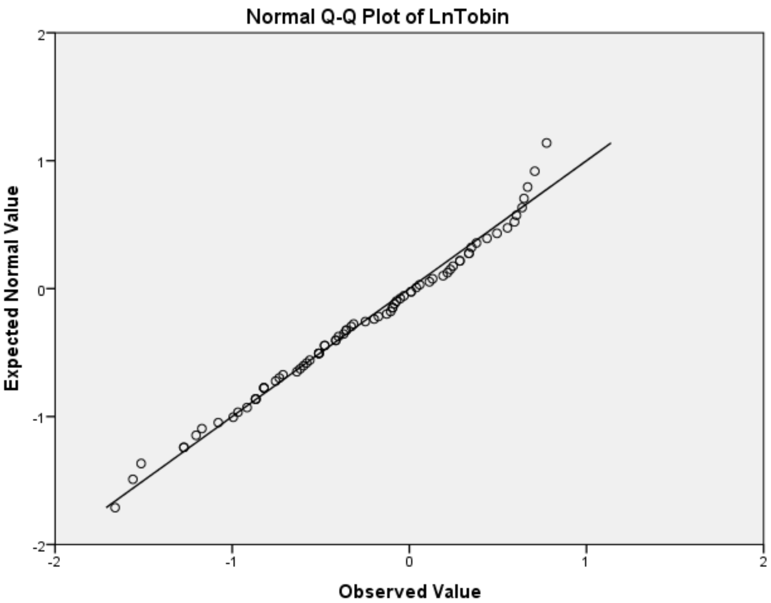
Company	Country	Tobin's q	Government Ownership	Blockholding	Transparency Risk	Freedom House Risk	OECD Risk	Aggregate Freedom House Risk	Euromoney Risk
YPF 'D'	Argentina	1,33	0	100	3	2	7	81	38,07
OMV	Austria	0,22	31,5	60,04	7,8	1	0	97	81,18
PETROBRAS ON	Brazil	0,38	50,24	58,58	3,8	2	3	80	62,58
BG GROUP	Britain	1,14	0	14,53	7,8	1	0	96	73,94
BP	Britain	0,44	0	35,88	7,8	1	0	96	73,94
CANADIAN NATURAL RES.	Canada	0,91	0	11,19	8,7	1	0	99	84,57
ENCANA	Canada	0,34	0	12,05	8,7	1	0	99	84,57
HUSKY EN.	Canada	0,67	0	71,11	8,7	1	0	99	84,57
IMPERIAL OIL	Canada	1,55	0	69,6	8,7	1	0	99	84,57
MEG ENERGY	Canada	1,06	0	36,8	8,7	1	0	99	84,57
NEXEN	Canada	0,42	0	19,93	8,7	1	0	99	84,57
PACIFIC RUBIALES ENERGY	Canada	0,88	0	16,01	8,7	1	0	99	84,57
PENN WEST PETROLEUM	Canada	0,66	0	11,83	8,7	1	0	99	84,57
SUNCOR ENERGY	Canada	0,56	0	10,93	8,7	1	0	99	84,57
TALISMAN EN.	Canada	0,6	0	11,88	8,7	1	0	99	84,57
CHINA PTL.& CHM.'A'	China	0,6	75,84	95,07	3,6	6,5	2	17	61,47
CNOOC	China	1,12	100	100	3,6	6,5	2	17	61,47
PETROCHINA 'H'	China	0,84	86,5	87,29	3,6	6,5	2	17	61,47
ECOPETROL	Columbia	1,91	89,9	89,9	3,4	3,5	4	61	59,62
INA INDUSTRIJA NAFTE	Croatia	1,26	44,84	92,1	4	1,5	5	86	54,78
TOTAL	France	0,44	0	5,7	7	1	0	95	75,05
KUNLUN ENERGY	Hong Kong	0,9	69,52	69,52		3,5	1	67	
MOL MAGYAR OLAJ-ES	Hungary	0,3	24,6	38,9	4,6	1	0	88	53,36
CAIRN INDIA	India	1,28	0	23,13	3,1	2,5	3	77	54,04
GAIL (INDIA)	India	1,42	57,4	64,7	3,1	2,5	3	77	54,04
INDIAN OIL	India	0,44	78,92	82,36	3,1	2,5	3	77	54,04
OIL & NATURAL GAS	India	1,01	84,23	87,46	3,1	2,5	3	77	54,04
RELIANCE INDUSTRIES	India	0,93	0	45,72	3,1	2,5	3	77	54,04
ENI	Italy	0,4	30,3	33,44	3,9	1,5	0	89	63,19
INPEX	Japan	0,78	18,9	31	8	1,5	0	88	69,42
JX HOLDINGS	Japan	0,19	0	15	8	1,5	0	88	69,42
PETRONAS DAGANGAN	Malaysia	1,81	69,86	78,3	4,3	4	2	49	62,34
ROYAL DUTCH SHELL A	Netherlands	0,62	0	51	8,9	1	0	99	83,76
STATOIL	Norway	0,6	67	72,57	9	1	0	100	90,69
OIL & GAS DEVELOPMENT	Pakistan	2,03	74,97	85,02	2,5	4,5	7	43	29,85
OIL SEARCH	Papua New Guinea	1,4	14,97	14,97	2,2	3,5	5	59	36,43
POLISH OIL AND GAS	Poland	0,66	72,41	72,41	5,5	1	0	93	67,52
GALP ENERGIA SGPS	Portugal	0,97	7	67,68	6,1	1	0	97	52,17
OMV PETROM	Romania	0,54	40,75	90,76	3,6	2	4	83	48,93
BASHNEFT	Russia	0,42	0	86,29	2,4	5,5	3	28	52,98
GAZPROM	Russia	0,28	50	50,68	2,4	5,5	3	28	52,98
GAZPROM NEFT	Russia	0,47	45	89,99	2,4	5,5	3	28	52,98
OC ROSNEFT	Russia	0,48	75,16	97,38	2,4	5,5	3	28	52,98
OIL COMPANY LUKOIL	Russia	0,31	0	89,7	2,4	5,5	3	28	52,98
TATNEFT	Russia	0,49	0	65	2,4	5,5	3	28	52,98
TNK-BP HOLDINGS	Russia	0,91	0	94,7	2,4	5,5	3	28	52,98
S-OIL	South Korea	0,73	0	66,34	5,4	1,5	0	86	69,54
SK INNOVATION	South Korea	0,21	0	48,33	5,4	1,5	0	86	69,54
REPSOL YPF	Spain	0,42	0	32,33	6,2	1	0	97	61,83
FORMOSA PETROCHEMICAL	Taiwan	1,64	0	78,05	6,1	1,5		88	76,34
PTT	Thailand	0,62	51,11	66,31	3,4	4,5	3	52	55,34
PTT EXPLORATION & PRDN.	Thailand	1,33	33,37	69,69	3,4	4,5	3	52	55,34
ANADARKO PETROLEUM	USA	0,7	0	14,92	7,1	1	0	93	75,66
APACHE	USA	0,7	0	14,04	7,1	1	0	93	75,66
CABOT OIL & GAS 'A'	USA	1,83	0	19,2	7,1	1	0	93	75,66
CHEVRON	USA	0,92	0	15,15	7,1	1	0	93	75,66
COBALT INTL.ENERGY	USA	1,95	0	45,85	7,1	1	0	93	75,66
CONCHO RESOURCES	USA	1,46	0	28	7,1	1	0	93	75,66
CONOCOPHILLIPS	USA	0,6	0	6,7	7,1	1	0	93	75,66
CONTINENTAL RESOURCES	USA	2,17	0	76,14	7,1	1	0	93	75,66
DENBURY RES.	USA	0,57	0	18,5	7,1	1	0	93	75,66
DEVON ENERGY	USA	0,55	0	5,78	7,1	1	0	93	75,66
EOG RES.	USA	1,04	0	20,4	7,1	1	0	93	75,66
EXXON MOBIL	USA	1,24	0	13,62	7,1	1	0	93	75,66
HESS	USA	0,53	0	21,78	7,1	1	0	93	75,66
HOLLYFRONTIER	USA	0,28	0	26,8	7,1	1	0	93	75,66
LINN ENERGY	USA	0,82	0	7,6	7,1	1	0	93	75,66
MARATHON OIL	USA	0,69	0	17,23	7,1	1	0	93	75,66
MARATHON PETROLEUM	USA	0,37	0	13,58	7,1	1	0	93	75,66
MURPHY OIL	USA	0,72	0	19,98	7,1	1	0	93	75,66
NOBLE ENERGY	USA	1,01	0	27,7	7,1	1	0	93	75,66
OCCIDENTAL PTL.	USA	1,21	0	13,64	7,1	1	0	93	75,66
RANGE RES.	USA	1,74	0	16,8	7,1	1	0	93	75,66
SOUTHWESTERN ENERGY	USA	1,4	0	16,31	7,1	1	0	93	75,66
TULLOW OIL	USA	1,89	0	23,1	7,1	1	0	93	75,66
WHITING PTL.	USA	0,95	0	23,29	7,1	1	0	93	75,66

Appendix 3

Normalization Test of dependent variable (Tobin's q)



Results after LN Tobin's q



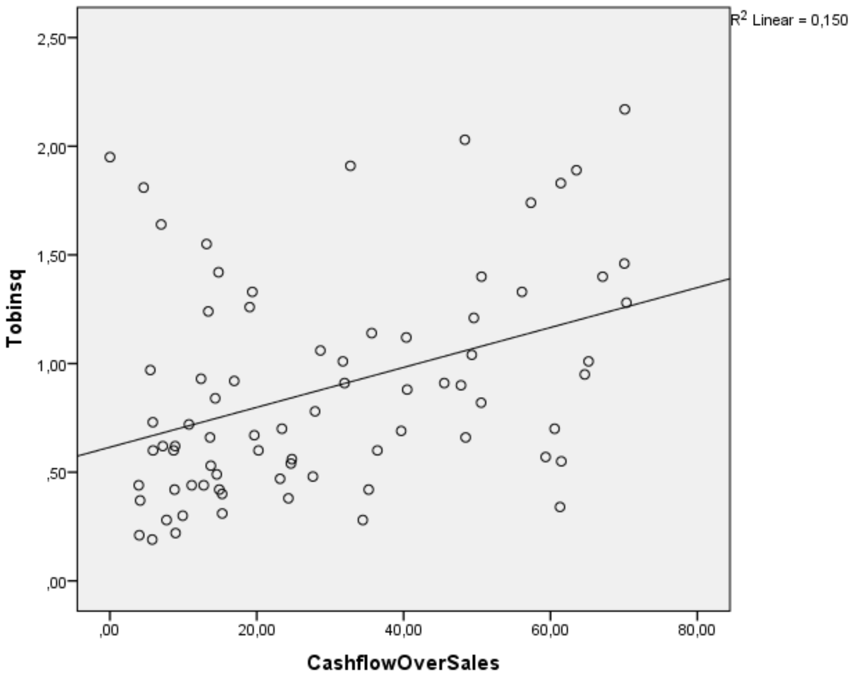
Appendix 4

Tobin's q and Cashflow over sales

Correlations

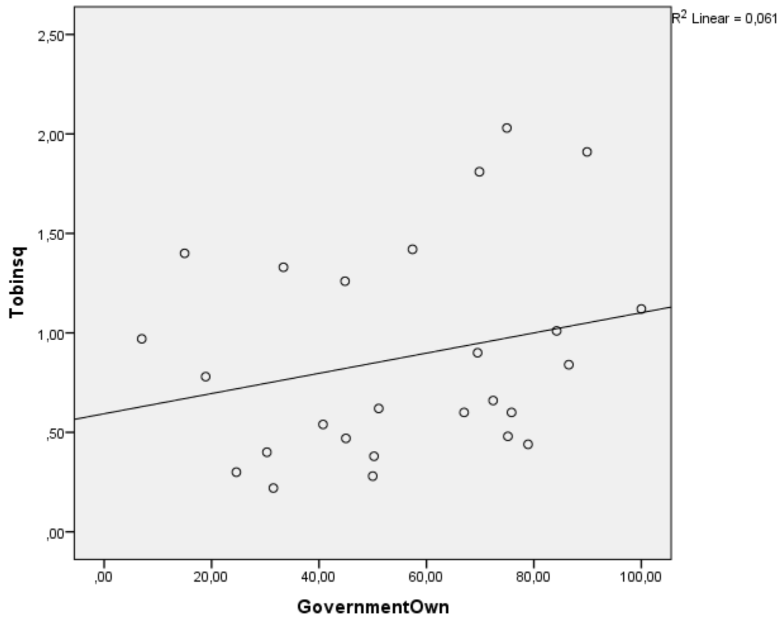
		Tobinsq	CashflowOverSales
Tobinsq	Pearson Correlation	1	,387**
	Sig. (2-tailed)		,001
	N	76	76
CashflowOverSales	Pearson Correlation	,387**	1
	Sig. (2-tailed)	,001	
	N	76	76

**. Correlation is significant at the 0.01 level (2-tailed).



Appendix 5

Tobins q and government ownership (only companies with government ownership share)



Correlations

		Tobinsq	Government Own
Tobinsq	Pearson Correlation	1	,247
	Sig. (2-tailed)		,224
	N	26	26
GovernmentOwn	Pearson Correlation	,247	1
	Sig. (2-tailed)	,224	
	N	26	26

Appendix 6

Tobin's q and country risk correlation scores.

		Tobinsq	OECD
Tobinsq	Pearson Correlation	1	,204
	Sig. (2-tailed)		,079
	N	76	75
OECD	Pearson Correlation	,204	1
	Sig. (2-tailed)	,079	
	N	75	75

		Tobinsq	FreedomHouseRisk
Tobinsq	Pearson Correlation	1	-,029
	Sig. (2-tailed)		,802
	N	76	76
FreedomHouseRisk	Pearson Correlation	-,029	1
	Sig. (2-tailed)	,802	
	N	76	76

		Tobinsq	TransparencyRisk
Tobinsq	Pearson Correlation	1	-,045
	Sig. (2-tailed)		,699
	N	76	75
TransparencyRisk	Pearson Correlation	-,045	1
	Sig. (2-tailed)	,699	
	N	75	75

		Tobinsq	AggFreedomHouse
Tobinsq	Pearson Correlation	1	,023
	Sig. (2-tailed)		,844
	N	76	76
AggFreedomHouse	Pearson Correlation	,023	1
	Sig. (2-tailed)	,844	
	N	76	76

		Tobinsq	Euromoney
Tobinsq	Pearson Correlation	1	-,095
	Sig. (2-tailed)		,418
	N	76	75
Euromoney	Pearson Correlation	-,095	1
	Sig. (2-tailed)	,418	
	N	75	75

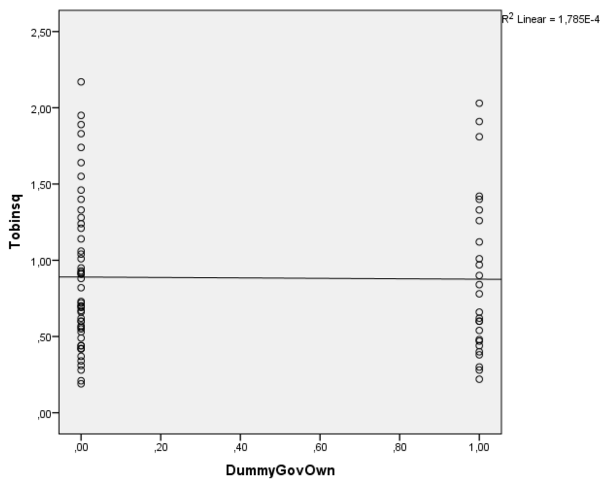
Appendix 7

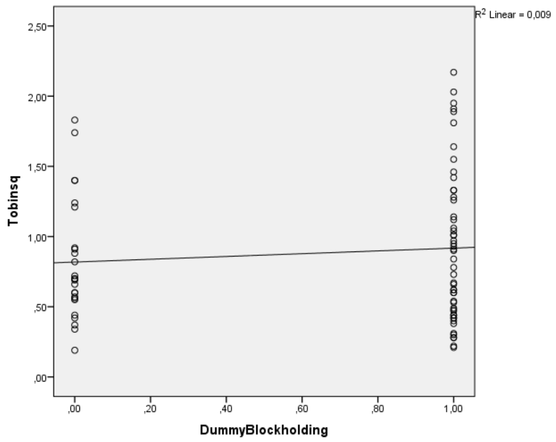
Tobin's q and Dummy Variables.

Correlations score:

		Tobinsq	DummyGovOwn
Tobinsq	Pearson Correlation	1	-,013
	Sig. (2-tailed)		,909
	N	76	76
DummyGovOwn	Pearson Correlation	-,013	1
	Sig. (2-tailed)	,909	
	N	76	76

		Tobinsq	DummyBlockholding
Tobinsq	Pearson Correlation	1	,094
	Sig. (2-tailed)		,421
	N	76	76
DummyBlockholding	Pearson Correlation	,094	1
	Sig. (2-tailed)	,421	
	N	76	76





Appendix 8

Tobin's q and Control Variables Correlation scores.

		Tobinsq	DebtOverAssets
Tobinsq	Pearson Correlation	1	-,003
	Sig. (2-tailed)		,982
	N	76	76
DebtOverAssets	Pearson Correlation	-,003	1
	Sig. (2-tailed)	,982	
	N	76	76

		Tobinsq	Production
Tobinsq	Pearson Correlation	1	-,236*
	Sig. (2-tailed)		,040
	N	76	76
Production	Pearson Correlation	-,236*	1
	Sig. (2-tailed)	,040	
	N	76	76

Appendix 9

Regression 1

Model	Variables Entered	Variables Removed	Method
1	OECD, GovernmentOwn, Blockholding, BlockholdingSQ	.	Enter

a. All requested variables entered.
b. Dependent Variable: LnTobin

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,194[a]	,038	-,017	,59583	1,672

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	,976	4	,244	,687	,603[a]
	Residual	24,851	70	,355		
	Total	25,827	74			

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95,0% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	-,271	,211		-1,282	,204	-,692	,151		
	Blockholding	-,005	,011	-,246	-,420	,676	-,027	,018	,040	24,917
	BlockholdingSQ	,000	,000	,193	,318	,751	,000	,000	,037	26,877
	GovernmentOwn	,000	,003	-,006	-,037	,971	-,006	,006	,532	1,881
	OECD	,071	,054	,214	1,315	,193	-,037	,179	,518	1,931

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	-,4321	,1146	-,2969	,11486	75
Residual	-1,32764	1,19633	,00000	,57950	75
Std. Predicted Value	-1,177	3,583	,000	1,000	75
Std. Residual	-2,228	2,008	,000	,973	75

Appendix 10

Regression 2 Control Variables

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Production, Blockholding, DebtOverAssets, OECD, GovernmentOwn, BlockholdingSQ	.	Enter

a. All requested variables entered.
b. Dependent Variable: LnTobin

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,328[a]	,108	,029	,58216	1,656

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2,780	6	,463	1,367	,240[a]
	Residual	23,046	68	,339		
	Total	25,827	74			

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95,0% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	-,066	,274		-,241	,810	-,612	,480		
	Blockholding	-,005	,011	-,255	-,446	,657	-,027	,017	,040	24,918
	BlockholdingSQ	,000	,000	,127	,213	,832	,000	,000	,037	27,153
	GovernmentOwn	,001	,003	,061	,383	,703	-,005	,007	,514	1,945
	OECD	,079	,053	,238	1,485	,142	-,027	,185	,513	1,951
	DebtOverAssets	-,586	,874	-,087	-,671	,504	-2,330	1,157	,788	1,269
	Production	,000	,000	-,281	-2,307	,024	-,001	,000	,887	1,128

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	-1,0715	,3072	-,2969	,19384	75
Residual	-1,39887	1,21001	,00000	,55806	75
Std. Predicted Value	-3,996	3,116	,000	1,000	75
Std. Residual	-2,403	2,078	,000	,959	75

Appendix 11

Regression 3 Dummy Government Variable

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	DummyGovOwn, OECD, Blockholding, BlockholdingSQ	.	Enter

a. All requested variables entered.
b. Dependent Variable: LnTobin

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,220[a]	,048	-,006	,59259	1,657

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1,246	4	,311	,887	,476[a]
	Residual	24,581	70	,351		
	Total	25,827	74			

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients			95,0% Confidence Interval for B		Collinearity Statistics	
	B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Tolerance	VIF
1 (Constant)	-,306	,213		-1,436	,155	-,732	,119		
Blockholding	-,002	,012	-,090	-,149	,882	-,025	,021	,037	27,061
BlockholdingSQ	,000	,000	,093	,151	,880	,000	,000	,036	27,668
OECD	,081	,055	,244	1,479	,144	-,028	,191	,497	2,010
DummyGovOwn	-,164	,187	-,133	-,877	,384	-,536	,209	,593	1,687

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	-,5123	,2607	-,2969	,12974	75
Residual	-1,33224	1,11369	,00000	,57635	75
Std. Predicted Value	-1,660	4,298	,000	1,000	75
Std. Residual	-2,248	1,879	,000	,973	75

Appendix 12

Regression 3 Dummy Blockholding Variable

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	DummyBlockholding, OECD, GovernmentOwn	.	Enter

a. All requested variables entered.
b. Dependent Variable: LnTobin

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,187[a]	,035	-,006	,59249	1,650

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	,903	3	,301	,857	,467[a]
	Residual	24,924	71	,351		
	Total	25,827	74			

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95,0% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	-,345	,119		-2,900	,005	-,581	-,108		
	OECD	,068	,046	,206	1,496	,139	-,023	,160	,717	1,394
	GovernmentOwn	-,001	,003	-,026	-,184	,854	-,006	,005	,678	1,474
	DummyBlockholding	-,032	,165	-,025	-,192	,848	-,361	,297	,775	1,291

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	-,4130	,1032	-,2969	,11045	75
Residual	-1,31617	1,15103	,00000	,58035	75
Std. Predicted Value	-1,051	3,623	,000	1,000	75
Std. Residual	-2,221	1,943	,000	,980	75

Appendix 13

Regression Cash flow over sales

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	CashflowOverSales, OECD, GovernmentOwn, Blockholding, BlockholdingSQ	.	Enter

a. All requested variables entered.
b. Dependent Variable: LnTobin

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,507[a]	,257	,204	,52718	1,667

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6,650	5	1,330	4,786	,001[a]
	Residual	19,177	69	,278		
	Total	25,827	74			

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95,0% Confidence Interval for B		Collinearity Statistics	
	B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1 (Constant)	-,974	,243		-4,004	,000	-1,459	-,489		
Blockholding	,007	,010	,371	,694	,490	-,013	,027	,038	26,652
BlockholdingSQ	,000	,000	-,188	-,345	,731	,000	,000	,036	27,539
GovernmentOwn	-,001	,003	-,026	-,185	,854	-,006	,005	,531	1,883
OECD	,038	,049	,115	,788	,433	-,059	,135	,506	1,976
CashflowOverSales	,014	,003	,513	4,518	,000	,008	,021	,836	1,197

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	-,8251	,3709	-,2969	,29978	75
Residual	-1,15233	1,38993	,00000	,50906	75
Std. Predicted Value	-1,762	2,228	,000	1,000	75
Std. Residual	-2,186	2,637	,000	,966	75

Appendix 14

Regression 4 Russian vs US companies

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	OECD, GovernemntOwn, BlockholdingSq, Blockholding	.	Enter

a. All requested variables entered.
b. Dependent Variable: LnTobinsq

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,656[a]	,430	,343	,47982	1,354

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4,520	4	1,130	4,909	,004[a]
	Residual	5,986	26	,230		
	Total	10,506	30			

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95,0% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	-,514	,275		-1,867	,073	-1,079	,052		
	Blockholding	,023	,017	1,150	1,376	,181	-,011	,057	,031	31,867
	BlockholdingSq	,000	,000	-,387	-,464	,646	,000	,000	,032	31,730
	GovernemntOwn	-,002	,006	-,069	-,376	,710	-,015	,010	,647	1,545
	OECD	-,529	,148	-1,140	-3,565	,001	-,834	-,224	,214	4,662

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	-1,2497	,7965	-,2426	,38818	31
Residual	-1,31814	,70681	,00000	,44669	31
Std. Predicted Value	-2,595	2,677	,000	1,000	31
Std. Residual	-2,747	1,473	,000	,931	31

Appendix 15

Regression 4. Russian vs US companies with cash flow over sales variable

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	CashflowSales, GovernemntOwn, Blockholding, OECD, BlockholdingSq	.	Enter

a. All requested variables entered.
b. Dependent Variable: LnTobinsq

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,742[a]	,550	,460	,43471	1,540

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5,782	5	1,156	6,120	,001[a]
	Residual	4,724	25	,189		
	Total	10,506	30			

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95,0% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	-,859	,283		-3,039	,006	-1,442	-,277		
	Blockholding	,021	,015	1,059	1,398	,174	-,010	,052	,031	31,935
	BlockholdingSq	,000	,000	-,369	-,488	,630	,000	,000	,032	31,733
	GovernemntOwn	-,004	,006	-,111	-,663	,513	-,015	,008	,641	1,560
	OECD	-,433	,139	-,932	-3,103	,005	-,720	-,146	,199	5,020
	CashflowSales	,009	,004	,370	2,584	,016	,002	,017	,877	1,140

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	-1,1407	,9837	-,2426	,43902	31
Residual	-,99814	,71068	,00000	,39683	31
Std. Predicted Value	-2,046	2,793	,000	1,000	31
Std. Residual	-2,296	1,635	,000	,913	31

Appendix 16

Cashflow over sales and Tobin's q correlation.

Correlations

		Tobinsq	CashflowOverSales
Tobinsq	Pearson Correlation	1	,387**
	Sig. (2-tailed)		,001
	N	76	76
CashflowOverSales	Pearson Correlation	,387**	1
	Sig. (2-tailed)	,001	
	N	76	76

**. Correlation is significant at the 0.01 level (2-tailed).