Oil & Gas producers’ financial performance

International Oil Companies’ financial performance and Crude oil prices in the Eurozone from 2004 to 2013

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Abstract

This paper determines the relationship between the crude oil price and the financial performance of International Oil Companies (IOCs) of the Eurozone during the last decade (from 2004 to 2013). This study is conducted around a multiple regression model with panel data with the financial performance ratios (ROA, ROE, Profit Margin) as dependent variables and the crude oil price as independent variables. A knowledge gap is visible since the crude oil price was never used as an independent variable in relation to the financial performance ratios of IOCs. In addition, the IOCs in the Eurozone have not been studied since most studies focuses on the United States and Asia. Moreover these studies focus on stock returns rather than financial performance. The research follows a quantitative approach by assessing the relationship of the crude oil price with financial performance of IOCS during the 10-year period (from 2004 to 2013) for 11 companies from 10 countries. The purpose of the study is to determine the effect of the crude oil prices on the financial performance of oil producer companies on a 10-year period using a multiple regression model with panel data. The research question therefore is:

What is the relationship between the crude oil price and the International Oil Companies’ financial performance in the Eurozone during the last ten years (2004-2013)?

The empirical results show that the crude oil price has a negative relationship with the financial ratios and that the crisis had an impact during that time period on the financial performance of the IOCs. It is also noted that the debt level and the size of IOCs have a strong relationship with their financial performance. The findings on the relationship between the crude oil price and the financial performance of IOCs are opposed to the results of Dayanandan & Donker study (2011). The findings of this research paper are relevant for investors and researchers looking to assess the performance of the Oil & Gas Industry so as its determinants.

Keywords: Eurozone, Oil & Gas industry, firm performance, International Oil Companies, Crude Oil.
# Table of Contents

Acknowledgements ........................................................................................................... 2

Abstract ............................................................................................................................... 3

List of Figures, Tables and Formulas .................................................................................. 3

Chapter 1 – Introduction ........................................................................................................ 1
  1.1 Historical overview ........................................................................................................ 1
    1.1.1 The Oil & Gas Industry ............................................................................................ 1
    1.1.2 The Eurozone .......................................................................................................... 2
  1.2 Problem background ....................................................................................................... 3
  1.3 Target Audience ............................................................................................................. 4
  1.4 Research Question & objective .................................................................................... 4
  1.5 Research Purpose ......................................................................................................... 4
  1.6 Research gap and Contribution .................................................................................... 5
  1.7 Delimitations ................................................................................................................. 6
  1.8 Disposition ..................................................................................................................... 6

Chapter 2 – Methodology .................................................................................................... 8
  2.1 Choice of subject .......................................................................................................... 8
  2.2 Preconception .............................................................................................................. 8
  2.3 Perspective .................................................................................................................... 9
  2.4 Research pyramid ....................................................................................................... 9
  2.5 Research Philosophy .................................................................................................. 10
    2.5.1 Ontology ................................................................................................................. 10
    2.5.2 Epistemology ......................................................................................................... 10
  2.6 Research Approach ...................................................................................................... 11
  2.7 Type of Study ............................................................................................................... 12
  2.8 Research design .......................................................................................................... 12
  2.9 Research Method ......................................................................................................... 13
  2.10 Literature and Data source ........................................................................................ 13
  2.11 Reliability, Replicability and Validity ........................................................................ 14
  2.12 Research Ethics & Societal Issues ............................................................................. 15

Chapter 3 - Theoretical and Literature Framework ............................................................. 16
  3.1 Firm Performance ....................................................................................................... 16
    3.1.1 Trade-off theory ..................................................................................................... 16
    3.1.2 Agency Theory .................................................................................................... 17
    3.1.3 Firm size .............................................................................................................. 17
    3.1.4 Country risk ....................................................................................................... 18
  3.2 The Oil & Gas industry ............................................................................................... 18
    3.2.1 Oil & Gas activities ............................................................................................... 18
    3.2.2 Types of Oil & Gas .............................................................................................. 18
    3.2.3 Different players in the Oil & Gas Producers ....................................................... 19
    3.2.4 Oil price effect on financial performance .......................................................... 20
    3.2.5 The Crisis and its effects on the Oil & Gas Companies in the Eurozone ............ 20
  3.3 Hypotheses development ............................................................................................ 22
    3.3.1 Hypothesis 1 ....................................................................................................... 22
List of Figures, Tables and Formulas

Figure 1. Research Pyramid 9
Figure 2. Deductive and Inductive Approach 11
Figure 3. Research Model 24
Figure 4. Types of variables 27
Figure 5. Revised Research Model 42
Figure 6. Return on Assets 56
Figure 7. Return on Equity 55
Figure 8. Profit Margin 56

Table 1. Research Method 13
Table 2. Dependent Variables 27
Table 3. Variables 29
Table 4. Descriptive Statistics 32
Table 5. Final list of companies used without outliers 33
Table 6. Correlation Analysis 34
Table 7. Regression Results 36
Table 8. Regression results without dummy variables 38
Table 9. Comparison of the coefficient of oil price in the two regression models 39
Table 10. List of Countries with outliers 52
Table 11. List of Companies with outliers 53
Table 12. SPSS output ROA 57
Table 13. SPSS output ROE 58
Table 14. SPSS output Profit Margin 59
Table 15. SPSS output without dummy variables – ROA 60
Table 16. SPSS output without dummy variables – ROE 61
Table 17. SPSS output without dummy variables - Profit Margin 62

Equation 1. Return on Assets 27
Equation 2. Return on Equity 28
Equation 3. Return on Equity (simplified) 28
Equation 4. Profit Margin 28
Equation 5. Regression model 31
Equation 6 Regression Model without dummy variables 38
Chapter 1 – Introduction

This Chapter introduces the problem background of this study. The purpose of the study is then presented as well as the research question and the research model. But firstly, a Historical overlook of the Oil & Gas Industry, the Global Financial Crisis and the Eurozone, should be helpful to understand the Key-concepts of the Subject.

1.1 Historical overlook

1.1.1 The Oil & Gas Industry

“Oil experts, economists and government officials who have attempted in recent years to predict future demand and prices for oil have had only marginally better success than those who foretell the advent of earthquakes or the second coming of the Messiah.” (Akins, 1973, p. 462). This quote comes from the introduction of James E. Akins’s essay published in April 1973, famous for predicting an embargo on oil before it occurred. The introduction of his essay makes it clear that a lack of studies of good quality on the oil and the oil & gas industry during his time, just before the two main oil crises. But, today it is clear that oil prices can affect the economy. Indeed the Major Oil Shocks: the oil crises of 1973 and 1979 have changed the fuel market and revealed its global dependence. During the 1960s, crude oil production was at an all-time high, with countries like Germany, Venezuela, the United States and Iran beginning to be at their production peak (U.S. Department of Transportation [USDOT], 2009). Nonetheless the 1970s energy crises unfolded, with the worst happening in 1973 and 1979. This period had a serious impact on the worldwide economy and especially on the economy of the United States, Western Europe and Asian Pacific countries. The effects of this period were a shortage in the supply of oil around the world that dragged the prices to increase drastically.

The 1973 crisis began when the Organisation of Arab Petroleum Exporting Countries, in response to the involvement of the United States in the Yom Kippur war, launched an oil embargo against Canada, The United States, Japan, The United Kingdom and The Netherlands, creating an increase of the oil barrel price by 400%, from 3 USD to 12 USD. The crisis began on the Oct 6, 1973 and lasted six months until March 1974. This price fluctuation was dealt with different measures by countries, companies and even whole industries. For example, Japan began distancing itself from oil-intensive industries, The United States began auditing their production capacities and the world’s automotive industry began producing more fuel-efficient cars. The second oil shock started in 1979 and was the result of the Iranian revolution, when the Shah of Iran, Mohammad Reza Pahlavi, was forced in exile and the Ayatollah Khomeini became the new leader of Iran. A sizeable increase in the oil price was therefore visible. This increase was the consequences of human panic on price rises rather than from a real impact on the oil production at the time, oil production decreased by only 4% (National Association of Convenience Stores [NACS], 2011).
The aftereffects of this shock were devastating for the worldwide oil production: with the start of the Iran-Iraq war, both countries’ production were nearly stopped, giving other producing countries more space to grow: South America, with Venezuela and Mexico, were able to expand their production, as well as Nigeria. The USSR became the first producer of the world and Alaskan and North Sea oil became much more present on commodities markets than before. Overall, this crisis was a blow for the OPEC who lost its prime position of oil producing countries because of the rise of a new breed of Oil & Gas producers. The effect of the crisis on the oil prices was significant: at the end of the shock, twelve month later, the price for a barrel of oil was at USD 39.5. Therefore, an interest into the oil & gas industry as well as the commodities effect on the economy and finance started just after the crises with Chen et al. (1986) being one of the first to look into the effect of crude oil price on stock prices of oil producers. Hamilton (1983) looked into the effect of crises on oil prices and discovered that oil prices surged after almost every crisis since the Second World War. In addition studies focusing on those topics are necessary even today because there is a constant need of crude oil: as of today, China is the second consumer of crude oil worldwide. Oil-exporting countries benefit from that need. However the state members of the European Union (and the Eurozone) have quite limited reserves of crude oil available. The European Union (EU) is a major net importer of crude oil: their imports represent 18 million barrels per day (Poladova, 2012, p. 2). However the EU has numerous companies in the Oil & Gas industry, some are even among the top Oil & Gas producers worldwide. These companies are called International Oil Companies (IOCs), this notion will be explained in the theoretical part. This paper will deal of the performance of IOCs. Knowing that previous crises had remarkably affected the economy, it might be interesting to wonder if the last crisis also had the same effect.

Today the effects of oil prices on the economy are recognised by numerous studies each developing a special relationship between the crude oil price and an economical factor or a financial factor. For example, the International Energy agency (2004) found that an increase of 10% per barrel in the oil price would affect the world GDP negatively the following year by at least 0.5%.

1.1.2 The Eurozone

The Eurozone is an interesting region to study in relation to the crude oil price, since it is the only region in the world that does not have access to a direct energy source. Indeed, its members are not part of the world biggest oil producers and have to import the most part of their energetic needs. This region is dependent on the crude oil but is also the home of oil producers’ headquarters. Those oil producers play a strategic role for the Eurozone.

The Eurozone is officially called the Euro Area. It is an Economic and Monetary Union of the European Union. 18 countries of the EU have adopted the single Euro Currency up to now. The European Central Bank (ECB) determines the monetary policy of the Eurozone. The Eurozone was formerly composed of 11 member states when the Euro was introduced in 1999. However notes and coins replaced the local currencies only in 2002. Between these years, Greece fulfilled the criteria and joined in 2001. Since 2002, six countries joined the Eurozone, mostly from Eastern and Central Europe. Ten countries are not using the
Euro currency but are part of the European Union. However in 2015, Lithuania will adopt the Euro at his turn. The Euro area hosted around 334 Million of persons in 2013. The total GDP (Gross Domestic Product) accounts for $12.75 Trillion. The GNI (Gross National Income) per capita represents $38,333. As a title of comparison, the European Union has a GDP of $17.35 Trillion for a population of 506.7 Million in 2013, the United States of America has a GDP of $ 16.80 Trillion for a population of 316.1 Million in 2013, and China has a GDP of $9.240 Trillion for a population of 1.357 Billion the same year (The World Bank, 2014).

1.2 Problem background

After looking at the history overlook of the oil & gas industry and the Eurozone, a search for previous literature concerning this topic and this region was conducted. It seems that the Crude oil price was a topic that numerous studies have dived into. The main topics are the Effect of the crude oil price on the macroeconomics, the impact on stock returns and the market return of oil & gas companies. The latest studies focused on the effect of hedging against the fluctuation of crude oil prices, from the point of view of the producers and from the point of view of the buyers. The first must hedge against the decline in the price of crude oil while the second must protect themselves against price surges.

Carter et al. (2006) took the point of view of the Airline industry against the fluctuation of jet fuel prices that are directly linked to the crude oil prices. Their results show that “High jet fuel prices coincide with low industry cash flows, and industry investment is positively related to the level of jet fuel costs” (Carter et al., 2006, p 79) but they do point out that they “do not claim that airlines can magically increase value by increasing the amount of fuel hedged” (Carter et al., 2006, p 81). In that case it could be interesting to see firms’ financial performance in relation to of the crude oil price.

Concerning the oil producers, Pirog (2012) did a comparison of the financial performance of the major oil companies from 2007 until 2011 by using different financial ratios, his findings include: “During the period 2007 to 2011, the five major companies’ upstream activities of exploration and production contributed more to the total profitability of the firms than the downstream activities of refining and marketing.” (Pirog, 2012) Jin & Jorion (2006) and Mnasri et al. (2013) looked into the hedging practices of Oil & Gas producers mainly in the United States. Mnasri et al. (2013) took a panel of 150 firms from the United States and analysed their hedging strategies: what kind of derivatives they were using, in what proportions and how they mix them together to create their hedging strategy. They provided “novel evidence of the real implications of hedging strategy choice on stock price and risk sensitivity to oil and gas price fluctuations” (Mnasri et al, 2013, p. 49), therefore there is a relation between the crude oil price and the stock performance of Oil & Gas producers.

Our choice of market, the Eurozone, is also well studied with working papers like Oberndorfer’s analysis of the volatility and the returns of Eurozone energy stocks (Oberndorfer, 2008). This paper “show that oil market volatility negatively affects European oil and gas stocks” (Oberndorfer, 2008, p. 1) as well as a study of energy prices,
volatility and the stock market in the Eurozone. (Oberndorfer, 2009). Lameira et al., studied the performance of Eurozone energy companies (2012) and based their findings on four key ratios (return on assets, return on equity, return on capital employee and profit margin). Their aim was to compare the performance of energy companies with the economic activity of the countries where the firms operate. They did not use the crude oil price as a variable in the financial performance of IOCs, and Oil & Gas producers in general. Due to the lack of actual studies on the relationship between crude oil price and financial performance from IOCs of the Eurozone during the last decade, a study could be done to fill that knowledge gap.

1.3 Target Audience

As a continuation of the previous literature, this Master Thesis is written for anyone interested in the Oil & gas industry, especially in the performance of Oil & Gas firms, as well as in the relationship between the crude oil price and performance of IOCs. It should be understandable for everyone with basic understanding of accounting and financial terms, ratios and statistical analysis. This knowledge is recommended but not compulsory as we aim to explain most of the specific terms but also every step of our analysis. Therefore, our target audience are students in Financial or Energy studies as well as professionals interested in commodity markets in the Eurozone.

1.4 Research Question & objective

Based on the problem background, an appropriate objective could be to update the relationship between the crude oil price and Oil & Gas producers’ financial performance from 2004 to 2013 in the Eurozone. This period will enable us to evaluate IOCs’ performance before, during and after the Global Financial Crisis (GFC) of 2007-2008.

Research Question: What is the relationship between the crude oil price and the International Oil Companies’ financial performance in the Eurozone during the last ten years (2004-2013)?

Sub-question 1: Was there an impact of the crisis on the financial performance of the IOCs?
Sub-question 2: Is there a key indicator that affects the financial performance of IOCs in the Eurozone

Three directional hypotheses have been developed to answer the research question and the sub-questions. They are presented in the literature review chapter so as to link them with previous research.

1.5 Research Purpose

From the research question, the study’s purpose is to determine if there is a relationship between the crude oil price and the financial performance of IOCs in the Eurozone from 2004 until 2013. The study will serve the purpose of assessing the impact of the crude oil
price on their financial performance. Thanks to the theoretical background, the study’s results have the purpose to show that crude oil price is an indicator to take into account when dealing with financial performance in the Oil & Gas Industry, especially in developed countries like the Eurozone. As shown in the research objective part, the authors’ will try to assess scientifically if the crude oil price, one of the most important commodity price in the world, has an impact on the financial performance and therefore on the value of IOCs especially in the Eurozone. The choice of the Eurozone is motivated because this region is in one of the biggest demander of crude oil in the world today but without natural reserves like for example, the United States, Russia or the Middle East. The Eurozone is therefore obliged to purchase abroad to satisfy its thirst in energy.

In addition, by assessing the relationship between the crude oil price and the financial performance of IOCs, the study will try to enlighten some findings in the form of patterns and anomalies within the comparison. The authors expect to see a negative relationship between the crisis and the financial performance of IOCs since this crisis has not spared any industry nor country, but a scientific proven relationship could give investors and students a clearer view on the value of those companies. In addition, Hamilton (1983) found out that all crisis since the Second World War except one (in 1960) was preceded by a crude oil price hike in the US. This may lead to some significant effects on the financial performance on Oil & Gas companies. And finally, this comparison would be helpful for efficient portfolio and commodity management as to assess the International Oil Companies performance.

1.6 Research gap and Contribution

In their study, The International Monetary Fund (2000) states that the fluctuation of crude oil price affects economic activities as well as corporate earnings. As a follow up, Sauter & Awerbuch (2003) discovered that it is the volatility of the crude oil price that affects companies’ performance rather than the decline or the increase in the commodity’s price. Ramos & Veiga (2011) confirm that crude oil price is a price factor for producers.

With the growing importance of crude oil in the international economy, a real demand of studies in this field is visible. In addition, during the last decade, few studies have analysed the relationship between the crude oil prices with Oil & Gas producers’ financial performance and the studies end their time period with the end of the financial crisis. Lameira et al. (2012) studied the performance of the Eurozone’s energy companies based on their industry sector (electricity, oil & gas, etc.) and write that further research could “insert other variables that may promote differences in the performance of energy companies” and “[future] research may increase the period investigated” (Lameira et al., 2012, p 5). Dayanandan & Donker (2011) did study the relationship between the crude oil price and the ROE of Oil & Gas companies in the US and used the Asian crisis, the events of 9/11 and the global financial crisis (2007-2008) as interaction dummy variables in their mathematical model. However, they did not look into the direct effect of the crisis on the Oil & Gas companies and since their sample was US based firms, they did not take into
account the start of the European recession in 2009. In addition, Dayanandan & Donker
state that “there are virtually no studies on the impact of oil prices on accounting measures
of performance of oil and gas companies” (2011, p. 253).

Concerning the Eurozone, studies tend to stick the topics outlined in the problem
background, the market value and the stock return of oil & gas companies. Oberndorfer
(2008) studied the return and the volatility of stocks from the energy industry in the
Eurozone. Therefore, it seems a research gap exist, there are not any study done to
determine the relationship between the crude oil price and IOCs’ financial performance
based on financial ratios.

The contribution of this paper to the literature on the crude oil price is to continue the
findings of Dayanandan & Donker (2011). It can be done by adding two financial ratios:
the ROA and the Profit Margin to the ROE as dependent variables. Those two financial
ratios are used to determine the relationship of the crude oil price with different aspects of
the financial performance of IOCs. The contribution of this paper is also visible with a
different time horizon, from 2004 to 2013 to be able to assess the effect of the three main
years of the global financial crisis (2007, 2008 and 2009) on the financial performance of
IOCs. Finally, the contribution of this paper is to determine this relationship on a specific
region: the Eurozone. Dayanandan & Donker (2011) study focuses on the 200 largest oil
and gas companies listed on the US stock exchange between the periods of 1990 to 2008.

1.7 Delimitations

The choice of this subject created delimitations. First of all, the time period can be seen as
constraint since more data and more research could be done with a longer period.
Nonetheless the authors chose to analyse a period of ten years to focus on the last available
data as well as studied before, during and after a financial crisis.

Secondly, the geographical delimitation has an effect on the study. Indeed the study
analyses Oil & Gas producers in the Eurozone because the authors come from those
countries and to make it convenient for academic and practical purposes in Europe. The
choice of the Eurozone is also more convenient for using a single currency.

Thirdly, the choice of commodity, and financial ratios is also a constraint. Indeed the
choice of Brent crude oil was motivated on the basis that it is the benchmark for the
European Market. The financial ratios were picked on the data available and on their
relevance to indicate the level of performance of the Oil & Gas producers.

1.8 Disposition

Chapter 1 – Introduction
This chapter, as its title says, introduces the topic of the Oil & Gas industry. The first part
deals with a quick history of the Oil & Gas industry and its place after World War Two and
its shocks during the 1970s. The background is followed by the presentation of our research
idea and its clarification. The problem background is stated afterward with the research question and the knowledge gap, research purpose and delimitations. The Research Model concludes this Chapter by giving a visual representation of the thesis’ disposition.

Chapter 2 – Methodology
This chapter states the research philosophy, research approach, research types, research methodology and research strategy. It also elaborates the data collection method and the literature source. In addition, this chapter states the ethical issues (the validity and the reliability) of the study.

Chapter 3 – Literature review
In this chapter, the theories chosen by the authors that were related to the research question are presented. It starts with the capital structure effect on financial performance previous literature. Thereafter the Brent blend crude oil’s importance as a commodity is presented. The crisis is also discussed in this chapter. Finally, the chapter starts the relationship of the crude oil price with energy companies.

Chapter 4 – Practical Method
The practical method describes how the regression analysis is going to be conducted. It starts with assuming the hypotheses of time horizon and sample data. It also explains how the data was collected and the list of dependent, independent and control variable used in the regression model.

Chapter 5 – Empirical results
This part exposes the results of the research. It follows on the regression model announced in the previous chapter. The data collected are summarized in this part. Even though the results are not interpreted yet, they are shown as final results after experimentation.

Chapter 6 – Analysis & Discussion
As mentioned before, the analysis and discussion part is post-experimental. It uses the empirical results to formulate a clear analysis, with deduction as mentioned in the following chapter.

Chapter 7 – Conclusion & Recommendation
This part sums up the study realized and formulate recommendations. The authors express a personal point of view on this subject. It will be addressed mainly to investors and researchers. It will answer the research question and sub questions. It would also allow readers to make further research on subjects this study chose not to go deeper into.
Chapter 2 – Methodology

This chapter will present the research philosophies, the research approaches, the research types, the research strategies, research method and the data collection process used to conduct this study. The authors present each choice possible for researchers in the field of business administration and present their choices for this study. In the end of the chapter, the quality and ethical issues of this research is discussed such as validity, reliability and replicability.

2.1 Choice of subject

This subject came to the authors, as they wanted from the beginning to study oil and gas companies. Although not sure at first to contribute on the relationship of the crude oil price and their financial performance, it was obvious to them that the Energy and Commodity sector was an interesting field of study. The Oil & Gas Industry is a dynamic sector but also very segmented among its participants. The authors decided to choose the International Oil Companies, and not all actors of the Oil & Gas Industry as it was more interesting to study major players in this market. Although they produce oil and gas, the choice was made to focus on oil production only: and especially on the effect of the Oil price and not Gas price. The Oil price were thought to reflect the market, and have could have more impact on the firm performances than the Gas price. One of the authors has experienced different internships in the banking industry financing Oil & Gas companies. This has undoubtedly influenced the choice of the field of study.

2.2 Preconception

In order to conduct this thesis, it was obvious that reducing the bias, as much as possible, was an end it itself. Some bias may occur for instance when the authors of the thesis already have a preconception of the subject. This can be due to the previous knowledge or experiences of the authors. As both authors have made the same studies of Master in Finance, they should have the same theoretical knowledge and preconception about this subject. From a practical point of view, it is clear that every individual has its own life experience. Some preconception may have come with the previous practical knowledge of one of the author. The Oil & Gas Industry and its particularities didn’t seem completely unfamiliar. Although it could be a source of bias between the visions of both authors, it has been more a tool to reduce the misconceptions about this field.

Misconception is also a key concept to reduce. It is one of the main goals of research to reduce it. The authors intended to conduct this thesis with as little misconception as possible.
2.3 Perspective

Perspective is a matter of targeting the right audience. As described before, the authors aim to add and update financial information for students and professionals of the Commodity Industry, especially those interested in studying the Oil firms’ financial performance. Therefore the authors will try to conduct this study with an Oil Professional’s perspective: it could be from an investor’s perspective, as we will determine the relationship between the crude oil price and the financial performance of those firms; from a researcher’s perspective trying to update his knowledge about this industry; from any professional within Oil & Gas firms trying to get specific indicators of performance for its own firm or its competitors (including financial analysts); and finally from a student’s perspective to get him/her to discover the Oil & Gas Industry.

2.4 Research pyramid

![Research Pyramid](image)

Figure 1. Research Pyramid

Figure 1 presents the structure of the research methodology of the study. The base of the pyramid, and the study, concerns the research philosophy that explains the philosophical standpoint of the research study. The second level of the pyramid is the research approach, which states how the study involves the existing theories. The third level of the pyramid
states the type of study performed. The fourth and last levels present the research design and research methodology of the study.

2.5 Research Philosophy

This chapter presents the direction of the study and the perspective of the authors towards the study with social reality. Research philosophy has two standpoints: Ontology and Epistemology (Bryman & Bell, 2011, p. 22).

2.5.1 Ontology

We can define ontology as the description of reality and how it can be understood. Ontological questions tend to explain relationship between society and people. Bryman & Bell (2011, p. 20) write that, “the central point of orientation here is the question of whether social entities can and should be considered objective entities that have a reality external to social actors, or whether they can and should be considered social construction built up from the perceptions and actions of social actors”. There are two main sections of social ontology: Objectivism and Constructionism. Objectivism position asserts that social phenomena and their meaning have an existence that is independent of social actors and beyond any influence. On the other side, constructionism is based on the belief that social phenomena and their meanings are continually being accomplished by social actors and therefore, in constant change. (Bryman & Bell, 2011, p. 21 & 22).

This study’s ontological position is objectivism since the main purpose of the study is to assess the relationship between the crude oil price with the financial performance of International Oil Companies in the Eurozone over a period of ten years. The Data needed for this study are independent variables (crude oil price, size, debt level, country) and the dependent variables (ROA, ROE, Profit Margin) were collected from a financial database. Independent actors collected the data prior to this study therefore the data was not influence or tampered with by other social actors. The data was analysed statistically (refer to the research methodology chapter) to discover more about the relationship between the crude oil price and the financial performance of International Oil Companies in the Eurozone. Consequently, the data is independent from the social actors and fulfils the objectivism position.

2.5.2 Epistemology

Epistemology is the study of knowledge and justified belief. (Steup, 2014, p 1). From Bryman & Bell, “An epistemological issue concerns the question of what is or should be regarded as acceptable knowledge in a discipline.” (Bryman & Bell, 2011, p 15). There are three main epistemological position, positivism, interpretivism and realism. “Positivism is an epistemological position that advocates the application of the methods of the natural sciences to the study of social reality and beyond.” (Bryman & Bell, 2011, p. 15). Positivism main assumption is that “the researcher is independent of and neither affects nor is affected by the subject of the research” (Remenyi et al., 1998:32; as cited in Saunders et al., 2009, p.114).
The second epistemological position, interpretivism, asserts “that a strategy is required that respects the differences between people and the objects of the natural sciences and therefore requires the social scientist to grasp the subjective meaning of social action.” (Bryman & Bell, 2011, p. 16). This epistemological position is adapted to business students since “the researchers have to adopt an empathetic stance.” (Saunders, et al., 2009, p. 116).

The last epistemological position, realism, “is a branch of epistemology which is similar to positivism in that it assumes a scientific approach to the development of knowledge” (Saunders et al., 2012, p. 116).

For the study research purpose, the positivism was the best epistemological choice since the aim of the study is to determine the relationship between the crude oil price and the financial performance of International Oil Companies. Furthermore, the study does not present new theories, it builds and tests new hypotheses with existing theories.

### 2.6 Research Approach

There are two main research approaches, a deductive approach or an inductive approach. Deductive theory is the most common approach of the relationship between research and theory. In this approach, a researcher must deduce hypotheses from the theory on a particular domain that must be subjected to empirical findings. The data found is then used to confirm or reject the hypotheses. The inductive approach is the other way around, theory is the outcome of research. The process involves drawing generalizable inferences out of observations (Bryman & Bell, 2011).
This study takes the deductive approach since it states already existing theories and doesn't create new ones. The same goes for the hypotheses; they have been constructed considering previous studies on the same subject. The study will then use the data collected to reject or confirm the hypotheses that will then be tested against the selected theories.

2.7 Type of Study

There are three types of studies: explanatory, exploratory and descriptive (Saunders et al. 2009, pp.139-140). The first one refers to studies that try to find casual linkages between variables. Exploratory studies focus on clarifying the understanding of the subject, to find new ideas and solutions. And finally, a descriptive study tries to identify an accurate profile of a situation but doesn’t take into account the casual linkages of the elements (Saunders et al., 2009, pp. 139-140). This study chose to combine two types of studies, exploratory and descriptive. This choice is based on the purpose of the study, to determine the relationship between of the crude oil price with Oil & Gas producers in the Eurozone.

2.8 Research design

This chapter deals with the general plan of the study for answering the research question. Bryman & Bell (2011) outline five different research designs:

The Experimental design: it involves conducting a true experiment. This means constructing a theoretical hypothesis, sampling from the populations and experimenting in different condition.

The Cross-sectional design: which is often called a social survey design. “It deals with the collection of data on more than one case […] and at a single point in time in order to collect a body of quantitative or qualitative data in connection with two or more variable […], which are then examined to detect patterns of associations” (Bryman & Bell, 2011, p. 53).

The Longitudinal design: it is typically used to analyse changes in business and management research (Bryman & Bell, 2011, p. 57). Longitudinal design is close to the cross-sectional design. It adds, however, an insight to the time order of variables and thus allows more analysis. (Bryman & Bell, 2011, p. 58).

The Case study design: “the basic case study entails the detailed and intensive analysis of a single case” (Bryman & Bell, 2011, p. 59)

The Comparative Design: “This design entails the study using more or less identical methods of two or more contrasting cases” (Bryman & Bell, 2011, p. 63).

For the empirical study, the time period covers ten years (from 2004 to 2013). The data, composed of financial ratios (ROE, ROA, Profit Margin) and commodity prices (Crude oil prices) has been obtained on the DataStream database and control variables (dummy variables including size of companies and country of origin) that were created by the authors based on the data from DataStream (Natural Logarithm of Total Assets and
Country of origin). The analysis of changes throughout the ten years makes the choice of a cross-sectional and longitudinal design the best adapted to answer the research question.

2.9 Research Method

Research method concerns the data collection techniques and the method of analysis of the data. There are two main research methods, quantitative methods and qualitative methods. The first one is defined as “a research strategy that emphasizes quantification in the collection and analysis of data” (Bryman & Bell, 2011, p. 26). The second one is construed as “a research strategy that usually emphasizes words rather than quantification in the collection and analysis of data” (Bryman & Bell, 2011, p. 27). Table 1 sums up the categories of research methods. It states that for positivism as epistemological orientation and objectivism as ontological position, a quantitative research method is the most appropriate.

<table>
<thead>
<tr>
<th>Principal orientation to the role of theory in relation to research</th>
<th>Quantitative</th>
<th>Qualitative</th>
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<tbody>
<tr>
<td><strong>Epistemological orientation</strong></td>
<td>Deductive; testing of theory</td>
<td>Inductive; generation of theory</td>
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<tr>
<td><strong>Ontological orientation</strong></td>
<td>Natural science model, in particular positivism</td>
<td>Interpretivism</td>
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<td><strong>Table 1. Research Method</strong></td>
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With this information, the best research strategy for this study is the quantitative approach since the collection of data concerns stock prices and financial ratios.

For the theoretical framework, academic literature was used and came from Umeå University library, Google scholar and the Mendeley database. The numerical part was collected on the DataStream database of Thomson Reuters for the crude oil price, the International Oil Companies’ financial performance ratios.

The advantage of secondary data is that it enables data collection easily, cheaply and quickly, thus giving more time to do a longitudinal analysis.

2.10 Literature and Data source

After selecting the research strategy comes the selection of data and literature source. The different types of data sources are primary, secondary and tertiary. The first open concerns the data that comes from direct collection, the second one is the data collected by a third party and the last category is the data from the first and second category aggregated under the form of indexes (Saunders et al., 2009, p. 51).

The study will use secondary data since it will be collected from academic literature, books and database. It will be mainly using historical data and literature. The main advantages of
using secondary data is that enables data collection easily, cheaply and quickly, thus it is best suited for longitudinal analysis (Bryman & Bell, 2011, p. 313-320). However there are three main drawbacks on using secondary data. The first one is that the researchers may lack an understanding of the data, the second is that the data may be unfamiliar for the researcher and lastly, the researchers have no control on the quality of the data collected (Bryman & Bell, 2011, p. 320-321). This study uses reliable sources for data collection and the researchers are quite familiar with commodities prices and financial ratios using financial studies and practical knowledge during previous internships.

The data collected for the Thomson’s financial database DataStream is, from the point of view of the authors, free from bias and effect. The sources and scientific articles and research were taken from serious database (Mendeley, JTOR and the Umeå Library database) used by researchers from around the globe. There was no hesitation to use that database since they are reputable and credible.

2.11 Reliability, Replicability and Validity

Reliability, replicability and validity are three quality criteria that must be complied with by any academic study.

Reliability deals with the possibility of the results of the thesis being repeatable. This criteria is linked to quantitative research (Bryman & Bell, 2011, p. 41).

Replicating findings of a thesis should be possible if the same data and the same model is used by another researcher. Therefore a study should state clearly its procedure for others to replicate it (Bryman & Bell, 2011, p. 41). This study collected publicly available data, to replicate the research done, other researchers will have to use our same time period and the same source.

Validity refers to the integrity of the conclusions generated from the research and Bryman & Bell (2011) consider it the most important criterion in a research. There are four categories of validity: measurement validity, internal validity, external validity and ecological validity. The first one deals with the measures if they are reflecting what they are intended to represent. The data was processed with Microsoft Excel and SPSS for the regression analysis and will be explained in the following chapter. The second category refers to the causality of the measurement and the relationship between variables (Bryman & Bell, 2011, p. 42). Since this study will determine the relationship between crude oil prices and the crisis with Oil & Gas producers’ financial performances. The third category answers the question if a result from a research can be generalized beyond a specific research context (Bryman & Bell, 2011).

Selecting the Oil & Gas industry, the crude oil commodity and collecting the data on the DataStream database has prevented the quality of the study’s results to be affected by other factors. Nonetheless, the study should not be generalized over other industries and variables. The last criteria, ecological validity is defined as “concerned with the questions of whether or not social scientific findings are applicable to people’s every day, natural
social settings” (Bryman & Bell, 2011, p. 43). Since the study can be relevant for investors and thus affect their behaviour, this validity criterion is quite relevant for this research.

2.12 Research Ethics & Societal Issues

Research Ethics is important in any research project independently of the choice of selecting primary or secondary data (Saunders et al., 2012, p. 208). Since this study is focused on the relationship between the crude oil price and the International Oil Companies financial performance the authors are conducting a quantitative approach with analysis of collected secondary data. Umeå School of Business and Economics provides a thesis manual to guide students while they write their thesis. The manual contains all that is needed to structure the thesis as well as ethical guidelines to follow during the research.

Ethics are “the standards of behaviour that guide your conduct in relation to the rights of those who become the subject of your works, or are affected by it” (Saunders et al., 2012, p.226). Ethical issues can be associated with the collection of data. Indeed, for this study, the authors had to collect data on the DataStream. One of the issues possible brought up by Saunders et al. (2012) is the copyright issue when collecting the data and analysing it. How the data is managed is an additional problem.

While collecting data, researchers should make sure that they maintain their objectivity and collect accurate data to avoid subjective selecting of data, which would hurt the validity and reliability of the research (Saunders et al., 2012, p. 241). A high level of integrity is asked during the analysis part of the research. Indeed a great degree of trust is put into the researchers to present honest and trustworthy findings (Saunders et al., 2012, p. 245).

The study follows an objective approach towards the data without any presumed results. The authors have also used the Harvard referencing system for all the literature collected to give the reader the chance to validate the collected data and information. The data of the market were collected using the DataStream database form Thomson Reuters therefore the data is presumed to be valid and correct. In addition to the thesis manual, Umeå School of Business and Economics appoints to every research group a supervisor whose role is to guide and give advice on ethical problems and has to approve the research before its publishing.

This study with valid resources has the purpose to extend the knowledge of investors. Critical examination of the crude oil price’s relation towards the financial performance of Oil & Gas producers will contribute to a better valuation of the energy industry and help investors choose which company to invest in.
Chapter 3 - Theoretical and Literature Framework

This chapter details the different theories, concepts and studies that were found important for the study of the relationship of the crude oil price with International Oil Companies financial performance. The first part deals with the Firm performance. The second part will describe the Oil & Gas industry and the last part will present the hypotheses of this study.

3.1 Firm Performance

Firm performance is a diverse subject and can be measured with different ratios such as the return on equity (ROE), return on assets (ROA), Earnings before interest and taxes (EBIT) and net income (Degryse et al., 2010; Zahra & Pearce, 1989), stock market returns and stock volatility (O’Brien, 2003; Muzir, 2011) but also Tobin’s q ratio that links together market values and accounting values (O’Brien, 2003).

Numerous studies have looked into the performance of companies and its relationship with their capital structure. Capital structure refers to the choice of debt and equity in a firms’ capital. It also refers to the type of debt used by companies (long term and short term debt) (Margaritis & Psillaki, 2010; La Rocca & La Rocca, 2007). It is argued to be crucial for businesses to find a good balance of debt and equity to be able to maximize their value. Different theories refer to the capital structure. Some deal with the effect of financial performance on capital structure (Pecking-order theory, Efficiency-risk hypothesis and Franchise-value hypothesis), this research will only focus on the theories dealing with the effects of capital structure on financial performance such as the trade-off theory and the agency cost theory.

3.1.1 Trade-off theory

This theory discusses the choice of capital structure but also its effects on firms’ financial performance. It focuses on how firms choose their level of debt by a trade-off between benefits and costs of debt. Firms are substituting debt for equity to maximize its value. Therefore the trade-off theory is the balancing of the benefits and costs of debt financing to have optimal capital structure. The trade-off theory give a positive relationship between level of debt and a firm’s performance because the optimal debt level will decrease the firm’s cost of capital and thus increase its financial performance (Titman & Wessels, 1998, p. 3).

Therefore, firms use high leverage to benefit from tax shield to maximize its financial performance. Firms tend to push the debt level until it reaches the optimal level which is when a trade-off between benefits and cost of that debt (Titman & Wessels, 1998, p. 3).

Numerous studies support the positive relationship between debt level and firm’s performance (Berger & Bonaccorsidipatti, 2006; Champion, 1999; Ghosh et al., 2000; Hadlock & James, 2002; Roden & Lewellen, 1995; Taub, 1975). However, some studies have a different view on the relationship between level of debt and financial performance. Indeed Fama & French (1999) and Myers (1984) found a negative relationship between
profitability and leverage. In addition, the theory states that firm size affects debt level and financial performance. Indeed, bigger firms have less adjustment costs and have more easily access to credit and benefit more from tax shield.

3.1.2 Agency Theory

This theory from Jensen & Meckling (1976) also deals with the effects of capital structure on firms’ financial performance. The authors define the agency relationship inside a company as “a contract under which one or more person (the principal) engages another person (the agent) to perform some service on their behalf which involves delegating some decision making authority to the agent.” (Jensen & Meckling, 1976, p. 308)

The agency theory states that a high debt ratio is related to a high financial performance. Leverage affects agency costs and thus affects firm performance (Berger & Bonaccorsidipatti, 2006, p. 1069).

Both trade-off theory and agency theory assert that the leverage level of a firm affects its financial results. Therefore this ratio should be taken into account when dealing with financial performance of companies.

3.1.3 Firm size

As said before, firm size has an effect on capital structure choice and therefore on financial performance of companies. This is explained by the fact that smaller companies have less facility to obtain external financing than bigger ones or at a higher cost. This is argued from the asymmetry of information between the lenders and the small companies since the first have lack of information on the smaller firms or can’t evaluate them as shown by Degryse et al. (2010) and Lindblom et al. (2011). But there are other reasons why smaller firms cannot pretend to achieve the same financial performance of bigger firms:

Transaction costs: Larger firms have scale advantages that reduces the transaction costs (Degryse et al., 2010; Lindblom et al., 2011)

Market access: the access of the stock market is one way for companies to get external financing. However, smaller companies might not have access to it or have a lower reputation than larger firms (Degryse et al., 2010; Lindblom et al., 2011).

Bankruptcy costs: this is negatively correlated with firm size since larger firms tend to have lower bankruptcy cost (Degryse et al., 2010; Lindblom et al., 2011).

Operating risk: This risk is also negatively related to firm size. Indeed, smaller companies should use less debt and external financing when compared to bigger ones since the operating risk are higher in smaller firms.

Therefore, firm size has an effect on financial performance and should be taken into account when research is made on this subject.
3.1.4 Country risk

Numerous studies have evaluated the risk of the country of origin of companies regarding their cost of capital. Harvey (2004) linked the country risk measures to cost of equity for firms in emerging countries, thus affecting financial performance of companies. Koedijk, Kool, Van Dijk & Schotman (2001, cited in Lameira et al. 2012, p. 1) have used local and international asset pricing models to calculate cost of capitals of firms and found differences due to country variables that impact financial performance. That literature infers that location of companies can have an effect on their financial performance.

3.2 The Oil & Gas industry

3.2.1 Oil & Gas activities

The Oil & Gas industry is divided in two sectors: the upstream sector and the downstream sector. The upstream deals with the oil and gas exploration and production and the downstream with the activities after the production phase, refining and marketing petroleum products. Even if there are different sectors in the industry, some companies are engaged in all phase of the business as well as transportation, petrochemical and renewable fuels operations. The fuel market includes Oil & Gas producers; the prices for these commodities were fixed until 1985 when the OPEC pricing regime collapsed and thus leaving place for a forward and spot market. (Eydeland & Wolyniec, 2003, p.2). This paper will focus only on the upstream sector, especially production, although the major companies are diversified in every sector.

3.2.2 Types of Oil & Gas

A distinction must be made first between Oil and Natural Gas. Oil itself can be divided into Crude Oil and Refined Products. Crude oil is a natural unrefined petroleum product composed of hydrocarbon deposits. To produce gasoline, kerosene or heat gas for instance, the crude oil needs to be refined. Crude oil has different variant based on their sulphur content and gravity. It can vary in colour, composition and consistency. The world benchmark for crude oil prices is the Brent blend since two third of the world production is priced in accordance to this blend. Other worldwide benchmarks are the West Texas Intermediate (WTI) for the United States and the Dubai blend for the Middle East. (Eydeland & Wolyniec, 2003, p.2). The Commodities forward market is conducted on the intercontinental exchange (ICE) in Europe and on the New York Mercantile Exchange (NYMEX) in the United States. The NYMEX most quoted crude oil price is the sweet crude oil price, in reference to the level of sulphur of the Brent blend. The Brent blend is considered a sweet crude oil because it has a level of sulphur under 0.5% (0.37%). This commodity is priced in dollars and traded throughout the year on contracts each equating 1,000 barrels. (Eydeland & Wolyniec, 2003, p.2). “The crude oil market is the largest commodity market in the world. The most significant trading hubs are New York, London, and Singapore. These markets trade crude oil as well as refined products such as gasoline and heating oil.” (Eydeland & Wolyniec, 2003, p. 2).
This Blend is usually used in academic literature dealing with the Oil & Gas industry in Europe, for example, Ringlund et al. (2008) use the four main benchmarks for their study of reactions on oil rig activities on fluctuation of oil prices around the world: WTI for the United States, Brent blend for Europe and Dubai for the Middle East. (Ringlund et al., 2008, p. 376).

3.2.3 Different players in the Oil & Gas Producers

There are three different types of companies in the Oil & Gas production industry.

Firstly, International Oil Companies (IOCs): Majors and Independent. It also exists the distinction among the majors of the Supermajors: BP, Chevron, ExxonMobil, Royal Dutch Shell and Total. They are the biggest IOCs and sometimes referred to as “Big Oil”. The Top 3 IOCs in 2011 were Exxon Mobil (3% of the world oil production), BP (3%) and Royal Dutch Shell (2%). (EIA, 2013) The Supermajors emerged in the 1990s after several mergers that announced the end of the “Seven Sisters”: BP (Anglo-Persian Oil Company at the time), Esso (Standard Oil of New Jersey), Gulf Oil, ExxonMobil (Standard Oil Company of New York – Socony), Royal Dutch Shell, SoCal (Standard Oil of California) and Chevron (Texaco). These companies were called like that by Enrico Mattei former CEO of ENI (Hoyos, 2007). These seven companies were famous in the 1950s for controlling around 85% of the worldwide reserves. (The Economist, 2013). The situation has been reversed nowadays with the emergence of the National Oil Companies.

The second category is National Oil Companies (NOCs): state-owned companies that are an extension of the government. These companies control around 85% of the worldwide proved oil reserves in 2010, and 58% of the production in 2010 and 2011. Many NOCs are members of the Organization of the Petroleum Exporting Countries (OPEC). The most important NOCs are Saudi Aramco (Saudi Arabia) with 12% of the world production in 2011, National Iranian Oil Co (NIOC – Iran) with 5%, China National Petroleum Corp (CNPC – China) with 4%, Petroles de Venezuela SA (PdVSA) with 3%... (EIA, 2013).

The third category includes NOCs with strategic and operational autonomy. They operate as a mix of traditional NOCs and IOCs: seeking profit but also caring about the country’s development. Some examples are Petrobras in Brazil and Statoil in Norway. (EIA, 2013). The 4 NOCs mentioned in the 2nd category along with Petrobras, Petronas from Malaysia and Gazprom from Russia form the “new seven sisters” according to the Financial Times (Hoyos, 2007).

In this paper, we will focus on the International Oil Companies as it might be interesting to understand what became of the former most important Oil companies in the world and how well they perform nowadays. Why did they leave their leader seats to the NOCs is not the subject here, it is rather preferable to study what is their present and how their future looks like. Moreover as time is a matter of perspective, their performance before, during and after the crisis is essential to see if they can still compete with the new leading NOCs.
The delimitation of the Eurozone also leaves the NOCs out of the studied perimeter: indeed, most of them are outside Europe and Norway (with Statoil) is not using the Euro currency.

3.2.4 Oil price effect on financial performance

In a previous study, the International Monetary Fund (IMF) (2000) states that the fluctuation in crude oil prices affects economic activity, corporate earnings, inflation and monetary policies that affect financial markets. It is current and future information about the economic health of a firm that reflect the asset price on the stock market (Bjørnland, 2008, p.6). Bjørnland also states in his study (2008, p. 6) that asset prices are calculated with the present discounted value of future net earnings of the firm. Therefore the cash flows take into account the current and future impacts of the fluctuation of crude oil prices. However there seems to be more affecting economic activities than just the fluctuation of crude oil prices. Sauter & Awerbuch (2003, p. 11), discovered that since “the 1980s, oil price volatility is more significant in its effects on economic activity than the oil price level”.

Ramos & Veiga (2011), with a study of 29 countries, found evidence that crude oil price is a priced factor for the Oil & Gas industry and that companies in developed countries are more affected to oil price changes than emerging markets. At the same time, Dayanandan & Donker (2011), present evidence that crude oil price affects Oil & Gas producers positively in North America.

As of Europe, Mohanty et al. (2010) look into the relationship between the crude oil price and oil producer stock return in Central and Eastern Europe (CEE) and found no real relation between the crude oil price and the stock return during the period of 1998 – 2010. Two years later, Lameira et al. (2012, p. 5), show evidence that “in the period between 2005 and 2009 have allowed to infer that the oil and gas sector has the highest profitability among energy companies located in Eurozone”. Their study agrees with the findings of Ramos & Veiga (2011). They also state “it is not reasonable to expect significant differences in performance of energy companies due to its location” (Lameira et al., 2012, p. 5). However, Lameira et al. do not use the crude oil price as a variable in their mathematical model. Indeed their study compared the energy industry based on their sectors (Electricity sector, Oil & Gas sector and holding companies).

3.2.5 The Crisis and its effects on the Oil & Gas Companies in the Eurozone

*The Global Financial Crisis*

“Starting in 2007, the United States experienced the worst financial crisis since the 1930s. The crisis spread rapidly from the United States to other countries and from financial markets to the real economy.” (Hull, 2012, p. 121). This crisis started with the burst of a housing bubble in the US market. This affected the subprime mortgage lending that are mortgages that are considered to be more risky than average (Hull, 2012, p. 121). These borrowers increased the demand for real estate and the prices rose. “To mortgage brokers
and mortgage lenders, the combination of more lending and rising house prices was attractive. More lending meant bigger profits. Rising houses prices meant that the lending was well covered by the underlying collateral. If the borrower defaulted, the resulting foreclosure would lead to little or no loss.” (Hull, 2012, p. 122).

Those mortgages were then engineered in pools of low-risk asset back securities (ABS) called collateralized debt obligations (CDOs). An ABS is “a security created from the cash flows of financial assets such as loans, bonds, credit card receivables, mortgages, auto loans, and aircraft leases (Hull, 2012, p. 125). In addition, a re-securitization occurred which led to the creation of ABS of CDOs and CDOs of CDOs. (Hull, 2012, p. 128) Some of those financial securities tranches were attributed a triple-A credit rating from Moody’s, Standard & Poor’s and others which qualified them as a safe investment. “When the housing market turned, a chain reaction exposed fragilities in the financial system” (The Economist, 2013). Indeed, the securities backed by mortgage decreased fairly quickly in value and the safety of the CDOs disappeared. This created a situation where banks had to revalue all of their assets to current prices and therefore write losses. The situation obligated banks to withhold short-term credit thus slowing down the economy. Alan Greenspan, Chairman of the Federal Reserve Board, describes the behaviour of investors during the bull market of the 1990s as “Irrational Exuberance”. “This can be attributed also to the investors during the credit crisis. The causes of a financial crisis of these amplitudes where quite simple: the lack of regulators oversight, the blind acceptance of rating agencies. The other one was the globalization of the financial markets and the power of American banks in the world.

Its effect on the oil & gas companies

In 2009 already, the cutbacks in the upstream investments worldwide were estimated around 21% compared to 2008, so approximately $100 Bn. Many projects were deferred or cancelled during the crisis. (International Energy Agency, 2009, p. 3)

Major Oil & Gas Companies are more willing to survive the crisis than the smaller ones. Indeed, the biggest companies have more ability to face unexpected events. The Oil & Gas investments have known a major drop in 2009, especially for the smaller companies. “In general, the smaller the company, the bigger the cutback”. The Top 50 Oil & Gas companies’ investments dropped by 14% in 2009 compared to 2008. However super-majors companies (ExxonMobil, Shell, BP, Chevron and Total) only cut their capital-spending plan by 5%. The Upstream industry has been the more hit by the investments cutbacks in 2008-2009. (International Energy Agency, 2009, p. 22). Dayanandan & Donker (2011) used an interaction variable in their regression model to assess the effect of the crisis on oil prices. Their conclusions are that the crisis had a negative impact on the oil price (2011, p. 256).

The Oil & Gas Industry has its own characteristics: high self-financing and low Debt-to-Equity ratios. Once again, International Oil Companies, called Majors, confront less difficulty raising the capital needed than smaller ones. The Majors investments represent 50% of the global investments in this industry. As they use more internal cash flow and less external borrowing for their needs, they are less dependent of the financial markets. All
players have been affected by the crisis but in different levels depending on their size. (International Energy Agency, 2009, p. 22)

The oil prices have been adversely affected by the financial crisis, in two different ways: firstly the panic effect, when the crisis became a reality for all players of the Oil & Gas Market, led the traders and operators to liquidate suddenly their position. This is often known to lead to great changes in listed prices. The other channel is through the global decrease of commodity demand as the World economies began a phase of recession. (Economic and Social Commission for Western Asia ESCWA, 2009, p. 3). Reversely, it is also said that high oil prices didn’t help some economies to get out of the crisis. (International Energy Agency, 2009, p. 9)

*Crisis effects on the Eurozone*

The European Union and the members of the Euro area took different but many measures to sustain stability, growth and employment as a response to the financial crisis. The crisis had especially a major impact on the public and private debt levels in Europe. Competitiveness also suffers from it. Many measures were addressed to protect the Eurozone but most of them also applied to the entire European Union. They had two main channels in their response: to maintain the financial stability of the Eurozone and strengthen its administration, policy and architecture. In 2011 for instance the “six-pack” a legislative package on economic governance came to support the existing Stability and Growth Pact (SGP). This six-pack focuses on avoiding and correcting macroeconomic imbalances. The “two-pack” in 2013 also adds some characteristics to the previous legislations: improving budgetary coordination and economic and financial surveillance. In addition of new authorities of supervision of financial institutions, the Eurozone created a mechanism of crisis management called the European Stability Mechanism (ESM). This mechanism, with a budget capacity of €500 Bn, is permanent contrary to the previous ones. (Eurozone Portal, 2014).

**3.3 Hypotheses development**

Three directional hypotheses were developed on the possible relationship of the oil price with the financial performance of Oil & Gas producers.

**3.3.1 Hypothesis 1**

Lameira et al. (2012) studied the performance of Eurozone energy companies and their conclusion is that “the oil and gas sector has the highest profitability among energy companies located in Eurozone” (Lameira et al., 2012, p. 5). Pirog (2012) who studied the profitability of the major oil companies states that “The Oil & Gas industry tends to become highly profitable when the price of crude oil rises” (Pirog, 2012, p. 9). From this theoretical background, the authors will determine the relationship between the crude oil prices with the financial performance of IOCs from the Eurozone. Therefore, from the literature the first hypothesis of this research is a directional hypothesis:
Hypothesis 1: The Crude Oil Price is positively associated with the financial performance of Oil & Gas Companies.

3.3.2 Hypothesis 2

The International Energy Agency drew several comparisons already in 2009 about the effects of the GFC on the Oil & Gas Industry. Dayanandan & Donker (2011) studied the effect of the crisis on the oil price before determining the relationship of the crude oil price with the financial performance of oil producers. It might be interesting to see, if the performance of the International Oil Companies have been affected directly by the crisis. This analysis is possible since the performance data are available for years before, during and after the crisis.

Hypothesis 2: The crisis is negatively associated with the financial performance of the IOCs.

3.3.4 Hypothesis 3

Majors and Supermajors are more willing to survive the crisis: their performance is less affected than smaller companies. This is the idea promoted by the US IEA (International Energy Agency, 2009, p. 22) Therefore the Size of the company should influence their performance. As mentioned before, Degryse et al. (2010) argued that the firm size has an effect on the capital structure choice and therefore on the financial performance of companies. Lindblom et al. (2011) came to the same conclusion. These authors give different reasons proving that smaller firms have less access to information and markets, but also more costs and risks.

Hypothesis 3: The size of IOCs is positively associated with the financial performance of IOCs.

Therefore the size of a company can be measured by the size of its assets in its Balance Sheet. The point here is not to study if the size of the assets have changed due to the crisis - i.e. looking at their size before, during and after the crisis – but if the financial performance of companies is related to their size.

3.3.6 Hypotheses testing

To test those hypotheses, the SPSS software will be used with the Pearson Product-Method Correlation test to test the data and a multiple regression model using the Ordinary Least Squares (OLS) will be conducted. The t-statistics will be used to test that the sample is reflected within the population (Bryman & Bell, 2011, p. 355). With n-2 degrees of freedom and a significant level of 0.05 or 0.01. The hypothesis will have to be qualified: if the Significance level (2-tailed) is less than 0,05 because the correlation will be statistically significant and it is not statistically significant if the Significance level (2-tailed) is greater than 0,05 (Saunders et al., 2009, p. 456). The same applies to the regression model’s results.
3.4 Research Model
The research model on the figure below represents the different variables of the model. It is composed of three types of variables. These types will be explained in the Chapter 4. However, what is important to understand in this model is that different factors might have affected the Performance of the Oil & Gas Producers. The first factor is the Crisis: this notion will be explained in the Chapter 3, but what is interesting is to compare the firm performance ratios before, during and after the crisis. The second factor is the Crude Oil Price.
Chapter 4 – Practical Methodology

This chapter will present the data collection method, the data sample, the time horizon, the multiple regression model used as well as the dependent, independent and control variable used.

4.1 Sample Data

In this thesis, it was decided to study the performance of firms of the Eurozone. The data was available for several companies all over the world but choosing the Eurozone allowed us to avoid formulating more hypotheses, to give more reliance to the thesis, lead to less differences among companies and be more precise on the region studied. The Euro currency helps us to avoid fluctuations among currencies that could have biased our study. Even if the value of one Euro is not empirically the same in every country of the Euro Zone, it should be in theory.

The area of study also relies on Oil Producers and not all the Oil & Gas Industry participants. The reason was explained in the Chapter 1. Therefore, the sample data is composed of reports of Oil & Gas Companies within the Eurozone for the past decade. Moreover, it is opposed to the Brent Crude Oil Prices. The choice of listed companies in the Eurozone from 2004 to 2013 was made to determine the effects before, during and after the crisis on the financial performance of oil producers.

4.2 Time horizon

There are two possible choices when looking at time-period referring to Saunders et al. (2012, p.190): cross-sectional analysis or longitudinal analysis. In this thesis, the method used is cross-sectional and longitudinal. Indeed, the authors chose a 10-years approach to understand the behaviour of firm performance and oil prices before, during and after the Global Financial Crisis. What is interesting in studying the firm performance is to see the evolution of this performance over successive years.

Moreover, choosing only the previous 5 years could have only shown the performance of firms trying to recover from the crisis. Choosing a period of more than 10 years could have been irrelevant because it could have shown the effects of other crises. Since the Oil Shocks in the 70s, and except oil spills and other environmental damages, the Oil & Gas firms didn’t seem to experience major crisis until the last one. The case of Enron isn’t taken into account, as it seems more linked to fraud and accounting problems that purely oil-related. It is not a Eurozone-company anyway. This research gap is interesting as it gives more credit to our analysis.

4.3 Data Collection Method

Obtaining data could have been done several ways. The authors could have get their data through the annual reports of each company, which is time consuming. However the best
choice was to use the Thomson’s financial database, DataStream. This method of data collection proved to be quick throughout the used of the access of the Umeå library. The selection was first countrywide then by industry: i.e. select one country first and then select the outlying industry “Oil & Gas”. We repeated the same for every country of the Eurozone Area. We selected the 18 countries in the Euro zone portal as the official gateway of the Euro area (Euro Zone portal, 2014).

4.3.1 Data selection Criteria

The data extracted from the Thomson’s financial database, DataStream. However the data had to be suitable for the research, therefore the data was selected based on criteria to meet the results the authors were looking for. The selection criteria are:

- All the data must come from companies listed in countries that are member of the Eurozone
- The companies must be International Oil Companies (IOCs)
- The time horizon is from 2004 until 2013, companies without data for the total of years in the time horizon were rejected since the research’s purpose is to determine the relationship between financial performance of IOCs and the crude oil price and the GFC.

4.3.2 Data Analysis Process

After collecting the data, it is needed to analyse the raw data. SPSS was a simple choice for that matter since it is used for analysing data in social science and that the authors followed a training module on this software. The data was imported to SPSS and two types of analysis were run: a regression and a descriptive analysis. Descriptive Statistics contains the mean, standard deviation, maximum and minimum value. This analysis presents the main features of the data under the form of a summary. Regression analysis role is to determine relationships between variables (Scarbrough & Tanenbaum, 1998, p. 29). Since the main purpose of this thesis is to assess the relationship between dependent and independent variables in detail. A regression analysis will provide the research with estimations of quantitative effect of variables and test the statistical significance of the relationships.

4.4 Variables

Since the aim of this research is to determine the relationship between the financial performance of oil producers in the Eurozone and the crude oil price from 2004 and 2013, a regression analysis is needed. The variables were divided in three categories: independent variables, control variables and dependent variables. From the subject of this thesis, the dependent variables are measurements of financial performance of oil producers, the crude oil price and the crisis dummy variables (explained in more details with the regression
model) are independent variables and control variables are used to control the dependent variables.

![Figure 4. Types of variables](image)

### 4.4.1 Dependent variables

The firm performance will be measured with the help of financial statement indicators. Following the study of Lameira et al. (2012), the three ratios used to assess the financial performance of the oil producers companies are the return on assets (ROA), the return on equity (ROE) and the profit margin (PM). The ROA and the ROE are the most common used ratios concerning the financial performance of companies.

<table>
<thead>
<tr>
<th>Performance indicators</th>
<th>Unit of Measurement</th>
<th>Data Collection Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Return on Assets</td>
<td>Percentage</td>
<td>DataStream Ratios</td>
</tr>
<tr>
<td>Return on Equity</td>
<td>Percentage</td>
<td>DataStream Ratios</td>
</tr>
<tr>
<td>Profit Margin</td>
<td>Percentage</td>
<td>Calculated from collected data</td>
</tr>
</tbody>
</table>

Table 2. Dependent Variables

Return on Assets (ROA) is an indicator of the profitability of a company based on its total assets used to create income. Thus giving an assessment of the management of a given firm and how they generate earnings. It is a measure of efficiency. A high level of ROA means that the firm is capable of transforming assets into profits. To calculate this ratio, it is necessary to divide net income with total assets (Penman, 2013, p. 369). The Return on Asset is used as a financial performance ratio in the regression model of Lameira et al. (2012)

\[
ROA = \frac{Net\ Income + Interest\ Expense\ (after\ tax)}{Average\ Total\ Assets}
\]

Equation 1. Return on Assets

Another fundamental ratio is the Return on Equity (ROE) ratio. ROE reveals the profit generated by a company due to the money invested by the Shareholders. This ratio proves the capability of management to create new earnings for the shareholders (Tezel & McManus 2003, p. 67). It is a profitability ratio of a firm that is quite useful for researchers and researchers since it gives information from the balance sheet and the income statement. Its main use is to discover companies with the fastest growth of shareholder equity. Therefore, if ROE increases, the stock price of the company will increase (Rothschild 2006, p.28). It is calculated by dividing the Annual Net Income by shareholders’ Equity, there are three ratios that compose the Return on Equity: Profit Margin, Asset Turnover and
Financial Leverage. The Return on Equity is used as a financial performance ratio in the regression model of Lameira et al. (2012) and in the mathematical model of Dayanandan & Donker (2011).

\[
ROE = \frac{Net\ Income}{Sales} \times \frac{Sales}{Assets} \times \frac{Assets}{Shareholder's\ Equity}
\]

Equation 2. Return on Equity

Which gives us:

\[
\text{Return on Equity} = \frac{Net\ Income}{Shareholders'\ Equity}
\]

Equation 3. Return on Equity (simplified)

With the combination of ROA, ROE and Profit Margin, we will be able to have a clear picture of the management effectiveness on profitability.

The profit margin (PM) is based on the net income (Penman, 2013, p. 318).

\[
\text{Profit Margin} = \frac{Net\ income\ (after\ tax)}{Sales}
\]

Equation 4. Profit Margin

Profit margin is usually used to compare companies between them as this ratio can show quickly which company outperforms the others. It shows the percentage of each dollar form sales kept as equity. Profit margin is used as a financial performance ratio in the regression model of Lameira et al. (2012).

4.4.2 Independent variables

As mentioned before, the analysis of oil fluctuations comes at a major support of the analysis of firm performances. This thesis doesn’t show the mutual benefits/effects of oil markets and oil producers’ performance. It simply confirms how Oil & Gas producers perform during the last 10 years. The authors study mainly this one-way relationship effects. The practical methodology of studying oil fluctuations rely on an average of the Brent Crude Oil Price each year for 10 years, an analysis of its highest and lowest point, the major trends. We will also use the Moving Average method to identify the current trend.

At the same time, the researchers wanted to determine the effect the crisis had on the oil producers in the Eurozone. Therefore a dummy variables was added as an independent variable to determine the relationship between the financial performance and the time period. A set of three dummy variables were created to represent three different time periods: the dummy variable 2007, 2008 and 2009 to refer to the years of the beginning of the crisis, during the crisis and at the end of the crisis and the beginning of the recession crisis in Europe. A similar dummy variable is used by Dayanandan & Donker in their mathematical model (2011) to determine the effect of the global financial crisis, the Asian crisis and the events of 9/11 on the crude oil price.
4.4.3 Control Variables

After the dependent and independent variables, the authors focused on the control variables to control the characteristics of the companies by using the factors that have a relationship with financial performance such as size of the company and the country of origin of the company. The size of the companies is a natural logarithm of the amount of total assets taken from the Thomson’s financial database DataStream. This way of measuring the size of companies is used by numerous studies such as Tsoutsoura (2004) and Dayanandan & Donker (2011). The dummy COUNTRY is constructed by giving it the value 1 if the country of origin of the company was one of the first member of the Eurozone in January 1999. This dummy variable is different from the one used by Lameira et al. (2012) because they did not get significant results on their relationship with financial performance. Table 3 below gives a summary of each variable.

<table>
<thead>
<tr>
<th>Concept (Attribute)</th>
<th>Variables</th>
<th>Indicators of Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Profitability of the companies</strong></td>
<td>Financial performance of the companies</td>
<td>Return on Assets – ROA (%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Return on Equity – ROE (%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Profit Margin – PM (%)</td>
</tr>
<tr>
<td><strong>Size of the companies</strong></td>
<td>Relative financial indicator of the size of the companies</td>
<td>Natural Logarithm of the amount of Total Assets of the companies</td>
</tr>
<tr>
<td><strong>GFC</strong></td>
<td>Three different time periods from 2004 until 2013</td>
<td>Dummy variables:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2007: 0 = not during 2007</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 = during 2007</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2008: 0 = not 2008</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 = during 2008</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2009: 0 = not during 2009</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 = during 2009</td>
</tr>
<tr>
<td><strong>Leverage</strong></td>
<td>Debt Level of the firm</td>
<td>Total debt to total asset ratio</td>
</tr>
<tr>
<td><strong>Crude oil price</strong></td>
<td>Price of the crude oil price per year</td>
<td>Crude oil price in EUR</td>
</tr>
<tr>
<td><strong>The level of participation in economic and financial</strong></td>
<td>Classification in central or peripheral country based on the date of entry</td>
<td>Dummy variable COUNTRY that includes the value 0 if the country joined the Eurozone</td>
</tr>
<tr>
<td><strong>Euro-zone decisions</strong></td>
<td>in the Eurozone</td>
<td>after January 1999</td>
</tr>
</tbody>
</table>

Table 3. Variables
4.4.4 Regression Model

Regression is a popular statistical technique in social sciences. With a multiple regression model, researchers can determine the relationship between a dependent variable and numerous independent variables and therefore is useful to explain social phenomena (Scarborough & Tanenbaum, 1998, p. 29). It is also useful since researchers are required to make predictions based on more than one source of information (Hutcheson & Sofroniou, 1999, p. 71).

The research will employ an Ordinary Least Squares (OLS) regression analysis. An OLS determines the relationship between a dependent variable and a collection of independent variables. “The value of a dependent variable is defined as a linear combination of the independent variables plus an error term:

\[ Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \cdots + \beta_k X_k + \varepsilon \]  

(Pohlmann & Leitner, 2003, p. 120).

In this formula, the \( \beta \)s represents the regression coefficients, Xs are the independent variables and \( \varepsilon \) represents the errors of prediction. “The regression coefficients are interpreted as the change in the expected value of \( Y \) associated with a one-unit increase in an independent variable, with the other independent variables held constant. The errors are assumed to be normally distributed with an expected value of zero and a common variance” (Pohlmann & Leitner, 2003, p. 120).

To answer the research question, the authors will base their research on the regression model of Lameira et al. (2012) and the research model of Dayanandan & Donker (2011). Lameira et al. (2012) mathematical model’s purpose was to determine the relationship between the financial performance, the energy sector and the countries of oil producers in the Eurozone. Dayanandan & Donker (2011) purpose was more linked to the research of this study: to assess the relationship between the crude oil price on financial performance by also determining the effect of three crisis on the price of crude oil. The purpose of this research paper being slightly different, the mathematical model was adapted to determine the relationship between different variables.

Indeed, the authors of this research are looking into the relationship of the oil price, the size of the company and the effect of the crisis directly on the financial performance of oil producers in the Eurozone. Therefore to determine if there is a relationship between those variables, the method of linear regression with panel data was conducted.

The performance ratios (ROA, ROE and PM) were entered as the dependent variable in the regression models to test their relationship with the independent variables. To test our Hypotheses, the authors came up with the following model:

\[ \text{Performance} = \beta_0 + \beta_1 \text{Oil price} + \beta_2 \text{Country} + \beta_3 \text{Size} + \beta_4 \text{debt} + \beta_5 2007 + \beta_6 2008 + \beta_7 2009 + \varepsilon \]

Equation 5. Regression model
An explanation of the terms given by SPSS is useful; the regression coefficient, noted $b$ in the software and noted $\beta$ in our formulas, shows the degree of influence of each independent variable. Therefore, higher value of $b$ of an independent variable gives it more influence than other independent variables on the dependent variable. In addition, the sign of the regression, positive or negative, coefficient shows the type of relationship between variables (Statsoft.com, 2014). For example, if the independent variable increases of one point in value, the dependent variables would increase or decrease of $b$ in value when other variables are constant (Allison, 1999, p. 27, 29). Adjusted $R^2$ measures the proportion of the variation in the data set. The difference between the adjusted $R^2$ and the normal $R^2$ is that the latter can be sometime high due to changes in variation of independent variables which can explain the variance of the dependent variables. Lastly, the intercepts are given by a constant which shows the value of the dependent variables if all the independent variables have the value of zero.
Chapter 5 - Empirical Results

This Chapter presents the findings of the study. It starts with the descriptive statistics of the data used. The correlation between each variable is then presented. The chapter concludes on the results of the regression model.

5.1 Descriptive Statistics

<table>
<thead>
<tr>
<th></th>
<th>N Valid</th>
<th>Range</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROA (%)</td>
<td>110</td>
<td>38.77</td>
<td>-3.58</td>
<td>35.19</td>
<td>10.381</td>
<td>7.123</td>
</tr>
<tr>
<td>ROE (%)</td>
<td>110</td>
<td>74.18</td>
<td>-13.65</td>
<td>60.53</td>
<td>14.604</td>
<td>12.772</td>
</tr>
<tr>
<td>Profit Margin (%)</td>
<td>110</td>
<td>15</td>
<td>-3</td>
<td>12</td>
<td>4.4</td>
<td>3.2</td>
</tr>
<tr>
<td>Oil Price</td>
<td>110</td>
<td>59</td>
<td>24</td>
<td>83</td>
<td>52.8</td>
<td>21.085</td>
</tr>
<tr>
<td>Size</td>
<td>110</td>
<td>2</td>
<td>6</td>
<td>8</td>
<td>7.081</td>
<td>0.799</td>
</tr>
<tr>
<td>Debt Level</td>
<td>110</td>
<td>0.57</td>
<td>&lt;0.01</td>
<td>0.57</td>
<td>0.235</td>
<td>0.127</td>
</tr>
</tbody>
</table>

Table 4. Descriptive Statistics

In the previous chapter, the authors stated that the data used for this research was retrieved from Thomson Reuter’s database DataStream and it is believed that the data is reliable. Therefore figures in the descriptive statistics are valid and reliable. However, some figures were clearly outliers. Outliers are data that are far from the rest of the general linear pattern. In this case, Outliers were companies’ data that had a level of ratio too far from reality or companies were outliers when DataStream could not provide ten consecutive years of data. Excluding outliers can “ensure that the analysis is not overly influenced by outliers” (Cassar & Holmes, 2003, p. 132). “In particular outliers (i.e., extreme cases) can seriously bias the results by "pulling" or "pushing" the regression line in a particular direction, thereby leading to biased regression coefficients. Often, excluding just a single extreme case can yield a completely different set of results” (Statsoft.com, 2014). Thus the authors took the decision to avoid outliers in their analysis. For example, a German company, United Energy Group, was not kept for the analysis when the authors realised that DataStream did not have ten years of consecutive data and when their ROE in 2012 was -1887.67%. Thus from the first sample of IOCs of this study, the authors came through with eleven companies that had complete data from 2004 to 2013 with acceptable level compared to each other.

Based on table 4, the highest value of the Return on Asset, the Return on Equity and the Profit Margin for all the firm-year observations were respectively 35.19%, 60.53% and 12% while the lowest values where -3.58%, -13.65% and -3%. It should be clear that the higher those three financial ratios are the better it is for the company. The mean and the standard deviation for the three financial ratios were respectively 10.381 and 7.123 for the Return on Asset, 14.604 and 12.772 for the Return on Equity and 4.4 and 3.2 for the Profit Margin. The crude oil price highest price during the time period studied was 83EUR while the lowest price was 24EUR, its mean and standard deviation were respectively 52.8 and
21.085. The maximum values of the two control variables used in the regression model, Size, calculated by using the natural logarithm of Total Asset, and Debt level, represented by the Total Debt on Total asset ratio, were respectively 8 and 0.57 while the lowest value were 6 and 0 respectively. Concerning the debt level, this means that from all the firm-year observation, the firm with the highest level of debt had a debt level of 57% of the total of its capital structure while the lowest level of debt during the time period was below 1%.

<table>
<thead>
<tr>
<th>ENI</th>
<th>Italy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Galp Energia</td>
<td>Portugal</td>
</tr>
<tr>
<td>Hellenic Petroleum</td>
<td>Greece</td>
</tr>
<tr>
<td>Motor Oil</td>
<td>Greece</td>
</tr>
<tr>
<td>Neste Oil</td>
<td>Finland</td>
</tr>
<tr>
<td>OMV</td>
<td>Austria</td>
</tr>
<tr>
<td>Petrol</td>
<td>Slovenia</td>
</tr>
<tr>
<td>Repsol</td>
<td>Spain</td>
</tr>
<tr>
<td>Royal Dutch Shell</td>
<td>The Netherlands</td>
</tr>
<tr>
<td>Slovnaft</td>
<td>Slovakia</td>
</tr>
<tr>
<td>Total</td>
<td>France</td>
</tr>
</tbody>
</table>

Table 5. Final list of companies used without outliers

The following figures (in the appendix) illustrate the evolution of the financial ratios chosen as dependent variables. They should help any reader to understand the figures mentioned in the descriptive statistics as well as the regressions. These figures come in addition to the Table 4 to facilitate the understanding of the evolution of the ROA, ROE and PM through the ten-year period. The Figure 6 illustrates the drop in the Return on Assets starting in 2008. The Figure 7 illustrates the evolution of the Return on Equity during the Time period studied. Both figures 6 and 7 have the same scale and graduations to show the bigger range of results for the ROE compared to the ROA. Indeed as mentioned in the Table 4, the range of the ROA results are 38.77 whereas the range for the ROE is 74.18. The Figure 8 is a representation of the evolution of the Profit Margin for all companies between 2004 and 2013. The data are compiled not to underline the Profit Margin for each company but to reveal the singular drop in 2008.
From the table, the dependent variables correlate similarly to the crude oil price, indeed the ROA, the ROE and the profit margin is negatively correlated to the crude oil price. Therefore, it can be said that in this sample, the crude oil price is negatively correlated financial with the financial performance of IOCs. In addition, our three dependent variables are positively correlated between them because they share some data from the balance sheet and from the income statements. The debt level is negatively correlated with the ROA but insignificantly. It is however significant when correlated with the Profit Margin. Finally, the ROE and the Profit Margin are significantly correlated with the dummy variable for the year 2007 at a low degree.

Regarding the independent variables, the crude oil price is not correlated to the country variable but is negatively correlated with the dummy variable for the year 2009. The
country variable is positively correlated with the Profit Margin at a high degree, this is also true for the size variable. It seems that the Profit Margin is more correlated to the independent variables than the other financial ratios.

The highest correlation between variables is the positive correlation between the dummy variable COUNTRY and the size of companies, 0.882. The second highest correlation is between the Return on Asset and the Return on Equity, 0.762, since they share data from the financial statements. It can be observed that the control variables do not have the same correlation sign with the dependent variables. The debt level is negatively correlated with the Return on Asset and the Profit Margin while being positively correlated with the Return on Equity. In addition the correlation between the debt level and the Profit Margin is the highest negative correlation between variables at -0.481. The size of company is positively correlated with Return on Asset and the profit Margin but is negatively correlated with the Return on Equity. The country of origin is also positively correlated with the Return on Asset and the Profit Margin and negatively correlated with the Return on Equity.

A multicollinearity test was conducted to check that the level of correlation between variable would not affect the regression model. The VIF are available in the appendixes with the regression models.

5.2 Regression Results
The authors used the OLS method (Ordinary Least Square Regression) with the SPSS software to test their Regression model. This model, as explained in the previous chapter, tries to determine the relationship and correlation among our variables: independent, dependant and control. The final idea is of course to see what are the effects of a change in the Oil price on the profitability ratios (ROA, ROE, PM), but also the effects of other variables such as the Crisis, the Capital Structure (through the Debt Level), the Size of the company and Country of origin.

Three different regressions were run here to follow a single model. There are 110 observations for each regression as shown by the table below: 11 companies after taking out the outliers (explained in the previous chapter) times a 10-year period. What is important to look at in these results, besides coefficients, are the p-values because they show the level of confidence of each independent variable’s relationship to the dependent variable, here the 3 regressions.

Concerning the R², this analysis needs to be compared to the study of Lameira et al. (2012) since their mathematical model was used as a base for the formula of this paper. The adjusted R² of Lameira et al. (2012) varies around 0.0899 and 0.1947. There is also a difference when comparing the regressions since this paper use ROA, ROE and PM and Lameira et al. (2012) use their logarithm: Log ROA, Log ROE, Log RCE and Log PM.
### Table 7: Regression results

<table>
<thead>
<tr>
<th>Dependent Variable:</th>
<th>ROA (%)</th>
<th>ROE (%)</th>
<th>Profit Margin (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil Price</td>
<td>-0.184</td>
<td>-0.354</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.000)</td>
</tr>
<tr>
<td>Country</td>
<td>-1.01</td>
<td>-2.096</td>
<td>0.005</td>
</tr>
<tr>
<td></td>
<td>(0.695)</td>
<td>(0.654)</td>
<td>(0.5)</td>
</tr>
<tr>
<td>Size</td>
<td>2.343</td>
<td>2.144</td>
<td>0.021</td>
</tr>
<tr>
<td></td>
<td>(0.173)</td>
<td>(0.491)</td>
<td>(0.000)</td>
</tr>
<tr>
<td>Debt</td>
<td>-0.514</td>
<td>31.949</td>
<td>-0.032</td>
</tr>
<tr>
<td></td>
<td>(0.919)</td>
<td>(0.001)</td>
<td>(0.034)</td>
</tr>
<tr>
<td>2007</td>
<td>4.096</td>
<td>3.807</td>
<td>0.012</td>
</tr>
<tr>
<td></td>
<td>(0.036)</td>
<td>(0.279)</td>
<td>(0.045)</td>
</tr>
<tr>
<td>2008</td>
<td>-1.076</td>
<td>-3.770</td>
<td>-0.007</td>
</tr>
<tr>
<td></td>
<td>(0.575)</td>
<td>(0.28)</td>
<td>(0.214)</td>
</tr>
<tr>
<td>2009</td>
<td>-9.711</td>
<td>-17.979</td>
<td>-0.38</td>
</tr>
<tr>
<td></td>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.000)</td>
</tr>
<tr>
<td>Constant</td>
<td>12.368</td>
<td>13.078</td>
<td>-0.56</td>
</tr>
<tr>
<td></td>
<td>(0.330)</td>
<td>(0.527)</td>
<td>(0.095)</td>
</tr>
<tr>
<td>Numbers of Observations</td>
<td>110</td>
<td>110</td>
<td>110</td>
</tr>
<tr>
<td>R²</td>
<td>0.369</td>
<td>0.353</td>
<td>0.722</td>
</tr>
<tr>
<td>Adjusted R²</td>
<td>0.326</td>
<td>0.309</td>
<td>0.703</td>
</tr>
</tbody>
</table>

#### 5.2.1 Regression 1: Return on Assets (ROA)

The Return on Assets as explained in the previous chapter, shows how the company can use its assets to generate profits. For this model, the adjusted R² is 0.326 which means that 32.6% of the total variance of the ROA is explained by this model. The adjusted R² of Lameira et al. (2012) study was of 0.1947. Although the expected sign was positive, the Oil Price is negatively impacting the ROA during the period studied. The impact is moderate: for an increase of euro in the yearly mean of Oil Price, the ROA will decrease of 0.184. These results are significant as the p-value is below 0.001. The Crisis has also affected the ROA. The year 2007 is positive in relation to the ROA however the year 2009 is negatively influencing it. These results are also significant, however all other variables are not significant regarding their effect on the ROA. The Return on Asset has the highest level of relationship, compared to the other two financial ratios, with the size of the company although it is not statistically significant and the year 2007.

#### 5.2.2 Regression 2: Return on Equity (ROE)

The Return on Equity ratio has been explained in the previous chapter. It is one key indicator of profitability and, therefore, of performance. For this model, the adjusted R² is 0.309, which means that 30.9% of the total variance of the ROE can be explained by this model. The adjusted R² of Lameira et al. (2012) was of 0.0899, meaning that around 9% of the total variance of the Log ROE can be explained by his model. Just like with the ROA, the Oil Price is negatively impacting the ROE. It means that an increase of one euro in the yearly mean of the Oil Price will make decrease the Return on Equity decrease by 0.354. The significance of this relationship is strong as its p-value is below 0.001. Another key
variable is the relationship between the Crisis and the ROE. As expected, the situation has changed between 2007 and 2009. The year 2007 is positive in relation to the ROE, just like the ROA. However the results are only significant for the year 2009. This year has a negative relationship with the ROE: it means that compared to the average of the other years, the ROE suffered a decrease during this special year compared to all others. From 2004 to 2013, an influence of the debt level on the Return on Equity is visible. Indeed, among all the relationships between the independent variables and the ROE, the total debt on total asset ratio has the highest coefficient. Therefore when the total debt level increases compared to the total asset, thus when the total debt on total asset ratio increases, the ROE increases as well. It is interesting to note that the debt level, has a positive relationship with the Return on Equity and negative relationships with the other two financial ratios. This finding is not in accordance to the results of Dayanandan & Donker (2011) who found that the long-term liabilities are negatively related to the Return on Equity. This dependent variables has the highest coefficient with the Oil price, the dummy COUNTRY, the debt level and the years 2008 and 2009 although only the oil price, the debt level and the year 2009 are statistically significant.

5.2.3 Regression 3: Profit Margin (PM)

The Profit Margin, as explained in the Chapter 4, is an appropriate indicator of performance. For this model, the adjusted $R^2$ is 0.703, which means that 70.3% of the total variance of the PM can be explained by this model. The adjusted $R^2$ of Lameira et al. (2012) was of 0.0962, meaning that 9.62% of the total variance of the Log PM can be explained by his model. The $R^2$ of our model for the PM is quite high giving consistency and reliability to the whole model. Therefore, as it will be explained later, this high ratio might raise several concerns about the PM analysis.

However, the Oil Price is not influencing the Profit Margin within the period of study (this relationship has a coefficient of zero and a p-value of below 0.001). There is no link between these variables according to our results and this absence of relationship seems relevant due to the significance level.

Most variables, except the Year 2008, the constant and the country, are statistically significant with the Profit Margin. However, most of them show little relationship: the coefficients are close to zero. One effect that might be underlined is that the crisis had negatively impacted the Profit Margin. Indeed, the Coefficient is barely positive in 2007 whereas it is negative in 2009. Nevertheless, these results are not showing a proved relationship even though the results are significant. It can be said then that there is no strong relationship between the variables and the Profit Margin and no relationship at all between the Oil Price and the Profit Margin.

5.2.4 Conclusion of regression analysis

As mentioned in chapter three, there are numerous studies that deal about the effect of the crude oil price on the IOCs results. However, only one study, Dayanandan & Donker’s study (2011) used the crude oil price as an independent variable to assess its relationship with financial performance of the IOCs. Their conclusion is that the crude oil price has a
positive relationship with the Return on Equity of oil producers in North America. The study of Mohanty et al. (2010) did use it in the CEE but in relation to the stock price returns of Oil & Gas companies. This study analysis concludes that there is a negative relationship between the crude oil price and the financial performance of IOCs and thus do not agree with the conclusion of Dayanandan & Donker (2011). Concerning the impact of the crisis on the financial ratios, the results tend to differ depending on the year. But all of the ratios have a negative relationship with the year 2009 and 2008. Therefore, the crisis did have a negative impact on the financial performance of IOCs in the Eurozone. Concerning the regression model with the Profit Margin as dependent variable. The model seems statistically significant, however the degree of relationship as well as the high-adjusted $R^2$ is quite peculiar. After analysing the data once more, the authors did not find any particular reason for the model to give those type of results. As a precaution, the authors will only use the results of this regression model to assert what the other two models have already stated.

To test the relationship of the crude oil price with the financial performance of IOCs a regression analysis was conducted without dummy variables (without the variables CRISIS and COUNTRY). The regression model will therefore look like this:

$$\text{Performance} = \beta_0 + \beta_1 \text{Oil price} + \beta_2 \text{Size} + \beta_3 \text{debt} + \epsilon$$

Equation 6. Regression model without dummy variables

The results of this regression are presented in the table below:

<table>
<thead>
<tr>
<th>Dependent Variable:</th>
<th>ROA (%)</th>
<th>ROE (%)</th>
<th>Profit Margin (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil Price</td>
<td>-0.127</td>
<td>-0.248</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.000)</td>
</tr>
<tr>
<td>Size</td>
<td>1.215</td>
<td>0.012</td>
<td>0.022</td>
</tr>
<tr>
<td></td>
<td>(0.179)</td>
<td>(0.994)</td>
<td>(0.000)</td>
</tr>
<tr>
<td>Debt</td>
<td>-6.322</td>
<td>22.032</td>
<td>-0.051</td>
</tr>
<tr>
<td></td>
<td>(0.246)</td>
<td>(0.025)</td>
<td>(0.003)</td>
</tr>
<tr>
<td>Constant</td>
<td>9.923</td>
<td>22.419</td>
<td>-0.70</td>
</tr>
<tr>
<td></td>
<td>(0.152)</td>
<td>(0.072)</td>
<td>(0.002)</td>
</tr>
<tr>
<td>Numbers of observations</td>
<td>110</td>
<td>110</td>
<td>110</td>
</tr>
<tr>
<td>R²</td>
<td>0.187</td>
<td>0.188</td>
<td>0.587</td>
</tr>
<tr>
<td>Adjusted R²</td>
<td>0.164</td>
<td>0.165</td>
<td>0.575</td>
</tr>
</tbody>
</table>

Table 8. Regression results without dummy variables

From the results presented in table 8, the relationship between the crude oil price and the financial performance is negative. The coefficients from this regression model are close to the ones from the regression model including the dummy variables.
<table>
<thead>
<tr>
<th>Dependent Variables</th>
<th>ROA (%)</th>
<th>ROE (%)</th>
<th>Profit Margin (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Regression Model</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oil Price</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>With dummies</td>
<td>-0.184</td>
<td>-0.354</td>
<td>0.000</td>
</tr>
<tr>
<td>Without dummies</td>
<td>-0.127</td>
<td>-0.248</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Table 9. Comparison of the coefficient of oil price in the two regression models

The coefficient are however stronger when the regression model includes the dummy variables. But, the main conclusion of both regression models is that the crude oil price is negatively related to the financial ratios of IOCs in the Eurozone form 2004 to 2013.
Chapter 6 - Analysis and Discussion

This Chapter deals with the discussion of the empirical findings from the last chapter.

Regarding the answer to hypotheses, one must not forget that the following analysis of results is applicable to the companies studied within the Eurozone and within this specific period of time (2004-2013).

6.1 Hypothesis 1: The Crude Oil Price is positively associated with the financial performance of Oil & Gas Companies

From the results of the regression model, it can be affirmed that the crude oil price has a negative relationship with the financial performance of IOCs in the Eurozone. This statement does not agree with the study of Dayanandan & Donker (2011) concerning the Oil & Gas producers in North America. However, this result agrees with the study of Ramos & Veiga (2011), which showed that the crude oil price is a priced factor for the Oil & Gas industry.

This commodity price was never used as an independent variable before in a mathematical model to determine a relationship with three different financial ratios to assess the financial performance of IOCs in the Eurozone. The previous literature was used as suggestion for the possible type of relationship the crude oil price could have with those three financial ratios. This means that if the crude oil price increases, the Return on Asset and the Return on Equity will decrease but won’t affect the profit margin of the companies. Since the Return on Asset and Return on Equity use the same data in the balance sheet and income statements, the sign of their relationship with the crude oil price should be the same.

Since the hypothesis 1 states that the crude oil price is positively associated with the financial performance of IOCs based on previous literature, it is rejected because the results of this study find that the crude oil price is negatively associated with the financial performance of IOCs.

6.2 Hypothesis 2: The crisis is negatively associated with the financial performance of the IOCs

The three regressions show an important effect on the Crisis on the Performance of the Oil & Gas Companies during the period of study. There is a difference between the beginnings of the Crisis, the year 2007, and when the Crisis affects the Eurozone, as shown by the Year 2009.

These changes in profitability might be the impact of the cutback in investments during these years as underlined by the International Energy Agency (2009). The results are different between each year since the impact of the crisis changed during those three central years. The crisis started on August 9 2007 and could explain why the dummy variable 2007 is positively associated with the financial ratios, however the effects of the crisis on
macroeconomics and finance are translated by the negative coefficient of the dummy variable 2008, and thus the crisis has started to affect the financial performance of IOCs in 2008. However, 2009 is the worst year concerning the level of relationship between the financial performance of IOCs in the Eurozone and the crisis. Indeed the levels of negative relationship are far higher between the dummy variables 2009 and the financial performance than the two others combined. 2009 is the starting of the European recession crisis that is caused by the global financial crisis. Since the recession has yet to end, it could not yet be possible to see the impact of this recession crisis on the financial performance of IOCs. From the regression table (table 7), between the three years used to determine the association of the crisis with the financial performance of IOCs, 2009 was the worst year and the financial ratio that was the most affected by the crisis was the Return on Equity.

Therefore, IOCs were not spared by the Global Financial crisis and the central years of the crisis (2007, 2008 and 2009) have had a negative impact on the different financial ratios. The answer of the hypothesis continues on the results of Dayanandan & Donker study (2011) that the crisis had a negative impact on the price of crude oil by looking into the relationship with financial performance. It also seems that the years studied don’t reflect the effects of the responses of the Eurozone to the crisis as they came later (after 2010).

Thus, hypothesis 2, that states that the crisis is negatively associated with the financial performance of IOCs, is accepted.

6.3 Hypothesis 3: The size of IOCs is positively associated with the financial performance of IOCs

By analysing the results of the regression model, the size actually matters in relation to the financial performance of the firm. There is a positive effect on all regressions, even though the ROA and ROE are not statistically significant. The relationship is significant for the Profit Margin but the coefficient is not at the same level as for the Return on Asset and Return on Equity. This results goes to the same conclusion as the studies of Degryse et al. (2010) and Lindblom et al. (2011). The results agree also with the study of Dayanandan & Donker (2011) concerning the expected and final relationship between the size of oil & gas companies and their financial performance.

A company with more assets should be able to perform better than others with less assets. It might be interesting as another subject to look at the effect of the crisis on the Assets of the companies, and then on their financial performance. It is the same recommendation as for the Oil Price, it is possible via an interaction model. This analysis might seem interesting here as it is known that companies not only reduced their investments during the crisis but also divested. (International Energy Agency, 2009, p. 3).

Finally the Hypothesis 3, which states that the Size of IOCs matters when linked to their financial performance, is accepted.
6.4 Correction of Research Model

Since the Hypothesis 1 is not verified, the Research Model has been changed. The Crude Oil price has a negative effect on the firm performance in the Eurozone during the studied period.

Figure 5. Revised Research Model
Chapter 7 – Conclusion

This chapter presents the conclusion of the study and how the findings are connected to the purpose of the research. The delimitations of this research is also dealt with and recommendations for future studies are mentioned.

7.1 Conclusion

The main purpose of this research paper was to examine the relationship between the crude oil price and the financial performance of International Oil Companies based in the Eurozone from 2004 to 2013. The research question and the sub questions are:

What is the relationship between the crude oil price and the International Oil Companies’ financial performance in the Eurozone during the last ten years (2004-2013)?

The role of the sub questions was to help to answer the main research question.

7.1.1 Answer to the research question and sub-questions

Sub-question 1: Was there an impact of the crisis on the financial performance of the IOCs?

With sub question 1, the impact of the crisis was taken into account to determine the effect of the financial standstill that happen during the time period of this research. From the empirical results and the accepted second hypothesis, it can be inferred that there was an impact of the crisis years compared to the average of every other years in the time period of this research. The research focused on three main years on the crisis, the year 2007 that started off the financial disaster of the beginning of the twenty firth century, the year 2008 that saw the crisis become global and affect the economy worldwide and 2009 that kick-started the recession crisis in the European Union. The results show that the year 2009 had a worst impact than the others on the financial performance of IOCs in the Eurozone.

Sub-question 2: Is there a key indicator that affects the financial performance of IOCs in the Eurozone?

This sub question concerns the industry of the IOCs. Indeed this industry is extremely specialised and complex. The theories that dealt with the capital structure pointed out that the size of the company, the debt level and the country or origin could affect the financial performance of companies in general. From this study, two indicators can affect the financial performance of IOCs: The debt level and the size of companies.

The debt level is positively associated to the Return on Equity of a company whereas the size of companies has a relationship with each of the financial ratios used as dependent variables. This goes to the same conclusion as Lameira et al. (2012), Degryse et al. (2010) and Lindblom et al. (2011).
The size of a company can be calculated and used in a regression model in numerous ways, this enables it to be used as a control variable and as an independent variable in different regression model dealing with the performance of companies.

In conclusion, this research paper confirms that the crude oil price is associated with the financial performance of IOCs in the Eurozone from 2004 to 2013. However, the results of this study do not agree with the results of Dayanandan & Donker (2011). Therefore, this research paper fulfilled its purpose by answering its research question.

### 7.1.2 Contribution of the research

The contribution of this thesis was to continue the findings of previous studies but with the use of the crude oil price as an independent variable to test its relationship with the financial performance of IOCs.

**Theoretical Contribution**

This study was able to find a research gap in the fact that the crude oil price was never used as a variable that could affect the financial returns of IOCs. In addition, the Eurozone’s IOCs were not the main topic of previous literature, they focused on the oil & gas industry in general or on different regions. The majority of them used the North America or the Asia-Pacific region. Finally, this study is able to actualise the findings of previous studies concerning the crisis. Indeed few dealt with the effect of the crisis on the performance of IOCs. The findings of this research paper could permit the creation of other hypotheses based on the effect of the commodity price with the effect of the other key indicators on financial performance of IOCs.

**Practical Contribution**

The main practical contribution of this research paper is the knowledge of the negative relationship between the crude oil price and the financial performance of IOCs in the Eurozone during the last ten years (2004 to 2013). This would enable investors and student to use this information to assess the business of IOCs. Secondly, the findings that the debt level and the size of the company have a strong relationship with the financial performance of IOCs will add to help investors and students to understand the performance of those companies based on their balance sheet and income statements.

### 7.2 Quality Research

In the empirical findings and in the discussion chapter, numerous different results were presented and can help investors and students understand the relationship between the financial performance of IOCs and the price of the most important commodity in the world today as well as some indicators found in the balance sheet and income statements of those companies. This paper has proven that the crude oil price is associated with the financial performance of IOCs in the Eurozone scientifically. It is nonetheless important to assess the reliability of this study for the generalization purpose.
It can be stated that this study has fulfilled its reliability criteria, because the same results can be obtained by repeating the same study with the same raw data and the same mathematical model. Transparency is maintained since every output and data sheet is saved to be submitted if needed. As many outliers have been taken out the study, the readers might be pleased to see that the authors tried to get results as close to reality as possible. The coherency of the results and analysis was one of the main guidelines of this paper.

Concerning the validity of the study, the empirical study is focused on answering the research question and sub questions and having no other variables acting upon them, the coefficient of the relationships can be confirmed. However the results are linked to the sample of the population studied as well as the time period used. This means that same results should not be expected if using another industry or another geographical region or another time period.

Finally, the results can be useful for investors and students to assess the financial performance of IOCs but they should not consider those values as absolute truth for future prediction but they should use the results as to figure out a trend or pattern between the commodity price and the financial performance of IOCs.

7.3 Limitations of Research

One of the limitations of this study is the lack of acceptable results on the regression model using the Profit Margin. Indeed the results are quite peculiar and should be used with caution. This may be because that there was not enough complete data retrieved from DataStream. Indeed, the selection of Oil & Gas industry in each country member of the Eurozone on the Database proved to provide only few companies with yearly data from 2004 to 2013.

Another limitation is the lack of significant results concerning the Country risk, Lameira et al. (2012) also tried to determine the relationship between the country of origin and the financial performance but their results were also not significant. The authors decided to use a different COUNTRY dummy variable than Lameira et al.’s (2012) to try to get significant results. Indeed, Lameira et al. (2012) does not give a lot of information concerning how they constructed this variable expect for “The dummy COUNTRY that includes the value 0 if the country is peripheral, and 1 if the country is central.” (Lameira et al., 2012, p. 4). This research paper used the date of entrance in the Eurozone. Lameira et al. (2012) use countries outside of the Eurozone to assess the effect of central countries in the Eurozone. However the authors of this study chose to avoid using countries outside of the Eurozone to avoid the rate change of different currencies compared to the Euro. To be able to continue the findings of Lameira et al. (2012), one should deal with the rate exchange of currencies in Europe to be able to compare each ratio and variable on the same basis. A different dummy variable representing the country of origin of companies in the Eurozone could be used to get significant results in future research.

One must not forget that this study is realized within a specific time period: these years include years of crisis. Therefore it might be the reason why the hypothesis 1 is rejected.
Indeed, the Crude Oil Price is affected by the Crisis as shown by the results of Dayanandan & Donker (2011), and therefore it could be interesting to study these effects in the Eurozone before comparing it to the Firm Performance.

7.4 Recommendation for further research

As any other research, this one has its limits. The findings and the conclusion gives space for more research and more findings in this industry. Firstly, since financial market are dynamic and change rapidly, it could be interesting to actualize this study in a few years to see how did the IOCs managed their financial performance in the still active recession crisis in the Eurozone. Secondly, this study can be done with more sophisticated models in order to grasp the whole picture of variables that can interact with the financial performance of IOCs, however to conduct this kind of study, a longer time period should be considered.

Thirdly, the testing of the relationship of gas prices and the financial performance of Gas producers could be interesting. In addition, the combination of the crude oil price and the gas price could lead to new findings. This idea can be followed by many others similar studies: the relationship between Crude Oil price and other refined products, or between Brent Crude Oil and WTI Crude Oil.

Fourthly, as stated in the limitation paragraph, a similar study using countries outside the Eurozone as well as the Eurozone could lead to significant results concerning the impact of the country risk on the financial performance of IOCs. As all countries studied here were in the Eurozone, the distinction made between members and newcomers wasn’t significant enough in this study.

Fifthly, a regression model with an interaction variable could be used to assess the effect of the crisis on the crude oil price in relation to the financial performance of IOCs in the Eurozone. Thus it would be an extension of Dayanandan & Donker (2011) study in a different region. As mentioned in the limitation part, this interaction variable could show how the Crude Oil price reacted to the GFC and then how the IOCs performed due to the change in Oil Price.

One must not forget for further research to take wide range of data and variables to exclude the effects of outliers, to have after that the correct and sufficient data to analyse. This is a general recommendation: this subject might be too precise to have the sufficient data to analyse when excluding outliers.

It may be that those recommendations may not be enough to conduct a research paper but they may be used as starting ideas to develop the research on the Oil & Gas industry and find answers and gain more knowledge around it.
References


Appendix

<table>
<thead>
<tr>
<th>Countries in alphabetical order</th>
<th>Number of companies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>1</td>
</tr>
<tr>
<td>Cyprus</td>
<td>2</td>
</tr>
<tr>
<td>Finland</td>
<td>1</td>
</tr>
<tr>
<td>France</td>
<td>6</td>
</tr>
<tr>
<td>Germany</td>
<td>5</td>
</tr>
<tr>
<td>Greece</td>
<td>2</td>
</tr>
<tr>
<td>Ireland</td>
<td>6</td>
</tr>
<tr>
<td>Italy</td>
<td>4</td>
</tr>
<tr>
<td>Netherland</td>
<td>1</td>
</tr>
<tr>
<td>Portugal</td>
<td>1</td>
</tr>
<tr>
<td>Slovakia</td>
<td>1</td>
</tr>
<tr>
<td>Slovenia</td>
<td>1</td>
</tr>
<tr>
<td>Spain</td>
<td>1</td>
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</tbody>
</table>
| **Total: 13**                   | **Total: 32**       

*Table 10. List of Countries with Outliers*
<table>
<thead>
<tr>
<th>Companies in alphabetical order</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activa Resources</td>
<td>Germany</td>
</tr>
<tr>
<td>Aminex</td>
<td>Ireland</td>
</tr>
<tr>
<td>CO Cyprus</td>
<td>Cyprus</td>
</tr>
<tr>
<td>Dragon Oil</td>
<td>Ireland</td>
</tr>
<tr>
<td>Dynex Energy</td>
<td>France</td>
</tr>
<tr>
<td>Eni</td>
<td>Italy</td>
</tr>
<tr>
<td>Erg</td>
<td>Italy</td>
</tr>
<tr>
<td>Esso</td>
<td>France</td>
</tr>
<tr>
<td>Galp Energia SGPS</td>
<td>Portugal</td>
</tr>
<tr>
<td>Gas Plus</td>
<td>Italy</td>
</tr>
<tr>
<td>Global Oil &amp; Gas</td>
<td>Germany</td>
</tr>
<tr>
<td>Hellenic Petroleum</td>
<td>Greece</td>
</tr>
<tr>
<td>Maple Energy</td>
<td>Ireland</td>
</tr>
<tr>
<td>Maurel et Prom</td>
<td>France</td>
</tr>
<tr>
<td>Mclaren Resources</td>
<td>Germany</td>
</tr>
<tr>
<td>Meravest Capital</td>
<td>Germany</td>
</tr>
<tr>
<td>Motor Oil</td>
<td>Greece</td>
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<td>MPI</td>
<td>France</td>
</tr>
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<td>Neste Oil</td>
<td>Finland</td>
</tr>
<tr>
<td>OMV</td>
<td>Austria</td>
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<td>Petroneft Resources</td>
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<td>Repsol</td>
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<tr>
<td>Saras</td>
<td>Italy</td>
</tr>
<tr>
<td>Solvnaft</td>
<td>Slovakia</td>
</tr>
<tr>
<td>Total</td>
<td>France</td>
</tr>
<tr>
<td>Total Gabon</td>
<td>France</td>
</tr>
<tr>
<td>United Energy Group</td>
<td>Germany</td>
</tr>
</tbody>
</table>

Table 11. List of Companies with outliers
Figure 6. Return on Assets
Figure 7. Return on Equity
Figure 8. Profit Margin
### Model Summary

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.608&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.369</td>
<td>.326</td>
<td>5.8736397</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), 2009, countries, 2008, 2007, Debt Level, Oil Price, size

### ANOVA<sup>b</sup>

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>2062.024</td>
<td>7</td>
<td>294.575</td>
<td>8.538</td>
<td>.000&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Residual</td>
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<td></td>
<td></td>
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<tr>
<td>Total</td>
<td>5580.987</td>
<td>109</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), 2009, countries, 2008, 2007, Debt Level, Oil Price, size

b. Dependent Variable: ROA

### Coefficients<sup>a</sup>

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
<th>Collinearity Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
<td>Tolerance</td>
</tr>
<tr>
<td>1</td>
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<td>4.546</td>
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<td>.689</td>
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<td>-.546</td>
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<td>.251</td>
<td>1.371</td>
</tr>
<tr>
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<td>-.009</td>
<td>-.102</td>
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</tr>
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</table>

a. Dependent Variable: ROA

Table 12. SPSS output ROA
### Model Summary

<table>
<thead>
<tr>
<th>Model</th>
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<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
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<tbody>
<tr>
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<td>.309</td>
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</tbody>
</table>

a. Predictors: (Constant), 2009, countries, 2008, 2007, Debt Level, Oil Price, size

### ANOVA

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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<tr>
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<td>Residual</td>
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<td>102</td>
<td>113.813</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>17944.049</td>
<td>109</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


b. Dependent Variable: ROE

### Coefficients

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
<th>Collinearity Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
<td>Tolerance</td>
</tr>
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a. Dependent Variable: ROE

Table 13. SPSS output ROE
### Model Summary

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<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
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<tbody>
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### ANOVA

<table>
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<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
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<td>.000</td>
<td></td>
</tr>
<tr>
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<td>109</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


b. Dependent Variable: Profit Margin

### Coefficients

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
<th>Collinearity Statistics</th>
</tr>
</thead>
<tbody>
<tr>
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<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
<td>Tolerance</td>
</tr>
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<td>-.001</td>
<td>.000</td>
<td>-5.66</td>
<td>.000</td>
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<tr>
<td></td>
<td>Size</td>
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<td>.005</td>
<td>5.20</td>
<td>.000</td>
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<td>.500</td>
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<td></td>
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<td>.006</td>
<td>.109</td>
<td>.045</td>
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<td>.006</td>
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<tr>
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</table>

a. Dependent Variable: Profit Margin

Table 14. SPSS output Profit Margin
Table 15. SPSS output without dummy variables - ROA

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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</table>

a. Predictors: (Constant), Debt level, Oil Price, Size

<table>
<thead>
<tr>
<th>ANOVAb</th>
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</thead>
<tbody>
<tr>
<td>Model</td>
</tr>
<tr>
<td>-------</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>Residual</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), Debt level, Oil Price, Size
b. Dependent Variable: ROA

<table>
<thead>
<tr>
<th>Coefficientsa</th>
</tr>
</thead>
<tbody>
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<td>Model</td>
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<td>-------</td>
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<tr>
<td>Oil price</td>
</tr>
<tr>
<td>Size</td>
</tr>
<tr>
<td>Debt level</td>
</tr>
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a. Dependent Variable: ROA
### Model Summary

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
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<td>.434a</td>
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<td>.165</td>
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</table>

*a. Predictors: (Constant), DebttoAssets, OIL PRICE, log ta*

### ANOVA

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
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</thead>
<tbody>
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<tr>
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<td>137.467</td>
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<td></td>
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<tr>
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<td>109</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*a. Predictors: (Constant), Debt Level, Oil Price, Size*  
*b. Dependent Variable: ROE*

### Coefficients

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
<th>Collinearity Statistics</th>
</tr>
</thead>
<tbody>
<tr>
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<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
<td>Tolerance</td>
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</table>

*a. Dependent Variable: ROE*

Table 16. SPSS output without dummy variables – ROE
## Table 17. SPSS output without dummy variables - Profit Margin

### Model Summary

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
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a. Predictors: (Constant), Debt level, Oil Price, Size

### ANOVA

<table>
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<th>Model</th>
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<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
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</thead>
<tbody>
<tr>
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<td>.064</td>
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<td>.021</td>
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<td>.000a</td>
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<tr>
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<td>106</td>
<td>.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>.110</td>
<td>109</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), Debt level, Oil Price, Size

b. Dependent Variable: PM

### Coefficients

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>Collinearity Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td>Std. Error</td>
<td>Beta</td>
</tr>
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<td>.022</td>
</tr>
<tr>
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<td>.000</td>
</tr>
<tr>
<td></td>
<td>Size</td>
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<td>.003</td>
</tr>
<tr>
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</table>

a. Dependent Variable: PM