How effectively do major oil producing companies use derivatives in hedging market-based risk?

Dissertation submitted in part fulfilment of the requirements for the degree of MBA (Finance stream) at Dublin Business School

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**Declaration**

I, Zhuldyz Nyssanova, declare that this research is my original work and that it has never been presented to any institution or university for the award of Degree or Diploma. In addition, I have referenced correctly all literature and sources used in this work and this work is fully compliant with the Dublin Business School’s academic honesty policy.

**Signed:** Zhuldyz Nyssanova

**Date:** 20 August 2016
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Abstract

The researcher had established the goal to lighten up the crude oil market from the perspective of oil producing companies using derivatives as a part of their risk management strategies. Firstly, the researcher investigated that derivatives are an effective tool of a risk management during the market volatility, however, there was no empirical evidence found toward their effect on company’s enterprise value. Secondly, it has been established that the crude oil market is currently dominated more by speculators rather than hedgers, however, oil producing companies themselves mostly act as hedgers in the market.

Chapter One: Introduction

1. Introduction

Risk management is an integral part of a strategic planning for businesses of any scale. An in-debt rational analysis of risks attached to the particular industry should be overdone by managers in order to achieve a business goal and sustain operational activities. Depending on the industry, and scale of risk resistance, companies might reassess their risk management techniques. The primary objective of risk management is to maximise firm value through the reduction of costs associated with risk, it concedes companies to improve their capital structure, and enables companies to protect themselves from financial loss (Dionne, 2013). Management of market-based risk is crucial for companies which financial performance reflect the volatility of the market they operate in. Market risk is related to the fluctuation of prices in the market.

Oil and gas producing companies have been in the spotlight since the 2015’s dramatic fluctuations of crude oil prices, that was recorded by both benchmarks. Fattouh (2011, p. 7) since the late 1980s ‘physical benchmarks, such as West Texas Intermediate or WTI, Dated Brent have been a central feature of oil pricing system price cargoes under long-term contracts or in spot market transaction’. There has been nearly 60 percent decrease in the price of a crude oil since 2014, urging oil commodity producing companies to adjust to changes. Managing market-based risk from the perspective of oil producers addresses maintaining volatility of crude oil prices. Volatility of the market can reflect numerous occasions, starting with the political issues in the operating regions, natural disasters, fluctuations of currencies, and also project specific industry’s positions, such as supply and
demand for crude oil and its final products, spot prices of crude oil in the futures markets, OPEC and other regulative bodies activities and et cetera. Thus, oil producing companies develop strategies to conduct their business operations in the rapidly changing environment.

The derivative is a security or contract designed in a way that its price is derived from the underlying asset, that allows derivatives to offset the risk of a price change (Somanathan, 1998). Since the financial crisis 2008 in the United Stated of America, perception toward derivatives has been negative, as some of the derivative contracts were blamed for the collapse of economies. It has been noted by an American investor Warren Buffet ‘derivatives are the financial weapon of mass destruction’. However, the surveys and researchers overdid in the field of derivatives projected that the negativity surrounding derivatives arose due to the lack of knowledge and inappropriate management of these contracts. Derivatives may results in losses through the trading due to the way that they are used such as unauthorised trading, or inappropriate controls, or monitoring procedures that regulate these derivatives positions (El-Masry, 2006). Besides, some companies prefer hedging their risk exposures with the use of derivatives, including oil producing companies. Energy products are the second most heavily traded category of futures contracts on organised exchanges, after financial products, in addition to exchange-traded contracts, many energy companies enter into over-the-counter forward contracts or swaps to manage price risk (EIA, 2002).

Oppositely to hedging market -based risk with derivatives, companies or individuals could use diversification (investing in a variety of unrelated businesses), which in practice is expensive and often fails due to of the complexity of managing diverse businesses (EIA, 2002, p. 4). Another method of managing risk which persists, when the prices are fluctuating is to use long-term fixed-price contracts, which also has a downside by the more favourable spot prices in the market (EIA, 2002, p. 4). Furthermore, insurance contracts allow shifting the risks from the owner of an asset to the ‘counterparty’ of the contract (EIA, 2002, p. 4). However, oil and gas producing companies do use diversification and tools for managing exploration risk and protecting firm from property loss and liability (EIA, 2004, p. 20).

Nonetheless, throughout the development of derivative contracts and their amplification in the market, speculation arose in various markets, provoking risks that became increasingly difficult to control (Dionne, 2013). Individuals, hedge funds, traders, companies from the related industries, and oil producing companies themselves can be involved in the speculation activities. Those activities have a direct impact on market’s stability and affect prices of oil products.
Finance theory indicates that hedging increases firm value if there are capital market imperfections such as expected costs of financial distress, expected taxes and other agency costs (El-Masry, 2006). Theorem created by Modigliani-Miller (1959) rejects the concept of risk management bringing its irrelevance to add to organisation’s value. While a study by Allayannis and Weston (2001) found that hedging activity increases the value of the firm by analysing a sample of firms that faced currency risk directly because of foreign sales or indirectly because of import competition. They found that firms with sales in foreign countries that hedged with currency derivatives had a 4.87-percent higher firm value (hedging premium) than similar firms that did not use derivatives. Firms that did not have foreign sales but faced currency risk indirectly had a smaller, but statistically insignificant, hedging premium. The study also found evidence that after firms began hedging, their market value increased and that after firms quit hedging, their value fell.

Although some studies (e.g. EIA, 2002; Jin and Jorion, 2004; Silva and Gomes, 2011) have already analysed the risk management strategies applied by non-financial companies and found an evidence that hedging positively affects company’s market value, to the researchers knowledge there have not been any recent researchers published based on the current situation in the oil industry, considering the recent dramatic fall in the crude oil prices. Jin and Jorion (2004) studies 119 U.S. oil and gas producing companies from 1998 to 2001 and evaluated their effect on firms value, by conducting valuation of reserves and collection of detailed information on the extent of hedging, authors verified that hedging reduces company’s stock price sensitivity to oil and gas prices, while hedging did not project to have any effect on market values for this industry.

At the same time, a sample that has been used by researcher is limited to the U.S., while the situation in other operating regions may project different results additionally, the time frame cannot be applied to the current situation. Previous studies assessed hedging with derivatives from the angle of speculative activities by energy sector (oil and gas companies), individual traders, and hedge funds (i.e. Marthinsen and Yunwei, 2010; Carret, 2015; Kilian and Murphy, 2011). On the other hand, some previous studies projected that hedging with derivatives may not have a positive effect on company’s risk management possibilities (e.g. Khediri, 2010). According to Khediri (2010) who analysed 250 non-financial companies in France, concluded that the use of derivatives does not assign a higher value to the company, and French investors do not attach a premium value to derivatives hedging. The major limitation of this research is a lack of evidence toward oil-producing companies.
1.1. Research Objectives / Questions

The purpose of this dissertation is to investigate the risk management strategy such as hedging with derivatives in the oil sector, particularly performed by major oil producing companies which operations are not limited to one specific location and which financial performance reflects the volatility of the global oil industry market. Moreover, it aims to quantify the implementation of derivatives and their effectiveness in increasing company’s enterprise value. Although dissertation considers the impact of the downside characteristic of derivative contracts such as a possibility of speculation and its relevance in oil producing companies. Effective use of derivatives was traced through these companies financial performance, as appropriate techniques and contracts would theoretically improve the financial statements.

Research question one:
Are derivatives considered to be an effective tool in enhancing an enterprise value that might be applied by oil producing companies facing market volatility?

Research question one rationale:
Due to the existing controversy toward derivatives contracts, research question aimed at the analysis on how hedging with derivatives reflects on major oil and gas producing companies enterprise value. Enterprise value (EV) is a measure of company’s total value, and presents the complex version of market value, as it accounts for company’s market value of debt, interest, and preferred shares.

Derivatives are financial instruments that allow hedge against risks, the most common derivatives contract are: options, futures, swaps. Derivatives, theoretically, would affect company’s enterprise value, through the increased profitability for the financial period, if the contract was managed accordingly. On the other hand, derivatives can possess an additional risk for the company, and may negatively reflect upon its value. Enterprise value is an integral term for businesses, as it represents the market value of the company, and in the case of sale process or dealing with mergers and acquisitions, the acquiring company has to consider this particular amount to proceed with the deal.

The research question responds to the assessment of hedging techniques used by major oil and gas companies in offsetting the market-based risk, driven by the fluctuations of oil prices, in order to define the most successful practices of derivatives usage based on the expertise of observed companies. The effect of hedging on company’s enterprise value is going to be analysed.
Research question two:
In the crude oil industry are derivatives primarily used to hedge the market risk or they are used for speculative purposes?

Research question two rationale:
Previous studies in oil industry projected that oil industry present vast of opportunities for speculators to participate in the market (Fattouh et al 2012; Learsy, 2013; OPEC, 2016), moreover oil futures market cannot function without speculative traders providing liquidity and assisting in the price discovery. Thus, speculation has been an integral aspect of consideration for oil producing companies in the process of risk management development strategies. Persistent speculation in the oil market has been referred to one of the contributors to the volatility in the market. Notwithstanding the impact it has on the prices of final products, that are used by common industries (Ryanair case 2015; Thomas, 2015; Farrell, 2015). The relationship of speculation activities overdone by oil industry players has to be traced in this dissertation in order to retrieve the full picture of the current situation in the oil sector, as its contribution to the market’s volatility is reasonable.

1.2. Research Value
A fair examination of hedging with derivatives by major oil and gas producers is the central idea of the dissertation, research is valuable for the industry as it carries practical implementations through the use of various models and theories, and professional opinions. The practical benefit of research is that it would allow organisations to trace the impact of hedging on organisation’s market value enhancing. The geographical location of interviews used as a part of a primary research provides this thesis with an objective outlook for the current issues in risk management and derivatives amplification in the oil industry. In general, research will analyse the most recent situation in the global energy sector, providing rational guidelines for the management of market-based risk in the context of the rapidly changing environment. Moreover, this dissertation would be beneficial for the investors who target energy sector, as it would support them with the up to date information on major oil producing companies so that they could make their investing decisions through the comparison of different companies and would understand the risks of their potential investments. Although this research maintains academic insights, critical analysis of related theories of risk management and possesses to bring value to the current collection of oil industry analytics.

1.3. Research Structure
In order to fulfil research questions and objectives, this dissertation is divided into five main chapters. The Chapter One aims to explain the rationale of a topic selected, including
established research questions and hypothesis for investigation. The Chapter Two is dedicated to the literature review, that aims to explain existing theories that assisted researcher with a background knowledge, recent trends applicable to the industry of the choice in order to justify observed questions. Subsequently, Chapter Three aims to explain the research methodology. Chapter Four outlines research findings based on the gathered primary data, while interpretation of research findings and outlined conclusion are explained in the last Chapter Five.

1.4. Motivation for the research

Research topic was primarily motivated by researcher’s career plans, as being interested in working in oil and gas company, as a financial analyst. The researcher had established the goal to practice analytical skills and extend knowledge about risk management, particularly derivatives contracts, and establish a network connection with those professionals working in the industry.
Chapter Two: Literature Review

2.1. Introduction

For the purpose of this dissertation, previous researchers have been looked at, in order to find how derivatives could be used as a tool of a risk management, in particularly managing market-based risk by oil and gas producing companies. Previous researchers mainly focus on the derivatives management from the economic perspective, affecting the economy itself, or the whole energy sector itself. Less research was made from the producers’ of these commodities perspective, providing me with an opportunity to exploit the research in that area. The literature review covers the fundamental theories, models, and researchers that are relevant for the investigation process of the dissertation.

2.2. Hedging market-based risk

The conceptual framework of risk management (Hedging) market-based risk is an integral for this dissertation, as it provides with the fundamental theory that was used in order to fulfil established goal of the dissertation. Reviewing the literature on the hedging, numerous articles that cover exposure and management of foreign currency exchange or interest rates were found, while there are a limited number of researchers toward the commodity, in particular, oil. Despite the widespread use of derivatives by corporations, and substantial growth of the derivative market over the last two decades, it is still complicating to retrieve empirical evidence on the effectiveness of derivatives hedging on firm’s value (Berrospide et al, 2008, p. 1). The lack of data on the extent and direction of a firm’s exposure to risk, or it is often non-trivial to even identify the frictions that hedging may assist to overcome, also data on the kinds of derivatives used by a firm and indeed on whether firms are hedging or speculating may not be available, and finally, some firms have hidden or unobservable characteristics that introduce complications that affect the interpretations of empirical results (Berrospide et al, 2008, p. 1).

Aretz et al (2007, p. 434) explain that the interest of corporations in hedging risks with derivatives is rising when there are imperfections in capital markets occur, as it can enhance shareholder value through its impact on agency costs, costly external financing, direct and indirect costs of bankruptcy, and taxes. More precisely, corporate hedging can relieve underinvestment and asset substitution problems by reducing the volatility of cash flows, and it can accommodate through eliminating unsystematic risk, which in result leads to lower bankruptcy costs (Aretz et al, 2007, p. 449). Authors emphasise that corporate risk management can align the availability of internal resources with the need for investment.
funds, helping companies to avoid costly external financing. Conclusively, the corporate tax burden can be also reduced by an appropriate corporate risk management.

Hedging presents a double-edged sword for those companies who decide to use it as a part of their risk management strategy. The airline industry presents the real example of the failure and success of adopted hedging strategies. For instance, Ryanair, an Irish low-cost airline, that gained its reputation as being a successful fuel hedging airline, that helped it to protect itself from market shocks and allowed them to budget in advance, in February 2015 projected that hedging can also destroy the expected profits (O’Donoghue, Independent, 2015). That was a time, when a slump in jet fuel prices, triggered by the falling cost of oil had hit the airline companies, that prefer to hedge in advance (O’Donoghue, Independent, 2015).

Thus, in 2015 Ryanair said that it had hedged its fuel costs at 92 US dollars per barrel for the year of 2016, limiting the carrier’s gains from oil prices that have sharply decreased below 50 US dollar per barrel (Farrell, The Guardian, 2015). That hedging had a negative effect on the company, as it meant them paying up to 200 million euros more than it would if they bought fuel at price that was set up in the market, notwithstanding the emerged consequences of an additional cost on currency exchange between euros and dollars (O’Donoghue, Independent, 2015).

Ryanair was not the only airline company that experienced losses over the market’s recent volatility, many other European airlines were 70-90 percent hedging going into 2015 (RTE, 2015). The US firm Delta Airlines announced the loss of 712 million US dollar loss in its fourth quarter report 2015, which was mainly attributed to its fuel hedging, also Singapore Airlines saw its hedging policy wipe 216 million US dollars from its third quarter earnings (O’Donoghue, Independent, 2015). In contrast, Norwegian Air was largely unhedged, by have only 23 per cent hedged of its fuel needs for the rest of 2015, and 28 percent for 2016, which helped airline stand to benefit (RTE, 2015).

However, in spite of its unsuccessful hedging practice in 2015, Ryanair’s spokeswoman said the company’s hedging policy “achieves significant certainty in managing and growing Ryanair’s business profitability over time…Our hedging policy enables us to obtain certainty in relation to key operating expenses, such as fuel, and the cost of our aircrafts.” (O’Donoghue, Independent, 2015). Ryanair is expected to achieve savings from hedging of about 430 million euros in 2017, by locking in a greater proportion of its 2017 aviation fuel requirement (Powley and Pooler, FT, 2015).
2.3. The crude oil market

Crude oil markets have a tendency to be in backwardation, mostly explained by refiners’ behaviour and by the logistics process of crude oil supply (Horsnell et al, 1995). Theory of normal backwardation was originated by economist John Maynard Keynes, which holds the theory that the price of the futures price is less than expected future spot price and that the futures spot price should rise over time to equal the expected future spot price at expiration. Keynes noted that this price relationship prevailed for most commodities (Kolb, 1992).

*Chart 1: Composition of the Bloomberg Commodity Index*

Source: Bloomberg Published by U.S. Energy Information Administration

Chart 1 projects that crude oil plays a major role in commodity investment. Energy Commodities accounted for about one-third of 2015 Target Weights in the Bloomberg commodity index, with crude oil comprising 15 percent (EIA, 2016).

However, the oil market differs from other commodities, as it was stated by (Horsnell et al, 1995, p.16) and normal backwardation that was initially explained by Keynes is rising, particularly, in the oil industry, as a function of the supply and demand balance for promptly delivered crude oil. In other words, tightness in the short-term market results in a backwardation, the premium for prompt delivery (Horsnell et al, 1995, p.16). Oil producers
have strong incentive to keep close to minimum inventory levels as crude oil commodity’s storage is expensive and limited, dissimilar to agricultural or metals commodities that are faced with less demand and therefore prudent for inventories (Hornell et al, 1995, p.18). According to EIA (2013), the backwardation was also referred to an increased supply from the US oil producers, as their production was projected to increase by 29 per cent since 2012 year.

Graph 1: Backwardation and Contango are visually explained

Source: Hill, 2015

The effect of market’s backwardation on oil producing companies has been recently explained by Barnett (2014) who emphasizes that current combination of steeply backwardated crude oil markets and historically low volatility is creating a tough environment for oil producers who need to lock in forward prices to satisfy their enterprise value protection, capital provider requirements, or cash flow needs for drilling programs. According to his opinion, backwardation in the crude market is likely to persist indefinitely, which leads to the increasing need for producers to establish their view of how absolute prices and the shape of the forward curve will move over time (Barnett, 2014).

The opposite price relationship, which is called contango, arises where the prompt market is well supplied, and if the contango grows substantially to maintain interest and storage
charges, then it will encourage stock building, which tends to stabilise and prolong the period of contango (Horsnell et al, 1995, p.20).

On the other hand, periods of the market being in backwardation or contango stages provoke speculation activities arising by traders in the oil industry. Austin (2015) mentioned that traders in oil can profit from contango speculation without even getting involved in the arbitrage transaction themselves, a real example was 2005 and 2006 years when oil market was in contango. That position of a crude oil market caused speculators to buy up oil tankers and use them as storage facilities, and a large proportion of the crude oil supply in the market was purchased by people who were simply oriented on holding assets. The use of tankers to hold the oil compromised trader to take care of their storage and transport needs with one facility, which in the result, according to analysts, had added between 10 US dollars and 20 US dollars to the price of oil (Austin, 2015).

2.4. Speculation in the oil market

Carret (2015) defined oil market as an attractive field for speculation, where speculator will find many promising vehicles for his operations among the oil stocks. The group of speculator’s interest has a wide range, starting from companies owning little except land which contains oil to companies owning widely scattered producing wells and all the facilities transforming their product into marketable form, and companies operating principally in politically unstable regions to companies operating in one particular country (Carret, 2015). Another reason for attractiveness for speculation is that speculator, in general, will find ample information about leading oil companies and about the state of the industry in the financial press (Carret, 2015).

Speculation, as it was defined by Kilian and Murphy (2011), is anyone buying crude oil for future use rather than current consumption, becomes a speculator from an economic point of view. Conforming to Fattouh et al (2012, p.5) who was driven by Kilian and Murphy studies, outlined that there are the similarities that are common to all speculative purchases of oil is that the buyer is anticipating rising oil prices. In turn, speculating buying may involve buying crude oil for physical storage leading to an accumulation of oil inventories, or it may involve buying an oil futures contract, provided an oil futures market exists.

Tokic (2012, p. 801) in his research paper maintained that the theory of speculation is important for understanding by corporate hedgers, as it explains how bubbles develop, that in turn will help them to adjust their corporate strategies. By using term bubbles, the author means a significant and persistent deviation between the actual prices and the fundamental values. He mentioned that excess speculation in the market is always the primary cause of all
bubbles, and corporate hedgers must recognise those bubbles and must refrain from becoming the positive feedback traders themselves. The author also explained that it might be possible by having insurance in the form of options against potential bubbles at all times (Tokic, 2012, p. 801). Strategies that do reflect the and encourage the growth of bubbles through speculation provoke the inefficiency in the market, that shape the value of assets and destabilise market itself (Graph 2).

*Graph 2: The market inefficiency model*

![Graph 2: The market inefficiency model](image)

*Source: Tokic, 2012, p. 805*

However, Fattouh et al (2012, p. 5) highlighted in their research that oil producers do generally act as speculators in the physical market, as well as hedge funds do. According to authors, oil futures market cannot function without speculative traders providing liquidity and assisting in the price discovery. Supportively, Learsy (2013) maintained that in order to appreciate the excess of the oil market one needs to understand that some 80 per cent of all contracts bought and sold on the commodity exchanges are not executed by actual producers or crude oil consumers engaged in ‘legitimate’ hedging strategies, but rather by speculators trying to drive the price of oil in the direction in which they have placed their bets.

While price relationship between future contracts and spot price can be assessed through the analysis of a supply and demand, and stock of inventory, the price of crude oil itself is complex for understanding. The information above provides the reasons behind the pricing policies, such as oil markets position and speculation activities that either way drive the prices up or down. Hereby, the price of an original crude oil is going to be discussed.
Research has been made on the exposure of oil producers to the volatility of oil prices over the last decade. Mostly, researchers were oriented on the impact it has on the economy in which those companies operate.

2.5. Price of the crude oil

OPEC provides reports based on an outlook for crude oil market developments including trends in world oil demand and supply. OPEC (Organisation of Petroleum Exporting Countries) is an intergovernmental organisation established in 1960 and represent 13 oil-exporting developing nations that coordinates and unifies the petroleum policies of its member states. These policies are mainly oriented on ensuring price stability in the world oil market, obtain a stable revenue for oil-producing nations, and provide a regular, reliable, efficient and economic supply to consuming countries and a fair return to investors in the oil industry (OPEC, 2016).

However, OPEC’s policies and regulations have been largely criticised in the media claiming the organisation is not fulfilling its obligations as it declared. For instance, Thomas (2016) reported that OPEC is a cartel that is purely controlled by Saudi Arabia, and the oil price slump which saw crude oil fall to 30 US dollar per barrel in the beginning of 2016 from what had seemed to become the norm at over 100 US dollars, has exposed unprecedented fissures between cartel’s wealthiest members and the smaller producers who have seen their economies decimated, and among them Africa’s major oil producers. Thus, African economies reveal a system that has lost sight of one of OPEC’s founding principles- to deliver economic prosperity to member states (Thomas, 2016).

Notwithstanding the historical evidence of OPEC’s regulations in the oil industry, there were timely provable actions taken on the occasion. For instance, according to Moody’s (2011) report, the increase in crude oil prices in 2011 was mainly achieved by a limited increase in OPEC supplies, rather than economic growth or weaker dollar position. Agency also confirmed that those actions of OPEC were beneficial for oil producing companies with integrated schemes of production as it assisted in increased profitability as per increase in oil prices, such as WTI and Brent benchmarks projected 29 percent higher indicators than in 2010 (Moody’s, 2011). As the result, it provided oil producing companies with a strong boost to exploration and production cash margins (Moody’s, 2011).

*Graph 3: World demand and supply of oil*
International Energy Agency (IEA, 2016) provided the consecutive report on the changes in supply and demand of crude oil for the last three years. The following report, crude oil prices rallied to 2016 high above 51 US dollar bbl in June, caused by continuing outages in Nigeria and Canada as well as a steady decline in the US oil production. Disruption in OPEC and non-OPEC countries cut global oil supply by nearly 0.8 mb/d in May. OPEC crude output fell by 110 kb/d in May to 32.61 mb/d as big losses in Nigeria due to oil sector sabotage more than offset higher Middle East output (IEA, 2016).

Iran has clearly emerged as OPEC's fastest source of supply growth this year. Global oil demand in 1Q16 has been revised upwards to 1.6 mb/d and for 2016 growth will now be 1.3 mb/d (IEA, 2016). In 2017 we will see the same rate of growth and global demand will reach 97.4 mb/d (IEA, 2016). Non-OECD nations will provide most of the expected gains in
both years (IEA, 2016). The growth rate is slightly above the previous trend, mostly due to relatively low crude oil prices (IEA, 2016).

Conforming to IEA (2016) in spite of the sharp oil price drop in January 2016 in history since November 2013, they forecasted that oil market would re-balance in the reasonably foreseeable future, even though, a lot of surplus oil would be added to prominent stocks. Another important aspect that transformed the outlook of the agency has been unexpected supply cuts caused by Canada’s wildfires that removed up to 1.5 mb/d of production capacity, along with Nigeria militant actions that have forced production down to nearly thirty-years lows (IEA, 2016). Libya has a long way to recovery of its production capacity, unlike Canada, that will fully return in the near future (IEA, 2016).

Graph 4: Crude oil price movements 2015-2016

Source: OPEC Monthly oil market report, June 2016

Morningstar (2010) expressed that oil prices reflect the state of the dollar, and act as a tax on economies, moreover, when oil purchases begin to account for a material level of GDP of 4 per cent to 6 per cent as it occurred in 2008, economies are not able to bear that tax, and demand for commodity responds strongly. Supportively, Alguist and Gervais (2011) provided with an explanation that the increase in the price of crude oil between 2003 and 2008 was due to the macroeconomic fundamentals. Authors found no evidence that financial speculation in the oil market played an important role in that occasion. However, other researchers projected that the price of a crude oil is related to the price of refined products (Haigh & Holt, 2002). Thus, the price of oil directly affected by the crack spread (the difference between the price of crude oil and refined products price) that is driven by the demand for oil refined products, such as gasoline or heating oil (Verleger, 2011).
Choi et al (2015) explored the relationship between the crude oil spot price and refined product derivatives market, as a tool for the forecasting movements in the crude oil price. According to authors, Error Correction Model (ECM) and the Multivariate GARCH (MGARCH) model present an opportunity for companies and investors to forecast the movements in crude oil prices.

Nonetheless, these models do not fully justify the movements of oil prices. Quantum Financier (2010) outlined that GARCH model has its limitations, one of the most important is the negative effect, such as events/news that tend to impact volatility. The recent event, that was described earlier, Canada’s wildfires is a real example how those models, might be ineffective at times. Speculations in the oil market also put restraints on the use of predicting models, as they have a direct impact on the crude oil price movements. Mahdi (2015) referring to OPEC in his article outlined that oil supply and demand do not fully justify the 60 percent drop in oil prices between June and January as speculation also played a role, the premium that speculators add to oil prices ranges from 10 US dollar to 30 US dollar a barrel.

Hence, the price of crude oil affects producers, and the possibility of forecasting the movements of oil prices is an integral part of these companies budgeting planning activities, forecasting profit, and strategic management. Depending on the price of a crude oil, companies can decide on the hedging method as a part of a risk management strategy.

2.6. The derivatives market, hedging methods, and regulation

Derivatives are traded over exchange-traded markets or over-the-counter (OTC) markets. Derivative exchange market is individuals trade standardised contracts that have been defined by the exchange (Hull, 2006, p. 1). While over-the-counter markets that present an alternative to exchanges and is measured in terms of total volume of trading has become much larger than the exchange-traded market. Trades are done over the phone and are usually between two financial institutions and one of its clients (typically a corporate treasurer or fund manager) (Hull, 2006, p. 2). One of the advantages of OTC is that the terms of contracts traded do not have to be specified by an exchange so that market participants are free to negotiate any mutually attractive deal (Hull, 2006, p. 2).

On the other hand, Rahman (2015) in his research mentioned that the financial crisis of 2007-2009 highlighted shortcomings in the identification and management of risk in OTC derivatives markets, as there was a lack of transparency about the size of bilateral positions in OTC derivatives contracts. Chart 2 shows that the OTC derivatives segment is much larger, constituting around 90 percent of the overall derivatives market (Rahman, 2015).
Chart 2: Composition of global derivatives contracts by trading arrangement as at the end of 2014


Graph 5 shows that the notional value (a measure of activity but not necessarily of economic exposure of risk) of outstanding OTC derivatives grew rapidly in the early 2000s, particularly from 2006 to 2008 (Rahman, 2015). It might be noticed that equity and commodities have both less gross notional value than the interest rate of credit derivatives.

Graph 5: Size of global OTC derivatives markets by outstanding gross notional value

Source: Rahman, 2015

Based on the type of derivative contracts used by companies, they can adjust the hedging strategies which are appropriate and coordinate their goals. Following the theoretical framework, issues in hedging involve the determination of the optimal hedge ratio (OHR) (Chang et al, 2010). Risk management requires determination of OHR (the optimal amount of futures bought or sold expressed as a proportion of cash position), taking into account a minimum variance criterion. The calculation of OHR, based on early researchers (Ederington
1979, Figlewski 1985, Myers and Thomson 1989) and represent the slope of the classical linear regression model of cash on the futures price that assumed a time-invariant hedge ratio (Chang et al, 2010). However, Baillie and Myers (1991) argued that because of the joint distribution of cash prices and futures prices do change over time the estimation of a hedge ratio may not be appropriate. Notwithstanding, an analyst in oil companies do use those calculations in selecting the hedging strategies.

Chang et al (2010) in their working paper estimated four multivariate volatility models CCC, VARMA-GARCH, DCC, BEKK and diagonal BEKK, for the crude oil spot and futures returns of two major benchmark international crude oil markets, Brent and WTI. Models were used in order to process with calculations of the optimal portfolio weights and optimal hedge ratios to indicate crude oil hedge strategies. According to their findings, based on daily data from 5 November 1997 to 4 November 2009, Brent market suggested holding futures in larger proportion than spot. On the other hand, WTI market recommended holding a spot in larger proportion than futures.

EIA (2002) outlined derivatives are particularly appropriate for managing the market (price) risk that arises as a result of highly volatile prices in the petroleum and natural gas industries. The typical hedging techniques with standard derivative contracts that might be used by market participants faced with price risk are shown in table 1.

Table 1: Petroleum and Natural Gas Price Risks and Risk Management Strategies

<table>
<thead>
<tr>
<th>Participants</th>
<th>Price Risks</th>
<th>Risk Management Strategies and Derivative Instruments Employed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil Producers</td>
<td>Low crude oil price</td>
<td>Sell crude oil future, buy put option</td>
</tr>
<tr>
<td>Petroleum Refiners</td>
<td>High crude oil price</td>
<td>Buy crude oil future or call option</td>
</tr>
<tr>
<td></td>
<td>Low product price</td>
<td>Sell product future or swap contract, buy put option</td>
</tr>
<tr>
<td>Storage Operators</td>
<td>Thin profit margin</td>
<td>Buy crack spreada</td>
</tr>
<tr>
<td>Large Consumers</td>
<td>High purchase price or low sale price</td>
<td>Buy or sell futures</td>
</tr>
<tr>
<td>Local Distribution Companies</td>
<td>Unstable prices, wholesale prices higher than retail</td>
<td>Buy future or call option, buy basis contractb</td>
</tr>
<tr>
<td>Power Plants (Natural Gas)</td>
<td>Thin profit margin</td>
<td>Buy spark spreadc</td>
</tr>
<tr>
<td>Airlines and Shippers</td>
<td>High fuel price</td>
<td>Buy swap contract</td>
</tr>
</tbody>
</table>

*aEssentially, buy crude oil future and simultaneously sell product future.  
bA basis contract fixes the transportation cost between Henry Hub and a local market.  
cBuy natural gas future and sell electricity future.  
Source: Energy Information Administration.

Research by Lien and Tse (2002) projected the evolution in futures hedging. Hull (2006, p. 47) advised that one of the hedging strategy that is common using futures contracts is a
hedge-and-forget strategy, which means that no attempt is made to adjust the hedge once it has been put in place. Hedger simply takes the future position at the beginning of the life of the hedge and closes out a position at the end of the life of the hedge (Hull, 2006, p.48).

Additionally, Leoni et al (2014) provided research on the dynamic of forward contracts and established how to hedge derivatives on smaller delivery periods, such as months or days by using a coarse-grained trading approach, that introduces a basis risk as the claims are written on a different asset than the one that is being used to hedge with. Authors added that particularly in energy markets, the extra risk is worth taking because the liquidity constraint would either not allow a direct hedging procedure to be executed, or the associated cost would be too high. According to their research, commodities such as oil, gas, electricity, are mostly traded on a short-period basis due to the physical characteristics, and poor liquidity.

Oil producing companies, alike companies in other industries, will hedge if they expect an upcoming adverse event. Dubofsky and Miller (2003, p. 35) conducted that it is less costly for the firm to hedge than for individuals to hedge, due to trading commissions and collateral requirements for using derivatives are likely to be less for firm rather than individuals. Moreover, authors specified that many investors are unsophisticated and do not know how to hedge, and many of them do not have access to most of the risk management tools (such as swaps) that are available for large firms. Large companies have more information available to them to choose the proper hedging method. For instance, oil companies have more accurate data about crude oil inventories, production, and demand that parties not involved in energy on a daily basis (Dubofsky and Miller, 2003, p. 36). KPMG’s survey explained that mostly that negative perception toward derivatives was rising due to the lack of in-debt knowledge, expertise approach and effective use of derivatives might become a tool of prudent risk management for the company, according to the research provided by Bezzina and Grima (2012).

Knill et al (2006) argued that oil companies by hedging risk mainly only manage the downside risk. Considering hedging by crude oil producers normally involves selling commodity futures because producers or refiners use futures contracts to lock the futures selling prices, thus defining their preferences in taking short positions in futures (Chang, 2010). Although energy traders, investors or fuel oil users focusing on locking in a futures purchase price prefer long positions in futures (Chang, 2010).

One of the features of derivatives is that they allow companies to manage risks associated with the business. As risk management takes the form of reducing (or even eliminating) price
uncertainty via hedging transactions, the chief economic benefit of derivative contracts is that they provide inexpensive conduits to transfer risk (Dubofsky and Miller, 2003, p. 24). When an industry perspective is good (bad), it will scale down (up) on the futures usage, therefore pushing futures prices higher (lower) (Chang, 2010). Moreover, Daniel (2001) confirmed that implementation of hedging strategies can considerably reduce oil price volatility without significantly reducing returns, and with the added benefit of greater predictability and certainty (Chang, 2010).

Taking into consideration the regulation of derivatives, the major regulative responsibilities are performed by the U.S. Commodity Futures Trading Commission (CFTC). Commission was historically charged by the Commodity Exchange Act with regulatory authority over the futures markets (CFTC, 2016). In the aftermath of the 2008 financial crisis that was caused by the unregulated swaps market, President Obama charged the CFTC with reforming market (CFTC, 2016). Nowadays, commission have grown to include contracts on energy and metal commodities, such as crude oil, heating oil, gasoline, copper, contracts on financial products, such as interest rates, stock indexes, and foreign currencies, moreover, commission has regulatory oversight of the over 400 trillion US dollars swaps market which is about a dozen times the size of the futures market. Thus, CTFC throughout its regulations fosters open, transparent, competitive and financially sound markets to protect the market users and funds. CTFC is publishing regular reports on the situation in the derivative market, that are divided according to the specification of industries, among them petroleum derivatives, such as crude oil, ethanol, gasoline etc. Reports have been used as a secondary data, oriented on the solvation of the second research question, regarding the predominance of hedging or speculative activities in the market.

Thus, market participants may enter the market, considering the long or short positions. Dubofsky and Miller (2003, p. 167) characterised long hedgers as one buys future contracts, meaning that hedger either is currently short the cash or has a future commitment to but the good at the spot price that will exist at a later day. For these type of hedgers, any subsequent price rise should lead to a profit in the futures market and a loss in the cash market. Oppositely, in short hedge futures contracts are sold, hedgers are driven by the idea that prices will fall.

2.7. The effectiveness of hedging in enhancing company’s value

Reviewing the literature on the hedging, numerous articles that cover exposure and management of foreign currency exchange or interest rates were found, while there are a limited number of researchers toward the commodity, in particular, oil. Previous studies
projected that hedging with the use of derivatives by oil and gas companies do not consistently add market value for companies, as there are different factors involved and the specificity of derivatives implementations. Thus, literature on hedging effectiveness in enhancing company’s value is still controversial and did achieve unity.

While some studies over the years emphasise the need of risk management as an important part of a strategic choice that organisation has to make, theorem created by Modigliani and Miller (1958) rejects the whole concept of risk management bringing its irrelevance to add to organisation’s value. According to Modigliani and Miller (1958) hypothesis showed that with a fixed investment policy in an economy without any friction (transaction cost, agency costs and taxes), in a scenario where all rational investors have the same access to market prices and to information without any cost, the firm’s financial policy will be irrelevant (Modigliani-Miller, 1958; Junior and Laham, 2008). If the markets are complete, the firm value will be independent of hedging (Modigliani-Miller, 1958; Junior and Laham, 2008). The belief exists that commodities market price directly affects company’s (its producer’s) market value (Jin and Jorion, 2006). Meanwhile, the market price of a commodity is driven by producer’s operational cycle and might be decreased by company’s used hedging strategies (Jin and Jorion, 2006).

One of the researchers on hedging with the use of weather derivatives by Perez-Gonzalez and Yun (2013) concluded that derivatives lead to higher firm’s value, investments, and leverage by the means of natural experiment and data collected from utilities. Authors also maintained that, currently, little information is available on the causal effect of hedging on firms value, however, evidence they obtained proved that derivatives have been a powerful tool for shifting or hedging risk.

Supportively, Bartram et al (2011) by using a large sample of non-financial companies from 47 countries examined the effect of derivative use on firm risk and firm’s value, by matching users and nonusers on the basis of their propensity to use derivatives. Researchers found strong evidence that the use of financial derivatives reduces both total risk and systematic risk. Considering the effect of derivative use on firm value, a positive trend has been noted. However, using derivatives is associated with a significantly higher value, abnormal returns, and larger profits during the economic downturn in 2001–2002, suggesting that firms are hedging downside risk.

Although, Junior and Laham (2008) research analysed the impact of hedging activities on firm value in a sample of non-financial Brazilian firms from 1996 to 2005, and results indicated that firms that use currency derivatives are negotiated with a premium with
relation to the companies that do not use them. Similarly, research on the Swedish firms overdone by Hagelin et al (2004) found a positive impact of the use of derivatives on firms value. Researchers who considered currency derivatives confirmed a positive relation of hedging used by companies on their hedging premiums (Allayannis and Weston, 2001).

Furthermore, research performed by Jin and Jorion (2006) on hedging activities of the US 119 oil and gas producers from 1998 to 2001 projected that hedging increases company’s market value. Authors verified that hedging reduces the firm’s stock price sensitivity to oil and gas prices, while hedging strategies that are used by companies do not affect the market value of an industry.

On the other hand, Fleming and Ostdiek (1999) remarked that in perfect markets, derivatives should have no effect on the underlying asset market because they are redundant securities, due to the fact that they can be synthetically created by some combination of the asset and riskless bonds. With market imperfections, derivatives make the market more complete by allowing investment choices that were previously cost inefficient or impossible due to regulatory or institutional constraints (Hakansson, 1982). Additionally, the study of French companies using currency derivatives projected that hedging did not have an effect on those companies’ value (Clark et al, 2006).

According to EIA (2002, p. 42), the use of derivatives as a part of risk management is limited by the availability of spot market data, specifically, timely, public and accurate information on prices and quantities. Additionally, in order to judge the creditworthiness of counterparties and the risks managers are taking, their financial statements should be transparent. Moreover, the agency emphasised that accurate, timely price and quantity data from spot markets are critical for the design and pricing of derivatives that can be used to manage rather than amplify price risk. The issue of credibility of information as addressed to the accounting committee, and reflected in the formation of Statement 133, which still does not provide in practice, referring to EIA (2002), the credibility of the information available.

From the accounting perspective, specifically the accounting record of the use of derivatives by oil companies is based on the principle FASB (Federal Accounting Standard Board) Statement 133, meaning that all derivatives have to be carried on the balance sheet at fair market value (EIA, 2006, p.55). Table 2 projects the impact of derivatives on the balance sheet and income statement.
Table 2: Balance Sheet and Income Statement Impacts of Cash Flow and Fair Value Hedges

<table>
<thead>
<tr>
<th>Type of Derivative</th>
<th>Balance Sheet Impact</th>
<th>Income Statement Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fair Value Hedge</td>
<td>Derivative (asset or liability) is reported at fair value. Heded item is also reported at fair value.</td>
<td>Changes in fair value are reported as income/loss in income statement. Offsetting changes in fair value of hedged item are also reported as income/loss in income statement.</td>
</tr>
<tr>
<td>Cash Flow Hedge</td>
<td>Derivative (asset or liability) is reported at fair value. Changes in fair value of derivative are reported as components of Other Comprehensive Income (balance sheet).</td>
<td>No immediate income statement impact. Changes in fair value of derivative are reclassified into income statement (from Other Comprehensive Income in the balance sheet) when the expected (hedged) transaction affects the net income.</td>
</tr>
<tr>
<td>Speculative Transaction</td>
<td>Derivative (asset or liability) is reported at fair value.</td>
<td>Changes in fair value are reported as income/loss in income statement. (There will be no offsetting changes in the fair value of the hedged item.)</td>
</tr>
</tbody>
</table>

Source: FASB Statement 133.
Source: EIA, 2006

Furthermore, from the accounting perspective, the concept of hedge effectiveness is applicable in two ways (EIA, 2002, p. 57). First, derivatives are expected to be highly effective in offsetting changes in fair value stemming from the risk being hedged, which is relevant for all types of hedges. Although Statement 133 requires companies to specify how it will measure effectiveness over the life of derivatives, as according to FASB, derivatives contracts consider to be effective, if 80 per cent of risk has been hedged (EIA, 2002, p. 57). Secondly, according to the report, hedging ineffectiveness has to be generally included in earnings in the quarter in which it occurs. By considering ineffectiveness, agency referring to FASB discloses the amount by which the change in the value of the derivative does not exactly offset changes in the value of the hedged item. Thus, derivatives have a direct impact on company’s financial performance.

Financial results of 2015 projected that some of the worst-performing oil companies in North America are getting more for their crude oil than Exxon Mobil Corporation, or Chevron Corporation did. Chart 3 illustrates Goodrich Petroleum Corporation which is considered as the biggest loser in the Bloomberg Intelligence index of North American independent producers, sold it’s crude oil for 86.49 US dollars per barrel in the second quarter 2015, while Exxon Mobil only received 54.26 US dollars per barrel sold (McNeely and Loder, 2015). The reason behind the outrage in a profit of those companies is the hedging strategies arose due to lack of cash. Smaller oil producing companies with riskier credit bought insurance against an oil crash, which locked in higher prices and reassured lenders that they would get paid back (McNeely and Loder, 2015).
However, Goodrich Petroleum, that was selling the most expensive oil due to hedging in 2015, is currently facing a bankruptcy, as it could not bear the consequences of declining oil prices and could not manage its debt issues (Gleason, 2016).
Chapter Three: Methodology

3.1. Introduction to research methodology

Methodology chapter designed to outline methods researched had used throughout the process of the dissertation. Methodology chapter covers research design, explains how the data is going to be collected and analysed, maintain researcher’s ethical standards that would guide during the process of the dissertation, and outline limitations that will arise during the research.

Saunders et al (2012, p. 130) had proposed the research “onion”, which consist of guidelines valuable for the assessment of research. Those steps contribute to the structure of research and include research philosophies, research approaches, strategy, choice, time horizon, techniques, and procedures (Graph 6). While Walter (2006, p. 35) refers to methodology as a referencing frame for research that is affected by ‘the paradigm in which our theoretical perspective is placed or developed’.

Graph 6: The research ‘onion’

Source: Saunders et al, 2012, p. 130
3.2. Research Design

3.2.1 Research Philosophy

The initiation of research methods establishes with the choose of research philosophy. Saunders et al (2016, p. 124) refer the term research philosophy to a system of beliefs and assumptions about the development of knowledge. Saunders et al (2016, p. 125) have a broad range of philosophies outlines, including positivism, pragmatism, post-modernism, critical realism, and interpretivism. While, Blumberg et al (2005, p. 18) concluded that choosing suitable research philosophy is beneficial as it provides researcher with a competence to clarify the research design, and there are several philosophies available, however they are primarily distinguished into two main categories based on the principles attributable towards all of them: positivism philosophy and interpretivism philosophy.

Principles of positivism philosophy are determined based on its groundwork of the knowledge development throughout research, as its assumes the investigation of social reality by analysing observations of objective facts (Blumberg et al, 2005, p. 20) Positivism philosophy was applied, due to requirements set up within its framework such as follows: the neutrality towards collected data, focus on observable and measurable facts to produce credible and meaningful data. (Saunders et al, 2016, p.136-137).

Oil and gas producing companies that were chosen present different countries not only from the geographical location of their operations, also from the corporate structure and governance perspectives, in order to produce the objective piece of research. For instance, the observed phenomena of an effect of derivatives contracts were based exclusively on facts, ignoring any impressions.

The interpretive philosophical framework would not be a preferable philosophy due to its perception of business being too complex to be formed in designed theories and laws, and its emphasis the importance of understanding humans differences (Saunders et al, 2009, p. 116). Fisher (2004, p. 41) indicated that researchers who prefer to approach research see the link between understanding and action as an indirect one, and based on the analysis of people’s thinking, values and relationship with each other.

The conceptual framework of this dissertation is based on collected data from interviews that are supported by the facts and financial calculations that in result were presented in a credible manner.

Research has established research question that will be answered through the analysis of the financial statement of the targeted companies.
3.2.2 Research Approach

Approach to a theory development is an essential part of ‘research onion’. Dissertation involves and extends the theoretical framework of financial instruments and their implementation particularly in the oil industry. Saunders et al (2016, p. 144) emphasise the role of two main approaches based on researcher’s reasoning toward the use of theories, such as deductive and inductive.

Moreover, Ghauri and Gronhaug (2005, p. 15) conducted that the difference between both approaches is that by implementing induction reasoning facts acquired through observations lead to theories and hypotheses, while with deduction, commonly understandable under logical reasoning, researcher accept or reject these theories and hypotheses.

According to Riley et al (2005, p. 12), the deduction is the process that starts with theory and proceeds through research hypothesis and its testing, as well as data collection, are oriented to deduce explanations based on the behaviour of a particular phenomenon.

For the purpose of this dissertation, the deductive approach will be used in order to explain and predict the research. Thus initially, academic theories in finance and financial risk management were the drivers for research questions to rise, that consequently generalised to the specific situations that lead to a logical conclusion in result either maintained verification or falsified theoretical framework (Saunders et al, 2016, p.146). The deductive approach was applied as its characteristics provide description and explanation of casual relationships between implemented factors affecting the use of derivatives by major oil and gas producers and the effect they have on companies enterprise values.

In contrast, Goddard and Melville (2004) conducted that inductive approach initially considers results of observations that consequently formulate final theories, would not be applicable due to the context of this dissertation, and taking into account that financial theories on derivatives and risk management has been established and were tested throughout the research. Moreover, respondents of interviews are those with an educational and professional background in finance, whose knowledge was built based on the existing theories and practices used in companies they have been working for.

Fisher (2004, p. 76) advises that the strength of inductive arguments is often weaker than that of deductions, as deductions are certainties while inductive conclusions are probabilities, which supports researchers choice of deduction reasoning. Outcomes of research might modify the theory based on findings as assumed by deduction, rather than the establishment of new theories, further specific dissertation topic requires strongly established arguments to answer the research question.
3.2.3 Research Strategy

Research onion that was taken for a guideline for an establishment of research methods requires the researcher to choose the strategy that maintains the plan of certain processes in order to obtain a goal. Saunders et al (2016, p. 178) outlines following strategies available: experiment, survey, archival and documentary research, case study, ethnography, action research, grounded theory, and narrative inquiry.

Survey has been defined as a strategic choice for this dissertation. Saunders et al (2016, p.181) describe survey as a strategy that is more common in business and management research as it frequently used to answer ‘what’, ‘who’, ‘how much’, and associated with a deductive research approach that has been chosen by the researcher. The topic of dissertation starts with question ‘how effectively do…’ that has been answered by in-debt analysis of interviews.

However, Fisher (2004, p. 52) claims that surveys are not efficient means of studying the complexity of things in particular alike case studies. Nevertheless, case study was not applicable due to the research questions and researcher’s intentions to analyse all aspects from a broader perspective, as oil companies vary in their hedging strategies, and resources available for their operations, thus, specialising in one particular company, as if researcher would implement case study strategy, results cannot be claimed to be typical for other oil companies.

The dissertation is in the mix of qualitative and quantitative methods that supports the primary research. Saunders et al (2009, p. 153) described mixed method approach as a research that analyses qualitative data qualitatively and quantitative data quantitatively.

The qualitative method will be predominant in research throughout interviews that will be undertaken with the professionals related to oil and gas companies on the derivative contracts adding enterprise value for these companies. Mixed method research will provide the researcher with a deep understanding of investigating the phenomenon.

3.2.4 Methodological Choice

Saunders et al (2009, p. 152) defined research choice idea through the implementation of two methods of collection data. The qualitative and quantitative data might be analysed by several choices of methods: mono method which includes the usage of single data collection technique and corresponding analysis procedures, or multiple methods that refer to the implementation of more than one technique.
The methodological choice of dissertation present mixed method. The specificity of questions outlined during interviews contained both qualitative and quantitative elements, thus explaining the choice of the researcher. However, the predominant was a qualitative method, as per questions towards the effectiveness, the prevalence of speculation or hedging, and use of particular derivative contracts provided by respondents based on their professional observations maintained non-numerical data. While the question on quantifying interviewer’s assumption on hedging or speculation motives contained quantitative data, based on the provided statistical evidence etc.

Mono methods would not allow analysing all aspects of the research question in order to fulfil the purpose of research, due to the complexity of the research question, and its requirement to gather quantitative data.

3.2.5. Time Horizon

The choice of the time horizon is an important aspect of research, there are two varieties of events representation available for researchers such as cross-sectional and longitudinal studies (Saunders et al, 2016, p. 200). Authors describe the cross-sectional study as snapshots and interpretation at the particular time. While longitudinal study presents by itself series of snapshots over given period of time.

A cross-sectional study has been selected by the researcher to serve the purpose of the dissertation. The phenomena of the effectiveness of derivatives use in the oil industry was observed during the recent market volatility, when the price of crude oil had sharply dropped. That period of time had to establish the set of hedging techniques used by oil producers and project their effectiveness on affecting in a positive/ negative dynamic on companies’ enterprise value. Moreover, the cross-sectional study provided the researcher with an opportunity to concentrate at one specific time, that allowed getting an in-debt analysis for conducting objective conclusions.

Even though longitudinal study benefit due to its capacity to study change and development, and provide researcher with a measure of control over some of the variables being studied, it would mean that researcher had to analyze not only the period of the most recent volatility but also set of periods, when industry was experiencing upstream positions, which would not be possible due to time constraints set up by submission date of dissertation (Saunders et al, 2016, p.200).
3.4. Techniques and procedures

According to Saunders et al (2016, p.164) the centre element of ‘research onion’ refers to the establishment of a set of techniques and procedures that are maintained by data collection process and analysis of retrieved data.

Based on the requirements set up within the framework of the dissertation, research is based on primary data collection, that in result defined findings chapter and researcher’s conclusion on the observed topic. However, secondary data was also used for the conduction of objective research, providing support for a primary data.

Saunders et al (2016, p. 316) characterised primary data, as a new piece of information specifically serving the purpose of research, while secondary data include both raw data and published summaries. Even though research sis mostly starts with the preparation of literature review based on the collected secondary data, that is beneficial for researcher to understand and explain particular topic, it has its own drawbacks such as reliability of data, exaggeration of facts that serve certain purposes of publisher, and accuracy of information (Ghauri and Gronhaug, 2005, p. 91). On another hand, most data collected by international organisations and governments are of high quality and reliable as they are collected and compiled by experts using rigorous methods (Ghauri and Gronhaug, 2005, p. 95).

Focus of this dissertation is primary data, that was collected for this particular project. Ghauri and Gronhaug (2005, p. 103) mentioned that in spite of numerous advantages of primary data and its benefit to collect more consistent information that complies research questions and objectives, primary data grants researcher with less degree of control in data collection process.

3.5. Primary data collection

For the purpose of primary data collection researcher had conducted interviews. An objective approach that sees the interview as a method to collect data from interviewees who are treated as a witness to a reality that exists independently of them has been selected (Saunders et al, 2016, p. 388). Dissimilar to a subjecting approach, that would not be an option for a researcher due to its characteristics described by Saunders et al (2016, p. 390) such as being linked to the perspective that views toward social word are socially constructed. It would involve interviewer to respond to the participant’s views, that as believed by researcher would not provide the full freedom of expressing thoughts toward an issue. Moreover, questions of the interview were specific, and did not require any further detalization, that explains the preference to follow an objective approach.
Saunders et al (2016, p. 390) outline several types of interview, among them are structured, semi-structured, and in-debt interviews. According to characteristics of each type provided by authors, the researcher had adhered to structured interviews, as a result of ‘standardised’ questions that have been asked. All respondents were asked an identical question in an identical manner. Contradictory to unstructured interview type that on one hand allows interviewee to talk freely about topic, and also provides interviewee’s opinions to emerge as he or she responds to the questions carrying an informal environment was not possible to implement due to researcher’s clear idea of the reasons behind particular question, and its contribution to the general research question fulfilment (Saunders et al, 2016, p. 391). Notwithstanding the fact that all respondents due to their personal circumstances preferred to answer question through the use of electronic mail, that did not allow researcher to implement semi-structured interview. Semi-structured interview type as perceived by Riley et al (2005, p. 129) present a challenge that is driven by a problem of subjectivity which stems from the individual nature of cognitive classification systems. Nonetheless, the major goal of interviews arrangements is researcher’s willingness to extend research with findings of relative qualitative data in order to answer the research question.

### 3.5.1. Sampling - Selecting Respondents

Saunders et al (2009, p. 213) outline two common sampling techniques: probability or representative sampling, and non-probability or judgmental sampling. In this dissertation, the non-probability sampling technique has been used, as the total population could not be defined. Sample type presented the self-selection. The researcher was asking selected candidates to participate in the interviews and collected data from those who showed the willingness to contribute to the project.

Due to the specificity of the topic, candidates for the interview were those professionals working in the financial market institutions, and financial specialists or analysts working in the oil and gas industry. In order to constrain with positivism philosophy, those professionals represent different countries, that initially was oriented on researcher’s ethical standards on the elimination of the bias conclusions.

There are five respondents who agreed to make their contribution to research. Access to interviewers was gained through the personal network connections to those potential interviewers, sending letters to targeted people through the professional online network LinkedIn to attract attention for the researched project. As it was mentioned above,
interviewers have different backgrounds and are located in different countries such as Canada, the United States of America, the United Kingdom, Kazakhstan, and Azerbaijan.

**Respondent 1:** Andrey Bouchuk, Co-Head of Credit Research in Pioneer Investment Limited, Experience in asset management 12 years. Location: London, the UK.

**Respondent 2:** Ron Alquist, Bank of Canada, an active researcher in the oil industry, published 18 articles on international economics, financial economics, monetary economics. Location: Ottawa, Canada.

**Respondent 3:** Hallimysore Dattatreya, Finance Director of PetroKazakhstan Kumkol Resources, has been working in the oil industry since 1987 (25+ years). Location: Almaty, Kazakhstan.

**Respondent 4:** Christiane Baumeister, an Assistant Professor in the Departments of Economics at the University Notre Dame, an active researcher in the oil industry. Location: South Bend, the U.S.

**Respondent 5:** Andrei Ordine, CPP Investment Board, Ontario Teacher’s Pension Plan, Bank of Montreal, experience in managing private investments for 11 years. Location: Toronto, Canada.

**Respondent 6:** Javanshir Jabrayil-Zadeh, Economy, and Finance Manager in Lukoil Overseas, experience in oil industry 10 years. Location: Baku, Azerbaijan

### 3.6. Secondary data collection

Secondary data maintained researcher with an understanding of the topic, that guided the establishment of the research question and hypothesis. The implementation and importance of secondary data were reported as in the literature review chapter and as a supplemental material in findings chapter. Primary sources of secondary data were: academic journals in finance and oil industry, theories in finance, particularly related to hedging, reports of related agencies and organisations, government’s reports, reviews of financial advising companies, and financial statements of companies etc. Moreover, secondary data had an integral role is supporting the answers to the research question. For instance, a researcher in order to define the real perspective of the current situation in the oil industry had used report provided by CFTC organisation, the data from the report was interpreted according to researcher’s goals and analysed. Although, the researcher had used financial reports of two oil producing companies to respond to research question regarding the effectiveness of hedging with derivatives. For that purposes, the researcher identified companies that were noticed to use derivatives and one that does not practice this type of hedging. The purpose of that activity
was to compare both companies from the perspective of their market value indicators in order to check the effect hedging with derivatives would have on company’s profile.

Secondary data was analysed and as researcher believes present a valuable information for the dissertation, besides, according to Saunders et al (2016, p. 330) it provides a comparative data if the quality is controlled and checked, that might result in unforeseen discoveries. The existing theoretical framework in finance provides the researcher with an advantage of using such information is that it is not related directly to the company, which secured dissertation with an objective position. Moreover, selected secondary data was observed for the certain period, in order to get a ‘snapshot’ of a current situation in the oil industry.

3.7. Data Collection Instruments

3.7.1. Data Analysis Procedures

Graph 7 describes the process of moderate data analysis that was applied by the researcher to serve the purpose of the dissertation. Thus, following the guidelines, interviews were transcribed and retrieved data proceeded with the implementation of categorising and coding system.

*Graph 7: Data analysis procedures of the research*

*Source: Miles and Huberman, 1994*
Categorising and coding used for analysis

1) Hedging and speculation:
   - HDGOC Hedging performed by oil producing companies
   - SPCOC Speculations performed by oil producing companies
   - PHDR Purpose of hedging with derivatives
   - RFS Rationale for speculation
   - LPOC Long positions oil companies
   - SPOC Short positions oil companies

2) Oil and Gas specificity:
   - COP Crude oil price changes
   - LSFM Light Sweet Crude Oil Futures Market

3) Outcomes:
   - DPEV Derivatives increased enterprise value
   - DNEV Derivatives negatively affected enterprise value
   - DUS Derivatives used for speculations
   - DUH Derivatives used for hedging

Saunders et al (2009, p. 490) defined three types of qualitative analysis processes, ‘summarizing (condensation) of meanings, categorization (grouping) of meanings, and structuring (ordering) of meanings using narrative’. Categorization of meanings was used as a guideline for analysis of data obtained from interviews.

The categories formed: the widespread of hedging among oil producers, the predominance of hedging versus speculation, most commonly used derivative contracts, the effectiveness of hedging during market volatility. Categorised data was analysed, each group was evaluated separately, and summary of responses was outlined in findings chapter. This type of data analysis was preferable due to the specificity of interview question, as each question was oriented on different aspects of the topic, that provided the researcher with an outline of all aspects related to research, which constrained researcher of using other types of analysis. Data was analysed and compared between respondents. The interpretation was presented in the findings chapter through the graphs and charts for an understandable visualisation of results and tables were presented in the appendix.

Secondary quantitative data was analyzed through the calculation of financial multipliers that were relevant for supporting research question and primary data. Obtained results were analyzed through the theories established in academic journals and publications.
3.8. Research Ethics

Deontological view of ethics, that was established by philosopher Immanuel Kant, is primarily oriented on actions from the perspective of ‘right’ and ‘wrong’ rather than on possible outcomes (Michel Dion, 2012). There are two challenges that are facing deontologists: which duty, right, or principle should be considered for decision making; second is there might be a conflict with consequentialist reasoning (Michel Dion, 2012). In contrast, Saunders et al (2009, p. 184) described the teleological view as results conducted by research results justify the means, providing with an opportunity to justify one’s unethical behaviour. Both philosophical frameworks are not common for the researcher, as they will not personally apply, in researcher’s perception, the whole process of the dissertation is valuable and should provide the researcher with an opportunity to learn, and every step of it is important, and has to be maintained ethically.

Thus, the researcher had implemented the virtue ethical theory, as it was described by Aristotle, is about the creation and then training of one’s moral standards, which constitute the part of an individual (Beauchamp and Bowie, 2001). However, Graham (2004, p. 63) concluded that virtue as a common sense understanding of good and wrong has limitations that might be applied to a leader in the multinational organisations, as virtue moral directly depends on the environment in which humans are living.

Main moral standards that researcher had created for guiding during dissertation are:

- To stay objective during research. It is integral not to be bias
- Be accurate and responsible with data. This relates to the collection, representation, and interpretation of data to illuminate the misleading outcomes, to make sure information is double checked before reported in the dissertation.
- Be socially responsible. Bear in mind the goals set up by research and to understand the impact of research might have on the society. Maintain the trust of those who will participate in the process of research.
- Manage data accordingly. Plagiarism cannot occur at any stage of the process, thus data should be managed according to the requirements, referenced properly.

The researcher had provided respondents with a guarantee that dissertation is serving an only educational purpose and will be restrained from public access. Participants in the interview were provided with accurate information toward researcher’s goal and researcher’s background. Some investment reports which were used in the research were obtained from sources which required confidentiality due to the limited access to that information for public.
3.9. Limitations of Methodology

There were several limitations faced by the researcher during the conduction of this thesis. Firstly, the time limit, as a researcher had two and half month available for undertaking academic research. This limitation directly affected the researcher’s initial intention to extend the primary research, by arranging face-to-face interviews with at least two agreed respondents. Moreover, due to the strict deadlines and shortage of time, the researcher had to follow a schedule which was set up during the research method to proposal submission (Appendix 1).

Secondly, a sample of respondents does not guarantee the whole market’s opinion, due to the subjectivity of interviewers. Even though researcher had a goal to project as an objective piece of research as it possible, by selecting a sample based on the different geographical location and respondents’ different degree of relevance to the researched industry, the thesis cannot by default grand inevitably errors. According to Freedman (2004, p. 2), the literature differentiates two types of errors, such as sampling error also noted as random error, and nonsampling error referred as bias or systematic error. By assigning sampling errors, the author characterizes errors appearing when the sample size is not fully heterogenic because of unforeseen circumstances. While non-sampling errors consider mistakes overdone by researchers in the selection stage for certain groups, that consequently lead to an exclusion of particular objectives from the sample (Freedman, 2004, p. 2).

Thus, due to the sampling method is chosen by the researcher, there is a possibility that sample does not represent the whole population, as the total population is not known (impossible to count all financial analysts, directors, treasuries in the industry or related industries). As the result, interpretations are limited to the accessed respondents and their experience. Nonetheless, research dealt with this issue by trying to select the most experienced and relevant that researcher could have an access. Hence, personal experience, professional observations, and judgments of the sample have been noticed during the data analysis stage. Researcher pursuit that respondents’ bias was minimized to present the final valuable project. At last, the availability of secondary data had limited the research, as a researcher could only gain access to the publically available information, provided by companies, governments, regulative bodies. The researcher came across of articles and publications that could bear a contribution to the literature review and assist with finding, however, they were required to have an access code or registration, or had to be purchased.
Chapter Four: Research Findings

4.1. Introduction

This chapter represents the research findings based on the collected primary data through an organised set of interviews. As it was stated, in methodology chapter, primary data is supported with an analysis of financial ratios to check the relationship of hedging with derivatives on the company’s market value. However, a major consideration is the analysis of interviews, as it will project an expert opinion and provide a recent outlook from inside of the industry and related bodies. In the centre of attention, five interviewers who dedicated their time to participate in this project, thus, chapter starts with synopses of the interviewee, followed the illustration and interpretation of interview results that are relevant to a particular research question, aligned with a supportive secondary data. Discussion of findings and conclusion of the research along with recommendations for further research are provided in the following Chapter Five.

4.2. Synopses of the Interviewee

First interviewer Hallimysore Dattatreya, Finance Director of PetroKazakhstan Kumkol Resources. Current location: Almaty, Kazakhstan. PetroKazakhstan is a joint stock company, whereas half of the shares belongs to a Kazakhstani national oil and gas company ‘Kazmunaigas’, and another half belongs to ‘Chinese National Oil Corporation’. Previously the company was owned partially by Canadian oil company. Respondent has a work experience in the oil industry for more than 25 years, specifically working in finance-related departments. According to the respondent currently the company is not using derivatives, however, previously derivatives were an integral part of their risk management strategy. Although, since derivatives became irrelevant, he is still interested in the market, and trying to keep himself up to date with derivative market movements.

The second interviewer Ron Alquist is currently employed by Bank of Canada. He has been an active researcher in the oil industry, as it was his major interest. Location: Ottawa, Canada. Respondent had published 18 articles on international economics, financial economics, monetary economics. His articles are: ‘A Blessing in Disguise: The Implications of High Global Oil Prices for the North American Market’, ‘Commodity-Price Comovement and Global Economic Activity’, ‘Forecasting the Price of Oil’ etc. Respondent is researching oil sector as a part of his position responsibilities in the Bank of Canada, he is aware of recent
trends in the industry, which makes his opinion valuable for research questions investigations within the framework of this dissertation.

The third respondent is Christiane Baumeister, an Assistant Professor in the Departments of Economics at the University Notre Dame, an active researcher in the oil industry. Location: South Bend, the U.S. Her primary research interests include the study of time-varying macroeconomic relationships with applications the oil market and the transmission mechanism of both conventional and unconventional monetary policy using Bayesian methods. Respondent has also worked extensively on forecasting the real price of oil (Profile on Google site, 2016). Her most recent research papers are: ‘Inside the Crystal Ball: New Approaches to Predicting the Gasoline Price at the Pump’, ‘Are product Spreads Useful for Forecasting Oil Prices? An Empirical Evaluation of the Verleger Hypothesis’, ‘Understanding the Decline in the Price of Oil Since June 2014’ etc. Her great interest and academic contribution in the oil industry made her a suitable candidature as per researcher’s outlined requirements.

The fourth respondent is Javanshir Jabrayil-zadeh, an Economy and Finance manager at Lukoil Overseas company. Lukoil Overseas is an integral part of Lukoil group, a Russian oil integrated company, which operations are spread worldwide, and is considered one of the largest oil companies. Respondent had an intense experience working in a risk management and finance departments. Moreover, respondent holds a Master Degree, thus makes him a suitable candidature as per his work experience, and expertise knowledge in the oil industry. Currently, a person is located in Baku, Azerbaijan.

The fifth respondent is Andrey Bouchuk, Co-Head of Credit Research in Pioneer Investment Limited, location: London, the UK. Pioneer Investment Ltd is a global investment management firm, with a presence in 28 countries worldwide. Respondent has an experience in asset management for 12 years, has a strong educational background (Masters Degree, ACCA), moreover he has been working closely with investors who are interested in the oil industry as in Ireland as in the UK. Respondent projected the deep understanding of derivatives, especially related contracts in the oil industry.

The last respondent was Andrei Ordine, CPP Investment Board, Ontario Teacher’s Pension Plan, Bank of Montreal. Location: Toronto, Canada. Respondent has an experience in managing private investments for 11 years, among his clients were investors interested in the oil industry. As the previous respondent, the researcher was interested in these people due to their relation to the oil industry, as per related counterparts. Their contribution provides this research with an objective outlook, as it has been mentioned in the literature review, the
oil market has several players, aside from oil producing companies, there are other counterparties, that have a strong influence in the industry. Thus, by conducting interviews with related parties researcher tried to eliminate the biases that would arise if opinions of oil working employees would be gathered.

4.3. Primary research findings supporting first research question:

_Are derivatives considered to be an effective tool in enhancing an enterprise value that might be applied by oil producing companies facing market volatility?_

In order to define the effectiveness of derivatives in terms of enhancing market value, it is integral to question the use of derivatives itself in the oil industry. Thus, respondents were questioned about the implementation practices be oil companies, and the use of derivative markets by counterparties. Reasonable was to gather the data towards the widespread of derivatives in industry, the preferences toward types of derivative contracts used, and logic behind the choice. Moreover, it is beneficial for the research to outline the most common reasons for supporting hedging with derivatives in the industry and to analyse motives that are guiding oil producers to keen to a particular way of risk management.

*Chart 4: The use of derivatives in oil industry*

Source: Interview responses

Referring to the transcript of interviews (Appendix 2) toward the widespread usage of derivatives in the oil industry, five out of six respondents confidently agreed to the extensive usage of derivatives. Derivatives common in the oil industry and are widely used by oil producing companies, hedge funds, banks, investment agencies. While one respondent has explained that derivative market even though has improved, but at the same time, hedging with derivatives became more complex since there are more risks to manage nowadays. Although two respondents agreed on the improved liquidity in the industry ‘excessive
liquidity’ which reasonably explains the increased interest in derivatives in the industry, and also the times of low-interest rates provokes the market’s growth. According to answers provided by one of the respondents, only since 2004 till 2008 it was noted that the number of futures in the oil industry increased by 71 percent. Supportively another interviewer mentioned that with the considerable growth of the market, it became easier for oil and gas companies to find counterparties.

Taking into consideration the rationale of hedging with derivatives researcher’s investigation projected the following results illustrated in Chart 5.

*Chart 5: Rationale for hedging with derivatives*

![Rationale for hedging with derivatives](chart.png)

*Source: Interview responses*

It might be seen that the vast majority (five respondents out of six) perceived the major reason for hedging with the use of derivatives as to offset the market risk exposure. Answers included an explanation that by managing market risk exposure through hedging, oil producing companies are trying to reduce the exposure of volatility of the market on their companies’ profiles. Interviews projected that another common goal of hedging implementation is it allows companies to forecast future revenues, guarantee the certainty of earnings by setting derivatives positions. Likewise, possibility to estimate future earnings, financial cost reduction was mentioned by three people as a stand-alone consideration for hedging strategy. By reducing financial cost respondent clarified the absence of commitment to store any inventory throughout the use of derivatives contracts, specifically futures, for the disposal of all company’s inventory. Moreover, by reducing unexpected costs companies can future earnings, and reduce risk to expected revenue. Among respondents answers, two interviewees mentioned that hedging with derivatives is used by companies to allow more
business flexibility. Lastly, hedging can be an option for oil companies as it grants the possibility to take risk elsewhere depending on company’s profile. It provides with an advantage of different views in the market.

In order to support the research question outlined above it is moderate to gather opinions toward the most common derivative contracts used in the oil industry by oil producing companies and participants of the market. Thus, researcher’s findings are presented in Chart 6.

*Chart 6: Commonly used derivative contracts in the oil industry*

![Chart 6: Commonly used derivative contracts in the oil industry](image)

*Source: Interview responses*

Conforming to interview results, the most commonly used derivative contract mentioned was futures, supported by five respondents. The preference toward futures derivatives, as it was stated by respondents, was defined by their characteristics such as the liquidity of contracts, low cost, ease of the process. Moreover, they guarantee volumes and set the prices that assess oil producing companies to generate their expected income. Futures also were noted to reduce the financial costs as per reducing the cost of carry of inventory. One respondent refrains from calling one particular derivative contract, as the respondent considers that the choice of a contact purely depends on the purpose of hedging which varies from company to company. The second commonly used derivative contract, according to interviews, was a swap, mentioned by two respondents. Rationale toward swaps was explained by company’s ability to affect the market, precisely make it more flexible and to expand the number of participants. Crack spreads and options are also present in the market, however, they are not so widely used as per interview participants’ professional experience.
One of the respondents said that in general, options are more effective than futures at hedging market volatility because the price of option increases in implied volatility which tends to highly but imperfectly correlated with realized volatility. Interview participant who is an active researcher in the oil industry and professor in the U.S university justified that prior making a decision on the selection of particular derivative contract, a company should develop a risk profile that takes into account all the factors that expose the company’s business risks and then weigh these risks against each other. Moreover, it is important for the company to consider price volatility, competition, changes in product markets such as sensitivity of consumers’ demand to price changes, and macroeconomic environment. Although respondent confirmed that environmental considerations such as accidents and pollution are playing a more important role nowadays. It was also stated in the literature review that environment has an impact on the industry, natural disasters that are happening in one country reflects on the oil industry (for instance, recent Canada wildfires affected the price of oil through the changes in supply and demand). Additionally, respondent suggested to assess whether the risks are specific to the company or whether they affect the entire industry and to ensure the timeframe of risks (short-run or long-run). Another respondent, who is also an active researcher in the oil industry, noted that in practice, companies do not buy individual contracts, as they normally run hedging programs that require careful planning and execution. Most of the criteria for the choice of one particular type of derivative contracts were similar to respondents mentioned above such as assessment of the purpose of hedging and desired risk profile, stress scenarios, and solvency. However, it was added that cost efficiency of hedging and tax implications have to be also considered prior the choice of a particular derivative contract.

*Chart 7: Effectiveness of derivatives in oil industry*

| Yes, 5 | Other, 1 |

*Source: Interview responses*
Taking into consideration the specificity of derivatives as a tool for market risk management, the vast majority of respondents agreed that derivatives provide oil producers with an opportunity to manage risk during the volatility of the market. It was noticed earlier, that respondents perceived the major purpose of hedging is exactly to reduce volatility. However, one of the respondents noted that in the case of an entity is hedging its exposure to the stock of oil producing companies, the effectiveness of the hedge would decrease. Responses were also based on the recent situation when the oil producers saw oil recovering towards 50 US dollars per barrel started to actively hedge their exposure letting oil price to break much higher (R1). Other respondent considered that the effectiveness of derivatives also depends on the type of derivative, thus, according to interview, even though futures contracts are more common in the industry, options are more effective because of the price of derivative increases in implied volatility which tends to highly, but imperfectly, correlated with realized volatility (R2). Furthermore, another respondent commented that the effectiveness of derivatives purely depends on the way its managed, as it requires the knowledge of the market, because if the market starts trending in a particular direction it can also hurt the oil company, thus, timing is an integral point for consideration (R3). Moreover, as it was stated by another respondent, the challenge is to measure risk exposure in volatile markets and devise beneficial hedging strategies (R4). Derivatives have to be wide presented during market volatility and they are effective, and at the same time speculation add to market volatility (R6). Oppositely, one of the respondents commented that there are some other challenges that have to be managed by oil producers, particularly additional liquidity needs, ‘should the position start losing money while it is ok for a hedge to lose money so long as the main price exposure creates profit, but the resulting futures margin calls can create cash shortage, and create the risk of insolvency’ (R5).

As a part of the secondary data, the researcher had a goal to establish a relationship between the use of derivatives and oil producing company’s enterprise value. Graph 8 illustrates enterprise values calculated for five oil producing companies, that had a record of using derivatives such as Halcon Resources, Schlumberger, and Good Rich Petroleum (assigned H letter stands for Hedging); and Chevron and Exxon Mobil companies that did not perform hedging with derivatives during the observed period. The observed period was based on the annual financial reports for 2013-2015. It has been mentioned in the literature review that companies which performed hedging with oil derivatives have been selling their products twice the price than those, who did not (Chevron and Exxon Mobil). Schlumberger had a record of using derivatives for managing currency risk it was facing back to 2015. Over the
observed period, it might be seen that four companies had experienced the decrease of their enterprise values, while Schlumberger, oppositely, had increased company’s total cost by 39 percent.

Goodrich petroleum and Halcon Resources, even though were endorsed by Bloomberg as per their timely hedging strategy, had experienced the worst decrease in enterprise value by 30 and 62 percent respectively. While Chevron and Exxon Mobil in spite of their risk management strategies and not engagement in oil derivative markets, were not noticed to have an extreme change in their enterprise values, by reducing their company’s total cost only by 2 and 11 percent respectively.

Graph 8: Enterprise Value (EV) and Percentage change in EV 2013-2015
4.4. Primary research findings supporting second research question:

In the crude oil industry are derivatives primarily used to hedge the market risk or they are used for speculative purposes?

Literature review projected that derivatives might be used not only for hedging purposes but also for speculative reasons. Thus, in order to answer the second research question, it was reasonable to collect the primary data on the speculation activities that are taking place in the market. The major concern was to question participants of interviews on their professional experience observations toward the predominance of hedging or speculation in the oil industry.

Chart 8: Speculation in the oil industry

Source: Interview responses

Firstly, the researcher was aiming to identify the roots of speculation in the industry, to clarify actual speculators among all participants of the market. According to Chart 8, it might be observed that respondents outlined that the vast majority of speculation activities are performed in the oil industry by counterparties, such as individual traders, hedge funds, and investment banks. That perception was common for four out six respondents. Two respondents could not provide a certain answer, as they both explained that the division between hedging and speculation is ‘somewhat artificial’. Justifying the assumption, respondent provided an example of a hedge fund taking a position in the oil market to try to offset some inflation risk it has in the portfolio, and at the same time a natural gas producer, which would be considered as a hedger, taking a position in the oil market because it had a strong view on the direction of oil prices, thus the division is doubtful as for one it is
considered as hedging as for another side it would be called speculation. Another respondent’s uncertain position was caused by his professional observations that for some contracts commercial users dominate the open interest, and for some the non-commercial, or speculative, is the biggest component, so that separate contracts has to be checked. While one person was certain that oil companies do use derivatives for speculation, motivated by the volatility of the market. Although he mentioned that it is not the best option for those companies, as per speculation’s integral part in the financial crisis. However, the financial crisis is not relevant within the framework of this dissertation.

*Chart 9: Derivatives usage in the oil industry*

![Derivatives usage in the oil industry](image)

*Source: Interview responses*

Thus, Chart 9 represents the collaborate view on the derivative usage in the oil industry, gathered throughout the interpretation of interviews. As it might be observed on the Chart 9, the derivative usage in the oil industry is currently controversial. Two respondents expressed their professional opinion in the favour of hedging’s predominance in the market over the speculation, granting the perception that oil companies use hedging more than speculation. While other two respondents projected that industry is predominant by speculators arising from the counterparties and oil producing companies themselves. Uncertainty has been referred to the lack of distinction between speculation and hedging motives.

Secondly, researcher classified the gathered primary data into the category that would interpret current preferences of oil producing companies toward hedging with derivatives or using them for solely speculation purposes. Thus, Chart 10 illustrates the purpose of derivatives usage from the perspective of the oil producing companies.
According to data collected through the set of interviews, oil companies primarily use derivatives as a part of their hedging strategy rather than speculation, as it was confirmed by three respondents. The finance director of oil company mentioned that previously, when the major shareholder was a Canadian oil company, they used to hedge on a regular basis, and speculation positions have never taken a place in their practice. Supportively, another respondent emphasized that oil companies are hedgers in the market and it is not common for oil producers to be involved in speculation activities. While a manager from Lukoil company mentioned that speculation still presents in the market and moreover it present the major purpose for oil companies to be engaged in the derivatives market. Although, the uncertainty is arising from the perspective of respondents clarifications that the choice of speculation or hedging depends on the type of the contract, as some contracts present more opportunities for speculation than others.

Additionally, as it was mentioned in the methodology chapter, the researcher had the aim to support the primary data with secondary data findings, that are in the case of the second research question presented through the collection of relevant information toward the speculation positions in the crude oil market. CTFC (2016) classified the Light Sweet Crude Oil as one of the most valuable crude oil product as per the number of possible refined final products (Appendix 3).
Graph 9: Numbers of open Long positions for Light Sweet Crude Oil at NYMEX

Graph 9 projects the number of open long positions for the Light Sweet Crude Oil at NYMEX. As it might be seen on the graph 9, oil producing companies, had less long positions in the market, rather than speculators. Positions are defined as a number of contracts, contract of 1000 barrels. One of the interviewers had informed about the statistic he had observed, that for 1 barrel of crude oil produced by the manufacturer, 17 barrels are traded. Thus, we might observe that oil manufacturers interest in the long positions has reached its peak in February 2016. Graph 10 illustrates the price movements of the crude oil for the last year, where the lowest price was recorded in February 2016, in average, dropping to 30 US dollars per barrel. Gathered primary data, confirmed that in most cases, oil producers tend to take long positions during the market volatility, to stabilise the market, and to anticipate the losses. Graph 9 illustrates that speculators started to lose their interest in setting long positions in the marker since March 2016, when the industry was experiencing the most turbulent times due to the dramatic fall in oil prices.

Source: researcher’s interpretation based on CFTC data (Appendix 3, excel file, reference list)
Graph 10: Crude Oil WTI (NYMEX) Prices

Source: Nasdaq, 2016

Graph 11 projects the numbers of open Short positions for the same type of crude oil at NYME. It might be observed, that oil producers keen to take more short positions rather than speculators, which interest have been declining over the observed period. Similarly to long positions, the futures market was booming during the crash of oil prices, back in February 2016. It was a period when oil producers started to actively define positions in the market, trying to stabilise the situation. The number of contracts traded short by oil producers has been growing steadily since last year.

Graph 11: Numbers of open Short positions for Light Sweet Crude Oil at NYMEX

Source: researcher’s interpretation based on CFTC data (excel, reference list)
Chapter Five: Analysis, Discussion, and Conclusion

This chapter concludes the research by answering research questions based on the information gathered over the study. Chapter designed in the way that each research question has been answered separately, that are consequently followed by the research’s general conclusion, and lastly, researcher provides future researchers with relevant recommendations.

5.1. Research question one analysis:

*Are derivatives considered to be an effective tool in enhancing an enterprise value that might be applied by oil producing companies facing market volatility?*

Currently, derivatives are widely used in the oil industry, according to interviews. The market has grown rapidly provoked by the times of low-interest rates, and excessive liquidity. Moreover, with the arose number of market participants, oil turned to be not only a commodity but also a financial instrument. As it was mentioned in the literature review, among active participants are airline industries, that are also reluctant to the volatility of the crude oil market, as per their fuel requirements. They become as counterparties in the market and offsetting their exposure to market risk by taking positions in the derivative markets. There have been favourable strategies practices by some of the airline companies (ie. Ryanair case). However, on the another side of the market, are those crude oil producers, that tend to protect themselves during the market volatility. Primary data projected that the major reason of hedging for oil producers is to manage the exposure to market-based risk. Interviewers confirmed that hedging with derivatives is an effective tool in reducing market’s volatility, and it adds value to the company, ‘provided the hedging is made in the right direction at the right time’ (Respondent 3). Hedging also allows companies to project the future revenues, and plan budgets accordingly, at the same time, it reduces financial costs of producing companies, by reducing inventory expenses.

Literature review projected controversial results toward the effect hedging has on firm’s value. As in some cases, there was a positive relationship between hedging and company’s total value, and in some cases, there were not relationship noticed. Most previous researchers were oriented on the analysis of hedging performed by companies from one particular country, or the industry was observed throughout the comparison analysis. Within the framework of this dissertation, the researcher had a goal to light up the oil industry by tracing the effect of hedging on companies enterprise values, particularly during the market volatility. The analysis of interviews projects that derivatives are an effective tool to manage
the market-based risk for oil producing companies. In the times of oil price fluctuations, derivatives might be applied by companies to reduce their exposure, and to be able to take risks elsewhere. The oil producing companies do use derivatives for that purposes, and according to professional opinion, this type of risk management is reasonable, when it is overdone properly. KPMG’s research that has been used in the literature review, agreed that mostly negativity towards derivatives arose due to their improper implication and lack of knowledge. Hence, the effectiveness of derivatives in oil industry depends on as external as internal factors according to gathered primary data. Among internal factors are the ability of companies to weigh benefits of hedging to hedging cost, inventory levels management, develop its own risk profile, taking into consideration all adherent and specific risks applicable to the company, stress scenarios and liquidity management should be implemented. Moreover, it is important to define the type of derivative as well. Futures are currently the most commonly used derivatives, as per their liquidity and low cost, while options, swaps are still present in the market. Although, according to one of the respondents, options are more effective during market volatility. Thus, respondents confirmed that company, willing to implement derivatives have to be able to use them at the right time, referring to the external conditions, precise analysis of the market has to be done. Furthermore, competition, changes in product markets such as the sensitivity of consumers’ demand to price changes, the macroeconomic environment along with environmental considerations have to become factors for assessment prior the implementation of derivatives in order to sustain an effective hedging strategy. Literature review still did not reach a consensus in defining whether or not hedging with derivatives affect the total cost of the company.

Secondary data findings that included the analysis of five oil producing companies, that were divided based on the records of preference of hedging with derivatives and non-hedging, projected that hedging did not affect those companies enterprise values. Companies, that used hedging presented different outcomes, as per two companies was bearing losses and decline of their enterprise values, while one company (Schlumberger) observed had oppositely increase in its total cost. Moreover, Halcon Resources that has been taking the sample has a good record of selling it’s crude oil during a crude oil price decline in the beginning of 2015, is now struggling with a bankruptcy (Gleason, 2016). On the other hand, there were two companies Chevron and Exxon Mobil that did not report themselves as hedgers in the oil market, and still, they were both experiencing the decline in their enterprise values. It is fair to note, that the decline of non-hedger was not enormous in comparison to those, who hedged
their risk exposure. Referring to the literature review, there is a historical evidence, that by hedging initiatives, smaller oil producing companies did achieve better financial results, that those large corporations, that did not hedge, based on their revenue acknowledgments. At the same time, Leo Mariani an analyst with RBC Capital Markets in the US said “The more debt you have, the more hedges you need to protect yourself in a downturn…That’s why the really big companies don’t have hedges. They don’t have much debt, and they don’t need them.” (Bloomberg, 2015). Supportively, McNeely and Loder (2015) mentioned that companies like Exxon Mobil can afford not to hedge, providing an example that Exxon Mobil had 4.3 US billion dollars in cash, even after its worst quarterly profit since 2009.

5.2. Research question one conclusion:
With the reference to the primary data, it might be concluded that hedging with derivatives presents an effective tool in managing the market-based risk during the time of crude oil volatility. The derivatives are widely used in the oil market by oil producers. However, hedging does not have an effect on company’s enterprise value, according to the literature review and secondary data analysis. The primary purpose of hedging with derivatives by the oil producers is to reduce the volatility of the market, to offset the risk of crude oil price fluctuations. Thus, the positive outcome of hedging strategy depends on the various factors that are important for companies to manage. Research projects that the theory developed by Modigliani and Miller (1958) justifies the current situation in the oil industry, as that company’s risk management strategies, are irrelevant in enhancing company’s enterprise values. Moreover, research confirms that in a complete market, company’s value is independent of hedging (Junior and Laham, 2008). Thus, hedging with derivatives in the oil industry over the last three years perceived to be an effective tool in managing oil price exposure, but hedging strategy does not relate to the enhancement of enterprise value.

5.3. Research question two analysis:
In the crude oil industry are derivatives primarily used to hedge the market risk or they are used for speculative purposes?

The primary research has projected that most oil companies use derivatives for hedging purposes, while other market participants dominantly speculate in the market. Other market participants include individual traders, hedge funds, and banks. Among the relatively new type of traders were noticed the appearance of commodity index traders (CITs) that have been main investors in commodities in the market (Stoll and Whaley, 2010). Supportively,
the literature review confirms that oil industry is an attractive field for speculation, as per the wide range oil producing companies having a presence in the derivative exchanges, and it makes it accessible for traders to use commodities for their own speculative purposes (Carret, 2015). Evidence from the interview shows that speculation causes the distress for the market, as it provokes bigger volatility. Speculation in the oil industry mostly was referred to activities overdone by other market participants, while oil producers contribute to 14 per cent of that occasion, according to primary data. Hedge funds, traders, and investment banks became an integral part of the crude oil market, by offsetting their risks through the commodities, without having any physical persistence in the market.

Moreover, analysis of primary data leads to confirmation of Tokic’s (2012) theory of speculation, in regards to excess speculation in the market presents the primary cause of all bubbles, meaning that market becomes less stable and more reluctant to irrational behaviour. Irrational behaviour in the case of the oil industry reflects on the price of crude oil. Thus, making it’s hard to predict the movements of oil prices. The recent sharp decrease in crude oil prices has been affected by the speculation activities in the market. The market inefficiency model by Tokic (2012) justifies that recent change in the market. Respondents of interview emphasized the fact that traders and other counterparties in the industry represent a positive feedback trading by involving into the speculation activities, which limits the arbitrage provided by oil producing companies, and the ‘effect of snowball’ occurs until the bubble crashes. Thus, OPEC (2015) had endorsed speculators for the volatility of the market, particularly for the crash or crude oil prices.

However, it has been also stated in the literature review that oil producers do generally act as speculators in the market along with the hedge funds and traders (Fattouh et al, 2012). As per the primary data analysis, one respondent confirmed that he had an experience within his company when the organisation was involved in the speculation activities. At the same time, reasonable responses from oil researchers explained that there is a doubtful difference between speculators and hedgers. In the real world, the speculation can be hardly differentiated. For instance, a hedge fund is trying to offset its negative portfolio by taking positions in the crude oil derivative market, from the hedge fund’s perspective, it is considered to be hedging his risk by participating in the crude oil market. On the other hand, this activity might be viewed from the perception of oil producing companies, that participate in the same market, and, for instance the ‘long’ position of hedge fund, in that case, provokes the market and reflects the number of open interest, which results in the demand for derivative contracts, that eventually affect the prices.
Currently, in the oil industry, where the most commonly used derivative contracts are futures according to interviews, speculators exist along with oil producers, where each party has its own interest in participation. Keynes’s theoretical model (1930) that has been used in the literature review chapter, still has an influence on the establishment of hedging strategies by oil producing companies. Keynes (1930) had focused on the role of futures markets in allowing companies to hedge positions in the physical commodity, in particular, agents with inherent long positions in the physical product, such as raw material producers (in that case, oil manufacturers), reduce the riskiness of their portfolios by taking short positions in the futures market (Brunetti and Reiffen, 2011). Thus, analysing secondary data, based on the report by CTFC (2016), it has been noticed by researcher that oil producers are more active in the short positions futures market, by these means they are aiming to offset the riskiness of portfolios, while non-physical asset owners, such as speculators and commercial traders, are less active in short, dominating in the long positions. By setting up short positions, oil producers project their fear of the fall of oil prices, because if they do, losses will be sustained on the spot and cash positions, but profits on the short futures positions should be earned instead (Dubofsky and Miller, 2003). Brunetti and Reiffen (2014) research projected that large traders (referred in CFTC reports as commercial traders) are likely to take positions that primarily reflect a desire to reduce their inherent risk (they are hedgers), and such firms typically acquire long positions in the physical market, and therefore take short positions in the futures markets to hedge their price exposure, so that the futures market positions of these traders are natural reflections of their underlying business. Supportively, it has been seen on Graph 11, that oil companies increased their presence in short positions during the rapid decline of oil prices, which occurred in February 2016, confirming their actions toward anticipating the risk of crude oil value decline, thus taking short positions. However, according to interview, oil producers are naturally long the underlying commodity alike traditional investors (long-only) tend to use hedging to protect their long position to oil from stocks. In the long position futures market, speculators have been more active participants rather than oil producing companies. Referring back to Keynes (1930) model, who explained that long positions are primarily taken by speculators, who are willing to hold these futures positions in the exchange for positive returns (Dubofsky and Miller, 2003). Hence, the theory of backwardation reflects the situation in the futures oil market during the observed period by the researcher. Backwardation currently persists in the market, where speculators are by taking long positions, experience positive returns futures prices are below the expected spot prices at contract expiration.
5.4. Research question two conclusion:
It has been more than eighty years, since Keynes’ came up with the theory of backwardation in the market, and defined the hedging strategies for commodity manufacturers, that are widely used till now. Oil producers primarily oriented on the offsetting market risks, caused by the crude oil price movements, by taking preferable short positions in the futures market has been common practice referring to the collected data. Oil producers mostly have been acknowledged to be hedgers in the market, according to the vast majority of interview respondents. However, the crude oil industry is currently predominant with speculators rather than hedgers, which was projected in the number of open interest positions in the futures market and evidence from the primary data. As per speculators, the oil industry is an attractive market, especially during backwardation period, where this type of participants can anticipate from the favourable price movements, which consequently adds more volatility to the market.
Thus, in the crude oil industry, derivatives are used more for speculation rather than hedging.

5.5. Overall conclusion:
Derivatives are widespread in the oil industry and are a common tool for risk management as for oil producing companies as for other market participants. Hedging with derivatives are effective for oil producing companies to manage their exposure to the crude oil prices fluctuations, however, they cannot be considered for company’s goal to enhance its enterprise value. However, they are effective in the reducing volatility in the market, from the perspective of oil producing companies. Hedging strategies, especially those that involve derivative contracts should be managed with an expertise knowledge. At the same time, the market volatility is rising due to the increased number of speculation activities, mostly performed by other counterparties existing in the oil market. Speculation became an issue in the market, since its existence is causing distress in the market, and affecting oil prices.

5.6. Recommendations for future researchers:
Oil industry provides future researchers with a vast range of topics for consideration. It would be beneficial to contribute to the industry by analysing the cost of hedging, hedging’s impact on the financial costs of companies. This dissertation had a point that hedging might reduce the financial costs, as per decreased spending on inventory storage, however, the more detailed research would make a strong contribution due to the lack of information available. Moreover, the gas industry has also to lighten up, as a gas contribution to many world’s economies is integral (ex. Russia).
Chapter six: Self-Reflection on learning and performance

6.1. Introduction on self-reflection

This final part of the dissertation is oriented on the reflection process based on the used theories and personal observations.

Prior to studies of MBA Finance, I had a Masters of Business Studies (MBS) degree from Dublin Business School. That time I was sure of my great interest in finance and there was no doubt that I should extend my knowledge and enrol into a new course. I had a strong motivation to learn and practice during the academic year because I had a particular goal to achieve in my mind, i.e. to get as much as I can from my studies to be competitive in the professional market.

Choosing DBS was a default decision, since I had a good experience last time, and I enjoyed small groups on modules, which allowed professors to interact better with students, notwithstanding the professionalism of lecturers and their approach to assist students and help them to succeed. The major disadvantage of MBA programme offered by DBS is a lack of financial modules, I would prefer them over marketing module. Ultimately, it is possible to close the gaps by researching, selecting thesis in the finance area, what has been done by me.

One of the hardest parts of doing this dissertation was a topic selection. I had the intention to dedicate the time spent on this thesis on a piece of work that would assist me in my career goal, and would make it interesting for me to investigate the topic. I had a great interest in the oil industry, as it has been the major contributor to the economic development of my home country Kazakhstan, and oil industry probably one of the most controversial, as for some countries oil brings prosperity, while for others ‘black gold’ brings problems. However, it is more a political issue, which is not part of this dissertation.

Thus, once I defined the industry, I had another issue of being specific about my thesis. During one of our MBA course classes Corporate Financial Management with Andrew Quinn, when he was explaining derivatives, I noted that it would be valuable for me to get an insight of them. Previously, I had a perception that derivatives are too complex for understanding, and it would be impossible for myself to become a kind of expert in it. During the second semester, we had a course on Operational Governance of Financial Markets with Enda Murphy, when we also went through derivatives topic, that time it was clear to me that my research will be dedicated to that part of finance science. Linking derivatives and oil industry I have done with the help of Andrew Quinn, who dedicated his time to help me to define the particular angle for my research perspective.
Initially, I had a basic understanding of derivatives, thus this research presented me with an opportunity to challenge myself. I was pursued by the idea, that every step of this research is beneficial, as most information on these financial contracts and hedging was new for me.

6.2. Solving arising issues

Since the topic has been established, as per requirements of an awarding body, primary research had to be conducted. That presented some constraints and complications for the process, as it was difficult to find interviews, especially when initially set up targets were high, such as only highly professional people, from different parts of the world, speaking fluently English. I have started to look for potential respondents at the end of the first semester. The search considered checking connections through the LinkedIn network, where I was looking for people who would match my criteria. The website itself restricts people who are not related by any means to an interested person to send messages unless the premium account is purchased. Thus, I had to use some tricks to get an access to those people by mentioning that either I have been working in the same company as them or attending same colleges, just to be allowed by the website to send a message.

After sending a dozen of letters asking for a participation in the interview, I got only one reply from a person who was willing to do so, for my understanding it was because he himself went through the same process of writing a dissertation. Thus, I had a strong impression that it would be impossible to collect primary data so that during the second semester I tried to think of another topic. However, likely I had a relative working in Canada, and he was also studying in the U.S., moreover, his experience made me think that he would have some valuable connections, and before giving up on my topic, I had to ask him for a help. Eventually, he came up with three suggested people, and I was excited to get answers from them because they were a perfect match. Moreover, one of the respondents is a well-known researcher in finance, who’s articles are published by Oxford University, particularly, his major interest is the oil and gas sector. It has been an honour for me to get his opinion. Hence, gave me the inspiration to work in the selected industry. The problem was solved, it did take around six months to make sure that I have a proper sample and I do have people to interview.

Another issue arose was a busy schedule of respondents additionally influenced by the time difference, as interviewers are located in different countries. The problem was solved due to the agreement to reply through the electronic mail. This sort of response was preferred by most interviewers.
6.3. Reflection on learning background

*Graph 12: The experimental learning cycle*

![Graph 12: The experimental learning cycle](image)

*Source: Kolb, 2005*

According to Kolb’s learning theory, the effective learning process occurs when all four stages of experimental learning cycle have been followed. The four steps include the concrete experience, the abstract conceptualization, the experience-reflective observation and the active experimentation to fulfil the process of learning by experience.

Kolb believed that different people intuitively prefer different learning style due to personal specific factors affecting the formation of one’s personality. So that one can start with any step of the learning cycle, based on his preferences and then consequent steps has to take place.

The concrete experience is the encountering of a new experience or reassessment of existing experience which occurs in a new situation. Reflective observation of the new experience refers to arising incompatibility between understanding and experienced gained so far. While abstract conceptualization attributed to the process when reflection proceeds to the creation of a new idea or modifies an existing abstract concept. Finally, active experimentation stage involves learner to apply gained knowledge to the world surrounding him/her to ‘experiment’ results.
Following those steps is integral as it allows to construct the time more efficiently, by dividing the process, and at the same time to analyse one’s own learning style. Thus, initially, the new theoretical framework regarding derivatives have been mentioned during the finance classes we had, which then motivated me to read more academic articles, tracking oil price movements, and gathering all required information, followed by the interviewing experts and analysing and generalising responds to answer research questions.

6.4. Self-Appraisal
Inspired by Kolb’s learning cycle, Gibbs came up with a Reflective Cycle model in 1988, which focuses more on one’s own and others’ feelings, perceptions. According to the model ‘Reflective cycle’ Graph 13, I would like to take an opportunity and to conduct a self-appraisal.

Graph 13: Gibbs Reflective Cycle

Source: Gibbs, 1988

Thus, reflective cycle model suggests following issues for analysis:

1) Description ‘What happened?’
At the beginning, I had to admit that the thesis research is the ‘must do’, and I had to mentally prepare myself for the full concentration and make sure that I have all conditions set up to be able to fulfil this research.

2) Feelings ‘What were you thinking and feeling?’
Feelings and thoughts were constantly changing. Initially, I had a passion for starting my research as soon as I could and I was full of energy and was sure that it would be an exciting journey for me full of interesting investigations. Mostly my expectations and feelings came true. However, sometimes I had moments when I felt that my English language is not good enough to properly communicate. Also, I noticed myself reading the same article few times, in order to understand it, as the specific terminology of the oil industry and some financial terms were not common for my knowledge, not including that all articles were exceptionally in English. However, that feeling made myself feeling proud, as overcoming constraints and succeeding is important for the life.

3) Evaluation ‘What was good and bad about the experience?’
I do not tend to think that there is any bad experience in the life of any individual, as every experience is good as it is beneficial for life. The matter is if a person can fairly analyse the experience he had and to be able to bear a lesson given by experience. Hence, the whole journey was great, I expanded my knowledge in finance, I practised personal and professional skills, I meet interesting people during the process of collecting primary data.

4) Analysis ‘What sense can you make of the situation?’
It is never late to learn something new, it is never to teach yourself on how to dedicate all available time for something valuable and important for a future. It is critically beneficial for one to write dissertation him/herself as I mentioned earlier, it is not just the theory or concepts models that are discovered, learned, it is also a personal development, which is extremely beneficial. Although I realised that education is the best investment.

5) Conclusion ‘What else could you have done?’
If there was more time available, I would do more interviews and if it was in my power I would arrange Skype or face-to-face interviews, to get an experience of interaction with respondents. Moreover, I would consider a wider range of oil producing companies for my secondary data analysis process to ensure that sample could claim to be purely objective, however, as it mentioned in the methodology chapter, that was an impossible mission to accomplish. Being only human and having certain obligations and responsibilities, I could not constantly be productive for my thesis, I had ups and downs when I found myself studying
without breaks for few hours in a row, and sometimes I had times when my motivation was vanishing and I could not study at all.

6) Action Plan ‘If it arose again what would you do?’

I would definitely make sure that I do have conditions for being able to study without any destructions. I would also use currently gained experience and it would make the whole process easier, as by that time I would perfectly know my capacity and my learning style to adjust to a new project. However, I have decided that this is my last masters’ degree and last experience of writing an academic research, as in the future I only plan to go to CFA which does not require submission of any thesis.

6.5. Summary of added value

In conclusion, this Master’s programme was a lifetime experience that has a decent effect on my personality and my professional profile. Notwithstanding that I have gained an efficient knowledge that I believe would be beneficial for my career, but also I have met new good friends that made my journey special. The knowledge and skills obtained during dissertation process helped me to gain confidence and sense of accomplishment. I do believe now that even after dissertation and getting my diploma, I will still motivate myself to learn, explore and develop as professionally as personally. I felt that my time-management skill has grown to a mature level, and I learned how to manage time effectively so that my research would not negatively affect my health and relationships with my friends and family. I have been proud of myself for being able to advance my English-language skills, there is a target still to reach in terms of correcting grammar and extending vocabulary, however, it is an achievement for me, to write a research in foreign language.
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Refrencing companies used for calculations in excel spreadsheet:

**Chevron:**


**Exxon Mobil:**


**Goodrich Petroleum:**


**Halcon Resources:**


**Schlumberger:**


Hedging

Appendix 1: Plan for completion

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also a financial instrument. Usually, asset managers are not allowed to own physical commodity but use derivative instruments for hedging and / or speculative purposes.

2) Would you perceive hedging with derivatives to be effective during market volatility?
The purpose of hedging is exactly to reduce volatility. However, the answers depends on the underlying: if it is crude, then it is a reasonably good hedge; when we recently saw oil recovering towards ca. $50 / barrel, oil producers started actively hedging their exposure and this is why the oil price struggled to break much higher. However, if you hedge your exposure to stocks of oil producing companies, the effectiveness of the hedge would decrease.

3) Based on your professional experience/ observations would you perceive that derivatives are used more for hedging rather than speculation?
The use of the oil derivatives depends on the type of the market players; oil producers use instruments to hedge their operations as they are naturally long the underlying commodity, traditional investors (long-only) tend to use it for both hedging (e.g. protecting their long position to oil from stocks) and speculation while hedge fund community usually use derivatives for speculation

4) Could you please quantify the assumption?
I’ve seen statistics that for every barrel of oil produced 17 barrels are getting traded. Another way of looking at it is to compare net position of non-commercial traders (speculators) vs. commercial traders.

5) Which derivatives used more often and why?
Oil futures (mostly used), crack spreads (differential between the price of crude oil and petroleum products), WTI options, naphtha swaps, etc..

RESPONDENT 2: Ron Alquist, Bank of Canada, an active researcher in the oil industry, published 18 articles on international economics, financial economics, monetary economics.
Location: Ottawa, Canada.
Date of interview: 10 July 2016, answered through e-mail

1) Do you think that derivatives are widespread in oil sector?
Derivative contracts are widely used by firms directly exposed to oil-price risk as well as by firms that have no connection to the oil sector (e.g., hedge funds) that take views on the direction of oil prices. For that reason, I would say that yes, derivatives contracts are widely used in the oil sector. They help firms in the industry manage their price risk and to take advantage of a different views of the market.

2) Would you perceive hedging with derivatives to be effective during market volatility?
It depends on the derivative. In general, options are more effective than futures at hedging market volatility because the price of an option increases in implied volatility which tends to highly, but imperfectly, correlated with realized volatility. In that environment, being long the right type of derivative contract can be profitable.

3) Based on your professional experience/ observations would you perceive that derivatives are used more for hedging rather than speculation?
I work at a hedge fund, so we use derivatives solely for what would normally be called speculation -- i.e., taking positions based on a forecast of how the price will change over a given time horizon. This point also applies to other trading firms. It is hard for me to say whether the there is more hedging or speculation because I don't work closely with firms that have to manage oil-price risk. Plus, the usual distinction between hedging and speculation
can be murky. You can imagine a natural gas producer, which would be considered a hedger, taking a position in the oil market because it had a strong view on the direction of oil prices. On the other hand, you can also imagine a hedge fund taking a position in the oil market to try to offset some inflation risk it has in the portfolio. A hedge fund, despite its name, is a speculator extraordinaire and yet in this case it is hedging inflation risk. It is impossible to infer the motives for taking positions based solely on the identity of the firm that is trading and without knowing how that position fits into its overall portfolio.

4) **Could you please quantify the assumption?**
As I said, it is impossible to do.

5) **Which derivatives used more often and why?**
My hunch is that futures contracts are the most widely used because of their liquidity and low cost, but that is simply a guess. At my hedge fund, we have only ever traded futures contracts in the energy markets because of the ease of doing so.

**RESPONDENT 3:** Hallimysore Dattatreya, Finance Director of PetroKazakhstan Kumkol Resources, has been working in oil industry since 1987. Location: Almaty, Kazakhstan.
Date of interview: 7 July 2016, answered through e-mail

1) **Do you think that derivatives are widespread in oil sector?**
I wouldn’t say derivatives are widespread in the oil sector, but certainly most of the major oil producers will be using derivatives to minimize their risk of market volatility – be it sale of futures, or options on futures or a forward contract etc.

2) **Would you perceive hedging with derivatives to be effective during market volatility?**
If the hedging is made properly using derivatives it certainly is an effective tool minimize the risk low oil prices particularly when the market is so volatile. It certainly can add value to the company provided the hedging is made in the right direction at the right time!! If the market starts trending in a particular direction it can also hurt the oil company, that’s why I say timing has to be right!

3) **Based on your professional experience/ observations would you perceive that derivatives are used more for hedging rather than speculation?**
Based on my experience, I would say most of the oil companies use the derivatives for hedging only. But there is a big pool of traders who are joining the derivatives market for speculations purposes which is actually causing a bigger volatility in the market. I would say there are more speculators in the derivatives market than hedgers!!

4) **Could you please quantify the assumption?**
I am assuming you want me to talk about the ratio between speculators and hedgers? I could safely say the number of speculators have more than doubled over the past 10 years based on the no. of open interest contracts each month on each strike price etc. All in all I would say there is more speculators than Hedgers!!

5) **Which derivatives used more often and why?**
Because we are talking about Oil Producers/ Oil sector, I would have to says Oil futures are the most frequently used derivative instruments by the oil producers to lock in the prices at higher prices and also ensure that they don’t need to store any inventory by using these futures for the disposal of all their inventory!
1) **Do you think that derivatives are widespread in oil sector?**

I think that derivative practices in oil and gas companies have improved considerably over the past decade since market activity has increased which ensures there is enough liquidity and makes it easier for oil and gas companies to find counterparties. At the same time hedging has become more complex since there are more risks to manage nowadays.

2) **Would you perceive hedging with derivatives to be effective during market volatility?**

Hedging using derivative contracts is an essential part in the oil and gas industry since it can dampen the impact of price movements on earnings and mitigate oil price uncertainty. I think the major challenge is to measure risk exposure in volatile markets and devise beneficial hedging strategies because it's harder to quantify the risks a company is facing. Derivatives reduce unexpected financial costs in the sense that they create planning certainty i.e. oil and gas companies can better plan what costs and revenues to expect. Of course, depending on how the market moves, this planning certainty can come at the expense of higher costs if the price decreases since companies are committed to their derivative contracts. Of course also hedging in itself is costly (see above: developing risk profile, engaging in hedging activities etc.). So the company has to carefully weigh the benefits against the costs.

3) **What are major factors that has to considered prior the choice of a particular derivative contract?**

Before deciding which derivative contract is most suitable, a company should develop a risk profile that takes into account all the factors that exposes the company's business to risk and then weigh these risks against each other. The major factors to take into consideration are price volatility, competition, changes in product markets such as the sensitivity of consumers' demand to price changes, and the macroeconomic environment. Environmental considerations such as accidents and pollution are also playing a more important role recently. It is also important to assess whether the risks are specific to the company or whether they affect the entire industry, whether they are short-run or long-run risks, and how high/low the probability of any risk event is.
contracts - they run hedging programs that require careful planning and execution. The following factors/activities are worth considering:

- Purpose of hedging and the desired risk profile
- Cost efficiency of hedging
- Cash and liquidity management implications
- Stress scenarios and solvency
- Tax implications

One of the challenges is the additional liquidity needs, should the position start losing money - while it is ok for a hedge to lose money so long as the main price exposure creates profit, but the resulting futures margin calls can create cash shortage, and create the risk of insolvency. For over-the-counter derivatives, costs can be considerable and counterparty risk becomes important. Unfortunately, the investment banks are incentivised to sell as much derivatives as possible. And should the bank that sold the derivatives become insolvent, the recovery procedure can be long, painful and costly. All derivatives, and especially the over-the-counter products, can also be overwhelmingly complex to manage, requiring specialized staff and systems.

3) Based on your experience, would you perceive derivatives as a tool to reduce financial costs?

Derivatives are not a tool to reduce the costs per se. Trading derivatives incurs costs, which vary between markets. "Over-the-counter" derivatives, sold by investment banks, carry considerable brokerage costs. Futures are more liquid and have no transaction costs, but have explicit costs in terms of the market impact.

4) Based on your professional experience/observations would you perceive that derivatives are used more for hedging rather than speculation?

The division between speculation and hedging is somewhat artificial. But for some contracts, commercial users dominate the open interest, for some the non-commercial, or speculative, is the biggest component.

5) Could you please quantify the assumption?

The CFTC commitment of traders report can be used to separate the open interest by the type of user. I do not have access to any other data, but the web site below has historical data back to 2006.

RESPONDENT 6: Javanshir Jabrayil-Zadeh, Economy, and Finance Manager in Lukoil Overseas, experience in oil industry 10 years. Location: Baku, Azerbaijan
Date of interview: 11 July 2016, answered through e-mail

1) Do you think that derivatives are widespread in oil sector?
Yes. For instance in 2007-2008 the number of futures achieved 260-350 k Vs 70-100 k in 2004-2005.

2) Would you perceive hedging with derivatives to be effective during market volatility?
To guarantee future volumes and price hedging by derivatives has to be placed. In one hand hedging (by derivatives) has to be wide presented during market volatility and it should be effective, from other hand derivatives are using for speculation and add market volatility.

3) Based on your professional experience/observations would you perceive that derivatives are used more for hedging rather than speculation?
Derivatives are used for speculation. For example: the whole derivatives in the world in 2008 ~ $600 trillion while GDP ~ $60 trillion (10 times less) and it was one of the main reason of crisis. It shows that derivatives are using as instrument for speculation more than for hedging.
4) Could you please quantify the assumption?
Regulation by law/Limitation of speculation of financial instruments. Ideally limit using derivatives.

5) Which derivatives used more often and why?
In oil market more often used futures and swops. Futures - guarantee volumes and price on the exact date. Swap – make oil market more flexible by expansion to more number of markets.

Appendix 3: CTFC Trader report on the Crude Oil open positions (July 2015-July 2016)
<table>
<thead>
<tr>
<th>Position</th>
<th>Long</th>
<th>Short</th>
<th>Long</th>
<th>Short</th>
<th>Spreading</th>
<th>Long</th>
<th>Short</th>
<th>Spreading</th>
<th>Reportable Positions</th>
</tr>
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<tbody>
<tr>
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<td>9.2</td>
<td>24.6</td>
<td>14.6</td>
<td>11.1</td>
<td>9.9</td>
<td>8.6</td>
<td>20.4</td>
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<tr>
<td>Number of Traders in Each Category</td>
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<td>81</td>
<td>22</td>
<td>18</td>
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<td>47</td>
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<td>14.7</td>
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<td>Number of Traders in Each Category</td>
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<td>74</td>
<td>19</td>
<td>19</td>
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<td>375,379</td>
<td>234,399</td>
<td>210,195</td>
<td>179,100</td>
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<td>Percent of Open Interest Represented by Each Category of Trader</td>
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<td>15.1</td>
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<td>Number of Traders in Each Category</td>
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<td>66</td>
<td>19</td>
<td>19</td>
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<td>44</td>
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<th>Spreading</th>
<th>Long</th>
<th>Short</th>
<th>Spreading</th>
<th>Reportable Positions</th>
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<td>19</td>
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### Disaggregated Commitments of Traders—All Futures Combined Positions as of October 6, 2015

#### Reportable Positions

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<th>Category</th>
<th>Long</th>
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<th>Long Spreading</th>
<th>Short Spreading</th>
<th>Managed Money</th>
<th>Other Reportables</th>
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<td>Producer/Merchant</td>
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<td>Processor/User</td>
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<td>Swap Dealers</td>
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<td>Other Reportables</td>
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**CFTC Code**: N687651  
**New York Mercantile Exchange**  
**Contracts of 1,000 Barrels**  
**Open Interest**: 1,675,676  
**Positions**:  
- 176,740  
- 361,858  
- 218,526  
- 286,621  
- 193,483  
- 278,318  
- 104,851  
- 259,398  
- 212,782  
- 127,988  
- 263,306  
**Changes from**: September 29, 2015  
- 10,701  
- 17,376  
- 6,500  
- 3,289  
- 11,173  
- 15,192  
- 7,885  
- 15  
- 5,577  
- 10,967  
- 17,467  
**Percent of Open Interest Represented by Each Category of Trader**:  
- 10.5  
- 23.6  
- 13.0  
- 17.1  
- 11.5  
- 16.6  
- 6.3  
- 15.5  
- 12.7  
- 7.6  
- 15.7  
**Number of Traders in Each Category**:  
- 69  
- 69  
- 83  
- 73  
- 82

### Disaggregated Commitments of Traders—All Futures Combined Positions as of September 1, 2015

#### Reportable Positions

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<thead>
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<th>Category</th>
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<td>Other Reportables</td>
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</tbody>
</table>

**CFTC Code**: N687651  
**New York Mercantile Exchange**  
**Contracts of 1,000 Barrels**  
**Open Interest**: 1,688,806  
**Positions**:  
- 308,621  
- 220,887  
- 297,795  
- 196,614  
- 250,891  
- 140,781  
- 286,520  
- 236,286  
- 126,134  
- 266,649  
**Changes from**: August 25, 2015  
- -8,121  
- -1,260  
- 2,752  
- -1,948  
- 10,619  
- 5,653  
- -15,303  
- 3,629  
- 7,364  
- 23,541  
**Percent of Open Interest Represented by Each Category of Trader**:  
- 9.4  
- 17.0  
- 15.1  
- 17.0  
- 11.6  
- 14.9  
- 8.3  
- 17.0  
- 14.0  
- 7.5  
**Number of Traders in Each Category**:  
- 66  
- 66  
- 62  
- 63  
- 81

### Disaggregated Commitments of Traders—All Futures Combined Positions as of August 4, 2015

#### Reportable Positions

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<thead>
<tr>
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<th>Long</th>
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<td>Swap Dealers</td>
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**CFTC Code**: N687651  
**New York Mercantile Exchange**  
**Contracts of 1,000 Barrels**  
**Open Interest**: 1,736,523  
**Positions**:  
- 220,419  
- 343,269  
- 198,930  
- 318,356  
- 192,336  
- 251,136  
- 135,164  
- 286,911  
- 227,548  
- 96,427  
- 282,877  
**Changes from**: July 28, 2015  
- 14,021  
- 11,339  
- -10,972  
- -9,610  
- 14,439  
- 5,118  
- -4,388  
- 16,309  
- -2,409  
- 3,423  
**Percent of Open Interest Represented by Each Category of Trader**:  
- 12.7  
- 19.8  
- 11.9  
- 18.3  
- 11.1  
- 14.5  
- 7.8  
- 16.5  
- 13.1  
- 5.6  
**Number of Traders in Each Category**:  
- 56  
- 68  
- 18  
- 20  
- 30  
- 59  
- 53  
- 73  
- 69  
- 59  
- 84

### Disaggregated Commitments of Traders—All Futures Combined Positions as of July 7, 2015

#### Reportable Positions

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</table>

**CFTC Code**: N687651  
**New York Mercantile Exchange**  
**Contracts of 1,000 Barrels**  
**Open Interest**: 1,691,891  
**Positions**:  
- 281,152  
- 345,380  
- 199,924  
- 346,572  
- 183,743  
- 279,448  
- 98,418  
- 274,637  
- 206,414  
- 91,284  
- 266,342  
**Changes from**: June 30, 2015  
- -3,872  
- -24,460  
- 13,466  
- -6,741  
- -8,356  
- -7,328  
- 32,694  
- 12,467  
- 10,169  
- 2,166  
**Percent of Open Interest Represented by Each Category of Trader**:  
- 11.9  
- 20.4  
- 13.8  
- 20.5  
- 10.9  
- 16.5  
- 5.8  
- 16.2  
- 12.2  
- 5.4  
**Number of Traders in Each Category**:  
- 53  
- 69  
- 18  
- 20  
- 33  
- 60  
- 49  
- 72  
- 69  
- 59  
- 78