Effects of derivative use on firm value: Evidence from Nordic financial firms

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Abstract

Financial firms are carrying more risks than non-financial firms as they are operating with highly liquid assets. Use of derivatives is one of hedging techniques used in protecting firms from such kind of risks. There has been considerable discussion in academia of whether or not derivative usage can be considered to be value relevant. This is a question, which relate to both risk management and value maximization perspectives in terms of theory, but also discussions in regards to hedging irrelevancy (M&M) and arbitrage theory as well:

*Does the use of derivatives affect listed Nordic financial firms’ market value, if so how?*

Thereby, the main purpose of this thesis is to find out whether or not there a relationship between derivative use and firm value, which would be evidenced from sample taken from listed Nordic financial firms. In addition to this main purpose, this thesis furthermore sets out to answer whether geographical diversification and firm size contribute toward the effect of derivative use on firm value.

Moreover, to answer the research question, a positivist philosophical standpoint with objectivist viewpoint taken, which subsequently leads the author to utilize quantitative methods and statistical analysis to the data collected for this study. Here, different panel models are fitted to the data to account effects that exist within it. To explain the findings, a theoretical framework is built upon two main theories and prior literatures. Here, on the theories such as M&M theory as well as arbitrage theory are dealt with. On the prior literatures, different scholars finding on the derivative use and firm value relationship discussed.

After looking at the results and the analysis, one can draw the conclusion that there is a positive relationship between derivative usage and firm value. The analysis this thesis took the entire 96 Nordic financial firms sample for study period of four years (2012-“015), and from this sample size 80% found derivative users and the rest are non-users. Further, the study result and analysis lead the author to conclude that derivative usage has a positive impact on Nordic financial firms’ value.

Overall, this thesis can find evidence for a value-relevance of derivative usage to firm value in the Nordic markets. Essentially, Tobin’s Q ratio used as a proxy for firm value and panel data model has been used in the analysis. The test result of the study shows that there is a positive statistically and economically significant derivative use premium for Nordic financial firms.

**Keywords:** Risk management; Hedging; Derivatives; Derivatives use; Firm value
ABBREVIATIONS AND ACRONYMS

CAPEX – Capital Expenditure
CAPEXSmooth - Smoothed Capital Expenditure
DervDumSmooth – Smoothed derivative dummy variable
Diver.Dum – Geographical diversification dummy variable
Divid.Dum – Dividend dummy variable
Divid.DumSmooth – Smoothed dividend dummy variable
ETD – Exchange trade derivatives
IFRS – International Financial Reporting Standards
ISDA - International Swaps and Derivatives Association
LEVSsmooth – Smoothed leverage
Liq – Liquidity ratio
LiqSmooth – Smoothed liquidity ratio
OLS - ordinary least squares
OTC – Over the counter trade
PROF – profitability
ROA- Return on assets
ROASMOOTH – Smoothed return on assets
SIZE – Firm size
SIZESmooth – Smoothed firm size
Dedication
This thesis work dedicated to the author’s wife Lilly Getahu with special gratitude for standing beside, motivating to work hard, energizing when stacked somewhere in the middle and others. Without her standing beside, completion of this research paper was unthinkable. The author forwards his heartfelt thanks again for the effort she contributed to this study.
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CHAPTER I. Introduction

Under this chapter, the author explores the background of the thesis, motivates readers by giving a basic understanding regarding financial derivatives theoretical as well as practical aspects. Further, the problematization section discusses the relevance of this study by showing the readers a clear gap that this study tries to fill. This is followed by a research question that addresses the gap and the aim that this thesis holds in answering it. At the end, the sole purpose of this study will be discussed which is followed by theoretical as well as practical contributions. Then, a brief explanation regarding delimitation and delimitation of this thesis will be given before closing the chapter by highlighting the disposition of the entire thesis sections.

1.1 Background

1.1.1. Financial derivatives & financial markets

The remarkable speed of globalization compels companies to participate in the utilization of derivatives through hedging activities. Mainly this is to protect themselves from different financial perils. Hull (2011, p.1) also argued that when derivatives are measured in terms of their underlying, their markets are vast and significantly larger than that of the equity market. Due to this, we cannot avoid derivatives even if we like them or not. Eklund et al. support this argument by saying “The total global value of derivative contracts’ underlying assets amounts to just over USD 600,000 billion. This is equivalent to more than 40 times the United States’ GDP” (2012, p.1). Further, the use of financial derivatives has been steadily growing during the last decades, and today we can see a lot of well-developed exchange trade market for these financial instruments, like over-the-counter (OTC) and exchange-traded derivatives (ETD).

The report issued by International Swaps And Derivatives Association, INC. on financial market shows that many corporations and firms involve in hedging activities (ISDA, 2009, p.2) Moreover, the motives of these corporations and firms differ from each other, some of them use derivatives for risk management purpose and others use it for speculation, even some use them for both purposes (Chui, 2000, p.4). Besides, hedging corporate risks with derivatives are gaining huge attention from different industries and became popular corporate activities for the last decades (Ayturk et al., 2016, p.108). This was invented and has been growing fast due to a gradual shift of financial as well as capital market attention toward volatility and its effect on firm’s performance and profitability.

Simply derivatives are an agreement between two or more parties, and their values are derived from underlying assets (Stulz, 2004, p.174). These contracts can be related to currency, commodity or interest rate. However, uses of derivatives in the manner of risk management usually require an initial investment to mitigate unfavourable future price movements. Many firms also use derivatives for speculation purpose besides using them as the hedging instrument.

In addition of firms’ use of derivatives, different enforcements led on the global market with respect to the way the financial statements of the firm are compiled and presented. Thus, it has led to the implementation of the guidelines called International Financial Reporting Standards (IFRS) in many countries worldwide as well as in Nordica countries,
which this thesis concerned on. According to the IFRS, firms are required to disclose whether they use derivative contracts or not for hedging or trading purposes. Further, this rule enforces firms to provide information about the probability of risks they face and the actions they have taken to properly handling them.

Besides that, financial derivatives are tools in making financial market functional as well as assisting with its development (Halilbegovic & Mekic, 2017, p.249). Further, these authors identify the role of derivative in financial market by pointing out its contributions, “provide the quality and quantity of the supply and demand of capital, improve the business climate, and create opportunities for new jobs, and the largest contributing to the decline in unemployment” (Halilbegovic & Mekic, 2017, p.249), which imply the relevance of derivatives in current financial markets. Moreover, as financial markets are more sensitive compared to non-financial markets, they always bear higher risks. So, this forces the market to have an effective risk management system that leads to use of derivatives to hedge these risks. Therefore, derivatives play an important role in risk management and in trading securities, of both in over-the-counter and exchange markets. And this has been seen on different aspects of the sectors such as the significant expansion of the stock market, financial instruments standardization, and the massive development of information and communication technologies and others (Halilbegovic & Mekic, 2017, p.249).

Besides that, during the period of the financial crisis, different unease over several risks contributed to great uncertainty.Mainly, over the counter (OTC) market, in which derivative contracts are traded outside stock exchanges were found particularly problematic. This was due to lack of transparency in the market and neither was it regulated to any great extent. The lack of transparency also led the market to great uncertainty in connection to events that might happen in that market, which rose a question on any possible serious problematic impact on any of the participants. Therefore, the crisis gave hints to the market regulatory bodies that there was a need of taking alleviative measures on the OTC derivatives market to strengthen financial stability.

Subsequently, leaders of the G20 countries started making the required amendments which have got a contribution to reducing the risk of future crisis (Eklund et al., 2012, p.1). The change helps financial as well as non-financial firms because the market rules assist in the proper management of derivatives. And Chui (2012, p.3) also argued that if derivatives are properly handled they can provide the holder with substantial economic benefits. He elaborated it further by saying that proper handling helps the actors to manage market and credit risks with the promotion of financial innovations, the development of the market, and market flexibility and shocks. Moreover, these issues will be further discussed with supportive argumentation under literature review section.

1.1.2. The role of financial derivatives & firm value

Nowadays, all firms are well aware of derivatives as they are using them in risk management and speculative reasons. For this, firms’ financial statements have been showing a gradual change in uses of these derivatives and reporting them with disclosure required by financial reporting regulatory bodies (Graham & Rogers, 2002, p.815). The awareness was specially developed since 2008-09 global crisis, which left its mark on the world economy, and many countries are still straggling from the injury (Davide &
Annabelle, 2012, p.822). Then after, scholars also have given attention towards investigation of derivatives’ role in world economic crisis and devoting much effort in finding ways how firms can tackle if similar situation exist in the future.

On the other view, firms, which stand for profit making objectives, are working hard to ensure their sustainability (Michael D, 2015, p.630). This means that they are involved in a kind of business operation, which makes their stakeholders satisfied from the services provided or products delivered to them. In return, the firms expect some kind of loyalty, long-lasting business relationships among others (Michael D, 2015, p.630). Gaining these factors helps the firm in pledging competitive advantages that lead to better performance results, which contributes to the increase in firm value. Firms, which are operating both in financial and non-financial markets, are facing a tougher computation. On this, the major concern is related to the firm value, which is how much a given firm is worth at the current market pool. In securing this, firms look for something unique and apply innovative products and services to bet the market. However, this requires a continuous process and it is also riskier because markets are experiencing fast inflow of newly innovated products and services. With this, derivatives are one of the newly created financial instruments that firms use for many reasons including speculation (Chui, 2012, p. 4) and risk management (Mai, 2008, p.8). These two elements have an impact on firm value and many scholars have been researching on them in order to identify the existence of those impacts.

Those scholars who have been studying importance of derivatives argued for and against its use as they found the relationship with the firm value. Some say that as derivatives are financial instruments in risk management they contribute to the firm value because effective risk management helps the firm in assuring its future perspectives (Halilbegovic & Mekic, 2016, p.2). This effective risk management also creates better performance achievement, which motivates investors to invest as the prospective of the firm is positive. Akpinar and Fettahoglu (2016, p.2) also argued that the key purpose of derivatives is management of risk and hedging, which arose as a strong method of segregating or relocating risk, from which we can see the effective function of derivatives. In addition of that Leland (1998, p.1237) in his study asserted that hedging would have contribution toward increase of firm’s debt capacity, and as borrowing increase it leads to increase in the effect of tax savings and contribute to firm value.

Others also says that derivatives have negative impact on firm value. Nguyen and Faff (2010, p.681) in their study arrived on a conclusion that the use of swap contracts in particular has statistically significant and negative effect on firm value. Even some of the scholars linked it and argued on the existence of derivatives behind the fall of different large firms like Enron, Queen’s banker (Barings) and others (Stulz, 2004, p.173). These scholars’ viewpoints will be discussed in details under the literature review section this thesis.

1.1.3. Financial derivatives & related theory
Theories are helpful as a ground while one makes a research on specific field of study. So, the author of this thesis also aims to see the interpretation of different facts that have a relation with derivatives. As derivatives are financial instruments, which are held by firms for the two major objectives have tie with different theories. For instance, risk
management theories discuss different kind of risks with suggestions to avoid or reduce them. These theories include random walk theory, efficient market theory, perfect capital market (Modigliani and Miller or M&M) theory, risk management theories, and others.

Further, these risk management theories have indirectly imply the existence of derivatives as they are tools in managing these problems (Klimczak, 2007, p. 27-28). For example, market imperfection leads to the existence of arbitrage (Figlewski, 2017, p.317) and firms use derivative contracts in protecting themselves from this kind of market fluctuations. Likewise, as no companies are completely similar on different prospective, their optimal course of actions is contingent (dependent) on their internal as well as external situation and a contingent leader can apply his/her own style of leadership to the right situation (Fiedler, 1971b, 1978). This means that firm managers apply different tools for the type of risk they are facing. Therefore, it advocates that having a derivative in risk management is one alternative way for the firm.

Besides this, the classical financial theory which advocates the capital market perfection is the Modigliani and Miller (1958)’s theory. The two professors argued that as all investors and other market participants have equal access to market information no one can beat the market in the world of perfect capital market. And they added that the firm would not be involved in hedging activities for the reason that whatever the firm can achieve through hedging might equally be accomplished by the financial investors performing on their own accounts (Modigliani & Miller, 1958, p.271). This theory implies that capital market is free of any risk, which is against the arbitrage theory. The author will make a detail discussion on these two theories, with the aim of exploring the standpoint of the capital market in the current era, under the literature review section.

There are also many theories which are linked to derivatives and those theories argue in favour of and against the importance of derivatives use in the firm’s performance management as well as value promotions. In both cases this thesis will try to explore based on the grounding theories to achieve its purposes. Besides, as those theories show the existence of differences in the views of scholars on the capital market, which moves us to the next section which pinpoints the research gap.

1.2 Problematization
Tremendously changing global business environment which reflects the effect of derivative usage on firm value has received significant attention among financial press, academia, regulators, and other financial market participants. In this study approximately more than 75% of listed Nordic financial firms were found to be users of derivatives. Existing empirical evidence related to this issue varies; for instance, Adam and Fernando (2006, p.283), Carter et al. (2006, p.53), and Berrospide et al. (2008, p.29) came up with a positive relation between use of derivative and firm value. Allayannis and Weston (2001, p.243) on their examination of the relation between foreign currency hedging and Tobin’s Q found an association between hedging with higher firm value. Furthermore, other scholars also agreed on this positive outcome with slightly small conditionality (e.g., Mello & Parsons, 2000, p.151; Froot et al., 1993, p.1629; Stulz, 1996, p.24; DeMarzo & Duffie, 1991, p.284-285; Bessembinder, 1991, p.519; Stulz, 1990, p.23; Smith & Stulz, 1985, p.391; Myers, 1977, p.171). They argued that the link between the two variables is dependent on the extent to how effective their use is in addressing the
imperfection of the market like bankruptcy costs, financing constraints, information asymmetries, and taxes.

Conversely, Jin and Jorion (2006, p.893), Nain (2006), and Lookman (2004, p.33) concluded that the relationship between derivative use and firm value is a conditional positive or negative one or no relation. Other scholars who found negative relation between these two variables argued that it may lead the firm to account for agency costs and monitoring problems associated with it; for instance, managers of a firm may selectively use derivatives for speculative and self-interest motives (e.g., Tufano, 1998, p.67; Geczy et al., 2007, p.2405; Stulz, 1984, p.128; Faulkender, 2005, p.959; Ljungqvist, 1994, p.188). They also claimed that this may result in a potential loss in firm value at the expense of the firm owners. With a similar view, The Economist reported that “the worries over derivatives stem not from any inherent evil, but from their power to disguise the intentions of their users” … “The critics (Warren Buffett, Bill Gross, and other critics) also claim that derivatives enable corporate treasurers to gamble with shareholders’ money” (The Economist, January 24, 2004, p.3 &10, Survey of Risk section). On strengthening this point, a well-known investor Warren Buffett defined derivatives as “financial weapons of mass destruction” (Berkshire Hathaway Inc. [BHI], 2002, p. 15). As a coincidence, he also experienced a loss of $1.1 billion in the second quarter of 2012 while he was CEO and board chairman at Berkshire Hathaway firm which resulted from the use of derivative instruments (Berkshire Hathaway Inc., Form 10-Q, 2012). Further, Stulz (2004, p. 173) also supported scholars who identified negative impact by studying the existence of derivatives in association to the collapse of the Queen’s banker (Barings); collapse of the Thai Baht; and with the fall of Enron.

Others also noted that there is no significant effect that derivative usage has on firm value (Akpınar & Fettahoğlu, 2016, p.53). Modigliani and Miller (1958, p.284) also found no impact due to intended arbitrage procedures by investors who share equal right in getting into the market. In addition, Akpınar and Fettahoğlu (2016, p.52) in their study of derivative effect on a firm value which takes samples from Turkish firms also concluded that there is no significant correlation between firm value and derivatives.

Furthermore, as discussed before, there are inconsistences between the studies done on non-financial firms. It could be argued that, those studies might not be helpful to infer for financial firms. But as Stulz (2004, p.180) pointed out that for individuals and non-financial firms’ derivatives are non-redundant assets as they face much higher trading costs compared to most effective financial firms. Therefore, this implies that derivative can be used by both financial as well as non-financial firms with the same aim but the extent is different. Additionally, Hull (2015, p.1) argued that the majority of risk management ideas (tools) that are used by financial firms are equally applicable to non-financial firms. Therefore, these two industries (financial and non-financial) are operating in largely similar business risks and use similar tools to reduce or eliminate those risks. For this, this thesis attempts to address these gaps and try to enrich the financial derivatives literature, in the context of the Nordic financial market, for which empirical study of derivative usage is an apparent need as it is a valuable risk management tool. Besides that, to the author’s knowledge, there is no study focusing on the use of derivatives impact on firm value in relation to Nordic financial firms. There are some studies on financial firms in other areas of the world, but it is hard to infer that to Nordic
firms because they are operating in totally different culture, country’s regulation system, and business environment. Moreover, no empirical studies have been found on financial firms in the subject area of this thesis. Therefore, the author motivated to study these Nordic financial firms which prior research did not cover and for easiness of collecting required study materials as the region is well organized and governed by similar rule.

1.3 Research question
As the previous discussion showed and explained the current issues related to derivatives, there is a research gap that calls the scholars attention. The question is therefore whether derivatives have positive, negative or no impact on Nordic financial firms’ market value.

*Does the use of derivatives affect listed Nordic financial firms’ market value, if so how?*

With the aim of fully answering this question, it is worthwhile to define what is meant by firm value and derivatives. For this, the issue will be further elaborated in the theoretical framework section. Even if some highlighting discussions has been made in the introduction section there is a need for further detail to give a full picture of the issue under this study.

1.4 Research purpose
With this quantitative study, the author’s intention is to enrich research on the relationship between derivative usage and firm value of Nordic financial firms listed on NASDAQ OMX Nordic and Oslo Børs OMX stock exchange. On this, the goal is to examine if there has been any relationship between these two variables, and in a parallel way, if this has over time become more important in the eyes of Nordic financial firms which are focusing on this issues. To the author’s knowledge, no study has been done on Nordic financial firms, but there are studies done on non-financial firms. Thus, this study seeks to advance the understanding of derivative usage and firm value relationship through examination of how Nordic stock market responds to the use of derivative by financial firms. To do this, the study takes population as well as a sample from Nordic financial firms’ listed on NASDAQ OMX Nordic and Oslo Børs OMX stock exchange with a time frame of 2012 to 2015.

Moreover, as globalization pushes all industries toward one market place, financial firms role takes major part because they are a backbone for those non-financial firms and due to their sensitivity to market movements. Additionally, Bartram et al. (2011, p. 968) found that the effect of derivatives during the financial crisis were more severe in the financial firms than non-financial firms. Further, mainly firms use derivative in risk management and trading purposes; on doing this they are making transactions with national as well as international businesses and they bear risks like market price fluctuation, exchange rate fluctuation and some others. For this, the author is keen to gain insight on how the value of the firm reacts on the management of these factors by applying derivatives as a tool.

The author will carry out this study with the help of a multiple regression model, and derivatives related data will be collected from firms’ annual report and stock price, to facilitate utilization of Tobin’s Q a proxy variable for firm value, from Thomson Reuter DataStream. Bearing this in mind, the issue will be explored by connecting to the Nordic financial firms which have not been accounted by prior studies. So, by doing this the
author believes that there would be a possibility and importance of bringing prior research to this new setting.

1.5 Theoretical and practical contribution
This thesis contributes towards the building of existing literature about the matter concerning the impact of derivatives on firm value. Bearing this in mind, the author will conduct a quantitative study, basing on listed Nordic financial firms, to investigate the existence of a relationship between the two variables and provide valuable information to those academicians who want to make a further study on this matter. Hence, to provide empirical evidence a longitudinal analysis will also be performed with collected data. Further, this study aims to complement the existing literature which does not cover Nordic financial firms. Additionally, the author of this thesis tries to contribute some facts towards neutralization of inconsistency found in prior scholars’ findings stated under problematization section.

Since many firms use derivatives in managing different kind of risks and/or for the trading purpose; managers, stock analysts, and policy makers always seek for information regarding these derivatives on their operational decision-making concern. Thus, this study will contribute through providing required information to enable them to make an effective decision towards the firm’s goal. Further, stockholders also need this information to evaluate the performance of the organization in connection with effective risk management and value contribution of derivative usage. On this prospective, this study will help stockholders on deciding to invest more or to take corrective action choices.

Furthermore, as derivatives led big companies like Queen’s banker (Barings), Thai baht, and Enron to collapse (Stulz, 2004, p. 173), there is a need of giving due attention to it on operation management. For this, Bartram et al. (2011, p. 969) suggest that before having new regulations, there is a need to see its costs and benefits while identifying whether derivative usage can provide protection against systematic decline for some firms. Therefore, this study also contributes valuable information in assisting these market regulators in their development of new regulation regarding the subject under this study.

1.6 De-limitations of the research
On ending the introduction chapter, the author highlights the limitation of this study in this section. As pointed out on the above sections, the intention is to explore whether or not there has been a relationship between derivatives use and firm value under the umbrella of the financial industry. Therefore, the author holds the sole objective of looking at this issue over a 4-year period (2012-2015).

This study will be based on Nordic financial firms, which are dealing with derivatives and incorporate it in their annual financial statement. Companies listed on their local stock exchange will be selected for the study with a time frame of 4 years. This four-year time frame is chosen for the reason that majority of Nordica financial firms start using derivative since 2012 and the inclusion of period that majority had not been using reduce the value of this thesis. Moreover, it also deviates from the sole objective of the study which is “derivative usage effect on firm value”, and studying during the period in which most firms were not using derivative is meaningless. This will allow the study to be broad and capture all relevant components to come with contributing result for the research gap
stated in the previous section. Naturally, derivatives might not cover the entire variables affecting firm value or provide a detailed view of the issue under the study. Some of these other variables are not observable or have been excluded due to the data and time constraints.

1.7 Disposition

Chapter I: Introduction

The introductory chapter of this thesis broadly started with the background of the thesis subject and its explanation, then further disseminated into a research question and purpose. It argued for the delimitations, and the limitations of the study also pointed. Generally, the introductory chapter stands as the skeleton of the full thesis and provides reasoning for the purpose of the thesis with the aim of theoretical as well as practical contributions.

Chapter II: Methodology

In the methodological section, the author will talks about the applicable philosophical issues, like, epistemological, ontological and axiological contemplations, relating it to this study. Choices are made in accordance with the research question to have the capacity to answer it completely. Besides, in this section, the research approach is expounded on and argued for “why” of the chosen approach. In conclusion, the part flows to the end of the chapter by a discussing on ethical and social matters concerning with research, and finalize through wrapping up the entire section in a graphical frame.

Chapter III: Theoretical Framework

Under this chapter, the author elaborates on the chosen theories with the aim of answering the research question. The major theories chosen for this thesis include firm value, different derivative types like currency derivatives, interest rate derivatives, commodity derivatives, and theories highlighted under chapter one. Furthermore, the concept of derivatives and firm value will be covered widely in the light of these theories. Derivatives use in risk management will also be discussed in depth since it plays a significant role in the financial market. The author will also cover under this chapter those relevant theories that are helpful to understand and interpret the findings and answer the stated research question/s. Finally, the chapter ends by bringing the theories together into a model that enable to make the analysis.

Chapter IV: Practical Method

The practical aspect of this thesis about its empirical side will be covered under this chapter. For this, different statistical techniques used, collected data, the entire data collection process, and finally the development of the theory of a testable model are discussed / presented. Moreover, this chapter is developed on all the former ones, facilitates and bridges previous chapters to the finding chapter.

Chapter V: Analysis and Results

This chapter follows the empirical methods developed in the earlier chapter and subsequently deals with the examination of the issue at hand with the help of statistical tools that have been enlightened and argued for formerly. In general, the author
demonstrates in this chapter the results of this study and answers the stated hypotheses. Moreover, this chapter also acts as a bridge to connect the findings with the chosen theories and work on strengthening the study by creating the interconnection between the two main sections of the thesis. As such, the results interpretation will be performed through the theoretical framework developed by the author.

Chapter VI: Conclusions

In the conclusions chapter, as it is a finishing chapter of this thesis the author will perform discussion and interpretation of the overall findings. Further, the author also elaborates on what has been found in regards to theoretical as well as practical contributions with clear standpoint which is consistent with the study outcome. Moreover, the author will suggest areas for further research and social as well as ethical implications of study results are elaborated on. With the last sub-section of this chapter, the author will discuss the quality of the thesis by scrutinizing over different levels, starting from the generalizability of this research findings to the reliability of our result.
CHAPTER II. Methodology

To begin with, the methodological chapter starts with discussing the author’s interest in the choice of the topic and with understanding and perspectives of this thesis. It moves from the ontological to epistemological issues and followed by the approach, design and strategic considerations. It is also argued why a positivist and objectivist viewpoint is chosen for this thesis. For this reason, it consequently led to the adoption of a quantitative approach. Moreover, this chapter discusses issues related to literature and data search procedures, and time horizon used for this study. The chapter ends with the discussion relating to an ethical and social matter with regards to the chosen philosophical standpoints and the thesis itself. With the aim of simplifying the chapter to the readers, a graphical model is developed at the end of the chapter.

2.1. Choice of topic & preconceptions

At the very beginning of the choice of this thesis topic, the author has been influenced by the experience gained while working in financial consultant firm and from the content of the courses taken in his major in finance. Especially, courses like Corporate Finance, Investment and Risk Management motivated the author to have a deeper understanding of derivatives as well as the pro and cons of derivatives on firm’s financial performance. Subsequently, the author quickly came to be interested in knowing if there were derivatives behind the collapse of large international firms, the effectiveness of derivatives on risk management, and its contribution toward firm performance. Therefore, with the intention of expanding knowledge on derivatives, the author chose to investigate if there is a relationship between firm value and use of derivatives.

Besides that, the author has read in deep and seen that the growing awareness of derivatives and the market share it holds at current financial environment kind of issues becoming key factors that firms concerned within risk management as well as other financial performances matter.

Similarly, in reviewing the current literature, the author identified a worthwhile relation between the subject under the study and firm performance which contribute a lot toward firm value improvement. As derivatives are used by the firm for different purposes such as to motivate employees towards firm objectives, to build trust by customers, and so forth; which shows its interconnection with different section of the firm activities also contributed toward motivating the author to look in depth on the subject matter.

To the knowledge of the author, the subject under the study is not widely covered. The articles found focus on non-financial firms, but few look at both financial as well as non-financial firms together. Thus, opportunities to explore further in this area gave the author a chance to move in depth on this issue by accounting Nordic financial firms. Nordic financial firms are classified as those well organized and advanced financial organizations but not covered much by prior studies. Thus, it won the author’s attention to look in to it and contribute to the existing literature. The perspective behind this is that the author believes that there must be some difference in a way of operating and understanding of the concept of derivatives between financial firms as their geographical location and societal culture they are operating in differ in comparison to financial firms in author’s
countries. For this, the Nordic perspective which this study accounted for may employ different techniques to evaluate and measurement of derivative usage and firm value. Therefore, even if these potential problems are there, it could let the author learn a new thing with regards of derivatives under European context which might be different from the author’s educational as well as work experience. Because Nordic region has a well-organized derivative market, regional financial firms governing rules, automated system, and adopt Basel Accord compared to author’s homeland financial firms. As this study is carried out in a new geographical location as well as culture, the author might face with some conflicting issues in relation to prior educational as well as work experience but those biases will be dropped to the minimum.

Moreover, the author believes that the possibility of subjectivity will be held to a minimum from being transferred to the study result. The reasoning behind this is that; the author has the required awareness and understanding of how objective scientific studies from different perspective can be performed. Further, the author is also confident on the assurance of objectivity of the result as it is backed-up with statistical tests, consultation with supervisor and feedback from fellow students.

2.2. Perspective of the thesis
It is prominence that a study should have a prospect that fully reflects the plan and way of conducting the study for the reason that it is helpful in reducing the misunderstanding that might be created on readers, and consequently make their evaluation easier (Thurén, 2011, p. 88-89). Further, it is quite important to identify the research perspectives to create a better awareness about the author’s utmost potential interest in his/her findings. For this, this study holds the primary perspective of the investors and managers. It is natural that investors and managers are keen to see the performance of their investment and operations, for this, they are the ones most interested in the findings of this study. But the author also would like to acknowledge that this study might affect other stakeholders of the firm. When we say stakeholders, it is a broad and diverse interested group on a given research results in their perspectives, and it is hard to account for. However, as this study aims to look in a broader view of whether firm value has got a relationship with the use of derivatives, the author expects that this aspect has a prospect to receive more attention in the future for the reason that derivative market is covering a significant share in a current era.

2.3. Research philosophy
Philosophy is “a set or system of beliefs (stemming from) the study of the fundamental nature of knowledge, reality, and existence” (Waite & Hawker, 2009, p.685). In doing research, it is natural that a researcher should clarify his/her philosophical standpoints that are used in studying the subject matter. For this, the researcher is expected to state the assumption that he/she has chosen due to the impact he/she cause in practice of research. This is supported by Creswell’s (2014, p. 5) argument that in the process of planning the research, it is necessary to show a clear connection between the philosophical worldview, the design of the research, and the method applied on carrying on the research. Meaning, the strategy or research approach should be in a compulsory relationship with the major two philosophical standpoints that are epistemology and ontology (Scott, 2014, p.30). In addition, McNabb (2002, p.37) argued that if the standpoints are properly chosen it will establish the framework on which pillars of the
research process, which includes research strategy and data collection methods, are pre-set and applied. Hence, the author follows the fundamental idea of Burrell and Morgan (1979, p. 1) which argue on the necessity of clarifying how a researcher view epistemology, ontology and human nature.

2.3.1. Ontological assumptions: Objectivism

Basically, ontology is an area that philosophers broadly discussed among themselves; it mainly concerns asking researcher as individuals what he/she think of the world is made of (Benton & Craib, 2010, p. 4). It could be possible that one can hold a standpoint that world consisted of different matters, but on the contrary to this, it could also be possible to stand on the point that reality resides in the mental and metaphysical aspects (Benton & Craib, 2010, p. 4).

With this regard, the author’s view of the world is grounded on what is observed around us, as what is seen happening in reality; or it can be reflected on the basis that is seen and made out of the observations which are in line with the beliefs and value. In other words, reality is socially constructed (Ryan et al., 2002, p. 13-14). Keeping this in mind ontology can be seen from different perspectives.

According to Saunders et al., (2012, p. 130-132) there are two ontological positions, namely, objectivism and subjectivism. They further explained that social entities are external to the research, the existence of only one reality, and the social entities are not controlled by the social actors. On the contrary to objectivism, subjectivism assumes that reality is dependent on the social actors and also subjective and multiple for the reason that it is socially constructed (Saunders et al., 2012, p. 130-132).

In this sense, the subject for the researcher is that whether she/he wants to realize the phenomena from a deeper perspective, or relationship between certain aspects of it (Ardalan, 2008, p. 3). Here is where we can see a flash of the unescapable issue of ontology problem. If a person seeks for deeper understanding, it is quite likely to be affected by the subjective approach, whereas, if a person looking for an understanding of the linkage between given aspects, then that takes more external and objective approach (Ardalan, 2008, p. 3).

For this thesis, objectivism is the primary ontological assumption that the author could argue for as it is essential on answering the research question. As this study is carried on with the help of numerical data that will be collected from the market actors (individual firms report), which means that the data collected will be raw and not changed by the author in any case. For this, the author will use the data in the way of objectivism viewpoint.

This study is not directing to explain or explore in depth firms’ viewpoint; rather its target is objectively looking at data over a period of time. And on this, the author tries to cover as well as learn by approving or disproving what is found by the prior studies on the relationship between derivatives use and firm value. It could, of course, be possible that one can argue that subjectivism also allows the author to explore the subject matter under the study, but that would be from a different viewpoint that could create hurdles to the author in assessing the phenomena. Long et al. (2000, p. 195) argued that it is vital for researchers to challenge their philosophical standpoint and realized that the existence of
other viewpoints a research could take which would deliver a similar yield of knowledge. Moreover, there is also the fact that an objective stance could be said problematic, which the researchers allowed to ignore “the disturbing ambiguity about things that are neither right nor wrong, good nor bad” (Bettner et al., 1994, p. 4). The author has anticipated this, and feel that subjectivity will be held to minimal by utilizing publicly accessible numerical information. While recognizing this, it might not demonstrate the full picture of the expected issue, objectivity is the common and most available method for addressing the issue. In this manner, objectivism is the preferable choice of the author in this study.

2.3.2. Epistemological assumptions: Positivism
From the positivist point of view, the second relevant assumption is the epistemological one. It is related to how one absorb, how one can gain knowledge, and what is acceptable knowledge (Ryan et al., 2002, p. 11; Saunders et al., 2012, p. 132; Collis & Hussey, 2014, p.47). Epistemology is an old assumption that have engaged well-known Greece philosophers like Plato, Socrates, and Aristotle (Ryan et al., 2002, p. 11-12). However, their main viewpoints differ; for instance, Plato and Socrates held a viewpoint that knowledge of a given issue is gained through reason and which were further grown to Plato’s ideal forms (Ryan et al., 2002, p. 11-12). Further, these were perceived by Plato as ideas and concepts are already existed in the world, however, in enriching the two, it had been found that there is need of using one’s mind for reasoning (Ryan et al., 2002, p. 12-13). It was this building blocks that played a significant role in the development of empiricism whose central focus was observation and replication, which later become relevant about idea of positivism (Ryan et al., 2002, p. 12-13).

Burrell and Morgan (1979, p. 5) noted in their article that there are two positions, namely: positivism and anti-positivism. The positivist argues on the point which is drawn from natural science inspiration which says, the aim of the researcher is to perceive society in order to understand it, to see its regularity, and finally to create the existence of interconnection between different aspects of the phenomena (Burrell & Morgan, 1979, p. 5). On the contrary spectrum, anti-positivists, who are against observing viewpoint of positivism, and try to understand the world through the interaction with the phenomena under the study (Burrell & Morgan, 1979, p. 5). Therefore, these two viewpoints clash on their understanding of the world from an internal versus external perspectives (Burrell & Morgan, 1979, p. 5).

The author will use positivist point of view on this thesis because he is aiming to explore and examine empirical data relating to firm value and derivatives use of Nordic financial firms. From this, while trying to make a generalization from it and at the same time investigating the relationship, the author assume externality. As argued on the ontological assumption of this thesis in the previous section, the overall nature of the problem at hand and the research question requires the author to align the standpoint with it even if there are some potential issues with this viewpoint which the author admitted. However, if instead, the author’s intention had been to understand the perception of investors and firm managers on firm’s usage of derivative or risk management tools, then the anti-positivist viewpoint would have been more suitable than that of positivist viewpoint. Because some subjective comments could be given from these actors and also hard to make the author external from the phenomena under the study. Moreover, the natural intention of the author in this thesis is not to have a deeper understanding of whether usage of derivative
has become more legitimate in the eyes of the inventors as well as managers rather it aim to look on its relationship with firm value. With this, it will be possible to the author to answer the intended research question through observation of the existence of a relationship between the two variables.

2.3.3. Research in finance
During the history of research in finance, it is quite common that a trend towards given philosophical positions can be spotted. On most financial researches it has seen that a move toward objectivist viewpoint dominates, this is where the researcher gives a greater importance on the building of theory that describes how things are, and that can be testified with replication and rigorous testing (Ryan et al., 2002, p. 8). Further, finance is a field that mainly focuses on an empirical matter that requires a continuous testing of hypothetical models and thus linking reality with theory (Ryan et al., 2002, p. 27). However, critics on these philosophical viewpoints exist, for instance; Ardalan (2004, p. 685) argued that there are problems applying methods used in natural science to social science. Ardalan also added that under objectivist viewpoint there is a requirement that issue under the study should possess stability as well as not subject to change (2004, p. 685). In strengthening his argument, Ardalan said that the role players under the given study affect the concept under the study due to its dissemination to the world of social science (Ardalan, 2004, p. 685). Consequently, this could create an effect on their behavior as well, and this makes it troublesome for objectivism viewpoint (Ardalan, 2004, p. 685).

In line with this, this study will not be a different one of positivist viewpoint. The author will hold the position of positivism approach of objectivist, whereby hypotheses will be developed from existing theories in this field of study. Regarding the issues that stem from this area, the author will be thoughtfully attentive and will elaborate further with the aim to be transparent and aware of possible limitations.

2.3.4. Research paradigm: Functionalism
Burrell and Morgan (1979, p. 23) found four major paradigms that a researcher can choose from and adopt. These paradigms have two dimensions which are objective-subjective and regulation-radical change, and they in due course connected to the standpoints that could be taken in the perspective view of natural science (Burrell & Morgan, 1979, p. 21). According to Burrell and Morgan (1979, p. 23), the basic assumptions will be nearly the same within in these paradigms, but it is different if we compare it to the competing paradigms. Burrell and Morgan (1979, p. 25.) identified four different views, which help scholars in analyzing society (Burrell & Morgan, 1979, p. 25.)

These four paradigms include radical humanist, radical structuralism, interpretivist and the functionalist (Burrell & Morgan 1979, p. 23). Radical humanist holds the quality of radical change, tied with a subjective, anti-positivist and voluntarist stance (Burrell & Morgan, 1979, p. 32), while radical structuralist goes for the quality of radical change from the objectivist viewpoint that is positivist and determinist attitude (Burrell & Morgan, 1979, p. 32-33). Further, interpretivist push to explore the social world with the subjective, anti-positivist, and voluntarist viewpoint in which the individual as well as his/her experience matter (Burrell & Morgan, 1979, p. 28).
However, in this thesis, the author will adopt functionalist paradigm. This paradigm tailors an objective viewpoint by which the goal is to understand the world and supporting the phenomena within it by finding clarification for it (Burrell & Morgan, 1979, p. 26). Further, it is a positivist and determinist paradigm as well (Burrell & Morgan, 1979, p. 26). For this, the author found functionalist viewpoint suitable and it is in line with this study’s objectives. That means the author’s target is to observe phenomena, more specifically, investigating whether there is a relationship between usage of derivative and firm value. As argued in the prior section the author’s epistemological standpoint is also positivist, which is entirely in line with the choice of functionalist paradigm. In addition to that, the author human nature viewpoint which is chosen for this study is mainly deterministic. Moreover, the author argued on the existence of some sense of free-well with regards to investors and managers, but as a whole, the author considers them as being results of their environment.

2.3.5. Axiology & assumption of values
From Hart’s point of view, the author learned the importance of value in our lives; “The concept of value permeates our life at every step.” (1971, p. 29). The author stands on the philosophical foundation of positivist and objectivist, and as Saunders et al. (2012, p. 134) pointed out that research could also be carried on with an objective and value-free viewpoint. This viewpoint is also possible that as author deals with numerical data with the objective viewpoint and over a period. This is because the sole target of the study is to investigate stated phenomena to gain understanding and answer the research question. Therefore, this study particularly holds a value-free view.

2.4. Research approach: Deduction
In doing research it is mandatory to apply a given kind of reasoning throughout the research process to gain an ability to explain findings and demonstrate connections (Mantere & Ketokivi, 2013, p. 71). Accordingly, there are three major kinds of reasoning approaches, namely, deduction, induction, and abduction (Mantere & Ketokivi, 2013, p. 71).

When a researcher adopts a deductive approach of reasoning, he/she starts with a collection of theories and concepts that help in developing the hypotheses and then testifying the hypotheses to observe the verification or rejections of these hypotheses (Mantere & Ketokivi, 2013, p. 71). For this, this approach utilizes the existing literature and move from general to specific observation (Collis & Hussey, 2014, p.7). On the contrary, an inductive approach of reasoning start with observation and proceed to the development of hypotheses and then theory (Mantere & Ketokivi, 2013, p. 71). So, the inductive approach does not depend on the already existing literature, but rather seeks to develop a new theory. Moreover, an inductive approach of reasoning moves from specific or individual thought to statement of broader forms or laws (Collis & Hussey, 2014, p.7). However, abduction approach of reasoning falls between the two extremes of reasoning, and starts with an observation that attracts the researcher and moves to developing testable hypothesis and theory then test it again (Saunders et al., 2012, p. 147).

Regarding this thesis, as the author is utilizing numerical data as well as grounding on the existing theories, a deductive approach of reasoning is selected. However, the author acknowledges value with the inductive approach under the topic of this thesis, but if this
thesis account for this approach it requires a change of this study’s research question as well as the method. This is an issue that needs future research to elaborate on it and take other reasoning approaches than this thesis. Hence, there are matured theories to build hypotheses under the deductive approach of reasoning, of which some of them highlighted in the introduction section of the thesis and will be elaborated with the rests under the theoretical framework. Moreover, the author believes this approach fits well with the chosen quantitative research design that allows to the author to test the developed hypotheses with the help of statistical tools and draw a conclusion from the results. In general, the author targets to employ deductive approach as it allows to make a generalization in the conclusion that will be drawn as it depends on already existing theory, positivist and objectivism viewpoints are used.

2.5. Research design: Quantitative

Regarding the research design, the author can spot three existing types of designs: the quantitative, qualitative, and mixed. A quantitative design is usually linked to the natural science for the reason that it has similarity with the method applied by the natural science (Bryman, 1984, p. 77). It is a kind of research design that is related to an epistemological viewpoint of positivism which claims the researcher to be objective and distant from the phenomena under the study (Bryman, 1984, p.77). On the other hand, a qualitative design differs as it goes for understanding a specific setting under the views of a certain actor (Bryman, 1984, p.78). Qualitative is also linked to interpretivist viewpoint when we compare it to quantitative design (Saunders et al., 2012, p. 163). Further, Mixed design takes some viewpoints from quantitative and some from qualitative according to what fit for that given research. Usually, a mixed method is advised in longitudinal case studies. Different scholars argue that mixed method has two distinct features, first, it involves in collecting and analyzing of both quantitative and qualitative data in a way that is rigorous and epistemologically sound, second it integrates the two approaches with the aim of illuminating and advancing the readers understanding of the phenomenon of interest (Creswell, 2015; Creswell & Plano Clark, 2011; Hesse-Biber, 2010; Johnson, et al., 2007)

One difference that Saunders et al. (2012, p. 161) identified between qualitative and the quantitative designs is that; while a quantitative deal with numerical data, qualitative focus on the method that collect or use that data which is not numerical. Hyde (2000, p. 84) also stated the difference between the two from the perspective of what they seek to find by saying, quantitate method is used in exploring large sample with the objective of some kind of generalization about the population from which the sample has been taken (Hyde, 2000, p. 84). On the other view, qualitative methods deal with subjective data and this makes hard to generalize for the entire population from the results of drawn sample as subjectivity exist (Hyde, 2000, p. 84). Therefore, the author is well aware of the fundamental difference between these three research designs.

As stated in research question tipoff, this thesis will apply a quantitative design by which the author is able to attain the desired goal through grounding on existing literature and develop hypotheses that are to be thoroughly tested by using statistical analysis. And this is highly associated to the author’s stated philosophical standpoints, which are fully in line with the features that quantitative design has. In a similar way with a usual methodological approach of natural scientists, this thesis will also take an objective and external standpoint with a quantitative method. Meanwhile, the author also does not
forget to acknowledge worthwhileness of qualitative method if it were adopted in this thesis. But in connection with this specific research question, it would be more valuable taking a natural scientists standpoint while taking into account those potential issues. One of the potentials issues pointed out by Lukka and Kasanen (1995, p. 79-80) is that inherent quantitative statistical approaches might not be sufficiently performed or understood by the researchers, or focus of statistical significance might be misplaced by the researcher. Moreover, one should take into account that even if results found from statistical analysis show significance, it does not necessary mean that there is a relationship, nor does it mean the outcome is economically noteworthy (Lukka & Kasanen, 1995, p. 79-80). Further, the author is acquainted with possible issues that could be inherent to the design and will attempt to alleviate them whenever it happens.

2.6. Research strategy: Archival
Saunders et al. (2012, p. 178) said “An archival research strategy makes use of administrative records and documents as the principal source of data.”, and Oler et al., (2010, p. 668) also argued in the same way by saying archival research is a kind of research that use already existing data, like stock price and financial reports. This thesis also utilizes historical data in order to explore whether or not use of derivative has an impact on firm value, and it agrees with Saunders et al. (2012, p. 179) argument which explains archival research strategy as kind of strategy that can be used by the researcher in exploring existence of change in phenomenon has occurred over time. Further, all these scholars’ point of view is related to the stated purpose of this thesis on which the author hold an intention of having an understanding of whether there is a relationship between derivatives and firm value. In answering that, data will be collected on the type of derivative firms’ use, financial reports for performance measure, and stock price to identify firm value. However, as these data are not specifically prepared and publicly available for this thesis, then they are classified as secondary data (Saunders et al., 2012, p. 304). Collis and Hussey also defined secondary data as data collected from some existing sources, like different publications, database, or internal records (2014, p. 59). Data for this study will be collected from Thomson Reuters Datastream and annual reports of each sample firms. And due to a time period of one semester that this study has, the author believes that this is a suitable data that can help to answer stated research question. Secondary data have some positive aspects of taking less researcher resources and allow the researcher to have a longitudinal standpoint (Saunders et al., 2012, p. 317-318). Even though it has positive aspects it is also worthwhile to acknowledge potentials it has, for instance, it might not match the research question as they are not specifically prepared for the given research. For this, it might be hard for the researcher in gaining access to, and this could be a kind of data with poor quality and so on (Saunders et al., 2012, p. 319-320). However, the mentioned limitation does not have an impact on this study and this issue will be further discussed under the practical method part of this thesis.

2.7. Time horizon: Longitudinal
The purpose of this thesis with its research question is to investigate the existence of a relationship between firm value and use of derivatives. This implies that the author is studying something over a period to ascertain that real impact of derivatives on firm value to fill the research gap stated under chapter one. The time horizon is called longitudinal if the study account for a given range of time (Saunders et al., 2012, p. 190-191).
According to Diggle et al. (2013, p. 2), in economics context, this approach is called panel studies. The researcher will study the phenomena over a longer period which means several periods of measurements will be used (Diggle et al., 2013, p. 1). Collis and Hussey (2014, p.64) also joined a view of these scholars on a longitudinal study that it is a methodology that is used in carrying a study over a long period of time in order to investigate variables or a group of subjects.

However, while considering time dimension there are two types of research designs, which are cross-sectional and longitudinal. A longitudinal research design is more suitable for this study as argued in the above paragraph. But cross-sectional design well fit to make a comparison of several cases at a single point in time (Collis & Hussey, 2014, P. 63). This design can help in comparing different variables, like derivative use and firm value on the entire sample companies taken in this study during the chosen study period. However, it lacks to provide certain information about relationship between derivative use and firm value. This is because, a cross-sectional studies only give a snapshot at a time, it does not provide information about after and before that given snapshot (Ghauri & Gronhaug, 2010, P. 67). So this cross-sectional study limitation lead the author to conclude that longitudinal study design is more suitable in the case of this study.

In this study, the author plans to collect data from different databases for a period of 4 years (2012-2015). In addition to what is mentioned earlier this data collection will be done for numerous variables. It will also be further elaborated the reasoning behind this under the theoretical framework and practical method. There are two major variables; use of derivatives (independent variable), and firm value (dependent variable). To be included in the dataset, a firm must have been listed on one of the two stock exchange for the whole period and have publicly available annual reports, if not they will be removed from the set. Moreover, how to achieve this will be further discussed under the practical method section.

2.8. Nature of research design: Explanatory

Collis and Hussey classify research based on purpose, process, logic and outcomes (Collis & Hussey, 2014, p.3). Further, they also sub-classify these broad class. For instance, research classified with their purpose can be further sub-classified as exploratory, descriptive, analytical, and predictive (Collis & Hussey, 2014, p.4). Explanatory research is research that would be conducted when there are very few, or no prior studies exist to which the researcher can refer for supportive information about the issue or problem under the study (Collis & Hussey 2014, p.4). This type of study aims to look for some patterns, thoughts and develop rather than test hypothesis and it is rare to reach on conclusive answer under this study (Collis & Hussey, 2014, p.4). Descriptive mode of research instead, perform a description of a phenomenon as they exist, and it is used in identifying and gaining information on the features of a given problem or issue (Collis & Hussey, 2014, p.4). Moreover, it goes further in examining a problem compared to exploratory study since it assumed to determine and describe the feature of the relevant issue (Collis & Hussey, 2014, p.4).

An analytical or explanatory approach is rather a continuation of descriptive research. For this, the researcher goes further from merely describing a characteristic of existing phenomena to analyzing and explaining it with the aim of reasoning for “why and how”
question of the occurrence of the phenomena under the study is happening (Collis & Hussey, 2014, p.5). Moreover, predictive research further moves beyond explanatory research because it seeks to generalize from the analysis by doing prediction on certain phenomena with the basis of hypothesized general relationships (Collis & Hussey, 2014, p.5). By this type of research, the researcher seeks to answer questions like “why, how, where, and what if” (Collis & Hussey, 2014, p.5).

Therefore, in the case of this thesis, the nature of the study enforces the author to go with an explanatory study. Because the core objective of this study is to investigate whether derivative usage has an effect on firm value and on doing this the author only answer the “why and how” question, not the one added by the predictive method which is “what if”. Further, because this thesis is using a quantitative approach of study and regression analysis will be done in ascertaining if there is a relationship between two variables, this thesis ultimately utilizes explanatory study.

2.9. Ethical & social considerations
Collis and Hussey (2014, p.30) state that when one says the term ethics he/she means that the moral value or principle that create the basis of a code of conduct. So, when conducting a research, we are required to consider its potential social as well as ethical implications. In line with this, the European Code of Conduct for Research Integrity (European Science Foundation, 2011, p. 5), pinpointed; honesty, reliability, objectivity, independence, openness, no plagiarism, and show responsibility, as keywords and practices in conducting ethical research. For this reason, it is quite usual that researchers acknowledge and address these issues when a possible violation of them occur. Therefore, this study data will be handled in a proper manner where manipulation do not exist. On solving this problem, the author will directly take data from Thomson Reuters Datastream database, and the author will only modify the list by removing some firms that do not fulfil the criteria to be included in a sample.

Moreover, the author of this thesis is independent, and have chosen the subject under study on free-will and the study does not have any connection with any organization which protects the author from any conflict that can stem from it. Further, valuable comments on the thesis in relation to the subject under the study come throughout the entire work from the supervisor and fellow students which strengthen the robustness of the outcome. Therefore, the author confirms that this is the author’s own work, but with some guidance received from the supervisor. Besides that, the author has been extremely using the USBE Thesis Manual in order to ensure proper referencing and follow other academicals rules stated under it.

2.10. Choice of literature & criticism
With regards to the inclusion of this thesis, the author has followed the approach adopted by Saunders et al. (2012, p. 107) that claim the assessment of standards in determining what should be included and excluded. In line with this thesis, the author adopted a deductive approach of reasoning and all the resource that it utilizes are secondary by their nature including the numerical data. Therefore, in determining the inclusions it is worthy to look at the argumentation, the methodology, and the theoretical aspects of a given article (Saunders et al., 2012, p. 107). Nowadays, the author is enriched by different research and documents that can be accessed through the help of different databases and
websites. However, this is something that becomes troublesome to individuals who are not capable of criticizing the source (Hjørland, 2012, p. 258). Hjørland (2012, p. 258-268) discussed 12 different methods that can be helpful in criticizing sources, of which checklist approach, peer-review, author credentials, publisher reputation, and impact factor, are the major ones. And the author also has been largely using these ones in assessing literature to the possible extant.

Moreover, the author has also checked on how prominent articles which have been used with regard to citations and applied much effort to include most recent articles when necessary as they improve the robustness of the thesis. In addition to that, the author has also been looking on the journals that the articles are drawn from to ensure the credibility and suitability to this thesis. The literature used in this thesis has been extracted with the help of different databases at Umeå University library, mainly EBSCO and Emerald, Google scholars also been used when necessary. Here the keywords that have been used in searching for literature include firm value, interest rate derivative, commodity derivatives, foreign currency derivatives, and so forth.

2.11. Summation of methodological framework

In the following figure, the author tries to summarize the chapter and show the linkage with the forthcoming chapter pertaining to the practical method. Overall, this thesis will adopt objectivist and positivist standpoint which suit in the attainment of quantitative design goal and descriptive study that the research question could be answered with. Further, the study takes an archival and longitudinal character in fulfilling the requirement of the research question. Generally, this study account for classical methodological standpoints that can be found within the author field of study.

![Figure 1 – Summary of Methodology](image-url)
CHAPTER III. Theoretical framework and prior literature

This section of the thesis shows the theoretical foundations that have been performed by different scholars in relation to the author’s study area. The chapter begins with detail discussion of firm value with different sub-heading of firm value related issues. Then followed by broader perspectives of derivatives with other related subsections like; types of derivatives and their uses. Risk management theories, M&M theory of perfect capital market as well as arbitrage theory will also be discussed in connection to derivatives uses. Then it moves to the core issue of this thesis which is thought of different scholars regarding the relation between derivatives use and firm value. Finally, the chapter end by depicting the conceptual model of the theoretical framework.

3.1 Firm value

3.1.1 General overview

Investors usually, evaluate the performance of the stock at the time they purchase it from the financial market. This is done through assessing expected return or current one that they earn from their investment decision. This return earned by an investor from an increase in price is dependent on several factors, such as innovation and profit realized from the productivity of investee firm (Deng et al., 1999, p. 20). The other factor that is used in assessing the stock return is risk bearings in investment. Because investment by itself is risk taking and in return, it award investor an economic return. Alexander & Buchholz (1978, p. 480), also argued that as firm take a higher inherent risk of a given financial instrument including stocks, it is probable that it provides a higher return to the investor.

Cochran & Wood (1984, p. 45) identified two ways of firm’s financial performance measurements. The first one is that investor’s return, which is alternatively used in measuring stock performance of the firm. While measuring the stock performance of the firm by its return there is need of taking into account the major assumption, which is stockholder’s perspectives, should be favoured in the measurement of performance (Cochran & Wood, 1984, p. 45). Vance (1975), considered single variable namely change in price per share, in measuring stock performance; Abbott & Monsen (1979, p. 512) also used dividend as a variable to measure the stock performance. But this model of stock performance measurement criticized by another scholar for the reason that it is simple and do not capture essential risk factors that an investor inherits in his/her investment (Cochran & Wood, 1984, p. 45).

Further, in having a better understanding of the stock performance of a firm, many investigations have been done by scholars in predicting future firm’s stock price, which will reflect its performance, depending on the historical prices of the stock (Fama, 1965, p. 34). Regarding this point, there are two conflicting theories exist, namely, random walk theory and charity theory (Fama, 1965, p. 34). Advocates of the later were motivated by Dow Theory, which concerns with stock price movement that was initially introduced by Charles Henry Dow, the founder of the Wall Street Journal (Brown et al., 1998, p. 1312). The theory promotes investors to rely on the historical price of the stock in predicting future price (Fama, 1965, p. 34). However, this theory was criticized by Cowles (1933, p. 309) who were supported his argument with statistical tools and his empirical analysis, forecast efforts of 45 professional agencies in order to predict future
performance of the stock market. The study was classified into two main sections, and the first one was dealing with 20 fire insurance companies and 16 financial services firms, while the second investigate the effort of 25 financial publication firms’ prediction of future stock price (Cowles, 1933, p. 309). The result shows that the predication was inefficient and little were found more efficient, which were better than the predicted result from pure chance (Cowles,1933, p. 324).

The other theory, which is a random walk, advocate that movement of stock price is random and does not have memory, and for this, it cannot be used in predicting stock future price (Fama, 1965, p. 34). However, this theory is one of the pillars of the efficient market hypothesis, which was initially theorized by Paul Samuelson (1965) supplement to many other thoughts of modern economics (Lo, 2004, p. 2). This theory argues that, as a given stock integrate all relevant information useful for any investment decisions, it would create challenges to the investor to bet the market and gain abnormal return due to the random walk behavior of the stock price trend (Yen & Lee, 2008, p. 308).

Though, it has been only a few types of research done to challenge the random walk hypothesis by applying a series of statistical tests. Semenov (2008, p. 2504) is the one who used a Monte Carlo simulation in testing random walk hypothesis by supporting it with Pearson autocorrelation coefficient. The conclusion arrived at from this study test result is that the stock price does not follow a random walk, on the other hand, disproved the random walk theory (Semenov, 2008, p. 2504). He further strengthens it by applying multiple variance ratio tests that include Whang-Kim subsampling and Kim’s wild bootstrap tests and chow-denning test. Charles and Darne (2009, p. 117) also examined the validity of the random walk hypothesis with two classes of stocks, A and B, in Shanghai and Shenzhen stock exchanges. They also used daily stock prices with a study time frame of 6 years (1992-1997), and their result confirms that class A stocks follow a random walk feature while class B stock does not follow the random walk path and was found significantly incompetent (Charles & Darne, 2009, p. 117). Besides, from the deterministic dynamical system perspectives, Nakamura and Small (2007, p. 599) support the random walk hypothesis. These scholars were applied small-shuffle surrogate method and arrived at the conclusion that the stock price from the index, like S&P 500 and Nikkei 225, and price of commodities like gold and oil, follow a random walk path. The other standard economic theory which is known as arbitrage theory support the argument that state financial market is efficient (Shleifer, 2000, p. 2). As arbitrage has a substantial effect on the examination of the stock market, it will return the price of stocks to their ultimate value and thus preserve the market efficiency at its efficient position (Shleifer & Vishny, 1997, p. 35).

From the theoretical viewpoint, the efficient market hypothesis is constructed on three major interrelated arguments (Shleifer, 2000, p. 2). The first argument stands on the assumption that an investor has to be rational while investing and valuing a given security. In building this assumption, Bernstein (1999, p. 129) claimed that more efficient market could be attending only when many well-trained investors reflect a greater degree of rationality. The second assumption views the fact that a price of a stock does not affected by the existence of irrational investors since they will offset each other (Shleifer, 2000, p. 2). The equality of the irrational investors reflected in the third assumption (Shleifer, 2000, P. 2). From the three assumptions, we can understand the significance of
information availability to the efficient market hypothesis. Moreover, Zietz (1995, p. 311) revealed two relevant assumptions of efficient market hypothesis, which are; the existence of equilibrium relationship between different variables, and rational expectation of market participants about the price of stocks. This hypothesis was first brought to existence by French economist Leon Walras, and he argued as the determinant of most variables in the market are free market forces (Cited by Bernstein, 1999, p. 131). However, there is situation that the stock price does not promptly show an equilibrium state (Bernstein, 1999, p. 131).

Stoll and Whaley (2010) argued that uses of derivative offer the firm with financial benefits, and the main contribution of these derivatives is their leverage. Which means for a given purchasing cost of the underlying asset they produce similar price exposure with that of the owners. Consequently, they deliver a competent means of counterbalancing between hedgers (those risk transferors) and speculators. Further, derivatives motivate the diffusion of information and price discovery. For this reason, speculators will be attracted by the leverage and smaller transaction costs, and it is their presence in that market, which affects the price in the same manner.

Therefore, firm value in an efficient market determines by investors rationality and a view of the two theories, which are random walk and charity theory. However, in this thesis charity theory fit the object that the author's attempt to achieve. Because historical costs are more reliable in predicting the price of stock in the future. Moreover, when one predicts firm value on the basis of historical costs, he/she is also considering the trend of the stock movement in the prior periods, so the prediction is grounded on actual data. Besides, a random walk situation could work when an expected event like, theorist attacks, political citations (e.g. Donald Trump victory) affect stock price movement. But real firm value can be identified only in a regular and stable market.

Besides that, Tobin’s Q a proxy for firm value initially introduced by Nobel laureate in economics of James Tobin (1969) which represent the ratio of firm market value to the replacement cost of its common stock (Tobin, 1969, p.21). After that Tobin’s Q has been used in measuring different kinds of phenomenon like; firm performance (Chen and Lee 1995), feasible project opportunities (Lang and Litzenberger 1989), diversification returns (Stulz 1994), and other financial market measures. It also has several attracting aspects like addressing accounting measures limitation in addition to its base on efficient market hypotheses’ strong empirical and theoretical foundation (Fama 1970). Further, this robust approximation ratio is initially introduced in finance and accounting by Chung and Pruitt (1994) and then after used by many scholars like Allayannis and Weston (2001), Jin and Jorion (2006), Ahmed et al (2014), and Panaretou (2013). Ahmed et al. (2014, p.9) used Tobin’s Q as a proxy variable to measure firm value and defined it as:

\[
Tobin's Q = \frac{\text{Book value of assets} + \text{market value of equity} - \text{book value of equity}}{\text{Book value of assets}}
\]

3.1.2 Nordic stock market
The majority of Nordic stock exchange market have been established between 1808 and 1912, since then the market continuously shows a rapid growth (Credit Suisse Yearbook 2016). Each country’s equity market covers nearly higher percentage compared to other indexes. For instance, the Danish equity market represents 45%, Finish equity market
55%, in Oslo the three larger companies take 52% of the index, and 35% of the index in the Swedish stock market taken by financial firms (Credit Suisse Yearbook 2016). However, the Iceland stock market is too small compared to all other Nordic stock markets. Moreover, the country’s credit rating issued by the major international rating companies, (S&P500, Moody's, and Fitch), shows that their stock market has been holding their rating position stable. The report shows that most of the Nordic countries have triple A rating and Finland moved down to AA+ since 2015, according to a Credit Suisse analysis, this decline in rating might be due to Nokia’s market loss.

Countries credit rating shows that the stock market is performing well and contribute toward assuring sustainability by both financial as well as non-financial firms.

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<th>Nordic countries Rating 22-03-2017</th>
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Source: Trading Economics

Figure 2, Nordic countries S&P500 rating on 20-03-2017

3.1.3 Nordic stock performance
As discussed about the Nordic stock market is performing well and the credit rate of the countries fall in the top list of the rating companies. The report issued by the Credit Suisse Global Investment Yearbook 0f 2016 shows that four of the Nordic countries stock and bond markets ranked within the top 5 high return markets. This result implies that Nordic firms are in a stable competitive market. Additionally, this Credit Suisse Global investment report shows that these Nordic countries’ real value of equities and income reinvested, growing by higher factors (2016, p.43, 44, 52, 57).

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<td>Credit Suisse World Index</td>
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Source: Credit Suisse Global Investment Returns Yearbook

Figure 3, Nordic countries average annual investment return.
3.2 Derivatives: Overview
In a simple term, derivatives can be defined as something that is derived or obtained from some other, imminent from a source; not original by itself. But in the field of financial economics, financial derivatives referred as a financial contract for which its value is derived from the underlying asset’s value (Chui, 2012, p.3). There are so many financial assets used by firms which are called underlying. These underlying includes; equities or equity index, fixed-income instruments, foreign currencies, commodities, credit events and it could also be other derivative securities (Chui, 2012, p.3). Therefore, the value of derivatives can be derived depending on the types of underlying assets which might correspond to equity price, interest rates, exchange rates, commodity prices and the prospects of certain credit events (Chui, 2012, p.3). Moreover, over the life of the contract, the value of derivatives fluctuates in line with the underlying asset price movements (Mai, 2008, p.6).

History of derivatives shows that it was first instruments developed for insurance of supply of commodities, facilitate trade and protecting farmers against crop failures (Mai, 2008, p.6). Over time, it starts serving for other purposes as well, which includes; help as a source of funding and method for quick profits (Kummer & Paulett, 2012, p.1). Derivatives are totally different when we compare it to securities because it is a financial instrument that mainly used by firms in protecting themselves from and against risk, and often also helps in arbitrage and investment reason (Mai, 2008, p.6). It also differs from those derivative-like securities such as certificates, warrants, or structured credit-linked securities because these are not derivatives even if they have got some characteristics of derivatives (Mai, 2008, p.6).

Initially, derivatives were first traded in over-the-counter market (OTC) and later derivative exchange also becomes another market for derivative trade (Kummer and Paulett, 2012, p.1). Now a day both markets are huge. However, statistics collected from the two market shows that they are extremely not comparable (Hull, 2015, p.97). So, over-the-counter (OTC) is much larger than that of exchange-traded derivatives market (Hull, 2015, p.97). The statistical data collected in December 2013 shows that the size of the OTC market was $710.1 trillion and that of the exchange-trade market was $64.6 trillion, which means 91.7% derivative trade takes place in OTC market (Hull, 2015, p. 97).

As it has been discussed in the previous paragraph derivatives can be traded on OTC or exchanges. Those OTC derivatives are generated from an agreement made between buyer and seller. OTC derivatives agreement range from highly standardized (which is usually called “exchange look-alike” to tailor-made contracts with an individualized feature about underlying, contract size, maturity and other. (Mai 2008, p.10). Depending on the contract between the two parties, derivatives are mostly held until maturity by the original buyer, but some of them changed during their life or cleared before termination.

3.2.1 Types of derivatives
Currently, there are many types of derivative contracts traded in OTC market as well as exchange markets. Some of these derivative contracts include:

1. **Forward contracts, or simply forwards**, are contractual agreement between two parties, basically called “counterparties” and it is a bilateral contract exchanged in OTC market (Sundaram, 2012, p.3).
2. **Futures Contracts, simply Futures**, are a standardized and exchange guarantee performance contracts that counterparties agreed upon to buy or to sell a certain commodity or financial instruments at a pre-determined future price and a claims settlement of position daily (Sundaram, 2012, p. 3).

3. **Option** is a kind of derivative that gives the holder a right to buy or to sell underlying assets. This financial security does not obligate the holder to buy or to sell, rather the holder has a right to exercise the option or leave it depend on the underlying asset’s future price, but the issuer is obliged to buy or to sell if the holder wants to exercise his/her right (Sundaram, 2012, p. 3-4).

4. **Swaps** are like a forward contract which is non-standard and exchanged in the OTC market, and it is a derivative contract that shows an agreement between two parties to exchange financial instruments (Sundaram, 2012, p. 32). These financial instruments can be anything but it usually deals with cash flows.

5. **Exotics Exotic** is a kind of derivative which is different from the above derivative types and it usually refers those derivatives which are complex, unusual and specific contracts (Satchell, 2013, p.243).

### 3.2.2 Benefits, drawback, and costs of derivatives use

Many scholars argue that derivative use has drawback as well as costs besides its benefits. For instance, Enron Corporation, which reported the biggest bankruptcy in American history, was dealing with energy derivative trading (Brunet & Shafe, 2007, p.665). This is due to high speculation and manipulation of price on energy derivative trading which led the company for a loss of 66 billion US dollar (Brunet & Shafe, 2007, p.686). It implies that improper use of derivative leads firms to significant amount of losses. Further, Berkshire Hathaway also incurred a loss of $1.1 billion in the second quarter of 2012 (Berkshire Hathaway Inc., Form 10-Q, 2012) and this loss was related to failure of proper uses derivatives. Besides these two big firms, others like Queen’s banker (Barings) and the Thai baht losses were also related to derivative uses (Stulz, 2004, p 173). Therefore, firms expected to give due attention on how and to what extent they have to use derivative in their operation because there are potentials that derivative use lead firms to bankruptcy and higher transaction costs.

However, derivatives make potential risks tradable and contribute to the rise of two main useful applications. First, it eliminates future uncertainty by switching market risks, commonly called hedging. Corporates and financial firms for instance use derivatives in protecting themselves from a change in raw materials price, interest rates, exchange rates, and other. That means derivatives serve as insurance to protect from unwanted price movement and reduce the volatility of firm’s cash-flow (Mai, 2008, p.8). The reduction in cash-flow volatility enables the firm to make more reliable forecasting, lower capital requirements, and higher capital productivity (Mai, 2008, p.8).

Mai (2008, p.8) pointed out the second use of derivatives by stating that they are an investment alternative tools to invest in a given assets rather than buying and owning it directly. Additionally, derivatives allow the firm to invest in the underlying asset and risks that a firm cannot purchase the asset directly. A credit derivative that gives
compensation could be a good example of this kind of investment as derivative holder receive compensation payment when a creditor default.

Similarly, according to Fleming and Ostdiek, (1999, p.136), derivatives allow parties to trade a given financial risks like interest risk, currency, equity, commodity price, and credit risk to other party or firm who has a willing to take or manage that risk. Moreover, the uses of derivatives not limited by its widening of the investment universe, but also has a significance in lowering the cost of investment. For example, the transaction cost of buying derivatives contract that has been incurred on a major European stock index is 60 percent lower than that of the underlying portfolio shares (Mai 2008, p.8). Besides that, if we compare the cost of obtaining exposure to an asset which is a less liquid-like real estate, we can clearly find significantly higher cost differential between the derivative and the direct investment in the asset itself. Additionally, Mai (2008, p.10) pointed out the rapid growth of the derivative market as the benefit from the use of its help in risk mitigation and risk transfer have become gradually vital. In line with this, Europe is a key region for derivatives that have recently become the main part of European financial services sector and have got direct as well as an indirect contribution toward the economic growth of the region (Mai, 2008, p.10).

Generally, use of derivatives classified into two broad classes which are; risk management or hedging and speculation purposes. In line with this, Chui (2012, p. 4) classified participants in derivatives markets as “hedgers” and “speculators”. Hedgers join a derivative market to protect themselves from adverse changes in the values of assets or liabilities they hold. Meaning, they enter the market with the expectation that a fall in the value of their asset will be compensated by an increase in the value of the derivative contract. On the contrary, speculators enter the derivative market transaction with the anticipation of gaining from changes in market price or rates or credit events (Chui, 2012, p. 4). However, these speculators activities naturally riskier and require close monitoring by financial regulators since the effect might be a saviour for the speculators as well as to the market too. But the monitoring might be harder as Jarrow and Turnbull argued on the difficultness of differentiating the participants in practices by saying “Hedging – risk reduction – speculation – risk augmentation are flip sides of the same coin.” (2000, p.3). Moreover, both hedging, as well as speculation, have a direct impact on firm’s cash flow which consequently affects firm value.

3.2.2.1 Risk management
Hull (2015, p.1) explained that companies are required to take risks if they want to survive and prosper. So, the primary responsibility of risk management function is to understand currently undertaken risk and the risks that the firm plan to take in the future. Hull also added that many of risk management ideas applied to financial firms equally applicable to non-financial firms as well, hence risk management is becoming more important for all firms in the last decades (Hull, 2015, p.1). Beside that financial firms are mainly dealing with most liquid assets and are at higher risk compared to non-financial firms, so they are required to implement an efficient risk management system. For this reason, Purnanandam (2007, p.1804) identified a fact that shows financial firms that are users of derivatives are larger than those of non-users. This implies that financial firms’ uses derivatives in order to hedge potential risks that they face in their operations. Further, B.E. Baaquie et al. explain hedging as a universal thought in the process of minimizing
risks, if not eliminating it, that an investor’s exposed to due to his/her construction of portfolio related investments (2007, p.730).

Applying effective risk management system beneficent financial firms in protecting themselves from different kinds of risks, which includes, credit risk, interest rate risk, foreign currency, stock index and commodities. In alleviating these risk factors, derivative contracts like options, forward or future contracts, swaps, and exotics are used by financial firms. These contracts allow the holder company to transfer risk that it bears to the counterparty. For example, if a firm has an outstanding interest-bearing debt and predicts that interest rate moves up, then the firm go for hedging to protect itself from the future unfavourable move in an interest rate.

Usually, hedging is used in minimizing risks of given cash market position, for this Pennings and Meulenberg, (1997, p.612) argued that importance of future trading laid on effective hedging, and the fluctuation in return explain the risk that the firm berried. A part of deviation of return of the hedged position that a firm can alleviate by hedging is called ‘hedge effectiveness’ which mean a decrease in hedged and unhedged return discrepancies (Ederington, 1979, p.163-164). Moreover, in hedging the most important point is that identification of this hedging effectiveness with the help of optimal hedging ratio (Malhotra, 2015, p. 186). Basically, as discussed in the above paragraph firms prompt to protect themselves from those three major risks through foreign currency hedging, interest rate hedging and commodity or product hedging.

### 3.2.2.1 Foreign exchange hedging

A turmoil seen in the global, the volatility of individual countries’ currencies against other global currencies and the intensive global computation in the financial market has created complication on foreign exchange hedge decision making process and have contributed much toward an increase in uncertainty of the outcome of business performance in the global market (Maniar, 2016, p.42). Undeniably, some countries economy has proven to be robust to substantial exchange rate fluctuations (Maniar, 2016, p.42). Further, this robustness has been strengthened over time, and currently, companies are expert-oriented and have learned to become accustomed to exchange rate fluctuations, which includes the improvement of hedging practices.

Additionally, Maniar (2016, p.42) argued that the main reason for the rise of foreign exchange risk is the currency difference in a company’s assets and liabilities, and a difference in cash flow. So, this risk lasts until the foreign exchange position is settled and the cause for such risk is a foreign currency cash transaction. Those transactions include; foreign exchange trade, foreign currency denominated investments, and investment made in foreign companies (Maniar, 2016, p.42).

While Jesswein et al. (1995, p.71) study the uses of derivatives by US corporations, they classified foreign exchange risk management instruments into three generations; first generation includes forward contracts; futures, options, futures-options, warranties. And swaps take the second-generation section; while range, compound options, synthetic products and foreign exchange agreements have taken the third-generation class. Then the authors arrived at the conclusion that the uses of the third-generation risk management tools were less than that of the second generation, and uses of first generation outperform from all the three. On this study the uses of these risk management instruments was not
related to firm size in general term rather was considerably related to the company’s
degree of international transactions.

Further, the study performed by Sathya (2008, p.89) covered 18 industries with a response
from 501 Indian companies, of which 53% of respondents said they are using derivatives
in foreign exchange hedging, and the study revealed a wide usage of derivatives in risk
management with the intention of reducing volatility of cash flow. On doing this, the
study identified that many of the respondents use forward contracts in managing foreign
exchange risk. Beside this, Anurag and Nitika (2012, p.36) in their study investigate
whether various alternatives exist for Indian corporations to hedge financial risks and the
perceptions, fears, and expectations of common investors who invest in currency
derivative markets. Their result shows that only 100 respondents who were operating in
Punjab state were held for analysis and results. The outcome shows that many of those
individual respondents perceived uses of currency derivative trading for hedging.

From the overall points laid out under this section, one can gain an understanding of the
way that firms use foreign exchange derivatives in hedging risks that they exposed to
while performing international businesses. Beside that these risks have got an impact on
both trading countries economy as well as individual firm level performance returns.

3.2.2.1.2 Interest rate hedging
Uncertainty and deregulation the financial market led firms to become a prominent user
of financial future contracts and as a consequence optimal use of derivative gained
attention from many scholars and practitioners (Arak and McCurdy, 1979, 1980;
Ederington, 1979; Franckle, 1980; Dew and Martell, 1981; Morgan and Smith, 1986;
Morgan et al., 1988; Picou, 1981). These scholars have performed an investigation on
ways of reducing or eliminating different types of risks through the use of derivatives.

Carcano and Foresi (1997, p.127-128) suggested two ways of a protective strategy of a
portfolio from interest rate change risks, which are deduction and immunization.
Deduction strategy ground on exact cash-flow and immunization ground on the
concerning of firm assets and liabilities with the fluctuation of the interest rate, for this
the overall impact of the changes in portfolio value would be minimized. More
specifically, to make immunization effective two elements must be assessed, which are
unpredicted shifts of yield curve assumption and its impact on firm asset value. Therefore,
immunization strategy depends on the degree of these two elements anticipations. The
reason for dependency as per the study result shows is that a correlation adjusted
immunization perform well compared to the factor models and simple-immunization
(Carcano & Foresi, 1997, p.139-140). They also found the correlation of interest rate
change controlling variation and rebalancing horizon. On the contrary, when the
rebalancing horizon is larger, simple volatility adjustment perform well due to the
correlation of interest rate fluctuation over the maturity incline with the period of
sampling. Beside this correlation adjusted immunization has an advantage over simple-
immunization since it increases the number of assets involved in the problem of hedging.
The authors also arrived on the test result that shows the significant role play of convexity
is due to infrequent rebalancing. Therefore, this point implies that immunization of
portfolios based on a growing number of securities look to achieve higher, merely for the
reason that consistent and expectable returns can be generated from immunization (Carcano & Foresi, 1997, p.139-140).

Angbazo (1997, p.82) also performed hypothetical tests on banks with riskier loan and exposed to higher interest rate risk. Those banks choice of a risky loan and deposit rates is related to the aim of achieving higher interest margins. And the study result shows consistency with the hypothesis that interest rate margin of the banks shows default and interest rate premium. Further, the study identified a positive relationship between interest rate margin and principal capital, non-interest bearing reserves, and quality management, but the inverse relation with liquidity (Angbazo, 1997, p.82). The authors of this article concluded that the difference in interest rate risk impact on super-regional and regional banks could be explained by the reasoning that big banks focus on short-term assets with much ease in hedging of interest rate risk through the use of future and another off-balance sheet tools (Angbazo, 1997, p.82).

### 3.2.2.1.3 Commodity or product hedging

Uncertainty in commodity market led commodity producer to face various risks like production yield, spot market prices, and the financial distress cost. Due to this fact, the significant commodity price fluctuation also has promoted the relevance of derivatives in hedging both products and consumers. Moreover, in relation to derivatives usage in the commodity market, many scholars identified a tremendous increase in commodity futures markets both in size of the market and price since the mid of 2000 (e.g., Stoll & Whaley 2010, p.7; Buyukshahin & Harris 2011, p.168; Irwin & Sanders 2012b, p.371). Further, Lehecka (2015, p. 600) in his study of hedging and speculation on commodity price concluded that the explanatory power of hedging and speculations is little with regard to the price of commodity future market; further he identified the revers on hedging and speculation position behaviour, and said hedging could be well explained by price in commodity future market.

Johnson et al. (2003, p.32) in their study pinpointed that substantial source of risk for manufacturers is the dependency on the key components supply and the demands for their outputs. Brown and Toft (2002, p.1319) also contributed their study in line with this manufacturers’ risk by suggesting an exotic hedging structure that does not have market flexibility. On this, the only thing that the value maximizer can do is that applying financial hedging to avoid financial distress costs riskier states. And they also indicated that exotic hedging is better than the vanilla derivatives during the time quantity risk is greater than that of price risk and at the time correlation between price and quantity is high enough. In a similar study, Civelek (2014, p.126) suggested a commodity producer to buy a forward option and transportation capacity from the production location at the same time to minimize problems related to meeting his obligations to firm’s creditors at the time of the demand, and spot-market prices are lower in the different market.

Therefore, commodity or product hedging helps in securing farmers and manufacturers from a different product (commodity) related risks. The use of hedging in risk management by these firms directly linked to the financial firms as they are major sources of financing for those manufacturing companies as well as farmers. Risks that potentially exist around products of the farmers and manufacturers also affect the performance of
financial firms for the reason that those parties might default to settle their loan due to the injury they received from the risk that they have been involved in.

3.2.2.2 Speculative or profit making
Quetsch (2014, p.896) explained speculation as a way of betting on market price movement. And Boze (1990, p.628) also explained it in a similar way by saying, the term speculation means being exposed to price movements. This can exist whenever a given firm or individual has a position in a spot, future, forward, option, or other asset or liability which bring change in firm’s revenue or expenses, or change in loss position due to change in market value (Boze, 1990, p.628). For instance, a speculator who thought the price of coal would go up, want to purchase an option from the coal owning firm to sell it at a higher price. Unlike hedgers seeking to smooth things out, speculators usually show less interest on hedging (Quetsch 2014, p.896). Even if speculative transactions are riskier by themselves due to market uncertainty, it provides profit by chance to the speculator. Further, Conlon et al. (2016, p.1536) found that speculative hedging strategies enable the hedgers to lower risk aversion, with a longer lasting horizon and positive expected returns.

Beside the benefits discussed above, derivative use has also drawback and costs. As pointed out earlier unless derivative are properly managed they may lead firms to bankruptcy and other unfavourable outcomes. Moreover, Aogoncea and Paun (2013, p.97) argued that derivatives are redundant assets for the reason that use of derivative is a building of cloned portfolio. Therefore, firms or individuals who are non-derivative users are in active in this redundancy for the following three reasons; not have a will to face higher transaction costs, due to a binding contract portfolio replacement take place when the underlying price changes, and strategy for replication is problematic (Aogoncea & Paun, 2013, p.97). For this firms are forced to incur additional cost on hiring specialists to handle those cases.

3.3 Derivatives and relevant theories
3.3.1 Modigliani and Miller theory
Modigliani and Miller (1958), studied capital structure theory deeply. From the analysis of their study, they established the capital-structure irrelevance proposition. This is mainly hypothesized perfect capital markets. In the perfect capital market, it is not a matter that what capital structure a company uses to finance its operations. They theorized that the determinant of the market value of a firm is its earning power and the risk that its underlying asset possesses. As a result, the value of a firm is independent of the choice of financing its investment and dividend distribution. In other terms, the market value of the firm is not dependent on how the firm distributes its cash flow between its shareholders and long-term debt capital holders, rather it is dependent on its expected cash flow and required rate of return (The Treasurer – May 1998, p. 29).

Basically, their proposition built on the assumptions like; no taxes, no transaction costs, no bankruptcy costs, uniformity in borrowing costs for both companies as well as individual investors, both companies and investors have the same market information, and debt does not have an impact on a company's earnings before interest and taxes. However, when we come to the real world, there are taxes, transactions costs, bankruptcy costs, of course difference in borrowing costs, information asymmetries with agency costs and existence of debt effect on earnings. Further, uncertainty in capital market prevailed
relevance of risk management, as a result, it direct companies to use different hedging tools like derivatives. Similarly, Chui (2012, p.11) argued that the reason for derivatives invention is to tackle some fundamental change in the global financial market system. He further identified that proper handling of derivatives not only help in improving the resilience of the system, but also it awards the holder with economic benefits. Due to this use of derivatives grow with financial globalization.

However, the best description of the importance of M&M’s capital structure irrelevance proposition in their study of “The Cost of Capital, Corporation Finance and the Theory of Investment (1958)” used as starting point for the theory of modern business finance (Eckbo, 2008, p. 140).

Moreover, Modigliani and Miller's theory has been criticized by many scholars due to assumptions under this theory could not work in a current practical world. In line with this Sanchez and Machuca (2011, p. 5) argued that firm and its management teams are required to focus and clearly involve in the infrastructure of firm's capital structure for the reason that the result of the action will help the firm to succeed in its industry. Weston and Brigham (1992, p.173), also arrived at the conclusion that the ideal capital structure is the one that boosts the market estimation of the firm's outstanding stocks.

Further, author of this thesis argues that M&M proposition of capital structure irrelevance does not fit the current financial market trend. Because, as mentioned about the assumption that M&M proposition laid out are; no taxes, no transaction costs, no bankruptcy costs, uniformity in borrowing costs for both companies as well as individual investors, both companies and investors have the same market information, and long-term loans do not have an impact on a company's earnings before interest and taxes, are not working as both financial as well as non-financial firms facing these factors impacting their performance results (Modigliani and Miller, 1958). Therefore, the author standpoint on this regard is that markets are inefficient and competitive. Due to this companies bear risks and apply efforts through risk management system to protect themselves from those risks. The inefficiency of the market also pushes firms to use different risk management tools like derivatives. Hence, the author’s standpoint helps in answering the research question because as per M&M proposition of perfect capital market uses of derivatives seems to be irrelevant but practically this does not exist rather we are facing a competitive market which always operates with different kinds of risks.

3.3.2 Arbitrage theory
Generally, arbitrage price theory is a model that deals with asset pricing. It assumes asset return prediction from the relationship that an asset has with common risk factors (Ross, S, 1976a, p.341; 1976b, p.189). Moreover, under this theory, it is assumed that the market neutralizes arbitrage events happen by itself.

In a practical world, arbitrage is a trade (Figlewski, 2017, p.317). For instance, market transaction costs, different kinds of risks, an infinite flow of capital, and other limits to arbitrage, implies that trade is riskier and costly than that of the theoretical framework and might be impossible at all in some cases. No-arbitrage pricing should be held precise under mathematical possessions of a theoretical model, and here the underlying assumption is that when mispricing to rise, then unlimited arbitrage trading would automatically drive the market price back to its fair value. And at the time actual arbitrage
is not unattainable in the market (e.g., if there is difficulty to find a buyer of the underlying asset), that derivative model converted to “The Law of One Price,” which advocate a principle of two identical substances cannot have different prices (Figlewski, 2017, p.317). This is because the preference of the buyer will be directed to the cheaper price market while the arbitrageurs hold a willing of selling for a higher price and look for higher price market (Figlewski, 2017, p.317). The equilibrium will only be reached when both markets prevail the same price (Figlewski, 2017, p.317).

Therefore, as stated in the previous paragraph, arbitrageurs always willing to make a risk-free profit from arbitrage opportunities, but everybody wants to make such profit if they know the existence of price difference in two markets. However, this price difference cannot last for long because as everybody wants to buy in a cheaper market and sell in the high price market demand and supply theory of economics enforce the price to move to its equilibrium position. So, this is a riskier activity that arbitrageurs involved in. But in practices, these arbitrage events happen quite often. Hence, firms which are using derivative to protect themselves from price fluctuation also safe from arbitrage events.

3.4 Prior studies on derivatives and firm value

3.4.1 Relation between derivatives and firm value overview

Generally, derivative use related literature focus on two points. The first point of literature, which investigate the determinants to use and hypothetical motivation after the uses of derivatives in the regular operation of a firm. From those scholars who involved in this kind of investigation, some say, derivatives are used to manage different risks in an effective and efficient manners, while others say derivatives are used for speculative purposes or solving firm agency problem. On the other view, the second part deal with the investigation of the relationship between uses of derivatives and firm value. However, numerous studies result in this matter shows a mixed result. Some of the studies identified the result that confirms the use of derivatives positively affects firm value, while others, on the contrary, found a negative correlation between firm value and derivative uses. Even other identified no influence that derivative have on firm value. The next sections discuss each finding in detail to give a clear view.

3.4.2 Studies which found positive impact

Since 1990’s accounting rule that enforce firms to disclose the value of derivatives used and their purpose in footnotes of their financial statements, many scholars conducted empirical studies on derivative use and firm value relationships. For instance; Smith et al. (1993) performed a study on derivative usage with a sample of 169 large US non-financial companies by distributing questionnaires. From their study result, they concluded that firms which use derivative in risk management show more growth opportunities and more convex tax function compared to that of non-users (Smith et al., 1993, p.280). Similarly, Geczy et al. (1997, p.1350) in their study took 372 sample companies out of 500 Fortune companies in the USA. Then they arrived at a conclusion that firms in higher growth options, wide exposure of foreign exchange rate, tough financial restrains, and economies of scale in hedging activities, were found more likely to use foreign currency derivatives.

A study done by Bartram et al. (2009) covered large scale of a sample, 7319 non-financial firms, in 50 countries which are in total 80% of the global market capitalization, and concluded from their result that hedging is a value enhancing activities of a firm.
Basically, this study revealed proof that support the theoretical hypothesis of interest rate risk management is positively correlated with firm value for both US and international firms (Bartram et al., 2009, p.204).

Allayannis and Weston (2001) studied foreign currency derivatives impact on firm value with a sample of 720 large non-financial firms with a time frame of 6 years (1990-1995) in the US and applied Tobin’s Q in determining firm value. The scholars arrived on the conclusion that foreign currency derivative is positively correlated with firm value (Allayannis & Weston, 2001, p.243). Particularly, they contributed a strong evidence in supporting the hypothesis that states firms exposed to foreign currency risk use foreign currency derivative in hedging. Moreover, on average, they found a higher value of 4.87% for derivative user than that of non-users, which is statistically and economically significant. This study also identified that those firms, which begin to introduce hedging policy in their operation experience a rise in their value more than that of unhedged firms. And firms, which quit after a while shows a decline in their value relative to that of remain hedged. The uniqueness of this direct approach compared to the old one is that here derivative usage is independent variable and firm value is the dependent variable of the model, after controlling other variables that have also effect firm value. Similarly, Graham and Roger (2002, p.816) who took a broader sample also share the same idea, and they revealed derivative use enable the firm to improve its debt capacity by 3.03% and this debt capacity improve firm’s value premium and market value of firm’s assets by 1.1% on average.

In expanding the above studies on the positive impact of derivatives on firm value, many empirical studies have been done on an international basis. For example, Berrospide et al. (2008) investigate foreign currency derivatives usage impact on the value of firms in Brazil, and they found that the derivative user firms have a 6.7% to 7.8% greater value than firms which do not use. They also added in their conclusion that foreign currency derivatives hedging allow the firm to sustain its capital investment and decrease investment sensitivity to locally generated funds, which in return has a favorable impact on mitigation of underinvestment problem.

On commodity hedging study, Tufano (1996, p.1097) argued that the use of commodity derivatives positively correlated with values of stock which are in the hands of managers and directors. This argument reflects that managers’ who have a claim on the firm’s asset believe that use of derivatives affects firm value positively. In a similar talk, Smith and Stulz (1985, p.391) argued that due to cost that a firm incurs on hedging is less than the reduction in compensation paid to managers plus an increment in revenue gained from hedging, then firm value should be increased from hedging.

Similarly, Junior and Laham (2008) took non-financial Brazilian firms in their study to investigate the relationship between foreign exchange hedging and firm value during a period of 1996-2005. These scholars started their study with a different view and took a sample from emerging market, which has not been covered by prior studies. Additionally, from their findings, they confirmed a significant increase in firm value from foreign exchange hedging activities (Junior & Laham, 2008, p.13). In line with this Chaudhry et al. (2014, p.123) also found that uses of both foreign exchange derivatives as well as interest rate derivatives are value maximization activates. The result that Ahmed et al.
(2014, p.17) on their investigation of 288 non-financial firms list at the London stock exchange revealed that foreign exchange hedging positively related with firm value and performance.

Additionally, Allayannis et al. (2012, p.65) studied foreign currency derivative impact on firm value which incorporates corporate governance, found a strong firm-level and external countries-level governance relation with a significant value premium. The study was performed on 372 firms from 39 countries, and panel data analysis were done to generate a result that helped to conclude on.

To sum-up, even if the above scholars took different approaches to identify the use of derivative impact on firm value they came to the same conclusion that firm value and derivative usage has got a positive relationship.

3.4.3 Studies which found negative impact

Hagelin et al. (2007, p.739-740) in their investigation of derivative effects on firm value used a managerial motive perspective, and they arrived at a conclusion that state firm value decrease when a firm involve in hedging activates on the motive of manager’s stock options. The authors argued on their findings that as firm utilize derivatives to reduce stock price sensitivity of managerial stock option, but as a result hedging reduce firm value. This reduction in firm value is due to managers usually hold a risk avert motives and protect their claim on firm’s assets due to stock options they hold. Fauver and Naranjo (2010, p.719) confirmed the findings of Hagelin et al. (2007) by taking a perspective of agency costs and monitoring problems. In this study, they took a sample of more than 1745 US firms with a time frame range of 1991-2000. And the conclusion from this study shows that firms with a huge amount of agency and monitoring problem like; low transparent, significant agency costs and information asymmetry problem, weaker corporate governance and monitoring, are subject to have a negative correlation between Tobin’s Q and derivative usage (Fauver & Naranjo, 2010, p.719).

Dan et al. (2005, p.40) found in their study of the existence of a potential nonlinear return from uses of hedging. The result from their analysis shows that debt risk hedging derivative is the only significant factor that affects firm value negatively. Moreover, the report issued by The Economist states that “the worries over derivatives stem not from any inherent evil, but from their power to disguise the intensions of their users” … “The critics (Warren Buffett, Bill Gross, and other critics) also claim that derivatives enable corporate treasurers to gamble with shareholders' money” (The Economist, January 24, 2004, p. 3,10). Beside this, a well-known investor Warren Buffet define derivatives, as “derivatives are financial weapons of mass destruction” (Berkshire Hathaway Inc. [BHI], 2002, p. 15). Further, as a coincidence, Warren Buffet was CEO and board chairman of Berkshire Hathaway firm while the firm incurs a loss of $1.1 billion in the second quarter of 2012 (Berkshire Hathaway Inc., Form 10-Q, 2012). The special thing with this $1.1 billion loss is that it is a loss resulting from the use of derivative instruments. Similarly, Stulz (2004, p 173) also argued that the collapse of Queen’s banker (Barings); the collapse of the Thai baht; and the fall of Enron, are associated with the use of derivatives.

As a conclusion, these scholars performed studies on different kinds of derivatives that the firms use and their impact on firm value. And from their analysis result, they came to conclusion that firm value is negatively correlated with uses of different derivatives.
3.4.4 Studies which found no impact

Besides the above two opposite viewpoints, there are also scholars who say there is no relation between these two variables. For instance, while Ameer (2009) performed an investigation on Malaysian firms to testify the effect of foreign exchange and interest rate derivatives on firm value over a period of 5 years (2003-2007). Their result shows that, even if few Malaysian firms use derivatives, the use does not have a significant correlation with firm value for Malaysian firms when it is compared to other countries (Ameer, 2009, p.78). The study done by Ayturk et al. on Turkish non-financial firms also led them to conclude that there is no significant hedging premium or discount when all Turkish non-financial firms are considered (2016, p.108).

Similarly, Jin and Jorion (2006, p.893) have studied the impact of hedging on firm value, and they depicted that there is no evidence that hedging advance to higher firm value. They further argued that if a use of derivative does not contribute to firm value maximization, then firm managers use it for their own personal utility maximization. On this study, the authors have taken a sample of 119 USA oil and gas manufacturers with study periods of 1998-2001 and identified that hedging has a negative impact on stock price sensitivity, but they could not find evidence for variance between derivatives users and non-user. Further, they argued that a type of firms' risk exposure is a factor of hedging premium.

Beside those scholars mentioned in the previous two paragraphs, the classical economic theory of perfect capital market advocate that in a perfect capital market hedging is irrelevant to firm value (Modigliani & Miller, 1958, p.284). Their theory states that in a perfect capital market there is no taxes, bankruptcy costs, agency costs, and asymmetric information, and in this perfect market firm value is not dependent on hedging activity of a firm.

Lookman (2004, p.31) also performed the same study on a sample of oil manufacturing firms which extract and produce gas to understand if hedging has got an impact on firm value. On this research, he split those firm exposures into two, primary and secondary depend on the magnitude of the influence they have on firm’s financial performance. This study result showed that hedging the primary risk exposure lead the firm to a value reduction of 17%, while secondary risk exposure hedging contributes a premium of 26.7% which was contrary to the expectation. From this result, he concluded that hedging does not contribute any value premium to the hedger. And suggest an alternative hypothesis that says hedging serves as a noisy proxy for other variables which has got an impact on firm value, and those variables have not considered while assessing the effect of derivatives on firm value.

Further, Guay and Kothari (2003, 441) argued that the degree of the firm’s corporate financial risk hedging is too small to affect firm value. They gave an elaboration on their findings by saying that, in the case of continuing change in the interest rates, foreign exchange rates and commodity prices the relative change in derivative usage does not exceed 4% of the historical cost of the underlying assets. Due to this, they concluded that for this derivatives usage does not have a significant effect on firm value. Additionally, from a total foreign exchange and interest rates risk exposure of firms only 3%-6% covered by uses of derivatives, this implies that it is still insignificant level to affect firm
value. With a similar thought, Tufano (1998, p.68) argued that in a perfect market hedging, derivatives do not have any impact on firm value, because, in perfect market taxes, financial distress, and costly external financing would not exist.

3.5 Theoretical framework model
The literature review section helps as a ground for this study since it gives detailed information about the variables like firm value, derivative type, use and related theories, and thought of different scholars in relation to impacts that derivatives imposed on firm value. Besides that, the section enables the author to argue for and against the hypotheses which will be developed in the next chapter and tested in the result section of this thesis. To put it differently, this conceptual model has got a contribution in enriching this thesis on analytical performance to provide practical as well as the theoretical contribution which is highlighted in the introduction section.

Figure 4, Theoretical model
Chapter IV: Empirical Study

This chapter deal with the framework of empirical method and detail discussions. The chapter starts with data collection and sampling techniques used. Then in deep description of both dependent and independent variables to be used in this thesis, then their measurement tools continue. After that, statistical testing for normality, linearity, and heteroscedasticity discussion presented before moving to discussion of different data analysis techniques. The next part deals with hypotheses development and the chapter end with ethical & social considerations in relation to this empirical study section. Indeed, the building of this chapter is based on the following empirical findings and analysis chapter.

4.1 Overview

On this study the author focus on a sample of Nordic financial firms that are listed on NASDAQ OMX Nordic and Oslo Børs OMX stock exchange. With this, the author is looking into the existence of derivatives usage effect on firm value. To carrying out this empirical study, the author has used numerous empirical studies done on similar topics but would indicate that Ayturk et al. (2016), Allayannis et al.(2012) and Allayannis and Weston (2001) are benchmarks for this study. All of the studies postulate exploratory analyses and test the relationship between different hedging’ and firm value. Ayturk et al. study is the most recent one done on Turkish non-financial companies, and it is on a similar topic with that of this thesis except that it is on non-financial and not in the Nordic region. However, these two industries are highly exposed to similar risks and use almost similar risk reduction and elimination technics (Hull, 2015, p.1). The major difference is that as financial firms are dealing with most liquid assets their risk is much higher than that of the non-financial firms.

4.2 Data Collection and Sample size

In investigating the relationship between firm value and derivatives use the author performed collection of data related to usage of derivatives and type of derivative used from financial statement of the firms and firm market value from NASDAQ OMX Nordic and Oslo Børs OMX stock exchange. Further, this study capture study period of 4 years (2012-2015), this time period is chosen because the majority of the Nordic financial firms start using derivatives since 2012. Therefore, in order to make this study inclusive and to increase the size of the sample, which helps in generalization, the chosen time frame is more suitable for this study. Besides that, as the choice of sample selection is very critical to the accuracy of the results, the inclusiveness of the sample enforce the author to take this time frame too. Further, to inline this sampling process with the specific aim of this study, the author took the following assumptions that enable to direct the study toward answering the stated research question.

The sampling activity done based on the assumption set for this study, such as:

a) The firm should be listed on one of the two stock exchanges
b) The firm should have to have a footnote or values in the financial statement regarding the use of derivatives.
c) The firm should have to operate in the Nordic region and in a financial industry
d) The firm should have to have publicly available annual reports.
From total population of 286 which are listed at NASDAQ OMX Nordic and Oslo Børs OMX stock exchange 130 firms were found eligible. However, out of 130 eligible financial firms 30 removed due to data missing problem, and then from the rest 4 firm found subsidiary firms and removed to eliminate redundancy. With this assumption, the number of firms that fulfill these criteria are 96 and as a result for the stated study period a longitudinal data of 384 firm-year observation emerges. According to Baltagi (1995), a balanced panel data approach is mainly important in controlling individual heterogeneity for the reason that it provides more informative data, less collinearity, better degree freedom and more efficient, and it also waives any possible bias coming from aggregation done over firms or individuals.

Moreover, data collected will be utilized in the following sections to carry two major different economic analyses. Mainly, the author demand to perform testing in order to determine derivative usage by Nordic financial firms is in line with theories stated under theoretical review section of this thesis (value maximizing theories, value reduction theories, or no effect theories). First, the author will do a univariate analysis, by which comparison of the mean of those derivative user financial firms with that of non-users once, including a firm value proxy for testing the core hypothesis. Secondly, the author will carry on a multivariate analysis to differentiate hedging effect on firm value, while controlling the other variables that have a potential effect on firm value.

4.3 Variables
As discussed in the previous chapter, major theories in relation to derivatives usage are theories which help as ground under the analysis section of this paper. Thus, different dependent and independent variables are mainly assumed in these theories. And they assist as proxy measures of variables that these theories anticipate to have a power of explaining it and its effect on firm value. The author also accounts for different variables that have similar purpose and used by prior studies which are related to examining determent of derivative use and impacts of those derivative uses on firm value.

a. Dependent variable
As pointed out under the literature review section this strong approximation ratio is initially introduced by James Tobin (1969) and then after used by Allayannis and Weston (2001), Jin and Jorion (2006) and Panaretou (2013). It measures two variables which are the current price of capital assets and market value of common equity (Tobin, 1969). However, Tobin’s can also be affected by other variables like intellectual capital that the firm possess and market propaganda and speculation of price movement (Tobin, 1969). Accordingly, Tobin (1969, 1978) who examined a causal relationship between Q and an investment argued that when Q value is more than 1 it gives an incentive to invest. This is because when Q is more than 1 it means that capital investment proceed is more than its cost. On contrary when Q value is less than 1 then it implies capital expenditure is greater than it’s proceed and discourage investment.

Moreover, the author of this thesis uses the natural logarithm transformation of Tobin's Q ratio because as Hirsch and Seaks (1993) suggested log transformed Tobin's Q ratios gives a better statistical distribution property compared to raw Tobin's Q ratios.
In line with the research question stated in chapter one, the dependent variable is the firm value and it is measured by use of Tobin’s Q ratio. As Wernerfelt and Montgomery (1988) pointed out, to measure firm value Tobin’s Q ratio is a good proxy. Generally, several studies use Tobin’s Q ratio in their empirical studies to predict firm value. Similarly, in this study Tobin’s Q ratio defined in a s way as defined by Ahmed et al. (2014, p.9) which is sum of market value of equity and total assets less book value of equity divided by total asset.

\[ \text{Tobin's Q} = \frac{\text{Book value of assets} + \text{market value of equity} - \text{book value of equity}}{\text{Book value of assets}} \]

b. Independent variable
The sample firms classified in to two in order to assign dummy variable on their derivatives uses. Therefore, to be called a derivative user company, a firm has to use any kind of derivative contract toward its risk management or speculation. For this, the dummy variable value 1 assigned to it. In other words, if a firm use; foreign exchange derivatives, interest rate hedging derivative, and commodity or equity price hedging derivative, then it takes a dummy variable value of 1. But if the firm is not using any kind of derivatives, then the dummy variable take a value of 0.

Data related to derivatives usage (foreign currency, interest rate, and commodity or equity price hedging derivatives) information are extracted from the annual report of each firm. Therefore, at the end of data collection process, the author developed a distinctive data set for the use of derivative by Nordic financial firms. Further, in collecting those data from annual reports of these financial firms, the author use the following keywords; derivative, hedge, forward, swap, option, futures, financial risk, and exotic. But some firm published their financial statement by their national language and hence these keywords translated to their language before applying the search engine. In both cases after finding those words in the financial statement or footnote then careful reading done to confirm that if the firm is using derivative instruments. Beside that many scholars argue that derivative use reward firms with a premium (Smith et al., 1993, p.280; Geczy et al., 1997, p.1350; Allayannis & Weston, 2001, p.243; Graham and Roger, 2002, p.816; Smith and Stulz, 1985, p.391; Junior & Laham, 2008, p.13, Allayannis et al., 2012, p.65) and the author also expect a positive relation between Tobin’s Q and derivative use.

c. Control Variables
Firm size (SIZE)
While Bartram et al. (2011) investigate the relationship between firm size and firm risks, they found that it is a major determinant of the total as well as systematic risks. In line with this, Smith and Stulz (1985) also identified in their study that the economic benefit from effective hedging of these risks. Usually,
large firms’ usage of derivative out range from those small companies for the reason that it claims them for instance higher start-up cost which could not be affordable by those small firms (Allayannis and Weston, 2001, p. 252). Firm size can be expressed as the log of total assets, or log of capital expenditure and log of total sales but all the three gives the same result (Allayannis and Weston, 2001, p, 252 & 258). Allayannis and Weston found a significant negative association between Tobin’s Q and firm size (2001, p.260). Similarly, the author expects a negative relation between Tobin’s Q and firm size in this study too.

\[ \text{Firm Size} = \log \text{ of total assets} \]

**Leverage (LEV)**
Firm value can also be affected by its capital structure. Graham and Rodgers (2002, p.816) in their study identified that firm value increase by 1.1% on average from debt financing. As known, too much debt mean high risk, which might lead to bankruptcy, and its costs, which also result in a low-risk return premium (firm value premium). This lead to generalize a low expectation from stockholder due to the majority of assets claimed by creditors. Moreover, the entire benefits and drawbacks of leverage are integrated by investors and be reflected in the stock price of that firm. This controlling variable, leverage, is defined as total long-term debt divided by total shareholders’ equity. (Allayannis & Weston, 2001, p. 252).

\[ \text{Leverage} = \frac{\text{long term debt}}{\text{Total Equity}} \]

Similar to Graham and Rodgers finding (2002) on a relationship between leverage and firm value the author also expects a positive relation among this two variables.

**Profitability (PROF)**
It is quite often expected that firms with higher profitability have a higher firm value. In other terms, higher profitability shows that lower financial distress costs which lead to having more resource to make an investment on projects which have positive net present value. It further leads to receipt of higher cash-flow by the stockholder. This higher return also reflected on the stock price of that firm. Consequently, the higher return has got a positive impact on firm value. Therefore, all the above-chained moves to a higher firm value and a higher Tobin’s Q for those higher profit firms. In controlling this variable (profitability), most prior studied used return on the asset (ROA) as a determinant of profitability, and defined it as net income divided by total assets of the firm.

\[ \text{Profitability (ROA)} = \frac{\text{Net income}}{\text{Total Assets}} \]
With the same point, Allayannis and Weston (2001, p.243) argued that higher profit firm has higher Tobin’s Q value with positive expected sign. The author also expects a positive relation among firm value and firm profitability.

**Capital Expenditures (CAPEX)**

Capital expenditures are simply an investment, or disbursement projected to create pay-offs in the future. Myers (1977, p.171) argued that future investment opportunities have an impact on firm value and those firms which use derivatives (hedger firms) may have greater investment opportunities. Accordingly, this research follows the findings of Allayannis and Weston (2001, p.252) and Junior and Laham (2008, p.7). And their technique to calculating capital expenditure ratio, which is, the ratio of capital expenditures to revenue of a firm (sales) used on this study too.

\[
\text{Capital Expenditure ratio} = \frac{\text{Total Capital Expenditures}}{\text{Total Revenue}}
\]

Therefore, the value of capital expenditure and sales extracted from firm’s annual report. Allayannis and Weston (2001, p.290) found a significant positive relation between capital expenditure and firm value. On the same way, the author expect a positive relation between these two variable in the for-comeing test result.

**Liquidity ratio (Liq)**

Liquidity measure firm’s ability to cover its current creditors claim on the firm’s assets. Thus having excess liquid assets enable the firm to use it for additional profit generating activities. Similar to Junior and Laham (2008, p.6), the author control for this variable and it is defined as the ratio of current assets to current liabilities.

\[
\text{Liquidity ratio} = \frac{\text{Total current assets}}{\text{Total current liabilities}}
\]

According to Jensen (1986), the excess of a current asset over current liabilities inspires firms to develop projects with unfavorable NPV (Net present value), which does not contribute to the wealth maximization motives of shareholders. For this, its expected sign in this study will be negative in relation to Tobin’s Q estimation.

**Geographical diversification (GeoD)**

Usually, when a firm said geographically diversified (multinational), it means that it has one or more subsidiaries located in different country or region than that of its registration or country of its origin. According to theories, companies which are operating in different geographical locations have a tendency of higher market values, and consequently, this diversification contributes toward firm value. As discussed under literature review section of this thesis, Junior and Laham (2008, p. 9) and Ahmed et al. (2014, p. 30) identified a positive relationship between these two variables. Additionally, Ahmed et al. argued that geographical diversification has got an effect on firm’s hedging policies. They support this
argument by their finding that shows geographically diversified firms are likely to apply hedging derivatives, mainly on foreign currency derivate (2013, p. 30). In line with this, to investigate whether geographical diversification activities has an influence on firm value and to control it, the author use this variable as a dummy. This dummy variable take a value equal to 1 if the sample firm report one or more foreign segment (proxy to business abroad) or local branch and 0 otherwise. Similarly, dummy variable for geographical diversification was also been adopted by Junior and Laham, (2008, p.6). Following Ahmed et al. (2014) study result and expect a positive coefficient of geographical diversification in relation to Tobin’s Q expected in this study too.

**Dividend (Div)**

According to Lang and Litzenberger (1989, p.181), free cash-flow theory, dividend announcement pushes stock price to react accordingly. They further argued that a substantial stock price action (increase in stock price) could arise as investors expected that a rise in dividend might bound the cash flow available for the firm’s managers to invest in the worthless or negative NPV projects. On the contrary, investors assume an announcement of a decrease in dividend payout as a sign of firms over investment policy. This leads to a decrease in stock price. In a similar thought, Allayannis and Weston (2001) and Jin and Jorion (2006) assumed dividend as a proxy for the financial market. Allayannis and Weston further argued that “If a firm paid a dividend, it is less likely to be capital constrained and may thus have a lower Q” (2001, p.252). Therefore, according to this argument profit distribution has a negative impact on firm value. However, Fama and French (1998), Jin and Jorion (2006), and Junior and Laham, (2008) argued in their study that an announcement of a dividend would convey facts about foreseen profitability. Therefore, dividend announcement and payment have an impact on stock price which leads to infer the same on firm value. In Tobin’s Q calculation the author control this variable as a dummy variable which holds a value of 1 if the firm announces or pay a dividend during the accounting period, otherwise 0. The choice of dividend dummy is consistent with Allayannis and Weston (2001), Ahmed et al. (2013), and Junior and Laham (2008) adoption of dividend dummy variable in their study. For a reason mentioned above the author expect a positive or negative relation between firm value and dividend announcements or payments.

The following table, Table 4.1, shows the summary of both dependent and independent variables used in this study with their definition and sources from where data related to each variables collected.
4.4 Statistical Tests

It is quite normal that statistical analysis is required for assessment of normality of data collected. Hence any statistical analysis or tests like; t-test, linear regression analysis, discriminant analysis and analysis of variance (ANOVA), are performed under the assumption that data are normally distributed (Razali and Wah, 2011, P. 21). In parametrical statistics, it is assumed that data are normally distributed; variables are measured on their scale of intervals or ratios, consistent standard deviation for conditional value (Collis and Hussey, 2014, P. 261). The consequence of violating these assumption leads to invalid or unreliable generalization and interpretations of findings of the study. For this reason, it is an important for the researcher to check the normality of data before performing any statistical analyses. In line with this Martin and Bridgmon (2012, P. 100) argued that accuracy, completeness, and consistency with the underlying assumptions of the statistics, are necessary qualities of data to assuring integrity and inferential tests.

On testing normality, there is three way that one can choose from. These are the graphical approach (through uses of a histogram, Q-Q plot and box plots). The second approach is the numerical one, which includes skewness and kurtosis. And thirdly, formal normality tests can be used, this includes Shapiro-Wilk test, Kolmogorov-Smirnov test, Lilliefors test and Anderson-Darling tests, and others. The study confirmed that Shapiro-Wilk test is a powerful technique among others in testing normality, and Anderson-Darling tests and Kolmogorov-Smirnov tests come next to it, but Razali and Wah (2011, p. 21) identified that the robustness of these four normality testing techniques weak for small sample size. Similarly, the following statistical activities will be performed with the help of STATA software in this thesis.

### 4.4.1 Normality Test

#### 4.4.1.1 Shapiro-Wilk Test

Getting perfectly normally distributed dataset is hard in reality, rather if most test results shows relatively normal distribution then it is enough to conclude that the dataset is normally distributed (Martin and Bridgmon, 2012, P. 114). P-value of a normally distributed dataset in Shapiro-Wilk test range from 0 to 1, and if P-value is less than 0.05
then it lead to rejecting the null hypothesis, but p-value more than 0.05 means that the data are normally distributed. In this study case, the p-value found for residuals is 0.79. Therefore, this leads the author to infer that data are approximately normally distributed.

4.4.1.2 Skewness and Kurtosis Test
Quite often data analysis outputs suggest facts on the Skewness and Kurtosis for a given sample distribution. Hence skewness describes the existence of distribution at the either extreme of the tails of that distribution. For instance, a positively skewed distribution have most of the values on its left side and some extreme values on the right side. Negatively skewed distribution has most value on the right and some extreme value on the left-hand side. Kurtosis describes the relative concentration of scores in the center, upper and lower ends of the tails, and in the shoulders of the distribution too (Martin & Bridgmon, 2012, P. 110). Here a systematic normal, which is called bell shape curve is called mesokurtic. A narrow and peaked shape called leptokurtic, while a widely dispersed and flat one is called Platykurtic.

Normally, z-value of skewness and kurtosis fall between -1.96 to +1.96. In the normal distribution, it is expected that the value of skewness and kurtosis closer to zero. However, when it comes to reality data are skewed and kurtotic. Therefore, smaller deviation from zero is acceptable if the measures are not too big in comparison to their standard error (Doane and Seward, 2011, P. 16). Similarly, the author uses STATA software to identify skewness and kurtosis of the data used in this study. The perspective z-value found fall in a range of -1.96 to +1.96 which let the author to assume data are normally distributed.

4.4.1.3 Histograms, Normal Q-Q Plots and Box plots
One of statistical tool to test normality through graphical representation is a histogram, which depicts asymmetrical, more peaked, narrowed or more flat shape of the distribution. A normal distribution histogram looks like a bell shape curve of systematic distribution, and its left and right sides are the mirror image of each other. In positively and negatively skewed distribution the histogram shows data loaded up on the one hand side of the distribution. Similarly, it is not expected that data have to have a precisely bell shaped histogram rather it should have to show the relatively bell-shaped curve of normal distribution. Moreover, the normal Q-Q plot indicates that the dots, which represent values, are along the normal line of the normally distributed data. The box-plot also claim symmetricity as much as possible.

4.4.3 Correlation
There are several types of correlation exist, of which Bevarate Pearson product movement correlation is one. It identifies the relationship between the dependent and independent variables as well as between the independent variables. It also justifies the multi-regression analysis suggesting the existence of feasible explanation (Martin and Bridgmon, 2012, P. 412). Its value range from -1 to +1. Even if Bevarate Pearson product movement correlation coefficient fall between -1 and +1, more than two variables correlation determinant (multiple correlation coefficients(R)) has only takes a positive value. Regarding this thesis, as it is dealing with parametric data Bevarate Pearson product movement correlation suitable measure of the relationship between the dependent and independent variables (Collis and Hussey, 2014, P. 275). If correlation value was zero it mean that there is no correlation between the two variables, but if it is negative it
mean the two variables have an inverse relationship and when one variable increase the other decrease.

Moreover, in relation to identifying the relationship between the dependent and independent variables it is worthwhile to look into multi-collinearity ($r>0.7$) situation existence between two independent variables which might complicate the actual result found on the relationship between the dependent and independent variables (Martín & Bridgmon, 2012, P. 413). Meaning when multicollinearity observed between two independent variables it means that the two variables appear to measure the same thing which is a redundancy of information, for this, it is advisable to remove one of the variables from the combination.

4.4.4 Regression: With assumption of normality, linearity of variables
Linear regression defined as a statistical tool by which a researcher test his/her built model for the relationship between the dependent and independent variables. Naturally, linear regression model parameters are estimated by using ordinary least squares method (OLS) (Greene, 2012, p. 52; 66; Stock & Watson, 2014, p. 238). In line with this, it is important to account for a random disturbance for the reason that it captures other factors that are not included in the model and have an effect on independent variables (Greene, 2012, p. 53).

4.5 Data analysis Techniques
4.5.1- Multivariate Analysis
The most recent empirical study performed by Aytürk et al. (2016) used a multivariate analysis in the investigation of derivative effect on firm value. And they have developed the following model. The model is estimated to investigate the value relevance of derivative use. Since the objective of this thesis is the same as that of Aytürk et al, then the author adopt their model in investigating effects of derivative use on Tobin’s Q.

$$y_{it} = \alpha + \beta Derivatives Use_{it} + \lambda X'_{it} + \mu_{it}$$

Where:

$y_{it}$ = Market value of the firm and measure how much value is created for given amount of assets (Tobin’s Q).

Derivatives Use$_{it}$ = Dummy variable equal to 1 for firm using derivatives, otherwise 0

$\alpha$ = Constant

$\beta$ = Estimated coefficient for corporate hedging proxies.

$\lambda$ = Vector of coefficients for control variables.

$X'_{it}$ = Matrixes containing all control variables

$\mu_{it}$ = error term
4.5.2 White heteroskedasticity-consistent standard error

Heteroskedasticity test has to be done in order to check consistency in a variance of error term (Karen A, 2013, p.124). Therefore, initially, heteroscedasticity (consistent standard errors) test would be performed if heteroskedasticity problem exists. And to solve this problem one can take a natural log conversion of the dependent variable. But if this transformation of dependent variable cannot solve the problem, then it claims to transform the independent variables too. Simply, when a p-value of F-test is greater than Goldfeld-Quandt ratio, then null hypothesis can be accepted at a confidence level of 95% and lead to the conclusion that there is no heteroscedasticity problem. However, if the problem exists several other statistical techniques can be applied in resolving of such problem. In this thesis, the author considers natural logarithm of the dependent variable and transform the independent variables if necessary through exponential smoothing (Karen A, 2013, p.124).

4.5.3 Panel data techniques

In statistics panel data can also be called longitudinal data or cross-sectional time series data. It is kind of data on which multiple scenarios observed with a longitudinal time frame. Hence, this thesis also deals with longitudinal data, and to attend the desired objective, panel data technique is employed with a consideration of different empirical models. Here in controlling effects of individual firm’s heterogeneity, the author uses the two statistical tools (random effect model and fixed effect model).

a) Fixed effect model

This model allows the user to control for omitted variables that could vary between cases but stable over the period (Kutner et al., 2005, p.1030). And it let to use the changes in variables to estimate effects of independent variables on the dependent variable. For this, it is a valuable technique used by those who deal with panel data.

b) Random effect model

The random effect model is the reverse of the fixed effect model which help when there are some omitted variables in the panel are consistent over a period of time and vary between scenarios when there are some omitted variables that can fixable between the cases but change over a period of time (Kutner et al., 2005, p.1033).

This model bounded by many assumptions, these are; variable should be unique, consistent over a period of time with regards to its attribution to an individual which are resulted from random variation, and do not have a correlation with other explanatory variables (Kutner et al., 2005, p.1033). This model is robust to draw an inference from the sample to the entire population.

However, while performing analysis with panel data, one has to test the fitness of the model to choose between the appropriate model from fixed effect model and random effect model for his/her study. To do this, it is mandatory to use Hausman test.
c) **Hausman test for identifying best fitting model**

This test was developed by J. A. Hausman in 1978, and it helps to identify the best fit of an empirical model in estimating Tobin’s Q equation of a given study. With this test, one can evaluate the significance of an estimator assumed versus the one stands as an alternative (i.e. it allow the users to identify the best fitting model for the study carried on from fixed effect model and random effect model).

### 4.5 Hypotheses development

With the aim carried on from starting point of this study, to validate the existence of a relationship between derivative usage and firm value, the author shall perform hypotheses testing with the help of most commonly used statistical testing tools (Collis & Hussey, 2014, pp. 259-260). This test of hypotheses helps the researcher to make a logical conclusion based on the results that the study revealed. At the starting point of hypothesis development, it requires the research to make a tentative assumption of the parameter on the population that the study account for. This conditional hypothesis is called null hypothesis (Ho) which is used in parallel with alternative hypothesis (H1). Normally the null hypothesis is based on the assumption that the stated claim is valid, in parallel, the alternative hypothesis stands for the condition that if the null hypothesis is rejected, then the statistical evidence prove that the alternative assumption is correct. On doing these two competing hypotheses test, data from the sample is used with the help of statistical testing tools (Anderson et al., 2009, pp. 337-338).

In this thesis also, the decision of accepting or rejecting the null hypothesis (Ho) will be made based on the findings that would be generated from the statistical tests. Basically, when the researcher found smaller p-value which is less than 5%, it is less supportive of the null hypothesis. Further in business and management studies, a p-value of 0.05 and above is significant and lead to accepting the null hypothesis (Collis & Hussey, 2014, p. 255). Therefore, the same approach will be adopted in this thesis too. And when the p-value is less than 0.05 it leads to reject the null hypothesis (Ho) and accept for a p-value of more than and equal to 0.05, i.e. the null hypothesis shall be rejected when p-value < \(\alpha\) (Anderson et al., 2009, p.346).

#### 4.5.1 Derivative effect on firm value

Generally, the central hypothesis of this thesis is that capital contribution that the derivative usage brings to the firm. Due to market imperfection, this study decline to support M&M perfect capital market hypothesis (Modigliani & Miller, 1958). For this, market imperfection force firms to use financial risk management techniques like derivatives to protect themselves from market imperfection and to reduce costs that these risks bring. By enhancing such kind of risk management, firms could generate some sort of value boost on its market value. In line with this, the first null hypothesis of this thesis is also expect outcome consistent with studies, which states derivative user firms have a higher Tobin’s Q compared to those non-derivative users.

**H1**  
**H0**- Derivative User firms have higher Tobin’s Q value than non-derivative users.  
**Hab**- Derivative User firms do not have higher Tobin’s Q value than non-derivative users

This hypothesis is consistence with the study result found by Allayannis & Weston (2001, p.243), Júnior and Laham (2008, p.13), Ahmed et al (2014, p.16), and Bartram et al.
derivative usage and its impact on firm value. Further, shareholders wealth maximization theory also the base for this hypothesis, which assumes firm managers act in accordance with shareholders’ interest. In other term, managers work toward firm value maximization. This is done in the world of an imperfect capital market, and it is contrary to claim of M&M theory of perfect capital market assumption. As it has discussed in earlier chapters of this thesis Nordic financial firms also conforms unfitness of assumptions of hedging irrelevance through use of derivatives.

Besides that, an alternative hypothesis can also be the one which is consistent with the result revealed by Jin and Jorion (2006, p.893) and Ayturk et al. (2016, p.108) which state there is no evidence that hedging advance to higher firm value. If the statistical test result enforces to reject the null hypothesis, then it leads to conclusion that Nordic financial firms’ derivatives usage has no positive contribution to their value enhancement.

4.5.2 Geographical diversification and high derivative impact on firm value

Geographical diversification helps firms to minimize risks that it undertake while performing operational activities. Risk avert investor always favor risk reduction ways and of which geographical diversification is the one that award investors through cost saving from a reduction in risk. Further current financial market computation and globalization enforce firms to geographically diversify their business with the aim of reaching their existing and potential customers. In return, this might award them with cost saving in different forms, like delivery cost reduction, a cost associated with a number of customers served by one staff, and others. However, this geographical diversification also has negative consequences too, but if it is combined with the use of derivatives to protect those diversified firms from diversification risks, it might contribute toward value addition (Ahmed et al. (2014, p.11). By holding the same expectation with Ahmed et al. finding, the author developed the following testable hypothesis.

\[ H_0 - Geographical\: diversification\: leads\: to\: higher\: derivative\: impact\: on\: Tobin’s\: Q. \]

\[ H_a - Geographical\: diversification\: do\: not\: leads\: to\: higher\: derivative\: impact\: on\: Tobin’s\: Q. \]

4.5.3 Firm size and higher derivative impact on firm value

Normally, an increase in firm size can be due to several reasons. But mainly an increase seen on those firms which are more profitable and mostly do not distribute income they have generated to their shareholders. Additional capital contribution from stockholders can also be a reason for an increase in firm size, but this is usually supported by the profitability of the firm. Because investors (stockholders) willing to contribute more mostly when they see a positive inflow of cash toward their value maximization objective. Similarly, Graham and Rogers (2002, p.822) argued that unless the benefit of hedging is greater than the cost of establishing the hedging program, a theory of large firms tend to use derivatives could not hold true.

Allayannis and Weston (2001, p. 252) states that due to large start-up costs associated with hedging, it is hard to be afforded by small firms, for this, large firms are more likely to use derivatives. Smith et al. (1993, p.280) also share this idea on their study by arguing that derivative users show more growth opportunities and convex tax curve, which contribute to value maximization, compared to those non-derivatives users. Therefore,
from this point of view, the author of this thesis expect a favorable impact of firm size toward effects of derivative use on Nordic financial firms’ market value and developed the following hypothesis.

\[ H_3 \quad H_0 - \text{Firm size contribute to higher derivative impact on Tobin’s } Q \]

\[ H_{alt} - \text{Firm size do not contribute to higher derivative impact on Tobin’s } Q \]

4.6 Ethical & social considerations

The author of this thesis takes into account social and ethical perspective with regards to data in order to make this study free of any manipulation. All data collected are directly from Thomson Reuters Datastream database and annual reports of the firms. The only thing that the author do is that removal of some firms which does not fulfill the criteria listed to be included in the sample. As it is pinpointed by Bryman and Bell (2015, p. 146), data management is a major issue concerning ethical aspects of research. In the case of this study, all data the author use are either publicly available through firms’ annual report or on different databases through the university’s library or calculated based on the actual data. The author does not expect to delete any data or substitute it unless it is stated or argued for with statistical methods. Those statistical changes, if they happen, are exclusively for assurance of making the data to fit better in accordance with statistical assumptions. This statistical assumptions are related to regression modeling and have a notification to it with in the chapter. Further, there is no alteration done on the data in order to skew or altering the results. As pointed out under chapter two objectivism and transparency are key standpoint, and have been thoroughly followed throughout the entire empirical work area of this thesis.

Moreover, the author of this thesis has been using both the code used by STATA in collecting results and dataset when required. In doing this, it provides the fortune to others to repeat the work that has done. And testing of the assumption made by the author through imitating what has been performed in accordance with stated premises in the empirical method. Doing this help in assuring the transparency and add value to this thesis. The author assumes this action highlight the quality of this study and its importance as a key factor in conducting research in a credible and best manner possible.

With regards to the dataset, it is available for anyone who is interested, the author of this thesis also offer the codes that help in collecting each variable for the dataset. Therefore, this clearly shows that how data has been collected and its source as well. Further, it also includes the actual calculation, which will be depicted too. To the author’s viewpoint, this shows transparency, as highlighted as a major concern in this study. The action of the author is also in accordance with Oliver (2010, p. 145) who advocate the advantage of writing a good research report. He further argued that good research reports can be used as a further research facilitator. For this, the author of this thesis have been accounting this key factor while doing this study and applied much effort in achieving it.
Chapter V: Result and analysis

Under this chapter analysis of data and research finding will be discussed in detail in relation to the theoretical framework which was discussed in the earlier chapter. The first section covers descriptive and summary statistics which will be followed by a multivariate analysis used to test hypotheses that are designed to help in answering the intended research question of the thesis. In a parallel way, the discussion of the result obtained from each test, in particular, the empirical findings of this study will be done to let analysis and results to move hand-to-hand with arguments supported by theories stated under theoretical framework chapter. And finally the chapter end with a summary paragraph for the overall section of this chapter.

5.1 Descriptive and summary statistics

According to Graziano and Raulin (2014, P. 129), descriptive statistics define as a way of describing a data with one or two numerical terms, that enable the user to compare groups easily and help in performing analysis through the use of statistical inference. Thus, this section will show the basic characteristics of data collected and processed for this study.

Table 5.1 and Table 5.2 shows the mean, median, standard error, and standard deviation of this study’s dependent (Tobin’s Q) and independent or controlling variables for the entire study period (2012-2015). With the aim of gaining from the availability of derivative usage, the sample size kept the same throughout the study period except for one firm which had been a user of a financial derivative in 2012. Then after the firm exists using financial derivate, so it was in derivative users group in 2012, and then from 2013-2015 added to non-user group. Consequently, data set of this thesis includes a total sample of 96 financial firms of which 79 firms were found derivative users and 17 were non-users in 2012 and then from 2013-2015 users of derivatives were 78 and non-users were 18 financial firms.

Moreover, while inspecting the dependent as well as independent variables it was found that there were some cases in regards of the normality of data, which consequently has an impact on kurtosis and skewness of it too. The problem was seen on most of the variables, and as mentioned under chapter five the natural logarithm was taken with those problematic variables value to transform the data to normally distributed one and suitable for the regression analysis. Further, the author of this thesis certainly acknowledges that this minimizes the variation which was creating unsuitability of data for regression analysis. Therefore, this transformation help in creating a close alignment between data which is assumed in linear regression.
Table 5.1: Descriptive statistics for derivative users

<table>
<thead>
<tr>
<th></th>
<th>Derivative Users</th>
<th>Non-Derivative Users</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tobin'sQ smooth</td>
<td>0,0468</td>
<td>0,0369</td>
</tr>
<tr>
<td>LiqSmooth</td>
<td>4,8142</td>
<td>3,2477</td>
</tr>
<tr>
<td>SIZESmooth</td>
<td>4,3192</td>
<td>3,2647</td>
</tr>
<tr>
<td>LEVSmooth</td>
<td>0,2746</td>
<td>0,1848</td>
</tr>
<tr>
<td>ROASmooth</td>
<td>0,0533</td>
<td>0,0310</td>
</tr>
<tr>
<td>CAPEXSmooth</td>
<td>0,1672</td>
<td>0,1440</td>
</tr>
<tr>
<td>Mean</td>
<td>0,0468</td>
<td>0,0369</td>
</tr>
<tr>
<td>Standard Error</td>
<td>0,0084</td>
<td>0,0213</td>
</tr>
<tr>
<td>Median</td>
<td>0,0433</td>
<td>0,0561</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>0,1476</td>
<td>0,1848</td>
</tr>
<tr>
<td>Sample Variance</td>
<td>0,0218</td>
<td>0,0342</td>
</tr>
<tr>
<td>Range</td>
<td>1,3334</td>
<td>1,0793</td>
</tr>
<tr>
<td>Minimum</td>
<td>-0,5989</td>
<td>-0,4471</td>
</tr>
<tr>
<td>Maximum</td>
<td>0,7345</td>
<td>0,6322</td>
</tr>
<tr>
<td>Count</td>
<td>309</td>
<td>75</td>
</tr>
</tbody>
</table>

When seeing the mean value of derivative users and non-users, it shows that derivative users mostly have a higher mean than that of non-user. The average Tobin’s Q of firms which use derivative is slightly greater than that of non-derivative users, and the difference (0, 047 - 0, 037) 0, 01 is not statistically significant. Similarly, an average value of firm size of derivative users in comparison to non-user (4.319 - 3.265) is statistically significant and lead to the inference that large Nordic financial firms are tending to use derivative than that of small ones. This inference is also consistent with the finding of Smith and Stulz (1985) which states large firms tend to use derivative than small firms. On the contrary to this, the difference between the liquidity ratio of non-derivative users and derivative users (4.814-3.248) 1.566 is also significant. From this, it could be possible to infer that derivative-user Nordic financial firms are more liquid than that of non-users. Further, the leverage ratio of derivative users is also higher than that of
non-user which imply that Nordic financial firms which have higher debt use derivative more often. In sum, Nordic financial firms which use derivatives have higher Tobin’s Q, which resembles toward the view of derivatives have a positive impact on firm value theories pointed out under theoretical framework section of this thesis. However, this result should be supported by multivariate tests (Bartram et al., 2011, p.997).

In comparison to the above two tables Table 5.3 shows that mean values of Tobin’s Q (firm value proxy), leverage, ROA (profitability proxy), capital expenditure (CAPEX), size, liquidity, dividend (dummy variable), and geographical diversification (dummy variable) on unmodified raw data collected for each variable are slightly different from results after adjustment on raw data. The result found as seen in the Table 5.3 depict a significant difference between derivative users and non-users. As expected, firms which use derivative for hedging are large (measured by the natural logarithm of their total assets), which is consistent with the argument of Stulz (1996) and Fauver and Naranjo (2010). This can be reasoned out as large firms are involving in more risky activities compared to those of small firms. And they tend to use derivatives to protect themselves from those risks. Additionally, firms, which use derivatives, are highly levered, have more capital expenditure, are more diversified and pay a larger dividend compared to those firms which do not use derivatives. Besides that, the summary result in Table 5.3 also shows that non-derivative users have higher liquidity and profitability compared to derivatives users. This can be interpreted as, firms, which are less profitable tend to hedge their risk with the aim of protecting their cash flows from potential losses that might be arise from market volatility. In other words, while profitable firms prefer not to hedge their cash flow, less profitable firms hedge their cash flow to protect themselves from potential losses due to market volatility. The comparing result in the two tables (Table 5.1 & 5.2 with 5.3) differ for the reason that in Table 5.1 and 5.2 exponentially smoothed data used while in Table 5.3 raw data were used.

Similar to Table 5.1 and 5.2 comparison result of a mean of Tobin’s Q, it is also similar in Table 5.3. Therefore, the difference in mean value of Tobin’s Q between derivative users and non-user lead the author to conclude that this result is consistent with theory of derivative use impact firm value positively (Clark and Mefteh, 2010; Allayannis and Weston, 2001). Further, the mean value of hedgers is greater than 1 which means they are selling at a premium and for non-hedger firms, it is less than 1, which relatively implies that they are trading at discount, (Allayannis & Weston, 2001, p.269).
Moreover, mean differences calculated on raw data also shows that mean of capital expenditure (CAPEX) and dividend payment (Divid.Dum) for derivative users are higher than non-users which imply that derivative users have higher perspective of growth and value maximization. The cause for these higher growths and value enhancement could be dividend distribution. Dividend announcement is a signal of the stock price to react accordingly and firm growth prospective to the current and potential investors (Lang & Litzenberger, 1989, p.191). Beside this geographically diversified firms have higher Tobin’s Q (Ayturk et al., 2016, p.114), it can be argued that diversification face different risks and those risks need effective risk management tools to be implemented. This can lead to concluded that geographically diversified firms tend to use derivative in risk management.

Besides that, statistical normality tests include Shapiro Wilk’s test (P >0, 05, and W=1), histograms, normal Q-Q plots and box plots shows that values of the variables used in this study are relatively normally distributed. The Shapiro Wilk’s test result of variables: leverage, ROA, CAPEX, and liquidity are insignificant to conclude that distributions are normal (see Table 5.4), but for other variables, W value of Shapiro Wilk’s test are more than 0.85 which is relatively normal. Moreover, W value of variables ROA, CAPEX, and liquidity are small in this test it is due to a small sample taken and the existence of equal values in the distribution. Therefore, it is quite usual that if small sample size problem exists in Shapiro Wilk’s test, then this test lead to a wrong decision of rejecting the null hypothesis of “data are normally distributed”. Razali & Wah (2011, p.21) also argued that Shapiro Wilk’s test more effective with larger sample size.
Table 5.4: Shapiro-Wilk W test for normal data

<table>
<thead>
<tr>
<th>Variable</th>
<th>Obs</th>
<th>W</th>
<th>V</th>
<th>z</th>
<th>Prob&gt;z</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tobin’s QSm-h</td>
<td>384</td>
<td>0.85225</td>
<td>39.215</td>
<td>1.714</td>
<td>0.06160</td>
</tr>
<tr>
<td>LiqSmooth</td>
<td>384</td>
<td>0.56897</td>
<td>114.404</td>
<td>1.257</td>
<td>0.00510</td>
</tr>
<tr>
<td>SIZESmooth</td>
<td>384</td>
<td>0.99361</td>
<td>1.696</td>
<td>1.254</td>
<td>0.10490</td>
</tr>
<tr>
<td>LEVSmooth</td>
<td>384</td>
<td>0.97317</td>
<td>7.120</td>
<td>1.662</td>
<td>0.08210</td>
</tr>
<tr>
<td>ROASmooth</td>
<td>384</td>
<td>0.48051</td>
<td>137.885</td>
<td>1.700</td>
<td>0.00000</td>
</tr>
<tr>
<td>CAPEXSmooth</td>
<td>384</td>
<td>0.65890</td>
<td>90.536</td>
<td>10.701</td>
<td>0.00000</td>
</tr>
<tr>
<td>DividDumSm-h</td>
<td>384</td>
<td>0.91028</td>
<td>23.813</td>
<td>7.529</td>
<td>0.00000</td>
</tr>
<tr>
<td>DerivDumSm-h</td>
<td>384</td>
<td>0.90967</td>
<td>1.975</td>
<td>2.545</td>
<td>0.07010</td>
</tr>
<tr>
<td>DiverDum</td>
<td>384</td>
<td>0.99252</td>
<td>1.987</td>
<td>1.630</td>
<td>0.05152</td>
</tr>
</tbody>
</table>

Further, as Appendix 1 shows that data are skewed but relatively to the center which is approaching the value of 0 for all variables that mean highly skewed. However, values of the kurtosis relatively equal to zero which leads this distribution to fall under the Mescokurtic distribution of kurtosis classification. Mescokurtic distribution is a type of normal distribution. Therefore, this distribution test result led the author to assume data are normally distributed. But it is also hard to get perfect normal distribution with this sample size and the author only assume that the distribution is relatively normally distributed.

Similarly, the histogram, Q-Q plot, boxplot in Figure A, B, and C respectively, shows that data distribution of this study met the assumption of normality. The histogram of residuals shows relatively bell-shaped with a normal pick. Q-Q plot reflects data are relatively on the slope line, and the box-plot also agreed with the assumption of symmetricity with first quartile (Q1) and third quartile (Q3). The distance from the median is relatively equal, and the whiskers of the plot approximately the same length. Therefore, from this result, the authors again conclude that data are relatively normally distributed.
Figure A: Histogram of normality Test

Figure B, Q-Q plot of normality Test
Moreover, Figure C shows that there are outliers in box-plot, so it would have been possible to remove these outliers as statistical thumb rule allow. Removing those outliers ensure the fitness of the data in the better way, however, it also can be argued that if that would be done the analysis miss some parts of the entire 96 facts that outliers are a natural part of reality. Rather the author performed a transformation to smoothen the data distribution.

Furthermore, statistical analysis of a relationship between the dependent and independent variables performed shows that all independent variables have a correlation with the dependent variable (Tobin’s Q). Table 5.5 shows the Pearson correlation coefficients of Tobin’s Q, derivative usage, and other controlling variables. The main variable of this study (derivative Usage) has correlation value of 0.3337 with Tobin’s Q. This result also consistent with those scholars who identified positive correlation of derivative usage with Tobin’s Q (Allayannis & Weston, 2001; Smith et al., 1993; Geczy et al., 1997; Stulz, 1985; Junior & Laham, 2008).

Table 5.5: Correlation result of dependent and independent variable

<table>
<thead>
<tr>
<th>TobinsQSmh</th>
<th>LiqSmooth</th>
<th>SIZESmooth</th>
<th>LEVSmooth</th>
<th>ROASmooth</th>
<th>CAPEXSmooth</th>
<th>DividDumSm-h</th>
<th>DerivDumSm-h</th>
<th>DiverDum</th>
</tr>
</thead>
<tbody>
<tr>
<td>TobinsQSmh</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LiqSmooth</td>
<td>0.1066</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SIZESmooth</td>
<td>-0.2156*</td>
<td>-0.1453*</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LEVSmooth</td>
<td>-0.0478</td>
<td>0.0163</td>
<td>0.2308*</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ROASmooth</td>
<td>0.1805*</td>
<td>-0.1616*</td>
<td>-0.0895</td>
<td>-0.0947</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CAPEXSmooth</td>
<td>0.0455</td>
<td>0.0462</td>
<td>-0.0306</td>
<td>0.1707*</td>
<td>-0.0610</td>
<td>1.0000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DividDumSm-h</td>
<td>-0.0036</td>
<td>-0.0268</td>
<td>0.3212*</td>
<td>0.1139*</td>
<td>0.1399*</td>
<td>-0.0050</td>
<td>1.0000</td>
<td></td>
</tr>
<tr>
<td>DerivDumSm-h</td>
<td>0.3337*</td>
<td>0.0993</td>
<td>0.5151*</td>
<td>0.3131*</td>
<td>0.0803</td>
<td>0.0466</td>
<td>0.3031*</td>
<td>1.0000</td>
</tr>
<tr>
<td>DiverDum</td>
<td>0.0424</td>
<td>-0.0129</td>
<td>0.2456*</td>
<td>-0.0364</td>
<td>0.0750</td>
<td>0.0569</td>
<td>0.1634*</td>
<td>0.1099</td>
</tr>
</tbody>
</table>

* Significant at confidence level of 5%
The report indicates two-dimensional correlation between the dependent and independent variables. Tobin’s Q, a proxy for firm value, negatively correlated with firm size (SIZESmooth), leverage (LEVSmooth), dividend payment (DividDumSm~h) with a correlation coefficient of \(-0.2156, -0.0478, -0.0036\), respectively. Further, the correlation between liquidity and Tobin’s Q is positive but not significant, which is only 0.1066. The other variables like, capital expenditure (CAPEXSmooth), and geographical diversification (DiverDum), are also positively correlated with Tobin’s Q, but their value is insignificant \(0.0455\) and \(0.0424\) respectively at 5\% confidence level. A positive correlation implies that when those variables increase by one unit the corresponding Tobin’s Q value also increase by the value of the coefficient. Besides that, there is a correlation between independent variables also, and these correlations between some independent variables are significant \(0.1616\); capital expenditure and leverage \(0.1707\); derivative use and firm size, leverage, and dividend \(0.5151, 0.3131\) and \(0.3031\) respectively; dividend and firm size \(0.3212\); dividend and leverage \(0.1139\); Dividend and ROA \(0.1399\); geographical diversification and firm size \(0.2456\); geographical diversification and dividend \(0.1634\). These correlation between independent variables happened due to small sample size that the study took. However, the other normality test result let the author to assume data are normally distributed.

Furthermore, the author did not check for multicollinearity for the reason that it is not found harmful in this study as the correlation coefficients of the independent variables do not exceed 10 \(\text{Kim et al. 2007 & Ayturk et al. 2016}\). Besides that, it can also be argued that as it can be seen on Table 5.9, the standard error is not being inflated by a factor of two or more which lead the author to conclude that there is no multicollinearity in the distribution. Additionally, the author also controlled for serial correlation problem for the reason that this study deals with panel data. However, the author assumes existence of serial correlation in such kinds of data is normal, because, one cannot build a model for a given period \(n\) that explain the model of the next period unless predicator period data \(\text{period } n\) has a relation with the succeeding one.

### 5.2 Hypothesis testing

Aiming to answer the stated research question the author has developed three hypotheses which will be tested under this section. In doing so, Anderson et al. (2008, p.352) suggested that research can use one of the two approaches of testing the hypothesis. The first one is \(p\)-value, which guides the researcher to know the significance level of the result. The second approach is the critical value approach, which helps in measure the significant of the result as per stated confidence level \(\text{Anderson et al., 2008, p.352}\).

Moreover, in testing the lower tail, the research use critical value as a benchmark in assessing whether reveal value of the statistical test is small enough and evidence to reject the null hypothesis \(\text{Anderson et al. 2008}\). The author performed calculation of \(Z\)-value which is a benchmark to determine the degree of freedom. The degree of freedom determined by a difference between the study’s sample and a number of independent variables. Therefore, sample size is 96 while a number of independent variables are 8, which gives a degree of freedom of 88 \((96-8)\). From \(z\)-distribution table, the corresponding critical value of 95 \% can be found, which mean \(\alpha = 0.05\), and the
interval range of -1.6623 to 1.6623. Basically, this can be interpreted as for any t-value greater than the corresponding z-value the null hypothesis will be rejected. But if it is less than z-value then the null hypothesis should be accepted. By keeping this point in mind the next section tries to make tests of fitness and heteroscedasticity before moving to the actual test of the three hypotheses.

**Hausman test for fixed or random effect**

The author used Hausman test to identify the model that fit well to this study in estimating Tobin’s Q (Hausman, 1978). The test result in Table 5.6 shows a p-value of 0.955. In Hausman’s test when the p-value is less than 0.05 it is insignificant, and the null hypothesis should be rejected, but if it is more than 0.05, then the null hypothesis should be accepted. Similarly, the result found on this test is more than 0.05; therefore, the null hypothesis of “random effect is appropriate” should be accepted and at the same time the alternative hypothesis of “fixed effect is appropriate” should be rejected.

**Table 5.6: Hausman best fit model test result**

<table>
<thead>
<tr>
<th>Coefficients</th>
<th>(b)</th>
<th>(B)</th>
<th>(b-B)</th>
<th>sqrt(diag(V_b-V_B))</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>fe</td>
<td>re</td>
<td>Difference</td>
<td>S.E.</td>
</tr>
<tr>
<td>LiqSmooth</td>
<td>.0034861</td>
<td>.0037552</td>
<td>-.0002691</td>
<td>.0003231</td>
</tr>
<tr>
<td>SIZEsMOOTH</td>
<td>-.0570087</td>
<td>-.0553288</td>
<td>-.00168</td>
<td>.0061051</td>
</tr>
<tr>
<td>LEVSMOOTH</td>
<td>-.0620869</td>
<td>-.0510411</td>
<td>-.0110458</td>
<td>.0161449</td>
</tr>
<tr>
<td>ROASMOOTH</td>
<td>.1082979</td>
<td>.1494176</td>
<td>-.041197</td>
<td>.0154493</td>
</tr>
<tr>
<td>CAPEXsMOOTH</td>
<td>.142375</td>
<td>.0900108</td>
<td>.0523642</td>
<td>.0421632</td>
</tr>
<tr>
<td>DividDumSm-h</td>
<td>.0540129</td>
<td>.0446596</td>
<td>.0093533</td>
<td>.0119166</td>
</tr>
<tr>
<td>DerivDumSm-h</td>
<td>.0368744</td>
<td>.038549</td>
<td>-.0016746</td>
<td>.0204503</td>
</tr>
<tr>
<td>DiverDum</td>
<td>.0489893</td>
<td>.0413889</td>
<td>.0076004</td>
<td>.0112269</td>
</tr>
</tbody>
</table>

b = consistent under Ho and Ha; obtained from xtreg

B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

\[
\text{chi}^2(8) = (b-B)'[(V_b-V_B)^(-1)](b-B)
\]

= 2.64

Prob>chi2 = 0.9550

After identification of random effect fitness for this thesis then the author tested for constant variance, which means the existence of heteroscedasticity. The initial result showed that there was heteroscedasticity and to clear these non-constant; first, natural logarithm Tobin’s Q taken and then tested again. There was still heteroscedasticity and then exponential smoothing used to smooth this non-constant variance. After that, the
following test result shown in Table 5.7 found. So all p-value are more than 0.05 significant level which means there is no heteroscedasticity in the distribution.

**Table 5.7: Breusch-Pagan, heteroscedasticity test**

<table>
<thead>
<tr>
<th>Variable</th>
<th>chi2</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>LogTobinsQ</td>
<td>4.63</td>
<td>1</td>
<td>0.0511 #</td>
</tr>
<tr>
<td>LiqSmooth</td>
<td>15.52</td>
<td>1</td>
<td>0.0577 #</td>
</tr>
<tr>
<td>SIZESmooth</td>
<td>2.97</td>
<td>1</td>
<td>0.6789 #</td>
</tr>
<tr>
<td>LEVSmooth</td>
<td>16.49</td>
<td>1</td>
<td>0.0904 #</td>
</tr>
<tr>
<td>ROASmooth</td>
<td>1.72</td>
<td>1</td>
<td>1.0000 #</td>
</tr>
<tr>
<td>CAPEXSmooth</td>
<td>0.01</td>
<td>1</td>
<td>1.0000 #</td>
</tr>
<tr>
<td>DividDumSm-h</td>
<td>25.01</td>
<td>1</td>
<td>0.0520 #</td>
</tr>
<tr>
<td>DerivDumSm-h</td>
<td>24.06</td>
<td>1</td>
<td>0.0610 #</td>
</tr>
<tr>
<td>DiverDum</td>
<td>3.84</td>
<td>1</td>
<td>0.4013 #</td>
</tr>
</tbody>
</table>

Moreover, the overall test result p-value is 0.1035, which is more than the significant level of 0.05. Therefore, the null hypothesis “Constant variance” cannot be rejected for the reason that the p-value found is greater than the required 0.05 significant level. Rather, it let the author conclude that there is no heteroscedasticity in the data.

### 5.2.1 Test for derivative use and firm value relation (H1)

A way of increasing understanding of the impact of corporate derivative use on firm value is an interest of contracting companies. To perform a testing, the sample taken in this study was classified into two (derivative users and non-users). The mean difference is calculated on actual data as well as smoothed data with t-test to identify whether these differences are significant or not which help to make strong and supported inferences. Beside that the statistical analysis performed to investigate the direct relationship between derivative use and firm value done with the help of multivariate model tests which is similar to the one used by Ayturk et al. (2016), Allayannis and Weston (2001), and Allayannis et al. (2012). Therefore, before running panel data regression, the author developed the following testable model of the first hypothesis.

**Tobin’s Q**

\[ Q_{it} = \alpha + \beta_1 \text{Derivative Use dummy}_{it} + \lambda B_{it} + \mu_{it} \]

*Tobin’s Q* is proxy variable of firm value, which is represented by natural logarithm of Tobin’s Q ratio, \( \alpha \) is the constant or an intercept, Derivative Use is dummy variable which measures firms derivative usage, \( \lambda \) is a constant multiply of vector of all controlling variables, \( B_{it} \) is vector of all controlling variables, and \( \mu_{it} \) is an error term.
Table 5.8 depict the regression result of pooled, random, and fixed effect of panel data with their p-value in parentheses. It also shows value before and after adjustment for heteroscedasticity found in the distribution. Even if the mean result let the author predict positive impacts of some variables on dependent variable, the regression results are slightly different. One reason for this is that several proper adjustments have made to make the data suitable to run the regression analysis. One of the actions taken to make the distribution normal was a use of natural log of the variables which required the adjustment (Allayannis and Weston, 2001, p. 251). Besides that, the three models regression results shows different value (pooled, random, and fixed effect model). For example, even if derivative usage has a positive impact on Tobin’s Q (a proxy of firm value), its p-value shows insignificance for fixed effect model after adjustment for heteroscedasticity (0.324).

Table 5.8: Summary of pooled, random, and fixed effect model regression results

<table>
<thead>
<tr>
<th></th>
<th>Before adj. for heteroskedasticity</th>
<th>After adj. for heteroskedasticity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pooled</td>
<td>Random eff.</td>
</tr>
<tr>
<td>LEV</td>
<td>-0.0024</td>
<td>-0.0532</td>
</tr>
<tr>
<td></td>
<td>(0.969)</td>
<td>(0.215)</td>
</tr>
<tr>
<td>ROA</td>
<td>0.1893</td>
<td>0.1485</td>
</tr>
<tr>
<td></td>
<td>(0.002)</td>
<td>(0.032)</td>
</tr>
<tr>
<td>CAPEX</td>
<td>0.0259</td>
<td>0.0917</td>
</tr>
<tr>
<td></td>
<td>(0.489)</td>
<td>(0.06)</td>
</tr>
<tr>
<td>SIZE</td>
<td>-0.4843</td>
<td>-0.0550</td>
</tr>
<tr>
<td></td>
<td>(0.000)</td>
<td>(0.000)</td>
</tr>
<tr>
<td>Liq</td>
<td>0.0068</td>
<td>0.0010</td>
</tr>
<tr>
<td></td>
<td>(0.037)</td>
<td>(0.488)</td>
</tr>
<tr>
<td>DerivDum</td>
<td>0.0311</td>
<td>0.0391</td>
</tr>
<tr>
<td></td>
<td>(0.031)</td>
<td>(0.019)</td>
</tr>
<tr>
<td>DividDum</td>
<td>0.0169</td>
<td>0.0460</td>
</tr>
<tr>
<td></td>
<td>(0.531)</td>
<td>(0.054)</td>
</tr>
<tr>
<td>DiverDum</td>
<td>0.0280</td>
<td>0.0469</td>
</tr>
<tr>
<td></td>
<td>(0.166)</td>
<td>(0.012)</td>
</tr>
</tbody>
</table>

Value of control variable SIZE is negative in all the three regression models (pooled, adjusted random and fixed effects). Which means firm size is negatively related to Tobin’s Q (proxy for firm value), which is consistent with the finding of Land and Stultz (1994) and Allayannis & Weston, (2001) and has the same sign as expected by the author. This negative relationship between firm size and value can be due to costly and hardness of implementing effective managements system compared to those small firms. In small firms, it is easy and less costly to have effective operational as well as other management systems because managing small firm does not need many skilled directors and other required resources to implement effective management compared to large firm.

Furthermore, the regression result found on geographical diversification shows a positive significant impact on Tobin’s Q when adjusted fixed and random effect method is used but for pooled regression the value is not significant as its p-value is 0.166. Even if the
first two methods showed a positive significant impact, adjusted fixed effect has higher than random effect (0.049 fixed effect and 0.0414 random effect). In other terms, geographically diversified Nordic financial firms have higher Tobin’s Q than those which are not diversified and this is consistence with finding of Ahmed et al. (2014) and expectation of the author.

As suggested by Hausman test random effect model fitness for this study, the regression result to test the first hypothesis shown in column 4 of Table 5.8. Consistent with studies that found positive relation (Smith et al., 1993, p.280; Gezcy et al. 1997, p.1350; Allayannis & Weston, 2001, p.243; Graham and Roger, 2002, p.816; Smith and Stulz, 1985, p.391; Junior & Laham, 2008, p.13; and Allayannis et al., 2012, p.65), this study also find a positive relationship between derivative use and Tobin’s Q, and the impact is significant at a confidence level of 0.05. As shown below in Table 5.9, random effect model regression result, $R^2$ value is 13.92% which means the extent to which independent variables explain the dependent variable (Tobin’s Q). It is not as such significant to say that dependent variable is well explained by the independent ones, this is due to small sample size taken in this study. A general truth is that, when a sample size increase the explanatory power of variables increase. Even if $R^2$ shows less explanatory power of variables the p-value imply significance at the confidence level of 0.05.

**Table 5.9: summary of chosen Random-effects GLS regression**

| TobinsQsmooth | Coef. | Std. Err. | z    | P>|z|        | [95% Conf. Interval] |
|---------------|-------|-----------|------|-----------|---------------------|
| LiqSmooth     | 0.037552 | 0.0014366 | 2.69 | 0.009     | 0.0009396          |
|              |        |           |      |           | 0.0065709          |
| SIZESmooth    | -0.055288 | 0.0109182 | -4.07 | 0.000     | -0.76728          |
|              |        |           |      |           | -0.339295          |
| LEVSmoot      | -0.0510411 | 0.0424857 | -1.20 | 0.230     | -0.1343115         |
|              |        |           |      |           | 0.032293           |
| ROASmooth     | 0.1494176 | 0.0973897 | 1.53 | 0.125     | -0.0414626         |
|              |        |           |      |           | 0.3402979          |
| CAPEXSmoot    | 0.0900108 | 0.0483796 | 1.86 | 0.063     | -0.0048115         |
|              |        |           |      |           | 0.1848331          |
| DividDumSMO-h | 0.0446596 | 0.0237092 | 1.88 | 0.060     | -0.0018095         |
|              |        |           |      |           | 0.0911287          |
| DerivDumSMO-h | 0.038949  | 0.031231  | 1.73 | 0.019     | -0.0226627         |
|              |        |           |      |           | 0.0997607          |
| DiverDum      | 0.0413889 | 0.0185132 | 2.24 | 0.025     | 0.0051036          |
|              |        |           |      |           | 0.0776741          |
| _cons         | 0.0683709 | 0.043807  | 1.56 | 0.119     | -0.0174894         |
|              |        |           |      |           | 0.1542311          |
Therefore, the test result of the first hypothesis lead to accept the null hypothesis that states derivative use has positive impact on firm value. Because as seen in Table 5.8 column 4 and Table 5.9, derivative has a positive relation with Tobin’s Q and this is statistically significant at a confidence level of 95%. At the same time the alternative hypothesis “derivative do not have positive impact on firm value” should be rejected.

5.2.2 Test for geographical diversification increase derivatives use impact (H2)
In testing this hypothesis the statistical model developed to run regression analysis with the aim of seeing geographical diversification impact on derivative use relation with Tobin’s Q is as follow:

\[
\text{Tobin’s } Q_{it} = \alpha + \beta_1 \text{Derivative Use dummy}_{it} + \beta_2 \text{Geo. Diver}_{it} + \lambda \text{ B}_{it} + \mu_{it}
\]

Tobin’s Q is proxy variable of firm value, which is represented by natural logarithm of Tobin’s Q ratio, \(\alpha\) is the constant or an intercept, \(\beta_1\) is estimated coefficient for corporate derivative proxies, and Derivative Use dummy is dummy variable which measures firm derivative usage. \(\beta_2\) is estimated coefficient for geographical diversification, Geo. Diver is geographical diversification proxies, \(\lambda\) is a constant multiply of vector of all controlling variables, \(\text{B}_{it}\) is vector of all controlling variables, and \(\mu_{it}\) is an error term.

The second hypothesis “geographical diversification has positive impact on the relationship between derivative uses on Tobin’s Q”. When we see from Table 5.10, derivative impact on firm value (Tobin’s Q) without adding variable firm size and geographical diversification, we found 0.0376. However, after including geographical diversification this impact increased to 0.0398, which is positive impact at 95% significant level (see Appendix 2). Therefore, the result found imply that the null hypothesis should be accepted at a significant level of 95%. The acceptance of the null hypothesis indicates that geographically diversified Nordic financial firms are tends to uses derivative. One reason for this could be location related risks increase with an increase in firm branches. Beside that the regression result also shows geographically diversified firms have lesser return on asset (a proxy of profitability). Similarly, firm liquidity also decrease when firms are more diversified. One reason for less liquidity is that capital expenditure is high for those geographically diversified firms. So most liquid assets of the firm could be tied-up by capital expenditures. In other words, as firms are more diversified it require them to spend higher capital expenditure and higher capital expenditure lead to lower liquidity (measured by return on asset) too.
Table 5.10: Summary of H2 test result with p-value in parentheses

<table>
<thead>
<tr>
<th></th>
<th>Without</th>
<th>With</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>LEV</td>
<td>-0.0767 (0.191)</td>
<td>-0.0707 (0.106)</td>
<td>0.0060</td>
</tr>
<tr>
<td>ROA</td>
<td>0.2367 (0.001)</td>
<td>0.2311 (0.019)</td>
<td>-0.0056</td>
</tr>
<tr>
<td>CAPEX</td>
<td>0.1037 (0.079)</td>
<td>0.1054 (0.034)</td>
<td>0.0017</td>
</tr>
<tr>
<td>Liq</td>
<td>0.0044 (0.000)</td>
<td>0.0040 (0.007)</td>
<td>-0.0004</td>
</tr>
<tr>
<td>DerivDum</td>
<td>0.0376 (0.016)</td>
<td>0.0398 (0.014)</td>
<td>0.0022</td>
</tr>
<tr>
<td>DividDum</td>
<td>0.0206 (0.564)</td>
<td>0.0199 (0.406)</td>
<td>-0.0007</td>
</tr>
<tr>
<td>DiverDum</td>
<td></td>
<td></td>
<td>0.0319</td>
</tr>
</tbody>
</table>

Similarly, firms geographically diversified have a lower negative impact of leverage on Tobin’s Q. Reason for this could be diversification enable firm to reach more customers, which means more sales. Higher revenue also has a potential to reducing firm debts because as diversification increase number of customers and revenue at the same time additional cash inflow exist. This additional cash inflow enable the firm to settle outstanding debt to reduce interest paid on it.

In overall, the second hypothesis of this study test result reveal that the null hypothesis should be accepted at the significant level of 95%. The test result for the first hypothesis identified positive relationship between Tobin’s Q and derivative use, at the same time test result of hypothesis two proved an increase on this effect. Therefore, geographical diversification has a positive impact on Tobin’s Q which is consistent with finding of Ahmed et al. (2014, p.8) and Ayturk et al., (2016). Acceptance of the second null hypothesis lead the author to reject the alternative.

5.2.3 Test for firm size add value to derivative use impact (H3)

In order to test the third hypothesis the following statistical model developed to see the effect of firm size on derivative impact.

\[
Tobin’sQ_{it} = \alpha + \beta_1 \text{Derivative Use dummy}_{it} + \beta_3 \text{SIZE}_{it} + \lambda \text{B}_{it} + \mu_{it}
\]

\(Tobin’s Q_{it}\) is proxy variable of firm value, which is represented by natural logarithm of Tobin’s Q ratio, \(\alpha\) is the constant or an intercept, \(\beta_1\) is estimated coefficient for corporate derivative proxies, Derivative Use dummy is dummy variable which measures firm’s derivative usage. And \(\beta_3\) is estimated coefficient for firm size, \(\text{SIZE}_{it}\) is firm size, \(\lambda\) is a constant multiply of vector of all controlling variables, \(\text{B}_{it}\) is vector of other controlling variables, and \(\mu_{it}\) is an error term.

Table 5.11 shows multivariate regression test result for the third hypothesis. The result in the table report that large size Nordic financial firms have higher derivative impact on their Tobin’s Q ratio. Initially derivative impact on Tobin’s Q without addition of firm
size variable was 0.0376, but when firm size was added, then derivative impact increased to value of 0.0393, which is statistically significant at 5% significant level (see Appendix 3). Therefore, this result lead to the acceptance of the null hypothesis of firm size add value to derivative impact on Tobin’s Q. The result is also consistent with finding of Allayannis and Weston, (2001, p, 252) which states large firms tend to use derivatives.

**Table 5.11: Summary of H3 test result**

<table>
<thead>
<tr>
<th></th>
<th>Without</th>
<th>With</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
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<td>0.0597</td>
<td>0.0170</td>
</tr>
<tr>
<td>ROA</td>
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<td>0.1607</td>
<td>-0.0760</td>
</tr>
<tr>
<td>CAPEX</td>
<td>0.1037</td>
<td>0.0887</td>
<td>-0.0150</td>
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<td>SIZE</td>
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<td>-0.0529</td>
<td>0.0000</td>
</tr>
<tr>
<td>Liq</td>
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<td>0.0042</td>
<td>-0.0002</td>
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<td>0.0393</td>
<td>0.0017</td>
</tr>
<tr>
<td>DividDum</td>
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<td>0.0444</td>
<td>0.0238</td>
</tr>
</tbody>
</table>

The result found also shows that firm size has a positive contribution toward the impacts of leverage and dividend distribution impact on Tobin’s Q. Moreover, firm size also negatively affect return on asset (proxy to profitability), capital expenditure, and liquidity coefficients. This imply that, as firm size increase, contribution of ROA, capital expenditure, and liquidity toward firm value decrease this is consistence with study result of Graham and Rogers (2002, p.822).

Therefore, the test result of the third hypothesis also let to conclude that the null hypothesis should be accepted at a significant level of 95%, for the reason that firm size has a positive contribution toward the impact of derivative use on firm value. At the same time the null hypothesis should be rejected due to this positive impact revealed.

In summary, the author has stated the result found from the data collected on Nordic financial firms and analyzed it to see the effect of derivative use on firm value. The result found in this analysis indicate that derivative use has statistically significant positive effect on firm value (Tobin’s Q). Further, the second and the third hypotheses of this study were developed to strength the result of the first hypothesis. And the result found from test of these two hypotheses strongly support the first hypothesis.
Chapter VI: Conclusion

This last chapter of the thesis discusses more closely the result of the study, theoretical and practical contributions with ethical as well as social impacts of the study results. Initially, the chapter begins with the general conclusion of the study results and followed by a practical and social contribution of the study that mainly interlinked with general conclusions. And then limitation and future research recommendation will be discussed in detail which lead the chapter to the last sub-topic of truth criteria’s which is relevant and valuable in evaluating the qualities of this thesis.

6.1 conclusion

This thesis initially starts with the question of derivative use effect on firm value, specifically on Nordic financial firms’ market value. With that aim, the author sorted out a sample of 96 (384 observations) Nordic financial firms which are listed on NASDAQ OMX Nordic and Oslo Børs OMX stock exchanges. The study period covers four years (2012 to 2015) in which relatively most of those firms adopt using derivative in their operations. Other scholars have already touched the starting question of this thesis. However, there has been inconsistencies between those studies. Besides that, those studied have been done on mixed industries (Bartram et al., 2009) and some of them on non-financial firms. Therefore, the author believes that this study result improves the pertinence of the current scientific research.

The primary focus of this study has been in corporate derivative use effect on firm value. In a supplement to the main focus, the author was considered geographical diversification and firm size contribution toward the effect of derivative on firm value. That means testing whether geographical diversification and firm size increase or decrease derivative impact on firm value. Besides this, to make this study more understandable, the results were classified into two sub-group as derivative users and non-users. However, unavailability of derivative use related information on databases enforce the author to look at financial reports of individual firms manually, but this attempt also could not solve the problem. The reason for that is some sample firms report derivative use in lump-sum with other short-term securities and has been hard to identify derivative use portion from that lump-sum amount. Therefore, the author used dummy variable of derivative as prior studies used too (Júnior & Laham, 2008, Ayturk, et al., 2016, Allayannis & Weston, 2001). This lengthy process of manual information searching for both derivative use and other variables from the annual report of individual firms hinder the author to not to use larger sample size.

The starting step in shedding some light on the topic of this study, univariate tests and a comprehensive descriptive analysis has been performed. On this, the sample simplified by applying the command to classify it as derivative users and non-users. And the result shows some tendency that derivative user Nordic financial firms have higher firm value compared to those non-derivative users. The result also enables the author to argue that derivatives user Nordic firms are large in size, highly levered, more profitable, geographically diversified, large dividend distributors, and greater in capital expenditure (Smith et al., 1993, Graham & Rogers, 2002). However, non-derivatives users found more liquid than those derivative user Nordic financial firms (Graham & Rogers, 2002).
Further, to strengthen the robustness of this study the author also employed a multivariate analysis by using both OLS estimate method as well as the two-panel data analysis tools (Fixed effect and random effect). To identify which model is more suitable for this study the required Hausman test and the Breusch-Pagan test has been employed and the test result suggested that random effect is an appropriate one to estimate Tobin’s Q in this study. The random effect model result, after adjustment for heteroscedasticity and autocorrelation, shows a positive and statistically significant impact of derivative use on firm value. Besides this, all the three models (pooled, Fixed effect, and random effect) shows a positive impact of derivatives use on the firm value which strengthens the conclusion of this study.

In general, as studies which found a positive impact of derivatives uses on firm value stated, this study result also suggest that derivative use rewards Nordic financial firms with higher market value. Further, the positive result has statistical as well as economic significance to accept the use of derivative as a mechanism in value creation. Besides that, the study utilized Modigliani and Miller perfect capital market theory (1958) and arbitrage theory as a starting point but found that M&M theory assumptions could not hold true in the current competitive market environment for the reason that firms are operating with different risks. Therefore, M&M theory derivative usage irrelevance contradict with the result of this study. Because the result show that derivative uses are awarding a premium to the holder in addition to reducing and eliminating firm risks. Moreover, in arbitrage theory market can neutralize itself when arbitrage events happen (Shleifer & Vishny, 1997, p. 35), but speculators gain from such events and try to maximize their return before market offset itself. In such situation firms can protect themselves from price volatility through hedging by utilizing derivatives, which also award a premium as this study identified.

**6.2. Theoretical & Practical Contribution**

The findings of this study are more valuable to the entire society and provide a pathway for future study in more detailed and broader perspective which this study could not cover. This study area requires further comprehensive research to get a clear picture of financial derivative usage and firm value relationship, especially about financial industries. This further research requirement for financial firms is due to the reason that they are bearing much larger risks compared to those non-financial firms. Besides, this thesis provides the existence of a relationship between firm value and derivative use which is valuable to scholars as well as academia as the whole. A connection also has been made with M&M theory of perfect capital market and arbitrage theory to frame the subject matter with the practical risks that firms operating in and the existence of arbitrage events that force firms to use derivatives. Some connections also made in relation to the efficient market hypothesis which advocates investors rationally, which also work for derivative usage, hence, those firms which invest on derivative expected to be rational. The reason for this is that, unless derivatives are managed (used) properly they might lead the firm to significant financial troubles (Berkshire Hathaway Inc. [BHI], 2002, p. 15). Therefore, the thesis tried to bring many theories together in order to answer the intended research question and make its contribution broader.
In a practical aspect also, this thesis provide users with valuable information with regards to the derivative use and firm value. So the finding help investor to have an understanding of derivative usage advantages which means its impact on their wealth maximization objective. Beside that firm manager as well as other get a deeper understanding of derivatives usage on firm risk management contribution toward value maximization. It also inform them to use it in a rational manner to gain from its benefits, because it may also lead the firm to a higher crisis if it is not utilized properly. Further, policy makers, regulators, creditors, customers as well as others benefit from this study as it provides them with information regarding the relationship between derivative use and firm value. For instance, policy maker like Basel Accord use it to predict an optimal level of firm derivative utilization, customer to deal with that firm, creditors to give a loan or not, regulators to control different scandals and miss-conducts. In sum, this practical as well as theoretical contribution help in assuring sustainability. Sustainability creates interlink between different parts of social actors toward a common goal.

6.3 Limitations & Future Research

As highlighted in the analysis section, there are different ways to investigate derivative usage impact on firm value. The one that is most logical is that having data from each company on one currency as well as language but that is too hard and costly to obtain. If that is found, it could make the study more objective due to the fact that currency as well as language conversation biases could be eliminated. Moreover, getting these information in one currency as well as language would build the ability of deeper understanding of the phenomenon under the study. For this, this thesis lacks generalizability, and it is above the capacity of the author’s control. Therefore, this is the valuable topic from which many stakeholders utilize the study outcome if it is performed free of these limitations. However, with the aim of objectivity, the author tried to use more reliable currency converter and language translation websites in addition to the support received from native fellow students’ from those countries.

Moreover, it is quite clear that further exploration of the topic of derivative usage and firm value relationship on Nordic financial firms is vital as these firms have an essential role in country’s economic. Likewise, this further exploration can also capture differentiation on financial firms which use derivative for speculative purpose and other which use for risk management purpose. So it is possible to compare its impact between these two different motive holder firms. Beside this, the author could not find any specific restriction of derivative uses in countries of the sample companies except those general rule as well as Basel Accord guidelines. Therefore future research can also cover this area too. In sum, this call for future studies much broader, but quite important to be undertaken.

Additionally, a sample taken in this study is too small due to scarcity of time and resources. But this can be broadened by expanding counties under the study to capture more financial firms and large sample size add value to the study’s representativeness as well as generalizability.

Besides, the proxy variables used in regards to predicting firm value could be arguably be improved for the reason that there is possibility to improve it. This improvement can be made by including other proxy variables which determine firm value. So, the addition of these proxy variables improves the robustness of the study as it captures many variables.
which have an impact on firm value. Further, it is also preferable if some of these proxy
variables are disaggregated. For instance, rather than using derivatives usage, dividend
distribution, and geographical diversification dummy variables which do not show the
clear extent of its impact on firm value (are less informative) it would be readable if actual
values of those variables taken. However, on this study, dummies are taken because of
lack of clear information in the financial report of the firms as well as the constraints
pointed out above. By looking at this issue, there is potential that future studies can
explore in this area to have a deeper insight on the matter under the study.

Similar to previously argued statistical matter, it is possible that this study could be
performed by using more advanced statistical methods that were impossible for this thesis
for different reasons including lack knowledge to utilize those methods as well as
unavailability of those in university’s computer labs. But the author would like to
acknowledge that this would improve the robustness as well as the reliability of this thesis.
The time constraint also played a significant role on not learn such methods too. However,
this could also be one avenue that scholars can explore further through utilizing these
methods and expand the analysis to more precise measure.

In summation, it’s the author’s perception that further study of the derivative use and firm
value relationship in the context of financial firms claims scholars’ attention. As depicted
under problematization and theoretical framework section of this thesis, which flashed
the inconsistency between study outcomes on this subject matter. Therefore, there is a
need for deeper future scholars’ effort to bring this inconsistency to one persuasive result
that all scholars will agree upon.

6.4 Truth Criteria
Research quality is an important issue as fellow scholars would use it. For this, the author
of this thesis also mind this importance and discuss hereafter the truth criteria with the
aim of demonstrating the way that this paper has attended the quality requirement in
academic writing.

6.4.1 Quality criteria
Studies performed in business and social science considerably required to fulfill the
quality criteria identifying which method (qualitative, quantitative and mixed study
methods) probably be applied by the author (Bryman et al., 2008, p. 262). Thus, in a
quantitative study, the nature of the subject under the study and the research paradigm
chosen are the key determinant of the quality criteria and requirements adopted
(Swanborn, 1996, p. 19). The features of quality criteria incorporate transparency,
accuracy, and provision of clear findings for each single study (Bryman et al., 2008,
p.262). The e-survey and semi-structured interview done by Bryman et al. (2008) depicted
that validity, reliability and generalizability account for higher rank and most appropriate
in the process of judging the quality of quantitative research. Hence, on this ground, the
author of this thesis assumed the following three key quality criteria for this thesis.

6.4.2 Validity
Swanborn (1996, p. 22) pointed out that validity of tools used and results generated from
empirical measurements should be correct and clean from any kind of biases (random and
systematic errors), mainly during the time of collection of data and analytical processes.
For this, Winter (2000) said that the study that fulfills these criteria is true study, which
incorporates features of precisely presentation of the theories through the phenomena planned to explain those theories.

While assuring the validity of this study, the author found those prior studies helpful and they were used as a ground on the development of conceptual framework from which hypothesis were derived and developed. Further, prior knowledge gained from books, articles and other material in connection to this research topic have been utilized for performing the development of the conceptual framework as well as the hypotheses. Moreover, the author bear in mind that the tools used in this thesis are consistency with the tools used by prior studies and confirm that appropriate measurements and approaches were used with a proper choice and presentation of variables and moderators. Beside that the statistical software, STATA, and Excel were used in processing and analyzing collected data with the aim of investigating derivative usage and firm value relationships. Therefore, the author believes that measurements used and methods adopted are valid and prior similar studies have used them too.

6.4.3 Reliability
Reliability is assured when a given result can be reproduced by applying the same or similar research methods and instruments that were used in investigating the subject matter. So, this assures the quality of consistency and accuracy in results of the study. Therefore, reliability measure how much (the degree) that the measurement results are free of errors. Similarly, it is crucial that the researcher has to attest and alter methods applied with regards to inconsistency and inaccuracy (Golafshani, 2003, pp. 598-599). In general, the frequency of replication increases when more studies ascertain the outcomes created and found against the investigation of the subject matter. Beliefs of social researchers’ state that, in a quantitative study, reliability is appropriate compared to qualitative study (Merriam, 1995, p. 55). Because, in a qualitative study which tries to discover human characteristics, reliability concepts cannot be applied as it is influenced by subjectivity (Merriam, 1995, p. 55). Similarly, this study is a kind of explanatory in its nature, and the author was aiming to investigate the existence of derivatives usage effect on firm value. Therefore, a chance of subjectivity is too rare as this study has been dealing with factual data which do not require author’s personal (subjective) views.

Moreover, in confirming reliability, one can perform tests many times by using a test-retest technique. In this method, the same sample will be tested several going to see the consistency of the outcome. However, some studies argue that the likelihood of obtaining the same result is very rare for the reason that some characteristic change of the respondent that could result in the existence of error (Golafshani, 2003, p. 599). In regards to this thesis, the author has assumed and used a test-retest technique as this study is a quantitative one in which the author has been seeking to figure out the existence of a relationship between derivative usage and firm value. Additionally the author highly believe that statistical tests performed under chapter V were with the aim of assuring validity and making this study free of errors. Thus, this study assures the ability of replicability with same or similar methods and measurement tools applied. Moreover, the author did his best to provide a crystal views and description of all suitable concepts with a readable layout of the whole process. This process layout aimed by the author to enable the readers to understand the overall framework of the author’s data approach and experience with regards to data collection.
6.4.4 Generalizability

Bryman & Bell (2011, pp.163-165) argued that in Business and Management Research, results should be extended from identical and related specific contexts from which the study was performed. This is an important feature which incorporates all quantitative studies conducted by the individual researcher. Moreover, Bryman & Bell stressed the importance of uniformity in research design, for instance, questionnaires developed in survey data collection should be a kind that holds the principle of generalization. In quantitative research, the first step that would be performed is identifying the population to which the research intended to infer generalizations rather than perfuming a broader inference from a given observation (Polit & Beck, 2010).

Similarly, in this study, the sample used are collected from a well-recognized source. Further, the exclusion of some sample data was reasoned out under the practical method chapter. When it is viewed in a sample size, this study has done on 77 sample companies which use derivatives in their risk management and/or speculation and 19 firms which do not use derivatives. For this, it could be arguable that generalization from the study’s result is too hard. However, the author of this thesis believes that even if the sample is too small to generalize, the index used is a well representative of the Nordic financial industry and highlight a clear summary percentage of Nordica financial firms derivatives usage. Therefore, on a ground of this study result, the author can conclude that the findings are generalizable to listed Nordic financial firms which were investigated, with derivatives usage, and its impact on firm value.
References:


Georg V. Lehecka, (2015). Do hedging and speculative pressures drive commodity prices, or the other way round?, Empirical Economics, 49, 575–603

Graham, John R.and Rogers (2002). Do Firms Hedge in Response to Tax Incentives?, Journal of Finance, 57(2), 815-839


Ismail Civelek, (2014). Commodity Production With Marketing Flexibility And Financial Hedging Current Topics in Management, Western Kentucky University, 17, 119-128


Johanna Eklund, Maria Sandström and Johanna Stenkula von Rosen, (2012). The derivative market is facing major changes, *Economic Commentaries*, No. 6, 1-7


Ken M. Boze,, (1990), Accounting for Options, Forwards and Futures Contracts, *Journal Of Accounting, Auditing & Finance*, 627-638


## Appendix

### Appendix 1: Skewness/Kurtosis tests for Normality

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<th>Variable</th>
<th>Obs</th>
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<th>Pr(Kurtosis)</th>
<th>adj chi2(2)</th>
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### Appendix 2: Hypothesis two-result significant test

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<th>Variable</th>
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<th>Std.error without</th>
<th>Std.error with</th>
<th>Std.error*2 without</th>
<th>Std.error*2 with</th>
<th>Sign. if R&gt;1.96</th>
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</thead>
<tbody>
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### Appendix 3: Hypothesis three result significant test

<table>
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<th>With</th>
<th>Std.error without</th>
<th>Std.error with</th>
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<th>Std.error^2 with</th>
<th>Sign. if R&gt;1,96</th>
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