A EUROPEAN STUDY REGARDING THE IMPACT OF CORPORATE HEDGING ON FIRM VALUE AND EARNINGS QUALITY

Name: David Mugisha Kingereli

Student number: 376086

Supervisor: Dr. M.H.R. Erkens

Second reader: Dr. L. Dal Maso

Abstract

The objective of this master thesis is to investigate the value relevance of derivatives usage by investigating how firm value in a European setting is affected by the use of financial derivatives. Derivatives usage information is obtained by hand-collecting financial derivatives usage data, which is extracted from annual reports of non-financial European listed firms and Tobin's Q is used as a main proxy for firm value. Besides that, this thesis also examines the impact of derivatives usage on earnings quality by using the performance-adjusted discretionary accruals within the modified jones model as a proxy for earnings quality. I find that in general, investors reward firms that use derivatives usage to for hedging purposes with a hedging premium of 1.05%. However, I do not find enough evidence to state that an increase in the extent of derivatives usage positively affects firm value. A possible reason for this finding lies in the high ownerships concentration associated with European firms and the corporate governance in Europe. Furthermore, I find that the (yes-no decision) use of derivatives in general significantly increases earnings quality. In contrast to this finding, I do not find that earnings quality is positively affected by the level of derivatives usage.

Keywords: Hedging, Financial Risks, Derivatives Usage, Firm Value, IFRS 7, IFRS 9, Earnings Quality

Table of Contents

Chapter 1- Introduction

Over the past few decades the use of derivatives for hedging purpose has become increasingly popular. According to the statistical release of the Bank for International Settlements in December 2014, there has been an increase of 33% in the outstanding notional amount of interest rate swaps from $380 trillion in 2007 to $505 trillion in December 2014 (BIS, 2015) (ISDA, 2015). Moreover, during the period 2007-2014 the use of Equity forwards, swaps and options increased even with a higher percentage of 110% whereby the outstanding notional value grew from $10 trillion in 2007 to 21 trillion in 2014 (ISDA, 2015) (BIS, 2015). The worldwide volatility in financial markets is an explanation for the huge increase in financial derivatives usage over the past decades. To understand the full picture, we'll have to go back to 1944, when the Bretton Woods System was formulated. This systems was put into practice from 1945 to 1971 in order to achieve two main objectives. The first objective was to rebuild Europe after the Second World War and the second objective was to control the exchange rate fluctuations which was done by setting up fixed exchange rates (Caramazza & Aziz, 1998). The stabilization of currency fluctuations in Europe was achieved by pegging European currencies to gold, to be more specific, European currencies were linked to the US Dollar and the US Dollar was tied to gold (Caramazza & Aziz, 1998). Because of the stabilization of currency and interest rate volatility during the Bretton Woods System period, managers/firms were little concerned about the management of foreign exchange and interest rate risk. However, eventually this system collapsed in October 1971 and the US chose for a floating exchange rate which lead to the de-pegging of the US Dollar with gold. The floating exchange rate did not only increase currency risk but also led to an increase in interest rate volatility because the interest rate was used by monetary authorities to manage fluctuations in the exchange rate (Bashir & Khazaal, 2013). The resulting increase of volatility in financial markets worldwide has led to a huge increase in the usage of financial instruments such as derivatives, which could be held to mitigate financial risks such as exchange rate/currency risk, interest rate risk and commodity price risk (ISDA, 2015).

The corporate use of derivatives to hedge exposures of financial risks has basically become standard practice for modern firms operating worldwide (Belghitar, Clark, & Mefteh, 2013). In order to establish a derivative based hedging strategy, a commitment of financial and human resource is required. In other words, an implemented hedging strategy based on derivatives is a significant source of costs for a firm (Belghitar, Clark, & Mefteh, 2013). However, because of the mixed results, there is no single consensus in the little existing literature on whether derivatives usage positively affects firm value. For example, the following empirical studies conclude that derivative usage enhances firm value: (Allayanis & Weston, 2001), (Carter, Rogers, & Simkins, 2006), (Nain, 2004) and (Bartram & Brown, 2011) . On the other hand empirical studies

of (Belghitar, Clark, & Mefteh, 2013)**,** (Khediri, 2010) and (Jorion & Jin, 2006) find no evidence that derivative usage enhances firm value. Similar to the methodology of (Allayannis, Lel, & Miller, 2012; Allayanis & Weston, 2001), this thesis uses the Tobin's Q ratio to operationalize firm value and derivative usage is measured by two proxies, the first proxy measures the extent or level of hedging and is retrieved by extracting the fair value of derivatives holdings from the financial statements and notes in the annual report of the sample firms for the years 2008 and 2009. A binary variable is also used to proxy derivative usage, which indicates whether a firm in general uses derivatives or not. Control variables that affect firm value such as leverage, size and profitability are also taken into consideration. The second hypothesis is based on findings of theoretical studies regarding the determinants of derivatives usage and focusses on whether the reduced volatility in earnings associated with derivatives usage (for hedging purposes) makes earnings more useful to investors by investigating the impact of derivatives usage on earnings quality. The approach of (Dechow, Sloan, & Sweeney, 1995) and (Kothari, Leone, & Wasley, 2005) forms a basis for operationalizing earnings quality, which is measured using the performance-adjusted discretionary accruals within the modified jones model.

The aim of this study is to shed more light on the controversial issue regarding the direct impact of derivative usage on firm value and earnings quality by providing empirical evidence on the general use (yes-no decision) of derivatives usage as well as on the extent of derivatives usage. Furthermore this study also makes a distinction between the two most used financial derivatives which are foreign currency derivatives and interest rate derivatives and I examine how these two different types of financial instruments directly affect firm value. Therefore the research question of this thesis could be formulated as:

Does corporate hedging using financial derivatives positively affects firm value and earnings quality?

It is important to investigate the usefulness of derivatives usage to investors because, if derivative usage positively affect firm value and earnings quality, this means that investors value the fact that firms use derivatives to hedge against financial risks and therefore take this information in consideration when making economic decisions regarding allocation of resources. This thesis could help managers, policy makers, standard setters and regulators because if derivative usage is value relevant. These parties could anticipate on this by making more efficient and effective (or increasing enforcement on) standards and policies that increase transparency and reduce information asymmetry between managers and users of financial statements, leading to more efficient markets. At the end this would definitely be beneficial for users of financial statements such as investors and auditors because they will have more relevant information which increases their ability to assess liquidity, market and credit risk and understand management's judgment

involved in the valuation techniques of financial instruments. This would eventually enable users of financial statements to make more informed economic decisions regarding the allocation of recourses.

There have been many studies that have investigated the value relevance of derivatives usage by examining the determinants of hedging policy and its association with firm's aspects like investments, growth opportunities and leverage. Because of the unavailability of reliable data on derivatives usage in the period, the majority of these kind of studies are based on survey data, such as (Nance, Smith, & Smithson, 1993) and (Bodnar, Hayt, & Marston, 1996). All of these survey studies basically examine determinants/factors that influence a firms decision to use derivatives and the results of these studies are in general in line with hedging theories of (Smith & Stulz, 1985), (Bessembinder, 1991) and (Froot, Scharfstein, & Stein, 1993). According to the hypothesis of (Modigliani & Miller, 1958), when there are no market imperfections, hedging does not affect firm value. The underlying thought behind this theory is that in perfect markets (markets without imperfections), information regarding risk exposures and risk management is also known to shareholders. Because of the fact that in this scenario, shareholders have all relevant information they need to hedge, shareholders will hedge financial risks themselves by investing in well diversified portfolios. Therefore (Modigliani & Miller, 1958) conclude that in this case, were there are no market imperfection, hedging is useless for a firm in terms that it will not increase firm value because shareholders can more efficiently hedge these risks themselves through diversification. So, in other words this basically means that a change in financial policy like deciding to hedge financial risk by using derivative instruments will not affect firm value but only affect the allocation of the firm's value between the claimholders. However, there are some hedging theories like the ones of (Smith & Stulz, 1985), (Bessembinder, 1991) and (Froot, Scharfstein, & Stein, 1993) that are not in line with the conclusion of (Modigliani & Miller, 1958). These studies argue that there are imperfections in real financial markets because firms face different problems like, costly external financing, high taxes, underinvestment problems, financial distress etc. After adding these frictions into the Modigliani and Miller model, the conclusion of these hedging theories is that using derivative instruments for hedging purpose increases firm value by reducing tax payments, probability of financial distress, cost of external financing and underinvestment problems. Prior literature (which are mainly survey studies) focusing on whether derivative usage indirectly affects firm value through the reduction of tax payments, financial distress and other agency problems is quite rich in amount in contrast to empirical studies that directly examine the impact of derivative usage on firm value (Tobin's q).

Most research investigating the impact of derivative usage on firm value focus on a specific country (the majority of studies focus on the U.S.). For example, (Allayannis & Eli, 2001) analyze whether firm value is positively affected by foreign currency hedging, using a large data set but focusing only on the U.S. (Ayturk

& Yanick, 2016) examine the value relevance of derivatives in terms of whether derivative usage enhances firm value of non-financial Turkish firms. Khediri (2010) uses a sample drawn from firms in France and investigates the value relevance of corporate hedging against foreign exchange risk and interest rate risk using derivatives. The study of Panaretou (2013) focusses as well on a specific country, the focus of her study is on the U.K. and she investigates whether hedging activities have a positive effect on firm value for firms in the UK.

Instead of focusing on a specific country (U.S.), this research focusses on non-financial firms based in different European countries. Because of the differences in corporate governance and firm characteristics between the US based studies and European based firms in this thesis, they might be a difference in how derivatives usage affect firm value and earnings quality. In addition, one could say that this thesis contributes to existing literature by focusing on a wider scope compared to most studies in this field (which increases the external validity).

To my knowledge, this is the first research to assess both whether risk management activities using corporate financial derivatives instruments (currency, interest rate or commodity) to mitigate financial risks have a positive impact on firm value. And at the same time investigating whether derivative usage has a positive impact on earnings quality using the modified jones model and identifying levels of derivatives use (instead of only using a dummy variable) for European listed non-financial firms by constructing a unique hand-collected data set for the period 2008 and 2009.

I find that the extent of derivatives usage (DERIVFV) does not significantly increase firm value, the conclusion stays the same across all regression models of the three proxies (Tobin's Q, Alt.Q1 and Alt.Q2) for firm value. This finding basically means that investors of European listed firms do not consider an increase of a firm's level of derivatives usage as a value adding activity for shareholders. A reason for this finding lies in the high ownerships concentration associated with European firms and the corporate governance in Europe. Furthermore, I find that the (yes-no decision) use of derivatives in general significantly increases earnings quality. In contrast to this finding, I do not find that earnings quality is positively affected by the level of derivatives usage.

Chapter 2 gives an overview of findings of prior research and as well explain how derivatives usage is related with firm value and earnings quality. Chapter 3 focusses on the theoretical framework and hypothesis development. Furthermore, chapter 4 deals with the operationalization of theoretical constructs. Chapter 5 focusses on the results and links these results to hedging theories and prior research and at last, chapter 6 deals with the conclusion, limitations and policy implementations

Chapter 2 – Literature review

2.1 Derivatives usage and firm value

When "derivatives usage" or "hedging" is mentioned in this thesis, this basically means that derivatives are strictly used for hedging purposes instead of speculative purpose. During the past decades there has been a significant development in the research method of studies that examine the value relevance of hedging using derivative instruments. Before the early 1990s, firms did not disclose their derivative positions. At that time some firms considered not disclosing derivative positions as an important aspect of strategic competitiveness (Allayanis & Weston, 2001). However, in the beginning of the 1990's firms where required to disclose the notional amounts of derivatives used, in the notes of their annual reports (Allayanis & Weston, 2001). Before the 1990's, researchers used data that was obtained through surveys to examine the determinants of derivative use. In those kind of studies the relation between derivative usage (dependent variable) and the determinants of hedging (independent variables) which are proxies of frictional costs in financial markets like taxes, expected costs of financial distress and other agency costs were examined in order to assess the value relevance of derivatives. One of the most comprehensive empirical test of this kind of study is the one of (Nance, Smith, & Smithson, 1993). They basically obtained data by sending questionnaires to CFO's of Fortune 500 and S&P 400 firms, which lead to a sample of 169 usable firm responses. The result of their study is that firms facing more convex tax schedules hedge more and using derivative hedging instruments leads to significantly more tax credits as the tax schedule becomes more progressive. They also conclude that firms that hedge more are larger, have less coverage of fixed claims and also have more growth opportunities. Due to the availability of public data on usage of derivative instruments in the beginning of the 1990's, researchers were able to measure the extent of hedging, using notional/fair value amounts of derivatives disclosed in annual reports (Berkman & Bradbury, 1996). The study of (Berkman & Bradbury, 1996) is an important study because it is the first study to empirically examine the value relevance of derivative usage by using fair values and contractual values extracted from financial statements to measure the extent of derivatives usage. Therefore, their study does not suffer from the major limitations of prior studies at that time which were based on survey data. One of the major limitations of studies based on questionnaires/surveys is sampling bias caused by factors like non-response/voluntary response bias whereby responses of firms in the sample are not generalizable to the population. Because firms in the sample do not have the same chance of being drawn from the population of firms, sampling bias could significantly limit the external validity of studies based on

surveys/questionnaires. Another limitation of studies based on survey data is the impossibility of measuring the extent to which firms hedge when using the binary dependent variable for derivatives usage (Berkman & Bradbury, 1996). (Berkman & Bradbury, 1996) Collected the contractual and fair values of derivatives from audited financial statements of 116 New Zeeland firms for the fiscal year 1994 and examined the relation between the extent of derivative use and determinants/market imperfections that might lead to the use of derivatives. As mentioned before, based on the classical Modigliani and Miller theory, a change in financial policy cannot affect firm value if there are no market imperfections (Modigliani & Miller, 1958). However, (Smith & Stulz, 1985), (Bessembinder, 1991) and (Froot, Scharfstein, & Stein, 1993) observe certain market imperfections that could lead to an increase of firm value when derivatives are used. These four identified market imperfections that could lead to the use of derivative instruments are: 1) The presence of costs of financial distress, 2) the progressiveness of effective corporate tax rates, 3) principal-agent problems between equity holders and debt holders and 4) the incapability of risk-averse parties contracting with a firm to diversify the risk of their claims on the firm (Berkman & Bradbury, 1996). In order to operationalize the probability of financial distress (Berkman & Bradbury, 1996) use leverage and interest-cover ratio. Leverage is measured by scaling the book value of debt with the firm's market value and the interest- cover ratio is operationalized using the log of the ratio EBIT (earnings before interest and tax) and interest expenses. They argue that these two proxies they use are good proxies because institutions such as banks also use these ratios/proxies to assess financial distress. Based on (Smith & Stulz, 1985), corporate hedging using derivatives can reduce a firm's probability of encountering financial distress by reducing the variability of future cash flows, which leads to a reduction in volatility of firm value and therefore a reduction in cost of debt. Therefore (Berkman & Bradbury, 1996) expect that hedging will reduce expected costs of financial distress. The expectation regarding the second market imperfection is that firms with derivatives are more likely to have tax losses carried forward. This is in line with (Smith & Stulz, 1985) who argue that hedging can reduce the expected taxes by smoothing taxable income if the firm is established in a country which has an effective progressive/convex tax system. Regarding the third market imperfection (Berkman & Bradbury, 1996) argue that shareholders have the incentive to underinvest by foregoing projects with a positive net present value if the gains of these projects are primarily allocated to the debt holders. In cases whereby firms have a high leverage and valuable growth options, it is more likely that these firms will be confronted by the underinvestment issue. However, based on (Bessembinder, 1991)**)**, usage of derivative contracts can solve this underinvestment problem by increasing the number of future states in which shareholders are the residual claimholders. Therefore (Berkman & Bradbury, 1996) predict that the extent of derivative usage will be higher for firms with high leverage and valuable options. The underlying thought behind the last market imperfection is that if several parties such as managers, who have

a contract with a firm are unable to diversify idiosyncratic risks of the firm, these parties will require an extra compensation for bearing the risk that is not diversifiable. In this case, the authors argue that an increase in firm value could be realized through hedging, that leads to a reduction in volatility of firm value. However, an increase in firm value will only be achieved if the cost of hedging is smaller than the extra compensation paid to the contracting parties in the situation without hedging. Amongst others, the empirical results of (Berkman & Bradbury, 1996) show that corporate derivative use increases with leverage, size and the existence of tax loses. In general the results of (Berkman & Bradbury, 1996) are consistent with the finance theories in the studies of (Smith & Stulz, 1985), (Bessembinder, 1991) and (Froot, Scharfstein, & Stein, 1993) that suggest that corporate hedging through derivatives can lead to an increase in firm value by reducing the uncertainty of expected costs of financial distress, the expected taxable income and agency costs.

As mentioned before, in contrary to the rich empirical evidence that derivatives usage indirectly increases firm value, there has been little empirical research done on whether derivatives usage directly affects firm value. Moreover, in the little amount of existing literature, there is no consensus on whether using derivative instruments for hedging purpose increases firm value and earnings quality. The first empirical study to investigate if derivative usage directly affects firm value is (Allayanis & Weston, 2001). The sample in their study consists of 720 large U.S. nonfinancial firms from the period between 1990 and 1995. Financial firms are not included in the sample because most of them are market makers in foreign currency derivatives, and might therefore have different motives for the usage of derivatives compared to non-financial firms. Public utilities are also not included in the sample because of the fact that they are heavily regulated. Furthermore, they make a distinction between firms that hedge and firms that do not hedge and examine whether there is a difference in firm value between firms that have a similar exposure to exchange rates. (Allayanis & Weston, 2001) Use the Tobin's Q ratio in order to measure a firm's value, which is the dependent variable. Data from COMPUSTAT is used for the calculation of Tobin's Q. The dependent variable is calculated by adding up the market value of equity, preferred stocks and total value of debts and dividing the sum by the total assets. After generating Tobin's Q, the researchers observe that the distribution of this variable is skewed and therefore does not have a normal distribution. In order to correct for this skewness and to make the dependent variable more symmetric, the natural log of Tobin's Q is used. One of the reasons why (Allayanis & Weston, 2001) use Tobin's Q as proxy for firm value is that this measure makes comparisons across firms relatively easier than comparisons based on stock returns or accounting measures were normalization is required. The use of derivatives, which is the main independent variable is measured by extracting information regarding the notional amount of currency derivatives used from the annual reports of the sample firms. Besides that, other variables that could also have an impact on firm value are taken into

consideration. These control variables that are used in the multivariate tests are: size (log of total assets), access to financial markets (dividend dummy which equals 1 if the firm paid dividend in a specified year), leverage (long term debt /shareholders equity), profitability (ROA= net income/total assets), investment growth (capital expenditures/sales), industrial diversification (dummy variable which equals 1 if a firm operates in more than 1 industry, industries are based on SIC codes from COMPUSTAT), geographic diversification (foreign sales divided by total sales), industry effect (industry-adjusted Tobin's Q), credit rating (using S&P and Moody's information and creating 7 indicator variable that measure the credit quality) and finally, the last control variable is a control for time effects by using year dummies in all regressions. The result of the study (Allayanis & Weston, 2001) is in line with their expectation that firms which are exposed to foreign exchange risk and use foreign currency derivatives are rewarded by investors with a higher market valuation. To be specific, (Allayanis & Weston, 2001) find that compared to firms that do not use foreign currency derivatives while being exposed to currency risk, firms that use foreign exchange derivatives on average have a significant higher firm value of 4.87%. Moreover, this result is robust to several control variables and different measures of Tobin's Q. However, (Guay & Kothari, 2002) find that based on the cash flows generated by hedge portfolios, the impact of derivatives usage on firm value of U.S. firms is too small to be responsible for the valuation premium reported by (Allayanis & Weston, 2001). (Guay & Kothari, 2002) Argue that the positive impact of derivative usage on firm value found in (Allayanis & Weston, 2001) is more of a reflection or tendency of a successful firm to use derivatives.

(Graham & Rogers, 2002) Also examine whether derivatives usage affects firm value. The researchers collect 10-K fillings of 3232 U.S. firms for the fiscal year 1995. The choice to collect data for the fiscal year 1995 is an important decision because in 1994, the FASB (Financial Accounting Standard Board) issued SFAS 119, which became effective for fiscal years ending after December 1994 and requires U.S. firms to disclose notional values of derivatives. In order to assess whether a company uses derivatives, (Graham & Rogers, 2002) use certain key words such as, "hedg", "swap" and "derivative" and read the surrounding text to be sure that the key words refer to derivative holdings. Because this method is quite time consuming, the researchers create a random sample of 855 firms from the population of 3,232 firm's 10-K fillings. From the sample of 855 firms, 442 10-K fillings of firms are retained that include all needed information. Besides measuring the extent of hedging, also a binary variable is created that equals 1 if a firm uses derivatives to hedge. They find that on average, hedging through derivatives significantly increase market value by 1.1%. (Graham & Rogers, 2002) Argument is that derivatives usage reduces earnings volatility and therefore increases the debt capacity of a firm, which in turn leads to an increase in tax shield because of the fact that interest paid on debt is tax deductible. Consistent to this are the results of (Nain, 2004). However, (Nain,

2004) uses a different and unique approach by shifting the focus and investigating what happens when firms do not hedge in an industry were hedging is common practice. In other words, (Nain, 2004) examines if foreign exchange derivatives are value relevant by examining the value of U.S. firms that do not use foreign exchange derivatives while foreign exchange derivatives are commonly used within the industry they operate. (Nain, 2004) Find that firms who choose not to hedge foreign exchange risk in industries where the use of foreign exchange derivatives is common have a 5% lower firm value (Tobin's Q) compared to their competitors that hedged.

The study of (Bartram & Brown, 2011) is one of the very few studies that uses a sample consisting of firms in several countries to investigate the impact of derivative usage on firm value. 6,888 non-financial firms from 47 countries exist in the sample and annual reports related to the fiscal years 2000-2002 are collected from Thomson Analytics database. Information extracted from the annual reports is used to assess level of derivative usage, which is the main independent variable. (Bartram & Brown, 2011) Choose to use Tobin's Q as proxy for firm value because of its simplicity, which enables them to generate values for almost every firm in their sample. The authors also control for variables that might affect firm value such as, size, profitability and leverage. Overall, (Bartram & Brown, 2011) conclude that corporate hedging of currency risks, interest rate risks and commodity risk using derivatives positively affects firm value. Inconsistent with this result is the study (Khediri, 2010). (Khediri, 2010) Tests whether investors attribute higher market values to firms that use foreign currency derivatives and interest rate derivatives using a French sample of firms. A binary variable as well as a continuous variable is created as a proxy for derivatives usage/extent of derivatives usage and the dependent variable is operationalized using Tobin's Q. Khediri also controls for other factors which could affect firm value and uses a panel data with fixed effects instead of pooled OLS in order to solve the heteroscedasticity problem for Tobin's Q. He finds that derivatives use does not have a significant impact on firm value, which means that investors do not value firms in France higher compared to French firms that do not use derivatives. Khediri's explanation for this result is that corporate governance is weaker in France compared to the U.S. because of the fact that legal protection of investors is weaker in France. Besides that, ownership is more concentrated in French firms were there is usually one major shareholder such as founding families. Therefore, (Khediri, 2010) argues that managers of French firms, that use derivatives, should increase transparency regarding this issue by explaining that derivatives are strictly used for hedging instead of speculation purposes and amplify how such a hedging strategy enhances firm value.

The study of (Khediri, 2010) relates to (Allayannis, Lel, & Miller, 2012) in terms that they take corporate governance environment in consideration when assessing the impact of derivatives usage on firm value. (Allayannis, Lel, & Miller, 2012) State that besides using derivatives for hedging, firms can also use derivatives for speculation. Using derivatives for speculation does not benefit investors on average. Therefore, firms that use derivatives for speculation could have an incentive to hide this sensitive information in mandatory reports such as annual reports. (Allayannis, Lel, & Miller, 2012) Argue that investors can assess the firm's motive of using derivatives based on the firm's internal and external corporate governance. The researchers follow the methodology of (Allayanis & Weston, 2001) by using Tobin's Q (dependent variable) as a measure for firm value, using data extracted from annual reports to measure the extent of hedging and also using a binary variable to proxy derivatives usage. Further, (Allayannis, Lel, & Miller, 2012) also control for variables that potentially might affect firm value. The empirical tests lead to the conclusion that usage of currency derivatives significantly increases a firm's value by 10.7%, which is higher than the 4.9% increase in the study of (Allayanis & Weston, 2001). Moreover, (Allayannis, Lel, & Miller, 2012) empirically test and observe that firms with a strong corporate governance are rewarded with a higher premium for the use of currency derivatives compared to firms with a weak corporate governance.

There are also some studies that examine the value relevance of firms in specific industries such as (Carter, Rogers, & Simkins, 2006)**)** and (Jorion & Jin, 2006). (Carter, Rogers, & Simkins, 2006) Focus on the commodity/fuel price risk in the U.S. airline industry and investigate jet fuel hedging. They conclude that hedging fuel price risk, using derivatives, is positively associated with an increase of firm value by 14%. The authors argue that this relatively high hedging premium is because hedging enables airlines to expand operations when the industry is going through tough times, thereby mitigating the underinvestment issue. (Jorion & Jin, 2006) Focus on the oil and gas industry and find no evidence that derivatives usage positively affects firm value.

As mentioned before, besides using derivatives as an instrument to reduce sensitivity to certain financial risks, firms could also use derivatives for speculation purpose, whereby exposures to certain financial risks are increased. (Bartram S. B., 2009) Finds that more than the half of the firms in their study use derivatives to hedge financial risks instead of usage for speculation purposes. (Bartram S. B., 2009) Investigated the annual reports published in 2000-2001 of 7292 nonfinancial firms in 48 countries. They found out that 59,8% of the firms use derivatives, the most used derivatives in this study where foreign currency derivatives which were used to hedge foreign currency transactions and interest rate derivatives to hedge interest rate fluctuations. (Allayannis & Eli, 2001) Also examine whether firms use derivatives for hedging or

speculative purposes by using a sample of S&P 500 non-financial firms in 1993. The result of their study is that on average, currency derivative use has a significant negative impact on firm exchange-rate exposure, suggesting that on average firms use derivative for hedging exposure to financial risk rather than to speculate (Allayannis & Eli, 2001).

Based on the empirical studies above, one can state that firms mainly use derivatives to reduce their exposure to certain financial risks. In other words, the primary purpose of most firms when using derivatives is to hedge risks instead of using derivatives for speculation.

It is important to realize that derivative usage is not the only instrument firms can use as a corporate risk management strategy. Firms could also decide to engage in risk management by changing their operating and financial strategies. A company can for example chose to reduce its exposure to financial risks by merging, acquiring a firm which is usually smaller in size or relocating production facilities to foreign countries (Liu & Nagurney, 2011) . However, Berkman and Bardbury argue that a firm has much more flexibility in adjusting the maturity and size of its financial instruments/derivatives compared to adjusting its operating and financial strategies (Berkman & Bradbury, 1996). So it is likely that financial instruments like derivatives are used to manage the risk exposure of a firm, after operating and financial decisions have been made.

2.2 Derivatives usage and earnings quality

One of the most influential academic paper that played an important role in accounting research is the one of (Ball & Brown, 1968). (Ball & Brown, 1968) Examine the value relevance of accounting earnings by empirically investigating the impact of accounting information (earnings announcement) on capital markets. This study was very influential because at that time there was a prevailing view that historical numbers are useless and stock markets were viewed as irrational. One of the findings of Ball and Brown is that firms with unexpected increase in earnings are associated with positive abnormal stock returns and vice versa. This finding indicates that earnings are useful to investors because they contain new information which affects investor's economic decisions regarding the allocation of their resources. If a firm uses derivatives for hedging purposes instead of speculation purposes, (Allayannis & Eli, 2001) and (Bartram & Brown, 2011) show that derivatives usage could reduce a firms exposure to certain financial risks (foreign exchange, interest rate risk and commodity risk), this results in less volatility in a firms future cash flows/ earnings. The reduced volatility in earnings/cash flows increases the earnings quality because it makes earnings more persistent and therefore more useful to users of financial statements such as, investors and analysts. Due to the smoothness of future earnings as a result of hedging, investors and financial analysts are able to make

more predictable and therefore more reliable estimates regarding the future performance and valuation. Because of this, investors, financial analysts and shareholders assign more value to firms with less volatile income and they consider firms with less volatility in earnings to have better future prospects (Healy & Wahlen, 1999). Because using derivatives for hedging purpose is a tool a firm can use to reduce volatility in earnings/cash flow, one can say that using derivatives can increase earnings quality by reducing the volatility in the cash flows/earnings and making earnings more persistence. This statement is backed up with empirical studies such as the one of (Bartram & Brown, 2011). (Bartram & Brown, 2011) Shows that derivative usage significantly reduces the exposure of financial risks by 15%-31% and find that firms that hedge experience on average 18% lower return volatility. This is an indication that hedging makes earnings less volatile which is turn enables investors to predict a firm's future prospect more accurately. Therefore I expect that derivative usage for hedging purposes will positively affect earnings quality.

According to the FASB's conceptual framework, earnings quality is determined by four qualitative concepts: relevance, reliability, comparability, and consistency. Relevance means that the information (earnings) are useful to investors for decision making purpose. Reliability refers to when information is accurate, true and fair. Comparability entails that information allows the user to identify differences and similarities between two sets of economic phenomena. Finally the last concept is consistency, which refers to unchanging policies and procedures, which are constant from period to period. The problem with these concepts is that they are hard to operationalize and they can be conflicting. For example, when calculating fair value, certain estimation are required by managers such as the discount rates and expected future cash flows. Because of managements estimations involved, fair value might not be reliable but on the other side be relevant to investors. So in a way a trade between the qualitative concepts has to be made. Fortunately certain researchers have found proxies to operationalize earnings quality. One of these proxies are discretionary accruals which are derived from the modified jones model introduced by (Dechow, Sloan, & Sweeney, 1995).

Dechow (1994) explains that earnings consist of cash flows and accruals. The reason why accruals are important is related to two important accounting principles: the revenue recognition principle and the matching principle. Cash flows suffer from timing and matching problems, therefore, performance measures evaluated solely from a cash accounting basis might be misleading and will not give a good reflection of the economic reality regarding the performance of a firm in a certain period. For example, suppose that a firm sales goods with a value of $1000 whereby the customer pays $200 dollar in cash and the remaining $800 dollar is sold on credit. In addition, the firm's cost of goods sold are $500 and the goods were bought on credit. When using accrual-based accounting and applying the revenue recognition principle, earnings

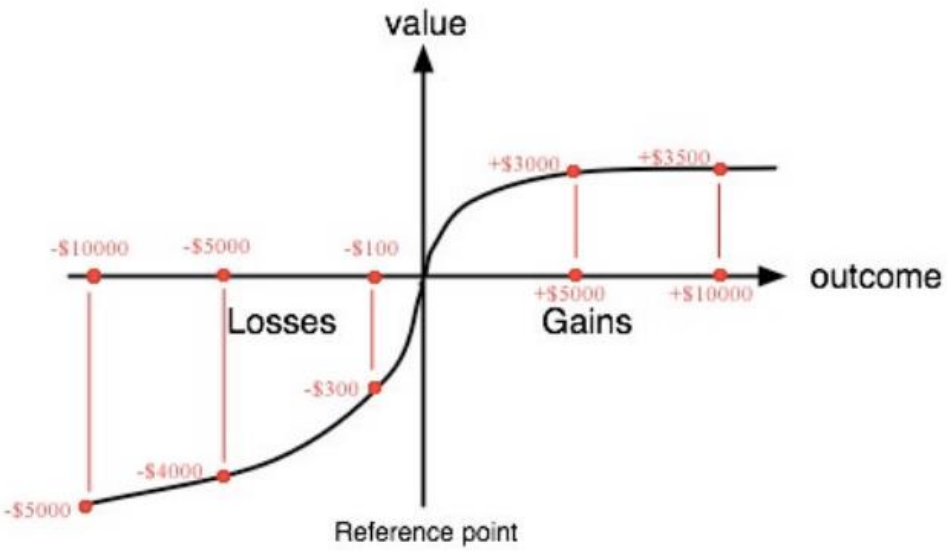
are (1000-500) $500. However, the same firm's performance, based on a cash flow basis would be the received $200. Obviously, the earnings based on a cash flow basis suffer from timing and matching problems because they don't take receivables and payables (accruals) into consideration when measuring performance. Moreover, (Dechow P. M., 1994) empirically finds a stronger association between stock returns and accrual based earnings than between stock returns and cash flows which indicates the importance of the accruals portion of earnings when evaluating performance. The revenue recognition principle is linked to the timing of revenue and requires revenues to be recognized when a firm has performed al services or a substantial portion of services to be provided and there is a reasonable certainty that cash will be received (Kieso, Weygandt, & Warfield, 2010). The matching principle requires cash outflows that are directly linked with revenues to be expensed in the period in which the firm recognizes the revenue (Kieso, Weygandt, & Warfield, 2010). Accruals are important because they correct cash flow from timing and matching problems when evaluating the performance of a firm in a specific period. So, accruals basically improves the earning's ability to reflect firm performance (Dechow P. M., 1994). However, managers have the ability to affect earnings by using discretionary accruals in a way that negatively affects earnings quality. This has to do with the discretion managers have when determining discretionary accruals.

As mentioned before, earnings consists of cash flows and accruals that correct the matching and timing problems associated with cash flows. In contrary to cash-basis accounting, when a company uses the accrual based method, the company is required to record transactions when expenses have been incurred and when revenue has been earned even though there has not yet been an actual cash transaction (Kieso, Weygandt, & Warfield, 2010). Accruals could be divided in discretionary (manageable) accruals and non-discretionary (non-manageable) accruals. Discretionary accruals are recognized by the subjectivity or discretion managers have when determining estimates regarding items such as, depreciation costs or bad debt provisions. In short, the difference between discretionary accruals and non-discretionary accruals is basically that discretionary accruals are not explained by economic fundamentals.

According to the meta-study of (Healy & Wahlen, 1999) managers have various reasons to manage earnings. One of the major reasons why managers manage earnings are related to capital markets. In line with the prospect theory, (Dichev & Burghstahler, 1997) argue that the investors are more sensitive to losses than gains, therefore, firms are severely punished when they don't meet or beat analysts' consensus forecasts. Because manager's performance is judged based on the stock performance of the firm, managers could have an incentive to manage earnings to a level that just meets or exceeds analyst's forecasts in order to receive their huge bonuses (Dichev & Burghstahler, 1997). Figure 1 reflects the prospect theory that investors are more sensitive to losses than gains. When comparing a $ 5000 gain with a $ 5000 loss, figure 1 shows that

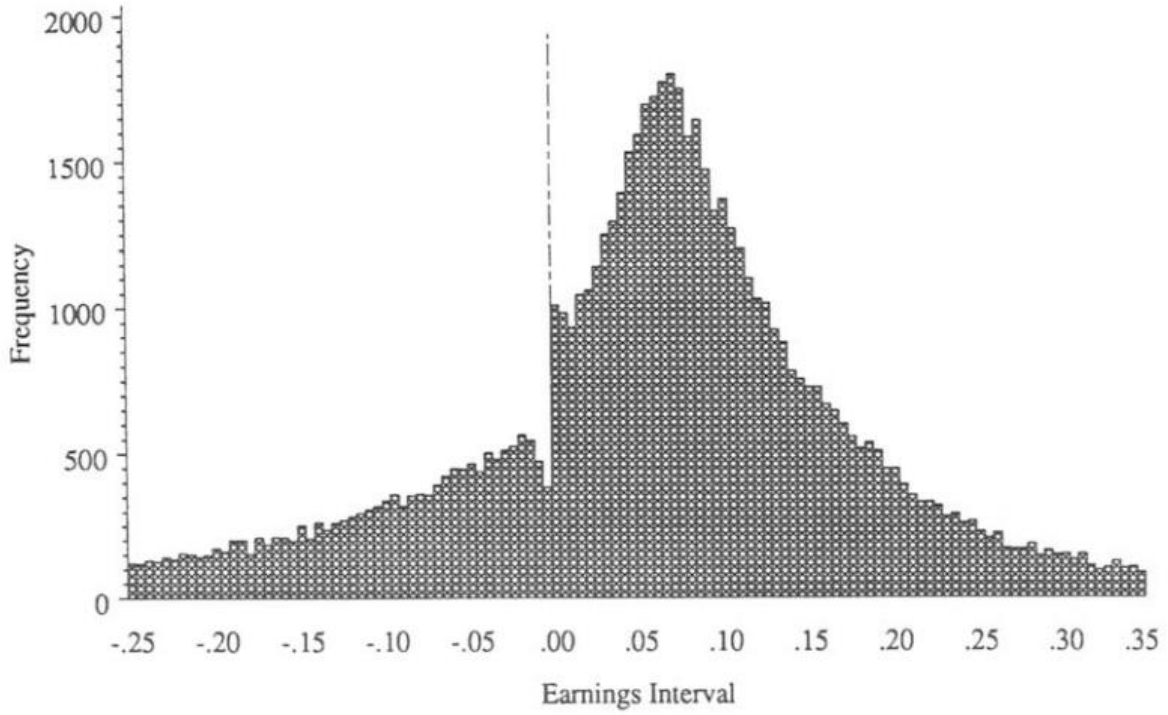
the $ 5000 gain leads to an increase in utility value by $3000 while the same amount in losses (- $5000) leads to a decrease in utility value by $4000. The fact that the utility loss of $4000 associated with the $5000 loss is larger than the utility increase of $3000 associated with the $5000 gain clearly shows that investors are more sensitive to losses than gains. Figure 2 consequently illustrates the discontinuity in distribution of earnings which implies that managers of firms anticipate on the investor's higher sensitivity to losses. Because of the asymmetric investor's reaction to losses compared to gains, managers have the incentive to manage earnings upwards by using discretionary accruals when they find themselves in a situation whereby the firm slightly made a loss or did not meet or beat the earnings consensus forecasts (Dichev & Burghstahler, 1997).

Figure 1



The steepness in the S-curve indicates that investors are more sensitive to losses compared to gains.

Figure 2



Discontinuity in the distribution of earnings whereby annual income is scaled the beginning of the year's market value. The peak around zero indicates that managers manage earnings upwards to avoid small losses (Dichev & Burghstahler, 1997).

According to (Dichev & Skinner, 2002) another reason for managing earnings is related to debt contracts, firms that are close of violating debt covenants have an incentive to manage earnings in order to avoid that the bank will increase the required interest rate payable. Firms could also manage earnings for regulation purposes, an interesting example of such a case is the study of (Key, 1997), which focusses on the cable TV industry in the U.S. The cable TV industry was deregulated in 1984, this basically meant that cable TV providers were no more subjected to regulated rates regarding the provision of their services. After massive complains of consumers about the poor services and high rate increases, the cable industry came under scrutiny in the period 1989/1990 and Congress was considering to re-regulate the cable-industry. (Key, 1997) provides empirical evidence that during the period of congressional scrutiny, firms that would potentially be more negatively affected by the considered re-regulation of the industry chose to manage earnings down by using income decreasing discretionary accruals as an attempt to avoid regulation. There are different ways managers could inflate earnings in order to mislead stakeholders about the underlying

economic performance of the firm. One of the most common way managers could manage earnings is by using discretionary accruals in order to artificially boost up earnings, which obviously negatively affects earnings quality. Because discretionary accruals play a significant role and is one of the most used tool to manage earnings, most studies (including this thesis) use discretionary accruals to assess earnings quality (Healy & Wahlen, 1999) (Dichev & Skinner, 2002), (Key, 1997).

2.3 Hedge accounting

David Tweedie, who was chairman of the IASB board once said that "If you understand it, you haven't read it properly" (ICA, 2010)**.** This statement is in line with the consideration that financial instruments are the most complex international financial reporting standards. IAS 39, which was drafted in the early 1990's and became effective in 2001 and IFRS 9, which partly replaces IAS 39 and will be effective on the 1 January 2018. Both IAS 39 and IFRS 9 deal with the recognition and measurement of financial instruments. Besides IAS 39 and IFRS 9, there is also IFRS 7 which also deals with financial instruments. IFRS 7 was issued in 2007 as a reaction to the financial global crisis with the objective to increase transparency/disclosure in financial instruments used by companies. IFRS 7 basically requires firms to disclose information that will enable its financial statement users to evaluate the nature and extent of risks arising from financial instruments it is exposed to, at the end of the reporting period (ICA, 2010).

According to the U.S. Department of the Treasury, derivatives are defined as *"a financial contract whose value is derived from the performance of underlying market factors, such as interest rates, currency exchange rates and commodity, credit and equity prices"* (U.S. Department of the Treasury, 2016). There are different types of derivatives that could be used for hedging purposes like for example forward contracts, options and swaps to hedge against currency risk, interest rate risk and commodity risk. According to IAS 39 and IFRS 9 the term 'hedging' means: *"Making an investment in derivative instruments or acquiring non-derivative instrument in order to offset potential losses (gains) that may be incurred on some items as a result of a particular risk* (Picker & Leo, 2012)*."* So based on this interpretation, if a company holds derivatives for hedging purposes, one could say that these derivatives could reduce the firm's exposure to a certain financial risk.

To give an example, for companies operating worldwide, uncertainty regarding the fluctuation of currency rates could be a major risk. To illustrate this issue, assume that at the moment 1 euro=1,20 U.S. dollar and a U.S. firm sells goods worth 100 million euros to a European client. The U.S. firm which sells the goods in Europe expects to receive the 100 million euros in six months. Over the next six months, if the price of the euro falls by 10 percent, the U.S. firm (exporter) would lose 12 million dollar. However, by using a

forward contract, the U.S. firm/exporter locks in the current forward rate, which eliminates the exposure to the uncertainty regarding foreign exchange rate fluctuations (Stulz, 2004).

Another similar example that shows the relevance of hedging is the situation of Daimler-Benz in 1995 when it reported losses in its half year of DM 1,56 billion (Stulz, 1996). This was the largest loss in the 109 year history of the company. Management reported in public statements that the loss was a result of the exchange rate loss associated with the weakening of the US Dollar. It all began with an order received by the subsidiary Daimler-Benz of DM 20 billion, of which 80% was going to be paid in US dollars. During the period in which the receivable was about to be paid, the US dollar strongly lost 14% of its value. The management of Daimler-Benz had not anticipated on the strong depreciation of the US dollar and therefore did not hedge the receivable which lead to a DM 1,2 billion loss. So this basically means that the huge loss could have been prevented/mitigated if the management of Daimler-Benz had used derivatives such as a forward currency derivative to hedge the uncertainty associated with foreign exchange movements.

When talking about hedging, IAS 39/IFRS 9 requires a distinction to be made between the hedged risk, hedged item and hedging instrument (EY, 2014).

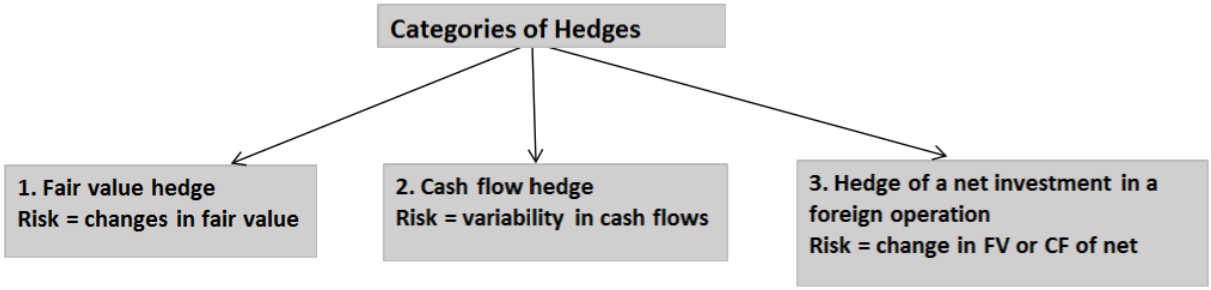
The hedged risk in the example above is the foreign currency risk, in other words, the hedged risk refers to the uncertainty regarding foreign exchange rate fluctuations that might potentially have a negative effect on the firms performance.

The hedged item is an item that could be reliably measured and that is exposed to a certain financial risk, a hedged item could be a recognized asset or liability, an unrecognized firm commitment, a highly probable forecast transaction or a net investment in a foreign operation (EY, 2014). In the first example case, the hedged item is the 100 million euro receivable which is expected to be received in 6 months and therefore exposed to exchange rate/currency risk.

The hedge instrument could be interpreted as a derivative instrument held with the purpose to eliminate or to reduce the financial risk to which the hedged item is exposed, to an acceptable level. In this case the hedge instrument is considered as the foreign exchange forward contract which is used by the U.S. firm to mitigate its exposure to the volatility of the foreign exchange rate risk by enabling the U.S. firm to convert the 100 million euro receivable at a fixed date (after 6 months) and for a fixed rate, whereby 1 euro is equivalent to 1,20 dollar.

Hedge accounting means: *"Designating one or more hedging instruments so that the change in value offsets the change in fair value or cash flow of a hedged item.* (Picker & Leo, 2012)*"*

Figure 3 – Categories of hedge accounting



Hedge accounting can be applied to three types of hedges which are categorized based on the type of risk (Picker & Leo, 2012). The first category is fair value hedge whereby hedge accounting is applied to mitigate risk regarding changes in fair value items. The second hedge accounting category is cash flow hedge, which is applied to mitigate the risk of variability in cash flows. And the last hedge accounting category is the hedge of a net investment in a foreign operation which can be used to reduce the risks regarding the change in fair value or cash flow volatility of the net investment in a foreign operation.

In order to apply hedge accounting, IAS 39 requires firms to meet strict conditions. One of the conditions that have to be met in order to apply hedge accounting is that the hedging relationship between the hedged item and hedge instrument must be documented in detail and be effective (EY, 2014). In this context the term "effective" means that changes in the fair value of the hedging instrument have to be within 80 to 125% of the opposite change in fair value of the hedged item. If for example, when comparing the change in fair value of the hedge instrument with the change in fair value of the hedged item and the conclusion is that the change in fair value of the hedge instrument is more than 125%, this means that there is an effective and an ineffective part. The fair value change of the hedge instrument that exceeds 125% of the change in fair value of the hedged item is considered as ineffective and is recognized in the income statement (P&L) and the effective part is recognized in the other comprehensive income. There is one exception which applies for hedges of net investments in foreign operations, in this case the change in fair value of the hedge instrument that exceeds 125% of the fair value change of the hedged item is not accounted in the income statement but in the other comprehensive income (EY, 2014).

To illustrate how to account for the change in fair value of a foreign currency forward with and without hedge accounting according to IFRS 9/IAS 39, the example of the U.S. firm selling goods in Europe will be used. First of all, if hedge accounting was not applied, all gains and losses regarding the change in fair value of the foreign currency forward would be immediately accounted/recognized in the income statement (P&L).

Therefore, the journal entry without hedging would be:

DEBIT: Finance expenses - loss on foreign currency	**CREDIT: Liabilities from foreign currency forward**

When applying hedge accounting, the type of hedge will be classified as a cash flow hedge. This means that the U.S. firm will recognize the full or a part of the losses or gains resulting from the change in fair value of the foreign currency forward directly in equity/other comprehensive income. Therefore, the journal entry when applying hedge accounting would be:

DEBIT: OCI - effective portion of a cash flow hedge **DEBIT: Finance expenses - ineffective portion of a cash flow hedge**	**CREDIT: Liabilities from foreign currency forward**

When assessing the impact of the cash flow hedge on the performance of the U.S. firm by observing the financial statements. One can conclude that when applying hedge accounting, earnings are less volatile because the gains/losses regarding the change in fair value of the hedge instrument, which are effective, are not recognized in the profit and loss statement but are recognized in other comprehensive income/equity. So, in other words, the variability of earnings is reduced when using hedge accounting in this case because you basically match the gains and losses of the hedge instrument with the gains/losses on the hedged item.

Chapter 3 – Theoretical framework and hypothesis development

3.1 Hypothesis 1 development

The main (alternative) hypothesis is:

H1 (alternative): Corporate derivatives usage for hedging purposes significantly increases firm value.

This hypothesis is partly based on theories of (Myers, 1977), (Stulz, 1996), (Bessembinder, 1991), (Smith & Stulz, 1985) and results of empirical studies such as (Allayanis & Weston, 2001), (Allayannis, Lel, & Miller, 2012), (Berkman & Bradbury, 1996) and (Graham & Rogers, 2002) .

The positive theory of hedging by (Smith & Stulz, 1985) suggests that hedging increases firm value through the reduction of expected tax expenses when a firm is confronted with a convex tax structure. The statutory progressiveness of the tax schedule is one of the factors that makes the tax schedule convex because in such a system, firms that make higher profits before tax pay relatively higher taxes compared to firms with relatively lower pre-tax income. Besides the statutory progressivity, other factors such as a tax loss carry forward also lead to a more convex tax schedule. Figure 4 shows that in a progressive/convex corporate tax system, the effective marginal tax rate of a firm is an increasing function of its pre-tax value. Due to the convexity, a relatively higher portion of the increase in pre-tax value is paid to tax authorities. This means that a relatively lower portion of the increase in pre-tax value stays within the company, therefore according to the hedging theory of (Smith & Stulz, 1985), the after-tax value of the firm is a concave function of its pre-tax value. The thought behind this theory is that, using derivatives to hedge reduces the volatility of the firm's pre-tax value or taxable income. So hedging basically makes the firm's pre-tax value smoother which leads to a less progressive pre-tax value and therefore a reduction in the present value of future tax liabilities which eventually increases the firms value as long as the cost of hedging is not to large (Smith & Stulz, 1985).To sum up, the positive theories of hedging basically argue that firm value could be enhanced by reducing a firms overall exposure, which consequently leads to a reduction of external claims on the firms cash inflow resulting from the firm's assets. Besides tax expenses, these claims include also bankruptcy costs and in general, costs associated with financial distress.

(Stulz, 1996) Also emphasizes on the fact that using derivatives as a risk management tool can increase firm value. Based on the finance theory, shareholders will require a higher rate of return for firms with a higher level of risk. However, the required rate of return or the cost of capital of a firm is only dependent on systematic risk (non-diversifiable risk) instead of the total risk. This means that shareholders are only rewarded with a higher rate of return for bearing only systematic risk. Systematic risk can be defined as the extent to which a firm moves (covariance) with the market. Stulz argues that most financial exposures are

unsystematic (diversifiable/idiosyncratic) and shareholders have an inexpensive risk management tool to reduce the unsystematic risk compared to firms. Therefore, firms that reduce this type of exposure will note be rewarded with a reduction of their cost of capital. In other words, reducing idiosyncratic risk will not lead to a higher firm value, because the cost of capital, which is used to discount future cash flows in order to assess the value of a firm, will not be reduced. Investing resources in hedging programs that use derivatives to reduce financial exposures is only useful if the cash flow variability caused by such risks have the potential to impose "real costs" on the firm. Based on academic literature (Stulz, 1996) comes up with three major costs related to higher variability of a firms cash flow caused by financial risks which are: 1) higher bankruptcy and financial distress costs, 2) higher expected payments to stakeholders, including higher rate of return demanded by shareholders and 3) higher expected tax payments. (Stulz, 1996) Argues that the effectiveness of corporate risk management by using derivatives for hedging purposes is its ability to reduce each of the three costs mentioned above.

Stulz argues that well-diversified shareholders will only be concerned about the cash flow variability caused by volatility in foreign exchange rates and commodity prices only if the currency and commodity risk materially raises the probability of financial distress. In an extreme scenario, a firm that has a lot of debt could experience a significant decrease in operating cash flow due to the unhedged exposures to financial risks and eventually have no other choice than to file for bankruptcy.

Bankruptcy costs could be divided in direct costs related to administration and reorganization such as court and lawyers expenses and the potentially larger indirect costs. Indirect costs are potentially larger than direct costs because indirect costs of bankruptcy affects a firms investment and operating decisions and could significantly reduce the ongoing operating value of the firm (Stulz, 1996)

If bankruptcy is considered as a real threat, the present value of the expected costs regarding the possibility of bankruptcy will be reflected in the current market value of the firm. (Stulz, 1996) Argues that hedging can basically reduce the variability of cash flows to an extent that default is not a possibility anymore. Because of the eliminated bankruptcy threat, one could say that firm value is increased by risk management. The increased amount in firm value as a result of hedging/risk management could roughly be retrieved by multiplying the bankruptcy cost by the probability of bankruptcy in case the firm remains unhedged. To illustrate this, (Stulz, 1996) gives an example whereby the market value of a firm is $100 million and assumes that the expected bankruptcy costs will be $25 million (25% of the firms' market value). Further, an assumption is made that 10% is the probability of bankruptcy in the case the firm does not hedge. The probability of bankruptcy for this firm is quite low, which means that this company is quite healthy. However, risk management can increase firm value by $2,5 million (10% x $25 million) or 2.5%. Obviously,

based on this rationalization, the contribution of risk management to firm value will be even higher for a firm which is confronted with a higher probability of bankruptcy and bankruptcy costs. This argument is an extension of financial distress in general. If a firm is financially weak, raising funds to finance projects will become more difficult for the firm. At a certain point, the costs of external financing, if even available, will rise to a level that managers might eventually choose to bypass projects/investments that are profitable. This underinvestment problem, to which firms that face a financially tough period are confronted to, represents an important cost of financial distress. (Stulz, 1996) Also argues that risk management can also increase a firm's market value by reducing the expected probability of financial distress and the costs related to underinvestment.

The second channel through with risk management can increase firm value is by reducing payments to stakeholders. One of the stakeholders of a firm are shareholders. If a firm is exposed to unhedged financial risks that have the potential to significantly affect a firms performance and its ability to fulfill its obligation, or in other words, if there is a chance that the shareholder's investment in the firm could vanish due to financial distress, shareholders are likely to demand extra compensation to bear the increased risk. Obviously this is not favorable for the firm because this would increase the cost of capital of the specific firm which eventually leads to a lower firm value. Hedging exposures in this case adds value for the firm by reducing the shareholder's risk and their required rate of return on investments/cost of capital for the firm.

Because of the increased financial distress resulting from unhedged exposures to financial risks. Other stakeholders such as employees will take the potentially higher possibility of getting fired into consideration and might therefore demand higher wages or even reduce their loyalty and work effort. Managers who have other opportunities and are approached to run a firm with significant risks of insolvency and loss of their reputation are also likely to demand higher salaries. Consequently, uncertainty of a firms cash flows due to unhedged exposures could lead to unfavorable outcomes for a firm when dealing with suppliers. The reason for this is that suppliers will probably not be willing to engage themselves in long term contracts with such a company. Moreover, due to the uncertainty of receiving their money back, it is likely that creditors will be less flexible and charge more. Customers could also be concerned about the ability of the firm to fulfill their promised services in the future such as warranty obligations. This could eventually be a reason for customers not to purchase the firms products or services, leading to a further decrease of the firm's profit. (Stulz, 1996) Is convinced that corporate hedging can eventually mitigate exposures to significant financial risk that would otherwise negatively affect the firm's future prospect. He argues that risk management (derivatives usage) can basically increase firm value by reducing uncertainty regarding the firms expected

cash flows, which enables the firm to make more favorable contract terms with corporate stakeholders and therefore reduces payments to the firm's stakeholders (Stulz, 1996).

The reduction of tax expenses is the third channel through which hedging or risk management can increases value according to (Stulz, 1996). Given the fact that most of the world's corporate tax rates are progressive. The underlying thought behind this theory is that due to the convexity of tax rates, companies could benefit by managing taxable income in a way that a large portion or as much as possible of the taxable income falls within an optimal range . By reducing the variability in taxable income and ensuring that the largest part of the firm's taxable income will fall within the optimal range of tax rates, risk management/hedging eventually increases the market value of a firm by reducing the present value of tax payments.

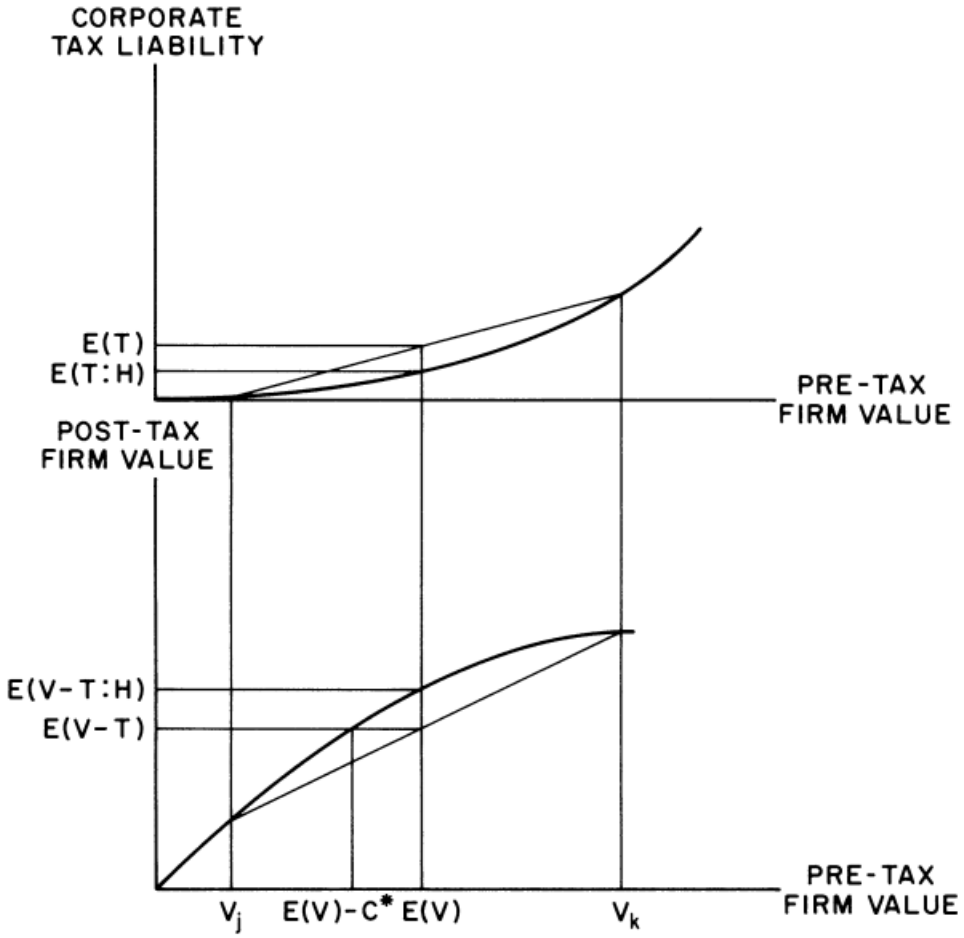
Like (Smith & Stulz, 1985), (Bessembinder, 1991) and (Stulz, 1996), (Graham & Rogers, 2002) also argues that derivative usage can enhance firm value. However, (Graham & Rogers, 2002) argues that hedging using derivatives increases firm value by increasing the debt capacity of a firm. (Graham & Rogers, 2002) Explains that hedging reduces the volatility of a firms earnings which enables the firm to increase its debt capacity. If the firm decides to take advantage of the increased debt capacity by increasing debt, the associated increase in interest deductions reduces the tax liabilities and increases firm value. So, due to an increase in debt, the firm is valued higher because of the increase in present value of the tax shield. The empirical results of (Graham & Rogers, 2002) are consistent with their expectations and find that hedging increases the debt capacity and the associated tax shield. To be specific, hedging increases the debt ratio of an average firm by 3% which leads to an increase of the average firm's tax shield by 1.1%.

Like (Stulz, 1996), (Bessembinder, 1991) also shares the view that corporate risk hedging with derivatives can also increase firm value by reducing agency costs such as, underinvestment problems and improve contracting terms. However (Bessembinder, 1991) takes a different approach by referring to the study of (Myers, 1977). This study shows that when a firm issues debt and the debt holders have a higher priority on the firms generated cash flows compared to the shareholders, there is an incentive for the shareholders to under invest. In this situation whereby leverage is increased, shareholders could have a tendency to bypass some projects that have a positive net present value (NPV) because most of the benefit of these projects with a positive NPV will flow to the debt holders instead of the shareholders. Obviously, for the firm as a whole this is a serious and toxic problem because the shareholders incentives reduces firm value and limits the firm to grow by excluding growth opportunities. The study of (Bessembinder, 1991) shows that using derivatives to hedge can reduce the underinvestment problem by increasing the number of future states in which shareholders are the residual claimants of the generated cash flows from projects. So, hedging basically creates the situation in which shareholders receive a larger part of the incremental cash flows

generated from new projects. Because of this, shareholders will no longer have the incentive to underinvest and will even be willing to provide extra capital to fund additional projects. (Bessembinder, 1991) Also argues just like (Stulz, 1996) that hedging can increase firm value by improving contract terms. The reason for this is that hedging accentuates the firms' obligation of paying its debts by providing cash inflows in states when the firm is out of cash. Because of the increased ability of a firm to pay its obligations, (Bessembinder, 1991) argues that hedging enables a firm to make value increasing changes in contracting terms with parties such as creditors and suppliers.

Besides the theories and studies implying that hedging indirectly increases firm value through the reduction of frictions such as tax expenses and financial distress, the first hypothesis is also based on the findings of empirical studies that directly examine the impact of derivative usage on firm value using Tobin's Q such as, (Allayanis & Weston, 2001), (Allayannis, Lel, & Miller, 2012), (Bartram S. B., 2009) and (Graham & Rogers, 2002). These empirical studies basically come to the conclusion that derivatives usage positively affect Tobin's Q and consequently increase firm value. Therefore my expectation expressed in the alternative hypothesis is that there is a positive association between the level of derivative usage and firm value after correcting for other factors that also affect firm value.

Figure 4 - Increase of firm value through hedging



$V_j[V_k]$:	pre-tax value of the firm without hedging if state j [k] occurs.
$E(V)$:	expected pre-tax value of firm without hedging.
$E(T)$:	expected corporate tax liability without hedging.
$E(T:H)$:	corporate tax liability with a costless, perfect hedge.
$E(V-T)$:	expected post-tax firm value without hedging.
$E(V-T:H)$:	post-tax firm value with a costless, perfect hedge.
C^*:	maximum cost of hedging where hedging is profitable.

3.2 Hypothesis 2 development

H2 (alternative): Corporate derivatives usage for hedging purposes significantly increases earnings quality.

I expect that derivative usage is relevant/useful to investors when used for hedging purposes, this relevance is reflected in the assumption that there is a positive association between earnings quality and derivatives usage. The link between derivatives usage and earnings quality has to do with reduction of earnings volatility and the enhanced predictability of a firms future earnings. Hedging theories imply that derivatives can be effective in mitigating unfavorable exposures against financial risks such as currency risks, whereby a firm is uncertain about the impact of a foreign business transaction on the (future) earnings/cash flows of the firm. If the exposure to a certain financial risk is not hedged, this risk can negatively affect a firms earnings/cash flow (think about unfavorable currency movements for a firm that has a lot of receivables in a foreign country).So, according to hedging theories, a firm can reduce uncertainties associated with exposures to unwanted financial risks, which in turn leads to a reduction in earnings volatility and therefore also results in more smoother earnings. The decrease in earnings volatility and smoother earnings eventually lead to a higher 'earnings quality' because earnings in the current period (which are smoother and less volatile due to hedging) are more reliable and useful for investors and financial analysts to estimate a firms future protective. Therefore I expect that firms that use derivatives for hedging purposes have a relatively higher earnings quality (relatively lower discretionary accruals). Which is an indication that derivatives usage is value relevant/useful to investors in terms that it increases their ability to predict/value a firm's future performance due to the reduced earnings volatility, increased smoothness and more reliable earnings associated with firms that use derivatives. This expectation can also be rationalized using earnings management literature. According to literature on earnings management, investors do not like firms that have volatile earnings, also because of the higher uncertainty associated with these firm's future earnings, investors and other stakeholders such as banks are less able to predict the firm's future prospective and therefore punish such firms by requiring a higher return on equity (investors)/return on debt (banks). However, investors and financial analysts and other stakeholders such as banks value the future prospective of firm's relatively higher if the earnings of these firms are more reliable/stable/smoother/consistent/less volatile, which is reflected in the lower required return on equity and required return on debts. Based on this rationalization, it is obvious that derivatives usage are not only value relevant to investors but also value relevant for the firm itself. As mentioned before, because of the lower uncertainty of future earnings associated with derivatives usage, firms are rewarded by investors, which is reflected through a lower cost of capital for firms using derivatives. The lower cost of capital eventually leads to a higher valuation for

firms using derivatives because, their future cash flows are discounted with a smaller 'WACC' (weighed average cost of capital). The fact that investors value firms with less volatile earnings higher is well known by managers, which is in general considered as one of the arguments for managers to manipulate earnings using discretionary accruals in earnings management studies. In this thesis, if a firm has a high earnings quality this means that the specific firm has relatively low discretionary accruals (absolute values) and that the earnings of this firm are less volatile, smoother, more reliable and therefore more predictable. To sum up, hedging theories imply that derivatives usage increases earnings quality by reducing a firm's unwanted exposure to financial risks and reducing the volatility of the firm's future cash flows/earnings. Earnings management theories/literature suggest that investors assign higher values to firms with earnings that are less volatile, more reliable and therefore more predictable by requiring a lower return on investment (lower WACC). The rationalization based on these two concepts leads to the second hypothesis which can also be formulated as: Firms that use derivatives for hedging purposes have relatively higher earnings quality.

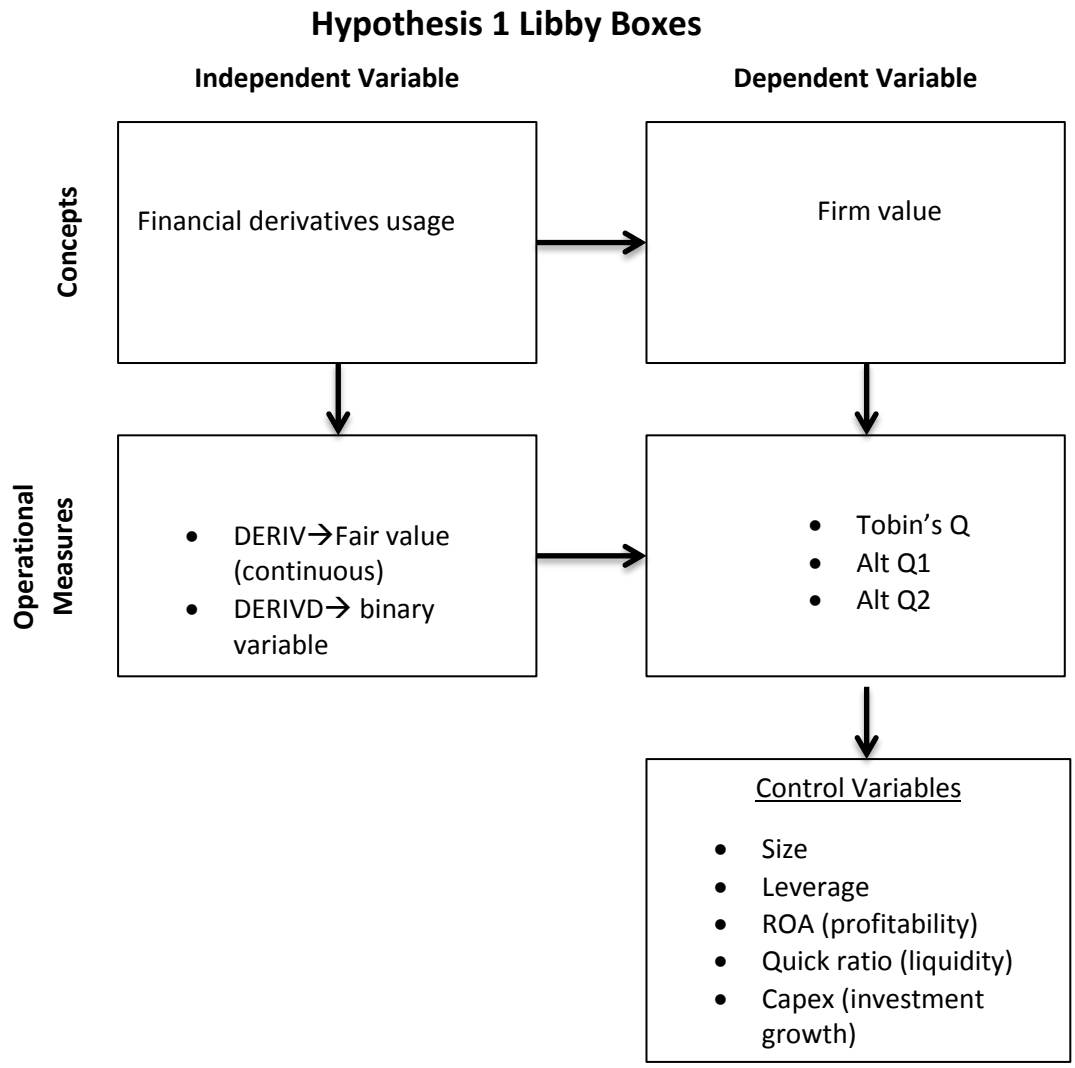
Chapter 4 – Research design

4.1 Hypothesis 1 variables

As mentioned before, the first and main hypothesis in this study is:

H1 (alternative): Corporate derivatives usage for hedging purposes significantly increases firm value.

The following libby box is used to illustrate and have a structured view on how the conceptual constructs of hypothesis 1 are operationalized.



4.1.1 Dependent variable(s)

Tobin's Q is used as a dependent variable to operationalize firm value. In this thesis I use the natural logarithm of Tobin's Q ratio. The reason for this choice is that the log-transformed Tobin's Q has a better statistical distribution in terms that it is more normally/symmetrically distributed compared to the raw Tobin's Q (Ayturk & Yanick, 2016). In addition to Tobin's Q, two alternative measures will also be used to proxy firm value which are Alt Q1 and Alt Q2. Alt Q1 is calculated by taking the natural log of the ratio [Market value of Equity/ Book value of Equity] and Alt Q2 is obtained by the natural log of the ratio [Market value of Equity/ Total Sales]. As emphasized by (Wernerfelt & Montgomery, 1988), Tobin's Q is a good proxy for firm value. In general, Tobin's Q ratio basically measures how much value is created for a certain amount of assets and is defined by the ratio: {market value/ replacement costs of the firm's assets}. (Wernerfelt & Montgomery, 1988) argue that unlike stock returns or accounting measures as proxy for firm performance whereby normalization or risk-adjustment is required, Tobin's Q is a good measure for firm value because it combines data extracted from capital markets and accounting data, and therefore implicitly uses the correct risk-adjusted discount rate and minimizes distortions caused by tax laws and accounting conventions (Wernerfelt & Montgomery, 1988). By accounting for the difference in systematic risk, tax laws and accounting differences across industries, Tobin's Q enables the comparability of firm performance between industries. The fact that Tobin's Q minimizes industry-related biases is an important advantage because the sample firms in this study are obtained from different industry sectors such as the telecommunication industry, automotive industry, petroleum industry, aerospace industry and tobacco industry.

In general, an approximation of the complex theoretical Tobin's Q ratio is used in empirical studies. In this thesis, the approximated Tobin's q, which was introduced by (Chung & Pruit, 1994) will be used because of its simplicity and robustness. Moreover, the approximated Tobin's q of (Chung & Pruit, 1994) is a widely used proxy for firm performance in various empirical studies such as (Allayanis & Weston, 2001), (Allayannis, Lel, & Miller, 2012), (Jorion & Jin, 2006). The approximation of Tobin's Q as defined by (Chung & Pruit, 1994) can be calculated by summing up the market value, preferred stocks and total debt and consequently dividing this sum by the total assets.

Tobin's q = [(Market value of equity + Preferred stocks + Total debts)/Total assets]

(Chung & Pruit, 1994) Approximation of the Tobin's Q ratio is a good and robust measure because when comparing the series of regressions of their approximated q with the values obtained from (Lindenberg & Ross, 1981) complex and cumbersome theoretical Tobin's Q model. They empirically prove that at least 96.6% of the total variability in theoretical Tobin's Q ratio is explained by their approximated q. This high correlation indicates that the approximated q is a relatively accurate performance measure that requires

minimal computational effort. Unlike other performance measures such as MVA (market value added) or EVA (economic value added), Tobin's q is a standardized performance measure and is therefore, as mentioned earlier, a more suitable proxy to compare firm's performance across various industries. The assumption is that firms that use derivatives for hedging purposes are able to reduce their exposure to financial risk (currency risk, interest rate risk and commodity price risk) and are therefore rewarded by investors with a higher firm value. Therefore, I expect that there will be a positive association between derivative usage and Tobin's q.

4.1.2 Main independent variable(s)

Derivative usage is the main independent variable, besides only using a dummy variable, also the extent of hedging will be used to operationalize derivative usage. The extent of derivatives usage is obtained by analyzing annual reports of all 191 firms in the sample and extracting information regarding the fair value/notional value of derivatives from the consolidated balance statements and the associated notes in the financial statements. Consequently, (Allayanis & Weston, 2001) approach is followed by generating the continuous variable DERIV, which is calculated by scaling the obtained data regarding the level of derivatives use with the total assets. Information in the annual reports is also used to construct the dummy variable DERIVD, this binary independent variable indicates 1 if a certain firm in the sample reports the uses derivatives for hedging purpose and 0 indicates that the firm does not use derivatives (for hedging purposes).

4.1.3 Control variables

To imply that derivatives usage for hedging purpose positively affects firm value, other factors that could potentially affect firm value should also be taken into consideration. This is done by including control variables in the OLS multivariate regression model. The control variables that could as well affect firm value are:

1) Firm size (SIZE): is operationalized by the natural logarithm of a firm's total assets. Based on prior literature, it is not really clear whether a firm's size is associated to a higher firm value. However firm size is included as control variable for the following reasons: (Belghitar & Clark, 2013) argue that because of the high start-up cost needed to develop a hedging program based on derivatives, larger firms have a higher likelihood of using derivatives as a risk management tool. On the other side, (Allayanis & Weston, 2001) finds that there is a significant negative relation between firm size and firm value which is contrary to the results of (Belghitar & Clark, 2013).

2) Leverage (LEV): Leverage is measured by scaling the total liabilities with total assets. According to (Graham & Rogers, 2002), hedging increases the debt capacity and therefore increases a firm tax-shield which consequently leads to an increase in firm value. However, on the other hand (Titman & Roberto, 1988) argues that huge debts, as a result of the increasing leverage, leads to financial distress and therefore decreases firm value.
3) Profitability (ROA): Profitability is considered to be an important value driver, ROA is used to proxy profitability and is calculated by dividing earnings before interest and tax (EBIT) with total assets. Firms that perform better than expected (analysts' consensus forecast) or better than its competitors are rewarded by investors, this phenomena is reflected by the higher stock values related to the firms with a higher profitability (Ball & Brown, 1968). Therefore, I expect that profitability will be positively associated with Tobin's Q (firm value).
4) Liquidity (QUICK): the Quick ratio is used to proxy liquidity and is calculated by adding up cash and cash equivalents and dividing the sum by current liabilities. Intuitively, it would be reasonable to state that there is a positive association between liquidity and firm value. Because a high liquidity means that a firm has enough internal resources, which enables the firm to realize profitable projects. However, (Jensen, 1986) argues that firms with an excess free cash flow (a high liquidity) have a higher likelihood to invest in negative NPV projects. Therefore based on the free cash flow argument (Jensen, 1986), one could say that firms with a low liquidity (firms that are cash constrained) have higher firm values.
5) Dividends (DIVIDUM): The binary variable DIVIDUM is used to proxy the ability to access financial markets and equals to 1 if the firm paid dividends (in cash or stocks) to its shareholders during 2008 and 2009 and 0 indicates that no dividends were paid during the sample period. (Allayanis & Weston, 2001) Argues that if a firm did not pay a dividend, then this firm is more likely to be capital constrained, however, the Tobin's Q of this firm might remain high because as a result of limited internal resources the firm will only undertake projects with a positive net present value. On the other side, if a particular firm paid a dividend, this means that this firm is less likely to be capital constrained and might have a lower Tobin's q (firm value). Because the likelihood is high that this firm has an excess free cash flow, based on Jensen's theory, such a firm will have a higher likelihood to invest in negative NPV. Based on (Allayanis & Weston, 2001) and (Jensen, 1986) studies one would expect a negative association between dividends paid and Tobin's q.
6) Investment growth/opportunities (CAPEX): Similar to the approach of (Allayanis & Weston, 2001) and (Belghitar, Clark, & Mefteh, 2013), investment growth/opportunity is operationalized by dividing a firm's capital expenditures by the total assets. According to (Allayanis & Weston, 2001),

investment growth is an important factor that positively affects firm value. Given the fact that the discount rate (WACC) of two similar companies are the same and the only difference between these two firms is that one firm has higher potential investment opportunities. The firm with higher investment opportunities will be valued higher by investors because of the higher expected discounted future cash flows. Therefore I expect a positive association between investment growth/opportunities and firm value.

Based on the information above, the following OLS multivariate regression models can be formulated:

$$\boldsymbol{LN\ Tobin's\ Q = \alpha + \beta 1 DERIV + \beta 2 SIZE + \beta 3 LEV + \beta 4 ROA + \beta 5 QUICK + \beta 6 DIVIDUM + \beta 7 CAPEX + \varepsilon}$$

$$\boldsymbol{LN\ Alt\ Q1 = \alpha + \beta 1 DERIV + \beta 2 SIZE + \beta 3 LEV + \beta 4 ROA + \beta 5 QUICK + \beta 6 DIVIDUM + \beta 7 CAPEX + \varepsilon}$$

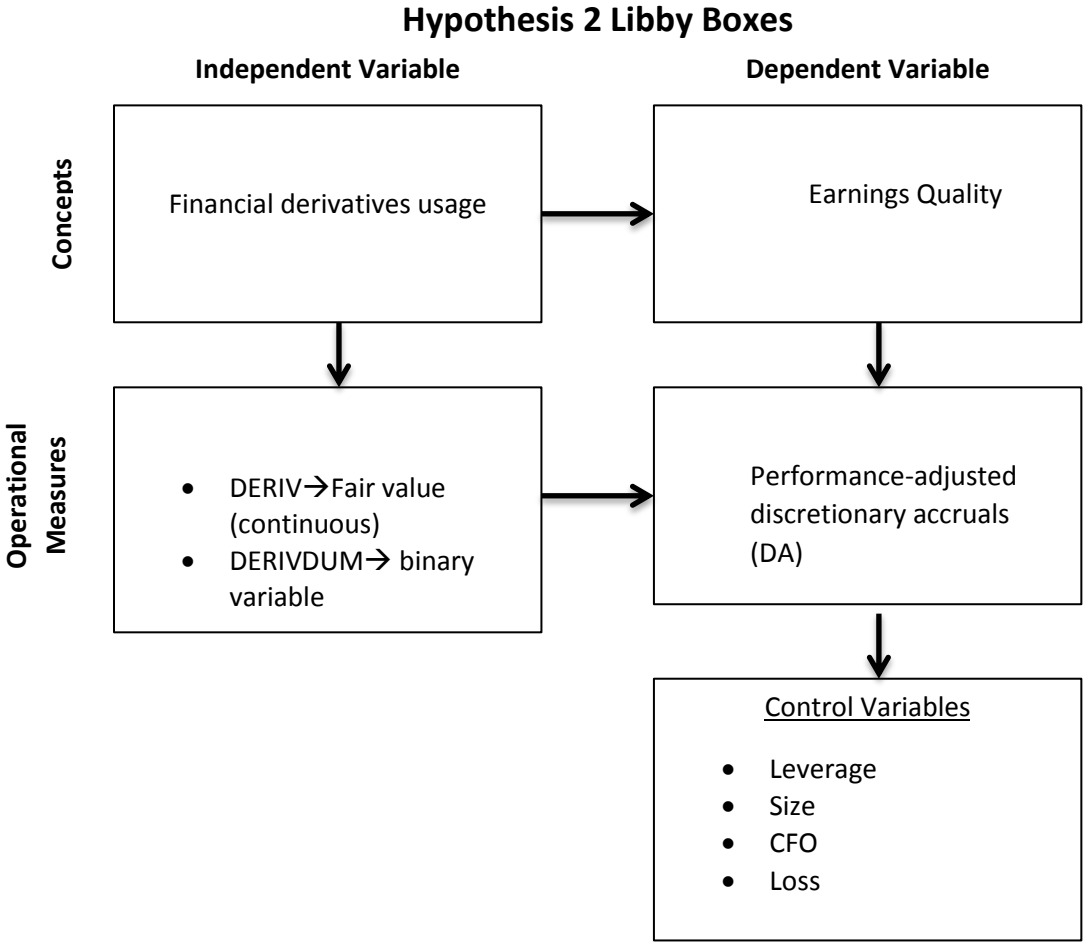
$$\boldsymbol{LN\ Alt\ Q2 = \alpha + \beta 1 DERIV + \beta 2 SIZE + \beta 3 LEV + \beta 4 ROA + \beta 5 QUICK + \beta 6 DIVIDUM + \beta 7 CAPEX + \varepsilon}$$

4.2 Hypothesis 2 variables

The second objective of this study is to examine whether financial derivatives use are useful to investors in terms that they positively affects earnings quality. In other words, as stated earlier, the second hypothesis is formulated as:

H2 (alternative): Corporate derivatives usage for hedging purposes significantly increases earnings quality.

As illustrated in the libby box bellow, one of the conceptual constructs is financial derivatives use, which is the main independent variable and earnings quality, which is the dependent variable. Like in the first hypothesis, derivative usage is operationalized using two proxies. The first proxy is a continuous variable (DERIV) which captures the extent/level of hedging and the second proxy (DERIVDUM) is a binary variable which indicates whether the firm uses financial derivatives to mitigate exposures to financial risks. As can be seen below, certain control variables are included in order to control for other factors that could potentially affect earnings quality.



4.2.1 Dependent variable and main independent variable(s) hypothesis 2

The dependent variable 'performance adjusted-discretionary accruals' is based on the modified jones model and is used to measure the level of earnings quality. Because the (discretionary accruals) modified jones model is widely used in most studies to proxy earnings quality, I will also use discretionary accruals to proxy earnings quality. As mentioned earlier, literature about hedging imply that financial derivatives usage for hedging purposes positively affects earnings quality by mitigating or fully eliminating a firm's exposure to currency risk, interest rate risk or commodity price risk and therefore reducing the uncertainty/volatility of a firm's future earnings/cash flows. This in turn eventually increases earnings quality by making a firms earnings/cash flows more predictable, which enables investors and analysts to make more reliable estimates regarding a firm's future performance and valuation. (Healy & Wahlen, 1999) Argue that investors reward firms that have less uncertainty/volatility regarding future earnings/cash flows. Therefore, I expect that the use of financial derivatives will increase earnings quality. Because lower discretionary accruals mean higher

earnings quality and vice versa. In other words, I expect that derivatives usage for hedging purposes is negatively associated with discretionary accruals.

4.2.2 Control variables hypothesis 2

In order to capture how financial derivative usage affects earnings quality, other factors that could potentially affect earnings quality should be excluded. This is done by including control variables in the regression model which reduce the likelihood of omitted correlated variables. (Brown, 2001) Finds that loss firms are less likely to outperform the market (earnings benchmark) and might therefore have a higher tendency to manage earnings upwards which leads to a lower earnings quality. Therefore, the control variable (dummy) 'LOSS' is included in the regression model and is equal to 1 if the firm's income before extra-ordinary items is smaller than is negative and takes the value of 0 otherwise. Firms with a high cash flow from operations are more likely to beat earnings benchmarks and might therefore have a lower likelihood of managing earnings (higher earnings quality) (Frankel, Johnson, & Nelson, 2002). The control variable 'CFO' represents cash flows from operations scaled by the book value of total assets. Leverage and size are as well included in the regression models because they are associated with discretionary accruals according to (Frankel, Johnson, & Nelson, 2002)and (Chen & Lin, 2008). Leverage is obtained by dividing total liabilities with the firm's total assets and size is measured using the natural logarithm of the book value of total assets.

Based on the information above, the following OLS multivariate regressions are executed in STATA:

$$\boldsymbol{DA = \alpha + \beta_1 DERIVFV\_AT + \beta_2 lEVERAGE + \beta_3 SIZE + \beta_4 CFO + \beta_5 LOSS + \varepsilon}$$

$$\boldsymbol{DA = \alpha + \beta_1 DERIVDUM + \beta_2 lEVERAGE + \beta_3 SIZE + \beta_4 CFO + \beta_5 LOSS + \varepsilon}$$

4.2.3 Historical development of discretional accrual models

As mentioned earlier, proxies based on accrual models are the most widely used measures to operationalize earnings quality. Accruals consists of discretionary accruals which are managed and non-discretionary accruals which are unmanaged. The basic idea behind all accrual models is to estimate the discretional components (discretionary accruals) of reported earnings. Over the last decades accrual models have been subjected to several developments that have improved their ability to capture discretionary accruals. The first accrual model was introduced by (Healy, 1985). By using his accrual model, (Healy, 1985) finds that if manager's compensation depends on the reported firms earnings, managers will have the incentive to inflate reported earnings using discretionary accruals, which obviously decreases earnings quality.

$$NDA_t = \frac{\sum TA_t}{T}$$

As shown above, in Healy's accrual model, non-discretional accruals are measured by calculating the average total accruals during the previous periods. This basically means that the difference between the accruals in a certain period t and the average total accruals in period T (NDA) is considered to be the discretionary accruals of period t. The second accrual model is the one of (DeAngelo, 1986), who investigates whether firms (managers) that decide to purchase all their public stocks (go private) use earnings decreasing discretionary accruals in the periods before the buyout in order to artificially reduce earnings and therefore reduce firms stock price which consequently leads to a reduced price paid for the public stocks and an increase in the managers wealth at the expense of shareholders. DeAngelo's accrual model is actually similar to Healy's in terms that they are both simple.

$$NDA_t = TA_{t-1}$$

As shown above, in DeAngelo's model, non-discretionary accruals in period t are equal to the total accruals in the previous period. This in fact means that the deviation between the total accruals in period t and the previous period is recognized as discretionary accruals.

The two simple accrual models of (Healy, 1985) and (DeAngelo, 1986) are nowadays considered as weak measures to distinguish discretionary accruals from non-discretionary accruals and are criticized to be naïve, because they assume that a firm has not changed during the event period compared to the previous periods.

This leads to the third accrual model of (Jones, 1991). Jones' accrual model was introduced in her study that investigates whether firms that would potentially benefit from import reliefs (such as quota reductions and tariff increases) manage their earnings downwards (using discretionary accruals) during import relief investigation in order to increase the likelihood that the United States International Trade Commission (ITC) will introduce impose import reliefs. The idea behind Jones' discretionary accrual model is to use a regression in order to obtain the unmanaged component of accruals (NDA), which are driven by economic events. (Jones, 1991) Uses 3 steps to eventually obtain the discretionary accruals.

The first step is to estimate the total accruals. The total accruals is basically the difference between net earnings and cash flows from operational activities. The function below depicts the factors that drive total accruals.

$$TA_{t-j} = \alpha_1 \left(\frac{1}{A_{t-1}}\right) + \alpha_2 \Delta REV_{t-j} + \alpha_3 PPE_{t-j} + e_{t-j}$$

In the equation above, the change in revenue **(ΔREV)** is used to capture the change in working capital items (short term accruals) such as the change in stock, receivables, creditors. Also the variable ***PPE*** (property, plant and equipment), that reflects the level of long term accruals such as depreciation is included in the equation. The equation above basically indicates that total accruals are equal to short term and long term accruals. When only analyzing a balance sheet, total accruals could as well be obtained by adding up net changes in non-cash-based assets and liabilities (Peek, 2013).

The second step is to estimate the unmanaged part of the total accrual by running a regression on the estimates of economic factors that drive the non-discretionary accruals during the event period as illustrated below.

$$NDA_t = \alpha_1 \left(\frac{1}{A_{t-1}}\right) + \alpha_2 (\Delta REV_t) + \alpha_3 (PPE_t)$$

Now that the total accruals and the unmanaged component of accruals are known, the discretionary accruals are obtained in **the third step** by simply deducting the non-discretionary accruals from the total accruals. As shown by the equation below, the discretionary accrual component is basically the residual.

$$DA_t = TA_t - NDA_t$$

$$DA = TA - \left[\alpha + \beta_1 \left(\frac{1}{A_{t-1}}\right) + \beta_2 \Delta REV_t + \beta_3 PPE\right]$$

In contrast to the accrual models of (Healy, 1985) and (DeAngelo, 1986), the accrual model of (Jones, 1991) has been quite influential and has moreover been used as a basis for many discretionary accrual models. Even though the Jones accrual model is better in terms that it includes economic factors that drive non-discretionary accruals compared to the simple accrual models of (Healy, 1985) and (DeAngelo, 1986), the Jones model suffers from severe limitations. One of the major limitation of the Jones model concerns the increasing probability of type 2 errors, which indicates that when earnings quality is low because of the manipulated earnings by managers, there is an increasing probability that the managed earnings will not be detected when using the Jones model. This has to do with the non-discretionary regression, were the change in revenue during the event period is included as an economical explanatory variable in order to estimate the unmanaged component of total accruals. The source of the problem lies in the fact that if managers manage earnings upwards by manipulating revenues, this decrease in earnings quality will not be detected

by the Jones model because the change in revenues is considered as an explanatory variable of non-discretionary accruals. (Dechow, Sloan, & Sweeney, 1995) Address the issue regarding the potential bias in the non-discretionary accruals when using the Jones model to capture the unmanaged part of total accruals and come up with a modification of Jones's accrual model (modified jones model) which has more power in capturing earnings quality because of the enhanced ability to distinguish the managed and unmanaged part of earnings. The modified Jones model uses regression bellow to estimate non-discretionary accruals.

$$\boldsymbol{NDA_t = \alpha_1\left(\frac{1}{A_{t-1}}\right) + \alpha_2(\Delta REV_t - \Delta REC_t) + \alpha_3(PPE_t)}$$

$$\boldsymbol{DA = TA - \left[\alpha + \beta_1\left(\frac{1}{A_{t-1}}\right) + \beta_2(\Delta REV - \Delta REC) + \beta_3 PPE\right]}$$

As can be noticed, the non-discretionary regression equation above is similar to the Jones model because all explanatory variables in the original Jones model are as well included. The modification made by (Dechow, Sloan, & Sweeney, 1995) is that they introduce an independent variable in the non-discretionary regression($\boldsymbol{\Delta REC_t}$), this added variable captures the change in receivables during the event period t and is subsequently deducted from the change in revenues $\boldsymbol{(\Delta REV_t)}$ during the event period t. The underlying though behind this modification is that it is easier to manage earnings using credit sales than via cash sales. Therefore, the change in sales on credit are subtracted from the change in revenues, as a result, the new variable '$\boldsymbol{\Delta REV_t - \Delta REC_t}$' obtained represents the change in cash sales and is used to estimate the unmanaged component of earnings (accruals). Because of this modification, which takes into consideration that managers are more likely to manage earnings through receivables, the modified jones model is less likely to suffer from type 2 errors, less likely that the manipulation of earnings is not discovered. This is eventually why the modified jones model has a better ability to capture earnings quality compared to the Jones model.

Although, the modified jones model is more capable of measuring earnings quality compared to the jones model, the magnitude of managed earnings has to be economically large in order to be captured by these models. (Kothari, Leone, & Wasley, 2005) Argue that the modified jones model as well suffers from misspecification issues in terms that it is not fully capable of distinguishing discretionary accruals from non-discretionary accruals associated with performance. Therefore (Kothari, Leone, & Wasley, 2005) find that

the accuracy and power of accrual models attempting to capture earnings quality using discretionary accruals can be enhanced by controlling for the impact of performance on estimated discretionary accruals. The reason for this is that performance has a big effect on discretionary accruals, not controlling for performance eventually leads to a situation whereby non-discretionary accruals are classified as discretionary accruals. If a firm for example experiences a substantial growth, the modified jones model can be misleading because it would indicate that the increase of receivables are managed earnings, which is an indication of low earnings quality, when the increase in receivable are in fact only a result of economic growth instead of earnings management (Kothari, Leone, & Wasley, 2005). The biasness as a result for not controlling for performance obviously decreases the power and accuracy of accruals attempting to capture earnings quality. Therefore, in this thesis, a performance-adjusted discretionary accruals based on the cross-sectional version of the modified jones model is used to measure earnings quality.

$$\boldsymbol{DA = TA - \left[\alpha + \beta_1\left(\frac{1}{A_{t-1}}\right) + \beta_2(\Delta REV - \Delta REC) + \beta_3 PPE + \beta_4 ROA_{t-1}\right]}$$

As illustrated in the equation above, the explanatory power of the discretionary accruals is increased by including the performance measure $\boldsymbol{ROA_{t-1}}$, which is the lagged return on total assets.

4.3 Data collection and sampling

A remarkable statement of Warren E. Buffet is: "Derivatives are financial weapons of mass destruction (Buffet, 2004)." This statement can be linked to the financial crisis of 2008-2009 because derivative securities held by financial firms such as collateralized debt obligations (which is a kind of securitization with underlying collateral such as mortgages) played a pivotal role in this financial crisis. On the contrary, derivatives held by non-financial firms, which were strictly held for hedging purpose instead of speculation, were not involved in the financial crisis (Bartram & Brown, 2011). It is important to make a distinction between derivatives held by financial firms and derivatives held by non-financial firms such as banks, because financial firms are the users and issuers of derivatives and sometimes act as market maker (Bashir & Khazaal, 2013). Because of these different characteristics, financial firms might behave differently than non-financial firms regarding on how derivative instruments are used. This study therefore, makes a distinction between these two types of firms and solely focusses on non-financial firms.

The sample of firms used in this thesis is randomly drawn from the Euro STOXX 600, which represents small, medium and large capitalized firms across 18 European countries. The sample drawn from the Euro STOXX 600 (population) consists of 191 non-financial firms. Because, information regarding a firm's level

of derivatives usage (fair value/notional value) and exposure to financial risks are not available in the widely used WRDS (Wharton research data services) data bases, I was required to hand collect this data from the annual reports of the firms in my sample. The process of hand collecting the data from the consolidated financial statements is demanding and time consuming, therefore, data was collected for only two years (2008 and 2009). The first step was to download all annual reports of the sample firms. Most firms publish their annual reports on their websites, which means that in most cases I was able to download the firm's annual report at the investor's relations section on the firm's website. It was sufficient to download only the annual reports of 2009 because both data regarding 2008 and 2009 are included in the annual report of 2009. Given the fact that the sample consists of 191 firms and annual reports of the years 2008 and 2009 are collected, this means that the total obtained firm-years observations should be 382. However, annual reports of 9 firm in the sample are not available for the years 2008 and 2009, this eventually leads to a total sample of 182 firms or 364 firm-year observations. The next step is to extract data such as whether the firms in the sample use derivatives and if they do, do they use it for hedging or speculative purposes? What are the fair value or notional value of derivatives holdings? What is a firm's exposure to financial risks before and after hedging? In order to extract such information from the financial statements of the sample firms, I first use certain key words such as "specul" "hedg", "swap" and "derivative" to assess whether the firm uses derivatives in the first place, if this keys are hits, I continue reading the surrounding parts to be sure that the certain firm uses derivatives. I proceed by analyzing the consolidated balance sheets to extract the firm's fair value of the derivatives and also read the related notes to extract the notional value of the derivatives. I also carefully read the "risk management" part in the consolidated financial statements in which management discloses which risks the firm is exposed to and how these risks are mitigated in order to assess whether hedge accounting is applied, whether the firms policies allows speculative derivatives transactions and to obtain other information regarding firm's risk management.

In order to answer the first hypothesis, data form different data bases have to be collected before executing the OLS multivariate regression model. The main independent variable in both hypothesis is the level of derivative usage and the binary variable indicating whether the firm uses financial derivatives to mitigate exposures to currency risk, interest rate risk and commodity price risk. As mentioned earlier, derivatives related data are extracted from the downloaded consolidated financial statements of the sample firms. After collecting all derivatives usage related data of the firms in the sample, I assess the data and exclude firms who use derivatives for speculative purposes because I am only interested in firms that use derivatives for hedging exposures to financial risks. 20 out of the 182 sample firms mention in their consolidated financial statements that derivatives are also used for speculative purposes. After removing these firms, the sample size is reduced to 162 firms or 324 firm-year observations. Furthermore, there are 7 firms that mention using

derivatives for hedging purposes but do not disclose the fair value of their derivatives holdings. Such firms are also excluded from the sample because of the fact that the main independent variable (extent of derivatives usage) cannot be measured for these firms. These modifications lead to a total sample size of 155 firms and 310 firm-years observation as can be seen in table 3. An interesting observation is that most of the firms in the sample use some kind of financial derivatives to mitigate currency risk, interest rate risk and commodity price risk. Only 10 out of 155 firms report that they do not make use of derivatives to mitigate these financial risks, which indicates that they use other risk management tools such as operational hedges (real options) such as merging/acquisition or relocating production facilities to reduce their risk exposures.

Table 3 - Sample H1

Hypothesis 1	Firm-year observations	Firms
Total beginning sample data	382	191
Firm's financial statements not available	-18	-9
Firms that use derivatives for speculative purpose	-40	-20
Firms that use derivatives but do not report fair value of derivatives	-14	-7
Firms for which stock price is not available (H1)	-13	-6
Total Ending sample data	**297**	**149**

4.3.1 Hypothesis 1: Data collection and sampling

Different data sources are used to collect data in order to perform the OLS regressions of hypothesis 1. As mentioned in the paragraph above, the main independent variables are obtained through extracting data from consolidated financial statements of the sample firms. The second step is to collect data needed for the calculation of the dependent variables: Tobin's Q, AltQ1 and AltQ2. The security daily database in CompuStat Global is used to obtain the firm's stock price at the end of its fiscal year, which is needed for the calculation of MVE (market value of equity), this STATA-file is then saved as h1-part1. I proceed by using another data base within CompuStat Global called Fundamentals Annual to attain the following items: CHOI (common shares outstanding including preferred stocks), CEQ (total common equity), AT (total assets), FYEAR (fiscal year), DLC (short term debt), DLTT (long term debt) and REVT represents total sales, this STATA-file is named h1-part2. I continue by merging these two data files using GVKEY and FYEAR as identifiers and name the new merged file h1-dependent variables. This new merged data base

enables me to calculate Tobin's Q, AltQ1 and AltQ2. In order to assess whether the variable Tobin's Q has a symmetric distribution, I create a histogram of this variable. Figure 5a clearly shows that Tobin's Q is definitely not normally distributed. Therefore I apply the natural logarithm to Tobin's Q, figure 5b illustrates that the logarithm transformation makes Tobin's Q more normally distributed by reducing the skewness by 74% (level of skewness Tobin's Q=5.30, level of skewness LN Tobin's Q=1.37). Therefore, the variable LN_TobinsQ is used as one of the three proxies for firm value.

Figure 5a - Asymmetrical distribution of Tobin's Q

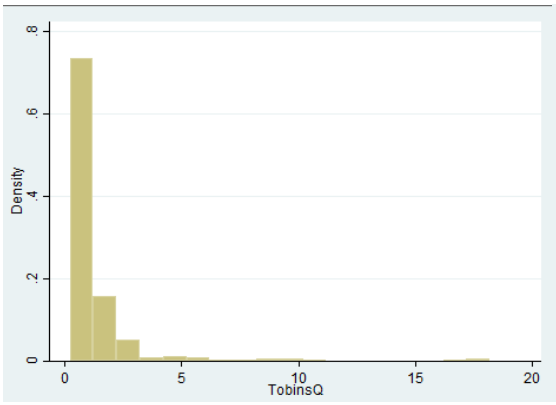
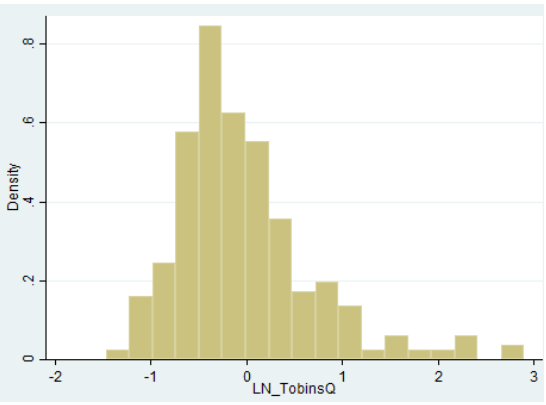


Figure 5b – LN Tobin's Q distribution



A big improvement is also made regarding the distribution of the other two proxies when using the natural logarithm to generate AltQ1 and AltQ2, as can be seen below, whereby skewness is reduced by 79% and 94% respectively.

Figure 6a - AltQ1 without LN transformation

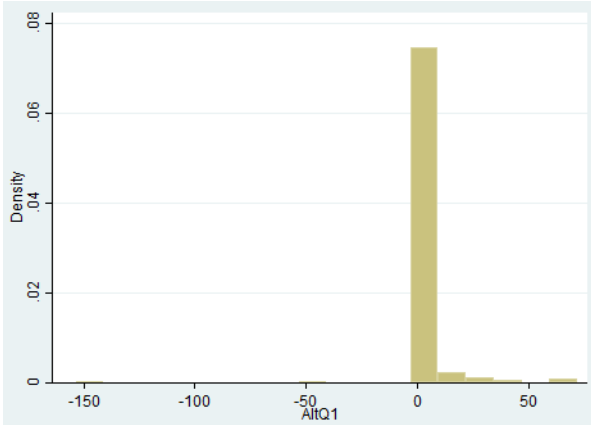


Figure 6b –Natural logarithm transformation of AltQ1

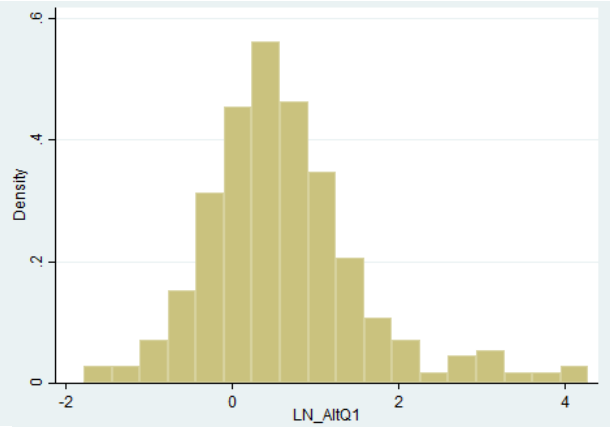


Figure 7a - AltQ2 without natural logarithm transformation

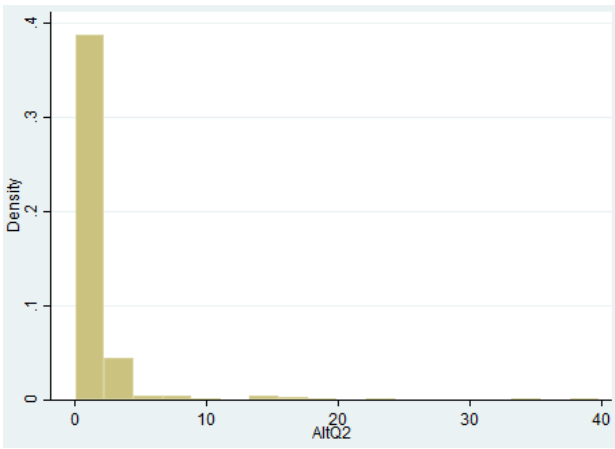
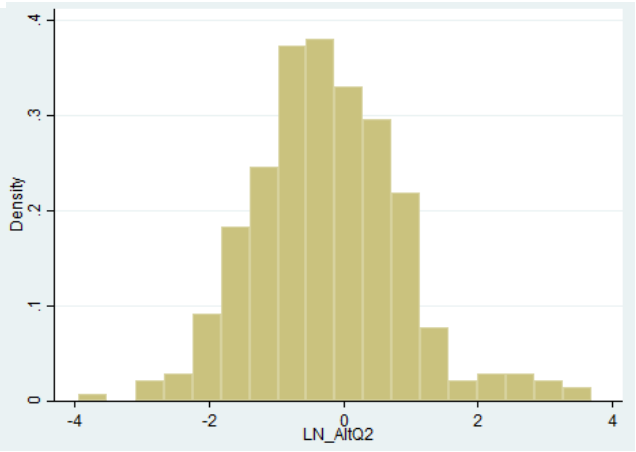


Figure 7b - AltQ2 without natural logarithm transformation



Now that the dependent variables LN_TobinsQ, LN_AltQ1 and LN_AltQ2 are generated and saved in the data file h1-dependent variables, this file is merged with the data file containing the main independent variables by using GVKEY and FYEAR as identifiers. This new merged file is saved as h1-dependent+MIV.

In order to generate the control variables, the data collection process is continued and the following data items are retrieved from CompuStat Global – Fundamentals Annual: LT (total liabilities), AT (total assets), REVT (total revenue), IBC (income before extraordinary items), CHEE (cash and cash equivalents), LCT (current liabilities), DVT (total paid dividends in stock and cash) and CAPX (capital expenditures). After collecting the necessary data items, the control variables SIZE, LEVERAGE, ROA, QUICK, DIVIDUM and CAPEX is calculated for each firm during the period 2008 and 2009, after winsorization of these control and the main independent variable DERIVFV_AT at the 1st and 99th percentile, the file is the saved as h1-control variable. This means that there are now two files, one containing the dependent variables and the main independent variables and the second one containing the control variables. After merging these two STATA-files using GVKEY and FYEAR as identifiers, I obtain one STATA-file with all necessary data to perform the OLS regression model of hypothesis 1.

4.3.2 Hypothesis 2: Data collection and sampling

Discretionary accruals

First, data items needed to generate the discretionary accruals of each firm are collected in one data file, this is done by uploading a file containing only GVKEY's of firms in the sample into WRDS so that CompuStat will collect only data of these firms. The following data items are obtained from the CompuStat Global – Fundamentals database: GVKEY, FYEAR, AT, IBC, OANCF (cash flow from operations), PPEGT (gross property, plant and equipment), REVT, RECT (receivables) and SICH (industry code). These data items enable the calculations of the inputs variables of the performance-adjusted modified jones model. The lagged assets (lag_at) are first generated, followed by the total accruals, which are calculated by subtracting the firm's cash flow from operations from the income before extraordinary items and scaling the difference by the lagged assets. A variable called 'inverse_assets' is as well generated by calculating (1/lag_at). Furthermore, the variable 'dsal' is generated and calculated by subtracting the difference in receivables from the difference in sales and scaling the difference by lagged assets $\{(\Delta REV_t - \Delta REC_t)/(lag\_at)\}$. Also the variable PPEGT is scaled by the lagged assets and finally, the lagged return on assets variable is generated (ROA_{t-1}), which represents a control for performance in the performance-adjusted modified jones model. Subsequently, I filter the outliers of all variables by winsorizing at the 1st and 99th percentiles of their distributions. The reason for filtering outliers is that the outliers might seriously alter inferences made from statistical tests. So, outliers are filtered in order to prevent that the results in this study will be driven by a few extreme and isolated observations. In general, outlier filtering can be done by two methods. Method 1 drops the highest 1% and the lowest 1% of observations. Method 2, which is called winsorizing, involves changing the extreme values of the highest 1% and lowest 1% of observations to less extreme values. In this thesis, winsorizing is chosen to filter outliers because of the fact that it reduces the impact of outliers without reducing the sample size. Table 4 shows that winsorizing strongly improves the distributions of the variables inputs for the model used to obtain discretionary accruals. Before winsorizing, the variable 'total accruals' had a skewness level of 205.7, however, after winsorizing, the skewness level was only -0.7. A strong improvement can also be observed for the other input variables such as the variable '$\{(\Delta REV_t - \Delta REC_t)/(lag\_at)\}$' which is totally not normally distributed as can be seen by its skewness level of -206, but winsorizing this variable makes its distribution more symmetric by reducing the skewness level to 0.9.

After winsorizing all the input variables, the performance-adjusted modified jones model is used to obtain all discretionary accruals of the sample firms for the years 2008 and 2009.

Independent variables

The next step is to collect all data items needed to generate the control variables. The CompuStat Global – Fundamentals database is used to attain the following data items: LT (total liabilities), AT (total assets), IBC (income before extraordinary items), OANCF (cash flow from operations). As can be seen in table 2, the obtained data items enable the calculation of LEVERAGE, LN_SIZE, CFO_AT and LOSS which are the control variables. I proceed by merging the data file containing the control variables with the file containing derivatives data which results in one file containing the independent variables using GVKEY and FYEAR as identifiers. The last step is to merge the file containing the independent variables with the file that includes the discretionary accruals using GVKEY and FYEAR as identifiers which finally results in one data file containing all data needed to execute the second hypothesis. All the independent variables are winsorized at the 1st and 99th percentile except for the dummy variables DERIVDUM and LOSS because these variables can only take 2 values (1 or 0).

Table 4 -winsorization of inputs performance-adjusted discretionary accrual model

	Before Winsorizing				After winsorizing			
	Mean	Median	Std. Dev.	Skewness	Mean	Median	Std. Dev.	Skewness
Total accruals	18.83	-0.04	4023.35	205.71	-0.05	-0.04	0.15	-0.69
Inverse_assets	0.07	0.00	2.70	86.70	0.02	0.00	0.07	5.54
$\Delta REV_t - \Delta REC_t$	-14.10	0.01	2939.63	-205.92	0.03	0.01	0.31	0.91
PPEG	5.94	0.52	768.55	153.23	0.59	0.52	0.44	0.98
lag_roa	0.33	0.03	213.49	38.58	0.00	0.03	0.21	-3.77

Note: The application of winsorization is quite effective in making the distributions of each variable more symmetric, this is indicated by the strongly reduced skewness after applying winsorization at the 1st and 99th percentile.

Chapter 5 – Empirical results and analysis

5.1 Testing OLS regression model assumptions

There are certain assumptions that have to be met before interpreting OLS regressions, some of the key assumptions require that:

1) **<u>Variance of residuals are homogenous</u>**: This assumption basically means that the variance of the residuals have to be constant. If the variance of the residuals have a certain pattern when plotting the residuals against the fitted values, this means that the variance of the residuals are not constant and the residual variance is said to be heteroskedastic which is an indication that the OLS regression model is not well-fitted. Besides the graphical method mentioned above, also non-graphical methods exists for detecting heteroscedasticity such as the White's test and the Breusch-Pagan test.

<u>Hypothesis 1</u>

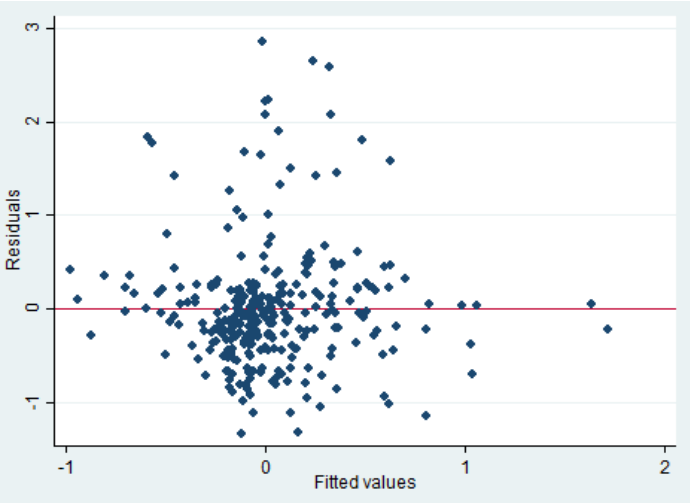


Figure 8a *- illustrates the scatterplot related to the residuals of the following OLS regression of hypothesis 1:* $LN\ Tobin's\ Q = \alpha + \beta 1 DERIV + \beta 2 SIZE + \beta 3 LEV + \beta 4 ROA + \beta 5 QUICK + \beta 6 DERIVDUM + \beta 7 CAPEX + \varepsilon$

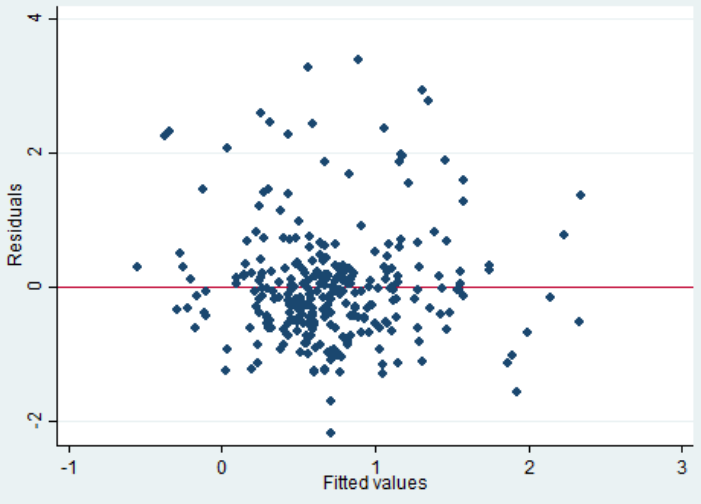


Figure 8b *- is a graphical reflection of the residuals related to the second OLS regression of hypothesis1: LN Alt Q1= α+ β1DERIV+ β2SIZE+ β3LEV+ β4ROA+ β5QUICK+β6DERIVDUM+β7CAPEX+ ε*

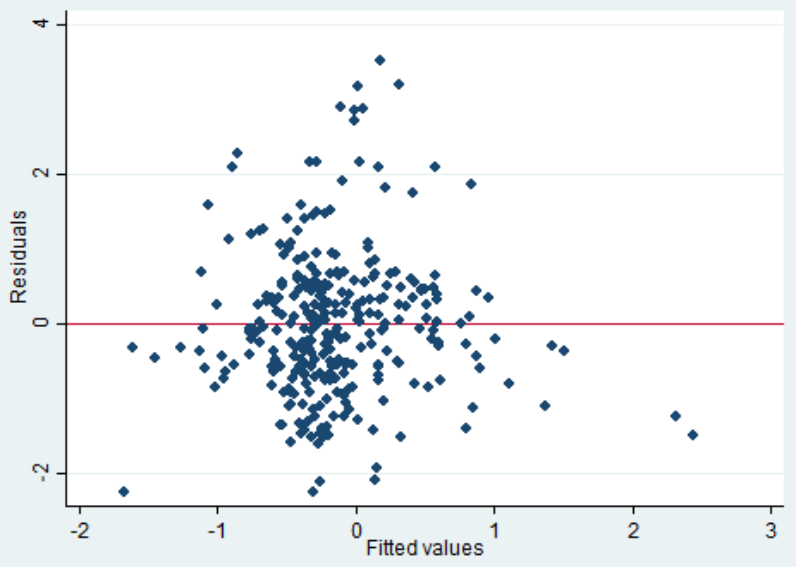


Figure 8c *- Is a graphical illustration of the residuals related to the third OLS regression of hypothesis1: LN Alt Q2= α+ β1DERIV+ β2SIZE+ β3LEV+ β4ROA+ β5QUICK+β6DERIVDUM+β7CAPEX+ ε*

Table 5 - Hypothesis 1 Test for heteroskedasticity

	Model 1 (Tobin's Q)		Model 2 (AltQ1)		Model 3 (AltQ2)	
	Chi-square statistic	P-value	Chi-square statistic	P-value	Chi-square statistic	P-value
White test	32.57	0.6842	18.9	0.8735	24.65	0.5939
Breusch-pagan test	0.66	0.4173	0.68	0.4088	0.62	0.4302

As can be seen in the graphs of the plotted residuals against the fitted values of the three regression models related to hypothesis 1 in figure 8, one can state that there are no alarming patterns which indicate heteroscedasticity of the residual variances. In order to statistically confirm this conclusion based on the scatterplots, the White's test and Breusch-Pagan test are performed. Both test the null hypothesis that the variance of the residuals are homogenous (the variance of residuals are constant). After performing the White's test and Breusch-Pagan test for all three regressions of hypothesis 1, Table 5 shows that in all three cases the p-values of these tests are above 0.05, therefore the null hypothesis cannot be rejected. This basically means that there is no reason to believe that the residual variances of the OLS regressions related to hypothesis 1 are heteroskedastic.

Hypothesis 2

In addition to plotting the residuals and fitted values, the White's test and Breusch-Pagan test are as well performed for the OLS regression model of hypothesis 2 in order to assess whether the residual variances suffer from heteroscedasticity. I do not really observe any suspicious patterns in the scatterplot, which is a good thing because this indicates that the residual variances are homoscedastic. This conclusion is confirmed by the White's test and Breusch-Pagan test which both give a p-value of 0.09 and 0.29 respectively (Table 6). Based on these p-values, there is no reason to reject the null hypothesis that the residual variance is constant. Although, heteroscedasticity is not an issue in both regressions, the robust standard errors are used in all regressions performed in this thesis to make sure that the standard errors of coefficients in the regressions are not biased.

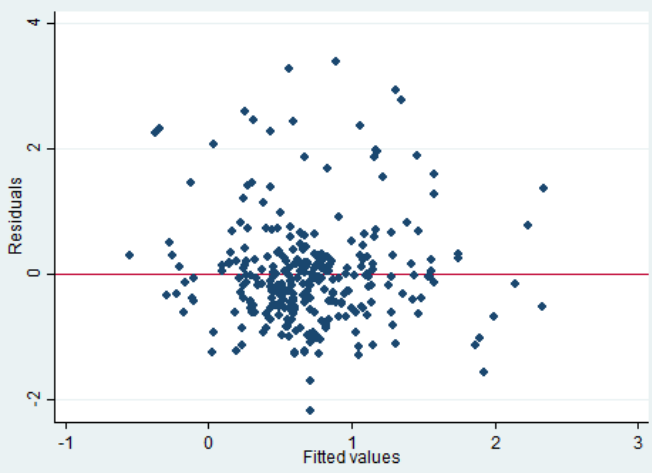


Figure 9 *– This scatterplot illustrates the plotted residuals against the fitted values of the OLS regression of hypothesis 2: DA= α+β1 DERIVFV_AT +β2 LEVERAGE+β3 SIZE+β4 CFO+β5 LOSS + ε*

Table 6 - Heteroskedasticity test hypothesis 1

	Chi-square statistic	P-value
White test	27.52	0.093
Breusch- pagan test	1.14	0.286

2) **<u>There is little or no multicollinearity in the data:</u>** When there is multicollinearity, this means that the two or more continuous independent variables in the regression are not independent from each other and these two or more variables have a nearly perfect linear association. The danger of data suffering from a high multicollinearity is that it leads to unstable regression model estimates and inflated standard errors coefficients that lead to biased results. In addition to the correlation matrix, the VIF which stands for variance inflation factor is used to detect multicollinearity.

<u>Hypothesis 1 and Hypothesis 2.</u>

The p-values of some of the variables in the correlation matrix tables (table 7a and 7b) are lower than 0.05, which indicates that there is a high likelihood that these variables have non-zero correlations. However, the correlation coefficients are relatively low and not higher than 0.5 or lower than -0.5 which suggest that there is no strong positive or strong negative correlation between all 8 variables of hypothesis 1 and all 6 variables of hypothesis 2. I therefore assume that the possibility of facing multicollinearity problems is low.

Table 7a – H1 Pearson correlation coefficients and VIF

	Tobin's Q	DERIVFV	LEV	SIZE	ROA	QUICK	DIVIDUM	CAPEX	VIF
DERIVFV	0.013	1.000							1.05
LEV	-0.221*	-0.127*	1.000						1.05
SIZE	-0.036	0.090	0.166*	1.000					1.05
ROA	0.436*	-0.014	-0.334*	-0.052	1.000				1.16
QUICK	0.234*	0.111***	-0.361*	-0.133**	0.186*	1.000			1.19
DIVIDUM	0.116**	-0.067	-0.020	-0.028	0.305*	-0.154*	1.000		1.14
CAPEX	-0.023	-0.135**	0.036	0.017	0.103***	-0.125**	0.213*	1.000	1.05

*Notes: correlation coefficients differ significantly from zero at *1%, **5% and ***10% level, this table also reports the VIF of each independent variable to detect multicolinearity. Given the fact that all independent variables have a VIF < 10, multicolinearity is not an issue in this study.*

Table 7b - H2 Pearson correlation coefficients and VIF

	DACC	DERIVFV	LEV	SIZE	CFO	LOSS	VIF
DERIVFV	0.067	1.000					1.01
LEV	-0.093***	-0.043	1.000				1.09
SIZE	0.139*	-0.045	0.150*	1.000			1.06
CFO	-0.474*	-0.051	-0.171*	-0.177*	1.000		1.11
LOSS	-0.344*	-0.017	0.222*	-0.217*	-0.217*	1.000	1.10

*Notes: correlation coefficients differ significantly from zero at *1%, **5% and ***10% level, this table also reports the VIF of each independent variable to detect multicolinearity. Given the fact that all independent variables have a VIF < 10, multicolinearity is not an issue in this study.*

To confirm my assumptions based on the correlation matrix, the VIF table is generated for the variables in both hypothesis. A rule of thumb when interpreting the VIF is that a variable that has a VIF value higher than 10 indicates that the level of multicollinearity is too high, this means that the specific variable could be considered as a linear combination of other independent variables and the standard error of the this variable's coefficient is inflated. The results in table 7 show that in both variables of hypothesis 1 and hypothesis 2, multicollinearity is not a problem to worry about because the VIF values of all variables are lower than 10.

3) **<u>There is little or no autocorrelation in the data:</u>** When the residuals are not independent from each other, one can speak of autocorrelation. A widely used test that detects autocorrelation is the Durbin-Watson's test. One of the conditions for using this test is that the independent variable in the OLS regression model is not allowed to be a lagged version of the dependent variable, which is not the case in this thesis. The null hypothesis of the Durbin-Watson's d test is that the residuals are not linearly auto-correlated. Furthermore, "d" can take values between 0 and 4. The rule of thumb is that values between 1.5 and 2.5 indicate no auto-correlation in the data. Table 8 shows a d-value of 1.9 for the main regression of the first hypothesis and a d-value of 2.1 for the main regression of hypothesis 2. Both d-values are quite close to 2 and fall within the rule of thumb, which indicates that auto-correlated residuals is not an issue in the dataset of this thesis.

Table 8 - Durban-Watson test for autocorrelation

	Hypothesis 1	Hypothesis 1
Durban-Watson d-statistic (8, 297)	1.867	
Durban-Watson d-statistic (6, 337)		2.121

Note: The D-statistic of the Durban Watson test is obtained by the number of variables in the OLS Regression Model, which is 8 for hypothesis 1 and 6 for hypothesis 2 and the number of firm-year observations which equals to 297 for hypothesis 1 and 337 for hypothesis 2. The D-statistics are <2.5 and >1.5, which indicates that autocorrelation is not a problem in the data set

5.2 Results Hypothesis 1

Table 9 provides an illustration regarding the frequency of derivatives usage among European non-financial firms by year. Out of the 297 total firm-years observation, I identify 277 (93.27%) derivatives usage observations, which means that 139 out of the 149 European firms in this study use at least one type of financial derivatives. This ratio is quite high, especially when compared to similar studies focusing on emerging economies such as the study of (Ayturk & Yanick, 2016), who focus on derivatives usage in Turkey and observe a 36.41% derivatives usage. However, this statistic is not really surprising, given the fact that most firms in the sample are based in developed economies, in which financial markets are more advanced and more liquid compared to emerging economies. Furthermore, I observe that the most frequently used type of financial derivatives are currency derivatives (83.84%) followed by interest derivatives (76.58%) and commodity derivatives (36.03%) are the least frequently used type of financial instrument.

Table 9 Derivatives users by year

	N (firm-years)	All Derivatives %	Currency Derivatives %	Interest Rate Derivatives %	Commodity Derivatives %
2008	148	93.24	83.78	76.64	35.81
2009	149	93.29	83.89	76.51	36.24
Total	297	93.27	83.84	76.58	36.03

Table 10 presents the description statistics for the whole sample containing 297 observations and 149 firms. Table 10 basically shows the description statistics of the dependent, main independent and control variables of the multivariate regression model related to hypothesis 1. The fact that the row variable 'Tobin's Q' has a mean that is substantially higher than the median is an indication that the distribution of Tobin's Q is skewed on the right side. As mentioned earlier, this issue is solved by using the natural logarithm of Tobin's Q, which strongly reduces the skewness found in the raw Tobin's Q. The same methodology is as well effectively applied to the two alternative proxies for firm value because Alt.Q1 and Alt.Q2 are also found to have a skewed distribution. Furthermore, Table 10 shows that the average Tobin's Q in the sample has a value of 1.51, LEV has a mean of 0.62 which means that on average, 62% of a firm's capital in this sample is financed through debts. Furthermore, I observe a mean value of 0.05 for the control variable ROA, which means that on average, firms in this study have a return on assets of 5%. The variable DIVDUM has a mean of 0.75 which implies that on average, 75% of the 149 firms in the sample pay dividends either in cash or stocks. When assessing the main independent variables, one can see that DERIVFV (fair value of derivatives

scaled by total assets) has a mean of 0.22 and the mean of DERIVDUM indicates that on average, 93% of the firms in this study use derivatives to mitigate exposures to financial risks. FCDDUM has a mean of 0.83, this means that on average, 83% of the 149 firms use foreign currency derivatives to mitigate currency risk. The mean of IRRDUM indicates that 77% of the firms in this study use interest rate risk to mitigate fluctuation of the interest rate and CODDUM's mean value of 0.36 is an indication that on average 36% of the total derivatives used are commodity derivatives, which are especially used by oil and gas firms to mitigate uncertainty of commodity prices.

Table 10 descriptive statistics

Variables	No.	Mean	Std. Dev	Median	Min	Max
Tobin's Q	297	1.51	2.23	0.89	0.23	18.18
LN (Tobin's Q)	297	0.03	0.74	-0.05	-1.46	2.90
Alt.Q1	297	3.28	12.82	1.73	-153.49	71.98
LN (Alt.Q1)	297	0.71	0.95	0.55	-1.47	4.28
Alt. Q2	297	1.83	4.02	0.81	0.02	39.82
LN (Alt.Q2)	297	-0.14	1.10	-0.21	-3.94	3.68
SIZE	297	9.49	1.42	9.52	6.21	12.75
LEV	297	0.62	0.15	0.62	0.25	1.01
CAPEX (growth)	297	0.05	0.04	0.04	0.00	0.17
ROA	297	0.05	0.06	0.05	-0.13	0.25
DIVDUM	297	0.75	0.43	1.00	0.00	1.00
Quick	297	0.29	0.29	0.21	0.05	1.91
DERIVFV/T.Assets	297	0.22	0.81	0.15	0.05	0.55
DERIVDUM	297	0.93	0.08	1.00	0.00	1.00
FCDDUM	297	0.83	0.18	1.00	0.00	1.00
IRDDUM	297	0.77	0.35	1.00	0.00	1.00
CODDUM	297	0.36	0.49	0.00	1.00	1.00

The OLS multivariate regression models in Table 11 capture how firm value is affected by the extent of hedging by using DERIVFV. With the variable DERIVDUM, the regression models in table 11 also capture the investor's perception on how firm value is affected by the yes-no decision of a firm's derivatives usage in general with the objective to manage financial risks. Table 11 also illustrates the types of hedging instruments which are splitted up in two types of the most used derivatives by creating a dummy variable for FCD and IRD to assess how foreign currency derivatives and interest rate derivatives are related to firm value

Table 11 – Main regression analysis Hypothesis 1

Firm value = α+ β_1DERIVATIVESUSAGE +β_2 SIZE + β_3LEV+ β_4CAPEX+ β_5ROA + β_6DIVDUM+ β_7QUICK + ε

	*Firm value=**											
Independent Variables	*LN Tobin's Q*				*LN Alt.Q1*				*LN Alt.Q2*			
DERIVFV	0.081				0.062				0.034			
	(0.531)				(0.842)				((0.634)			
DERIVDUM		0.046				0.029				0.035		
		(0.018)*				(0.033)*				(0.093)*		
FCD			0.031				0.028				0.003	
			(0.046)*				(0.073)*				(0.091)*	
IRD				0.018				0.043				-0.021
				(0.063)*				(0.398)				(0.539)
INTERCEPT	-0.215	-1.004	-0.424	-0.312	-1.536	-1.859	-1.052	-1.002	-0.763	-3.823	-1.028	-0.933
	(0.449)	(0.012)*	(0.199)	(0.283)	(0.008)*	(0.002)*	(0.033)*	(0.023)*	(0.092)*	(0.061)*	(0.055)*	(0.037)*
LN_SIZE	0.045	0.013	0.051	0.029	0.017	0.023	0.015	0.021	0.086	0.046	0.013	0.062
	(0.870)	(0.961)	(0.848)	(0.714)	(0.623)	(0.518)	(0.683)	(0.556)	(0.601)	(0.337)	(0.460)	(0.136)
LEV	-0.183	-0.147	-0.161	-0.225	0.211	0.189	0.215	0.249	-0.213	-0.177	-0.331	-0.242
	(0.053)*	(0.062)*	(0.059)*	(0.046)*	(0.431))	(0.081)*	(0.073)*	(0.408)	(0.076)*	(0.065)*	(0.083)*	(-0.047)*
CAPEX	0.119	0.168	0.109	0.197	0.234	0.259	0.181	0.272	0.329	0.112	0.248	0.173
	(0.118)	(0.085)*	(0.153)	(0.084)*	(0.072*)	(0.043)*	(0.148)	(0.091)*	(0.042)*	(0.189)	(0.037)*	(0.053)*
ROA	0.049	0.051	0.052	0.048	0.072	0.075	0.076	0.079	0.061	0.107	0.066	0.062
	(0.000)*	(0.000)*	(0.000)*	(0.000)*	(0.000)*	(0.000)*	(0.000)*	(0.000)*	(0.000)*	(0.000)*	(0.000)*	(0.000)*
DIVDUM	0.047	0.038	0.046	0.053	0.092	0.119	0.084	0.074	0.087	0.076	0.063	0.097
	(0.062)*	(0.047)*	(0.068)*	(0.066)*	(0.179)	(0.116)	(0.093)*	(0.187)	(0.063)*	(0.147)	(0.045)*	(0.057)*
QUICK	0.337	0.323	0.381	0.427	0.509	0.493	0.579	0.427	0.576	0.578	0.621	0.521
	(0.005)*	(0.007)*	(0.002)*	(0.001)*	(0.004)*	(0.006)*	(0.001)*	(0.001)*	(0.008)*	(0.293)	(0.379)	(0.495)
Adjusted R^2	0.2165	0.2240	0.2200	0.2241	0.2291	0.2368	0.2332	0.2351	0.2174	0.168	0.2332	0.2373
N	297	311	311	311	297	311	311	311	297	311	311	311

Note = LN Tobin's Q, LN Alt.Q1 and LN Alt.Q2 are used as dependent variables to proxy firm value. All three dependent variables are regressed with four key independent variables DERIVFV (measures extent of hedging) and the binary variables DERIVDUM, FCD and IRD. Control variables are the same in all regressions. The total firm-year observations in the regression measuring the extent of derivatives usage are slightly lower to the ones with binary variables as key independent variables because 7 firms (14 firm-years) mention that they use derivatives but do not disclose the fair value of their derivatives. Furthermore, the p-values of coefficients are noted under the coefficients in parentheses and'*' notes that the coefficient is at least significant at the 10% level. Robust standard errors are used in all regressions in order to correct for heteroskedasticity.

When using the DERIVDUM as main independent variable and correcting for other factors that might affect firm value using LN Tobin's Q as dependent variable. I find evidence that the yes-no decision (derivatives usage in general) of derivatives usage is important to investors. Because it seems that in general, firms that use financial derivatives to mitigate financial risk exposures are valued higher by investors. This is seen by the coefficient of 0.046 which is positive and statistically significant at a 5% significant level. One can interpret this coefficient by stating that on average, a firm that is exposed to financial risks (such as currency risk, interest rate risk and commodity risk) and uses derivatives to mitigate these risks, on average this farm is valued higher with a hedging premium of 1.05% ($e^{0.046}$) compared to firms that do not use derivatives. The same conclusion can be drawn from the regression model with the FCD dummy variables as main independent variables, which are as well positive and significant in all 3 models, implying that investors value firms' that use FCD to mitigate currency risk significantly higher compared to firms that are exposed to currency risks and do not use FCD. The coefficients of FCD in the model with Tobin's Q is 0.031 and significant at a 5% level, the coefficients in the models with Alt.Q1 and Alt.Q2 as dependent variable are 0.028 and 0.003 respectively and only significant at a 10% level. Table 11 also show the results of firms that use IRD to mitigate their exposures to fluctuations of interest rates that might negatively affect the firm's performance. The coefficients of IRD are not significant in the two models with Alt.Q1 and Alt.Q2 as dependent variables, but I find a small but positive coefficient of 0.018 which is significant at a 10% level when using Tobin's Q as dependent. This finding indicates that in general, investors reward firms that use IRD to manage their exposures against interest rate risk with a significantly higher firm value of 1.02%($e^{0.018}$).

In general, the majority of results so far are in line with the stream of studies that find a positive relationship between derivatives usage and firm value (Allayanis & Weston, 2001) (Graham & Rogers, 2002) (Allayannis, Lel, & Miller, 2012). All three models result in a hedging premium for DERIVDUM, which indicates that investors value the usage of derivatives for hedging purposes. The hedging premium found in the model of with Tobin's Q as dependent variable is 1.05%, which is quite smaller than the 10.7% hedging premium found by (Allayannis, Lel, & Miller, 2012) and the 4.87% premium found by (Allayanis & Weston, 2001) but similar to the 1.1% hedging premium found by (Graham & Rogers, 2002). The results so far are in line with the notion that the yes-no decision regarding derivatives usage is considered to be a value increasing risk management activity by investors in European firms. When linking these results to hedging theories, obviously the results in general do not support the Modigliani and Miller theory but could be linked to the hedging theories of (Smith & Stulz, 1985), (Bessembinder, 1991) and (Froot, Scharfstein, & Stein, 1993). Based on these theories, one could argue that corporate derivatives usage indirectly enhances firm value by reducing market imperfections such as a the probability of encountering financial distress (reduced

cost of capital associated with less volatile earnings), reduction of underinvestment costs and reducing expected taxes as a result of smoother taxable income which enhances the predictability/reliability of investor's forecast of the firms future prospects.

After analyzing the OLS multivariate regression outputs of the main independent variable DERIVFV, which measures the extent of derivatives usage, I find that the coefficients of DERIVFV are 0.081, 0.062 and 0.034 in all three models respectively (LN Tobin's Q, LN Alt.Q1 and LN Alt.Q2). Obviously, these coefficients of DERIVFV are higher than the ones of the binary variable DERIVDUM, which indicates that the effect on firm value is higher as the extent of derivatives usage increases. However, unlike in the case of DERIVDUM, the coefficients in all three models with DERIVFV as main independent variable are not significant. Based on this result which is in line with the findings of (Khediri, 2010) and (Guay & Kothari, 2002) , one can say that the extent of derivatives usage does not affect firm value. This basically means that investors in European firms do not assign extra value to firms that increase their level of derivatives usage. There are several reasons why investors do not consider an increase of a firm's level of derivatives usage as a value adding activity for shareholders. As mentioned earlier, most studies that examine the impact of derivatives usage on firm value are dominated by U.S. based studies, the majority of these studies find that the extent of derivatives usage has a positive and significant impact on firm value. However, this thesis focusses only on European firms listed in European stock markets and subjected to European legislation. When taking the differences in corporate governance and firm characteristics in consideration, it is not strange that the results regarding the impact of the extent of derivatives use on firm value in this European based study are in contradiction with the majority of U.S. based studies such as the one of (Allayanis & Weston, 2001). These different results suggest that there are big differences in the market valuation and characteristics (corporate governance) of European firms and U.S. firms. European firms in general, are known to have a higher ownership concentration compared to U.S. firms, which means that the majority of shares in European firms are usually held by a few groups (block holders) like the founding family, states, unions etc. Besides a higher ownership concentration, European countries also have limited investor's protection compared to the US (SOX). According to (Laporta et al., 2002), in countries that have limited investor's protection and high ownership concentration, there is a higher opportunity for the controlling shareholders to transfer value from minority shareholders. Furthermore, (Khediri, 2010) argues that controlling shareholders (block holders) in firms that have a high ownership concentration, which are located in a country with limited investor protection, have more incentives to hedge even though increasing the level of derivatives usage/hedging will not enhance shareholders value in a certain situation. The reason for this corporate hedging decision that does not maximize firm value, is explained by the risk-aversion of large shareholders who are not well diversified because they invested a large portion of their private wealth

in the firm. Based on this rationalization, it seems that investors in this study anticipate on the notion that a higher extent of derivatives usage is not always associated with value increasing motives. This inference supports the finding of (Allayannis, Lel, & Miller, 2012) that the extent of derivatives usage adds value only for firms residing in countries with strong external governance. The reason for this is that a strong legal environment whereby investor's protection is high like for example in the US, reduces the ability of block holders to engage in corporate derivatives usage as a risk management activity that will only benefit themselves. Another explanation for not finding a hedging premium associated with the extent of derivatives usage is because derivatives usage is not the only risk management tool to manage corporate risk. Firms could also use other risk management tools such as natural hedging and operational hedging (mergers, acquisitions, relocation of production facilities).

The remaining results pertaining the rest of the independent variables indicate that some control variables are significant and useful in explaining which factors affect firm value. ROA, which is a proxy for profitability, is found to be positively significantly related to firm value across all models. This basically means that investors value European listed firms based on their profitability. The coefficients of ROA range from 0.05 to 0.11 (5-11%), this finding is quite intuitive and in line with my expectations and the studies of (Allayanis & Weston, 2001) and (Khediri, 2010). Furthermore, I find that SIZE is positively associated with Tobin's Q, Alt.Q1 and Alt.Q2 in all regression models. However, the coefficients are not significant and therefore do not support the findings of (Allayanis & Weston, 2001) that larger firms are futured by lower firm value. The results also indicate a negative and significant relationship between leverage and firm value in all models besides in the regression models with Alt.Q1 as dependent variable. In general, this finding supports the results of (Khediri, 2010) that as leverage increases also the likelihood of under investment, financial distress and bankruptcy increases. I also find that the CAPEX is positive and significantly related to firm value across most of the regression models, which implies that firms with more growth/investment opportunities are valued higher firm value by investors. This finding is also in line with (Allayanis & Weston, 2001). All coefficients of the dividend dummy are positive in all regression models, most of them are significant as well. Unlike the findings of (Allayanis & Weston, 2001), this finding is consistent with the perception that investors value firms that pay dividends higher and consider management of such firms competent to generate stable future profits. Furthermore, in general, I also find the coefficients of QUICK are positive in all regression models and most coefficients are statistically significant at a 1% significance level. This finding is more consistent with the notion that a higher liquidity means that a firm has sufficient internal resources to realize profitable project that will increase the firm's value but not in line with Jensen's view that a firm with an excess free cash flow (high liquidity) is likely to invest in negative NPV project that destroys firm value.

5.3 Additional test on value relevance of derivatives

As mentioned earlier, IFRS 7 requires firms to disclose information about the significance of financial instruments and express both in qualitative and quantitative terms about the nature and extent of risks arising from the used financial instruments (IAS, 2005). In order to comply with IFRS 7, firms are required to include information about their level of exposure to financial risks (foreign exchange risks, interest rate risks and commodity price risk) before and after using derivatives. This type of information is usually included in the risk management section of financial statements. IFRS 7 became effective in 1 January 2007 and the data used in this thesis originates from the financial statements in 2008 and 2009. The fact that data was collected after IFRS 7 became effective enabled me to also hand collect data regarding the exposure levels of firms before and after the use of derivatives during the fiscal years 2008 and 2009.

After analyzing the annual reports of all firms in the sample for the period 2008 and 2009. I find that 157 firms of the 162 (97%) firms in the sample explicitly mention in their consolidated financial statements that they are exposed to foreign exchange risk. Out of the 157 firms exposed to currency risk, 149 firms mention that foreign exchange derivatives such as forwards, futures, options and swaps are used to mitigate exposures to foreign exchange risk. Of all these foreign exchange derivatives, forwards are used most frequently (93%), followed by swaps (51%), options (36%) and futures (9%). Of the 149 firms that reveal their use of FX derivatives in their consolidated financial statements, only 30% (44 firms) disclose the levels of their exposures to currency risk before and after hedging.

The basic thought of this additional test is that, if corporate derivatives use for hedging purpose is value relevant, I expect the average level of exposure to financial risks to be significant lower after the application of corporate derivatives usage compared to the exposure before hedging, when performing a t-test on average exposure before and after hedging.

H (null): The null hypothesis is that the average exposure to foreign exchange risk is the same before and after hedging.

H (alternative): The alternative hypothesis is that the average exposure to foreign exchange risk is lower after hedging.

After executing the paired t-test on the means before and after hedging, a t-value of 1.96 is obtained (table 12). The critical value of the t-test with 43 degrees of freedom and a significance level of 5% is equal to 1.68. Furthermore, the obtained p-value of the t-test is 0.028. Given the fact that the t-value of 1.9 is higher than the critical value of 1.68 and that the p-value of 0.0282 is smaller than the significance level of 0.05. I

reject the null hypothesis and accept the alternative hypothesis which is an indication that using foreign exchange derivatives is effective because it significantly decreases a firm's exposure to currency risks. If the use of financial derivatives significantly reduces exposures to financial risks, as shown by this simple test, I expect that firms that use derivatives will have less volatile future cash flows and higher earnings quality, which eventually leads to a hedging premium or higher valuation by investors because of the enhanced predictability/reliability of future prospects. However, in order to state that derivatives usage indirectly affects firm value by increasing a firm's earnings quality, other factors that might potentially affect earnings quality should be incorporated in an OLS multivariate regression model, which is done in the following section.

Table 12 - Paired T-test on currency risk exposure

Currency risk exposure	Firms	Mean	Std. Err	Std. Dev
Before hedging	44	31090	18620.38	123513.60
After hedging	44	-6495	6552.04	43461.34
Difference		37585	19162.87	127112.10
T-statistic	1.96			
$T_{(43\ df)}$*	1.68			
P-value	0.028*			

Note: T* refers to the critical value of the paired T-statistic with n-1 (43) degrees of freedom. The p-value of the t-statistic is significant at a 5%, which indicates a significant decrease of the average exposure level to currency risk after hedging.

5.4 Results Hypothesis 2

When taking a look at table 13, one can observe that the Actual F-statistic= 25.17. When interpreting this F-statistic, one should keep in mind that the null hypothesis and alternative hypothesis is as follows: *(null) Hypothesis: R-square = 0* which basically means that the model is not good because none of the variation in the dependent variable is explained by the independent variables. The alternative hypothesis is that *R-square ≠ 0*, implying that the multivariate OLS regression model has some explanatory power. As we can see in the table, the p-value of the F-statistic equals to 0.00, which is significant at a 1% significant level. Therefore, one can state that the OLS regression model with the level of derivatives usage as main independent variable is statistically significant at a 1% significant level and with a 99% confidence level, one can reject the null hypothesis that the R-square of the OLS regression model equals to zero. This basically means that the OLS regression model mentioned above has some explanatory power. Furthermore, we can see that the adjusted R-square is 0.445. This means that 44.5% of the variation in earnings quality is explained by the independent variables in the OLS regression models, which is quite alright compared to other studies using discretionary accruals to proxy earnings quality.

Table 13 also shows the p-values of the t-test related to the independent variables. In order to interpret these p-values, it is important to know that the null hypothesis of the t-test is that the coefficient of the independent variable equals to zero, which means that the independent variable does not have a significant effect on the dependent variable. The alternative hypothesis implies that the coefficient of the independent variable is not zero, which would mean that the independent variable has a significant effect on the dependent variable. When analyzing the table 13 one can also see that the coefficient of the main independent variable is 2.88e-08 which is basically 0.00 rounded in two decimals. The related p-value of DERIVFV's coefficient equals 0.43. Because the p-value of 0.43 is not significant, there is no reason to reject the null hypothesis that $\beta_2 = 0$. Based on this empirical results, one can conclude that there is no sufficient evidence to infer that the extent or level of hedging through derivatives significantly affects earnings quality. Table 13 also illustrates the results of the second OLS regression which is performed using the dummy variable (DERIVDUM) as main independent variable instead of the level of derivatives usage. The adjusted R-square of the regression model with the dummy variable as proxy for derivatives usage is 0.46 (46%). This indicates that the explanatory power of the OLS regression model with the dummy variable as proxy for derivatives usage is slightly higher compared to the OLS regression model measuring the level of hedging (DERIVFV).

After performing the regressions, table 13 illustrates that DERIVDUM's coefficient is -0.09 with a p-value of 0.002. Contrary to the regression with DERIFV as main independent variable, the p-value of the main

independent variable's coefficient (DERIVDUM) is statistical significant at a 1% level. This basically means that one can be 99% confident that $\beta_2 \neq 0$ and that there is sufficient evidence to reject the null hypothesis and state that derivatives usage in general or the yes-no decision of using derivatives, significantly enhances earnings quality. Based on these results, one can conclude that firms that use derivatives have relatively lower discretionary accruals, which implies that these firms have a relatively higher and significant earnings quality compared to firms that do not use derivatives to hedge their exposures against financial risks. So this means that in general, it matters whether firms use corporate derivatives to hedge financial risks because firms that use derivatives for hedging purpose on average have significant higher earnings quality after controlling for other factors that might affect earnings quality. This leads to the inference that at a wider scope, derivatives usage in general seems to be value relevant because they significantly reduce exposures to financial risks and reduce the volatility of future cash flows which enhances the predictability and reliability of investor's assessment regarding a firm's future performance. All this is eventually reflected in the fact that derivatives users in general have a significantly higher earnings quality, which is an indication that derivatives users have more useful earnings to investors compared to non-derivatives. However, when looking at a narrower scope in terms of the extent of derivatives usage, it seems that the level of derivatives usage does not significantly affect earnings quality. This means that a higher level of derivatives usage does not necessarily result in a higher earnings quality, a possible explanation for this finding is that at a certain point the higher costs associated with a higher level of derivatives usage outweighs the benefits of the increased level of derivatives usage in a way that at that point increasing the extent of derivatives is not more effective and efficient in reducing volatility and uncertainty of future cash flows. Another possible explanation is that at a certain point, other risk management tools are more effective (such as real options like relocating production facilities) in reducing the exposures related to uncertainties/volatility of a firms future cash flows compared to increasing the extent of derivatives usage.

Furthermore, when evaluating the control variables, table 13 Shows that LEVERAGE has a significant coefficient of -0.035 at a 5% significance level, which means that leverage positively affects earnings quality. (Jensen, 1986) views can be used to argument this finding, Jensen views debt as a disciplinary instrument because contractual payments related to leverage absorbs a firm's free cash flow and reduces the internal cash flows available which makes managers unable to invest in negative NPV projects. Therefore, one might argue that a higher leverage could positively affect earnings quality. LN_SIZE has a very small positive and insignificant coefficient of 0.002 and a p-value of 0.291, which indicates that the size of a firm does not significantly affect earnings quality. CFO_AT has a negative and significant coefficient of -0.55 and a p-value of 0.00. This finding is in line with the assumption that firms with a high cash flow from

operations are more likely to beat earnings benchmarks and might therefore have a lower likelihood to manage earnings by using discretionary accruals. The last control variable LOSS has a coefficient of –0.066, a p-value of 0.00 and is significant at a 1% significant level. This basically means that firms that made a loss, on average have higher earnings quality (lower discretionary accruals) than firms that made a profit. Surprisingly, this finding is not in line with the expectation that firms making a loss are more likely do mislead investors by using discretionary accruals to artificially boost up earnings. The magnitude of coefficients and p-values of the control variables in the regression with DERIVFV as main independent variable are very similar to the regression with the binary variable DERIVDUM and also lead to similar conclusions when interpreting the coefficients and p-values.

Table 13 Multivariate results of hypothesis 2

$$Discretionary\ accruals = \alpha + \beta_1 DERIVATIVESUSAGE + \beta_2 LEV + \beta_3 SIZE + \beta_4 CFO + \beta_5 LOSS + \varepsilon$$

Independent variables	Coef.	p-value	Coef.	p-value
DERIVFV	2.88E-08	0.245		
DERIVDUM			-0.088	0.002*
INTERCEPT	0.054	0.002*	0.139	0.000*
LEV	-0.033	0.051*	-0.035	0.042*
SIZE	0.001	0.435	0.002	0.249
CFO	-0.551	0.000*	-0.550	0.000*
LOSS	-0.067	0.000*	-0.066	0.000*
N (firm-year)	337		337	
F (5, 331)	25.17	0.000*	25.77	0.000*
Adjusted R_2	0.445		0.4600	

Note: Discretionary Accruals is used as a dependent variable in both regressions to proxy Earnings Quality. The first model includes DEIVFV (extent of derivatives usage) as main independent variable and the second model includes DERIVDUM (yes-no derivatives usage) as key independent variable. Control variables are the same in both regression models. Furthermore, '' means that the coefficient is significant at a 10% level.*

Chapter 6 – Conclusion

The main objective of this thesis is to investigate the direct impact of derivatives usage on firm value using a sample of non-financial European listed firms during 2008 and 2009. Besides that, I also examine how derivatives usage affects earnings quality using by using the performance-adjusted discretionary accruals based on the modified jones model. Throughout this thesis, in both hypotheses, two proxies are used to operationalize derivatives usage. The first proxy is DERIVFV which is a continuous variable representing a firm's level of derivatives usage and measured by the firm's fair value of derivatives scaled by its total assets. The second proxy is DERIVDUM which is a binary variable and represents the yes-no decision of derivatives usage in general. Both derivatives usage proxies are obtained by hand collecting data, which is extracted from financial statements of European listed firms. In the first hypothesis, firm value is operationalized using the widely used approximation of the complex theoretical Tobin's Q along with two alternative proxies (Alt.Q1 and Alt.Q2). Furthermore, besides using DERIFV and DERIVDUM as main independent variables in the first hypothesis, derivatives usage in general is further specified in FCD and IRD which are binary variables indicating whether a firm uses foreign currency derivatives (used by 83.84% of firms in sample) and interest rate derivatives (used by 76.58% of firms in sample) to manage currency and interest rate risk.

Most of the little research done on how firm value is affected is dominated by U.S. based studies. The majority of these U.S. based studies find that the extent of derivatives usage positively affect's investor's perception regarding a firm's value (Allayanis & Weston, 2001). However, when analyzing the results of the OLS multivariate regression models for hypothesis one, I find that the extent of derivatives usage (DERIVFV) does not significantly increase firm value, the conclusion stays the same across all regression models of the three proxies (Tobin's Q, Alt.Q1 and Alt.Q2) for firm value. This finding basically means that investors of European listed firms do not consider an increase of a firm's level of derivatives usage as a value adding activity for shareholders. This finding obviously contradicts the majority of U.S. based studies. However, the different results are not strange when considering the differences in corporate governance and firm characteristics between the U.S. and Europe. In contrast to European firms which are chacterized by a high ownerships concentration whereby a majority of firm's shares are held by a few groups (block holders) such as the founding family, government, unions etc., the ownership concentration in U.S. firms much lower because a firm's shares is dispersed among different shareholders. Furthermore, investor's protection is lower in Europe compared to the US (SOX). According to (Khediri, 2010) if a firm has a high ownership concentration and is located in a country whereby investor's protection is relatively law (like in most European countries compared to the US), the controlling shareholders might have an incentive to hedge in a situation whereby increasing the level of derivatives usage will not enhance

shareholders value. The reason for this decision is explained by the risk-aversion of the controlling shareholders who are not well diversified because they invested a large portion of their private wealth in the firm. Based on this rationalization, it seems that investors in this study anticipate on the notion that a higher extent of derivatives usage is not always associated with value increasing motives. This inference supports the finding of (Allayannis, Lel, & Miller, 2012) that the extent of derivatives usage adds value only for firms residing in countries with strong external governance. The reason for this is that a strong legal environment whereby investor's protection is high like for example in the US, reduces the ability of block holders to engage in corporate derivatives usage as a risk management activity that will only benefit themselves. Another explanation for not finding a hedging premium associated with the extent of derivatives usage is because derivatives usage is not the only risk management tool to manage corporate risk. Firms could also use other risk management tools such as natural hedging and operational hedging (mergers, acquisitions, relocation of production facilities).

In contrast to the results of the regression models with the extent of derivatives usage as main independent variable, I find evidence that the yes-no decision (derivatives usage in general/DERIVDUM) of derivatives usage is important to investors. Because it seems that in general, firms that use financial derivatives to mitigate financial risk exposures are valued higher by investors. This is reflected by the positive and significant coefficients of DERIVDUM across all three proxies. The coefficient of the regression model with Tobin's Q as independent variable results in a hedging premium of 1.05% ($e^{0.046}$) which indicate that on average, firms that are exposed to financial risks such as (currency risk, interest rate risk and commodity risk) and use derivatives to manage these risks are valued higher with a hedging premium of 1.05%. The coefficients of FCD are as well positive and significant across all three regression models but the coefficients of IRD are only significant in the regression model with Tobin's Q as dependent variable. The coefficients of FCD and IRD when using Tobin's Q as dependent variable indicate that investors reward firms with a hedging premium of 1.03% ($e^{0.031}$) and 1.02% ($e^{0.018}$) respectively. The majority of the results regarding the binary independent variables: DERIVDM, FCD and IRD are in line with the stream of studies that find a positive relationship between yes-no decision of using derivatives and firm value (Allayanis & Weston, 2001) (Graham & Rogers, 2002) (Allayannis, Lel, & Miller, 2012). All three binary variables result in a hedging premium, which indicates that investors in general value the fact that non-financial firms use financial derivatives for hedging purposes. The hedging premium found is similar to the 1.1% premium found by (Graham & Rogers, 2002) but quite lower than the premium of 10.7% and 4.87% found by (Allayanis & Weston, 2001) and (Allayannis, Lel, & Miller, 2012) respectively.

When analyzing the two OLS multivariate regression models related to the second hypothesis, I find that the coefficient of DERIVFV is slightly positive (extent of derivatives usage) but not significant at all given

the p-value of 0.43. This finding is an indication that there is no reason to infer that the extent or level of derivatives usage significantly affects earnings quality and is in line with the notion that a higher level of derivatives usage does not necessarily result in a higher earnings quality. A possible explanation for this finding is that at a certain point the higher costs associated with a higher level of derivatives usage outweighs the benefits of the increased level of derivatives usage in a way that at that point increasing the extent of derivatives is not more effective and efficient in reducing volatility and uncertainty of future cash flows. Another possible explanation is that at a certain point, other risk management tools are more effective (such as real options like relocating production facilities) in reducing the exposures related to uncertainties/volatility of a firms future cash flows compared to increasing the extent of derivatives usage. In contrast to DERIVFV, when assessing the regression that measures how earnings quality is affected by the yes-no decision of derivatives usage (DERIVDUM), I find that DERIVDUM has a coefficient of -0.09 and is significant a 1% significant level. Based on these results, one can conclude that firms that use derivatives have relatively lower discretionary accruals, which implies that these firms have a relatively higher and significant earnings quality compared to firms that do not use derivatives to hedge their exposures against financial risks. This empirical finding supports hedging theories that derivatives usage indirectly enhance firm value by increasing the earnings quality. The increase in earnings quality caused by derivatives usage is important to investors because the use of financial derivatives for hedging purposes has the ability to reduce volatility associated to future cash flows, which results in less volatile future earnings and therefore more predictable and reliable investor's forecast regarding a firm's future prospects.

6.1 Limitations, recommendations and policy implementations

Like all empirical studies, this thesis also has limitations. This thesis only uses a sample period of 2 years because of the demanding process of hand collecting data. However, 2 years might not be sufficient in order to really capture the extent of hedging, it would be better to use a sample which consists of more firm-years observation. Furthermore, I was not able to include other instruments a firm can use to manage its exposures to financial risks such as operational hedging due to data unavailability. However, it would be interesting for future research to incorporate these non-derivatives instrument by assessing whether they positively affect firm value.

I hand collected both the fair value and notional values of derivatives by extracting this data form annual reports. As mentioned in the thesis, amongst other items, IFRS 7 requires firms to disclose exposure levels before and after hedging and fair values and notional values of financial derivatives used by the firm. However, when collecting the data I noticed that many firms disclose limited information regarding their

use of financial derivatives. For example, initially I intended to use the notional value of derivatives as a proxy for the extent of derivatives usage but I was confronted with the fact that almost the half of the firms in my sample did not report this information. Furthermore, from all companies that report the use of derivatives for hedging currency risk, 70% of these firms do not disclose the level of exposure before and after hedging. I am convinced that IFRS 7 is a good step in increasing transparency regarding the nature and extent of a firms derives usage given the fact that investors use this information to make economic decisions regarding the allocation of resources. However, based on the examples mentioned above, many European firms do not fully comply with IFRS 7. Because IFRS 7 facilitates pivotal information to assess and understand how a firm mitigates its exposures to financial risks, I find that it is important to encourage and increase the transparency of a firm's disclosure regarding its financial derivatives usage. This can be done by increasing enforcement of regulatory authorities (such as AFM in the Netherlands).

Appendix

Table 1- Variable description Hypothesis 1

Dependent variable	
LN Tobin's Q	LN Tobin's Q is the main dependent variable which is used to operationalized firm value and is calculated by taking the natural logarithm of Tobin's Q
LN Alt.Q1	LN ALT.Q1 is an alternative proxy for firm value and is measured by the ratio between the market value of equity and the book value of equity
LN Alt.Q2	LN ALT.Q2 is an alternative measurement for firm value and is calculated by the ratio between the market value of equity and revenue
Main independent variables	
DEIVFV	DERIVFV measures the extent of derivatives use through the fair value of derivatives scaled by total assets
DERIVDUM	Measures derivatives usage in general, 1 indicates whether a firm uses derivatives to manage financial risk and 0 otherwise
Control variables	
LEV	LEV stands for Leverage and is measured by dividing the total liabilities by the total assets of a firm
ROA	ROA is a proxy for profitability and is calculated by dividing earnings before interest and tax (EBIT) with the total assets
QUICK	QUICK is a proxy for liquidity and is calculated by adding up cash and cash equivalent and dividing the sum by current liabilities
CAPEX	Investment growth/opportunity is operationalized using CAPEX, which is calculated by dividing a firm's capital expenditures with the total assets
SIZE	Measures how large a firm is, by using the natural logarithm of assets
DIVIDUM	DIVIDUM is a binary proxy variable that assesses whether a firm is capital constrained. DERIVDUM equals to 1 if the firm paid dividends either in cash or stock to shareholders and 0 indicates that no dividends were paid during the sample period

Table 2 – Variable Description Hypothesis 2

Dependent variables	
DA	Earnings quality is operationalized using DA, which stands for the performance-adjusted discretionary accruals obtained using the modified jones model.
Key variables	
DEIVFV	DERIVFV measures the extent of derivatives use through the fair value of derivatives scaled by total assets
DERIVDUM	Measures derivatives use in general, 1 indicates whether a firm uses derivatives to manage financial risk and 0 otherwise
Control variables	
LEVERAGE	Total liabilities divided by total assets of a firm.
LN_SIZE	Natural logarithm of the book value of the total assets.
CFO_AT	Cash flows of operating activities divided by total assets.
LOSS	Dummy variable. 1 if income before extraordinary items is smaller than 0. 0 if otherwise.

Bibliography

Allayanis, G., & Weston, J. P. (2001). The Use of Foreign Currency Derivatives and Firm Market Value. *The Review of Financial Studies* , 243-276.

Allayannis, G., & Eli, O. (2001). Exchange rate exposure, hedging, and the use of foreign currency derivatives. *Journal of International Money and finance*, 273-296.

Allayannis, G., Lel, U., & Miller, D. (2012). The use of foreign currency derivatives, corporate gouvernance, and firm value arround the world. *Journal of Internatiuonal Economics*, 65-79.

Ayturk, & Yanick. (2016). Corporate derivative use and firm value"evidence from Turkey. *Borsa istanbul Review*, 1-27.

Ball, R., & Brown, P. (1968). An Empirical Evaluation of Accounting Income Numbers. *Journal of Accounting Research 6*, 159-178.

Bartram, M., & Brown, G. W. (2011). The Effects of derivatives on firm risk and value . *Journal of financial and quantitative analysis* , 967-999.

Bartram, S. B. (2009). International evidence on financial derivatives use. *Journal of financial management*, 185-206.

Bashir, H., & Khazaal, O. (2013). Impact of derivative use on firm value . *Journal of management research*, 108-127.

Belghitar, Y., & Clark, E. S. (2013). Foreign currency derivative use and shareholders value . *International Review of Financial Analysis* , 283-293.

Belghitar, Y., Clark, E., & Mefteh, S. (2013). Foreign currency derivative use and shareholder value. *International Review of Financial Analysis* , 283-293.

Berkman, H., & Bradbury, M. (1996). Empirical evidence on the corporate use of derivatives. *Journal of Financial Management*, 5-13.

Bessembinder, H. (1991). Forward contracts and firm value: Investment incentive and contracting effects. *Journal of Financial and Quantitative Analysis 26*, 519-532.

BIS. (2015). *OTC derivatives statistics at end 2014. Monetary and Economic Department.* Basel: BANK FOR INTERNATIONAL SETTLEMENTS.

Bodnar, G. M., Hayt, G. S., & Marston, R. C. (1996). Wharton Survey of Derivatives Usage by US Non-Financial Firms. *Journal of Financial Management 25*, 113-133.

Brown, L. D. (2001). A temporal analysis of earnings surprises: Profits versus losses. *Journal of Accounting research* , 221-241.

Buffet, W. E. (2004). *BERKSHIRE HATHAWAY INC Annual Report 2003.* Omaha, Nebraska, United States: BERKSHIRE HATHAWAY INC.

Caramazza, F., & Aziz, J. (1998). *Fixed or Flexible? Getting the Exchange Rate Right in the 1990s.* Washington DC: International Monetary Fund.

Carter, D. A., Rogers, D. A., & Simkins, B. J. (2006). Hedging and Value in the U.S. Airline Industry. *Journal of applied corporate finance*, 21-33.

Chen, C.-Y., & Lin, C.-J. (2008). Audit Partner Tenure, Audit Firm Tenure, and Discretionary Accruals. *Contemporary Accounting Research*, 415-445.

Chung, K. H., & Pruit, S. W. (1994). A Simple Approximation of Tobin's q. *Journal of Financial Management*, 70-74.

DeAngelo, L. E. (1986). Accounting Numbers as Market Valuation Substitutes: A Study of Management Buyouts of Public Stockholders. *The Accounting Review*, 400-420.

Dechow, P. M. (1994). Accounting earnings and cash flows as measures of firm performance: The role of accounting accruals. *Journal of Accounting and Economics 18*, 3-42.

Dechow, P. M., Sloan, R. G., & Sweeney, A. P. (1995). Detecting Earnings Management. *The Accounting Review*, 193-225.

Dichev, I. D., & Skinner, D. J. (2002). Large–Sample Evidence on the Debt Covenant Hypothesis. *Journal of Accounting Research*, 1091-1123.

Dichev, I., & Burghstahler, D. (1997). Earnings management to avoid earnings decreases and losses . *Journal of Accounting and Economics 24*, 99-126.

EY. (2014). *Hedge accounting under IFRS 9.* Retrieved from Ernst and Young: http://www.ey.com/Publication/vwLUAssets/Applying_IFRS:_Hedge_accounting_under_IFRS_9/$File/Applying_Hedging_Feb2014.pdf

Frankel, R. M., Johnson, M. F., & Nelson, K. K. (2002). The Relation between Auditors' Fees for Nonaudit Services and Earnings Management. *The Accounting Review*, 71-105.

Froot, K. A., Scharfstein, D. S., & Stein, J. C. (1993). Risk management: Coordinating corporate investment and financing policies . *Journal of Finance 48*, 1629-1658.

Graham, J., & Rogers, D. (2002). Do firms hedge in response to tax incentives? *The Journal of finance* , 815-839.

Guay, W., & Kothari, S. (2002). How much do firms hedge with derivatives? *Journal of Financial Economics*, 423-462.

Guay, W., & Kothari, S. P. (2002). How much do firms hedge with derivatives? *Journal of Financial Economics* , 423-261.

Healy, P. M. (1985). The effect of bonus schemes on accounting decisions. *Journal of Accounting and Economics*, 85-107.

Healy, P. M., & Wahlen, J. M. (1999). A Review of the Earnings Management literature and its implications for standard setting . *Journal of Accounting Horizons*, 365-383.

ICA. (2010). Financial instrument disclosures. *Chartered Accountants Journal*, 46-48.

ISDA. (2015). *Survey report 2014.* New York: International Swaps and Derivatives Association .

Jensen, M. (1986). Agency costs of free cash flow, corporate finance, and takeovers. *American Economic Review 76*, 323-329.

Jones, J. J. (1991). Earnings Management During Import Relief Investigations. *Journal of Accounting Research*, 193-228.

Jorion, P., & Jin, Y. (2006). Firm value and hedging: evidence from US oil and gas produces. *Journal of Finance 56*, 510-536.

Key, K. G. (1997). Political cost incentives for earnings management in the cable television industry. *Journal of Accounting and Economics 23*, 309 337.

Khediri, K. (2010). Do investors really value derivative use? Empircal evidence from France. *The Journal of Risk Finance*, 62-74.

Kieso, D. E., Weygandt, J. J., & Warfield, T. D. (2010). *Intermediate Accounting.* Hoboken: JOHN WILEY & SONS.

Kothari, S., Leone, A. J., & Wasley, C. E. (2005). Performance Matched Discretionary Accrual Measures. *Journal of Accounting and Economics*, 1-49.

Lel, U. (2012). Currency hedging and corporate gouvernance: A cross- country analysis . *Journal of Corporate Finance* , 221-237.

Lindenberg, E., & Ross, S. (1981). Tobin's q ratio and industrial organization. *Journal of Business*, 1-32.

Liu, Z., & Nagurney, A. (2011). Risk Reduction and Cost Synergy in Mergers and Acquisitions via Supply Chain Network Integration. *Journal of financial decision making* , 1-18.

Modigliani, F., & Miller, M. H. (1958). The cost of capital, corporation finance and the theory of investment . *American Economic Review 48*, 261-297.

Myers, S. C. (1977). Determinants of Corporate Borrowing . *Journal of Financial Economics*, 147-175.

Nain, A. (2004). The Strategic Motives for Corporate Risk Management. *Working paper*, 1-43.

Nance, D., Smith, C., & Smithson, C. (1993). On the Determinants of Corporate Hedging. *Journal of Finance*, 267-284.

Panaretou, A. (2013). Corporate risk management and firm value: evidence from the UK market. *The European Journal of Finance* .

Peek, E. (2013). *Business Analysis & Valuation.* Boston: Cengage Learning Emea .

Picker, R., & Leo, K. (2012). Applying International Financial Reporting Standards. In R. Picker, & K. Leo, *Applying International Financial Reporting Standards.* John Wiley & Sons Australia Ltd .

Smith, C., & Stulz, R. M. (1985). The Determinants of Firms' Hedging Policies. *Journal of Financial and Quantitative Analysis*, 391-405.

Stulz, R. M. (1996). Rethinking Risk Management . *Journal of Corporate Finance* , 8-24.

Stulz, R. M. (2004). Should we fear derivatives? *Journal of Economic Perspectives*, 173-192.

Titman, S., & Roberto, W. (1988). The Determinants of Capital Structure Choice . *The Journal of Finance*, 1-19.

U.S. Department of the Treasury. (2016, february 8). *Capital markets*. Retrieved from http://www.occ.gov/topics/capital-markets/financial-markets/trading/derivatives/index-derivatives.html: http://www.occ.gov/topics/capital-markets/financial-markets/trading/derivatives/index-derivatives.html

Wernerfelt, B., & Montgomery, C. A. (1988). Diversification, Ricardian rents, and Tobin's q. *Journal of Economics*, 623-632.