Master Programme in Finance

Does Hedging Increase Firm Value?

An Examination of Swedish Companies

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ABSTRACT

In an uncertain financial world, corporate risk management has become an important element of a firm's overall business strategy. The ability to manage risk will help companies act more confidently on future business decisions. Their knowledge of the risks they are facing will give them various options on how to deal with potential problems. One of the most popular risk management programs that firm adopts is to hedge against the future's fluctuations of income due to the changes in currency exchange rate or interest rate risk. Despite an increasing interest in developing theoretical studies about the reasons why firms involved in risk management, however, only a handful of studies that address the issue whether risk management can enhance the firm value. The purpose of this project research is to fill this gap and investigate the impact of hedging on firm value.

Using Tobin's Q as an approximation for firm market value and *hedging* as a control variable, I examined 90 Swedish firms listed on the Stockholm Stock Exchange, having the total assets exceeds at least 1 billion Euros. The results of the regression analysis show insignificant indication that the usage of hedging impacts firm value positively. The findings of this research imply that there is no evidence that support the hypothesis that hedging causes an increase in firm value.

Key words: corporate hedging, firm value, risk management, derivative

PREFACE

The past ten weeks writing this master thesis have been very interesting, educating and challenging. Developing this thesis has been hard work and time- consuming nonetheless a process of learning.

I would like to express my sincerest gratitude towards my supervisor, Ph.D., Assistant Professor Håkan Jankengård for being a countless supportive person when developing my thesis and for help me during the troublesome phase. Without his guidance, this thesis would not be enabled.

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1. INTRODUCTION

This chapter begins with a brief overview about the impact of hedging on firm value and the reason firms hedge. The problem discussion will highlight the contradict findings related to whether hedging impact firms value. Subsequently, I am presenting the aim and research question at the end of the chapter.

1.1 BACKGROUND

Corporate risk management is an important element of a firm's overall business strategy (Guay & Kothari, 2002). In an uncertain financial world, a better understanding of the impact of risk management on firm value is valuable to determine the firm's long- term success. Stulz (1996) argued that the primary goal of risk management is to eliminate the probability of costly lower-tail outcomes- those that would cause financial distress or make a company unable to carry out its investment strategy. In the last decades, risk management has moved from pure risk mitigation to value creation (Ahmed, Azevedo & Guney, 2010). Despite the prevalence of corporate risk management and the effort that has been devoted to develop theoretical studies about the reasons why firms involved in risk management, however, only a handful of studies that address the issue whether risk management can actually enhance the firm value (Haushalter, 2000; Allayannis & Weston, 2001).

As a definition of risk management, it is a process of thinking systematically about all possible risks, problems or disasters before they happen and setting up procedures that will avoid risk or at least minimize its impact[1]. The most popular risk management program that firms adopt is hedging; a firm can hedge by trading in particular futures, forward or option market even though it has no identifiable cash position in the underlying commodity (Smith & Stulz, 1985).

According to the classic Modigliani and Miller paradigm, in a perfect market, risk management is irrelevant to firm as shareholders can do it on their own at the same cost (Yin & Jorion, 2004). However, recent studies have shown that in the presence of realistic capital market

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[1] An Introduction to Risk Management, www.ourcommunity.com.au

imperfections, i.e. agency costs, costs of external financing, direct and indirect bankruptcy costs, as well as taxes, corporate hedging will enhance the shareholder value (Hagelin, 2003; Aretz, Bartram & Dufey, 2007). Those studies suggested that hedging could increase firms' values by reducing the expected costs of financial distress, lowering the expected cost of taxes or minimize the underinvestment problems. Geczy, Minton and Schrand (1997) besides providing empirical evidence and further theoretical arguments, which support the view, that hedging can create value; they also found that firms' use of currency derivatives is positively related to growth opportunities by examining currency-hedging activities for a large sample of Fortune 500 firms.

Allayannis and Weston (2001) studied the relationship between hedging and firm value, with a sample of 720 firms, the authors focus their analysis on the subsample of firms that are exposed to exchange rate risk through sales from foreign operations and examine whether firms that have similar exposure differ in value, depending on whether they hedge or not. The finding of their studies indicates that firms that begin a hedging policy experience an increase in value relative to those firms that choose to remain unhedged and that firms that quit hedging experience a decrease in value relative to those firms that choose to remain hedged. Ahmed, Azevedo and Guney (2010) by studying a sample of 288 nonfinancial UK firms, also found evidence that support the value creating theory. Although the effect of hedging on firm value and performance varies significantly across financial risks and that there are derivatives that are more effective in hedging certain types of risks, contributing favorably to value creation and financial perform. Similarly, Jankengard (2015) by studying the sample of 257 listed Swedish firms found evidences consistent with the hypothesis that derivatives usage is more value creating in firms with centralized FX exposure management than in firms with a decentralized approach.

While all of the risk management theories indicated that hedging could increase firm value, the type of firm risk targeted by theories varies. For example, if a firm faces costly external financing then the focus will lay on the volatility of cash flows as the risk measure to be hedged. On the other hand, when the firms' managers are risk adverse and under- diversified with respect to their compensation, they are likely to reduce the firm's risk by hedging in order to reduce the required risk premium. In the case, the type of risk targeted for hedging is associated with cash flows, earnings, or stock price volatility, depending on the nature of the managers' compensation

contract and firm- specific wealth (Guay & Kothari, 2002). Another incentive for firms to hedge is to reduce the expected cost of tax liability. The structure of the tax code can make it advantageous for firms to take positions in futures, forward, or options markets. If effective marginal tax rates are an increasing function of the corporation's pre- tax value. If hedging reduces the variability of pre –tax value, then the expected corporate tax liability is reduced and the expected post- tax value of the firm is increased, as long as the cost of the hedge is not too large (Smith & Stulz, 1985).

1.2 PROBLEM DISCUSSION

There is mixed support for value creating theories; however, it could be argued that corporate hedging has no impact on firm value (Modigliani & Miller, 1958), as investors can achieve risk reduction at least as efficiently themselves through diversification. Dufey and Srinivasulu (1983) argued that the hedging of risks that investors cannot diversify in financial markets might also not increase shareholder value, as investors receive an appropriate return for holding securities of inherently risky businesses. Therefore, corporate hedging of market risks simply shifts firms along a line that reflect the risk/reward tradeoff in the market. Mian (1996) surveyed the effect of hedging activities on gold mining firms and found no support for the value maximization theory even though he found strong evidence that supported the managerial risk aversion theory: according to which managers who hold more stock tend to undertake more hedging activities. Jin and Jorion (2006) investigated the hedging activities of a sample of 119 U.S oil and gas producers from 1998 to 2001. They tested for a difference in firm value between firms that hedge and those that do not hedge their oil and gas price risk. The result of their finding indicates that there is no general difference in firm values between firms that hedge and firms that do not hedge. Fauver and Naranjo (2010) also studied the relationship between agency costs and monitoring problems affect derivative usage, which in turn affects firm value. In their investigation, the authors gathered derivative usage data on 1746 non- financial firms headquartered in the U.S during $1991 - 2000$ and used Tobin's Q to measure the value gain or loss from derivative usage. The findings of their study show that the usage of derivatives has a mixed effect on firm value, suggesting that the valuation depends on the firm's corporate governance structure. Firms with greater agency and monitoring problems (i.e. firms that are less transparent, face greater agency costs, have larger information asymmetry problems and so on)

experience negative valuation when using derivatives. Meanwhile, firms with better corporate governance structure experience a positive firm value when using derivatives.

Those studies are contrary to the findings report in Allayannis and Weston (2001); Jankengard (2015).

Most of the studies within the topic of risk management have mostly focused on the reasons to why firms hedge or the relation between corporate hedging and firm characteristics (Smith & Stulz, 1985; Hagelin, 2003; Aretz, Bartram & Dufey, 2007). Even though there are contract findings of how hedging affect firm value, not so many studies have addressed the question whether of there is a direct relation between hedging and firm value. The lack of attention to this relationship creates a strong incentive for me to write this thesis.

1.4 AIM AND RESEARCH QUESTION

The purpose of this study is to shed light on the impact of hedging on firm value. Due to a mix of results regarding the impact of hedging, this study aims to investigate if hedging can impact the firm value positively. In this thesis, the period from 2005 to 2010 will be used and under this period, the world has witnessed one of the most severe financial crises in the history. With this fact in hand, I believe that hedging can create a higher value for firms since it minimizes the financial distress that related to a slower economy. To address this issue, this research project will explore the following question:

Does hedging impact the firm value?

There are many argument about whether hedging can increase firm value (Allayannis & Weston, 2001; Jin & Jorion, 2006; Jankengard, 2015), however, most of the empirical research did not show any positive correlation between hedging and firm value that were performed before 2006. None of the research (Dufey & Srinivasulu,1983; Mian, 1996; Jin & Jorion, 2006) has witnessed the impact of our current financial crisis. Also, the time panel of the studies was relatively short, in most cases the period varies between 1- 3 years, therefore one may not see the impact of hedging immediately. Consequently, given that we are living in an uncertain financial world, hedging will increase the firm value since it sends a signal to investors that the firms' future cash flows are secured, and the risk of financial distress will be reduced.

1.5 LIMITATIONS

The first limitation of this study is to focus on Swedish firms that listed on the Stockholm Stock Exchange. Under limited resources and time, I narrow the research toward a handful mid-size and large-size companies that have total assets exceed at least one billion Euros. I tried to find companies that have headquarters in Stockholm but dealing with international trade. Therefore, the result of this study is only applicable for Swedish firms.

The second limitation is the period in which firms' hedging activities are observed.
Since there are no available suggestions about how long time is the optimal time to notice how much hedging impacts firm value, so I choose a period of six years. The years 2005 to 2010 have been choose, as the data is not completed after this date.

1.6 RELEVANCE OF THE STUDY

Firms use derivatives to hedge their exposure to a variety of risks. Hedging exposure attracts a great deal of managerial and financial resources (Hagelin, 2003). Therefore, knowledge of whether derivative hedging can add value to firms is of importance to shareholders. However, previous research has shown contradicting findings of the impact of hedging on firm value (Allayannis & Weston, 2001; Jin & Jorion, 2006; Jankengard, 2015). Until now, we still cannot draw a firm conclusion about whether hedging can add a positive value to firms or not. Therefore, the demand for a better understanding of risk management shows the importance of this research project to deal with the uncertainties in today's financial world.

With this knowledge of firm value, companies will be able to enhance their future success. Furthermore, in a macro perspective, this study could contribute to creating a more stable economic development.

1.7 OUTLINE OF THE THESIS

 The thesis consists of 7 chapters: Chapter 1 introduces the background to the study, the problem discussion, followed by the aim and objectives of the research question. Chapter 2 presents the Literature and Theoretical Review, which discusses previous research relevant to the study, followed by a theoretical underpinning in this study. Chapter 3 describes the methodology in which the data was collected and how it was analyzed. Chapter 4 presents the data findings along

with the discussion. The thesis ends with chapter 5 that presents the conclusions are drawn from the findings along with implications and suggestions for further research.

2. LITERATURE REVIEW

The previous chapter provides a basic overview about the contradiction in theories regarding the impact of hedging on firm value, followed by the problem discussion and purpose of the study. This chapter will bring up relevant studies related to areas connect to my thesis topic, starting with the classic Modigliani& Miller theorem and CAPM theories followed by a deep review of the reasons why firms hedge.

2.1 THE MODIGLIANI AND MILLER THEOREM

The basic idea of the Modigliani and Miller (M&M) theorem is that under certain assumptions such as if the CAPM holds, then it does not matter how the firm chooses to finance its investment: either by issuing shares, borrowing debts or spending its cash. The financing method will not affect the value of a firm since firm value is determined by its earning power and by the risk of its underlying assets. For the theorem to hold, there are some criteria must be satisfied such as there are no taxes, no transaction costs and no bankruptcy cost (Ogden, Jen & O'Connor, 2003). The theorem is consisted by two propositions; below I will describe the content of each proposition in details based on the work of M&M (1958).

Proposition I

Consider any company j and let X_J stand as before for the expected return on assets owned by the company. Denote D_j as the market value of the debt of the company and S_j, the market value of the company's common shares. In Equilibrium we have:

$$V_j, \equiv (S_j + D_j) = X_J / \rho_k \text{ for any firm } j, \text{ in class } k.$$

> *"That is the market value of the any firm is independent of its capital structure and is given by capitalizing its expected return at the rate ρ_k appropriate to its class (M&M, 1958 pp. 268)".*

This proposition can be stated in an equivalent way in terms of firm average cost of capital X_j/V_j, we can then express the proposition as:

$$\frac{X_j}{(S_j + D_j)} \equiv \frac{X_j}{V_j} = \rho_k \text{ for any firm } j, \text{ in class } k.$$

"That is, the average cost of capital to any firm is completely independent of its capital structure and is equal to the capitalization rate of pure equity stream of its class (M&M, 1958 pp. 268-269)".

Proposition II

Proposition II is a situation when the rate of return on common stock in companies whose capital structure includes some debt: The expected rate of return, *i* on the stock of any company *j* belonging to *k*th class is a linear function of leverage as follow:

$$i_j = \rho_k + (\rho_k - r) * D_j/S_j$$

"That is, the expected rate of return of a share of stock is equal to the appropriate capitalization rate, ρ_k, for a pure equity stream in the class, plus a premium related to financial risk equal to the debt to equity ratio times the spread between ρ_k and r (M&M, 1958)".

The conclusion, which can be derived from *proposition I & II,* is that in an efficient market when a firm value is not affected by the taxes, bankruptcy costs, agency costs and information asymmetry. It will not matter how a firm choose to invest in some projects, the ρ_k will be completely unaffected by the type of security firm used to finance the investment. In other word, regardless of the financing used, the marginal cost of capital to a firm equal to the average cost of capital, which is in turn equal to the capitalization rate for an unlevered stream in the class to which the firm belongs (M&M, 1958).

2.2 THE THEORIES OF CAPITAL ASSET PRICING MODEL (CAPM)

The Capital Asset Pricing Model is probably one of the most famous models in the financial history. The model builds on the Markowitz mean-variance- efficiency model in which risk adverse investors with a one period horizon care only about expected returns and the variance of returns (Fama & French, 2004). The basic idea of this model is that the investors are price takers and have homogenous expectations will choose only efficient portfolio, meaning that given the

same expected returns they will choose the portfolio with minimum variance and with given variance they will choose the portfolio with maximum returns.
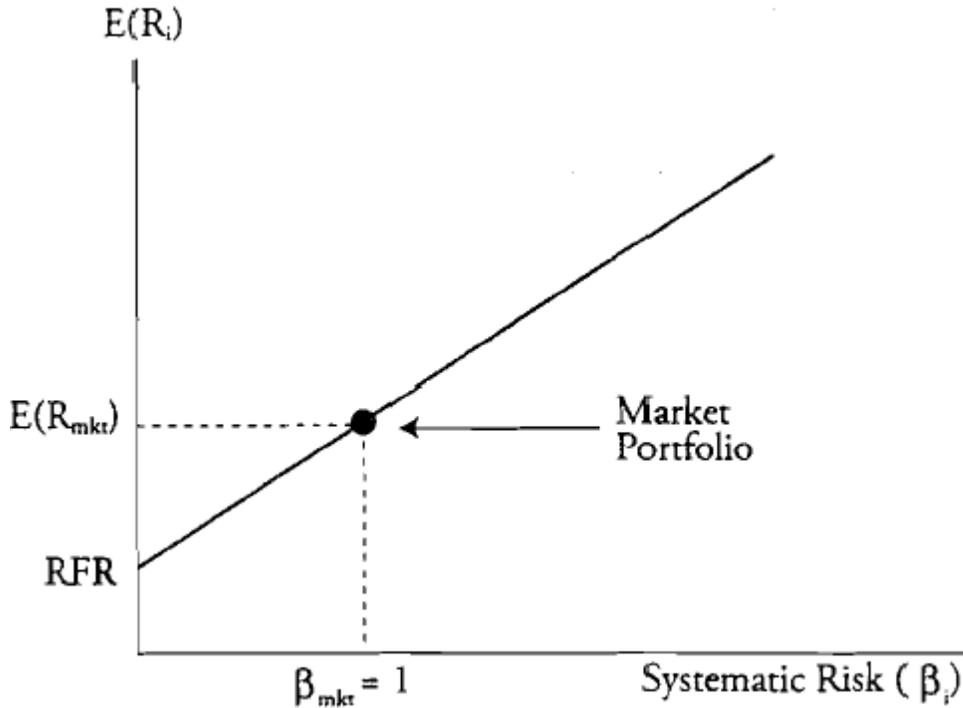
Figure 1: The Capital Asset Pricing Model

Source: Fama & French (2004)

The equation for the expected return for a given asset $E\ (R_i)$ is:

$$E(R_i) = r_f + \beta_i\ [\text{E}\ (r_m) - r_f]$$

The equation above describes the relationship between the expected return of the asset $E\ (R_i)$ and risk where $E\ (R_i)$ is the sum of the risk- free rate and the risk premium of the market multiplied by β_i. In other word, $E\ (R_i)$ is the compensation that the investors require for taking additional risk.

According to Rothschild (1985), the CAPM captures the notion that an asset's risk premium is determined by its diversifiable risk. In the CAPM, an asset's diversifiable risk is measured by its covariance with the market and is called *Beta, β_i* is the systematic risk and it measures the sensitivity of the expected excess asset return to the expected excess market return and can be expressed mathematically:

$$\beta_i = \frac{Cov\ (r_i, r_m)}{Var\ (r_m)}$$

The market portfolio presents the market and is consisted of all the assets. The β of the market portfolio is equal to one.

The reason I include CAPM in the Literature Review Chapter is to highlight the contradict theories regarding how risk management impact firm value. From the shareholder's perspective, risk management should contribute to the firm value. However, it is not entirely obvious why risk management can increase firm value. The demonstration below proving the so- called risk management irrelevance proposition is based on the Lecture note one (pp. 2-3) from the course Risk Management, spring semester, 2014[2].

From above, the mathematical expression for beta is:

$$\beta_i = \frac{Cov\ (r_i, r_m)}{Var\ (r_m)}$$

Now we want to value a firm with systematic risk (β> 0), in one year the firm will earn an uncertain cash flow (CF) and then liquidate. Under the assumptions that if CAPM hold, then the expected return of the investment is:

$$\frac{E\ [CF] - V}{V} = r_f + \beta\ (E\ [r_m] - r_f)$$

Where V is the value of the firm, and the value of the firm today according to the CAPM is:

$$V = \frac{E\ [CF]}{1 + r_f + \beta\ (E\ [r_m] - r_f)}$$

The value of the firm today is the discounted expected value of the cash flow and the discounted rate is equal to $1 + r_f + \beta\ (E\ [r_m] - r_f)$, which is higher than the risk free rate, reflecting the systematic risk.

If CAPM holds, we can decompose the actual return R of the firm as:

$$R = r_f + \beta\ [r_m - r_f] + u$$

Where $r_f + \beta [r_m - r_f]$ is the systematic component of the return and u is the unsystematic component of the return (which is uncorrelated with the systematic return and has zero mean. Taking the variance of R we obtain:

$$var (R)= var (r_f + \beta [r_m - r_f] + u)= \beta^2 \sigma_m^2 + \sigma_u^2$$

Where σ_m^2 is the variance of the market, and σ_u^2 is the variance of the unsystematic firm return. From here we can see that conclude that risk management will not impact firm value since only the systematic risk (β) enters the formula to calculate firm value V when the unsystematic risk σ_u^2 not. Even if the firm wants to hedge the market risk β, this act doesn't help the firm either, since the cost of hedging will offset the lower discounted rate (through lower β) on an efficient market.

2.3 WHY FIRM HEDGE?

2.3.1 MINIMIZING THE UNDERINVESTMENT PROBLEM

The neoclassical investment models (Hayashi, 1982) suggest that the firm faces frictionless capital markets and the Modigliani and Miller (1958) theorem holds. In reality, however, firms often face important external financing cost due to asymmetric information and managerial incentive problems (Gay & Nam, 1998; Bolton, Chen & Wang, 2011). This happens because the decline in in a firm's stock price depends on the fact that the demand curve for shares is downward sloping, meaning that when the firm increases the amount of its shares will have to be sold at discount from existing market prices in order to attract new buyers. The magnitude of the discount is an increasing function of the size of the issue (Scholes, 1972). There are a number of previous researches that try to measure these external financing costs. For instance, Asquith and Mullins (1986) find that the average stock price reaction to the announcement of a common stock issue is -3% and the loss in equity value is -31 %.

One of the reasons why firms choose to hedge depends on the fact that they want to avoid underinvestment problem. That's to be said, firms might have some promising future's investments, but those investments require significant funding and firms need plenty of cash. Froot, Scharfstein and Stein (1993) argue that if external financing is more costly than internal financing, hedging can be a value increasing activity if it more costly matches fund inflows with

outflows, thereby lowering the probability that a firm needs faces costs of external funds, it can reduce future financing costs by holding cash to finance its future investments i.e. lowering the probability that a firm needs to access to the capital market. In other word, hedging creates a positive association between potential underinvestment costs and the benefits of hedging.

The question here is: How much value does hedging add to the firm? Bolton, Chen and Wang (2011) answer this question by computing the Net Present Value (NPV) of optimal hedging to the firm with costly margin requirements (the percentage of marginal securities that an investor must pay for with his/her own cash). The NPV of hedging is calculated as follows. First the author computes the cost of external financing as the difference in Tobin's q under the case of hedging and under the case of not hedging. Second, they compute the *loss in adjusted present value* (APV), which is the difference in Tobin's q under the case of hedging and the case of hedging with a costly margin. Then the difference between costs of external financing and the loss in APV is simply the value created through hedging. The authors find out that, on average, when measured relative to Tobin' q under hedging with a costly margin, the cost of external financing is about 6% and the loss in APV is about 5%, so that the NPV of costly hedging is on the order of 1%.

2.3.2 MANAGERIAL RISK ADVERSION, COMPENSATION, AND HEDGING

In corporate finance theory, the principal- agency problem is explained by for example there are two individuals who operate in an uncertain environment and for whom risk sharing is desirable. Suppose that one of the individuals known as the agent is to take an action which the other individual known as the principal cannot observe. The problem arises when the principal cannot monitor the agent's behavior, leading to the agent acts in his self- interest at the expense of the principal (Grossman & Hart, 1983). In general, the action, which is optimal for the agent will depend on the extent of risk sharing between the principal and the agent. The question is: In the present of information asymmetry, what is the optimal action the principal needs to take in order to protect his interest? Smith and Stulz (1985) took this question into consideration and argued that in a corporate environment, under a constraint budget, the amount of risk that can be allocated to the stockholders is restricted by the company's capital stock. However, the firm can reduce the risk imposed on other claim holders by hedging. To see this, let assume that shareholders hire managers for their specialized resources, but in the absence of monitoring

shareholders will not know if the mangers really do their best in order to maximize the shareholders' value. One solution to the principal and agent problem is that the compensation contract must be designed so that when managers increase the value of the firm, they also increase their expected utility.

When the compensation ties to the manager's performance i.e. in term of the stock price movements, for the most part, stock price- related compensation schemes might consist of company stock or stock option programs. If the future's stock price can affect management's compensation, then the potential decline in stock price will intensify the risk aversion if undiversified managers. As a result, strong incentives are created for managers to reduce their risk aversion and to boost the stock price (Bartram, 2000).

Nonetheless, the stock price movement doesn't depend only on the managers' performance but other determinants as well for example exchange rate or interest rate risks are clearly beyond the managers' control. As a result, due to the external influences unrelated to managers' performance on share price, management compensation plans are less effective (Aretz, Bartram & Dufey, 2007). If managers and shareholders have different risk preferences, the firm may not be able to achieve its maximum value since the managers will be less like take risky investments. In order to solve this problem, the firm can employ a hedging program since it will reduce the impact of unrelated financial risks on firm value and help to secure the manager's compensation.

However, we need to take into account that the managers' risk aversion can give them the incentive to hedge, but it not necessary happen in that way. Smith and Stulz (1985) explained that if the compensation package of the manager is such that his income is a convex function of the value of the firm, it leads to that manager is better off if he choose not to hedge. Hence, the more option- like features in a firm' compensation plan, the less the firm is expected to hedge. In other hand, if the manager owns a significant fraction of the form, he will likely to hedge, as his income is now more a linear function of the firm's value.

2.3.3 DEBT AND HENDGING POLICIES

The transaction costs related to bankruptcy can be a deal breaker when it comes to hedging. Recent empirical studies of hedging theories have paid significant attention to the impact of high

leverage on firm' decision to hedge. Classic corporate finance theory tells us that while high leverage increase firm's value through the tax advantage of debt (Modigliani & Miller, 1958) since it also puts pressure on the firm i.e. a risk- averse investor will think twice before he puts money on a high leverage firm. Furthermore, in case firm doesn't meet its obligations to debt holders promptly, the firm may encounter financial distress and ultimately, bankruptcy (Aretz, Bartram & Dufey, 2007).

Financial distress costs consist of two forms: direct and indirect costs. Direct costs refer to a situation when in the case of bankruptcy; firms need to pay fees for lawyers, expert witnesses and administrative and accounting fees. While indirect costs relate to the situation when firms lose valuable contact with customers, suppliers or skillful employees. To demonstrate how hedging can minimize the risk of bankruptcy, we can demonstrate with an example (Aretz, Bartram & Dufey, 2007): Suppose an extremely distressed firm has a 60 percent chance of being unable to repay its fixed obligations. It has a debt with a face value equal to 250 and that the direct bankruptcy costs are 20 in this case of bankruptcy. If in the future, the firm's revenue falls below 250 then the firm will go bankrupt. The expected bankruptcy cost therefore, is: $0,6* 20 = 12$. Assume that the firm incurs indirect costs of financial distress, which equal 18. The total sum of both indirect and direct costs in case of bankruptcy adds up to 30. If the firm hedges its future cash flow to be more than 250 then the firm will not default.
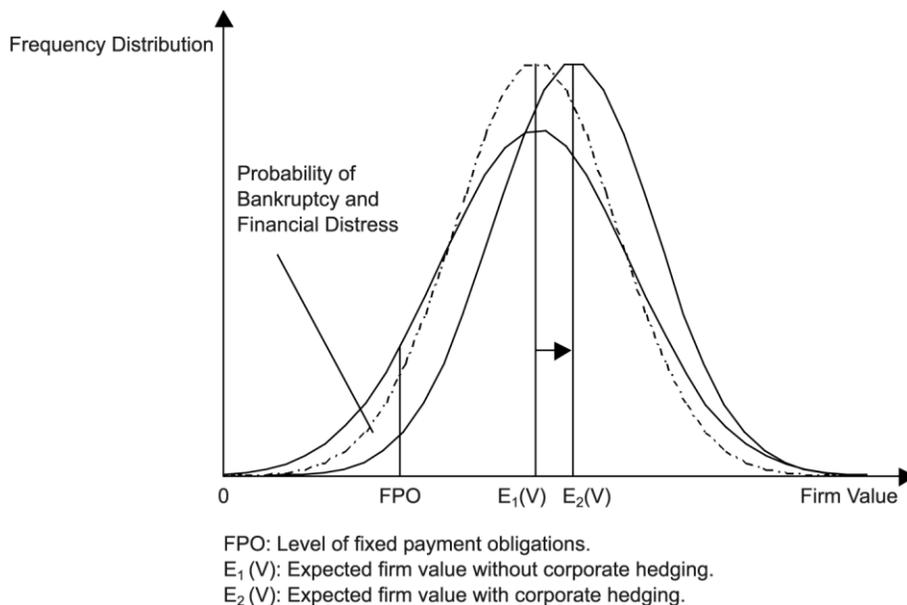

FPO: Level of fixed payment obligations.
$E_1(V)$: Expected firm value without corporate hedging.
$E_2(V)$: Expected firm value with corporate hedging.

Figure 2. Bankruptcy and financial distress (Aretz, Bartram & Dufey, 2007 pp.442)

Figure 1 above shows the distribution of cash flows of a firm, which is unable to pay off the debt to its debt holders when the cash flow drops under FPO. As the probability of falling below this point is positive, the firm may go bankrupt with a positive bankruptcy costs. If corporate risk management ensures that firm's future cash flow will be above FPO, firm value increases from $E_1(V)$ to $E_2(V)$.

So far, we have discussed the benefit of hedging to potential bankruptcy, but we still do not take into consideration the size of hedging costs. One question remains if hedging still increases the firm value if the costs of hedging are significant? Warner (1977) pointed out that in case if the transaction costs of bankruptcy costs are a small fraction of large firms' assets and they are less likely the reason for firms to hedge. However, if the reduction on expected bankruptcy costs exceeds the costs of hedging then large firms will likely to hedge. The same argument applies for small firms as well; since the expected bankruptcy costs are a significant fraction of the small firm' assets, then the reduction in expected bankruptcy costs is greater for the small firms. Therefore, they will be more likely to hedge.

Smith and Stulz (1985) explored the fact that hedging still give benefits to the firm give the fact that the hedge decreases the present value of bankruptcy costs and increases the present value of the tax shield of debt. To maximize the firm value, one thing managers can do is choosing the hedging alternative that has lower cost.

2.3.4 TAX BENEFITS AND HEDGING POLICIES

The structure of the tax code can make it advantageous for firm to take positions in futures, forward, or options markets. To analyze the effect of hedging on the present value of the firm's after- tax cash flow, I will use the demonstration taken from (Smith & Stulz, 1985). We can assume that there are *s* states of the world, with V_i defined as the pre- tax value of the firm in state of the world *i*. States of the world are numbered so that $V_i < V_j$ if $i < j$. Let P_i be the price today of one dollar to be delivered in state of the world *i* and $T(V_i)$ be the tax rate if the before- tax value of the firm is V_i. In the absence of leverage, the value of the firm after taxes, *V (0),* is given by:

$$(1) \ V(0) = \sum_{i=1}^{S} P_i \left(V_i - T(V_i)V_i \right)$$

Hedging can increase the value of the firm if there two states in the world, j and k, such that $T(V_i) < T(V_k)$. To demonstrate it, suppose that the firm holds a hedge portfolio such that $V_j + H_j = V_k + H_k$, and that the hedge portfolio is self-financing in the sense that $P_j H_j + P_k H_k = 0$. Let $V^H(0)$ be the value of the hedged firm. Then we have:

$$(2)\ V^H(0) - V(0) = P_j\ (T(V_j)V_j - T(V_j + H_j)(V_j + H_j))$$
$$+ P_k\ (T(V_k)V_k - T(V_k + H_k)(V_k + H_k)) > 0$$

The inequality implies that (2) is a concave function. Therefore, costless hedging increases the value of the firm.
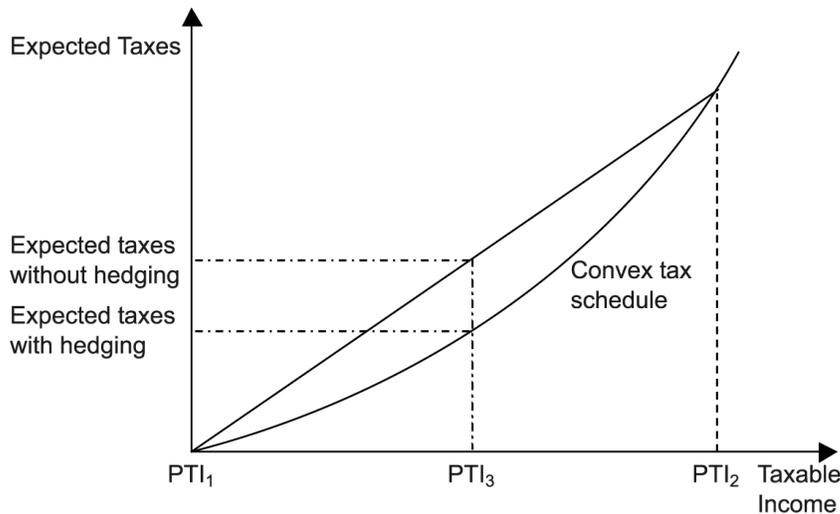
Figure 3: Tax and Hedging policies (Aretz, Bartram & Dufey, 2007 pp.443)

Figure 2 above show illustrated the fact if the firm tax schedule is a convexity, and then the firm faces a higher expected tax burden in the case of high volatile pre-tax income than in case of stable income. Therefore, the value of hedging will increase firm value compare with when the tax schedule is linear.

However, there are contradict about corporate tax shields can induce value maximizing corporation to hedge their operating cash flows. Kale and Noe (1990) point out that corporate

debt tax shields can prevent firms from hedging. The intuition behind this statement is that value-maximizing firm will set its hedging policy with the objective of minimizing the sum of financial distress costs. If the corporate tax code exhibits convexity and personal tax rates are linear, then the act of hedging can actually lower the value of the firm. As mentioned earlier in the Debt and Hedging policies part, firm will choose to hedge if the benefit of hedging exceeds the financial distress costs then firm will be better off to hedge. Nonetheless, if the effective corporate tax rate is low and the costs of bankruptcy are low, and then the effect of hedging will be to lower the value of the firm.

2.4   SUMMARY

There are two contradicting theories about whether firms should hedge or not. According to the neoclassical investment theories (Modigliani& Miller, 1958; Hayashi, 1982), in an efficient market (assuming CAPM hold) hedging is fruitless since investors with access to perfect information can manage to reduce the risk in their portfolios by themselves. In other word, hedging creates no value to the firm.

Nonetheless, in the presence of realistic capital market imperfections, i.e. agency costs, costs of external financing, direct and indirect bankruptcy costs, as well as taxes, corporate hedging will enhance the shareholder value. The theories about why firms choose to hedge can be divided into two categories: (1) Shareholder value maximization theory and (2) The structure of financial structure and tax code. The shareholder value maximization theory highlights the fact that when the compensation ties to the manager's performance in term of the stock price movements i.e. if the future's stock price can affect management's compensation, then the potential decline in stock price will intensify the risk aversion if undiversified managers. Hence, a risk adverse manager will stay away from risky projects, leading to underinvestment problem. One solution to this underinvestment problem is to hedge against the fluctuation of the stock price movement (Smith & Stulz, 1985; Froot, Scharfstein& Stein, 1993; Aretz, Bartram& Dufey, 2007).

Regarding the financial structure and tax code of the company, the motivations behind firm's decision to hedge are to (1) minimize the risk of bankruptcy and (2) reduce the corporate tax burden if the firm tax schedule is a convexity, then the firm faces a higher expected tax burden in the case of high volatile pre- tax income than in case of stable income. Therefore, the value of

hedging will increase firm value compare with when the tax schedule is linear (Smith & Stulz, 1985; Aretz, Bartram& Dufey, 2007).

3. METHODOLOGY

This chapter will describe the methodology used when developing this thesis and how the data was collected, followed by different diagnostics tests. In the end of this chapter, I present the OLS equation for estimating the firm value.

3.1 RESEARCH APPROACH AND STRATEGY

The research approach is used in this study has a quantitative nature, which is "explaining phenomena by collecting numerical data that are analyzed using mathematically based methods" (Aliaga & Gunderson, 2000). In order to find out if hedging can affect firm value or not, all the data need to be tested by using Eviews- a software program for time- series oriented econometric analysis.

Two empirical studies are used extensively in this thesis as benchmarks. The first one is Allayannis and Weston (2001) and the second one is Jankengard (2015), both studies provide great analysis and data about the subject. Nonetheless, I pay most attention to Jankengard's study by following reasons:

- The methodology in which the author used is very well described and easy to replicate.
- The author was one of few researchers that study Swedish firms' derivatives usage at a very deep level and his research provides great guidance to my own study.

3.2 DATA COLLECTION

The data used consisted of 90 Swedish firms listed on the Stockholm Stock Exchange, having the total assets exceeds at least 1 billion Euros. Initially 353 firms were extracted from DataStream, thereafter I excluded all the financial service firms, because most of them are also market makers in Foreign Currencies derivatives, hence their motivations for using derivatives may be different from the motivations of nonfinancial firms. I also excluded public organizations because they are heavily regulated. The next step is to delete all the firms that don't have complete data. This is an easy task since most of the data was extracted from the Data Stream. After the selection, I was left with 90 firms.

The choice of sample selection is very critical to the accuracy of results. Firstly, the sample is limited to the Swedish large and mid-cap firms in different industries with different growth rates. Comparison of the value may be affected by other variables not included in the analysis.

Secondly, I am aware that firms in different industries with different growth rates can make the comparison bias since the firm value can be affected by other variables not include in the analysis.

3.3 RESEARCH PROCEDURES

The purpose of this study is to document the impact of hedging on firm value. However, there are other variables that may affect the firm value as well, such as: profitability, leverage, dividend, industrial diversification, firm size, CAPEX (Allayannis & Weston, 2001; Jankengard, 2015). To take those variables into account, a multivariate setting will be used to test the hypothesis that hedgers have higher values than non-hedgers.

Firm value: To estimate the firm value, I use Tobin's Q. Tobin's Q is defined as the ratio of the market value of the firm to replacement cost of assets, evaluated at the end of the fiscal year. I compute Tobin's Q for a total of 540 firm- year observations (Total 90 firms * 6 years). According to Allayannis and Weston (2001), one more advantage of using Tobin's Q is that it makes the comparisons across firms easier than comparisons based on stock returns or accounting measures where a risk adjustment or normalization is required.

Hedging: The information about whether the selected firms hedge or not can be collected manual from the annual reports. I go through the reports for each firm and take note about their risk management. In most cases, this information was easy to obtain since most companies disclosure about their risk management program and also are clearly about why they choose to hedge. They declare that the purpose of hedging is not for speculative activities but rather to minimize the volatility of future cash flows and exposure to currency exchange rates. I use derivatives as a dummy variable that take the value one if the firm hedge and zero otherwise. Using dummy variable is appropriate for my regression analysis because it is hard to measure the size of hedging costs since most companies only disclosure the fact that they are involving in risk management program but do not articulate the magnitude of hedging costs in their financial reports.

Similarly to Jankengard (2015), besides the test variable hedging, I also choose other control variables that can affect the firm value such as: Dividend, firm size, profitability, leverage, diversification and CAPEX. I also want to include the variable foreign sales ratio as a control

variable. However, due to the severe lack of relevant data, this variable needs to be excluded from the analysis.

Dividend: is a dummy variable and takes the value of one if the firms pay dividends and zero otherwise. The reason to why I take dividend payment into my study is there are previous research providing the evidence that dividend payout announcement can impact firm value due to higher dividend payout rate, the higher is the tax cost of the dividend, which dampens the increase in firm value (Kane, Lee & Marcus, 1984; Murdoch, 1992). Nonetheless, there is also evidence that supports the hypothesis that dividend payout enhances firm value since it signals to the market that the firm in question is in a good financial shape, and in turn the investors reward the firm with higher valuation (Jin & Jorison, 2006).

Firm size: There is ambiguous evidence for U.S firms that the size of the firm leads to higher accounting profitability (Allayannis & Weston, 2001), due to the existence of large fixed start-up costs of hedging, the firm size is determined by taking the logarithm of Total Assets.

Profitability: A profitable firm is likely to trade at a premium relative to a less profitable one. This variable is equal to Net Income/ Total asset (Jankengard, 2015).

Leverage: A firm's capital structure can affect its value. In Modigliani and Miller (1958) demonstrated that in a frictionless world, financial leverage is unrelated to firm value. However, in a world with tax- deductible interest payments, firm value and capital structure are positively related (Antwi, Mills & Zhao, 2012). A firm's capital structure may affect its value. To control for *leverage,* I take Total Debt/Total Assets.

Industrial Diversification: This data was collected manually; I go through annual reports of all firms and take note if the companies operate in two or more product segments. This control variable is a dummy variable and takes the value one of the companies have more than two segments and zero otherwise. The reason, I want to include this variable in my regression analysis is that there are several theoretical suggest that industrial diversification increases value (Williamson, 1970; Jensen, 1986).

CAPEX: is defined as additions to Fixed Assets/Total Sales.

Table 1: Summary of variables and data sources

	Definition	**Source**
Tobin' Q	The log of (total book value of assets less book value of equity plus market value of equity) / Total assets	Datastream
Hedging	A dummy variable that has value 1 if the firm hedges and 0 otherwise	Annual reports
Leverage	Total debt/ Total Assets	Datastream-
CAPEX	Additional fixed assets	Datastream
Profitability	Net income/ Total assets	Datastream
Firm size	Logarithm of total assets	Datastream
Dividend	A dummy variable that takes value 1 if firm pays dividend and 0 otherwise	Datastream
Diversified	A dummy variable that takes value 1 if the firm has more than 2 product segments and 0 otherwise	Annual reports

Since I have different companies and a six- year period, I organize the collected data into panel data in order to use the software program Eviews. The advantages of panel method comparing to other methods are those that a panel of data will embody information across both time and space. Most importantly, a panel keeps the same individuals or objects and measures some quantity about them over time (Brooks, 2008).

	Number	Min	Max	Median	Mean	St. Dev
Tobin' Q	85	0,24	6,26	1,21	1,55	1,09
Hedging	60		1,00	1,00	0,77	0,42
Leverage	72		0,69	0,17	0,19	0,16
CAPEX	85		0,80	0,02	0,05	0,10
Profitability	85	-0,17	0,57	0,01	0,01	0,04
Firm size	85	3,30	8,56	6,46	6,58	0,95
Dividend	80		1,00	1,00	0,69	0,46
Diversified	85		1,00	0,00	0,32	0,47

The table above describes the *descriptive statistic* for all the control variables. Using the *descriptive statistic* is a good way to spot possible problems with the data (outliners and so on) and it also gives an idea about the distribution of the variables while interpreting the regression. As we can see from the *descriptive statistic* table, the median of Tobin's Q is 1, 21, which is smaller than the mean Tobin's Q (1, 55) indicates that the distribution of Tobin's Q is skewed. To control for the skewness, the natural log of Tobin's Q will be used in the multivariate test so that the distribution of Tobin's Q will be more symmetric.

The equation for the regression is:

$$Log(Tobin's\ Q) = c + \beta_1 * capex + \beta_2 * diver + \beta_3 * dividend + \beta_4 * hedge$$

$$+ \beta_5 * leverage + \beta_6 * profit + \beta_7 * size$$

Since I used panel data for my study, the remained question is to choose Fixed or Random effects? According to Brooks (2008, pp. 500) the random effects model is more appropriate when the entities in the sample can be thought of as having been randomly selected from the population, but a fixed effect model is more plausible when the entities in the sample effectively constitute the entire population. Furthermore, the fixed effects model also allows cross- sectional heterogeneity. In my data sample, there are 90 firms in different industries and it is unlikely to assume that there is no heterogeneity. One more advantage of using fixed effects model is that all

the unobservable firm characteristics that may affect firm value can be controlled since each firm is assigned a unique intercept (Hausman & Taylor, 1981).

In Eviews, I still perform both of the tests in order to find the most suitable one. (1) I select the *fixed effects* on the cross section after that I run the Redundant Fixed Effect- Likelihood Ratio, the P- value is 0,000 indicating that the effects are significant. (2) Select the random effect and perform the *Correlated Random Effects- Hausman test*. In this test, I am testing the random effects model against the fixed effects model. The null hypothesis in that case is that both tests are consistent estimators and the random effects model is efficient. Under the alternative hypothesis, only the fixed effect is consistent. Since the p- value is 0.000, I reject the null and, therefore, the fixed effects model is to be preferred.

3.4 STATISTICAL DISTRIBUTIONS FOR DIAGNOTIC TESTS

In order to run an OLS regression with the highest accuracy as possible, I need at first run various regression diagnostic tests that are based on the calculation of the test statistic.

For the classical OLS to work well, there are three basic assumptions that need to be satisfied in order to have an unbiased OLS estimation.

$$(1) \ E(u_t) = 0$$
$$(2) \ Var(u_t) = \sigma^2$$
$$(3) \ Cov(u_i, u_t) = 0$$

The first assumption (1) required that the average value of the errors is zero. However, when I estimate OLS, a constant term is included in the regression equation so this assumption will not be violated.

For the second assumption (2), it has been assumed so far that the variance of the errors is constant. This is known as the assumption of *homoscedasticity*. If the errors do not have a constant variance, they are said to be *heteroscedastic.* The consequence of not having a constant variance is that estimation of OLS will be biased. In order to detect if there is some evidence of heteroscedasticity, I run the *Goldfeld Quandt* test.

Assumption (3) requires that the covariance between the error terms over time is zero. In other word, it is assumed that errors are uncorrelated with one another. Because the population disturbances cannot be observed, so a test for this is necessary. I will use the Watson- Durbin test for this purpose.

One more potential problem that may occur is the relationship between the dependent variable and independent variables. For example, Froot *et al.* (1993) pointed out that the more valuable the firm's investment opportunities, the more attractive risk management becomes because disruptions to the investment program are more costly, this lead to the endogeneity problem. To test for this possibility, I will carry out the procedure recommend by Hausman, which involves using the residuals with *hedging* as dependent and other variables such as: Firm's size, profitability, leverage, CAPEX, dividends, diversified as exogenous variables. However, since fixed effects test allows for heterogeneity then Hausman test for endogeneity will not be performed.

Detection of heteroscedasticity

The Goldfeld Quandt is based on splitting the total sample of length T into two sub- samples of length T_1 and T_2. The regression model is estimated on each sub-sample and the two residual variances are calculated as $s_1^2 = \hat{u}_1' \hat{u}_1 / (T_1\text{-}k)$ and $s_2^2 = \hat{u}_2' \hat{u}_2 / (T_2\text{-}k)$ respectively. The null hypothesis is that the variances of the disturbances are equal, which can be written as $H_0: \sigma_1^2 = \sigma_2^2$, against a two- sided alternative. If we reject the null hypothesis then we can conclude that our model contain heteroscedasticity problem i.e. the variances of the error terms are not constant.

Detecting autocorrelation

As mentioned earlier the Durbin- Watson (DW) is a useful test for detecting the first order autocorrelation i.e. it tests only for a relationship between an error and its immediately previous value. The test equation is:

$$u_t = \rho u_{t-1} + v_t$$

Where $v_t \sim$ N (0, σ_v^2), the DW test statistic has as its null and alternative hypotheses are:

$$H_0: \rho = 0 \text{ and } H_1 = \rho \neq 0$$

If $\rho \neq 0$, we can reject the null and conclude that there is evidence of a relationship between residuals i.e. correlation.

After I run Goldfeld Quandt test for heteroscedasticity and Durbin-Watson for autocorrelation to make sure that there are no errors in the collected data. The next step is to estimate an OLS model for testing hedging premium based on the following equation:

$$Log(Tobin's\ Q) = c + \beta_1 {}^*hedging + \beta_2 {}^*leverage + \beta_3 {}^*CAPEX + \beta_4 {}^*profitability + \beta_5 {}^*size + \beta_6 {}^*dividend + \beta_7 {}^*diversifie$$

3.5 LIMITATION

The first limitation in methodology is due to the time constraint and difficulties in gathering complete data set, I will exclude some variables that can affect firm value such as: NETPOSITION and FOREIGN, though two variables may have significant impact on firm value. The variable NET Position is defined as the sum of absolute of the net position in each currency (expressed in units of home currency scaled by total assets. FOREIGN is the ratio of Foreign Sales to Total Sales. Previous studies showed that these variables impact firm value since they connect directly to the currency risks (Jankengard, 2015).

The second limitation is the univariate tests will be excluded from this study since even if univariate tests show *hedging* variable significant when the multivariate tests do not then a conclusion cannot be drawn based on univariate tests. Hence, because of the time shortage, only multivariate tests are performed.

4. RESULTS AND ANALYSIS

This chapter will present the results of the statistical tests and the OLS regression analysis. Since there may be another alternative explanation for the ordinary OLS, I also consider the robustness of the result and the re-estimation of the model is also presented at the end of the chapter.

4.1 EMPIRICAL FINDINGS

4.1.1 STATISTICAL TEST

For Goldfeld Quandt test: The t- statistic is 2, 72 and the P- value is 0,000, we can conclude that there is no evidence for the presence of heteroscedasticity. For *Durbin- Watson (DW)* Test*:* the Test- statistic is 1, 46 indicating that there is no autocorrelation between the residuals since theoretically speaking, if DW is close to 2, we can assume that there is no evidence of autocorrelation (Brooks, 2008). The results of the diagnostic tests signal that I can go ahead to run OLS regression analysis.

4.1.2 HEDGING AND FIRM VALUE USING MULTIVARIATE TEST

The explanatory variables for the equilibrium test regression are *CAPEX, diver, dividend, hedge, leverage, profit* and *size*. The dependent variable is the log of Tobin's Q. The null hypothesis for fixed effects is jointly zero (H_0 : $\eta_i = 0$). Since the P- value of fixed effects is 0.000 so I reject H_0 , meaning that the firm value is affected differently by the same variables (heterogeneity).

The result of the regression analysis shows that out of seven control variables, only *size* and *profit are* statistically significant at 5% level, telling us that size and profit affect the firm value positively. If firm increases its profit then the value of the firm will also be rewarded with higher value. The variable *size* is significant at 5% level indicating that larger firms have a stronger tendency to have higher value than smaller firms.

Table 3: An OLS model of firm value

C	0,47
	(0,22)
CAPEX	0,05
	(1,51)
DIVER	– 0,06
	(2,14)
DIVIDEND	0,04
	(0,116)
HEDGE	0,04
	(0,93)
LEVERAGE	– 0,54
	(3,73)
PROFIT	0,29
	(2,12)**
SIZE	0,04
	(2,27)**

*Note: t- ratios in parentheses, * and ** denote significance at the 1% and 5% levels respectively*

4.1.3 ROBUSTNESS

To check the robustness of the results, the model is re-estimated using different subsamples. This method is used to address outliner concern. One way to do this is using the *Descriptive Statistics* to find out if there are many too large numbers that deviate significantly from the mean value, then I will delete them and then re-estimate the model. There are also other concerns that need to be taken into account. In my data sample, some of the companies such as H& M and Fingerprint Cards AB don't have any debts at all, so those companies should not be included in the estimation since the t- stat for *leverage* may be affected. Furthermore, since the time period for the data is from 2005- 2010, due to the severe down turn in the economy because of the financial crisis; some of the companies in the data sample do not have dividend payments continuously. Some of them cut the dividends between years 2008 and 2009. Therefore, I also exclude those companies in order to avoid robustness in the *dividend* variable.

Below is the re- estimated OLS model:

Table 4: Robustness check for the impact of hedging on firm value

C	0,6
	(1,31)
CAPEX	0,45
	(1,59)
DIVER	– 0,04
	(2,07)
DIVIDEND	0,013
	(0,42)***
HEDGE	0,58
	6,9
LEVERAGE	– 0,4
	(1,9)**
PROFIT	1,79
	(2,56)**
SIZE	0,36
	(2,19)**

Note: t- ratios in parentheses, *, ** and *** denote significance at the 1%, 5% and 10% levels respectively.

After re-estimate the model I get a slightly different result. The coefficients for the seven control variables have different signs, suggesting a different effect on the dependent variable. For instance: the control variables for *diversified (diver)* and *leverage* have the negative sign (though *diver* is not statistically significant) meanwhile *leverage* is statistically significant at the 5% level.

One more difference that can be observed here is that the variable *dividend* is significant at 10 % level.

The control variables *CAPEX, hedge* and *diver* are not statically significant.

4.2 ANALYSIS OF THE FINDINGS

The finding indicates that there is no relationship exists between hedging and firm value since the variable *hedging* is insignificant, although the coefficient of this test variable is positive. This finding is in contrast to some studies in the literature (Allayannis & Weston, 2001; Jankengard, 2015). The time panel, which this study cover is from 2005 to 2010 and intuitively one might expect that the risk management program would be considered more valuable during the crisis.

As a well known fact that, since Sweden is an export dependency country and the fact that the macro condition is quite favorable for Sweden in term of a weakened Krona against major currencies such as USD and EUR. For instance, in 2009 the averages for these exchange rates versus SEK were 11% and 13% above their average for 2006- 2008, respectively (Jankengard, 2015). Previous research (Smith & Stulz, 1985; Bartram, 2000; Aretz, Bartram & Dufey, 2007) supports the value maximization theory, in which managers engage in risk management in order to secure the future cash flows, especially when the managers' compensation is tied to the performance of the firms. As a consequence of the financial crisis, we should not rule out the probability that the profits Swedish firms gained from net- export due to a weakened Krona can impair the effect of derivatives usage (the coefficient of test variable *hedging* is positive, we can assume that hedging impacts firm value positively but nonetheless, we can not prove a significant relationship). This theory is also consistent with the findings of Geczy, Minton and Schrand (1997), suggesting that the potential benefits of using currency derivatives depend on the firm's exposure to foreign exchange- rate risk. They find that firm characteristics related to these costs and benefits are related to how firm forecast its future cash flows. If the forecast is accuracy, indicating higher profitability then firm has less incentive to hedge.

The variable *leverage* is significant at 5% level, and the negative sign of variable indicates that if a firm has less debt (leverage) its value will increase more. This result is expected since an increase in debts leads to higher distress costs (Aretz, Bartram & Dufey, 2007). Previous studies have shown that highly leveraged firm lose substantial market share to more conservatively financial competitors in industry down turns. A similar decline also takes place in the market value of equity (Opler & Titman, 1994; Ogden, Jen & O'Connor, 2003). Smith and Stulz (1985)

also pointed that a firm's high level of debt is one of the main reasons mangers choose to hedge if corporate risk management ensures that firm's future cash flow will be secured.

Dividend variable is statistically significant at 10% level, and it tells us that whether the firm pays dividend or not will affect its value. This result is consistent with what is found in Jin and Jorison (2006), that dividend payouts may be viewed as a positive signal from management since it signals to the market that the firm in question is in a good financial shape, and in turn the investors reward the firm with higher valuation.

Size is statistically significant at 5% level, indicating that larger firms tend to have higher value. This result is consistent with what is found in Allayannis and Weston (2001), which states that the size of the firm leads to higher accounting profitability. However, the positive correlation between *size* and firm value is inconsistent with that of Bodnar, Tang and Wientrop (1999), according to the findings of this study, bigger firms are, the more multinational they are and when they do business in more than country, efficient and effectiveness are likely to become low due to the lack of corporate governance. This problem has been mentioned many times in corporate finance theory as principal and agency problem (Grossman & Hart, 1983). This is to be said, the shareholders' value maximization goal may differ from the managers' objectives leading to less firm value.

The variable *profit* is significant at 5 %, indicates a positive correlation between profit and firm value. The influence of profitability on firm value has long been discussed in the literature (Modigliani & Miller, 1958; Myer, 1984). An increased firm value due to a higher profitability is related to the *pecking order theory* (Myer, 1984) which states that when a firm has a need for capital to invest in some attractive projects, the optimal choice for firm is to fund the project with its internal fund (cash) since external financing (issuing debt or equity) can be costly due to information asymmetry. Therefore, higher profitability makes firm less vulnerable for external funds. Haugen and Baker (1996); Yang et al. (2010); Chen and Chen (2011) also proved that the greater is the firm's profit, the more distributable earnings there are for shareholders, and hence the expected firm value will be higher.

5. CONCLUSION

This project research studies the impact of hedging on firm value using a sample of 90 Swedish companies listed on the Stockholm Stock Exchange from 2005 through 2010. I examine whether the act of hedging is rewarded by investors with a higher market valuation.

Using Tobin's Q as an approximation for firm market value and *hedging* as a control variable, I found insignificant evidence that the usage of hedging impacts firm value positively. However, I found evidence about other factors such as: *dividend, leverage, firm size* and *profitability* affect the firm value differently. *Leverage* has a negative impact (the coefficient is negative), indicates that the higher the debt level in the firm' capital structure the less valuable firm is, while other variables such as: *firm size*, *profitability,* and *dividend* affect firm value positively.

Recently, the relationship between hedging and firm value has been studied extensively, and this research report is supposedly contribute to a better understanding of the risk management program. There an important implication from these findings that is the link between hedging and firm value does not support the notion that hedging increase firm value. Consequently, managers need to evaluate and consider whether to participate in the corporate risk management program. However, due to the mixed result of whether hedging can impact firm value positively, more research in this area is necessary before we can draw a firm conclusion about the impact of hedging on firm value.

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7. APPENDIX

1, Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	2.722032	Prob. F(7,424)	0.0000
Obs*R-squared	31.24230	Prob. Chi-Square(7)	0.0001
Scaled explained SS	33.13285	Prob. Chi-Square(7)	0.0000

Test Equation:

Dependent Variable: RESID^2

Method: Least Squares

Date: 05/07/15   Time: 17:39

Sample: 1 432

Included observations: 432

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.001152	0.048089	-0.023950	0.9809
CAPEX	-0.006146	0.014176	-0.433550	0.6648
DIVER	0.015551	0.011865	1.310685	0.1907
DIVIDEND	0.022842	0.012749	1.791653	0.0739
HEDGE	0.023055	0.015709	1.467665	0.1429
LEVERAGE	-0.162921	0.037059	-4.396251	0.0000
PROFIT	-0.312874	0.123396	-2.535526	0.0116
SIZE	0.010867	0.006537	1.662204	0.0972

R-squared	0.072320	Mean dependent var	0.078686
Adjusted R-squared	0.057005	S.D. dependent var	0.116893
S.E. of regression	0.113512	Akaike info criterion	-1.495463
Sum squared resid	5.463274	Schwarz criterion	-1.420122
Log likelihood	331.0201	Hannan-Quinn criter.	-1.465719
F-statistic	4.722032	**Durbin-Watson stat**	1.459300
Prob(F-statistic)	0.000040		

2, Fixed effects

Redundant Fixed Effects Tests

Equation: Untitled

Test period fixed effects

Effects Test	Statistic	d.f.	Prob.
Period F	12.498058	(5,497)	0.0000
Period Chi-square	60.402435	5	0.0000

Period fixed effects test equation:

Dependent Variable: TOBQ_LOG

Method: Panel Least Squares

Date: 05/07/15   Time: 15:43

Sample: 2005 2010

Periods included: 6

Cross-sections included: 90

Total panel (balanced) observations: 540

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.471898	0.094883	0.215400	0.0003
HEDGE	0.039482	0.032605	0.930910	0.2265
SIZE	0.036493	0.013542	2.274756	0.0043
PROFIT	0.293954	0.309939	2.121648	0.0407
LEVERAGE	-0.537268	0.084558	3.725165	0.0000
CAPEX	0.046357	0.035421	1.511065	0.1122
DIVIDEND	0.042698	0.029954	0.115906	0.6718
DIVER	-0.056292	0.027103	2.136967	0.5383

Redundant Fixed Effects Tests

Equation: Untitled

Test period fixed effects

Effects Test	Statistic	d.f.	Prob.
Period F	12.498058	(5,497)	0.0000
Period Chi-square	60.402435	5	0.0000

3, Re- estimated fixed effects

Period fixed effects test equation:

Dependent Variable: TOBQ_LOG

Method: Panel Least Squares

Date: 05/09/15   Time: 18:13

Sample: 2005 2010

Periods included: 6

Cross-sections included: 80

Total panel (balanced) observations: 480

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.561898	0.094883	1.315400	0.0043
HEDGE	0.579482	0.032605	6.910910	0.7512
SIZE	0.360493	0.013542	2.194756	0.0073
PROFIT	1.793954	0.309939	2.561648	0.0107
LEVERAGE	-0.387268	0.084558	1.945165	0.0000
CAPEX	0.456357	0.035421	1.591065	0.1132
DIVIDEND	0.012698	0.029954	0.423906	0.0718
DIVER	-0.036292	0.027103	2.076967	0.1383

4, Random effects

Cross-section random effects test equation:

Dependent Variable: TOBQ_LOG

Method: Panel Least Squares

Date: 05/07/15   Time: 15:51

Sample: 2005 2010

Periods included: 6

Cross-sections included: 90

Total panel (balanced) observations: 540

WARNING: estimated coefficient covariance matrix is of reduced rank

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.951119	0.386389	5.049617	0.0000
HEDGE	NA	NA	NA	NA

SIZE	-0.261930	0.058469	-4.479830	0.0000
PROFIT	-0.046639	0.304752	-0.153040	0.8784
LEVERAGE	-0.336977	0.116686	-2.887895	0.0041
CAPEX	0.034943	0.026230	1.332174	0.1835
DIVIDEND	-0.052817	0.027932	-1.890869	0.0593
DIVER	NA	NA	NA	NA