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Debt repurchases

- Does it have an effect on equity valuation?

An event study

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Master's thesis – Department of Finance and Management Science

NORGES HANDELSHØYSKOLE

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PREFACE

This master's thesis is an integral part of our Master in Financial Economics education at the Norwegian School of Business and Economics (NHH) in Bergen, Norway. Our motivation was to put theories learned at NHH into work within a relevant topic. Having witnessed the financial crunch of the autumn 2008 and the increased emphasis on deleveraging in the corporate world, we wanted to learn more about this topic and therefore decided to write a paper on debt repurchases.

Debt repurchases have been somewhat neglected in the corporate literature over the past 20 years, but have once again become a fashionable and highly utilized tool for corporate management. The reason that we chose to analyse repurchases within an event study framework, was that we believe it is an accurate method in assessing the effects of an advanced corporate action, since the accumulated market "knowledge" can be incorporated.

We feel privileged to be living in such a fascinating time, and to be able to spend several months studying an interesting topic in-to-depth. The most challenging part of the thesis was undoubtedly the process of gathering and organization the data. With regard to this, we want to express gratitude to Truls Evensen at Oslo Stock Exchange, who provided us with valuable information.

Finally, we want to thank our supervisor, Zheng Huang, how gave support and advice through the whole process.

Bergen, 11.06.09

Håvard André Bøe and Niels Kristoffer Sagberg

ABSTRACT

This paper examines whether companies that repurchase debt generate abnormal stock returns. The examination is performed within the event study methodology, where we exclude bond repurchases financed through new bond issues. According to a study of American bonds by *de Kruse, Nohel and Todd (2005)*, repurchases financed with cash from operations or asset sales, generate positive cumulative abnormal return (CAR). Based on capital structure theory, there is no rationale behind a repurchase unless there are strong tax, price or signalling incentives.

Using a sample of 30 cash-financed and 74 debt financed repurchases, we find that cash-financed repurchases result in a *significant* average *CAR of 3.70 %.* Repurchases financed with debt, i.e. new bond issues, result in an *insignificant CAR of 0.48 %.* In addition, cash-financed repurchases performed in a declining stock market account for most of the CAR, with an *insignificant* CAR of *8.94 %* (n=10 samples). Thus, the paper concluded that, given certain circumstances, a firm can create or move wealth in shareholders favour by buying back its debt, especially in times of financial turmoil.

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1. INTRODUCTION

How come a company can repurchase its debt from creditors below face value? As the financial crisis of autumn 2008 unfolded, we witnessed a corporate paradigm shift. While the corporate wisdom prior to these events suggested that a company should leverage as much as possible, maximize dividends and run its operations on a "Just In Time"[1] mentality, that suddenly changed in a matter of months. Now, corporations have rediscovered buzzwords such as prudence and thrift and "cash-burn-rate".

The plunge in financial markets has put companies' balance sheets and day-to-day operations under pressure. As equity and bonds markets have "dried up", several companies find it hard to raise capital. But times of economic distress also mean that opportunities arise. Some companies with a steady cash flow or liquidity reserves have been able to exploit the fact that bond prices have dropped. Many bondholders, such as banks, insurance companies and pension funds are facing pressure to deleverage themselves. In the new corporate climate, proactive debt management has become increasingly important, and we have witnessed an increase in debt repurchase activity.

This economic environment provides a rare opportunity to see how the market reacts to a debt repurchase in such troubling times. In this paper, we will analyze debt repurchases in the context of modern capital structure theory. By using the equity markets as an objective "referee", we want to find an answer to this paper's subtitle; *"Does (bond repurchases) affect equity valuation?"*

Our initial research suggests that the literature on bond repurchases have been somewhat neglected, which can imply that repurchases have been underutilized in the past. Since modern corporate finance have assumed that capital is an unlimited and fairly stable "commodity", deleveraging actions have been both unnecessary and "unfashionable". In this sense, this paper

[1] Just-in-time (def.): *(JIT) is an inventory strategy implemented to improve the return on investment of a business by reducing in-process inventory and its associated carrying costs.*

tries to be "proactive" with regard to what might be an academic change towards more research on debt and bond management.

Through this paper, we have tried to be consistent and clear with regard to the financial terms and expressions. A "debt repurchase" is for all practical considerations equivalent to a "debt buyback" or "cash-for-debt-swap". Although the last term is sparsely used, the papers referred to often use these and might as a result confuse the reader. Our event study will be based on the "tender offer" rather than the debt repurchases itself, although we often refer to this as a repurchase. Other terms and expressions are defined as they appear in the text.

2. THEORY ON DEBT REPURCHASES

This section will look into the theory behind a debt repurchase. In the first part, the link between capital structure and corporate costs is established. Thereafter, some of the main motivations behind a debt repurchase are given and discussed briefly. In the third part, we look into pricing of debt, the empirical effect on the value of equity and the remaining debt following a repurchase. The purpose of this section is to provide both a theoretical discussion and a literature review on equity valuation following a debt repurchase.

Our event study captures the markets valuation of the equity shortly before and after a debt tender offer. This is the main subject of our thesis, and a review of earlier studies and literature on equity valuation with regard to capital structure will follow in the following chapters.

2.1 THEORETICAL CONSIDERATIONS

A company can finance its operations primarily with equity or debt. The mix of debt and equity represents the capital structure. According to the famous *Modigliani-Miller theorem* (M&M theorem), the value of a firm is unaffected by how it is financed.[2,3] This theorem states that in an efficient market; in the absence of taxes, bankruptcy costs, and asymmetric information, the value of the firm remains constant and unaffected by financing decisions.

The firms value can be found by discounting expected cash flow using WACC, which is a weighted average representing the expected cost of capital on all of a company's sources of financing. Assuming we have only straight debt and equity, the required rate of return on equity increases as the leverage increases. Symmetrically, the cost of debt, as measured by the marginal lending rate, increases as the debt ratio and default risk increases. Figure 1 provides an illustration of the WACC-principle;

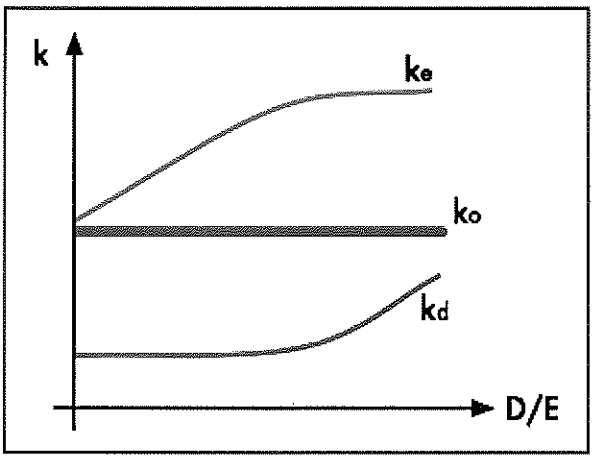

Figure 1: An illustration of Modigliani-Miller's proposition II

Given that the M&M theorem and its assumptions hold, a company's bond transactions should not affect the value of the equity. A repurchase (*issue*) of bonds decrease (*increase*) leverage, which in turn lowers (*increases*) the cost of equity so that the WACC remains constant.

[2] Miller & Modigliani (1958)

[3] Miller & Modigliani (1963)

In reality, debt financing has costs and benefits, with the latter usually outweighing the former. Debt financing is less costly than equity financing[4] mainly due to two factors. First, bondholders demand lower return than shareholders. This is because debt is superior to equity in a liquidation process, and thus carries less risk. Second – debt interest payments creates tax shields, thus increasing the effective after tax return to shareholders. In addition, debt lowers agency costs.[5] One of the three types of agency costs is the so-called "free cash flow problem". Debt imposes financial discipline on management, which minimizes this problem, lowering the overall agency costs for shareholders.[6]

On the other hand, debt financing increases the likelihood of bankruptcy[7] and thereby raises the costs of financial distress. In addition, debt might impose restrictions that force the firm to reject value-creating projects. If sufficiently tight, these restrictions, better known as covenants, can prevent managers from investing in positive NPV-projects.[8] Thus, covenants can reduce firm value. A paper examining debt covenants[9], concludes that during financial distress, debt covenants can be stronger disciplinary mechanisms than needed to meet interest payments. This suggests that firms might actually be more inclined to buying back debt in times of financial distress.

In a world were debt financing have benefits that outweighs costs, one would assume that companies would prefer to take on as much debt as possible up to a certain equilibrium level. This level would be that point at which the marginal benefits of debt (i.e. lower demanded return

[4] Rochester (1975)

[5] (def.) *The costs associated with less than perfect alignment between the interests of the agent (eg company CEO) and the beneficiaries (eg stockholders).*

[6] Leland (1998)

[7] Hitt & Harrison (2001)

[8] Smith & Warner (1979) - From "Bankruptcy, Secured Debt, and Optimal Capital Structure": With regard to the amount of debt the firm will take on:
"*We suggest that the firm will not necessarily "go to the limit"; it depends upon the relative magnitudes of the costs and benefits we have outlined above.*"

[9] DeAngelo, DeAngelo & Wruck (2003)

plus tax shield) are equal the marginal cost of debt (i.e. financial distress and bankruptcy costs). Theory on this subject is known as "*Trade-Off Theory of Capital Structure*"[10]. The Trade-Off Theory considers the balance between the costs of bankruptcy[11] and the tax saving benefits of debt. It can be shown graphically as below;

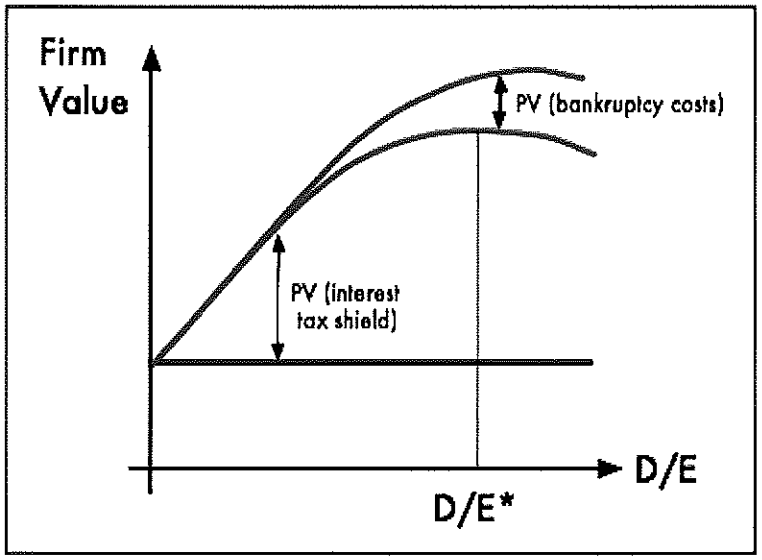

Figure 2: As the debt equity ratio (D/E) increases, the firm value increase too. However, there is a trade-off between the interest tax shield and bankruptcy related costs, causing an optimum capital structure, D/E*

A competing theory on the subject is the so-called "*Pecking Order Theory*"[12]. This theory suggests that companies prioritize their sources of funding, preferring internal financing to equity. According to this theory, a firm will prefer to finance operations from internal funds, rather than using external sources. This means that debt repurchases will only occur if the firm is confident that it can finance itself from internal funds (i.e. cash flow from operations and liquidity reserves). However, Pecking Order Theory also suggests that financial slack (i.e. excess liquidity/credit lines) is valuable.

As of today, the "Trade-Off Theory" remains the dominant theory of corporate capital structure, even though the empirical relevance is controversial. Critics, such as Miller suggest one should

[10] Kraus & Litzenberger (1973)

[11] Implicit costs of taking on debt include staff leaving, suppliers demanding disadvantageous payment terms, bondholder/stockholder infighting, etc.

[12] Myers (1983)

observe much higher debt levels than in reality if the theory was correct. The "Pecking Order Theory" on the other hand, has been found to be a fairly good approximation with reality, although studies find that it fails to show that it is of first-order importance[13] in determining a firm's capital structure.[14] On the other hand, a new paper[15] suggests that indirect bankruptcy costs appear to play an important role in a firm's choice of leverage.

Looking at the fundamental theories of capital structure, one can assume that the market value of a firm's equity would remain either unchanged (*Miller & Modigliani*) or decrease (*Trade-Off Theory*) if the leverage is decreased. However, if the company is highly leveraged (i.e. beyond the D/E* optimal capital structure), a debt repurchase can increase the equity value – as will be explained further in section 2.3.

Based on the fundamental theories, one can conclude that deleveraging should in best case be value neutral, or in worst case value destructive, given that a firms leverage is below the D/E* level. Consequently, pure cash for debt buy-backs should in theory not happen, unless the firm is highly leveraged.

Since companies choose to buy back debt, there has to be strong incentives that outweigh the lost tax shield and higher cost of capital. These incentives will be the subject of the following subchapter.

[13] First-order importance (def.): "*A clear cause and effect relationship*"

[14] Fama & French (2002)

[15] Frank & Goyal (2007)

2.2 PURPOSES & MOTIVATION BEHIND DEBT REPURCHASES

Several papers discuss motives and rationale behind a tender offer. Some of these describe what kind of common characteristics firms that carry out debt repurchases have. These characteristics can give valuable insight and understanding of the purpose and motivation behind the action taken.

According to the Trade-Off Theory, only companies that have an exceptional high leverage would initiate cash for debt swaps. In addition, a debt repurchase can lower the cost of serving debt, in the form of lower interest rates on parts of the remaining interest-bearing debt.[16] Indeed, a study by **Kruse, Nohel and Todd** (2005)[17], which compares a matched sample of non-repurchasing firms and repurchasing firms partly support this. The study finds that repurchasing companies' debt trades at a discount and that they have more long-term debt than companies which do not repurchase debt.

This suggests that the repurchasing company either have a return on capital employed below its WACC, or substantial default risk, i.e. it is overleveraged. Another explanation could be that only overleveraged firms in financial distress can perform a buyback on favourable terms, hence a sample bias might be present. Favourable terms would usually imply buying up debt at a deep discount comparing to its par value.

However, the same study find that the repurchasing firms have less cash, and more assets than firm that do not repurchase. This suggests two things: First, firms finance their repurchases by selling assets. This suggests that excess liquidity is a less important factor in the buyback consideration. In addition, **Chatterjee, Dhillon, Ramirez** (1995)[18] find that firms in severe financial distress tend to initiate exchange offers[19] rather than pure cash tender offers. Given that

[16] Interest rates are often linked to an external credit rating by a rating agency (i.e. Moodys and Fitch), which can upgrade a firm following a repurchase.

[17] Kruse, Nohel & Todd (2005)

[18] Chatterjeea, Dhillon & Ramirez (1995)

[19] An exchange is an offer to exchange old debt with new securities, equity, debt or both.

this holds for Norwegian companies as well, we should find that the companies which initiate pure cash-financed repurchases should do this based on pure rational considerations, rather than initiate a forced buy back because of covenant breaches. This would implicate that most firms that swap cash for debt have an initial leverage below the optimum leverage level, *D/E**. If the latter is true, the rationale behind a repurchase of debt can at least party be attributed to other firm specific factors rather than the capital structure per se.

A review of common characteristics of debt repurchasing firms with regard to capital structure theory did partly explain why some companies are inclined to buying back debt. On the other hand, the Pecking order theory suggests that there has to be strong reasons for the management to exchange internal liquidity with external liquidity. The nature of this review implies that the management considers other factors as well.

Given that reasons for companies to buy back debt are partly firm specific, several papers discuss the possible effects related to the company's financial position, the nature of its operations and the mix of bondholders. **Wingler and Jud** (1990)[20] list tax effects, accounting factors and informational effects as the three main aspects management considers when deciding to repurchase debt.

Companies can usually forecast their capital requirements well ahead of time. Since interest rates on outstanding debt are higher than the yield of cash, a firm might find it beneficial to initiate a buyback if one of the following factors changes; cash flows, time profile or price of debt. The price of debt is usually set in the market. Debt can be bought either at a premium, at par value or at a discount.

Assuming efficient markets, the absence of taxes and transaction costs; a company that put forward a tender offer should at best be expected to break even. The tendering company would have to pay bondholders a premium to repurchase high-coupon, non-callable debt. If the repurchase was financed with new debt, the new issue would impose the same subsequent debt service burden on the firm as the repurchased debt. An example is given in the appendix, section

[20] Wingler & Jud (1990)

10.2. This example proves numerically that the net present value of the debt service would be unchanged. Thus, a higher principal offsets the advantage of a lower coupon.

With this in mind, the following section will look at the effects *Wingler and Jud* listed as the most important aspects management considers with regard to debt restructuring, starting with tax effects.

Tax effects

Buying debt at a premium (*discount*), allows the company to recognize a financial loss (*profit*) which can have a tax-related cash flow effect that offsets costs associated with the transaction. Buying debt at a premium creates a tax-deductible financial loss. If the company is in a positive tax-position (i.e. taxable profit) a premium of for example 10 % before tax will be equal to 7.2 % after tax.[21] Likewise, a repurchase below par value is treated as a financial income, and thus taxable.

As discussed on the previous page; in an efficient market a debt financed repurchase should not occur. However, since there is a tax element present, the management of a company has an incentive to take the company's tax position into account, which can affect the repurchase decision. The bondholders know this, and one can expect a sharing of the possible benefit from a tax-timing option between bondholders and shareholders. This sharing might occur in the form of higher repurchase price and thus wealth transfer from shareholders to bondholders. A further discussion on this topic will follow in section 2.3.

Accounting factors

Companies that issues bond usually have several classes of debt. Senior debt is a common term for the liability with the highest seniority[22]. *Wingler and Jud* find that accounting rules give

[21] The general corporate tax rate is 28 % in Norway. There are exceptions and special tax rules regarding corporate bonds, but that is beyond the scope of this paper. One example is that a company can in some circumstances amortize the financial loss / profit following a repurchase of debt.

[22] Seniority (def.): *Refers to the order of repayment in the event of bankruptcy*

companies flexibility in terms of covenants and the possibility to perform "window – dressing"[23]. By issuing and repurchasing bonds of different seniority, the management can get around covenants and improve income statements. For example, by repurchasing debt at a premium and finance the transaction by issuing debt with a lower face value (thus higher coupon), one might avoid breaching covenants – at the cost of higher interest rates in the future. However, accounting rules on this subject are continuously changing, and differ across borders.

Information effects

As mentioned in the discussion on capital structure, a deleveraging action is value destructive given normal circumstances, assuming the company is on or below the optimal debt/equity level. This is in line with Vermaelen (1981)[24], who finds that leverage-increasing events are followed by unanticipated increases in firms' earnings in subsequent years. Thus, an increase in share price following a deleveraging announcement might be due to the informational effect. The repurchase is a sign of confidence in the outlook going forward. In addition, a repurchase financed out of either cash flow or sale of assets might mean that the management is willing to give up short-term excess liquidity, thus lowering the agency costs, for the long-term benefit of shareholders.

Based on capital structure theory, there is no reason to expect a positive abnormal return, rather the contrary. The exception can be a possible positive signalling effect. However, the apparent absence of positive abnormal return is only true when the price of the bonds is close to par value. If the bond prices deviate significantly from the par value, the price deviation can explain positive abnormal returns. Pricing of bonds are the subject of the next chapter.

[23]Window – dressing (def.): *Specious (but usually legal) adjustment of a firm's accounting data to make its financial statements look better than they actually are.*
[24] Vermaelen (1981)

2.3 PRICING OF DEBT

The fair price of a straight bond is determined by discounting the expected cash flows. A description of the valuation formula[25] can be found in Appendix 10.2. The alternative cost for a bond investor is the yield of foregone investments in bonds of the same risk. Thus, at the market equilibrium – the discount rate should reflect the risks and alternative costs associated with the bond. In an efficient bond market, the net present value of a bond should be par value.

When a firm issues long-term debt, it effectively starts a valuation side game between bondholders and stockholder. If general interest rates[26] (i.e. discount rate) rise, the future value of a fixed claim (the principal) will fall. In this event, assuming that the change in coupon[27] is lower than the change in discount rate[28], a wealth transfer from bondholders to shareholder occurs. This is the rationale behind refinancing debt in a period with low or falling interest rates.

Companies usually pay a premium to repurchase debt before maturity. The reason is that bondholders demand a compensation to sell their bonds prior to maturity, assuming that the net present value of the bond's cash flows is higher than face value. A paper[29] on European bond tender offers in the period 1995 – 2006, finds that the average premium of a bond tender offer is 3.9 %. The period 1995 – 2006 witnessed relatively low interest rates and an increase in risk reducing financial instruments such as Credit default swap[30] (CDS). These factors gave management both an incentive to refinance and made the bond market more liquid.

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[25] The general formula is as follows: $$P_c = \sum_{t=1}^{m} \frac{C}{u^t} + \frac{F}{(1+r)^T}.$$

[26] I.e. the general interest rate level, as measured by for example LIBOR - London Interbank Offered Rate.

[27] Most of the bonds in the Norwegian Bond Market are Floating-coupon bonds that pay an interest rate equal to reference rate plus a margin, reset on a regular basis. The reference rate is either the NIBOR or LIBOR; which is an abbreviation for Norwegian/London Inter Bank Offered Rate.

[28] To keep the general picture simple, bond technicalities such as duration and convexity will not be incorporated in the given examples.

[29] de Jong, Roosenboom & Schramade (2006)

[30] Credit default swap (def.): *A credit derivative contract between two counterparties. The* ***buyer*** *makes periodic payments to the* ***seller****, and in return receives a payoff if an underlying financial instrument defaults.*

As described above, the price of a bond is a function of the expected cash flows and the alternative cost. While the former is highly dependent on firm specific risk, the latter depends on market risk and the general level of interest rates.[31] The key to determine the market price of debt is therefore risk. There are several kinds of risk associated with holding corporate bonds, such as credit (default) risk, interest rate risk and liquidity risk. Floating rate bonds, such as the bonds in our event study, are linked to a reference rate. This link ensures there is effectively no interest rate risk, and the duration is close to zero. The risk factors left are the credit default risk and liquidity risk.[32]

In the following part of this chapter, the paper will focus on credit default risk. This risk has increased sharply since the peak of this business cycle, and due to the financial turmoil following the bankruptcy of Lehman Brothers in September 2008. A possible indication of this is the increased rate of repurchases, and the falling value of high yield bonds (see appendix 10.4). To understand why bondholders are willing to sell their bonds at deep discounts, one has to understand credit default risk.

Corporate debt falls into several categories along two dimensions; the degree of security and the degree of seniority. In the event of a default, the bonds with a high degree of security or seniority will have a priority before unsecured or lower-seniority debt. While most of the repurchases in our sample set are investment grade bonds with different levels of collateral, some of the bonds included are so called "high yield bonds"[33].

Unless the company or bondholder is in severe economic distress, the movements in the market interest rate are the main reason behind changes in bond prices. However, if the default risks

[31] Fons (1994)

[32] Liquidity risk (def.): *Risk that an entity will encounter difficulty in realizing assets, (i.e. the bid-ask spread is high).*

[33] High yield bonds (def.) *Non-investment grade bond, speculative grade bond or junk bond.*

increases or the value of the collateral falls, the bonds value will fall as well. As a rule of thumb, the following formula[34] summarizes the expected loss on a corporate bond;

*Expected Loss = Probability of Default * Loss Given Default*

If either the probability of default (financial distress), or the loss given default (principal minus collateral) increase, the value of the bond will change accordingly. In addition, if the bondholder gets into financial distress, and as a result is forced to liquidate his position, a bond transaction can occur at a so-called "fire sale" price, namely a deeply discounted value comparing to the underlying fundamental value.

Since the bond market turned sour in 2008, bonds are being traded at discounts comparing to historical pricing. This is due to a sharp increase in risk premiums and expected default rates, grim economic prospects and (with the benefit of hindsight) an excessive leverage both on companies and bondholders balance sheets. To assess the effect that steep discounts have on equity returns, an analysis with regarding to repurchases in rising and falling markets will be performed in section 6.2.

[34] Brealey & Myers (2002)

2.4 REVIEW OF COMPARABLE EVENT STUDIES

Having reviewed debt repurchases with regard to capital structure theory (2.1), the purpose from management's point of view (2.2) and the principles of bond pricing (2.3); this chapter will review literature on empirical equity valuation following a repurchase.

As introduced in chapter 2.1, in a perfect M&M theorem world, the capital structure of a company should not affect the value of equity. Few event studies of *debt* repurchase have been performed earlier, while much attention has been given to abnormal earnings following a *share* repurchase.

Some event studies on bond repurchases have been performed, for instance debt exchange offers (McConnell) and bond valuations following a repurchase. Most studies define the event as the day a debt tender offer is public. However, for all practical considerations, a notice to the stock exchange about a completed repurchase is the equivalent to a tender notice. Therefore, the comparison between tender based events and stock notice events is valid. In the following, the results from the most relevant studies will be presented.

One of the earlier U.S. papers on bond repurchases was **Wingler and Jud (1990)**[35], which analyzed utilities companies in the period from 1983 to 1988. They found that a repurchase might enhance shareholder wealth if the firm was able to take advantage of the tax timing option.

A study by **Kruse, Nohel and Todd (2005)**[36], using a more diverse sample of U.S. debt tender offers in the period from 1989 to 1996 found that debt repurchases are wealth creating events, with a cumulative equity announcement return (CAR) of 1.47 %. Interestingly, the study found that repurchases financed with debt or equity issuing fail to add value, while those financed by asset sales result in an average CAR of 3.77 %. A study by **Maxwell and Stephens (2003)**[37]

[35] Wingler & Jud (1990)

[36] Kruse, Nohel & Todd (2005)

[37] Maxwell & Stephens (2003):

confirms these findings, although they find that the CAR is highly dependent upon which rating the debt has initially and at what time the repurchase was performed.

One of the most recent event studies on the subject covers the European bond tender offers in the period 1996 – 2005, and is conducted by **de Jong, Roosenboom and Schramade (2006)[38].** They find that the shareholder wealth following an announcement of debt tendering is not influenced. The average amount of debt being bought back is 22 % of the outstanding, while the median is 11 %. This study gives some interesting suggestions as to why companies repurchase high yield debt. Two large European companies mentioned, Siemens and Vodafone, bought back high yield debt of newly acquired companies to maintain their investment grades, thereby suggesting that debt repurchases could be related to ownership changes.

At the time of writing (April/May 2009), no paper on the subject that covers the bond market of late 2008 and 2009 has been published. However, the last months have seen an extraordinary repurchase activity, and the equity market has been widely influenced by the drama in the bond markets worldwide. An example of a de-facto tender offer by a large shareholder, Hemen Holding, the majority owner of Golden Ocean (quote: GOGL), a Bermuda based dry bulk shipping company, offered to repurchase two-thirds of the convertible debt at 30 % of the principal, which was then trading at 20 %.[39] The stock skyrocketed; climbing more than 200 % in the minutes following the announcement, as investors considered this as a strong positive signal for the near-bankrupt Golden Ocean, and investors with a short position got into a "short squeeze"[40].

From the literature on repurchase effects on equity valuation, we can conclude that there is no clear consensus with regard to the presence of abnormal earnings. However, the papers reviewed indicate that one should observe abnormal earnings if a repurchase is financed with asset sale or performed in a falling equity market.

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[38] de Jong, Roosenboom & Schramade (2006)

[39]Golden Ocean's notice to OSE, March 4th 2009; http://www.newsweb.no/newsweb/search.do?messageId=230303

[40]Comment from Stig Myrseth, chief analyst at Orion Securities: http://www.hegnar.no/bors/article362955.ece

2.5 EFFECT ON VALUATION OF REMAINING DEBT

The discussion on general debt valuation is a part of the literature on capital structure. Several papers discuss the theoretical value and pricing of debt. The consensus among the papers assessed, is that the value of remaining debt is highly firm specific. One paper by **Leland (2004)**[41] shows that in theory, if a wealth transfer from shareholders to some of the bondholders (i.e. positive premium) occurs, the remaining bondholders can be worse off. The reason for this would be that the firm has given up assets that are both most liquid (i.e. increased the bankruptcy costs) and carry a higher value than the remaining asset.

On the flip side, **Hennessy and Whited (2005)**[42] note that the benefit of reduced leverage can outweigh the increased bankruptcy cost (giving up the most liquid assets). In addition, increasing the liquidity of the bonds in the second hand market can make up for most of the increased loss given default.

Following the discussion on the informational effects, one can expect that the signals the company give have an impact on the valuation of the remaining debt. **Barclay and Smith (1995)**[43] show that the *debt signalling hypothesis*[44] can be explained by firm quality and credit risk.

Signalling models imply that undervalued firms will issue claims with high priority since these are the least undervalued, and vice versa. Given that this holds true, the management of an undervalued company would choose to repurchase the lowest priority debt, since this debt can be expected to be most undervalued[45]. According to this theory, repurchasing debt sends mixed signals to the bond market. Repurchasing the most underpriced debt is a positive signal, while

[41] Leland (1994)

[42] Hennessy & Whited (2005)

[43] Barclay & Smith (1995)

[44] Debt signaling hypothesis: *A theory that states that an announcement regarding a firm's debt can be used as a signal of the stock's future performance.*

[45] Cheng-Few Lee (2006)

deleveraging in general is usually interpreted as a negative signal. Consequently the net effect depends on how the market interprets the specific repurchase.

Another possible, although questionable effect, is whether a premium repurchase increases the probability of a future premium repurchase or not.[46] The answer, together with maturity and the above mentioned effects, will decide on the valuation of the remaining debt.

[46] Maxwell & Stephens (2003)

2.6 HYPOTHESIS

In the previous chapters, the fundamentals of debt repurchase have been assessed and relevant theory reviewed. Assuming the markets are efficient in assessing whether a corporate action increases or decreases shareholder wealth, an event study would suggest if debt repurchases are indeed value creating or value destroying events.

The key hypothesis this paper will test, is if a debt repurchase produced cumulative abnormal returns following a repurchase announcement in the Norwegian stock market. Based on this, the following hypotheses are formulated.

H_0: The share price does not show cumulative abnormal returns following a repurchase, CAR=0.
H_A: The share price does show cumulative abnormal returns following a repurchase, CAR≠0.

The results of the event study and robustness test of the hypothesis will be presented in chapter five and six, respectively. The following section will present the methodology of event studies and is somewhat technical. A discussion on the data selection process will follow in chapter four.

3. THE EVENT STUDY METHODOLOGY

When economists are asked to measure the effect of an economic event they often use the event study methodology. Event studies have been used for decades, and the first known study was carried out in 1933 by James Dolley[47]. He studied the effect of stock splits and his finding supported his hypothesis that the splits had a value-creating effect for the stockholders.

Much literature exists on the methodology of event studies. We find that the approach of A. MacKinlay gives an intuitive and thorough examination of the methods needed, and make his work the primary source when we analyze the debt repurchase problem. He published the article **Event Studies in Economics and Finance**[48] in the Journal of Economic Literature in 1997. MacKinlay have also published his findings in the book The Econometric of Financial Markets[49] the same year.

An event study looks at how a specific event affects the stock price. In short, one wants to find the abnormal stock return in the time surrounding a debt repurchase. To find the abnormal return one obviously first need to find the normal return of the stock. In this process, one needs to measure the stock returns in a period prior to the event, and then use the market model to find an estimate of the normal return. After comparing the realized event-period return with the estimated normal return for the same period, one needs to test if the CAR is significantly larger than zero. A simple T-test will be used for this task.

In the following, a detailed presentation of the methods used in our analysis will be presented.

[47] Mackinlay (1997)

[48] Mackinlay (1997)

[49] Campbell, Lo MacKinlay: The Econometrics of Financial Markets, 1997.

3.1 MEASURING NORMAL RETURN

There are two different types of models that can be used to estimate the normal return. These are described in *MacKinlay (1997)*. The first types of models are *economic models* that make some assumptions of how investors behave in the stock market. The CAPM and Fama & French's three factor model are well known examples of economic models. The other broad group of models are *statistical models*. These models give a statistical description of the stock's return. One example of such a model is the market model. *MacKinlay (1997)* argues that economic models were popular prior to 1970, but are now seldom used. In addition, the article states that there are no justifiable reasons to use an economic model at the expense of a statistical model. A statistical model is not as dependent on the specific, and often questionable, assumptions behind the model as the economic models are. This is the main reason for the choice to use the market model in the following.

The market model is a linear model that assumes normally distributed stock returns. Formally it is stated as follows:

$$R_{i,t} = \alpha_i + \beta_i R_{m,t} + \varepsilon_{i,t}$$
$$E(\varepsilon_{i,t} = 0)$$
$$var(\varepsilon_{i,t}) = \sigma_{\varepsilon_t}^2$$

$R_{i,t}$ = return on the stock at time *t*.

$R_{m,t}$ = market portfolio or index return at time *t*.

$\varepsilon_{i,t}$ = disturbance term or noise residual. The expected mean of this parameter is zero.

$\alpha_i, \beta_i, and\ \sigma_{\varepsilon_t}^2$ = the parameters determined by the market model.

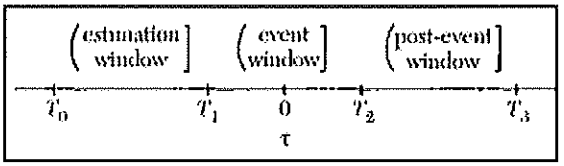
3.2 THE ESTIMATION WINDOW AND THE EVENT WINDOW.

The event window is the time period where the abnormal return is measured. It is important for the validity and result that the event day can be determined precisely. By stretching the event window to one day prior to the event day and three days after the event day one tries to capture any early information leakage and possible delayed effects. In chapter six a sensitivity analysis will be conducted, in which other event windows are utilized.

The normal return in the event window is determined using the parameters that were found in the estimation window. These parameters are therefore an important input to our analysis. We have decided to use approximately one year of daily data in the estimation period. This involves 240 trading days, and is in line with the recommendations given by **Brown and Warner**[50]. The length of estimation window will be discussed further in section 4.3.

It is important not to include the event window in the estimation period because it causes statistical difficulties and noise. The reason is that if the estimation period and the event period are overlapping, the event itself will influence the estimate of normal return, which is not the intention. In trying to isolate the effect of the event, and one need a clean measure of the estimation-period return. In some event studies a post-event window is used to measure delayed effects in the time following the event. This is not incorporated in our analysis because we assume that the market's reaction to the repurchase decision will become evident shortly after it is announced.

The following figure to the right shows a typical timeline of an event study:



τ is the event-time return. We define $\tau = 0$ as the event date. $\tau = T_1 + 1$ to $\tau = T_2$ represents the event window. $\tau = T_0 + 1$ to $\tau = T_1$ is the estimation window. $L_1 = T_1 - T_0$ and $L_2 = T_2 - T_1$ are the lengths of the estimation window and the event window, respectively. These notations are consistent with the ones used in *MacKinlay (1997)*.

[50] Brown & Warner (1985)

3.3 MARKET MODEL ESTIMATION

The market model was introduced in section 3.1. The next step is to estimate parameters in the model. The common method for this process is called *Ordinary Least Squares* (OLS). This is a regression method where you minimize the sum of the squared of the vertical distance between each point and the regression line. This distance is often referred to as the residual. For this event study, the OLS method is sufficiently efficient for estimation purposes, and as a consequence used in the discussion.

The estimation window consists of 240 daily observations. For all stock, the OLS parameters are calculated in the following way:

$$\hat{\beta}_i = \frac{\sum_{\tau = T_0+1}^{T_1} (R_{i\tau} - \hat{\mu}_i)(R_{m\tau} - \hat{\mu}_m)}{\sum_{\tau = T_0+1}^{T_1} (R_{m\tau} - \hat{\mu}_m)^2}$$

$$\hat{\alpha}_i = \hat{\mu}_i - \hat{\beta}_i \hat{\mu}_m$$

$$\hat{\sigma}^2_{\varepsilon_i} = \frac{1}{L_1 - 2} \sum_{\tau = T_0+1}^{T_1} (R_{i\tau} - \hat{\alpha}_i - \hat{\beta}_i R_{m\tau})^2$$

The estimate of the average stock return is computed in the following way:

$$\hat{\mu}_i = \frac{1}{L_1} \sum_{\tau = T_0+1}^{T_1} R_{i\tau}$$

Equivalently, the estimate of the average market return is calculated as follows:

$$\hat{\mu}_m = \frac{1}{L_1} \sum_{\tau = T_0+1}^{T_1} R_{m\tau}.$$

The estimated regression coefficient, β (BETA) is the same as in the CAPM (Capital Asset Pricing Model). α (ALPHA) is the estimated point of intersection between the y-axis and the regression line.

3.4 ABNORMAL RETURN CALCULATIONS

Abnormal return can be defined as follows:

$$AR_{i,\tau} = R_{i,\tau} - \hat{\alpha}_i - \hat{\beta}_i R_{m,\tau}$$

Abnormal returns are normally distributed with the following variance:

$$\sigma^2(AR_{i,\tau}) = \sigma^2_{\varepsilon_i} + \frac{1}{L_1}\left[1 + \frac{(R_{m\tau} - \hat{\mu}_m)^2}{\hat{\sigma}^2_m}\right].$$

$\sigma^2_{\varepsilon_i}$ is the variance of the noise residual (ε). The second part of the expression above is additional variance due to measurement error in the alpha and beta parameters. *MacKinlay (1997)* argues that when the estimation period (L_1) becomes large, the measurement error approaches zero. We make the assumption that our estimation period is sufficiently long to set the error equal to zero. This assumption results in the following variance approximation:

$$\sigma^2(AR_{i,t}) \approx \hat{\sigma}^2_{\varepsilon,i}$$

The next step in the methodology is to aggregate the abnormal return over time and stocks. The result of this aggregation is what was referred to in section 2.4 as the *cumulative abnormal return* (CAR). It is not important in what order the aggregation is done. We choose to first aggregate over stocks to find CAR_i. Next, one aggregates over time to find $CAR_{i,\tau}$.

Mathematically, the CAR can be defined as follows:

$$CAR_i = \sum_{i=1}^{N} AR_i$$

$$CAR_{i,\tau} = \sum_{\tau=1}^{T} CAR_i$$

Average CAR is found like this:

$$\overline{CAR} = \frac{1}{N}\sum_{i=1}^{N} CAR_{i,\tau}$$

Variance of CAR is given by the following formula:

$$\sigma_i^2 = (\tau_2 - \tau_1 + 1)\sigma_{\varepsilon_i}^2$$

To find variance of the *average* CAR one uses the following formula:

$$var(\overline{CAR}) = \frac{1}{N^2}\sum_{i=1}^{N} \sigma_i^2$$

To ensure that the variance calculation is of high accuracy, event windows should in general not overlap. However, the trade-off between accuracy in calculating the variance and the value of additional events favour a pragmatic approach were one allows for some events to overlap each other. The extent of the overlapping is minimal. To partly overcome this potential problem, we will include a standardization[51] of the key input variables; Alpha and Beta. The results of this standardization will be presented in section 6.1.

[51] (Def.): *Standardization is a procedure in which key variables, such as Alpha and Beta, are set to a predetermined correct theoretical value.*

3.5 STATISTICAL TESTING

To assess the significance of our results one needs to apply a statistical test. We decided to use a simple T-test with corresponding p-values.

H_0: $\overline{CAR} = 0$. Inferences surrounding the results can be drawn using:

$$\overline{CAR} \sim N[0, var(\overline{CAR})]$$

The real $\sigma^2_{\varepsilon,\tau}$ is unobservable so the *estimated* variance from the market model is used. The zero hypothesis can be tested using:

$$\theta_1 = \frac{\overline{CAR}}{var(\overline{CAR})^{1/2}} \sim N(0,1)$$

The H_A states the following: $\overline{CAR} \neq 0$. The rejection of the zero hypothesis is tested on a 99%, 95% and 90% confidence level. N-1 degrees of freedom are used.

The p-values in our analysis are standard p-values. That means they represent the probability of obtaining a value of the test statistic at least as extreme as the observed value, given that the zero hypothesis is true.

4. DATA

In the following section, we will explain how the data used in this paper was gathered and upon what criteria they are utilized. First, we will go through the process of gathering and selecting data. Second, we will list the criteria for a complete repurchase event.

First, we decided to use bond data from pure Norwegian bonds. Since many companies on the OBX-index have bonds abroad, they could add valuable information to the event study. However, differences with regard to disclosure of repurchase statements and tax rules would have made a direct comparison difficult. In addition, gathering bond data from foreign sources would have been challenging, if not impossible given the strict rules regarding disclosure.

When deciding on an appropriate time span, one should include at least a full business cycle. The rationale behind that is to include both an upturn and a downturn in the market. One complete business cycle should be sufficient to get reliable results. We settled for approximately one business cycle, starting on January 2nd 2004, ending January 21st 2009. Figure three shows the Norwegian OSEBX index in the given period. One can see a pattern of an upturn and a downturn. This should give the required amount of diversified data to perform a valid event study.

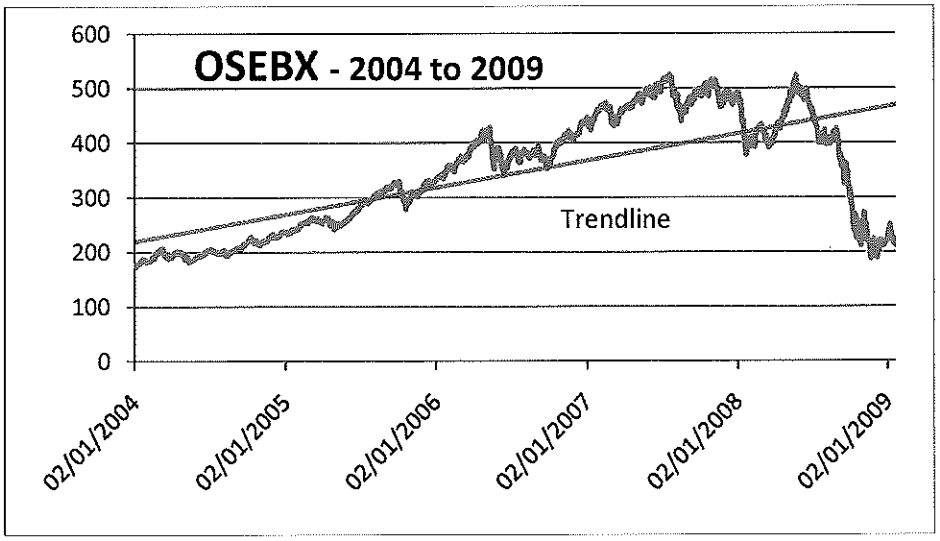


Figure 3: The Oslo Børs Benchmark Index (OSEBX) is an investible index which comprises the most traded shares listed on Oslo Stock Exchange.

The main source of information was initially Newsweb[52]. However, data gathering had to be performed manually on each company listed on the exchange over the time period. Needless to say, this task was immensely time-consuming. In addition, data entries proved to be inconsistent, as some bond repurchases where mislabelled, missing or incomplete. In order to get around this, several additional sources were contacted. As mentioned in the preface, Truls Evensen at Oslo Stock Exchange provided us with data that enhanced our manual findings.

Figure 4 shows the sector composition of the initial 104 samples. As the pie chart shows, the sample set is fairly diversified, although it differs somewhat from the composition of the OSEBX. Especially oil and gas related companies are underrepresented, the reason being that they often raise debt abroad.

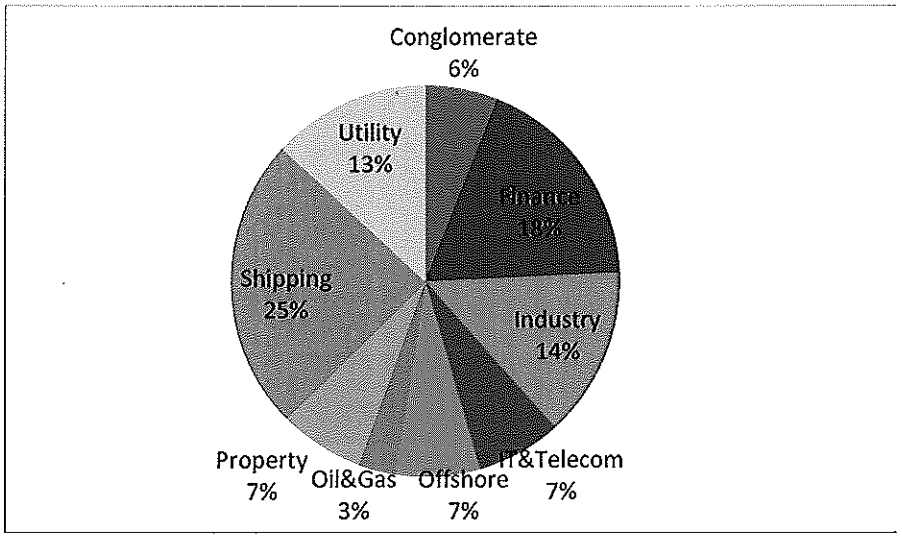


Figure 4: The composition of the initial sample of 104 repurchases events

[52] www.Newsweb.no is a webpage showing market announcements together with attachments.

4.1 SELECTION CRITERIA

Having applied the information research mentioned above, the initial data material included 104 repurchase samples, divided on 30 companies. Since many of the repurchases where financed with issue of new bonds, we expected that the results could be affected by this. Based on the literature on the subject, repurchases financed with debt or performed by financial companies should not be included in a pure repurchase analysis, since those samples can be considered to be rather technical events. Banks usually perform repurchases on a regular basis, and a repurchase financed with the same amount of debt do not change the capital structure, hence the information effect to the market should be insignificant on those samples.

After completing the tedious task of examining the nature of each single buyback, we ended up with 30 pure events that satisfied our strict conditions. These events were selected by studying the quarterly reports of the respective companies, mainly by looking in the cash flow statements and corresponding notes. The criteria used are listed below, including a brief explanation and justification.

- ***The stock had to be included in the OSEBX index at the time of the event***
  First, we eliminated companies that were not part of the OSEBX index when the repurchase was announced. For example, many regional utility companies are highly active in the bond market, but in state ownership (i.e. not listed on any exchange).
- ***Exclusion of banking, insurance and financial companies***
  As mentioned, banking, insurance and financial companies issue and repurchase debt at a regular basis as a part of their day to day operation. A repurchase performed within this sector cannot be assumed to have any influence on the share price, and is therefore excluded.
- ***Eliminate events within a timeframe of five days prior to and five days after the event***
  By assuming that an event carries information that the market need time digest, a "grace" period of five days prior to and five days after the event should be sufficient. For repurchases that happened within a short time span, the second event was ignored if it was within five days of the first event.

- ***Significance with regard to the relative size of repurchase to total debt***
  Minor repurchases might carry an informational signal, but to eliminate a series of repurchases of a small relative value with regard to the total outstanding (long term) debt, we sat a minimum 5 % threshold. The rationale behind a relative measure was that a repurchase of 15 MNOK worth of bonds might be significant for a relatively small company such as Stepstone ASA, but insignificant for a major company such as Aker ASA.
- ***Exclusion of repurchases influenced by other major events within the same time period***
  Repurchase events that happened within the same time span as other major company specific events, such as earning announcements, profit warnings, acquisitions and events of a similar magnitude were eliminated due to the assumed informational "noise" from the major event.

Having incorporated these criteria, we ended up with 30 samples. The composition of these is shown below, in figure 5. As the pie chart shows, financial companies are now excluded, while offshore and conglomerate companies seems to do pure repurchases most often compared to what we saw in figure 4.

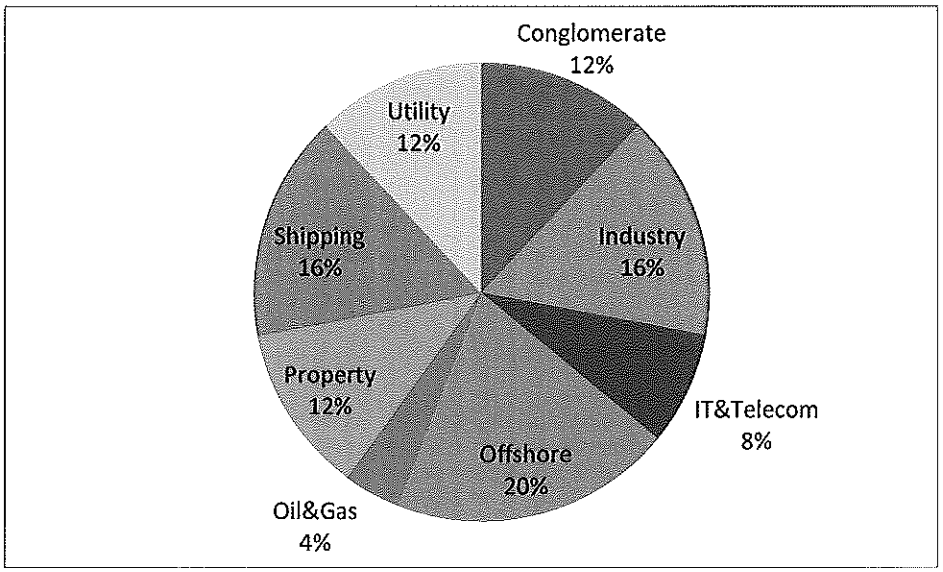


Figure 5: The composition of the final sample of 30 remaining events by sector

4.2 INDEX

As mentioned in the methodology section, one need to compare the stock returns to an index to calculate abnormal return in a given period. Therefore, an index is needed to establish a benchmark to which stock returns are measured. Since we are looking at Norwegian companies, the choice of benchmark is limited to either the OBX[53] or the broader OSEBX[54], which consists of approximately 60 shares with the highest level of liquidity. Since our samples include a number of smaller companies, the broader OSEBX index will give a more representative benchmark.

Since the companies in the dataset are diverse with regard to industry, size, cyclicality and so forth, it does not make sense to use specific business indices.

4.3 ESTIMATION PERIOD

In part 3 we presented our choice of an ideal estimation window of approximately 240 days. From a statistical point of view, a longer time period could be desirable. The problem with incorporating an even longer time period is that such periods might not represent normal return on the stock. We therefore find that an estimation period of 240 days is close to an ideal trade-off between statistical and economic relevance, and therefore give us the most relevant parameters for determining the normal return.

[53] The OBX Index is a stock market index which lists the 25 most liquid companies on the main index of the Oslo Stock Exchange in Norway.

[54] Oslo Bors Benchmark Index

5. RESULTS

In section two, the rationale behind dividing repurchase events into "cash-financed" and "debt-financed" was established. In section three, the methodology of an event study was introduced. The previous section showed how data where gathered and upon which criteria they where categorized. In the following section, we will present the results of the analysis, and discuss the probable causes of the findings. Whether the results are consistent with the theory from chapter two will be discussed throughout this chapter. As part of this, we will assess the hypothesis from section 2.6.

Figure six shows the cumulative abnormal returns (CAR) of the complete sample. The left vertical axis shows the CAR of the individual stocks. The red line with labels represents the average CAR for the complete sample, and the corresponding percentage return is depicted on the right vertical axis. The figure shows an event window equal to five days, as introduced in chapter three, with day 0 being the event day.

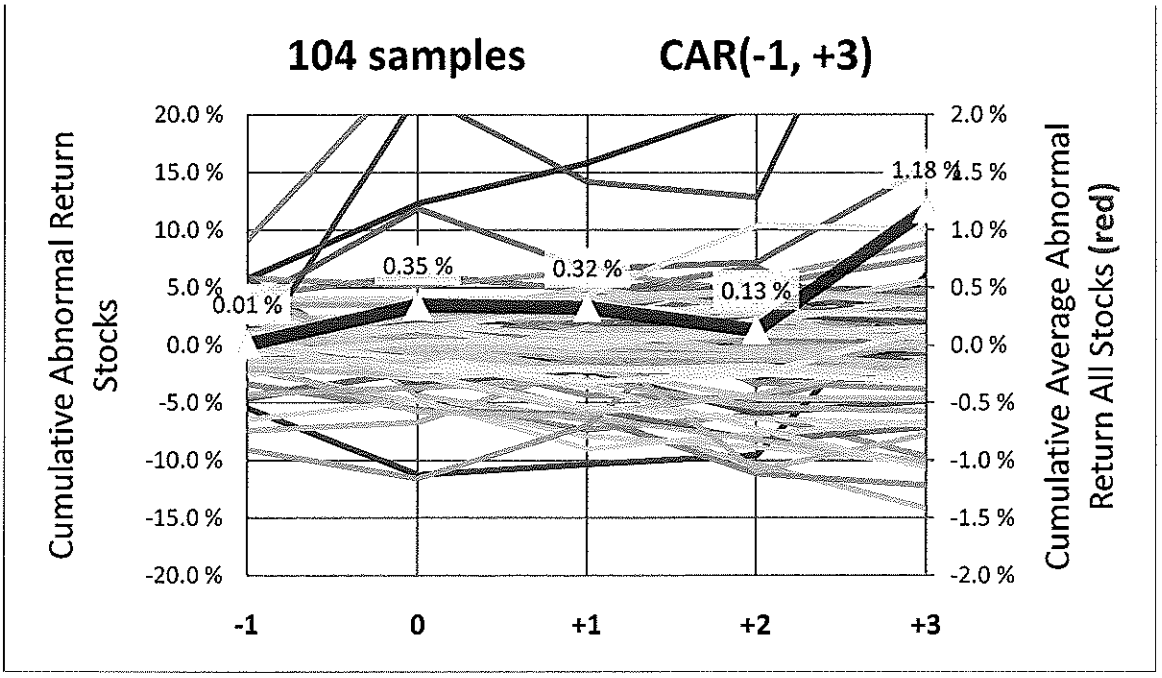


Figure 6: CAR for the complete sample

As one can see on figure six, there is no clear aggregated trend with regard to the CAR. The event day return is 0.34 %[55]. One exception might be the CAR at day three, which is strongly positive. The day three return is 1.05 %[56].

CAR (-1,+3)	104
-1	0.01 %
0	0.35 %
+1	0.32 %
+2	0.13 %
+3	1.18 %

The table to the left also shows the most relevant statistical values for this sample. As one can see, the T-value of 1.23 is fairly low. Using 103 degrees of freedom we find that our zero-hypothesis is not rejected for the stated (99, 95 and 90 % respectively) confidence levels. This implies that one cannot state on a significant basis that CAR differs from zero. The relatively high P-value provides the same conclusion.

CAR (-1,+3)	104
T-value	1.23
P-value	22.07 %
Critical T-values	
99 %	2.62
95 %	1.98
90 %	1.66
Avr. CAR	0.62 %

Given that the complete sample is a mix of repurchases financed with cash/debt, by financial/non-financial firms, in addition to other effect-diluting factors; the results are in line with expectations. There is a positive trend following a repurchase, but it is too weak to conclude on a statistically significant level. However, the initial results are encouraging as they confirm some of the results from other papers. The size of the CAR is in line with the findings of *Kruse, Nohel and Todd.*

Since the statistics from the complete sample indicate a weak positive CAR following a repurchase, it is natural to run the same analysis on the 30 events based on pure cash financing. The CAR for the 30 events is presented in figure seven. Again, the average CAR is depicted with a red labelled line, with corresponding percentage levels on the right vertical axis. Note that the scale on the right vertical axis is twice as large as in the first analysis.

[55] Return day zero (event day) = CAR (0) – CAR (-1) = 0.34 %

[56] Return day three = CAR(+3) – CAR(+2) = 1.18 % – 0.13 % = 1.05 %

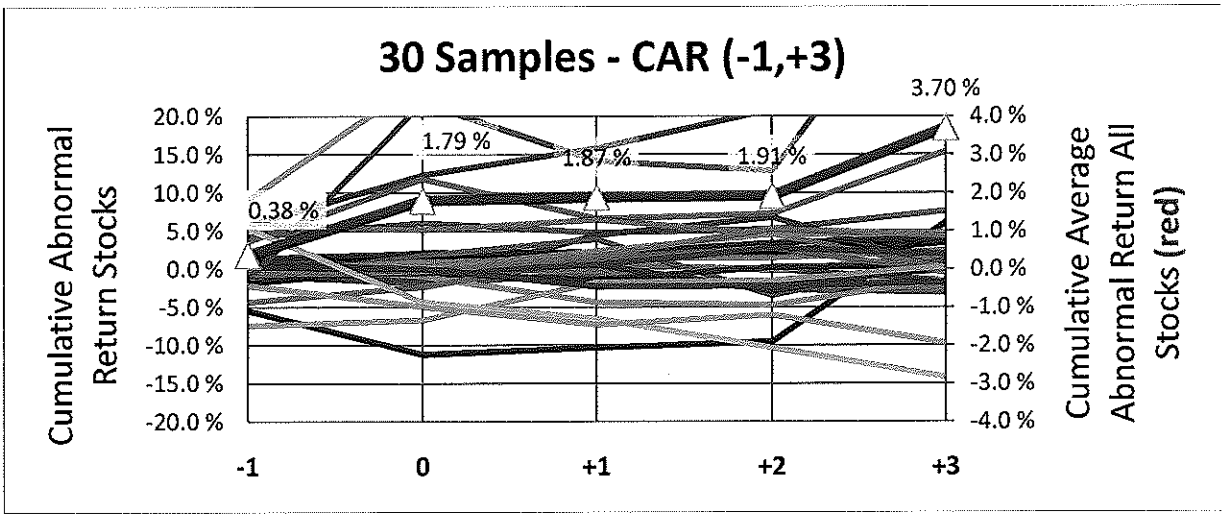


Figure 7: CAR for the 30 pure-cash events

The results are interesting, as they differ from the previous sample of 104 events. Where one previously did not have a clear trend, one can now see a upward moving trend. An interesting observation is that the event-day return is strongly positive, with an abnormal earning of 1.41 %. This is a relatively high return, which is in line with research and findings in other papers, such as *Kruse, Nohel and Todd* and *Chatterjee Dhillo and Ramirez.* These findings indicate that the market reacts positively to repurchase announcements in general, and on pure cash financed repurchases specifically. As we will show later, the latter results are also statistically significant.

CAR (-1,+3)	30
-1	0.38 %
0	1.79 %
+1	1.87 %
+2	1.91 %
+3	3.70 %

As presented in section two, this positive abnormal return can partly be explained by the change in capital structure, but can just as well indicate that either tax reasons or the signalling effect accounts for the market reaction. Given that a repurchase is considered a defensive measure with regard to capital structure (i.e. deleveraging), and most of the events in the sample have been performed in a surging market, one can assume the abnormal return would have been even higher in a plunging market. This will be further discussed in section 6.2, as a part of the sensitivity analysis.

Another interesting observation is that the day before the event has an abnormal return of 0.38%. If the market did not expect any (positive) news announcement, abnormal return should have been close to zero. This could indicate either leakages to the market, or that there is speculation that news will be disclosed the following day. If the former is the case, some of the return on day -1 can be attributed to the event return. If this is the case, one would have observed even higher return on the event day without any leakages.

Going forward to event day plus one and two, respectively, one can see that the CAR barely changes at all. This corresponds to an abnormal return close to zero on these days, and can be interpreted in several ways. First, it seems like the new information is incorporated in the stock price on the event day. This is highly plausible, since the equity markets are highly liquid and the information is distributed in real time.

However, assuming there is a reversal effect[57] present; one would expect to see a decline following the rapid rise (i.e. high abnormal return) on event day minus one and zero. Assuming there is a fair amount of short term trading in the respective stocks; one could expect a sell-off following a news announcement. The rationale behind this would be that many so-called speculators "Buy on rumours, sell on facts". Since the stocks stay at the same high level, the possible sell-off might be countered by a positive underlying demand placing an upward price pressure.

After two days of minor change in the CAR, an interesting observation can be made. Event day plus three shows an abnormal earning of 1.79 %, which is equal to the combined returns prior to and on the event day. The reason behind such a stock movement can be highly firm specific, but there are two likely general explanations. First, analysts usually send out revised recommendations and stock targets two to three days following a major firm specific event. If the analysts interprets the repurchase as a value increasing action, which research shown in chapter two suggests, they will issue revised and increased price targets. Another plausible explanation is that short term speculators finish their sell off after two to three days, and the demand from

[57] (Def.): *A tendency that stock prices overreact to relevant news so that short-term overreaction may lead to reversals as investors recognize and correct past pricing errors, generally referred to as the reversal effect*
More on reversal effects: De Bondt and Thaler (1989): A Mean-Reverting Walk Down Wall Street

CAR (-1,+3)	30
T-value	1.83
P-value	0.0775
Critical T-values	
99 %	2.76
95 %	2.05
90 %	1.70
Avr. CAR	2.21 %

"fundamental" investors push the stock price upwards. However, the latter is hard to confirm, but is a general feature of the literature on reversal, as mentioned above.

Looking at the statistics behind the sample of 30 pure cash financed repurchases, one can see that T-value is considerably higher than for the whole sample. At 1.83 it is significant at the 90 % level, indicated with red. The corresponding P-value is 0.0775, which indicates that one would be mistaken in rejecting the zero-hypothesis in one out of 13 cases. The result is quite strong – and in line with the findings mentioned in section 2.3.

To make sure the categorization of repurchases is sound and create valid differences, a calculation of CAR for the 74 events that did not satisfy the strict criteria is shown below.

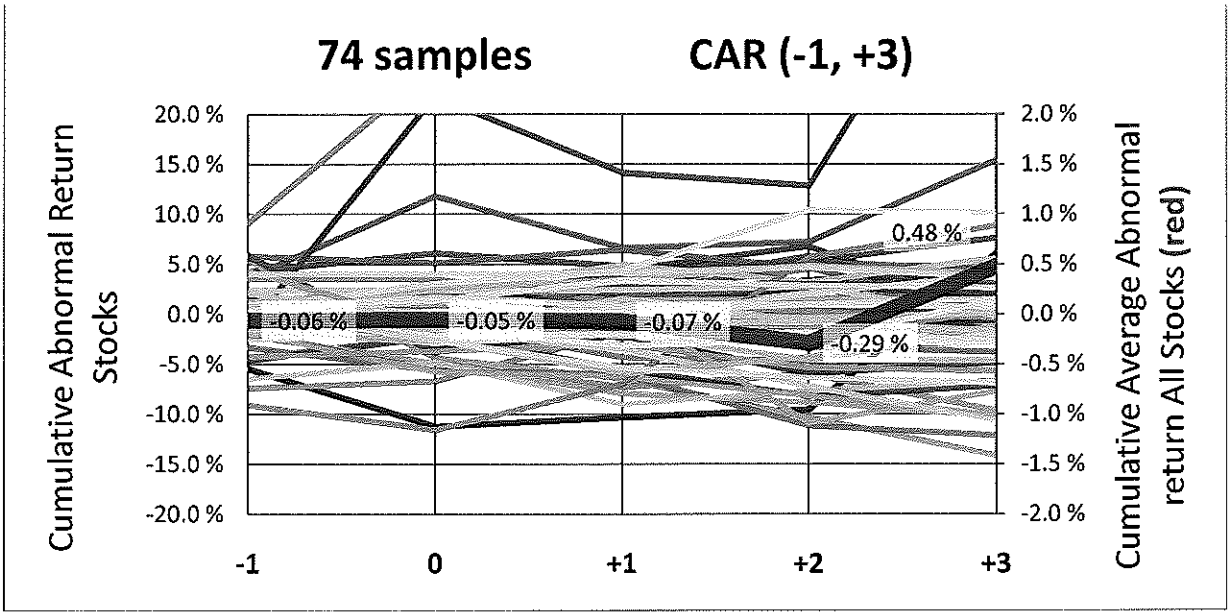


Figure 8: CAR for the 74 non-cash repurchases

As one can see, there is no clear trend around the event date. There is a minor upward movement on day three, but it is not statistically significant. Looking at the corresponding statistics, a low T-value confirms that the zero-hypothesis is not rejected.

CAR (-1,+3)	74
T-value	0.19
P-value	0.8534
Critical T-values	
99 %	2.64
95 %	1.99
90 %	1.67
Avr. CAR	0.11 %

To better see how the three samples differ with regard to the daily abnormal return, a summary can be found below. As one can see, the cash financed repurchases (red line), have the highest return on all five days.

To widen the comparison, a table on the CAR for the three respective samples is provided below. Again, the cash financed repurchases outperform the other samples, mainly due to the high CAR on the day before the event and the event day itself.

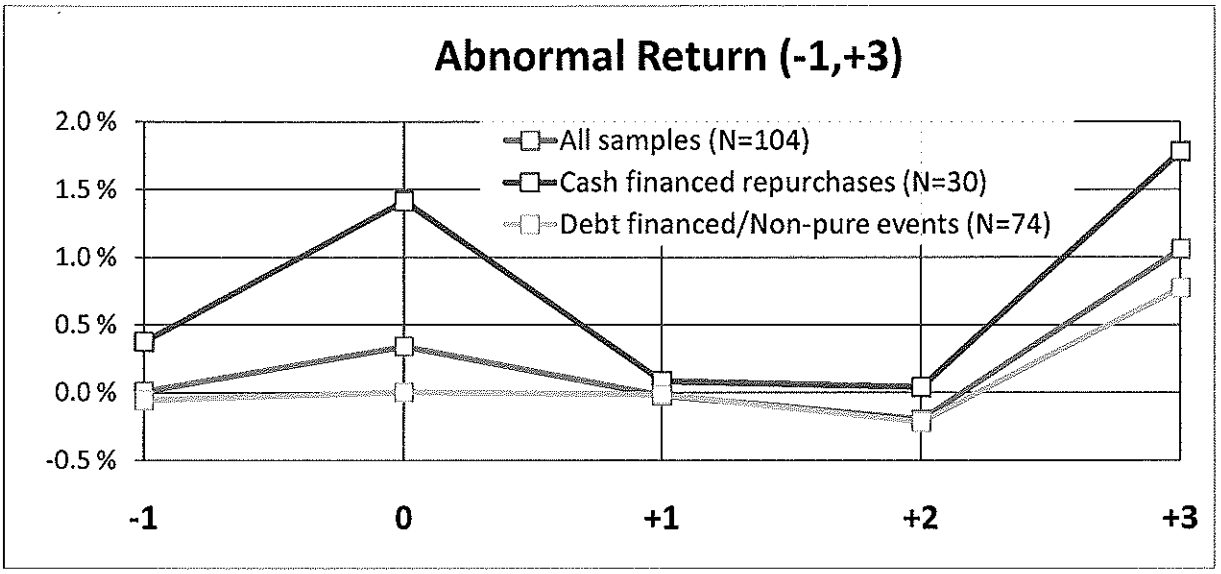


Figure 9: A summary of abnormal returns

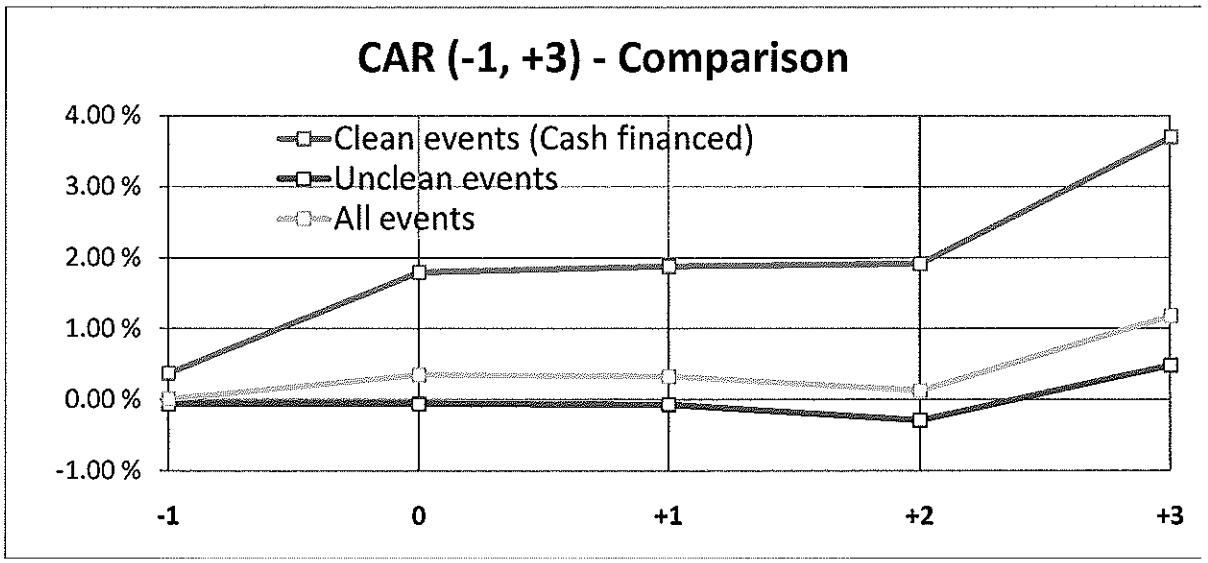


Figure 10: Summary of CAR from different samples

In this section we have shown the main results from our analysis. Graphical verification, statistical key values and an interpretation have been presented, as well as a comparison between the CAR-calculations.

In the following section, a deeper understanding of the results and their implications will be established. The validity of the results will be tested, in addition to the statistical assumptions behind the samples. Several "what-if" analyses will be performed to gain additional insight behind the abnormal returns found and presented in chapter five.

6. ROBUSTNESS TEST

The former chapter presented the results from the analysis and discussed the probable causes of the findings. This section is threefold, and divided as follows:

- First, we will perform a sensitivity analysis with regard to the event window. In addition, we will standardize the regression parameters (i.e. Alpha & Beta).
- Second, a validity test of the results over the market cycle will be performed. We will see whether the results are different in a rising versus a falling market.
- Third, a statistical assessment of the fundamentals behind our results, and a discussion regarding the consequences of this assessment.

The aim of this section is to show how changes in the assumptions and market cycle affect our results, and what can be derived from these finding. The techniques and methods will be emphasized to a lesser extent, to keep the chapter concise and to the point.

6.1 SENSITIVITY ANALYSIS

In section 3.2, the rationale behind an event window from day minus one to plus three was established. Since the findings in the results section suggests that there is a leakage prior to the event, it is constructive to see to which extent this leakage affects our results. The first alternative event window presented, (0,+3), can give a suggestion to how substantial the leakage effect is.

Next, a second alternative event window of (-1,+1) will be tested. This window will show to which extent the late post-announcement effect on day two and three are affecting the results. An event window of these three days will suggest how much of the event effect that can be attributed to the initial effect, excluding the slightly questionable day three effect.

Cumulative Abnormal Return, Event Window (0,+3)

CAR (0,+3)	30	74	104
0	1.42%	0.00%	0.34%
+1	1.50%	*-0.01%*	0.32%
+2	1.54%	*-0.23%*	0.12%
+3	3.32%	*0.54%*	1.17%
T-value	2.44	0.30	1.70
P-value	0.0212	0.7675	0.0927

The table above shows that the T-values suggest stronger CAR within all the three event groups. This implies that the leakages on the day prior to the event do not strengthen the results in general. The reason is mainly due to the fact that the CAR on the day excluded in this test is lower than the average for the period. This, combined with added variance lowers the T-values for the initial event window across the range of samples.

A graphical illustration of the new event window is shown on the next page, in figure 11.

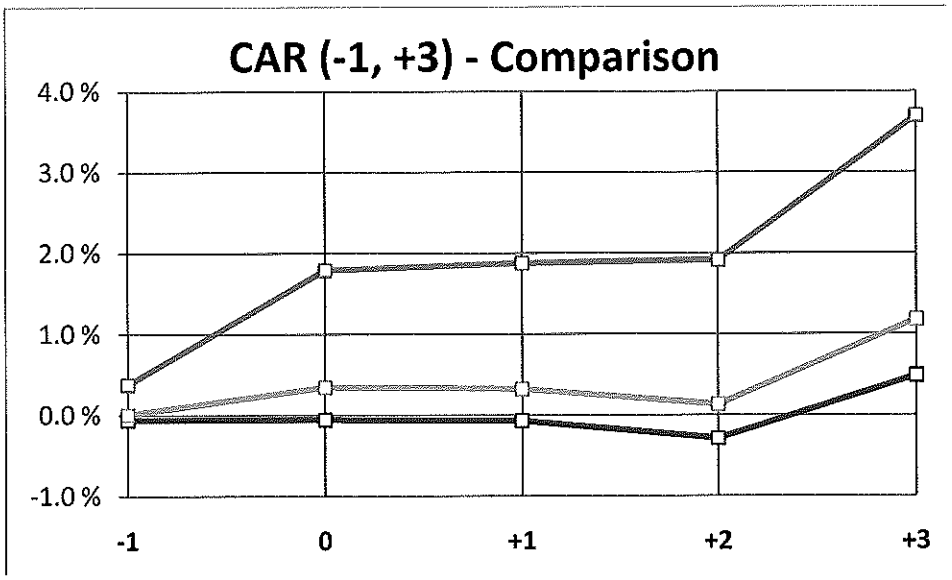


Figure 11: Summary of CAR from different samples

As the event window (0,+3) results shows, excluding the day prior to the event did increase the strength of the results. However, much of the CAR can be attributed to day three. Since the increase in CAR on this day is slightly questionable, a test with an event window excluding day two and three is appropriate.

Cumulative Abnormal Return, Event Window (-1,+1)

CAR (-1,+1)	30	74	114
-1	0.38%	**-0.05%**	0.02%
0	1.79%	-0.05%	0.35%
+1	1.87%	*-0.04%*	0.34%
T-value	1.72	0.12	1.07
P-value	0.0964	0.9082	0.2886

As one can see from the table above, the T-values are all lower than in the base case event window (-1,+3) and in the alternative window (0,+3). However, the cash-financed repurchase sample is still significant at the 90% level. The overall assessment of this shorter event window suggests than one should include day two and three, since there are abnormal earnings present on

these days which might outweigh the increased variance. Again, a graph depicting the CAR is shown below.

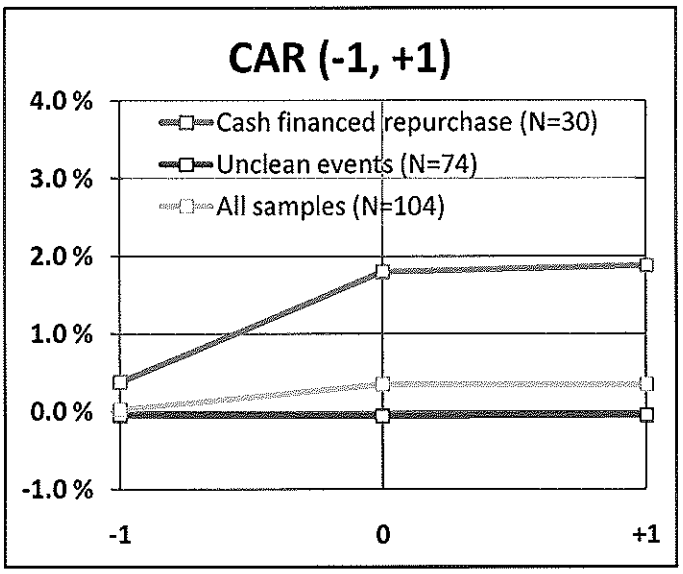


Figure 12: Summary of CAR from different samples

Another interesting finding is that the CAR of the 74 "unclean" events is close to zero, which implies that the selection criteria outlined in section 4.1 were sensible.

Standardizing Alpha and Beta

In the initial analysis, the Ordinary Least Squared (OLS) method was used on daily data to determine the Alpha and Beta parameters. Daily data can carry substantial amount of noise, thus the calculation of respective Alpha- and Beta-values can be slightly debatable. This coupled with the fact that an estimation window of 240 days can be somewhat short given the volatility in the market; suggest that standardization can be useful and give more insight.

The last argument for a standardized test, is that a few of the companies included in the event-sample are rather small and illiquid. This can result in stocks having a large spread or being traded rarely, which can lead to a misestimation of the true beta.

Standardized parameters means Alphas equal to zero[58] and Betas equal to one[59]. Assuming the market prices a share correctly, on should expect an Alpha value of zero. The market overall Beta

[58] Alpha def.: *the abnormal rate of return on a stock in excess of what would be predicted in an equilibrium model. That means that one would expect the market model to have an Alpha of zero in an efficient market.*

is equal to one per definition. Standardizing Beta to one seems like a reasonable assumption, since our sample set consists of 30 companies over a wide range of sectors. By adjusting the given parameters above, we can test the validity of the results even further, by excluding the effect of biased input variables.

CAR (-1,+3)	104	30
-1	-0.22%	0.19%
0	-0.01%	1.22%
+1	0.27%	1.63%
+2	-0.02%	1.47%
+3	0.68%	2.79%

CAR (-1,+3)	104	30
Avr. CAR	0.62%	2.21%
T-value	0.48	1.23
P-value	0.6339	0.2275
Critical T-values		
99%	2.62	2.76
95%	1.98	2.05
90%	1.66	1.70

The standardized results are given in the table and graph above. The returns are somewhat lower on both the total sample and the 30 selected cash-financed events than in the original scenario. This might imply that some of our promising findings are a result of partly inaccurate inputs from the OLS-method. However, the CAR is still strongly positive, which implies that the underlying results from section 5 are still valid. The T-value of 1.23 is not significant at the 90 % level, but can still give some indication of validity for our hypothesis, that is to say a CAR different from zero.

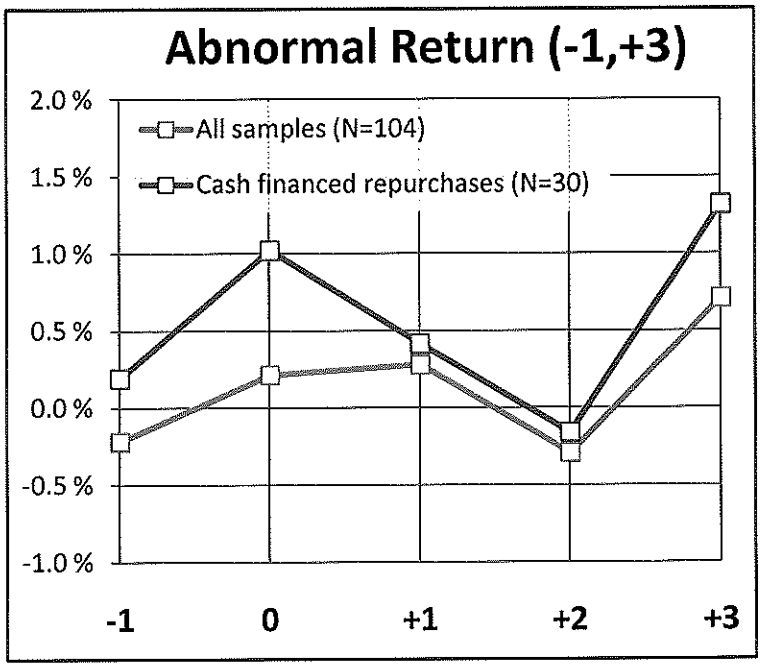


Figure 13:
Abnormal return, standardized parameters

[59] Beta (def).: *the tendency of a stock to fluctuate in relation to the broad market. The market Beta is then 1, and without additional information one could make the starting assumption that a single stock will have a Beta of 1.*

6.2 VALIDITY WITH REGARD TO MARKET TRENDS

At the time of writing (April/May 09), the financial markets have witnessed a severe financial crisis, and equity values all over the world have been declining in the recent months.

Since our data sample covers both a rising and declining market, it might be interesting to see whether the CAR following a cash-financed repurchase differs in a rising and a falling market. The reference indexed, OSEBX, reached a top at May 22th 2008[60]. Setting this as a watershed between a rising and falling market makes sense, since this is the all-time high of the index used as a benchmark in our analysis.

Using 22nd of May 2008 as partition line, we find that 20 of the repurchases were performed in the period before, and 10 events after this date. This also suggests that the repurchase activity has increased, since the former period covers approximately 50 months, while the latter covers only 7 months.

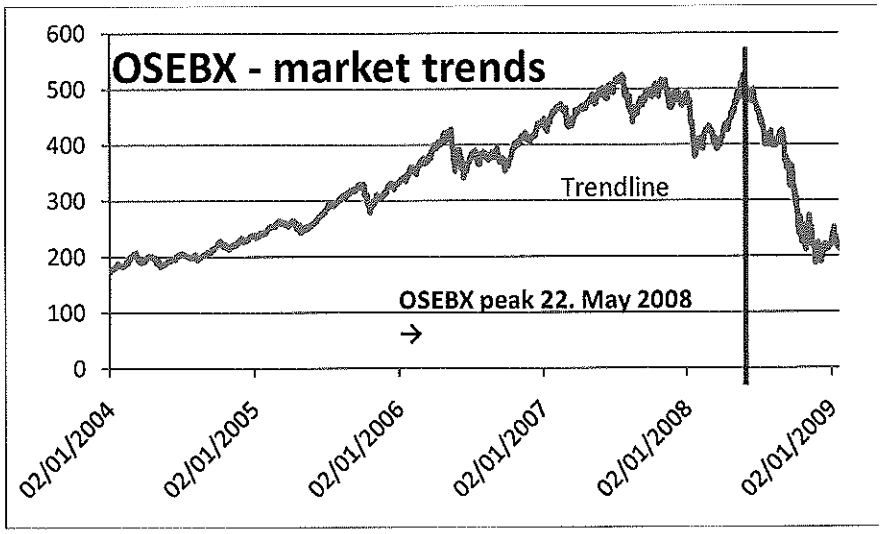


Figure 14: OSEBX from 2004 to 2009

The results of the analysis are shown in the tables on the following page. The term "Bull" is short for a bullish/rising market, while "Bear" is short for a bearish/falling market.

[60] A spreadsheet shown historical highs and lows on various OSE indices can be found at the following URL: www.oslobors.no/content/download/14586/381605/version/1/file/2008_Indekser.xls

"Bull"		"Bear"	
CAR (-1,+3)	**20**	**CAR (-1,+3)**	**10**
-1	-0.07%	-1	1.22%
0	0.22%	0	4.77%
+1	0.22%	+1	5.02%
+2	0.73%	+2	4.16%
+3	0.94%	+3	8.94%
CAR (-1,+3)	**20**	**CAR (-1,+3)**	**10**
T-value	0.84	T-value	1.68
P-value	0.4120	P-value	0.1278
Critical T-values		**Critical T-values**	
99%	2.86	99%	3.25
95%	2.09	95%	2.26
90%	1.73	90%	1.83
Avr. CAR	0.83%	**Avr. CAR**	4.82%

As one can see, the results are very interesting. The CAR for repurchases performed in the overall rising market of 2004-2008 is insignificant, which is in line with the findings *de Jong, Roosenboom and Schramade* found when performing a similar event study on European debt repurchases in the period 1996-2006, which saw a general upward moving trend.

The T-value of "the bull-period" is far from significant, suggesting that repurchases performed in a rising market are indeed not value creating. As suggested in section 2.3, this might be due to the premium[61] the company pays outweighs possible tax, covenant and signalling effects.

The "Bear" events on the other hand give quite different results. The CAR is strongly positive, with an average CAR of 8.94 %. This suggests that these 10 events make of for a majority of the CAR found in the results covering the complete sample of 30 companies. A possible explanation is that the companies can perform the repurchases at deep discounts, since the bond markets have fallen sharply since the beginning of the financial crisis (September 2008). Since the repurchasing companies know that other means of financing their operations can be expensive or non-existing for some time to come, repurchasing in a challenging financial environment sends a strong positive signal about the confidence and financial strength going forward. Thus, we can attribute most of the CAR to the price and signalling effect, and to a lesser extend taxation and accounting purposes.

[61] The premium is calculated as the cost above the net present value of the bond if held to maturity

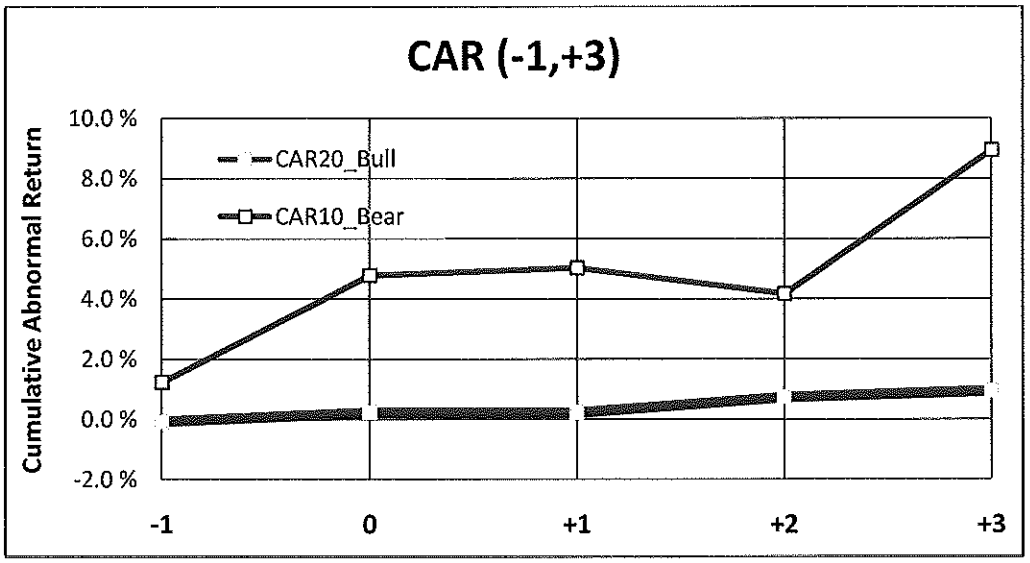


Figure 15: CAR of repurchases performed in "bullish" and "bearish" markets, respectively.

6.3 STATISTICAL INFERENCE

In this section, the main assumptions behind the statistical tests in this paper will be reviewed.

One of the fundamental assumptions behind the T-test is normality in the returns. This is hard to achieve when the sample size is relatively small. Non-normality is a common problem when it comes to stock returns. Studies[62] show that stock returns have too many extreme values, which implies that too many observations are in the tails of the normality curve. In his recent book, *The Black Swan*[63], Nasim Taleb have shown that these extreme events are at the core of the ongoing financial crisis, as classical financial models do not incorporate extreme returns and volatility. The implication for our sample is that the T-tests might be slightly misleading.

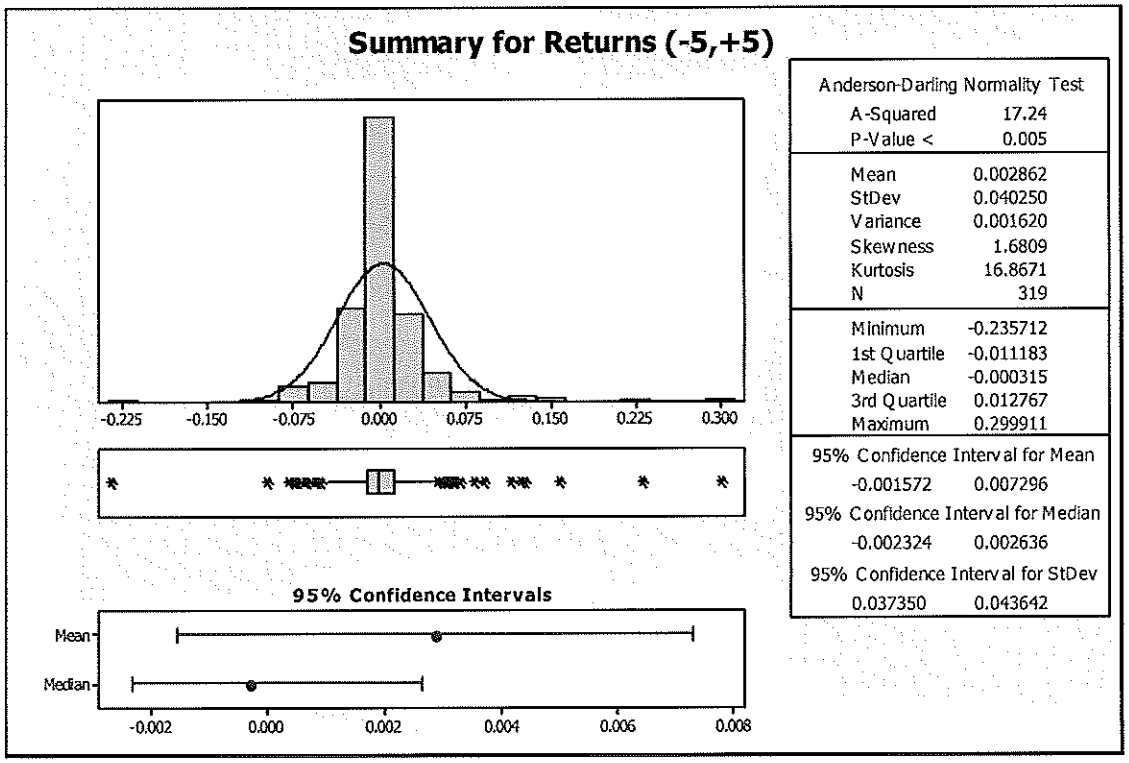


Figure 16: Statistical inference of returns

[62] Longin (1996): *The Asymptotic Distribution of Extreme Stock Market Returns*

[63] Nassim Nicholas Taleb (2007): *The Black Swan: The Impact of the Highly Improbable*

As we can see from the return plot in figure 16, our sample of 319 returns for the cash-financed repurchases shows some deviation from the normality distribution (blue line). As the table suggests, a relative high kurtosis of 16.87 suggests a "peak" around zero in the sample, which can be confirmed visually. The probability plot on the next page verifies this, since one can distinguish an S-shape. This distribution is called a leptokurtic[64] distribution.

A positive skewness suggests that the distribution is right-tilted, and the x-axis suggests that we have more extreme positive returns than extreme negative returns. In addition one can see that there are too few returns in the range of +/- 3-7 % on both sides of the distribution, comparing to the ideal normality plot.

However, the limitations listed above do not undermine the validity of the T-tests to a large extent. In addition, T-tests are widely used for statistical testing of stock returns even though there are minor weaknesses. This implies that there are few good alternatives and/or the problems associated with non-normality are outweighed by the benefits of the test.

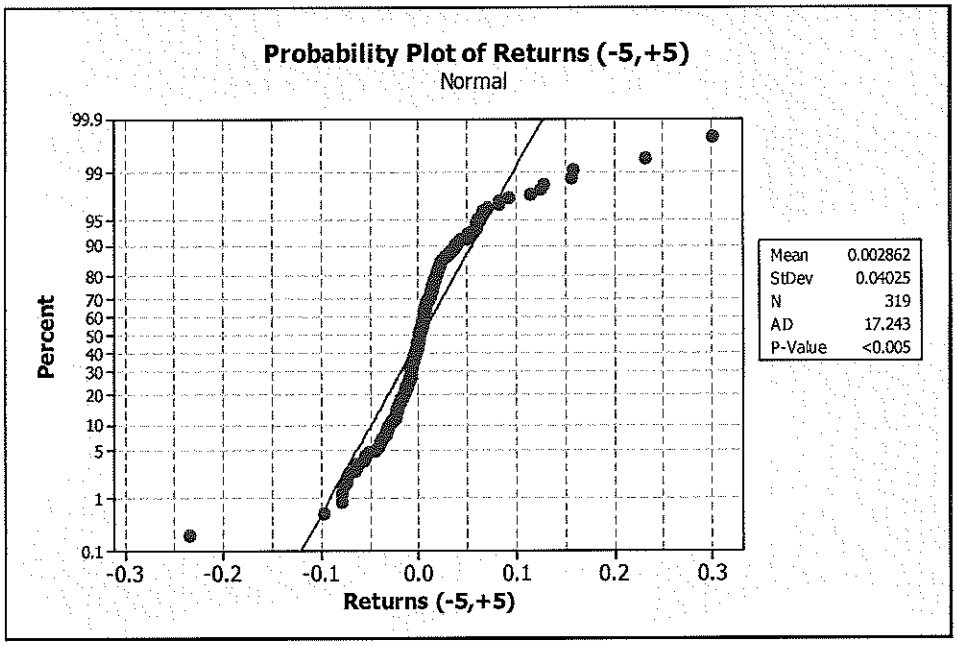


Figure 17: Normality plot

[64] *(Def.) A distribution having kurtosis, B_2, greater than 3, that is; more heavily concentrated about the mean than a normal distribution.*

7. LIMITATIONS AND PROPOSALS FOR FURTHER RESEARCH

In the previous sections, the results and several robustness tests have been presented. This section will deal will possible weaknesses and limitation to our study, while also suggesting possible future research on debt repurchases. The limitations of the findings in this paper can be defined as specific to the subject (data material) and technicalities (methods used). The respective limitations, their possible influence and solutions will hereby be presented.

7. 1 POSSIBLE DATA SPECIFIC LIMITATIONS

As mentioned in section four, the date of the repurchase could be inaccurate. In a perfect data set, the event date should represent the definitive date that the whole market can access and trade the equity on equal information. However, since market players are active in both the bond and equity market, leakages can occur. For example, a company that hires a financial advisory firm can expect that the financial advisors conduct research and cooperate with all stakeholders. Thus, market participants can receive information at different times. The implication for the results is that abnormal earnings are "smoothed" out, as some of the market participant's trade on the repurchase information prior to the public announcement. If the event studies indicate positive (negative) earnings on the event day, the actual abnormal earning on that day could have been higher (lower), and thus carry a higher significance.

Another problem partly assessed in the data section is the distinction between cash/asset sale financed repurchases (*clean events*) and different sorts of debt or equity financed transactions (*unclean events*). For example, a company could have raised equity or issued bonds in the second quarter and repurchased debt in the third quarter with the proceeds from the corporate actions in the second quarter. In the selection process used in this paper, this would count as a "clean event"; but in reality it would be an "unclean" event.

7. 2 POSSIBLE TECHNICAL LIMITATIONS

The main limitation with regard to methods used is that all calculations are based on historical data. Stock returns and volatility could be misleading with regard to actual Alpha and Beta, which in turn could produce wrong abnormal returns. There are few ways to overcome this problem, which is common in financial research. One possibility could be to use some sort of weighting, and give data close to the event date a higher weight than other data. However, it is by no means clear whether this would improve the accuracy of the event study. The event study method is in line with the recommended approach outlined in MacKinlay[65], which implies that this is a satisfying way to handle an event study given that one only has historical data.

A second limitation is the sheer number of events. The results are to a large extent insignificant, which could improve if one had access to a more samples. Given that the Norwegian bond market is small, it could be wise to include other Nordic countries to increase the sample size. One can argue that the number of "clean" events should have been higher, thus lowering the threshold for accepting an event as pure cash financed. On the flip side; by keeping the standards high the results will be more accurate with regard to CAR at the price of lower significance. A longer time horizon for collecting events (i.e. the period 1988-2008) could be useful, but given that the access to reliable historical bond data is limited, this was not possible. However, the sample size satisfies the formal criteria, and several of the statistical results are close to being significant.

[65] MacKinlay (1997)

7. 3 FURTHER RESEACH

The consensus of papers on corporate debt repurchases is that historically, research emphasis has been placed on equity rather than debt. In the literature corporate finance students are exposed to as of today, debt is considered a "fixed" claim, with its valuation in the second hand market virtually irrelevant to the management. Since the average debt-to-equity ratio in developed markets is between 40 % (U.S.) and 90 % (Japan)[66], one would assume that corporate debt actions are of a high importance. Going forward, one can assume that the capital structure research in the coming years will be shifting more towards debt, since many corporations find themselves overleveraged in the present unstable corporate environment.

A more concrete research proposal would be to analyse the bond markets and pricing across countries. In addition, a focus on smaller and emerging bond markets would be beneficial, since most papers and research on the area focus on the U.S. bond market alone. As the bond markets in the Nordic countries develop, and the costs of investing and trading in bonds fall, this market could become attractive as a supplement or alternative to equity investments.

Within the area of corporate debt, there seems to be little empirical studies or papers on the valuation of the remaining debt following a repurchase of parts of the outstanding debt. There are many theoretical cause-effect relationships in this particular field, and empirical results within this area could be interesting. The valuation of residual debt is also a part of the discussion on debt tender strategies and the conflicts of interest between groups of stakeholders.

[66] Article available at:
http://articles.moneycentral.msn.com/Investing/MutualFunds/bonds-that-beat-stocks.aspx?page=all

8. CONCLUSION

This paper examined whether companies that buy back parts of their outstanding debt generate abnormal stock returns. Structurally, the paper started out with a review of theory, methodology and the data selection process. Then the results were presented, and several robustness tests performed and contemplated upon. Data material for the study consisted of 104 events, out of which 30 were financed out of cash from operations or asset sales, while the remaining were debt financed.

The reviews of relevant capital structure theory and comparable event studies gave few clear answers with regard to what one could expect. Based on theory on capital structure, there is no clear rationale behind a repurchase. From the literature, tax, price and signalling incentives emerged as the main causes for repurchasing debt. Studies suggested that there is a difference between debt being "rolled over", which means that new debt replaces old debt, and repurchases financed out of cash from operations or asset sales. We incorporated this into our spreadsheet models and presented our results with this in mind.

Using an event window of one day prior to and three days after the event (-1, +3), the 30 cash-financed repurchases produced a significant average CAR of *3.70 %*. Repurchases financed with debt, resulted in an insignificant CAR of *0.48 %*. With an event window of (0, +3) the CARs for cash and debt financed repurchases was *3.32 %* and *0.54 %*, respectively. An event window of (-1, +1) return values of *1.87 %* and *-0.04 %*. In all these results, the cash-financed CARs where significant at 90 % level, while all debt-financed repurchases where statistically insignificant. A standardization of input parameters gave CARs of 2.79 % for the cash-financed repurchases, and 0.68 % for the whole sample. However, the standardized results were not statistically significant. A comparison of CARs following repurchases performed before and after the stock market peaked, gave some interesting results which suggest that repurchases in a declining market produced high cumulative abnormal return.

Based on our findings, we can conclude that the event study suggests that debt repurchases financed with cash from operations and asset sales can be value creating events for shareholders.

However, the sample size is relatively small, which means that strong conclusions cannot be drawn.

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Newsweb

A service provided by The Oslo Stock Exchange that collects all public information provided by the companies listed on the exchange. This service was used extensively in this thesis.
An example is Golden Ocean´s notice to buy back debt: http://www.newsweb.no/newsweb/search.do?messageId=230303

Hegnar.no

This is a Norwegian page for stock related news. It´s searching properties was used to a large extent to find stories containing debt repurchases.
An example is a comment from an analyst concerning Golden Ocean´s repurchase:
http://www.hegnar.no/bors/article362955.ece

10. APPENDIX

10.1 COMPANIES INCLUDED IN EVENT STUDY

Ticker	Name of company
ADRL	Ability Drilling ASA
AKER	Aker ASA
BLU	Bluewater Insurance ASA
BWO	BW Offshore Limited
DNBNOR	DnB NOR ASA
DOF	DOF ASA
EID	Eidsiva Rederi ASA
FOE	Fred. Olsen Energy ASA
GOGL	Golden Ocean Group ASA
HNA	Hafslund ASA
IGNIS	Ignis ASA
IMSK	I.M. Skaugen ASA
KOG	Kongsberg Gruppen ASA
NEC	Norse Energy Corp. Limited
NHY	Norsk Hydro ASA
NOR	Norwegian Energy Company ASA
NORGAN	Norgani ASA
NSG	Norske Skogindustrier ASA
OCR	Ocean Rig ASA
ODF	Odfjell ASA
OLT	Olav Thon Eiendomsselskap ASA
ORK	Orkla ASA
PGS	Petroleum Geo-Services ASA
ROGG	SpareBank 1 SR-Bank ASA
SIN	Sinvest ASA
SONG	Songa Offshore ASA
STB	Storebrand ASA
STP	StepStone ASA
TEL	Telenor ASA
WWI	Wilh. Wilhelmsen ASA

10.2 THEORETICAL VALUE OF A REPURCHASE FINANCED WITH DEBT

Assumptions:

- Old debt carries a 10 % coupon, three years to maturity.
- New debt carries a 5 % coupon, three years to maturity.
- New alternative cost of debt is 5 % = coupon = discount rate

	NPV	1	2	3
Old debt	1.1362	10%	10%	110%
New debt	1.0000	5%	5%	105%

NPV value of old debt using the new 5 % discount rate is 1.1362 times the face value. To repurchase the old debt, the firm has to pay a premium of 13.62 % to existing bondholders. Assuming they will finance the issue using the proceeds from an issue of a new bond, one can show that the theoretical value of this transaction is zero.

If the old debt has a face value of 1000, the price of the debt is 1136.2. If the new bond have a face value of 1000, 1.1362 new bonds @ 5 % coupon have to be issued.

	NPV	1	2	3
Old debt	1,1362	100	100	1,100
New debt	1,1362	57	57	1,193[67]

As one can see, the NPV value of these cash flows is similar. Thus, the price of one old bond equals the proceeds of 1.1362 new bonds. The NPV value year-by-year is as follows:

NPV	**Coupons**	**100**	**100**	**100**
272.32	∑	95.24	90.70	86.38
	Coupons	**57**	**57**	**193**
272.32	∑	54.10	51.53	166.70

As one can see, the net present value of both cash flows is equal to 272.32 (which are 136.16*2).

[67] Terminal value = Accumulated interest + Face value = (1000 * 5 % * 1.1362) + (1000 * 1.1362)

10.3 BOND VALUATION FORMULA

The general formula for valuation of a bond is as follows:

$$P_c = \sum_{t=1}^{m} \frac{C}{u^t} + \frac{F}{(1+r)^T}$$

The fair price of a straight bond (a bond with no option or call features) is determined by discounting the expected cash flows.

Cash flow:

C: Periodic coupon payments, each of which is made **n** times

F: Face or par value; which is payable at maturity of the bond after **T** years.

Discount rate:

r: The required (annually compounded) yield or rate of return

m: The number of coupons to be paid over the remaining lifetime of the bond, i.e. **n** times **T**.

u: (1+**r**)^(1/**n**) (i.e. an interest accumulation factor over one coupon period.)