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Share repurchase announcements and abnormal returns for Swedish listed real estate companies

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Abstract

Asymmetric information in the management-investor relationship implies that the management's actions will give signals to investors. According to the signalling hypothesis, an announcement of a share repurchase program is interpreted by investors that the management is putting its money where its mouth is, i.e. signalling that the stock is currently undervalued. Using the event study methodology to analyze share repurchases of listed Swedish real estate companies, we find significant short-term abnormal returns of 1,96% on the announcement day and cumulative abnormal returns of 2,32% (although not significant on conventional levels) for the ten first days subsequent to the announcement. At the most fundamental level of corporate finance theory, the Efficient Market Hypothesis stipulates that the whole value of the announcement should be discounted in the stock price immediately. On the other hand, it might be rational for investors to await certainty that the share repurchase program will be executed, before discounting its full value. We find indications of underreaction as the analysis suggests long-term positive stock price reactions to the announcement. The Jensen's alpha approach utilized in the long-term analysis suggests an average abnormal return of 10,30%, although insignificant on conventional levels, the year following a share repurchase announcement. From a stock investor point of view, the results from this study suggest that buying real estate stocks that announce share repurchase programs can yield positive abnormal returns for investment horizons of 10 days as well as 12 months.

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Lars Axelsson and Philip Brissman

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1 INTRODUCTION

As a means of employing excess cash, firms may either let it stay in their own treasury, seek new investments, or distribute excess cash to stock owners either directly through dividends or indirectly by repurchasing own shares. These different strategies of handling the distribution of excess cash have historically shown different degrees of efficiency and discrepancy in the performance of total returns to stockholders has been observed (Leimdörfer, 2010). As a consequence of this, companies employ different styles of distributing excess cash to stock owners in order to best satisfy the stock owners.

It has been shown that the fraction of companies that choose a dividend payout strategy has decreased, whereas the fraction that chooses to employ a stock repurchase program has increased steadily over the last 20 years in the U.S (Grullon & Ikenberry, 2000; Grullon & Michaely, 2002). One of the most important factors influencing this action is the signalling that is linked to repurchasing of own shares (Ikenberry, 1995). The theoretical principal-agent framework (see e.g. Eisenhardt, 1989) says that when one party is more informed (the agent) and the other less informed (the principal), actions of the agent can signal to the principal something that he did not yet know. Applying this framework to companies' actions implies that whenever a company (agent) chooses to repurchase own shares, it also signals to the investors (principal) that the stock is currently undervalued.

One of the most commonly used answers to why firms undertake this action of repurchasing their own shares lies within top management's valuation of the stock, or more correctly higher expected future earnings, compared to the current stock price. Other factors influencing the repurchase of shares are acquisition defence strategies and capital structure rearrangements (Ikenberry et al., 1995). The action of repurchasing shares to change the capital structure is done to reach a more appealing debt-equity ratio, hopefully leading to a higher valuation of the company. However, the foundation of the influential theoretical framework of Modigliani and Miller states as one of their main pillars that, under their market simplifications¹, the valuation of a company should be independent of their capital structure. Regardless of the findings in Modigliani and Miller, increases in share repurchases as a means to reach a desired capital structure has been observed across Europe, suggesting that this trend has grown in importance (Haw et al., 2011).

The frequency of companies that utilize share repurchase programs varies across Europe, depending on the jurisdictional allowances and traditions. Prior to year 2000, this action was not allowed for Swedish companies but since early March year 2000, Swedish companies have been allowed to repurchase their own shares (Tivéus, 2000). Since then, a majority of the companies on the Stockholm stock exchange have chosen to exercise this option and the sector that has been most frequent in repurchasing is the real estate sector.

Research in the U.S. and Canada has shown strong support for existence of long-term abnormal returns following repurchase announcements (e.g. Lakonishok and Vermaelen, 1990; Ikenberry et al., 2000; Chan et al., 2007; Yook, 2010). However, financial

¹ The assumptions include tax neutrality, no transaction costs, no bankruptcy costs, symmetric information and efficient markets. See section 2.3.

econometricians (e.g. Kothari et al., 2006) disagree whether there are any abnormal returns or if the observed abnormal returns stem from either mispricing or a lack of sufficiently sophisticated measurement tools.

Research on share repurchases has been executed on stocks as well as REITs and closed-end funds (Porter et al., 1999). Prior research on stock repurchases in Sweden has looked at the Swedish stock exchange as a whole and mainly focused on the short-term effects of share repurchases (e.g. Peterson et al., 2003; deRidder, 2005; Carlsson & Forsberg, 2008). The most repurchase intensive sector in Sweden is the real estate sector. The fact that real estate companies' discount or premium to Net Asset Values² (NAV) are easy to calculate and that they have relatively high leverage compared to other companies make them especially tailored for share repurchases (Leimdörfer, 2002). As prior research has analysed all industries combined, potential abnormal returns might depend on the real estate companies' overrepresentation. By analysing the real estate companies separately, which is done by comparing returns for share repurchasing real estate companies with non-repurchasing real estate companies, this bias can be removed.

Also, real estate companies are interesting from a valuation point of view, as real estate companies are more straightforward to value compared to most other types of companies. This makes real estate companies especially suitable for event studies, as investors will likely discount the value of the information to a greater extent for more "correct" valued stocks in comparison to stocks that are difficult to value.

Moreover, prior Swedish studies have mainly focused on the short-term effects following the repurchase announcements (e.g. deRidder, 2005; Carlsson & Forsberg, 2008). From a sustainable shareholder point of view, the long-term performance is equally important and therefore of interest in this study. Therefore, this study adds to prior research by analysing listed Swedish real estate companies separately. Furthermore, this study contributes by looking at the short-term as well as the long-term stock performance following share repurchase announcements.

1.2 DISPOSITION

This first chapter has given a brief introduction to share repurchases and prior scholarly research in the field. Also, the justification for our research has been presented in this first chapter. The rest of the thesis is organized as follows: Chapter 2 gives a brief introduction to the theoretical framework that research in the field is based on. In the third chapter, the findings of previous research on share repurchases are summarized in a literature review. Chapter 4 discusses, motivates and explains in depth the methodology used for the data analysis. Also in this chapter, four hypotheses are formed and presented. Chapter 5 presents and describes the data utilized for the research. In chapter 6, the results from the data analyses are presented. Moreover, the hypotheses are answered in the latter part of this chapter. The

² The Net Asset Value (NAV) of a real estate company is the value of its total assets less its total liabilities. Premium to NAV exists when the market capitalization of the stock exceeds the NAV, and discount exists when NAV exceeds the market capitalization.

seventh and last chapter in this thesis contains the conclusions of the study and suggestions for future research.

2 THEORETICAL BACKGROUND

To understand the concepts behind the hypotheses in the literature review (i.e. section 3) a theoretical background is needed. The scholarly works about share repurchase announcements and the associated abnormal stock performance have their foundation in a theoretical framework principally based on *the Efficient Market Hypothesis*, *the Principal-Agent Problem* and *the Modigliani-Miller Theorem*.

The Efficient Market Hypothesis is relevant as the stock price effects of corporate events are closely linked to market efficiency. Asymmetric information in the investor-management relationship that is reduced when a share repurchase program is announced makes the Principal-Agent Problem relevant. The capital structure effects that share repurchase announcements are associated with clarifies the relevancy of the Modigliani-Miller Theorem.

2.1 THE EFFICIENT MARKET HYPOTHESIS

Stemming from the findings in the article *Capital Asset Prices - A Theory of Market Equilibrium Under Conditions of Risk* by Sharpe (1964), Fama (1970) founded his influential theoretical framework of efficient markets, in which he stated that whenever supply equals demand, i.e. when the market is in equilibrium, all market information will be discounted in the current price of an asset. Moreover, Fama (ibid.) suggested that depending on the amount of market information prevailing, who has access to it and the pace at which the market discounts new information sets the degree of market efficiency. The market efficiency may either be weak, semi-strong or strong.

In the weak form of market efficiency, only historical performance of the asset is discounted in the current price of the asset (Fama, 1970). However, Lo et al. (2000) argue that technical analysis of stock price movements reveals patterns (e.g. “head and shoulders” and “double bottom”) which at least to some extent have predictive power about future price movements.

In the semi-strong degree of efficiency, all publicly available information is discounted in the current price of an asset. On the other hand, Malkiel (2003) argues that, even though the market is relatively efficient, abnormal returns may come from irrational pricing by the market’s participants. It has e.g. been shown that companies with similar tickers have high intercorrelation (Rasches, 2001) and companies including dot com in the company name during the last years of the dot-com era (Cooper et al., 2001) showed positive abnormal returns even if the companies’ connections to the dot-com industry were vague.

When there are no costs for gathering information, and all information – including insider information – is costless and readily available to all market participants, a market is said to be in its most efficient state. At this stage of efficiency, prices are unpredictable and follow a *random walk* (Malkiel, 1973). This means that no analyses can help investors achieve ex-ante risk adjusted positive abnormal returns by selecting undervalued stocks (Malkiel, 2003). However, in the recent decade, behavioural finance studies have started gaining in credibility amongst academics and have produced results that indicate that there is sufficient evidence for short-run momentum trading, which rejects the random walk hypothesis (Lo & MacKinley, 1999). It is moreover claimed that this stage of full efficiency is strictly a theoretical framework (Grossman & Stiglitz, 1980) and that these patterns are not predictable from

period to period, as the different patterns (e.g. The January effect) diminish after the market tries to trade on an already recognized historical pattern (Malkiel, 2003, p. 22).

The Efficient Market Hypothesis' supposition of the market's immediate discounting of information is the basis to studies of stock price reactions surrounding corporate events.

2.2 THE PRINCIPAL-AGENT PROBLEM

The principal agent problem has some different implications depending on the nature of the problem at hand. The problem has its foundations in two parties, a principal (less informed) who wants an agent (more informed) to complete a task. However, there are some problems surrounding this partnership, such as goal conflicts, conflicts of interest, limitations in ability for the principal to monitor the agent and asymmetric information between the parties (Eisenhardt, 1989; Ross, 1973).

The principal-agent problem is pertinent in the stockholder/investor relationship and the firm's management in a series of situations. Agency theory assumes management (agents) to act in their own interest and asymmetric information between management and shareholders (principals). Substantial research on share repurchases has focused on implications of the principal-agent problem, and different explanations to abnormal stock returns have been presented. Asymmetric information and the signalling effect are at the heart of most explanations to abnormal stock performance. The other highly relevant principal-agent aspect is that conflicts of interest between shareholders and management as well as between shareholders and debt holders result in agency costs (Jensen and Meckling, 1976).

2.3 THE MODIGLIANI-MILLER THEOREM

In corporate finance the Modigliani-Miller Theorem is a keystone. Based on four distinct results from a series of papers starting in 1958, the findings contribute to the financial research in a number of ways. In absence of tax non-neutrality, transaction costs, bankruptcy costs, asymmetric information and under efficient markets the following four propositions are valid (Modigliani and Merton, 1958; Miller and Modigliani, 1961; Modigliani and Miller, 1963; Miller, 1977). Firstly, the debt-equity ratio does not affect the market value of a firm. Secondly, the weighted average cost of capital is not affected by the leverage of the firm. Thirdly, a firm's dividend policy does not affect its market value. Fourthly, equity-holders are indifferent between a firm's financial strategies. In other words, if the stated assumptions hold, the value of a firm is not affected by the firm's financial decisions. For that reason, the theorem is also known as the Capital Structure Irrelevance Principle.

Miller (1991) explains the arguments behind the theorem with the following classical analogy:

"Think of the firm as a gigantic tub of whole milk. The farmer can sell the whole milk as it is. Or he can separate out the cream, and sell it at a considerably higher price than the whole milk would bring (selling cream is the analog of a firm selling debt securities, which pay a contractual return). But, of course, what the farmer would have left would be skim milk, with low butter-fat content, and that would sell for much less than whole milk (skim milk corresponds to the levered equity). The Modigliani-Miller proposition says that if there were

no cost of separation (and, of course, no government dairy support program), the cream plus the skim milk would bring the same price as the whole milk.” (Miller, 1991, p. 269)

Criticism of the theorem has focused on the assumptions and the illusiveness of them, as they do not correspond to the reality of the markets. However, the most substantial impacts of Modigliani and Miller’s work have been to understand the implication of the assumptions and relaxation and violation of each assumption. Miller (1989, p. 7) insists that “*showing what doesn’t matter can also show, by implication, what does.*”

The implication of the Modigliani-Miller Theorem in the research on share repurchases is primarily focused around two different aspects; the capital structure irrelevance, and the perfect substitution between dividends and share repurchases.

3 LITERATURE REVIEW

Research in the field has been focused around different explanations to why abnormal stock returns for share repurchasing firms should be observable. A range of hypotheses have been tested as the research within the field has progressed, and principally all are based on the theories discussed in section 2. The most established hypotheses are discussed below, namely; the personal tax hypothesis, the exchange option hypothesis, the straddle hypothesis, the agency cost hypothesis, the leverage hypothesis, the signalling hypothesis and the underreaction hypothesis.

The most cited article in the field, i.e. Ikenberry et al. (1995), put the main foci on the signalling and underreaction hypotheses. Therefore, the hypotheses of main focus in this study are the signalling and underreaction hypotheses.

3.1 HYPOTHESES IN PRIOR RESEARCH

The personal tax hypothesis explains abnormal returns by the advantage of lower tax rates for capital gains than for dividends, why distribution of capital through share repurchases rather than dividends is more favourable. In Sweden, the tax rates are similar but the personal tax hypothesis still holds because of the double taxation effect that comes with dividends. Masulis (1980) confirms the personal tax hypothesis, but Vermaelen (1981) argues that a possible tax effect is too small to explain the abnormal return.

Adams et al. (2007) suggest that abnormal performance for repurchasing firms can be explained by the exchange option hypothesis. Asymmetric information between insiders (management) and outside investors can be exploited by announcing a coming repurchase program, which creates an option, but not an obligation, to repurchase shares. This option increases possible investment opportunities for the company by authorizing management to in the future execute the repurchase program if their inside information signals repurchase benefits for their shareholders. If a company announces a repurchase program with the purpose to create an exchange option, a plausible expectation is that many repurchase options should not be exercised (Adams et al., 2007). According to Adams et al. (ibid.) most repurchase programs are in fact never executed, why the exchange option hypothesis should hold as an explanation to positive market reactions to an announcement. Among the Swedish listed real estate companies, however, the repurchase announcements are almost always followed by actual repurchases. Moreover, the exchange option hypothesis is almost identical to the more accepted signalling hypothesis, which is discussed later in this section. Consequently, the exchange option hypothesis is not considered in more detail in this study.

A related hypothesis is the straddle hypothesis. As in the exchange option hypothesis, the repurchase announcement is seen as a long call option on the company's stock. Together with the long put option that companies have, that is the opportunity to issue shares, a possible straddle position is created. This position makes possible for managers to repurchase shares when equity values are low and issue shares when equity values are high, thus exploiting the asymmetric information between insiders and outsiders (Baker & Wurgler, 2002). Adams et al. (2007) argue that if the straddle hypothesis is valid, then it should be possible to observe

share repurchases (exercise the long call option) in times of positive future prospects, and issuing of shares (exercise the long put option) in times of negative future prospects.

A firm's capital structure is the proportion of equity and debt. Repurchasing own shares will decrease equity, thus increasing the proportion of debt, or in other words increase leverage. Jensen (1986) argues that, from an agency theory point of view, the market value of a company is maximized when optimal capital structure occurs, that is, when the sum of agency costs of equity and agency costs of debt is minimized. Conflicts of interest between management and shareholders will, however, result in suboptimal capital structure, as management will likely prefer lower leverage to keep control of more of the cash flow. Consequently, free cash flow is a result of suboptimal leverage and should be seen as an agency cost. Given the preference of management to keep the leverage down, a stock repurchase announcement should be interpreted as an action that will reduce agency costs, as leverage will increase and approach the optimal level (Grullon and Michaely, 2000; Jansson and Larsson-Olaisson, 2010). On the other hand, if management's compensation or wealth is aligned with the stock price of the firm and the leverage is positively correlated to the stock performance, management has incentives to repurchase shares and thereby increase the leverage. Also, increased leverage comes with increased risk. In a situation where management can capitalize on good performance but owners bear the cost of poor performance, management has higher incentives than owners to increase leverage. An example of this is bonus schemes that reward the management for higher profits stemming from higher risk, but do not punish them for losses. An additional argument to why share repurchases should increase stock prices is the tax-shield effect (because of deductibility of interest payments) that is aligned with higher leverage (Peterson et al., 2003). In conclusion, this leverage hypothesis has ambiguous implications. Bohman (2006) concludes that leverage has no effect on the probability of a firm to repurchase shares, and Jansson and Larsson-Olaisson (2010) find that only firms with relatively dispersed ownership support the hypothesis that firms repurchase shares to optimize their capital structure.

At the most fundamental level of corporate finance theory, Modigliani-Miller's dividend irrelevancy theory (i.e. their third proposition) implies that there is perfect substitution between dividends and share repurchases. In other words, whether cash distribution to stockholders comes from dividends or share repurchases does not matter. Grullon and Michaely (2002) found that the difference between expected and actual dividends becomes smaller when firms spend money on share repurchases, which supports the substitution hypothesis. Moreover, Grullon and Michaely found that market reaction to dividend decreases is not significantly different from zero for firms engaged in share repurchase activities, while other firms show negative stock price reactions to dividend cuts. As a consequence, and from a signalling point of view, firms that are not completely confident about the future free cash should distribute at least a part of the cash through share repurchases today.

On the other hand, other research has shown evidence that the substitution hypothesis does not hold. Lie (2000) studied the agency costs that excess cash flows can create, and concluded that large incremental cash distribution through stock repurchases or special dividends, but not through ordinary dividends, can help mitigate these agency costs. Jagannathan et al. (2000) found that firms with more volatile cash flows, which often imply higher agency costs,

prefer share repurchases over dividends. The argument presented was that share repurchases is a more flexible way of distributing cash why the distribution of “temporary” profits is done by repurchasing shares, and dividends are increased only when management believe that earnings have risen permanently.

One interesting investment vehicle when studying share repurchases is Real Estate Investment Trusts (REIT). As REITs by U.S. legislation have to distribute 95% of profits through dividends, management has little potential of accumulating or misuse cash, which makes the agency cost hypothesis implausible (Brau and Holmes, 2006). The fact that REIT management has little decision power between distribution of cash today or reinvestment for higher future profits reduces investors’ sensitivity to differentiated taxes on dividends and capital gains. This makes the personal tax hypothesis irrelevant. According to Brau and Holmes (2006), the only traditional hypothesis that can explain positive abnormal returns associated with REIT repurchase announcements is the signalling hypothesis.

3.2 THE SIGNALLING HYPOTHESIS

Asymmetric information between management of a firm and investors on the stock market is obvious. Management’s actions will give signals about the operations to investors, and different signals can be interpreted in different ways. According to the signalling hypothesis, an announcement of the start of a share repurchase program is interpreted by investors as the management of a firm is putting its money where its mouth is, i.e. signalling that the stock is undervalued (Peterson et al., 2003). Consequently, under the signalling hypothesis companies should announce repurchase programs in times when the stock is underperforming. Yook (2010) lent support to this by showing significant negative pre-announcement returns for the 6 months prior to the announcement. However, firms do not only time repurchase programs to periods when their stock is undervalued but also to times of falling markets. In fact, deRidder (2005) showed that Swedish firms time their share repurchases to times of falling markets and thus provide their stock with liquidity in bearish times.

The signalling hypothesis is the most accepted hypothesis, and substantial research (e.g. Dann, 1981; Vermaelen, 1981; Stephens & Weisbach, 1998; Adams et al., 2007) has empirically documented positive abnormal returns following announcements of share repurchase programs. Under the assumption of efficient markets, the market’s investors should discount the new information that the announcement gives and the stock price should adjust immediately. The ensuing new stock price equilibrium should thereby fully reflect the new information. However, studying the stock performance over a longer period it is evident that there is a long term effect in stock performance following a share repurchase announcement, which means that not all new information is discounted in the price immediately. Ikenberry et al. (1995) supports the hypothesis that the market underreacts to repurchase announcements by showing that repurchasing firms show significant positive abnormal returns the years following an announcement of a share repurchase program. Jacobsen (1988) argues that abnormal returns are consequences of temporary disequilibrium in the market which in efficient markets should go back to equilibrium. However, Jacobsen showed that this is not true as abnormal returns often persist for long periods after an event.

3.3 THE UNDERREACTION HYPOTHESIS

Yook (2010) argues that the risk that the announced repurchase program will not be completed can be an explanation to the underreaction. In other words, investors know that the announcement is not a commitment from the company to repurchase shares according to the announcement. Conversely, the company may choose to buy back only a part of the shares announced (or cancel the entire repurchase program). If the short term stock price effect does not fully incorporate the entire value of the announcement, the residual value should be incorporated in the long term effect, which could be an explanation to the empirical evidence of a long term effect.

The fact that announcements have been followed by positive stock performance even when the repurchase programs never have been executed strengthens the signalling hypothesis (Yook, 2010). Claims that prior research has contained systematic errors have been raised, because earlier measurements were done regardless if the firm repurchased the announced shares or not. Therefore it is crucial to differentiate between firms that actually have repurchased share and those that have not.

In conclusion, many hypotheses to why share repurchases should be associated with abnormal stock returns have been presented. Firstly, the signals that a company's management sends to investors when announcing share repurchases, secondly, the consecutive short-term abnormal stock price effects and, thirdly, investors' underreactions that create long-term abnormal returns, are the most scrutinized and accepted explanations. Consequently, the hypotheses of regard in this thesis are the signalling hypothesis and the underreaction hypothesis.

4 METHOD

In order to arrive at the desired destination, this thesis utilizes the theoretical framework stemming from the ground breaking Fama et al. (1969) event study. Even though that study scrutinized the market reactions surrounding stock splits, it is also valid for other corporate events, and the article is still today regarded to be one of the benchmark studies within market information efficiency.

Event studies are used to analyse the effect of a corporate event or action. What an event study aims to achieve is to gauge the discrepancy between the actual performance and the expected performance of a security or portfolio if the event had not occurred. By utilizing an appropriate benchmark, such as an index or a portfolio of securities that is as similar as possible to the security or portfolio of interest, the performance of the event portfolio in the case of no event can be predicted. Any return different from the benchmark return is considered to be an abnormal return.

The obvious applicability and benefit of event studies is for investment strategies. Knowledge of abnormal returns stemmed from particular corporate events serve as important information for investors. But event studies also serve an important purpose in capital market research as a way of testing market efficiency. Abnormal returns, whether they are positive or negative, that persist after specific corporate events are inconsistent with market efficiency. Accordingly, event studies focusing on long-horizons following an event can provide key evidence on market inefficiency.

The methodologies surrounding event studies have been popular research topics for some decades now and the research within this field is considered to be mature (Kothari & Warner, 2006). Event studies are conducted to test short-term effects as well as long-term effects, where short-horizon studies typically focus on daily returns surrounding an event and long-horizon studies focus on one or a few years following an event.

4.1 BENCHMARK MODELS

Since event studies are used to find abnormal returns, it is of high importance to specify normal returns, i.e., finding an appropriate benchmark. Abnormal returns are then represented by the difference between observed returns and benchmark returns. Decades of research have been spent to identify, analyse and discuss benchmark models. Single-factor as well multi-factor models have been used. The most commonly used models are the Capital Asset Pricing Model (CAPM) and various versions of the Fama-French multi-factor models.

According to the CAPM, the risk is captured by each asset's individual beta, which is a measurement of how the asset return varies with the market as a whole (Malkiel, 2003). Beta represents the risk that cannot be diversified and is therefore the priced risk. Beta may be estimated by running an Ordinary Least Square (OLS) regression. Normally, the CAPM is defined from individual asset returns, but it can also be used on composite assets, i.e. portfolios containing several individual assets.

$$r_{pt} - r_{ft} = \alpha_{it} + \beta_{pt}(r_{mt} - r_{ft}) + \varepsilon_{it} \quad (1)$$

Where $r_{pt} - r_{ft}$ is the excess portfolio return in time period t and $(r_{mt} - r_{ft})$ is the excess return for the market portfolio.

There is a long and on-going debate whether the single-factor CAPM approach correctly describes asset returns or not. Beginning in early 1990s, Fama and French's (1992; 1993) papers that questioned whether "Beta Is Dead!" received a lot of attention amongst academics and newspapers. Fama and French (1992) provided market evidence supporting the belief that the size variable (measured as the market capitalization) and the book-to-market ratio (measured as the book value of an asset compared to its market value) explains the zero-beta returns that are above the risk-free rate. The articles clearly questioned earlier tests of the CAPM and showed two major pieces of new evidence. Firstly, firm size and the ratio of book-to-market value of equity better explains returns than CAPM beta and secondly, after controlling for size and book-to-market, the CAPM beta is insignificant. The multi-factor model proposed by Fama and French (1992) is as the CAPM originally defined for individual asset returns but is applicable for portfolios as well.

$$R_{p,t} - R_{f,t} = \alpha + \beta(R_{m,t} - R_{f,t}) + sSMB_t + hHML_t + \varepsilon_{p,t} \quad (2)$$

Where $R_{p,t} - R_{f,t}$ is the excess portfolio return in time period t , $(R_{m,t} - R_{f,t})$ is the excess return for the market portfolio, SMB_t , is the size factor, and HML_t is the book-to-market factor.

For this study, the choice between using a single-factor model or a multi-factor model is made based on the models used in the most acknowledged papers (e.g. Ikenberry et al., 1995; Yook, 2010). This means that a single-factor model will be applied for the short-horizon analysis and a multi-factor model will be applied for the long-horizon analysis.

4.2 MEASURING SHORT-HORIZON EFFECTS

As described in previous section, benchmark returns represent the expected returns for the assets if the specific event had not occurred. To calculate abnormal returns for asset i in time t , AR_{it} , for the days surrounding a share repurchase announcement expected returns, $[E]R_{it}$, are compared to actual returns R_{it} :

$$AR_{it} = R_{it} - [E]R_{it} \quad (3)$$

To analyse abnormal returns around the corporate event an appropriate event window must be specified. The event window is the desired time period before and after the specific event that is chosen for the analysis. Ikenberry et al. (1995), which is the most referenced article in the research field of share repurchases, considered a time frame of 20 days before the share repurchase announcement to 10 days after the same event. Cumulative Abnormal Returns, CAR_{it} , for asset i in different sub-periods, t , within the event-window is calculated as:

$$CAR_{it} = \sum AR_{it} \quad (4)$$

Although both short-term and long-term ARs surrounding corporate events are studied using event studies, the methodologies to apply have important and substantial differences. While

long-horizon studies are associated with methodological and statistical issues, short-horizon studies are more straightforward (Khotari, 2006; Ikenberry et al., 1995).

In the literature, a number of different methods have been used to calculate short-run expected stock returns. Ikenberry et al. (1995) propose a straightforward approach calculating abnormal returns by comparing actual stock returns and an appropriate benchmark index, simply assuming that if the event had not occurred the stock had developed as the index. In fact, they calculated abnormal performance relative to different benchmark indices but came up with principally the same results, concluding that “*when abnormal returns are calculated over such short intervals, the results are not overly sensitive to the benchmark used*” (ibid., p. 185).

The method proposed by Ikenberry et al. (1995) is known as the market adjusted model, and can be seen as a simplified modification of the market model first applied by Markowitz in the 1950s known as Modern Portfolio Theory (Elton & Gruber, 1997), and later developed by Fama et al. (1969). Even though in short-horizon tests “*risk adjustment is straightforward and typically unimportant*” (Khotari, 2006, p. 25), this thesis utilizes the acknowledged market model to consider risk:

$$R_{it} = \alpha_{it} + \beta_{it}(R_{MKT})_t + \varepsilon_{it} \quad (5)$$

Where R_{it} is the return for asset i in time period t and $(R_{MKT})_t$ is the return of the market during the same time period. By regressing these returns on the market return using the OLS regression technique, alphas, α_{it} , and betas, β_{it} , are derived, which, respectively represent the intercept (excess return of the asset compared to the risk adjusted market return) and slope (the extent to which the asset’s return varies with the market return) of the regression line.

When choosing an appropriate time period for the OLS regression, there is a trade-off between getting a sufficient amount of observations (in order to lower the standard deviation of the sample) and having as contemporary data as possible. Also, alphas and betas will not be stable over time why a tripod of trade-offs has to be considered before running the regression. The time period applied in the regressions in this thesis is daily returns for the year subsequent to the event window, which is in line with previous research.

The alpha and beta obtained from the OLS regression, as well as the market index, are then used to compute the expected return, $[E]R_{it}$, for the stock:

$$[E]R_{it} = \alpha_{it} + \beta_{it}(R_{MKT_t}) \quad (6)$$

4.3 MEASURING LONG-HORIZON EFFECTS

In contrast to short-horizon event tests, risk adjustment is critical when calculating long-term abnormal returns. Khotari and Warner (2006) argue that for a normal expected daily stock return of 0,05%, which corresponds to 12-13% annualized, an estimation error in the beta will have very small effect relative to a typical 1% abnormal return. When calculating AR over horizons of one year or more, however, such a risk misestimation can make large difference. This is due to the fact that the risk for estimation error is larger in long-horizon event studies. If the signalling hypothesis holds, the event of a share repurchase announcement should follow unusual poor prior performance. Moreover, a share repurchase program affects the

firm's capital structure. These factors make it difficult to accurately estimate risk, since historical risk estimates are based on risk situations that no longer hold. Consequently, when calculating long-term CAR, the basis for the estimation must be post-event risk (Chopra et al., 1992).

While there is consensus in the literature that long-term performance following an event must be estimated on the basis of post-event risk, different methods are proposed. The two most accepted methods are the buy-and-hold abnormal return (BHAR) method and the Jensen's alpha approach (also known as the calendar-time portfolio approach) (Khotari and Warner, 2006).

4.3.1 BUY-AND-HOLD ABNORMAL RETURN (BHAR)

The BHAR method uses the same approach as the short term event studies. First, an appropriate benchmark is identified, which represents the expected return if the event had not occurred. Second, the expected return is subtracted from the actual return which yields the AR.

The BHAR model is also known as the characteristic-based matching approach which describes the basis of what the method is developed to reach. The benchmark portfolio is assumed to be a perfect proxy of the expected return for the event portfolio, i.e., the event portfolio is assumed to differ from the benchmark portfolio only due to the event. Therefore it is crucial to match the event portfolio with a benchmark portfolio that is as similar as possible except from the occurrence of the event.

Applying this method to the share repurchase announcement issue, the following steps are taken: The event portfolio comprises all companies that have announced a share repurchase program. A company that announces a share repurchase program enters the event portfolio and stays in the portfolio for a specified time, e.g. 12 months. Through time, companies will enter and exit the portfolio which means that the number of companies included in the portfolio will vary. Every month the return of the event portfolio is compared to the benchmark portfolio, and the difference between these returns is the AR. This time series of monthly ARs are then accumulated to find yearly CAR.

Under the belief that Fama-French's three factor model adequately predicts expected returns, the event portfolio is preferably matched with a non-event portfolio with similar beta, size and book-to-market ratio. Ikenberry et al. (1995) propose an equal-weighted portfolio where firms are added to the portfolio the month following a repurchase announcement. Benchmark portfolios are created to match the same quintile ranking on market capitalization as well as book-to-market values.

4.3.2 JENSEN'S ALPHA

While in the BHAR model ARs are estimated by subtracting benchmark returns from actual returns, Jensen's alpha utilizes time-series regressions to estimate ARs. Under the Jensen's alpha approach ARs are calculated using the Fama-French three-factor regression discussed in section 4.1:

$$R_{p,t} - R_{f,t} = \alpha + \beta(R_{m,t} - R_{f,t}) + sSMB_t + hHML_t + \varepsilon_{p,t} \quad (7)$$

Monthly portfolios of share repurchasing companies are constructed. Each of the repurchasing companies enters a portfolio at the month following a share repurchase announcement and stays in e.g. 12 consecutive monthly portfolios. Portfolio returns are based on average monthly returns for all stocks included, and are equal-weighted. These portfolio returns excess of the risk-free interest rate, $R_{p,t} - R_{f,t}$, are regressed on the market return excess of the risk-free interest rate, $(R_{m,t} - R_{f,t})$, and the Fama-French factors SMB_t and HML_t .

The alpha generated from the regression represents average monthly AR, and to get annual returns the alpha value is multiplied by twelve.

4.3.3 CHOICE OF METHOD

Testing statistical significance when applying the BHAR method is difficult. First, the normality assumption used in many statistical tests does not always hold for long-horizon returns. Second, cross-correlation is a considerable problem as event firms often cluster in a few industries and event time horizons often overlap. Third, the matching of an event portfolio with an otherwise similar non-event portfolio is problematic, especially in small stock markets. Fourth, even if the event portfolio could be matched with a similar non-event portfolio, the analysis will suffer from event-induced volatility, which will discriminate them from a risk perspective (Khotari and Warner, 2006).

When analysing buy-and-hold returns it is important to remember that stock returns often suffer from skewness. Since the potential downside of a stock investment is -100% but the potential upside is unlimited, long-term stock returns tend to be positively (i.e. right) skewed. When testing significance using a t-distribution you implicitly assume normal distribution (Hurst, 1995), which creates problems when analysing skewed samples. Barber and Lyon (1997) conclude using simulations that right-skewness is true for individual long-term returns but that the skewness bias declines with the sample size. Mitchell and Stafford (2000) argue that right skewness in event firm portfolios is a result of overlapping firm observations rather than individual firm's skewness, which means that the problem is cross correlation in the data sample.

Cross-correlation is not a major problem in short-term event studies, as the events are not clustered in calendar time, and can therefore be ignored (Mitchell and Safford, 2000; Brav, 2000; Jegadeesh and Karceski, 2009; Khotari and Warner, 2006). However, cross-correlation is highly relevant for long-horizon event studies. According to the signalling hypothesis, firms will announce share repurchase programs in times of undervaluation. For real estate companies, that is typically when the stocks are trading at a larger discount-to-NAV than normal. This will lead to clustering of the events in time which creates potential cross-correlation bias. As Yook (2010, p. 325) claims *"the crosscorrelation problem arises because matching on the basis of several firm-specific characteristics cannot completely remove the correlation between event firm's returns."*

Mitchell and Stafford (2000) argue that the BHAR method assumes that the multiyear returns are independent, and show that they are in fact positively cross-correlated. Therefore, they suggest a methodology that takes this dependence into consideration, such as the Jensen's alpha. On the other hand, Barber and Lyon (1997) argue that the BHAR method should be

preferred on conceptual grounds as this method most precisely simulates a reasonable investment strategy.

Khotari and Warner (2006) as well as Yook (2010) argue that the choice between the two methods should depend on the data set available and the possibility to accurately handle the statistical issues.

A potential solution to cross-correlation bias is to set up calendar-time portfolios, i.e., use the Jensen's alpha approach. As the t-statistics for the intercept is based on the time series variability in the residuals for the portfolio returns, regardless of the correlation among the individual stock returns, the method accounts for that correlation.

Earlier research has focused on markets with large data availability, that is, stock exchanges with many stocks. As this study look at the Nasdaq OMX Stockholm Stock Exchange and its listed real estate companies specifically, the reality is that the data sample is limited. As a result, it might not be feasible to expect statistically significant results even if large ARs exist. Consequently, the authors will apply an accepted empirical method constructed for larger data samples, namely Jensen's alpha, and as a complement a straightforward method based on average abnormal returns and regression intercepts. The BHAR method will not be applied.

4.3.4 THE METHOD APPLIED

Using the Jensen's alpha approach, monthly portfolios between September 2005 and June 2009 have been constructed. Each stock enters the portfolio at the month following a share repurchase announcement and stays in the portfolio for 12 months. Firms that announce a new share repurchase program earlier than 12 months after the first announcement stays in the portfolios until the 12th month after the second announcement. Portfolio returns are based on average monthly returns for the included stocks, and are equal-weighted.

$$R_{p,t} - R_{f,t} = \alpha + \beta(R_{m,t} - R_{f,t}) + sSMB_t + hHML_t + \varepsilon_{p,t} \quad (8)$$

Using the portfolio time series returns, $R_{p,t}$, the 1-month T-bill, $R_{f,t}$, the market benchmark, $R_{m,t}$, and the Fama-French factors Small-Minus-Big, SMB_t , and High-Minus-Low, HML_t , a multivariate OLS regression have been executed. The generated intercept, α , shows the average monthly AR for the event firm portfolios.

Previous literature has looked at different event window horizons. Ikenberry et al (1995) looked at periods 1-4 years subsequent to the announcement, while Yook (2010) used 1-3 years. In order to cover as many repurchases as possible, and due to the fact that many repurchases occurred late in the applied study period, the event window horizon applied in this study is 12 months.

As a result of the limited data sample the first portfolios include only one stock, which risks creating sample selection bias. Therefore, we also estimate individual alphas for all securities in the portfolio and calculate the average of all individually estimated alphas since 2005. The average alpha then represents the average monthly AR following a share repurchase announcement, which is annualized by multiplying the monthly AR by 12.

To test if potential AR is a result of real estate companies outperforming the market rather than positive effects of share repurchases, a benchmark portfolio containing all non-repurchasing firms is created. All real estate companies that have not previously repurchased shares are included, meaning that share repurchasing companies are included in the portfolio before the announcements of share repurchase activities. However, share repurchasing companies that have employed share repurchase programs earlier, no matter the time elapsed since the announcements, are not included. The motivation to this is that previous research has shown evidence of abnormal returns over periods of up to four years subsequent to an announcement. Based on the Jensen's alpha approach, alphas representing abnormal returns are generated. If the hypothesis that share repurchasing companies are outperforming other firms holds true, the alpha for the benchmark portfolio should be lower than the portfolio of share repurchasing firms.

4.4 HYPOTHESIS TESTING

Prior research within the field has pointed toward a few aspects that are of interest in this thesis as well. Since this study includes both the short-run performance and the long-run performance, it is of equal interest to test hypotheses for both time horizons. Two hypotheses for the short-horizon and the long-horizon respectively have been formulated and are presented below.

4.4.1 HYPOTHESIS 1

One of the hypotheses concerning share repurchases is the undervaluation hypothesis, which states that management will announce share repurchase programs to signal that the stock is undervalued. If this holds true it would mean that the period prior to the announcement should show negative AR. Therefore, the first hypothesis can be formed as:

The period prior to a share repurchase announcement show negative abnormal stock returns.

$$H_0: \overline{AR}_{T-20 \text{ to } T-1} = 0$$

$$H_1: \overline{AR}_{T-20 \text{ to } T-1} \neq 0$$

Where $\overline{AR}_{T-20 \text{ to } T-1}$ is the average daily abnormal return for the 20 days before the event.

4.4.2 HYPOTHESIS 2

If the signalling hypothesis holds, share repurchasing companies should see positive stock price reactions to share repurchase announcements. Previous research has shown positive ARs at the announcement day, and the subsequent few days. Therefore, the second hypothesis is stated as:

The announcement of a share repurchase program will generate positive abnormal returns at the announcement day and the subsequent few days.

$$H_0: \overline{AR}_{T \text{ to } T+10} = 0$$

$$H_1: \overline{AR}_{T \text{ to } T+10} \neq 0$$

Where $\overline{AR}_{T \text{ to } T+10}$ is the average daily abnormal return for the event day and the subsequent 10 days.

4.4.3 HYPOTHESIS 3

The prevailing market information, including any insider information, shall under the efficient market hypothesis's strongest form be fully discounted in the price of an asset. Accordingly, the value of the information in a share repurchase announcement should be discounted in the stock price immediately. On the other hand, the market might entirely rational discount the value of the announcement gradually until it is evident that the repurchase program will be undertaken. In fact, substantial research has shown that the market underreacts and does not discount the information fully, which leads to positive ARs in the long-run. The third hypothesis is as follows:

Share repurchasing companies show positive abnormal stock returns the year following a share repurchase announcement.

$$H_0: AR_{\text{first year following announcement}} = 0$$

$$H_1: AR_{\text{first year following announcement}} \neq 0$$

Where $AR_{\text{first year following announcement}}$ is the abnormal return for the 12 months subsequent to a share repurchase announcement.

4.4.4 HYPOTHESIS 4

To test if potential long term AR is a result of real estate companies outperforming the market rather than positive effects of share repurchases, AR for non-repurchasing real estate companies is also calculated. If share repurchase announcements are followed by positive long-term AR, a portfolio containing all companies that within the last year have announced a share repurchase program should outperform a portfolio containing non-repurchasing companies. Therefore the fourth and final hypothesis is as follows:

Share repurchasing companies outperform non-repurchasing companies the year subsequent to a share repurchase announcement

$$H_0: AR_{\text{Repurchasing companies}} = AR_{\text{Non-repurchasing companies}}$$

$$H_1: AR_{\text{Repurchasing companies}} \neq AR_{\text{Non-repurchasing companies}}$$

Where $AR_{\text{Repurchasing companies}}$ is the abnormal return for the 12 months subsequent to the share repurchasing companies' announcement, and $AR_{\text{Non-repurchasing companies}}$ is the abnormal return for non-repurchasing companies for the corresponding period.

4.5 SIGNIFICANCE TESTING

In order to test the presented hypothesis statistically we perform significance testing of the estimated ARs and CARs. For smaller-size samples, it is considered sound practice to use a distribution similar to the normal distribution, preferably the t-distribution (Freund & Perles, 2007). The t-distribution has essentially the same properties as the normal distribution, but it takes into consideration the number of observations in the sample. For smaller-size samples,

the number of standard deviations used in order to get an e.g. 95% confidence interval is greater than for the standard normal distribution. However, the more the size of the observations in the sample increases, the fewer is the standard deviations used to reach the desired confidence interval. As the sample size goes toward infinity, the number of standard deviations used equals that of the standard normal distribution.

T-values of the estimated ARs and CARs are calculated using (Körner & Wahlgren, 2006):

$$t = \frac{\bar{x}}{\sqrt{\frac{s^2}{n}}} \quad (9)$$

Where \bar{x} is the average value of the observed ARs, s^2 is the variance within the abnormal returns, and n is the number of observations.

To test whether two means are significantly different from each other, the Student's t-test is usually applied (Newbold et al., 2010). This approach is used to test whether the portfolio of share repurchasing real estate companies is outperforming the portfolio of non-repurchasing real estate companies:

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}} \quad (10)$$

Where \bar{x}_1 is the average observation in the first sample, \bar{x}_2 is the average observation in the second sample, s_1^2 is the variance of the abnormal return in the first sample, s_2^2 is the variance of the abnormal return in the second sample, n_1 is the number of observations in the first sample, and n_2 is the number of observations in the second sample.

Under a t-test a number of assumptions are made, including that the sample follows a standard normal distribution. Daily abnormal returns have been proven to be fat-tailed in relation to the normal distribution (Brown & Warner, 1985). When the number of observations is large this tends to be a minor problem as, according to the central limit theorem, a normal standard deviation can be approximated. Normality is usually tested using an appropriate test for normality, for example the Jarque-Bera test. Applying the Jarque-Bera test on the short-term analysis as well as the long-term analysis in this study, the null hypothesis of normality cannot be rejected. However, tests for normality have been proven to systematically exaggerate normal distribution for small samples. In fact, Frain (2007) tested performance of the most used normality tests on small samples using simulations. The conclusion was that for sample sizes of 50 or lower, no normality test was satisfactory. Consequently, although the Jarque-Bera test indicates normality in the tests of this analysis one should keep in mind that small sample sizes always come with statistical problems.

5 DATA

To find the companies suitable for analysis in this thesis, a distinction of which companies that belong to the real estate sector had to be made. Having decided to use the existing indexation from the Global Industry Classification Standard (GICS) “Real Estate”, a total of 24 companies were matched. Taking this step also means only the companies that were listed by 2010-12-31 have been included in the selection, which means that the selection is discarding those companies that either no longer exists, those that have been acquired or merged into greater companies or have gone private. For companies that have two types of shares, only the most traded share is included. Furthermore, only companies listed on the Nasdaq OMX Stock Exchange were allowed in the selection. This adjustment narrowed down the number of companies to 16 and among these, 9 have been repurchasing shares at least once since the year 2000.

The two first share repurchase announcements occurred in year 2000, and the third announcement occurred in 2005. Constructing monthly portfolios from year 2000 will therefore for a long period result in portfolios including no companies. Because of this time gap, the long-term analysis focus on the period from 2005 to 2009. To see the companies included in the monthly portfolios, see Appendix 2.

To realistically compare long-term stock returns it is necessary to use total returns. Since the total return of a share consists of both appreciation return and dividends during a period, it is necessary to include the dividends in the data. That is done by simulating a reinvestment of the dividend at the day of dividend distribution. Historical data return series without the dividends already reinvested, but adjusted for stock splits and share issues, for both the non-repurchasing and repurchasing companies have been collected from Nasdaq OMX’s webpage. Thus, any dividend distribution during the event window, both in the short-run and long-run event windows, have been added manually, which has been done by simulating a reinvestment of the dividend at the ex-dividend date.

Announcement dates for share repurchase programs have been collected from respective company’s webpages and the executed share repurchases have been collected from Nasdaq OMX Nordic (2011). The retrieved data set has also been cross checked with the data from respective company’s webpage. This step is taken to secure that the data utilized is correct and relevant for the analyses.

Return data for constructing the Fama-French portfolios Small-minus-Big (SML) (i.e. the market capitalization) and High-minus-Low (HML) (i.e. Book-to-Market values) have been obtained from a database that previously has been utilized in a master thesis at the Stockholm School of Economics (Zytomierski & Poutiainen, 2010).

The benchmark representing the market portfolio is the OMX Stockholm Benchmark Cap GI, which is a value weighted gross index representing the 80 to 100 largest and most traded stocks on the Nasdaq OMX Stockholm Stock Exchange.

The risk free interest rate used in the analyses is the daily 1 month T-bill, which has been retrieved from The Riksbank (2011).

6 RESULTS

Results from the data analyses are presented for the short-horizon as well as the long-horizon.

6.1 SHORT-HORIZON ABNORMAL RETURN

The short horizon event study focuses on the 20 days before and 10 days after a share repurchase announcement.

Figure 1

Abnormal Return (AR) and Cumulative Abnormal Return (CAR) in the event window T-20 days to T+10 days

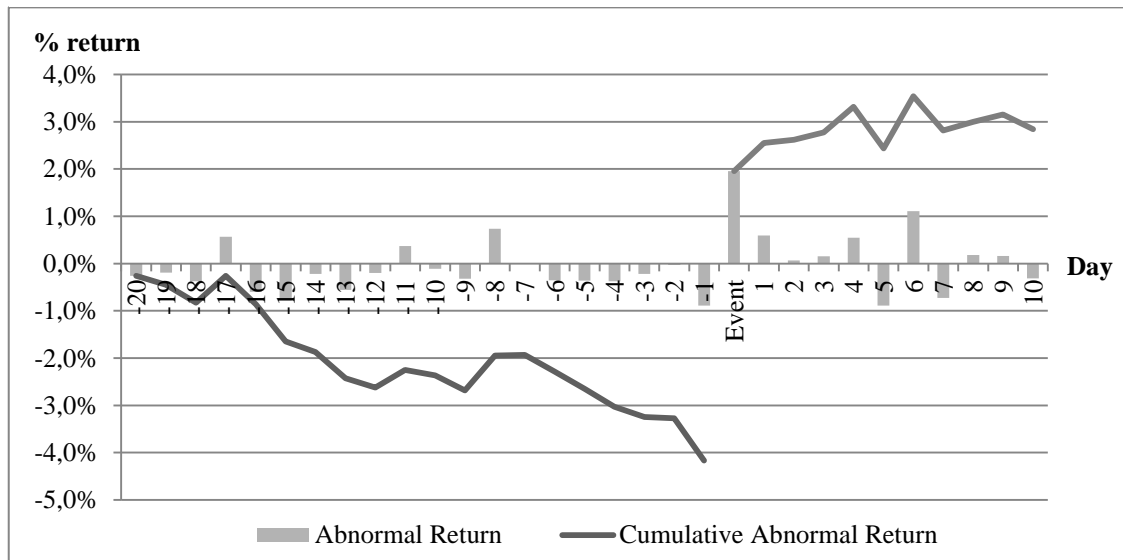


Table 1

Abnormal returns (AR) and Cumulative Abnormal Returns (CAR) for the event window T-20 days to T+10 days

| Day | AR | CAR | t-value | Stddev | N |
|-------|--------|--------|---------|--------|----|
| -20 | -0,26% | -0,26% | -0,52 | 2,14% | 19 |
| -19 | -0,19% | -0,45% | -0,43 | 1,96% | 19 |
| -18 | -0,38% | -0,83% | -0,90 | 1,82% | 19 |
| -17 | 0,57% | -0,26% | 1,52 | 1,63% | 19 |
| -16 | -0,60% | -0,86% | -2,16 | 1,21% | 19 |
| -15 | -0,79% | -1,65% | -1,90 | 1,81% | 19 |
| -14 | -0,22% | -1,87% | -0,54 | 1,78% | 19 |
| -13 | -0,56% | -2,42% | -1,35 | 1,80% | 19 |
| -12 | -0,20% | -2,62% | -0,41 | 2,12% | 19 |
| -11 | 0,37% | -2,25% | 1,06 | 1,52% | 19 |
| -10 | -0,11% | -2,36% | -0,25 | 1,93% | 19 |
| -9 | -0,32% | -2,68% | -0,87 | 1,59% | 19 |
| -8 | 0,74% | -1,94% | 1,42 | 2,27% | 19 |
| -7 | 0,01% | -1,94% | 0,02 | 2,00% | 19 |
| -6 | -0,35% | -2,29% | -0,90 | 1,71% | 19 |
| -5 | -0,36% | -2,65% | -0,60 | 2,64% | 19 |
| -4 | -0,38% | -3,03% | -1,13 | 1,45% | 19 |
| -3 | -0,22% | -3,25% | -0,51 | 1,88% | 19 |
| -2 | -0,03% | -3,28% | -0,08 | 1,72% | 19 |
| -1 | -0,89% | -4,17% | -1,58 | 2,45% | 19 |
| Event | 1,96% | 1,96% | 2,44 | 3,50% | 19 |
| 1 | 0,59% | 2,55% | 1,21 | 2,15% | 19 |
| 2 | 0,07% | 2,62% | 0,17 | 1,74% | 19 |
| 3 | 0,16% | 2,78% | 0,25 | 2,79% | 19 |
| 4 | 0,54% | 3,32% | 1,35 | 1,76% | 19 |

| | | | | | |
|-------------|--------|-------|-------|-------|-----|
| 5 | -0,89% | 2,43% | -1,56 | 2,48% | 19 |
| 6 | 1,11% | 3,54% | 2,22 | 2,18% | 19 |
| 7 | -0,73% | 2,82% | -1,74 | 1,82% | 19 |
| 8 | 0,18% | 3,00% | 0,37 | 2,15% | 19 |
| 9 | 0,16% | 3,16% | 0,43 | 1,61% | 19 |
| 10 | -0,31% | 2,84% | -0,79 | 1,75% | 19 |
| Average AR | | | | | |
| -20 to -1 | -0,21% | | -2,14 | 1,89% | 380 |
| Event to 10 | 0,26% | | 1,61 | 2,32% | 209 |

Figure 1 shows the average daily ARs for all share repurchasing companies for the period T-20 to T+10 days. For example, day T-16 shows the average AR for all share repurchasing companies 16 days before each company's respective announcement.

CARs for T-20 to T-1 and T to T+10, which are computed as the accumulated ARs for both periods separately, have been calculated. The results show mostly negative ARs for the period before the event, resulting in a pre-event CAR of -4,17% and positive ARs for the period after the event, resulting in a post-event CAR of 2,84% ten days after announcement.

Table 1 presents ARs, CARs, t-values and standard deviations for the days surrounding repurchase announcements. Looking at individual days, only T-16 and T+6 show significant ARs. However, looking at aggregated levels, the pre-event period shows average ARs of -0,21%, significant on the 95-percent level. The corresponding average AR for the event day and the days after the event is 0,26%, with a t-value of 1.61, i.e. not fully significant at conventional levels.

Ikenberry et al. (1995) report CARs for three sub-periods; T-20 to T-3, T-2 to T+2 and T+3 to T+10. The results from their analysis were -3,07%, 3,54% and 0,21% for the three sub-periods respectively, which can be compared to -2,65%, 1,55% and 0,26% for the same sub-periods in this study. The reason to look at a sub-period including both days before and after the event (e.g. T-2 to T+2) is to check for insider trading. With the knowledge that the event day should yield positive ARs, insider traders should take positive positions in the stock before the announcement, resulting in positive ARs the days before the event. The results for this sub-period show negative AR for the day before the event and strong positive AR for the event day. Hence, this study shows no evidence of insider trading at the days before the share repurchase announcements.

Hypothesis 1 aimed at testing whether or not event firms show negative average ARs prior to an announcement of a share repurchase program. As reported, the pre-event average AR is negative on the 95-percent level. Thus, the null hypothesis that the average AR is equal to zero can be rejected in favour for the alternative hypothesis that AR is negative.

The second hypothesis concerns the sign of ARs the days following a share repurchase announcement. The analyses show positive average ARs following the announcement. The event day shows AR of 1,96% statistically significant on the 95-percent level. Furthermore, the average AR for the 10 days following the event is 0,26% per day with t-value of 1,61, implying that the null hypothesis that there is no post event day AR cannot be rejected at conventional levels.

6.2 LONG-HORIZON ABNORMAL RETURN

As discussed in the method section, the long-horizon effects of share repurchase announcements is analyzed using two different methods; the Jensen's alpha approach and an average alpha approach. In this study, the long-horizon event window has been specified as the 12 months following a share repurchase announcement.

Table 2

Monthly and annual abnormal returns (AR) for the Jensen's alpha approach and the average alpha approach

| Method | Period | Monthly alpha (AR) | Annual alpha (AR) | t-value |
|-----------------------|---------------------------------|--------------------|-------------------|---------|
| Jensen's alpha | | | | |
| | 2007-12-28 to 2009-06-30 | | | |
| Share repurchasing | | 0,86% | 10,30% | 0,52 |
| Non-repurchasing | | 0,36% | 4,36% | 0,40 |
| Average alpha | | | | |
| | 2005-10-31 to 2009-06-30 | | | |
| Share repurchasing | | 1,50% | 17,97% | 3,06 |

The data covers the period 2005-10-31 to 2009-06-30. However, during the time period 2005-10-31 to 2007-12-27 the event portfolio used to estimate Jensen's alpha will include only one stock. Therefore the time period is limited to 2007-12-28 to 2009-06-30. The alpha obtained from the Jensen's alpha approach for this period is 0,86% per month, corresponding to an annual AR of 10,30%.

As the average alpha approach looks at average of individual alphas, the time period problems in the Jensen's alpha approach is not an issue. The average alpha of individual securities for the period 2005-10-31 to 2009-06-30 for the month following a repurchase announcement to 12 months after the announcement, is 1,50% with a t-value of 3,06. Annualizing the alpha yields an annual AR on 17,97%. See Appendix 4 for full disclosure of average alphas.

The third hypothesis aims at testing that share repurchase announcements are followed by long-term abnormal returns. Since we measure long-term AR in two different ways, we have two different test statistics. Firstly, the Jensen's alpha approach yields a positive annual AR of 10,30%, although not significant on conventional levels. Secondly, the average alpha approach shows a positive annual AR of 17,97%, significant on conventional levels. The results indicate that the effect of an announcement is not fully discounted by the market immediately. This could be seen as evidence that the market is not efficient. On the other hand, it might be rational to discount the information gradually until it is evident that the repurchase program will be undertaken. In conclusion, using the Jensen's alpha approach we fail to reject the null hypothesis that there is no long-term AR, but using the average alpha approach we reject the same null hypothesis.

To test if the long-horizon abnormal return (although not significant on conventional levels using the Jensen's alpha approach) is a result of sector outperformance rather than share repurchases, Jensen's alpha is also calculated for all non-repurchasing real estate companies. As seen in Table 2, the resulting alpha for non-repurchasing firms for the period 2007-12-28 to 2009-06-30 is 0,36%, or an annual AR of 4,36%. This means that share repurchasing real estate companies show higher AR than non-repurchasing real estate companies, which indicates that the repurchase announcement has a positive stock price effect. However, applying a Student's t-test yields a t-value of 0,79, which implies that the alpha values for

share repurchasing and non-repurchasing real estate companies are not significantly different from each other, which is not surprising considering the small amount of observations.

Abnormal return is not calculated for non-repurchasing companies using the average alpha approach. The reason for this is that the average alpha approach uses a time period of 12 months following each individual share repurchase announcement, which means that no corresponding 12-month post announcement period can be defined for companies without repurchase announcements.

The findings from the test of the fourth and final hypothesis, concerning the outperformance of real estate companies that repurchase their own shares compared to real estate companies that do not repurchase their own shares, suggests a more than twice as large annual abnormal return for the repurchasing firms (10,30%) compared to the non-repurchasing firms (4,36%). However, due to the low significance from the Student's t-test, the null hypothesis that there is no discrepancy between AR for share repurchasing companies and non-repurchasing companies cannot be rejected on conventional levels.

7 CONCLUSION

The short horizon event study show significant negative cumulative abnormal returns (-4,17%) the days before a share repurchase announcement, which supports our first hypothesis that management time the announcement to periods of undervaluation. The announcement day shows significant positive AR (1,96%), which supports our second hypothesis that the market trusts the undervaluation message that the company signals. Moreover, the days subsequent to the announcement show positive ARs, however not significant on conventional levels.

Our third hypothesis states that, in line with previous studies, a share repurchase announcement is followed by a longer period of positive ARs. The Jensen's alpha approach showed a positive annual alpha (10,30%), but not significant on conventional levels, while the average alpha approach showed a significant positive annual alpha (17,97%).

The ARs for the year following a share repurchase announcement of 10,30% and 17,97%, for the two ways of measuring long-horizon AR respectively, are substantially higher than the 2,04% (Ikenberry et al., 1995) and the 4% (Yook, 2010) that previous research has shown. However, this AR may partly be explained by real estate sector outperformance as non-repurchasing real estate companies yield an AR of 4,36%, however not significant on conventional levels. Although the two groups are not statistically different from each other on conventional levels, share repurchasing real estate companies show a more than twice as large AR the year subsequent to an announcement than non-repurchasing real estate companies. Furthermore, the long-horizon AR of 17,97% according to the average alpha approach is even higher in comparison. These results indicate that real estate companies in general outperformed the market during the study period, but also that real estate companies see positive long-term stock price effects of share repurchase announcements.

Conducting event studies of stock price movements surrounding corporate events is interesting as a way to study market efficiency. Even more interesting from a stock investor point of view, the results from this study suggest that real estate stocks that announce share repurchase programs yield positive short-term abnormal returns. Moreover, real estate companies that announce share repurchase programs yield positive abnormal returns over an investment horizon of 12 months, although the abnormal returns may partly be explained by real estate companies outperforming the market as a whole.

In conclusion, previous research has shown that companies that repurchase own shares have been accompanied by negative pre-announcement abnormal returns as well as positive short-term and long-term abnormal stock price reactions to the announcements. Although not all results in this study are significant on conventional levels, the results are consistent with previous research.

7.1 SUGGESTIONS FOR FUTURE RESEARCH

This thesis analyses the short-run and long-run effects of share repurchase announcements and conducts a comparison between real estate companies that undertake share repurchases and those that do not. As has been shown, announcements of such programs have short term positive impact on the stocks' performance.

However, this thesis has not taken into consideration at what time during the event day the information was released to the market. Therefore, an interesting extension of this study could be to analyze trading volumes the days before and during the announcement day, in order to scrutinize intraday trade movements and plausible insider trading.

As discussed in the introduction, real estate companies are interesting when assessing mispriced securities, because of their straightforward valuation. Net Asset Values are easier to calculate for real estate companies than other companies. On the one hand, management's signals that a real estate company is undervalued on the stock market might be stronger, as a discount to Net Asset Value is an evidence of relative undervaluation. On the other hand, management's signals to investors should be less credible for real estate companies as the valuation of the underlying assets is straightforward, which should suggest that investors should be able to value the real estate company properly on their own. Therefore, a robust test of the relation between discount to NAV and share repurchase announcements, could shed light on this issue.

REFERENCE LIST

Academic articles

- Adams, G., Brau, J., & Holmes, A. (2007). REIT Stock Repurchases: Completion Rates, Long-Run Returns, and the Straddle Hypothesis. *Journal of Real Estate Research*, 29(2), 115-136.
- Baker, M., & Wurgler, J. (2002). Market Timing and Capital Structure. *The Journal of Finance*, 57(1), 1-32. 10.1111/1540-6261.00414 database.
- Barber, B. M., & Lyon, J. D. (1997). Detecting long-run abnormal stock returns: The empirical power and specification of test statistics. *Journal of Financial Economics*, 43(3), 341-372.
- Bohman, L. (2006). Economic Action and Interfirm Relations: Diffusion of Stock Repurchases on the Stockholm Stock Exchange 2000–2003. *European Sociological Review*, 22(4), 383-396.
- Brau, J., & Holmes, A. (2006). Why Do REITs Repurchase Stock? Extricating the Effect of Managerial Signaling in Open Market Share Repurchase Announcements. *Journal of Real Estate Research*, 28(1), 1-24.
- Brav, A., 2000. Inference in long-horizon event studies: A Bayesian approach with application to initial public offerings. *Journal of Finance*, 55, 1979-2016.
- Brown, S. & Warner, J. (1985). Using daily stock returns – The case of event studies, *Journal of Financial Economics*, vol. 14, 3-31.
- Chan, K., Ikenberry, D. L., & Lee, I. (2007). Do managers time the market? Evidence from open-market share repurchases. *Journal of Banking & Finance*, 31(9), 2673-2694.
- Chopra, N., Lakonishok, J., & Ritter, J. (1992). Measuring abnormal performance: Do stocks overreact?. *Journal of Financial Economics*, 31, 235-268.
- Cooper, M., Dimitrov, O., & Rau, P. (2001). A Rose.com by Any Other Name, *Journal of Finance*, 56, 2371-2388.
- Dann, L. Y. (1981). Common stock repurchases : An analysis of returns to bondholders and stockholders. *Journal of Financial Economics*, 9(2), 113-138.
- deRidder, A. (2008). Share repurchases and firm behaviour, *International Journal of Theoretical and Applied Finance*, 12(5), 605-631.
- Eisenhardt, K. M. (1989). Agency Theory: An Assessment and Review. *The Academy of Management Review*, 14(1), 57-74.
- Elton, E., & Gruber, M. (1997). Modern portfolio theory, 1950 to date, *Journal of Banking & Finance*, 21, 1743-1759.
- Fama, E., Jensen, M., Fisher, Lawrence, R., & Richard, W. (1969). The Adjustment of Stock Prices to New Information. *International Economic Review*, 10, 1-21.
- Fama, E. (1970). Efficient capital markets: a review of theory and empirical work. *Journal of Finance*, 25, 383–417.
- Fama, E., & French, K. (1992). The Cross-Section of Expected Stock Returns. *Journal of Finance*, 47 (2), 427–465.

- Fama, E. F., & French, K. R. (1993). Common risk factors in the returns on stocks and bonds. *Journal of Financial Economics*, 33(1), 3-56.
- Grossman, S., & Stiglitz, J. (1980). On the Impossibility of Informationally Efficient Markets, *American Economic Review*, 70, 393-408.
- Grullon, G., & Ikenberry, D. (2000). What do we know about stock repurchases?, *Journal of Applied Corporate Finance*, 13(1), 31-51.
- Grullon, G., & Michaely, R. (2002). Dividends, Share Repurchases, and the Substitution Hypothesis. *The Journal of Finance*, 57(4), 1649-1684.
- Haw, I.-M., Ho, S., Hu, B., & Zhang, X. (2011). The contribution of stock repurchases to the value of the firm and cash holdings around the world. *Journal of Corporate Finance*, 152-166.
- Ikenberry, D., Lakonishok, J., & Vermaelen, T. (1995). Market underreaction to open market share repurchases. *Journal of Financial Economics*, 39(2-3), 181-208.
- Ikenberry, D., Lakonishok, J., & Vermaelen, T. (2000). Stock Repurchases in Canada: Performance and Strategic Trading. *The Journal of Finance*, 55(5), 2373-2397.
- Jacobsen, R. (1988). The persistence of abnormal returns, *Strategic Management Journal*, 9, 415-430.
- Jagannathan, M., Stephens, C., & Weisbach, M. (2000). Financial flexibility and the choice between dividends and stock repurchases, *Journal of Financial Economics*, 57, 355–384.
- Jansson, A., & Larsson-Olaison, U. (2010). The Effect of Corporate Governance on Stock Repurchases: Evidence from Sweden. *Corporate Governance: An International Review*, 18(5), 457-472.
- Jegadeesh, N. & Karceski, J. (2009). Long-Run Performance Evaluation: Correlation and Heteroskedasticity-Consistent Tests, *Journal of Empirical Finance*, 16(1), 101-111.
- Jensen, M. C. (1986). Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers. *The American Economic Review*, 76(2), 323-329.
- Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, 3(4), 305-360.
- Kothari, S., Lewellen, J., & Warner, J. (2006). Stock Returns, Aggregate Earnings Surprises, and Behavioral Finance. *Journal of Financial Economics*, 79, 537-568.
- Lakonishok, J., & Vermaelen, T. (1990). Anomalous Price Behavior Around Repurchase Tender Offers. *The Journal of Finance*, 45(2), 455-477.
- Lie, E. (2000). Excess Funds and Agency Problems: An Empirical Study of Incremental Cash Disbursements, *Review of Financial Studies*, 13, 219-247.
- Lo, A., Mamaysky, H., & Wang, J. (2000). Foundations of Technical Analysis: Computational Algorithms, Statistical Inference, and Empirical Implementation, *Journal of Finance*, 55, 1705-1765.
- Malkiel, B. (2003). The Efficient Market Hypothesis and Its Critics. *Journal of Economic Perspectives*, 17(1), 59–82.
- Masulis, R. W. (1980). The effects of capital structure change on security prices : A study of exchange offers. *Journal of Financial Economics*, 8(2), 139-178.

- Mitchell, M. L., & Stafford, E. (2000). Managerial Decisions and Long-Term Stock Price Performance. *The Journal of Business*, 73(3), 287-329.
- Modigliani, F., & Merton, H. M. (1958). The Cost of Capital, Corporation Finance and the Theory of Investment. *The American Economic Review*, 48(3), 261-297.
- Modigliani, F. & Miller, M. H. (1963). Corporate Income Taxes and the Cost of Capital: A Correction. *American Economic Review*, 53, 433-43.
- Miller, M. H. & Modigliani, F. (1961). Dividend Policy, Growth and the Valuation of Shares. *Journal of Business*, 34, 411-33.
- Miller, M. H. (1977). Debt and Taxes. *Journal of Finance*, 32, 261-75.
- Miller, M. (1989). The Modigliani Miller Propositions After Thirty Years, *Journal of Applied Corporate Finance*, 2(1), 6-18.
- Peterson, C., Fredriksson, J. & Nilfjord, A. (2003). Common Stock Repurchases: A First Year Swedish Sample and Comparative Reactions on the US and Finnish Markets. *Liiketaloudellinen Aikakauskirja*, 52, 455–473.
- Porter, G. E., Roenfeldt, R. L., & Sicherman, N. W. (1999). The Value of Open Market Repurchases of Closed-End Fund Shares. *The Journal of Business*, 72(2), 257-276.
- Rasches, M. (2001). Massively Confused Investors Making Conspicuously Ignorant Choices (MCI-MCIC), *Journal of Finance*, 56(5), 1911-1927.
- Ross, S. (1973). The economic theory of agency: The principal's problem, *American Economic Review*, 63, 134-139.
- Schwert, W. (2001). Anomalies and Market Efficiency. *Handbook of the Economics of Finance*, 937–972.
- Sharpe, W. (1964). Capital Asset Prices - A Theory of Market Equilibrium Under Conditions of Risk. *Journal of Finance*, 19(3), 425-442.
- Stephens, C. P., & Weisbach, M. S. (1998). Actual Share Repurchases in Open-Market Repurchase Programs. *The Journal of Finance*, 53(1), 313-333.
- Stigler, G. (1961). The Economics of Information, *The Journal of Political Economy*, 69(3), 213-225.
- Vermaelen, T. (1981). Common stock repurchases and market signalling : An empirical study. *Journal of Financial Economics*, 9(2), 139-183.
- Yook, K. C. (2010). Long-run stock performance following stock repurchases. *The Quarterly Review of Economics and Finance*, 50(3), 323-331.

Misc:

- Carlsson, C., & Forsberg, P. (2008). Återköp av egna aktier. (Unpublished dissertation). Uppsala University, Uppsala.
- Frain, J. C. (2007). Small sample power of tests of normality when the alternative is an α -stable distribution. *Trinity Economics Papers*, Trinity College Dublin, Department of Economics
- Freund, J., & Perles, B. (2007). Modern Elementary Statistics, Upper Saddle River, NJ: Pearson Education International.

- Hurst, S. (1995). The characteristic function of The Student t distribution, Research Report SRR95-044, retrieved from <http://maths.anu.edu.au/research.reports/srr/95/044/>
- Körner, S., & Wahlgren, L. (2006). Statistisk Dataanalys, Lund: Studentlitteratur
- Leimdörfer (2002). Återköp tillför värde, from <http://www.leimdorfer.se/upload/Analysartiklar/2002-1-1.pdf>
- Leimdörfer (2010). Property shares – How to outperform the market, from http://www.leimdorfer.se/upload/Analysartiklar/Eng%20Analysartiklar/Leimdörfer%202010_1%20Eng.pdf
- Lo, A., & MacKinlay, C. (1999). A Non-Random Walk Down Wall Street, Princeton, NJ: Princeton University Press.
- Malkiel, B. (1973). A Random Walk Down Wall Street: The Time-tested Strategy for Successful Investing. New York, NY: Norton.
- Markowitz H. (1959). Portfolio Selection. New York, NY: Macmillan.
- Miller, M. H. (1991). Financial Innovations and Market Volatility, Cambridge, MA: Blackwell Publishers
- Nasdaq OMX Nordic. (2011). *Shares / Historical Prices*. Available from www.nasdaqomxnordic.com
- Newbold, P. (2010). Statistics for business and economics. Upper Saddle River, NJ: Pearson Prentice Hall
- The Riksbank. (2011). *Interest & Exchange rates / Swedish market rates*. Available from www.riksbank.com
- Tivéus, U. (2000). Återköp av egna aktier, Skattenytt, from <http://www.skattenytt.se/pdf/03-Tiveus.pdf>
- Zytmierski, D., & Poutiainen, B. (2010). In Search of a Leverage Factor in Stock Returns: An Empirical Evaluation of Asset Pricing Models on Swedish Data. (Unpublished dissertation). Stockholm School of Economics, Stockholm.

APPENDIX 1 – COMPANY SELECTION

Repurchasing companies

| | | | |
|---------------|--|------------|-------------|
| BALD B | Fastighets AB Balder ser. B | Financials | Real Estate |
| BRIN B | Brinova Fastigheter AB ser.B | Financials | Real Estate |
| CAST | Castellum AB | Financials | Real Estate |
| DAG | Dagon AB | Financials | Real Estate |
| DIOS | Diös Fastigheter AB | Financials | Real Estate |
| FABG | Fabege AB | Financials | Real Estate |
| KLOV | Klövern AB | Financials | Real Estate |
| WALL B | Wallenstam Byggnads AB., Lennart ser. B | Financials | Real Estate |
| WIHL | Wihlborgs Fastigheter AB | Financials | Real Estate |

Non-repurchasing companies

| | | | |
|---------------|----------------------------|------------|-------------|
| CATE | Catena AB | Financials | Real Estate |
| FPAR | Fast Partner AB | Financials | Real Estate |
| HEBA B | Heba Fastighets AB ser. B | Financials | Real Estate |
| HUFV C | Hufvudstaden AB ser. C | Financials | Real Estate |
| KLED | Kungsleden AB | Financials | Real Estate |
| LJGR B | Atrium Ljungberg AB ser. B | Financials | Real Estate |
| SAGA | Sagax AB | Financials | Real Estate |

Excluded companies

| | | | | Explanation for excluding |
|------------------|--|------------|-------------|---------------------------|
| ALOK B | Allokton AB ser. B | Financials | Real Estate | Not listed on Nasdaq OMX |
| ANNE | Annehem Fastigheter AB | Financials | Real Estate | Not listed on Nasdaq OMX |
| DIN | Din Bostad Sverige AB | Financials | Real Estate | Not listed on Nasdaq OMX |
| HUFV A | Hufvudstaden AB ser. A | Financials | Real Estate | Not the most traded share |
| LUND B | Lundbergföretagen AB, L E ser. B | Financials | Real Estate | Investment company |
| RURI B | Russian Real Estate Inv. Comp. AB ser. B | Financials | Real Estate | Not listed on Nasdaq OMX |
| SAGA PREF | Sagax AB pref | Financials | Real Estate | Preference stock |
| VICP | Victoria Park AB | Financials | Real Estate | Not listed on Nasdaq OMX |

APPENDIX 2 – STOCKS INCLUDED IN THE PORTFOLIO

Stocks included in the portfolio

| Date | | | | | | | | | | |
|------------|----------|----------|---------|---------|-------------|------|----------|-------|--------|-------------|
| 2005-10-31 | Fabege 1 | | | | | | | | | |
| 2005-11-30 | Fabege 1 | | | | | | | | | |
| 2005-12-30 | Fabege 1 | | | | | | | | | |
| 2006-01-31 | Fabege 1 | | | | | | | | | |
| 2006-02-28 | Fabege 1 | | | | | | | | | |
| 2006-03-31 | Fabege 1 | | | | | | | | | |
| 2006-04-28 | Fabege 1 | | | | | | | | | |
| 2006-05-31 | Fabege 1 | | | | | | | | | |
| 2006-06-30 | Fabege 1 | Fabege 2 | | | | | | | | |
| 2006-07-31 | Fabege 1 | Fabege 2 | | | | | | | | |
| 2006-08-31 | Fabege 1 | Fabege 2 | | | | | | | | |
| 2006-09-29 | Fabege 1 | Fabege 2 | | | | | | | | |
| 2006-10-31 | | Fabege 2 | | | | | | | | |
| 2006-11-30 | | Fabege 2 | | | | | | | | |
| 2006-12-29 | | Fabege 2 | | | | | | | | |
| 2007-01-31 | | Fabege 2 | | | | | | | | |
| 2007-02-28 | | Fabege 2 | | | | | | | | |
| 2007-03-30 | | Fabege 2 | | | | | | | | |
| 2007-04-30 | | Fabege 2 | | | | | | | | |
| 2007-05-31 | | Fabege 2 | | | | | | | | |
| 2007-06-29 | | | | | | | | | | |
| 2007-07-31 | | Fabege 3 | | | | | | | | |
| 2007-08-31 | | Fabege 3 | | | | | | | | |
| 2007-09-28 | | Fabege 3 | | | | | | | | |
| 2007-10-31 | | Fabege 3 | | | | | | | | |
| 2007-11-30 | | Fabege 3 | | | | | | | | |
| 2007-12-28 | | Fabege 3 | Brinova | Klövern | Wihlborgs 1 | | | | | |
| 2008-01-31 | | Fabege 3 | Brinova | Klövern | Wihlborgs 1 | | | | | |
| 2008-02-29 | | Fabege 3 | Brinova | Klövern | Wihlborgs 1 | | | | | |
| 2008-03-31 | | Fabege 3 | Brinova | Klövern | Wihlborgs 1 | | | | | |
| 2008-04-30 | | Fabege 3 | Brinova | Klövern | Wihlborgs 1 | | | | | |
| 2008-05-30 | | Fabege 3 | Brinova | Klövern | Wihlborgs 1 | | | | | |
| 2008-06-30 | | Fabege 3 | Brinova | Klövern | Wihlborgs 1 | Diös | Fabege 4 | | | |
| 2008-07-31 | | | Brinova | Klövern | Wihlborgs 1 | Diös | Fabege 4 | Dagon | Balder | |
| 2008-08-29 | | | Brinova | Klövern | Wihlborgs 1 | Diös | Fabege 4 | Dagon | Balder | Wihlborgs 2 |
| 2008-09-30 | | | Brinova | Klövern | Wihlborgs 1 | Diös | Fabege 4 | Dagon | Balder | Wihlborgs 2 |
| 2008-10-31 | | | Brinova | Klövern | Wihlborgs 1 | Diös | Fabege 4 | Dagon | Balder | Wihlborgs 2 |
| 2008-11-28 | | | Brinova | Klövern | Wihlborgs 1 | Diös | Fabege 4 | Dagon | Balder | Wihlborgs 2 |
| 2008-12-30 | | | | | | Diös | Fabege 4 | Dagon | Balder | Wihlborgs 2 |
| 2009-01-30 | | | | | | Diös | Fabege 4 | Dagon | Balder | Wihlborgs 2 |
| 2009-02-27 | | | | | | Diös | Fabege 4 | Dagon | Balder | Wihlborgs 2 |
| 2009-03-31 | | | | | | Diös | Fabege 4 | Dagon | Balder | Wihlborgs 2 |
| 2009-04-30 | | | | | | Diös | Fabege 4 | Dagon | Balder | Wihlborgs 2 |
| 2009-05-29 | | | | | | Diös | Fabege 4 | Dagon | Balder | Wihlborgs 2 |
| 2009-06-30 | | | | | | | | Dagon | Balder | Wihlborgs 2 |

First month subsequent to announcement

| | |
|------------|-------------|
| 2000-06-30 | Castellum |
| 2000-09-29 | Wallenstam |
| 2005-10-31 | Fabege 1 |
| 2006-06-30 | Fabege 2 |
| 2007-07-31 | Fabege 3 |
| 2007-12-28 | Brinova |
| 2007-12-28 | Klövern |
| 2007-12-28 | Wihlborgs 1 |
| 2008-06-30 | Diös |
| 2008-06-30 | Fabege 4 |
| 2008-07-31 | Dagon |
| 2008-07-31 | Balder |
| 2008-08-29 | Wihlborgs 2 |

APPENDIX 3 – JENSEN’S ALPHA REGRESSION OUTPUT

| Fama-French Regression 2007-12-28 - 2009-06-30 | | |
|--|---|---------------------------------------|
| <i>Coefficients (t-values)</i> | <i>Share repurchasing companies</i> | <i>Non-repurchasing companies</i> |
| α | 0,0086 (0,5159) | 0,0036 (0,4011) |
| β_{market} | 0,6951 (3,8408) | 0,4804 (5,3272) |
| s_{SMB} | 0,3148 (1,0639) | 0,0566 (0,3946) |
| h_{HML} | -0,0365 (-0,1398) | 0,0326 (0,2620) |
| R Square | 0,5119 | 0,7044 |
| N | 19 | 19 |

APPENDIX 4 – AVERAGE ALPHA

Average alpha per month

| | Announcements from year 2000 | Announcements from year 2005 |
|-------------|------------------------------|------------------------------|
| Brinova | 0,26% | 0,26% |
| Castellum | 0,40% | |
| Dagon | -2,09% | -2,09% |
| Diös | 1,89% | 1,89% |
| Fabege 1 | 3,00% | 3,00% |
| Fabege 2 | 2,09% | 2,09% |
| Fabege 3 | 0,53% | 0,53% |
| Fabege 4 | 2,17% | 2,17% |
| Balder | 2,33% | 2,33% |
| Klövern | 3,01% | 3,01% |
| Wallenstam | -3,94% | |
| Wihlborgs 1 | 3,17% | 3,17% |
| Wihlborgs 2 | 0,10% | 0,10% |
| Average | 0,99% | 1,50% |
| Stddev | 2,12% | 1,62% |
| N | 13 | 11 |
| T-value | 1,69 | 3,06 |

Average annualized alpha

| | Announcements from year 2000 | Announcements from year 2005 |
|-------------|------------------------------|------------------------------|
| Brinova | 3,09% | 3,09% |
| Castellum | 4,75% | |
| Dagon | -25,04% | -25,04% |
| Diös | 22,70% | 22,70% |
| Fabege 1 | 36,05% | 36,05% |
| Fabege 2 | 25,13% | 25,13% |
| Fabege 3 | 6,32% | 6,32% |
| Fabege 4 | 25,99% | 25,99% |
| Balder | 27,96% | 27,96% |
| Klövern | 36,16% | 36,16% |
| Wallenstam | -47,29% | |
| Wihlborgs 1 | 38,03% | 38,03% |
| Wihlborgs 2 | 1,25% | 1,25% |
| Average | 11,93% | 17,97% |
| Stddev | 25,40% | 19,45% |
| N | 13 | 11 |
| T-value | 1,69 | 3,06 |