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The ownership structure of repurchasing firms

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The ownership structure of repurchasing firms[*]

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Abstract

This paper provides an examination of the ownership structure in Norwegian firms that announced repurchase plans during the period 1999 through 2001, as well as for groups of these firms conditional on whether they actually executed repurchases or not. By using detailed information on various ownership variables that can be related to corporate governance mechanisms, the paper also examines whether the propensity for firms to announce a repurchase program depends on the ownership composition. Some interesting patterns are found which are consistent with models where firms with potentially the highest agency problems use repurchases to mitigate agency costs. However, a high insider ownership in these firms may also suggest that asymmetric information, shareholder expropriation and entrenchment may also be motivations for why firms repurchase shares.

Keywords: Stock repurchases, ownership structure, corporate governance

JEL Codes: G10, G32, G35

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1 Introduction

An open market share repurchase is an event where the repurchasing firm indirectly distributes cash to some of its shareholders and gets in exchange a fraction of its outstanding equity.[1] Compared to dividends, which generally are pro-rata distributions at regular points in time, an open market repurchase distributes cash to shareholders in an non-proportional fashion at varying points in time. Although a repurchase, at a general level, merely is an alternative mechanism for the firm to distribute cash, it also changes the composition of assets held by the firm, the financing mix and alters the ownership proportions of the remaining shareholders. Furthermore, a repurchase is also a more flexible way for firms to distribute excess cash if they have volatile cash streams and aim at smoothing their dividends.

   Although there is a large amount of research aimed at explaining the price effect of repurchase announcements and why firms choose to initiate a repurchase plan, there are few studies that explicitly examine the relationship between ownership structure and share repurchases. This despite the fact that the initiation of a repurchase plan is an important corporate event that in some cases can alter the ownership composition significantly and in the long run potentially affect the value of a firm through corporate governance mechanisms. The ownership composition in a firm may also be an important motivation for firms to initiate a repurchase plan in the first place. As suggested by Jensen (1986) a repurchase can help reduce the probability of incurring agency costs related to free cash.[2] Thus, in firms with potentially severe agency problems, repurchases may be a way for managers to convey to the market that they are committed to distribute excess cash back to the owners.[3] A repurchase may also help improve the governance of the firm through other mechanisms as well. For example, in firms where there is insufficient monitoring of management,[4] a repurchase may change the ownership composition such that the incentives to monitor management becomes greater for some shareholders if their proportional cash-flow rights and voting rights increases. As noted by Shleifer and Vishny (1986), open market share repurchases are not equivalent to dividends, because they may change the share of the firm held by the large shareholder which has greater incentives to monitor. At the same time, a repurchase may also increase the manager's ownership proportion in the firm such that there is a convergence of interest between the inside and outside shareholders (Jensen and Meckling, 1976). On the other hand, a repurchase may also intensify the conflict between large shareholders and minority shareholders. For example, if large shareholders stronger incentives to becoming informed, a repurchase may be used to increase their ownership (and the remaining shareholders ownership) in an undervalued company by retaining their shares, or alternatively decrease their ownership in a over-valued company at the expense of less informed owners (Brennan and Thakor, 1990). A repurchase may also contribute to the conflict between inside- and outside owners since

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[1]The shares owned by the company is accounted for as Treasury shares and has no cash-flow or voting rights attached to them. These shares can later be removed to decrease the shares in the company, sold back to the market, used in acquisitions, distributed to employees as a part of a bonus plan etc.

[2]Jensen (1986) defines free cash as the remaining cash within the firm after all projects with positive net present values have been funded. Other suggested mechanisms for reducing agency costs of free cash is also new debt and dividends.

[3]This reasoning assumes that the managers actually have incentives to impose a disciplinary mechanism on themselves.

[4]One example could be liquid firms with few investment opportunities, dispersed ownership and where management has a low stake in the firm.

insiders have incentives to secure their position in the firm. By repurchasing shares from the owners with the lowest valuations (Bagwell, 1991) they increase the cost to a bidding firm. Thus, a repurchase can be used to reduce the probability of a value creating takeover occurring, which would benefit shareholders, but potentially make the manager loose control over the firms resources. Also, certain types of owners may prefer one type of payout policy to another for tax reasons. For example certain investors such as pension funds and non-profit organizations are in many countries exempt from taxes on dividends and capital gains, while other investors are not. Thus, if dividends and capital gains are taxed differently, firms may attract different types of investors through their payout policy. Grullon and Michaely (2002) suggest that one reason for the growth in repurchases in the US, is due to relative tax disadvantage of dividends. On the other hand, findings in Brav et al. (2003) indicate that taxes are, at best, of second order importance when firms choose whether to repurchase or not.

The main focus of this paper is to investigate these issues in more detail, and to examine whether firms that initiate repurchase programs[5] have any systematic patterns in ownership that may be related to theory. In this respect, the paper has several objectives. The first objective is to provide a descriptive analysis of the ownership structure of firms that announce repurchase plans, as well as for subgroups of these firms conditional on whether they actually execute repurchases or not. The second objective is to examine whether and how the ownership changes over time in firms that actually execute repurchases. The third objective is to study whether the propensity for firms to initiate a repurchase program may be motivated by ownership characteristics prior to the event.

Recent studies indicate that repurchases has become an increasingly important means for firms to distribute cash. In a study on repurchase activity in the US, Grullon and Michaely (2002) find that firms gradually have substituted repurchases for dividends during the period from 1980 through 2000, and that US firms in 2000 spent as much money on repurchases as on cash dividends.[6] This is also in line with findings in Fama and French (2001) who find that the number of dividend paying firms has fallen dramatically since 1980 until today. Similarly, in Norway, there has been an increase in spending on share repurchases, although for a much shorter time period. Since Norwegian firms for the first time were allowed to repurchase shares in 1999, they have increased their spending on repurchases as a percentage of cash dividends starting at 25% in 1999 and increased this to 44% in 2000 and 2001. During the same time period, there has been a growth in aggregate dividends as well.

At a general level, a share repurchase is essentially a dividend payment, and thus an alternative way for a firm to distribute excess cash back to its shareholders. In a world where markets are perfect and complete, whether a firm distributes its cash through dividends or repurchases should be equivalent according to the propositions in Miller and Modigliani (1961). Given the firms investment policy, no rational investor has a preference for either payout policy, and through arbitrage arguments the choice of payout policy

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[5]With "initiate" we mean that the firm announces a repurchase plan, which has received a supermajority vote at the general shareholder meeting. This gives the managers of the firm the opportunity to repurchase shares when they see fit over a pre-specified period. The maximum legal length of this period in Norway is 18 months, but the firm is not committed to repurchase any shares.

[6]Grullon and Michaely (2002) find that dividend payouts grew at an annual rate of 6.8% during the period 1980 to 2000, while cash used on share repurchases grew at an annual rate of 26.1% during the same period. From 1980 to 2000 share repurchases as a percentage of dividends increased from 13.1% in 1980 to 113.1% in 2000.

is shown to be irrelevant with respect to the value of the firm. On the other hand, empirical results suggest that the information inherent in repurchase announcements have some economical benefits to shareholders in the sense that these firms on average experience an abnormal price increase when they announce that they are planning on repurchasing shares. Among others, Vermaelen (1981), Dann (1981), Comment and Jarrell (1991), Stephens and Weisbach (1998) and Ikenberry et al. (1995, 2000), find strong support for a positive announcement effect, and that this effect is about 2%.[7] These findings are comparable to what has been found with respect to unexpected dividend initiations/increases and dividend omissions/decreases (Asquith and Mullins, 1983; Michaely et al., 1995).

The dominating theoretical explanation for both of these announcement effects rests on a signalling framework, in which there is asymmetric information between the managers and outside investors, and the announcement communicates valuable information about current earnings and the future prospects of the firm. As shown in Miller and Rock (1985), if there is asymmetric information between investors and the managers of a firm, changes in dividends can result in revaluations. Similarly for repurchases, models by Vermaelen (1981), Ofer and Thakor (1987), Constantinides and Grundy (1989), McNally (1999) and others, show that a repurchase announcement may be a valuable signal to investors about current undervaluation and the future prospects of the firm, which should command a higher stock price. In addition to the signalling hypothesis, other suggested reasons for why firms repurchase shares include, capital structure adjustments (Vermaelen, 1981; Opler and Titman, 1996), disgorgement of excess cash (Jensen, 1986; Stephens and Weisbach, 1998; Jagannathan et al., 2000), substitution for cash dividends (Grullon and Michaely, 2002), takeover defense (Denis, 1990; Bagwell, 1991; Dittmar, 2000), shareholder expropriation (Brennan and Thakor, 1990), to counter the dilution effects of employee and management options (Fenn and Liang, 1997), personal taxes (Masulis, 1980; Lie and Lie, 1999; Grullon and Michaely, 2002) and manipulating EPS figures (Bens et al., 2002).

With respect to the topic in this paper, the amount of research that examine the relationship between ownership structure and share repurchases is much more scarce. However, some exceptions include Ginglinger and L'Her (2002) who examine the relationship between ownership structure and the announcement effect for French firms, Howe et al. (2003) who examine the relation between insider ownership and the announcement effect of various cash distributions in the US, including tender offer repurchases, and Li and McNally (2002) who examine the insider holdings of repurchasing firms. The results in Ginglinger and L'Her (2002) suggests that the announcement effect of controlled firms is stronger than for widely held firms, that the presence of foreign institutional investors yield a more positive reaction and that family controlled firms experience a negative price effect when a repurchase program is announced. They also find that firms with a low likelihood of takeover and low risk of minority shareholder expropriation experience a stronger positive announcement effect, and that the effect is highly unfavorable when the market participants interpret the repurchase as a takeover defense.[8] Howe et al. (2003)

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[7]Comment and Jarrell (1991) and Ikenberry et al. (1995) find an announcement effect in the US of 2.3% (for the period 1985-1988) and 3.5% (1980-1990) respectively. In addition Comment and Jarrell (1991) examine Dutch auction repurchases and tender offer repurchases, which have a 11% and 8% price impact respectively. They argue that tender offer repurchases have the strongest signalling ability of the three. For Canada, Li and McNally (2002) find a announcement effect of 0.9% (for the period 1995-1999). Lasfer (2000) find the effect to be 1.64% in the UK, 1% for continental Europe, 0.78% in France and 0.63% for Italy over the period 1985 to 1998.

[8]Ginglinger and L'Her (2002) proxy potential target firms as firms where the largest shareholder owns 20% of the voting rights and the float is higher than 50%.

find that there is a positive relationship between the excess return around various cash distribution events[9] and the insider ownership for a sample of US firms. Their overall conclusion is that when managers owns a larger stake in the firm, their wealth depends stronger on the success of corporate decisions and strategy such that the signals conveyed through payout announcements becomes more valuable/credible in firms where the inside ownership is large. Li and McNally (2002) also study the insider holdings of repurchasing firms and find that insiders have a larger stake in firms that initiate repurchase plans, and that these firms experience a greater announcement effect. Their main argument for this is that insiders use repurchases to signal that they are committed to distribute excess cash back to the shareholders. In addition, Denis (1990) examines the price effect of defensive changes in corporate payout policy and how the ownership changes in firms that remain independent after the takeover contest. The results indicate that these firms experience large structural changes after the takeover attempt in which there are large changes in capital- and ownership structure in addition to a high turnover rate among top management. Finally, Grinstein and Michaely (2001) examine the effect of institutional ownership on the choice of payout policy among firms. Their main finding is that institutions increase their ownership in firms that repurchase, but that they do not actively affect firms payout policy or cause firms to increase their overall payout.

There are also earlier studies on the ownership structure of Norwegian firms that are important to mention. Bøhren and Ødegaard (2000, 2004) provide a detailed description of the ownership structure of Norwegian firms listed on the Oslo Stock exchange for the period 1989-1997. In addition, using the same dataset, Bøhren and Ødegaard (2001) examine whether ownership structure matters for economic performance. Their main findings are that insider ownership enhances firm value while ownership concentration is negatively related to firm value.[10] They also point to Norway being an atypical case relative to the ownership structure in other countries in Europe due to very high state ownership as well as relatively high foreign ownership (about 30%). In addition, the ownership by personal investors is found to be the smallest compared to any European country, and the largest shareholder owns much less while the second and third largest owner has a relatively high stake indicating that the power structure is very flat.

The analysis in this paper uses similar ownership data as used in Bøhren and Ødegaard (2000, 2001, 2004), but for a more recent period and with monthly share-holdings of all shareholders in all public Norwegian firms listed on the Oslo Stock Exchange (OSE). The paper combines this dataset with a sample of repurchase announcements and actual repurchases conducted by Norwegian firms for the period 1999 through 2001.[11] There are several things to note about the dataset. First of all, there are few papers that examine the actual repurchase activity of announcing firms. One reason for this is that a large amount of studies on open market repurchases has been for US data. Due to the loose disclosure rules in the US, where firms are not required to disclose the actual repurchase executions, this has made it difficult to obtain detailed data on actual repurchases in the US.[12] By combining the repurchase dataset with a detailed ownership database containing

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[9]The cash distributions they examine are dividend increases and decreases, dividend initiations and tender offer repurchases.

[10]While their results are robust in single-equation models, the relationships are rendered insignificant when they apply simultaneous equations models taking into account the causalities between governance and performance.

[11]The repurchase sample starts in 1999 because Norwegian firms were not allowed to repurchase shares earlier. However, firms were allowed to announce repurchase plans prior to 1999.

[12]One exception is Stephens and Weisbach (1998) who estimate the actual repurchase activity by US

the monthly equity holdings of all shareholders in all listed Norwegian firms, we are able to study in detail the ownership characteristics of these firms. In addition, we are able to examine to what degree the composition changes during the repurchase program and whether ownership characteristics affect firms propensity to initiate such programs.

To summarize our main findings, we find that firms that announce at least one repurchase program during our sample period, have a significantly lower ownership concentration (both when concentration is measured as the aggregate ownership of the five largest owners and by the Herfindahl index) than firms that do not announce a repurchase plan. With respect to the number of owners, announcing firms have about twice as many owners as non-announcing firms, while the average size of these firms are similar. This is in line with a story in which firms with dispersed ownership has a stronger incentive to disgorge cash to mitigate agency costs related to free cash. On the other hand, our results also suggest that insiders own on average a significantly higher fraction (20%) in announcing firms than in non-announcing firms (8%), and that this difference is most pronounced in firms that actually repurchase shares. This, however, is not consistent with a monitoring story for repurchases, since agency theory predicts that the insider and outsider interests are better aligned in these firms. Moreover, there would be a lesser need for additional mechanisms to avoid agency costs of free cash in these firms.

This finding would instead be more in line with models where insiders have incentives to initiate a repurchase program either to maximize the future value of their personal wealth (Isagawa, 2000), expropriate outside shareholders or to entrench themselves. Moreover, Isagawa (2000) argue that if managers have stock options or ownership in the firm, the managers objective function depends on the stock price as he gets a monetary compensation based on the future value of the firm. By repurchasing, this reflects that the manager has no profitable projects to invest in, and that his private benefits from increasing the value of the firm outweighs the personal benefit from investing in negative net present value projects, which would depress the stock price in the long run and reduce his wealth. Thus, Isagawa (2000) propose an explanation for the announcement effect which resolves the credibility issues, in addition to offering a prediction that repurchasing firms have a high insider ownership. Our finding may also be consistent with an mispricing story where there in asymmetric information between the inside- and the outside shareholders as suggested in models by Barclay and Smith (1988) as well as Brennan and Thakor (1990) when large shareholders are better informed than smaller shareholders. From this point of view, the insiders may use repurchases to transfer wealth from selling shareholders to themselves (and remaining shareholders) by retaining their shares when the firm repurchase. Our results also indicate that the dividend payments of announcing firms are lower than for non-announcing firms, which is consistent with a hypothesis where firms substitute repurchases for dividends (Grullon and Michaely, 2002). When examining the changes in ownership variables during the periods when firms repurchase shares the results confirm that the concentration increases. However, although there is an increase in the insider ownership, it is not significant. With respect to the different ownertypes, the results further indicate that the ownership by institutions and individuals falls, while the state ownership increases. Interestingly, this is opposite from what Grinstein and Michaely (2001) find for institutional investors in the US. Grinstein and Michaely (2001) argue their results are inconsistent with models in which firms use dividends to attract institutional

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firms based on the change in outstanding shares. In addition, during the last few years, studies on actual repurchase activity outside the US has emerged for markets where firms are subject to stricter disclosure rules, such as Canada.

investors. Our results may indicate an opposite effect for Norway.

In the second part of the paper, we estimate binary models for the probability of observing a firm announcing a repurchase plan during each sample year given the ownership characteristic at the beginning of the year. The results from these estimations reflect to a great degree the findings in the descriptive part of the analysis, but provide some additional results. With respect to the insider ownership, we find that the propensity to initiate a repurchase program increases with insider ownership. This is in line with findings in Li and McNally (2002) for Canada. In addition, while ownership concentration seem to be unimportant, a large controlling shareholder reduces the propensity for firms to initiate a repurchase program. This is the opposite of what is the prediction in the model by Brennan and Thakor (1990). One implication from their model is that large shareholders will prefer repurchases to dividends, while small shareholders will prefer dividends. Our findings instead suggests that a controlling shareholder opposes the initiation of a repurchase program. Alternatively, it may also reflect a lower need for additional mechanisms to mitigate agency costs of free cash when there is a large shareholder in place with sufficient incentives to monitor the management. We also examine whether the identity[13] of the largest shareholder is important, but find no systematic evidence. The estimation results also provide evidence that firms that paid dividends in the previous year have a lower propensity to initiate a repurchase plan. This is likely related to dividend smoothing, and that firms are reluctant to cutting dividends as suggested by findings in Lintner (1956) and Brav et al. (2003).

The remainder of the paper is structured as follows. In the next section we discuss theoretical and empirical results that motivate why there could be a relationship between ownership structure and firms choice of repurchasing. Then we give an overview of the repurchase methods and history of repurchases in Norway, the Norwegian tax system as well as some information about the corporate legal environment in Norway. In section 4 we discuss the datasets and provide some general statistics, before we in in section 5 and section 6 present and discuss our results and conclude in section 7.

2 Ownership structure and repurchases

In this section, we try to motivate why there could be a relationship between ownership structure and the choice by firms to initiate a repurchase program. Although the main purpose of the paper is to provide a descriptive analysis of repurchasing firms, it is necessary to have a theoretical framework in which we can interpret the results and guide the analysis as well to motivate various variables used when we estimate a model for the propensity for firms to announce a repurchase plan. However, as discussed in Bøhren and Ødegaard (2000, 2001) corporate governance has still an underdeveloped theoretical foundation. This also affect the present paper in the sense that there are few models directly relating firms choice of repurchases to ownership structure and corporate governance. In other words, there are few models with clear predictions with respect to what patterns we should expect to see. Due to the lack of a testable theory, the discussion of the results will to a large degree be partial. However, some models provide implicit theoretical prediction for the relationship between ownership structure, corporate governance mechanisms and stock repurchases which we will discuss below. At a general level,

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[13]We have information on five types of owners. These are "state" owners, "foreigners", "financial", "non-financial" and "individuals".

it is useful to distinguish between agency- and signalling models used in the literature to explain why firms repurchase shares and experience a positive announcement effect. In the agency models, the principal (shareholder) wants to ensure that the agent (manager) do not waste internal resources to benefit themselves. In these models, repurchases may be used as a mechanism to discipline the manager and reduce the cash available to him. The agency explanations however require that the shareholders can force the manager to actually repurchase or that the manager has incentives to do so. Also, if large shareholders or insiders own a large stake in the firm, it may be difficult to initiate a repurchase plan in the first place, since it in most cases requires a supermajority vote which can be blocked by a large shareholder. In addition, to ensure that the manager actually execute repurchases when there are no profitable investment opportunities may require excessive monitoring. As discussed by Jensen and Meckling (1976), it is generally impossible for the principal to costlessly ensure that the agent will act optimally from the principals viewpoint. Thus, even though a repurchase is a cash distribution mechanism that initially could help reduce agency costs, it may not be very effective unless the manager has incentives to disgorge free cash. In the signalling models, the manager may use repurchases to signal that they are committed to not wasting cash, or to convey information to the market about their private information. However, as will be discussed below, the credibility of the signal is not always clear, since the costs to the manager for signalling falsely may be questionable. This is especially important with respect to open market share repurchases.

Free cash flow

Agency theory predicts that non-owner managers will tend to divert parts of the firm's free cash flow to value-destroying projects that provide private benefits to themselves.[14] More specifically, as discussed by Jensen and Meckling (1976), if there is low or zero insider ownership, and consequently a separation of ownership from control, there may be a need for monitoring by outside shareholders to avoid that management uses internal resources in a fashion that does not maximize firm value.[15] However, active monitoring by outside owners may not occur if there are no outside owners with strong incentives to monitor the management.

In those cases payout policy is a mechanism that may help to mitigate agency costs related to cash. As suggested by Easterbrook (1984) and Jensen (1986) a firm may use cash distributions to reduce the agency cost of free cash by reducing the amount of cash available to the manager. Agency theory predicts that both debt financing, repurchases and dividend payments are mechanisms that help mitigating agency costs. With debt financing, the cash flow of the firm must be used to pay creditors which potentially could force a bankruptcy if not paid. Dividend payments are also a way for the firm to distribute excess cash that could potentially be miss-allocated by management. The use of repurchases is potentially less costly to the firm than using dividends for distributing non-sustainable excess cash. As proposed by Lintner (1956), managers prefer to increase dividends regularly and avoid cutting dividends if possible.[16] Substantiating the finding

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[14]As discussed by Shleifer and Vishny (1997) such diversion by insiders may be theft, dilution of outside investors through share issues to insiders, salary increases, below market value share issues to insiders etc.

[15]A crucial assumption with respect to outside monitoring is that outside shareholders are competent and that their monitoring in fact improve the quality of managerial decisions.

[16]These arguments predict that dividend increases will be made by firms with higher and more stable cash flows, that dividend increases will be related to permanent but not necessarily to temporary components of cash flow, and that dividend decreases will be less frequent than increases and accompanied by very

in Lintner (1956), 94% of the company executives interviewed in Brav et al. (2003), state that they strongly try to avoid dividend cuts, and 65% answered that they would raise external funds before they would cut dividends. This suggest that managers view dividend cuts as costly. One reason for this is that dividend decreases generally are punished by the market as found in Denis et al. (1994) among others.[17] Thus, firms may be reluctant to increasing dividends if the cash-flow is non-sustainable. In addition, studies suggests that firms aim at a target ratio and tries to smooth dividends. Thus, an unexpected dividend increase may be a stronger signal about permanent future earnings, while a repurchase announcement may convey to the market that management is committed to not wasting temporary cash on private benefits and value destroying activities.

With respect to the relationship between repurchases and ownership structure, a firm with plenty of cash, few investment opportunities, low insider ownership and dispersed outside ownership may benefit from using repurchases in distributing excess cash to mitigate agency costs. This in the sense that a repurchase announcement could be a signal to the market from the primary insiders that they are committed to not wasting excess cash. Overall, from an agency perspective, if repurchases are motivated by poor monitoring, we would expect to see more dispersed ownership and lower ownership concentration in firms that announce repurchase plans. In addition, one would also expect to see a lower insider ownership in these firms, since high insider ownership initially would reduce the need for monitoring. On the other hand, for the managers to support the initiation of a repurchase program as a self-imposed disciplinary mechanism, the manager must have incentives to do so. In a model by Isagawa (2000), the initiation of a repurchase program is argued to be credible despite the fact that the announcement of a repurchase plan is not a commitment to actually repurchase shares. The model by Isagawa (2000) assumes that the managers objective function depends on the stock price, as he gets a monetary compensation based on the future price of the firm (the manager may have stock options or own a part of the firm), in addition that he has a private benefit from growing the size of the firm. By announcing a repurchase plan, this reflects that the manager has no profitable investment opportunities, and that the cost to him for wasting internal cash is greater than returning cash to the shareholders and increasing the value of the firm. Thus, the announcement of a repurchase plan reveals information about the managers private benefits when there are no profitable investment opportunities available to the firm. Li and McNally (2002) find support for this model in that insiders have a larger stake in firms that announce repurchase plans.

Empirical results in Fenn and Liang (2001), suggest that there is a negative relationship between management stock ownership and the amount of cash distribution. They find that firms in which managers has a low ownership stake, few investment opportunities (or high free cash flow) pays out more cash. These are firms that potentially have the highest agency problem. However, although higher insider ownership is one mechanism that align managers interests with shareholders, it is also argued that greater ownership by institutional owners or other large shareholders may improve outside monitoring of the management (Shleifer and Vishny, 1986). Grinstein and Michaely (2001) investigate the relationship between firms payout policy and institutional ownership in the US, for the period 1980 through 1996, and find evidence that firms attract institutions through their payout policy. More specifically, their results suggests that institutions increase

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poor performance.

[17]Some proposed explanations for this has been signalling, overinvestment and dividend clienteles.

their holdings in firms that repurchase more shares, and decrease their holdings in firms that pay more dividends. In addition, when examining the causality between institutional ownership and payout policy, their results indicate that institutions do not actively change dividend policy or repurchase policy.

The signalling/undervaluation hypothesis

The traditional signalling hypothesis with respect to repurchases proposed by Vermaelen (1981, 1984) and Dann (1981), among others, is motivated by asymmetric information between the managers of a firm and the market. If the managers of the firm has superior information about the future prospect of the firm, and know that the firm is undervalued, they can initiate a repurchase plan to convey this information. Due to the new information about future earnings, implied by the announcement, a positive price impact on the announcement day is expected, as prices adjusts to the new information. Since the undervaluation hypothesis supposes that the managers of the firm has superior information about the true value of the firm, and that the managers successfully announce repurchase plans when the firm is truly undervalued, one would also expect the insiders of the firm to have a higher ownership fraction in these firms if they are able to trade in the firms shares.[18]

However, there is a problematic issue related to the signalling hypothesis and the incentives of the managers of a firm discussed in Fried (2002). The signalling hypothesis implies that managers signal only when the firm is undervalued, and thereby sacrifice their own wealth on behalf of the shareholders.[19] The proposition in Fried (2002) is that it is more likely that managers act opportunistically, and announce repurchase plans to maximize their own wealth. One prediction of the model is that managers announce a repurchase plan both when the firm is undervalued as well as when it is overvalued. The main intuition behind this is that when the firm is undervalued, the manager uses the announcement of a plan, as well as actual repurchases, to transfer wealth to themselves and the remaining shareholders. On the other hand, when the manager want to sell a large part of her shares due to overvaluation, the repurchase announcement can be used to temporarily boost the stock price. Another argument against the signalling hypothesis is that for the signal conveyed through the announcement of a repurchase plan to be credible, there should be an explicit commitment by the managers of the firm.[20] However, for open market share repurchases, it is rarely the case that insiders of a firm explicitly states that they are going to retain their shares for the course of the repurchase plan. Fried (2002) argue that managers could more credibly signal undervaluation by committing to retaining their shares over a period of time.

Thus, in the managerial opportunism case of Fried (2002), the prediction with respect to the level of insider ownership relative to non-announcing firms is not clear since the managers may choose to announce a repurchase plan both when the firm is undervalued and overvalued. With respect to the signaling hypothesis, however, one would expect

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[18]Primary insiders are generally constrained from trading in company shares around major information disclosures. However, a repurchase announcement is not generally considered as an information release where the firm announce fundamental information. In these cases, it is up to the firm to define a "blackout" period for the insiders in which they are not allowed to trade company shares.

[19]The main argument for this is that the announcement reduces the managers financial flexibility as well as limits the potential profits that they can reap from the information.

[20]At least, there should be an implicit commitment in the sense that the initial signal is backed by actual repurchases at a later point in time.

insider ownership to be greater in announcing firms if the managers in these firms exploit their private information.[21]

Management stock options

Fenn and Liang (2001) find evidence that managers substitute repurchases for dividends to increase the value of their stock options. More specifically, they find a strong negative relationship between dividend payouts and management stock options and a positive relationship between repurchase activity and stock options. Their main interpretation of this finding is that managers will have incentives to reduce dividends and increase repurchases (or retain more cash) because the value of the managers stock options are negatively related to expected future dividend payments. However, as noted by Fenn and Liang (2001), there are alternative explanations for a positive relationship between share repurchases and stock options. One explanation could be that options increase the managers incentives to maximize the value of the firm, and therefore also increase profits that is distributed to the shareholders. Another explanation may be that firms use repurchases to counter the dilution effects of employee and management options, such that the increased repurchase activity in firms with large amounts of management options is a direct result of option exercises.

With respect to how stock options relate to the ownership structure of repurchasing firms, one might expect there to be higher insider ownership in repurchasing firms if repurchases are substituted for dividends to maximize stock option values. However the prediction is not clear in the sense that risk averse managers with already a stake in the firm, through stock ownership as well as labor income, may want to reduce their ownership fraction when they are granted more options for diversification reasons.

Expropriation of minority shareholders

So far our discussion has centered around the the potential conflict between the management in a firm and the outside shareholders. However, as argued by Shleifer and Vishny (1997), if large controlling shareholders participate in, or is closely connected to, the firms management,[22] or have enough power to influence the decision process within the firm, there may also be a conflict between controlling shareholders and minority shareholders. For example, large shareholders may use the resources of a firm to benefit themselves on the expense of minority shareholder. If large shareholders are better informed than smaller shareholders, repurchases may be used by controlling shareholders to increase their ownership further (by retaining their shares) on behalf of smaller shareholders when they have favorable information about the firm. When a firm executes repurchases in the market, the sellers are current shareholders who, unknowingly, are trading with the firm in the open market. Thus, the cash distribution is essentially involuntary[23] in the sense that the sellers may not have wanted to sell any shares at the current price if they had known that

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[21]An behavioral interpretation could be that insiders have a higher ownership in announcing firms because these managers are over-optimistic with respect to their own abilities in generating value as well as to the firms future prospects.

[22]Gomes and Novaes (2002) shows that the conflict between controlling shareholders and minority shareholders may increase when the controlling shareholders also participate in the management of the firm.

[23]As opposed to a tender offer repurchase where the selling shareholders know beforehand that they are selling shares back to the firm. In addition, tender offer repurchases are generally executed at a premium to the market price, while own market share repurchases are executed at the prevailing market price.

the firm was the buyer. If there is asymmetric information between the managers of the firm and the market place, and the managers are able to correctly time their repurchases accordingly, the selling shareholders execute trades against an informed investor and sell shares at a price below fair value. Thus, if large controlling shareholders has superior information about firm value either through their potentially closer connection to the management or through their greater incentives to collect information, they are also more likely to retain their shares relative to small shareholders when the firm actually execute repurchases due to mispricing. Brennan and Thakor (1990) develop a theory for firms choice among several ways of paying out cash to shareholders in which there is a wealth distribution from small uninformed shareholders to large, better informed, shareholders. Their model assumes that the collection of information by investors is costly, and that stock prices does not reflect all information. Since large shareholders have greater incentives to becoming informed, small shareholders may face the risk of being expropriated by large shareholders. Thus, small uninformed shareholders has a co-ordination problem and are unable to keep their ownership fraction constant in the event when a firm repurchases shares. Moreover, they tend to be left with a greater ownership fraction in overvalued firms (when insiders or larger shareholders sell), and a lower ownership fraction in undervalued firms (when the firm and better informed investors buy). The center of their argument is that non-proportionate share repurchases forces shareholders to collect information and incur the gathering costs or alternatively run the risk of expropriation by better informed investors. As a result of this, large shareholders prefer cash to be paid out through repurchases instead of dividends, while small, potentially less informed, investors prefer dividends since these are paid pro-rata and do not bear such adverse selection costs.

The model of Brennan and Thakor (1990) is also related to the hypothesis of Barclay and Smith (1988) who argue that there is a implicit cost associated with repurchases.[24] Their main hypothesis is that a repurchase plan increases the adverse selection component of the spread in the market, which again may increase the cost of capital for the firm. If this effect is large enough, firms would prefer to use dividends instead of repurchases. In line with their hypothesis, they find that the spread increases after the firm has announced a repurchase plan, and decreases to its pre-announcement level after the repurchase plan is completed. In other words, the increased bid-ask spread captures the increased probability of trading with an informed investor (the firm or the insiders of the firm).

Takeover defense and entrenchment

Another motivation for management to support the initiation of a repurchase plan, as well as actually execute repurchases, is to reduce the probability of takeovers. This because a hostile takeover, if successful, could result in the manager being replaced and loose control over the firms resources. In a hostile takeover, the acquiring firm makes an offer to the shareholders of the firm. Thus, if the firms ownership is dispersed it is more likely that the bidding firm will be able to successfully take control. Repurchases is one[25] effective measure for managers to reduce the probability that a takeover will be successful. Stulz (1988), argues that a stock repurchase increases the proportion of shares held by the manager and stockholders supporting him, such that it becomes more difficult to

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[24]Their motivation was initially to explain why firms use dividends instead of repurchases to pay out cash despite the relative tax advantage of capital gains to dividends in the US.

[25]Among other things, managers can also adapt anti-takeover amendments, "poison pills", increase their ownership proportion etc. to oppose takeover attempts.

obtain enough shares to take control of the firm. Bagwell (1991) propose a model with heterogenous valuations among current shareholders and an upward sloping supply curve for the company shares. Thus, by repurchasing shares at the current market price, the shareholders with the lowest valuations are removed, such that a more expensive group of shareholders are left, implying that the cost of acquiring shares is increased. Also, Bagnoli and Lipman (1989) develop a model where they assume asymmetric information between the managers and the market. By signalling the quality of their firm through repurchases, this convinces the current shareholders that the value of the company is higher such that a takeover becomes more costly. However, as shown in Denis (1990), when a repurchase announcement is interpreted as a takeover defense, the announcement effect is highly unfavorable.

Thus, while managers have incentives to oppose takeovers, firms with characteristics that make them likely takeover candidates is expected to be more likely to announce repurchase plans and execute repurchases. The characteristics of a takeover candidate may depend on many factors, but generally, undervalued firms, with low managerial ownership and low ownership concentration (dispersed ownership) may be more likely takeover candidates. Thus, managers in firms with these characteristics may have stronger incentives to entrench themselves and use repurchases to increase their ownership as well as to remove shareholders with the lowest valuations.

3 Regulatory and institutional aspects

3.1 Repurchase methods

There are mainly three methods for firms to repurchase their own shares; through tender offers, open market transactions or via privately negotiated transactions, also referred to as Dutch auction repurchases. The two first methods are used to a larger extent than the latter, and in the US, open market transactions are observed more frequently than tender offers. In fact, 90% of the cases between 1985 and 1993 were open market transactions as discussed in Ikenberry et al. (1995) and Stephens and Weisbach (1998). However, the size of an open market share repurchase is in general of much smaller magnitude than a tender offer repurchase. In a tender offer, the reacquiring firm offers to repurchase its shares at a specific price, usually at a premium to the market price (fixed price tender offers). In an open market repurchase, on the other hand, the purchase is executed through brokers in the open market at normal commissions rates, and no premium is paid.[26] Thus, open market repurchases is the same as a sequence of tender offer repurchases, where the bid price is the tender price. Since tender offers are generally larger in magnitude than an open market repurchases, the alternative of trading the shares directly in the market through open market repurchases, would potentially incur a price impact cost to the firm that would exceed the premium offered through the tender price, making tender offers more attractive for large distributions.

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[26]At least no direct premium is paid. As argued by Barclay and Smith (1988), the announcement of a repurchase plan may lead to increased spread in the market due to an increased adverse selection component in the spread. Thus, by announcing a repurchase plan, the firm itself may experience higher implicit transactions costs in the primary market when it executes repurchases.

3.2 The introduction of repurchases in Norway

The 1st of January, 1999, the Securities Act of June 13 1997 went into effect, and Norwegian firms were allowed to repurchase their own shares. The Act states that firms are allowed to repurchase up to 10% of the outstanding shares as long as the firm's total equity value in excess of the firm's own stockholdings is higher than 1 mill. NOK. Such limited open market repurchase programs are often referred to as "Normal Course Issuer Bids", whereas fixed price tender offers which do not have any limit to the amount of stock that can be repurchased is commonly called "Substantial Issuer Bids".

In Norway, as in the US and other countries, the most frequently observed repurchase method is open market repurchases executed as a part of a Normal Course Issuer Bid, simply because Substantial Issuer Bids are only observed in a few instances. In this paper, we only examine open market shares repurchases. Furthermore, the OSE listed firms do not have to receive approval from the exchange before initiating a repurchase program. In the U.S. the same rule applies as in Norway. However, Canadian firms (see Ikenberry et al. (2000)), must receive approval from the exchange before they can initiate a repurchase program. In Norway, as in most countries, the managers must be authorized by the stockholders to initiate a repurchase program. Such an authorization is effective for the time period stated in the plan, or at most 18 months which is the legal limit. After the repurchase period has expired, there must be a new vote before the firm can continue to repurchase shares. When a firm carries out an open market transaction announcement rules apply, i.e. the firm must inform the OSE before the trading starts the following day. However, if the trade is considered as being informative, the general rule is that it must be announced to the OSE immediately.

3.3 The corporate environment

The main laws regulating corporations in Norway are Aksjeloven (the corporate law), Verdipapirhandelsloven (the securities law) and Børsloven (Oslo Stock Exchange regulations).[27] With respect to the board structure, all listed firms with more than 200 employees is required to have a supervisory board which elects the board. The supervisory board consists of 1/3 from the employees and 2/3 owners, and the board consists by 1/3 of the employees candidates and 2/3 consists of the owners candidates. With respect to to open market share repurchase programs, any owner can suggest that an repurchase program is put on the agenda for the ordinary stockholder meeting. In addition, an owner, or group of owners, representing at least 5% of the cash flow rights can force an extraordinary stockholder meeting. A repurchase program is defined as a change in the corporate charter, and requires a super-majority vote of 2/3 from the voting shares represented at the shareholder meeting. In addition, it requires a 2/3 vote from all shareholders (including holders of non-voting shares) to be passed. Thus, non-voting shares may be important when it comes to proposals for changing the corporate charter. There are also a set of regulations in place to protect minority shareholders. First, any shareholder has to report to the firm and the Oslo Stock Exchange when it passes through various thresholds.[28] If a stockholder passes 40% of the voting rights in a firm, he has to give a tender offer (Mandatory Bid) to the remaining shareholders, and if he owns at least 90% of the shares

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[27]A detailed description of the regulatory environment in Norway can be found in Bøhren and Ødegaard (2000).

[28]These thresholds were 10%, 20%, 33%, 50%, 67% and 90% during the sample period.

he is required to buy from any shareholder that wants to sell shares.

There are also insider trading rules that first of all restrict all insiders from trading on firm specific information that is important for the pricing of the stock. Furthermore, primary insiders, such as board members and the management team, are restricted from trading around various corporate events. For example, they are not allowed to trade two months before the publication of annual reports. In periods when they are allowed to trade, strict disclosure rules apply as the insider must report the transaction to the OSE within the trading starts the next day (10 am). Primary insiders are defined as members of the management team, board members and substitutes. The broader definition of all insiders also include company auditors, and the primary insiders immediate families. With respect to open market share repurchases, similar disclosure rules apply, as the firm is required to report their transactions before the market opens the next day.

3.4   The Norwegian tax system

Dividends distributed from a Norwegian tax resident public- or private limited company were taxed fully on the investor's hand until 1992. As a result of an extensive tax-reform in 1992, dividends became tax-exempt while the capital gains tax was set at a flat rate of 28%, both for individuals, companies and private pension funds.[29] However, shareholders in firms that retain a part of their after tax earnings, may experience that some of the capital gains when the shares are sold reflect a price increase due to the retained earnings. To eliminate the double taxation this would imply, an adjustment is made. The retained earnings per share is added to the cost basis (usually the purchase price) such that the capital gain/tax basis is reduced accordingly (RISK adjustment).[30] Thus, during the period 1992 until 2001, dividends were not taxed on the investor's hand at all, and tax on capital gains linked to retained earnings was eliminated.[31] The result of this was that there were essentially was no preference in the tax system between capital gains or regular cash distributions. However, in 2001, a personal tax on dividends was re-introduced, at a rate of 11%, while the capital gains tax and corporate tax remained at 28%. With respect to the dividend taxation, a basic deduction of NOK 10 000 was introduced. Thus, small investors in dividend paying firms were not directly affected by the tax increase. However, for larger investors the total taxation on dividends increased from 28% to 35.92%, due to the double taxation of parts of the earnings. In 2002 the personal taxation of dividends was again removed. For foreign investors, dividends distributed from a Norwegian tax resident public or private limited company to its non-resident shareholders are subject to 25% withholding tax. Tax treaties may make the withholding tax deductible in the shareholder's home country. Non-resident shareholders gain on a sale of shares in a Norwegian company is not subject to any Norwegian taxation, unless the shares form part of a permanent establishment in Norway or the seller is an individual who fulfill certain conditions that would make the gains taxable at a rate of 28%.

With respect to the relative tax treatment of dividends and repurchases in Norway, there has been a change during our sample period from 1999 through 2001. In 1999 and

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[29]labor unions, non-profit organizations and public pension funds are exempt from taxation.

[30]RISK is the acronym for "Regulering av Inngangsverdien med Skattlagt Kapital". Translated, it means that there is an adjustment of the cost basis by the retained earnings after corporate tax. To be eligible to the RISK adjustment within a given year, the shareholder must have owned the shares over the turn of the year.

[31]The Norwegian tax system is a full imputation system, in which a double taxation is eliminated. In the UK, there is a partial imputation system, while the US has a classical company tax system.

2000, dividend distributions were not taxed. On the other hand repurchases where the shareholder sells shares above the tax basis is taxed at 28%. Thus, in cases where the firm uses already taxed earnings for repurchasing shares at a price above the tax basis, the shareholder that sell shares back to the firm would experience a double taxation on the excess capital gains. In 2001, when a dividend tax of 11% was introduced, the tax differential between capital gains and dividends was reduced, favoring repurchases.[32] With respect to foreign investors, they have been subject to 25% withholding tax on dividends through the entire sample period. However, since the capital gains for foreigners is subject to the tax in the home country, the preference between dividends and repurchases may vary between foreign investors depending on the tax treatment in their home country.

4 Data description and general statistics

The repurchase data

The sample was formed by collecting all the announcements of open market share repurchase programs for the period 1998 through 2001. In addition, the actual repurchase executions related to these announcements reported to the Oslo Stock Exchange (OSE) from January 1999 through December 2001 were collected.[33] Panel A of table 1 shows statistics for repurchase plan announcements for the whole sample period as well as separate years for our repurchase sample. The second column in panel A shows the number of repurchase plans announced and the second column shows the number of separate firms that announced. Thus, through the sample there were 318 repurchase plans announced by 163 different firms. This is about 55% of the firms that were listed on the OSE during the sample period. The fourth column report the maximum number of announcements for the whole period and separate years. The firm that announced the largest number of times during the sample period announced once every year. Within each year, no firms announced more than once in 1998 and 1999, while there was at least one firm that announced twice during 2000 and 2001. The next three columns in panel A report the minimum, average and maximum amount authorized to be repurchased during the repurchase period. For the whole period, the minimum amount announced by a firm was 1% of the outstanding shares at announcement. The average amount announced was 9.5% while the maximum was 10%, which also the upper legal limit. The median announcement was for 10%, and 281 of the announcements was for 10% of the outstanding shares in the firm. Thus, the default amount announced seemed to be the maximum legal limit.[34] The last 5 columns of panel A in table 1 shows the number of announcing firms that actually bought shares during the repurchase period, the number of announcing firms that did not execute any repurchases, the median, mean and maximum fraction of outstanding shares repurchased during the announced repurchase periods. For the whole period there were 100 firms that actually executed at least one repurchase during the course of the program, while 63 firms did not. For the separate years, the number of repurchasing firms reflect the number of firms that announced a repurchase plan in the respective year, and repurchased

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[32]The dividend taxation was removed again in 2002.

[33]Firms could announce a repurchase plan before 1999, but were not allowed to execute any repurchase before January 1999.

[34]Several firms does not state a limit on the shares to be repurchased. In those cases, we assume that the legal limit of 10% apply. However, firms are not required to announce the size of their programs, such that these numbers may be too high relative to their intentions.

shares during the announced repurchase period (with a maximum length of 18 months). Thus, of the 85 firms that announced a repurchase plan in 1999, 41 firms executed at least one repurchase, while 44 did not. For the firms that actually repurchased shares, the median amount of outstanding shares repurchased was 1.8% while the mean amount was 2.9%. The maximum amount repurchased was 22.1% which is more than twice the legal limit of 10%. The maximum legal limit is exceeded by a few firms in every year in the sample except for repurchases related to announcements in 1998. This may be due a renewal of some repurchase plans which is not captured in our announcement records. In addition, it may be because these firms have used repurchased shares as payments in transactions, bonus plans to employees or managers or simply reduced the number of outstanding shares such that their holding of treasury shares is kept below 10% at any point in time, but that the accumulated repurchases exceeds the limit. Overall, the table shows that the first years after repurchases were introduced in Norway, there has been a large increase in the number of firms announcing that they have initiated a repurchase program. Of these firms, about 60% actually executed repurchases.

Panel B of table 1 shows statistics for the actual repurchase activity by the firms in our sample for the whole sample period as well as for separate years. The second column in panel B report the total number of executed repurchases, while the third to sixth column report the cross-sectional distribution for the number of repurchases, column seven and eight show the average repurchase size in number of shares and Norwegian kroner (NOK), while the two last columns provide numbers for the total repurchase volume in shares and NOK. The median firm executed 10 repurchases through the sample period while the average number of repurchases across firms was almost 17. The firm that repurchased the most, executed 197 repurchases through our sample period.[35] For the separate years, the number of repurchases more than tripled from 1999 to 2001, while it decreased in 2002. On the other hand, the average number of repurchases across firms doubled through the period. One interesting thing to note about the trend in repurchases is that there was that the repurchase volume was the highest in 2001, both with respect to the number of repurchases, the total number of shares repurchased as well as the NOK value of all repurchases. One reason behind this may be that there was introduced an 11% personal tax on dividends in 2001. However, a large amount of the repurchases in 2001 was also triggered due to the large price drop in September 2001 after the terrorist attacks in the US, as about 20% of the repurchases in 2001 was executed in September.

With respect to the size of the repurchases, the average size in number of shares increased from 1999 to 2001 and decreased in 2002, while the size in Norwegian kroner (NOK) steadily decreased through the period. This may indicate that firms that experienced a decline in their stock price repurchased more, wile firms with a high price or that experienced an increase in their price repurchased less. With respect to the two last columns in the table, we see that the number of shares in all repurchases tripled from 1999 to 2001, and fell in 2002. The same trend is evident when looking at the aggregate volume of repurchases in NOK.

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[35]The specific firm is Pan Fish ASA (PAN). The company is engaged in the farming, processing, sale and distribution of salmon and trout at a global level. It has more than 2300 employees and operations in 10 countries (numbers from 2002 annual report).

Table 1: Announcements of repurchase plans and actual repurchase activity

Panel A of the table shows the number of repurchase plans announced by firms, the authorized repurchase amounts, and the number of firms actually repurchasing shares as well as the associated completion rates as percentage of outstanding shares repurchased. The first column report the number of announcements, the second column report the number of different firms that announced at least one repurchase plan, and the third column report the maximum announcements by one firm within the specified period. The three next columns report the minimum, mean and maximum authorizations. The last five columns report the number of firms that actually repurchase (Rep.), the number of firms that do not repurchase as well as the median, mean and maximum fraction repurchased by firms relative to their outstanding shares. Panel B shows various statistics for the repurchases executed by firms for the whole period as well as for separate years. The columns report the total number of repurchases (n) by all firms for the whole period and separate years, the cross sectional distribution of the repurchases across firms (minimum, median, mean and max repurchases), the average size of repurchases in thousand shares and Norwegian kroner (NOK) and the total share-volume and NOK volume in all repurchases. Averages are are equally weighted across firms.

Panel A: Announcements of repurchase plans

	Announcements	Firms	Max ann.	Authorized repurchase amount			Repurchasing firms/Completion rates				
				Min.	Mean	Max.	Rep.	Norep.	Median	Mean	Max
Whole period	318	163	4	1.0%	9.5%	10.0%	100	63	1.8%	2.9%	22.1%
1998	28	28	1	2.5%	9.1%	10.0%	15	13	1.9%	2.9%	10.0%
1999	85	85	1	1.0%	9.5%	10.0%	41	44	1.9%	3.2%	19.0%
2000	93	90	2	1.0%	9.4%	10.0%	65	25	1.8%	2.9%	16.1%
2001	112	109	2	3.3%	9.6%	10.0%	60	49	1.3%	2.7%	22.1%

Panel B: Repurchase activity

	Number of repurchases					Repurchase size		Repurchase volume	
	n	min	median	mean	max	Shares (1000)	NOK (1000)	Shares (mill.)	NOK (mill.)
Whole period	1719	1	10	16.7	197	159	7223	247	16505
1999	205	1	3	5.0	17	168	13259	35	3679
2000	463	1	5	7.7	64	186	12770	65	5320
2001	659	1	4	9.6	120	281	7480	107	5947
2002	392	1	5	10.1	50	122	3780	41	1560

The ownership data

The ownership dataset was obtained from the Norwegian Central Securities Depository (Verdipapirsentralen, VPS), and contains detailed monthly data on the ownership of firms listed at the Oslo Stock Exchange spanning the same period as our repurchase data, 1999-2001.[36] More specifically, for each month, the data contain variables describing the ownership structure of each firm with respect to the number of shares owned by each owner, the number of owners, and the type of owners (state, foreigners, financials, nonfinancials and individuals).

We also use data on insider ownership. The insider data is constructed based on the reports published by the OSE when an insider trades in company stock. The disclosure rules at the OSE state that an primary insider is required to report any transactions to the OSE within 10 am the next day. This report contains the insider's name, position, number of shares transacted and the resulting total holding which makes it possible to estimate the stake held by primary insiders. One important problem with the insider data is that insiders who leave the firm has no obligation to report this event to the OSE. Thus, when tracking the insider ownership fractions in firms, we are unable to remove insiders that are no longer insiders. Thus, the insider ownership is potentially overstated due to this. With respect to price and accounting data, we obtained this from OBI.[37] This data contain daily stock prices (at the close with best bid and ask prices) and adjustment factors (for dividends, stock splits etc.).

To give a general overview of the ownership structure for firms listed at the OSE for the period we are studying, table 2 report some general statistics across time and market capitalization quartiles. In part (a) of the table we report statistics for the number of listed firms, the average market capitalization, market/book, price and dividend payment (per share) for the whole sample and for separate years. With respect to the number of firms, these numbers are higher than the official "end of year" number reported by the OSE. This is due to new listings, de-listings, mergers and de-mergers occurring within each year.[38] Overall, the average market capitalization increased through the period from NOK 2.3 bill. to NOK 3.4 bill, while the total market capitalization of all listed firms increased from NOK 582 bill. in 1999 to NOK 677 bill. in 2001.[39] The average market-to-book value was 1.15 for all firms through the sample period. Across MCAP quartiles, the market-to-book value was 1.2 for the firms with a market capitalization below the median and 1.1 for the above median firms. Further, the average cash dividend per share was the lowest in 1999, with NOK 6.1 per share, and the highest in 2000 with NOK 7.6 per share. The total cash dividends paid by all firms for the period was NOK 40 bill., distributed across years as NOK 14 bill. in 1999, NOK 12 bill in 2000 and NOK 14 bill. in 2001.[40] Thus, despite the increased tax on dividends in 2001, this did not seem to affect the average or aggregate dividend payments by Norwegian firms.

In part (b) of table 2 we summarize the average ownership fraction by each of the five largest owners. In addition, the average total fraction owned by the 5 largest owners combined and the Herfindahl index is reported. The first thing to note about the table is

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[36]The ownership data actually covers a longer period. For a monthly frequency, the ownership data starts in 1997 through 2002. For end of year data, the ownership data goes back to 1989.

[37]Oslo Børsinformasjon

[38]The official number companies listed at the OSE at the end of each year was 215 (1999), 214 (2000), 212 (2001), 203 (2002).

[39]In 2002 the total market capitalization of the OSE fell to NOK 503 bill.

[40]In 2002 Norwegian firms paid out more than NOK 19 bill. in dividends.

Table 2: Ownership concentration and insider ownership at the OSE

Part (a) of the table shows some general statistics for the listed firms at the Oslo Stock Exchange (OSE) across the whole sample period, separate years and market capitalization quartiles. The number of firms also contain de-listed and firms that are listed during the sample period. Thus, this number is larger than the number of listed firms at officially reported by the Oslo Stock Exchange at the end of the year. The average market capitalization, Market/Book and price are monthly averages across firms. The dividend per share is the average dividend paid by firms across the whole sample period or within each calendar year. Part (b) of the table shows the mean and median fraction owned by the five largest owners separately, the mean and median accumulated fraction owned by the five largest owners as well as the Herfindahl index. Part (c) of the table shows the mean and median fraction owned by all insiders in the firm and the primary insiders (board members and management team). Note that we only have insider data until June 2001.

| | All years | Separate years | | | Market capitalization quartiles | | | |
		1999	2000	2001	Q1	Q2	Q3	Q4
(a) General statistics								
Firm/year obs.	301	271	261	245	75	75	75	75
MCAP (mill.NOK)	3112	2326	2818	3353	93	354	1106	11394
Market/Book	1.15	1.2	1.3	1.0	1.2	1.2	1.1	1.1
Price	76.0	81.6	92.3	71.2	61.2	51.0	91.4	132.0
Dividend/share	6.5	6.1	7.6	7.1	8.6	7.1	8.0	5.1
(b) Ownership concentration								
Largest owner								
mean	0.326	0.308	0.318	0.306	0.259	0.299	0.315	0.293
stddev	0.236	0.232	0.253	0.238	0.180	0.235	0.219	0.223
median	0.243	0.226	0.230	0.240	0.236	0.222	0.212	0.213
2nd largest								
mean	0.103	0.106	0.101	0.108	0.107	0.104	0.106	0.098
stddev	0.067	0.071	0.072	0.075	0.056	0.075	0.065	0.066
median	0.090	0.091	0.085	0.094	0.097	0.094	0.094	0.080
3rd largest								
mean	0.060	0.063	0.059	0.061	0.065	0.062	0.062	0.057
stddev	0.034	0.037	0.036	0.042	0.031	0.039	0.034	0.034
median	0.053	0.055	0.052	0.053	0.059	0.057	0.056	0.048
4th largest								
mean	0.042	0.044	0.041	0.042	0.048	0.042	0.045	0.040
stddev	0.022	0.024	0.024	0.024	0.023	0.023	0.026	0.019
median	0.041	0.042	0.040	0.041	0.043	0.044	0.042	0.039
5th largest								
mean	0.032	0.034	0.032	0.032	0.036	0.033	0.033	0.032
stddev	0.016	0.018	0.018	0.017	0.016	0.018	0.018	0.014
median	0.032	0.033	0.032	0.032	0.035	0.035	0.032	0.032
Sum 5 largest								
mean	0.563	0.555	0.551	0.549	0.515	0.540	0.562	0.520
stddev	0.229	0.234	0.243	0.240	0.208	0.240	0.231	0.212
median	0.557	0.557	0.552	0.558	0.557	0.550	0.554	0.454
Herfindahl index								
mean	0.206	0.187	0.201	0.184	0.130	0.181	0.187	0.170
stddev	0.228	0.218	0.250	0.232	0.146	0.226	0.201	0.203
median	0.099	0.095	0.098	0.103	0.096	0.096	0.099	0.081
(c) Insider ownership								
All insiders								
mean	0.136	0.144	0.149	0.146	0.153	0.171	0.155	0.139
stddev	0.253	0.264	0.273	0.269	0.279	0.287	0.262	0.266
median	0.011	0.005	0.014	0.013	0.013	0.009	0.024	0.013
Primary insiders								
mean	0.079	0.081	0.085	0.089	0.100	0.103	0.095	0.054
stddev	0.192	0.198	0.210	0.216	0.241	0.239	0.215	0.122
median	0.001	0.000	0.002	0.003	0.003	0.001	0.005	0.002

Data from all listed firms at the Oslo Stock Exchange (OSE) over the period 1999-2002. Data source: Verdipapirsentralen (VPS).

that the average ownership fraction each of the largest owners has been relatively constant through the period, with the largest owner owning about 33% on average. In addition, the five largest owners decreased their mean ownership from 55.5% in 1999 to 54.9% in 2001, while the median ownership by the five largest owners remained unchanged. These numbers are similar to what is found in Bøhren and Ødegaard (2001) for 1997 when the average stake for the largest owner was 29%, and the total ownership by the five largest owners was 53%. However, relative to their study, the stake of the largest owner has increased by 1.8 percentage points from 1997 to 1999, wile the aggregate ownership of the five largest owners increased by 2.5 percentage points. Compared to what is common among European firms the ownership by the largest owners is very low in Norway. Bøhren and Ødegaard (2001) report that the average ownership by the largest owner for European countries in 1997 was 44%. When looking at the Herfindahl index,[41] this measure suggests that there was an increase in concentration from 1999 to 2000, and a decrease in concentration from 2000 to 2001. However, the median concentration has increased through the period. For 1997 Bøhren and Ødegaard (2001) report an average Herfindahl index of 0.15. Across market capitalizations, the most evident pattern is that the mean fraction owned by the five largest owners is the largest in firms with a market capitalization in the second and third quartile. This is also evident when looking at the Herfindahl index. With respect to the ownership of each of the largest owners across market capitalizations, the average ownership is generally the highest for firms in the third size quartile. However, the median ownership is the largest in the lowest size quartile.

In part (c) of table 2 we report similar statistics for the fraction owned by insiders in firms listed on the OSE. Before we continue, it should be noted that we only have insider data until the first half of 2001. For the entire sample period, all insiders owned about 14% in Norwegian firms on average, while primary insiders (the management team and board members) owned on average about 8%. Comparably, Bøhren and Ødegaard (2001) report that all insiders owned on average 10% in 1997 while primary insiders owned about 3%. Thus, relative to their numbers, there has been an increase in the insider ownership at the OSE. However, some caution should be used when interpreting these numbers since the larger insider fractions in this study may be because of the data problem related to the insider holdings discussed earlier. With respect to the median insider, all insiders owned about 1.1%, while primary insiders owned about 0.1%. Thus the distribution of inside ownership is highly skewed. This is caused by a large part of the sample firms having a very low or a close to zero fraction owned by insiders of the firm, in addition to several firms having a very high insiders ownership. Furthermore, across market capitalization quartiles, the average insider ownership is the highest in the lowest size quartiles.

5   Descriptive analysis of ownership in repurchasing firms

In this section we combine the data on announcements of repurchase plans, actual repurchases and the ownership data to examine whether there are differences in the ownership composition in announcing versus non-announcing firms. In addition, we examine whether firms that actually repurchase shares during the repurchase period and those that do not are different from firms that do not announce a repurchase plan. To facilitate this, we

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[41]The Herfindahl index is calculated as the sum of squared ownership fractions of all owners in a firm. The Herfindahl index is highly correlated (more than 0.8) with the aggregate ownership of the five largest owners.

split all the firms at the OSE into 4 subgroups. When looking at the whole sample period, the first group consists of all firms that *do not* announce a repurchase plan during our sample period from 1999 through 2001. The second group consists of firms that *do* announce at least one repurchase plan during our sample period. The third group consists of firms that announce a repurchase plan, but *do not* repurchase any shares during the repurchase period, and the fourth group consists of announcing firms that actually execute repurchases during the repurchase period.[42] Similarly, when looking at separate years, we split firms into groups based on whether they have announced a repurchase plan or not during the respective year. To determine whether a firm has repurchased any shares after it has announced within in a specific year, we track whether it has repurchased within the announced time limit, or within the legal limit of 18 months. For example, a firm that announces a repurchase plan in May of 1999 is considered a repurchasing firm (for that year) if it executes at least one repurchase before December 2000.

5.1 Ownership concentration in repurchasing firms

Jensen and Meckling (1976) and Shleifer and Vishny (1986), among others, suggest that ownership concentration is an important mechanism for disciplining and monitoring non-owner managers. This because large outside owners potentially both have the incentives to monitor through high cash flow rights as well as the power to affect corporate decisions through their voting rights. If there are no large shareholders with these incentives, there may be insufficient monitoring of managers. In those cases, payout policy is one mechanism that can help reduce the agency problems as suggested by Jensen (1986). Although cash dividends and new debt also reduce the amount of free cash within a firm, more flexible repurchases may be especially attractive for firms with volatile cash flows that want to smooth dividends.

In this section we examine the ownership concentration of repurchasing firms to investigate whether firms with potentially higher agency problems tend to use more repurchases. Table 3 shows the concentration statistics across firm-groups for the whole period as well as for separate years. We do not distinguish between voting and non-voting shares in any part of the analysis, but instead calculate the statistics at the company level.[43] We calculate average statistics for the groups discussed above, where "All OSE firms" are all listed firms at the OSE. These firms are further divided into "Non-announcing firms" and "Announcing firms" depending on whether the firm has announced a repurchase plan during the sample period or not. The "Announcing firms" group is then further divided into two sub-groups depending on whether the firms have executed any repurchases during the repurchase period ("Repurchase") or not ("No repurchase"). The second column in the table report the number of firms in each group and sub-group.[44] Column three to seven show the average fraction owned by the largest (ranking 1) to the fifth largest (ranking 5) owner. The eight and ninth column report the ownership concentration measures which is the combined fraction owned by the 5 largest owners and the Herfindal index respectively. Finally, the three last columns report the average market capitalization (in NOK

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[42]The repurchase period is the period for which the firm has announced that it may repurchase shares. The maximum legal limit is 18 months.

[43]Only 13 firms had non-voting (B-shares) shares at the end of 1999. During the sample period, many firms chose to merge these together into a single share-class.

[44]Note that the number of firms within each group is lower than in table 1. This is because the numbers are at company level, which reduces the number of observations with about 10.

mill.), the average dividend (in NOK per share) paid out by the firms, and the market to book value. We run tests for differences in means between the group of announcing firms and non-announcing firms. In addition, for the two subgroups of repurchasing and non-repurchasing firms we run a test for differences in means against the group of non-announcing firms. Thus, all tests are relative to the non-announcing group.[45]

Looking at the statistics for the whole period first, there are several things to note. The largest owner has a significantly lower stake in announcing firms (30%) than in non-announcing firms (43%). On the other hand, the second- to fifth largest owners owns a significantly larger fraction in announcing firms than in non-announcing firms. This is also reflected in the concentration measure in column eight ("Sum 5 largest"), where we see that the average fraction owned by the five largest owners is significantly lower in announcing firms than in firms that do not announce a repurchase plan. This difference is mainly due to the lower ownership by the largest owner in these firms. With respect to the Herfindahl index the difference becomes even more pronounced. When examining the group of announcing firms in more detail, we see that the differences in ownership concentration is the largest for firms that actually repurchase shares. Looking at the fraction owned by the five largest shareholders together, we see that while the firms that announce, but do not repurchase has on average a combined ownership of about 58% which is not significantly different from firms that do not announce a repurchase plan (63%). However, firms that announce and repurchase has a combined ownership of about 53%, which is significantly lower than the group of non-announcing firms. This is also evident when looking at the Herfindahl index. However, relative to that measure, both repurchasing and non repurchasing firms have a significantly lower concentration. For the separate years, the differences seem to be more pronounced in the last part of the sample, except for the ownership of the largest owner and the Herfindahl index.

These findings is in line with a story where firms with dispersed ownership have greater incentives to initiate a self-disciplinary mechanism to ensure their shareholders that they are committed to mitigate agency costs of free cash. This because the largest shareholder also has potentially lower incentives to monitor management, as well as less power to intervene, compared to non-announcing firms where the largest shareholders own a significantly higher fraction of the firm. In addition, the shareholders in these firms may also be more likely to support a proposal that the firm wants to initiate a repurchase program if it is expected to reduce agency costs.

Furthermore, the results also suggest that these differences in concentration is the strongest in firms that actually repurchase shares. This results may however also be in line with managers using repurchases to reduce the probability of a successful hostile takeover, and aim at increasing the ownership concentration over time in the hands of themselves and/or the most "manager-loyal" shareholders. In addition, as discussed earlier, those shareholders selling their shares in the market would also be those with the lowest valuations effectively increasing the price to a bidder. This may indicate that firms where the incentives to monitor are the lowest and the probability of a successful takeover

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[45]The test depends on whether the population variances of the two groups are equal or not. If the variances are equal, then the t-stat is calculated as $t = (\bar{x}_a - \bar{x}_b)/\sqrt{s^2(1/n_a + 1/n_b)}$ where $\bar{x}_a$ and $\bar{x}_b$ are the means for the two groups respectively, n_a and n_b are the number of firms in each group while s^2 is the pooled standard deviation calculated as $s^2 = [(n_a - 1)s_a^2 + (n_b - 1)s_b^2]/[n_a + n_b - 2]$, where s_a^2 and s_b^2 are the standard deviation of the ownership variable for the non-announcing and announcing firms respectively. We use the SAS v.8.2 package to perform all tests. If the variances are significantly different, the standard approximation (Satterwaite) supplied in SAS is used.

Table 3: Ownership concentration for repurchasing vs. non-repurchasing firms

In the table we examine ownership variables and other characteristics across different groups of firms. We split firms into five groups. "All OSE firms" are all firms listed on the OSE. These firms are divided into two groups. The first group is "Non announcing firms" containing all firms listed at the OSE that does not announce a repurchase plan during our sample period. The second group is "Announcing firms" which consists of firms that announce a repurchase plan. This group is further divided into firms that announce, but do not repurchase any shares ("No repurchase") and firms that announce and repurchase shares ("Repurchase"). For the separate years, "announcing firms" are firms that announce a repurchase plan that year. Repurchasing firms are firms that announce a repurchase plan that result in repurchases within the next repurchase period (max. 18 months). The table shows the average ownership fraction for the 5 largest owners, with the largest owner having rank 1. In addition, we examine the combined fraction owned by the 5 largest owners (Sum 1-5), the Herfindahl index (sum of squared ownership fractions of all owners), the average market value (MCAP) in NOK millions, the average yearly dividend (per share) paid by firms and the market to book value (market capitalization divided by the book value of equity). We test whether there are differences in means for the various variables between firms that announce a repurchase plan ("Announcing firms") and firms that do not ("Non announcing firms"). In addition, we also test whether the means of the announcing firms that repurchase and those that do not are different from the non-announcing group. Significance at the 1%, 5% and 10% is denoted by ***, ** and * respectively.

| Firm group | Firms | Largest owner ranking | | | | | Sum 5 largest | Herfindahl index | MCAP (mill.) | Dividend (pr.share) | Market to Book |
		1	2	3	4	5					
Whole sample											
All OSE firms	301	0.365	0.098	0.056	0.039	0.030	0.589	0.252	3112	6.5	1.15
Non announcing firms	152	0.429	0.091	0.049	0.033	0.025	0.628	0.327	3567	8.5	1.16
Announcing firms	149	0.301***	0.104*	0.063***	0.045***	0.035***	0.549***	0.176***	2693	5.4*	1.14
-No repurchase	54	0.342**	0.099	0.060**	0.044***	0.035***	0.581	0.220**	1880	5.1	1.15
-Repurchase	95	0.277***	0.107**	0.065***	0.045***	0.035***	0.531***	0.152***	3155	5.6	1.14
Year 1999											
All OSE firms	271	0.319	0.104	0.062	0.044	0.034	0.562	0.200	2326	6.1	1.22
Non announcing firms	193	0.333	0.101	0.061	0.043	0.033	0.572	0.220	2030	7.7	1.23
Announcing firms	78	0.284**	0.111	0.062	0.044	0.036	0.538	0.151***	2944*	3.4**	1.19
-No repurchase	39	0.307	0.108	0.061	0.044	0.035	0.554	0.182	1648	3.0***	1.15
-Repurchase	39	0.261**	0.114	0.064	0.045	0.037	0.521	0.117***	4274	3.6***	1.23
Year 2000											
All OSE firms	261	0.326	0.101	0.058	0.041	0.032	0.558	0.211	2818	7.6	1.26
Non announcing firms	181	0.355	0.099	0.057	0.038	0.029	0.578	0.245	2347	8.1	1.27
Announcing firms	80	0.261***	0.105	0.062	0.047***	0.036***	0.511	0.132***	3741	6.9	1.25
-No repurchase	20	0.249**	0.090	0.053	0.040	0.033	0.465**	0.121**	3310	9.3	1.25
-Repurchase	60	0.263***	0.110	0.065**	0.049***	0.037***	0.527	0.136***	3884	6.5***	1.25
Year 2001											
All OSE firms	245	0.313	0.106	0.060	0.041	0.032	0.552	0.193	3353	7.1	0.99
Non announcing firms	145	0.348	0.099	0.053	0.037	0.028	0.565	0.238	4232	8.9	0.97
Announcing firms	100	0.262***	0.114*	0.0704***	0.048***	0.037***	0.533	0.128***	2255	4.9***	1.00
-No repurchase	47	0.274*	0.113	0.068**	0.048***	0.039***	0.544	0.138***	1863	4.2***	0.99
-Repurchase	53	0.251***	0.116	0.072***	0.047***	0.036***	0.524	0.119***	2603	5.3**	1.01

is the highest, are more likely to actually repurchase. We will also come back to this issue when we later examine the number of owners in these firms.

The finding that the 2nd-5th largest owners have a higher ownership fraction in announcing firms seem to be the case both for non-repurchasing and repurchasing firms. This indicates that announcing firms have a flatter power structure than non-announcing firms. Furthermore, dispersion in ownership among the largest shareholders is even more pronounced in firms that actually repurchase shares. In non-announcing firms, the largest shareholder has about 2 times the stake of the combined ownership of the 2nd-5th largest owners, while this ratio is 1.5 in firms that announce a repurchase plan, and closer to 1 in firms that actually repurchase shares indicating that the largest owner has a similar stake as the 2nd-5th owners combined. The difference between announcing and non-announcing firms may reflect that it is easier to obtain enough votes for initiating a repurchase plan in these firms than in non-announcing firms in the sense that it would be more difficult for a large shareholder to block a proposal of a repurchase program when his relative ownership is low. With respect to why firms that actually repurchase shares has the flattest structure, this may reflect that managers have stronger incentives to actually repurchase shares in these firms. For example, the manager may benefit from concentrating the ownership in these firms to reduce the probability of experiencing a successful takeover. Alternatively, it may also reflect that managers in fact are committed to distribute excess cash in firms with the potentially highest agency costs.

With respect to the size of the firms in the different groups, there is no significant difference in market capitalization between announcing and non-announcing firms for the whole sample or separate years. Also with respect to dividends, the difference is only significant at the 10% level for the whole sample period. For the separate years however, firms that announced repurchase plans paid significantly lower dividends both in 1999 and 2001, but not in 2000. Looking at the subgroups of announcing firms within each year, firms that actually repurchased shares paid significantly lower dividends than non-announcing firms within each year. This is what one would expect to see if firms substitute repurchases for dividends as suggested by Grullon and Michaely (2002). In addition, for announcing firms that did not repurchase, the lower dividend payments may be explained by these firms being less liquid, and thus less likely to pay either dividends or repurchase shares.[46] In addition, as discussed earlier in the paper, an 11% dividend tax was introduced in 2001. This does not seem to have an impact on the average dividend payment by firms. With respect to the market to book values, these are not significantly different for firms in any of the groups.

Overall, there seem to be systematic differences in the ownership concentration of firms that initiate a repurchase program relative to firms that do not. Repurchasing firms generally have a much lower concentration and a flatter power structure between the five largest owners. This may support several theories. One interpretation may be that these firms may suffer from insufficient monitoring such that a repurchase plan is used to mitigate agency problems related to free cash. In addition, shareholders in these firms may be more likely to vote for a repurchase program if they believe this will help mitigate agency problems when there is insufficient monitoring. However, it may be difficult to force a manager to actually repurchase shares if he prefers to keep cash within the firm. On the other hand, as suggested by Isagawa (2000), if managers have a stake in the firm,

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[46]In a previous paper on repurchases in Norway, we find that announcing firms that do not repurchase shares has a significantly lower quick ratio and current ratio than firms that actually repurchase shares.

through share ownership or stock options, it may be optimal for them to disgorge excess cash through repurchases instead of investing in negative net present value projects that would decrease the value of the firm in the long run. Another interesting finding is that firms that actually repurchase shares have a much flatter power structure among the five largest owners compared to any other group. This may suggest that managers have the strongest incentives to actually execute repurchases in firms with low concentration.

5.2 Ownership by owner-types and number of owners in repurchasing firms

The type of owner may also have important implications for the corporate governance of a firm. As discussed in Bøhren and Ødegaard (2001), agency theory predicts that personal owners are better monitorers than non-personal owners such as other corporations or the state. This because, personal owners have direct private cash flow interests, while non-personal owners, being an agent representing the ultimate owner, do not. Thus, the incentives for monitoring management may be stronger for personal owners. On the other hand, personal owners are generally much smaller, and has less power in affecting the decisions unless they co-ordinate their interests. In addition, it may be that some types of owners that have a stronger preference for one type of payout policy due to e.g. tax reasons. As suggested in Brav et al. (2003), executives do not believe that institutional investors have a preference between dividends or repurchases, but that personal shareholders have a preference towards dividends despite the tax disadvantage to this payout method in the US. On the other hand, their study suggest that institutions often have an important influence with respect to initiating a repurchase program.

In this section we examine the ownership by different owner types both with respect to their proportional ownership as well as to the number of owners by different types. Our dataset has information on 5 main types of owners; *State* owners that represent investments by the central or local government, *foreign* owners[47] which reflect ownership by non-resident organizations or individuals, *financial* owners reflects institutional ownership such as private banks, insurance firms, pension funds and investment trusts, *Nonfinancial* owners are domestic firms, and *individuals* which are Norwegian personal investors.

In table 4 we calculate the average ownership fractions owned by these owner-types for the same groups that we used in the previous section. For all firms at the OSE, the largest average owner is non-financial, which is also the result in Bøhren and Ødegaard (2001). With respect to the difference in ownership fraction between announcing and non-announcing firms, there are only two types that have a significantly different ownership in announcing firms for the whole period. These are foreigners which has a significantly lower stake in announcing firms, while non-financial owners has a significantly higher stake in announcing firms. In both cases this is mainly due to their ownership in firms that actually execute repurchases. In addition, the difference is strongest for firms announcing and repurchasing in the beginning of the sample.

Whether these differences are because certain ownertypes has a preference for or against repurchases, or that firms with these types of owners initiate repurchases is difficult to say. However, one may speculate that one reason for this might be that foreign owners are mutual funds or other foreign investors that are invested in Norway for diversification reasons. As we saw in table 3 for the whole sample period, announcing firms seemed

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[47]The number of foreign owners is understated because it contain both registered individuals as well as nominee accounts which may reflect several different owners.

Table 4: Ownership by owner types for repurchasing vs. non-repurchasing firms

The table shows the average ownership fraction for 5 different types of owners. We split firms into five groups. "All OSE firms" are all firms listed on the OSE. These firms are divided into two groups. The first group is "Non announcing firms" containing all firms listed at the OSE that does not announce a repurchase plan during our sample period. The second group is "Announcing firms" which consists of firms that announce a repurchase plan. This group is further divided into firms that announce, but do not repurchase any shares ("No repurchase") and firms that announce and repurchase shares ("Repurchase"). Tests for differences in means between the different groups of announcing firms are performed relative to the group of non-announcing firms. A significant difference at the 1%, 5% and 10% is denoted by ***, ** and * respectively.

		Ownership fraction by type				
Firm group	Firm/year	State	Foreign	Financial	Non-financial	Individual
		Whole period				
All OSE firms	301	0.043	0.210	0.165	0.373	0.206
Non announcing firms	152	0.045	0.239	0.159	0.336	0.216
Announcing firms	149	0.042	0.180**	0.172	0.411**	0.196
-No repurchase	54	0.029	0.208	0.181	0.400	0.184
-Repurchase	95	0.049	0.164***	0.166	0.418***	0.203
		Year 1999				
All OSE firms	271	0.041	0.201	0.166	0.368	0.222
Non announcing firms	193	0.038	0.217	0.165	0.339	0.235
Announcing firms	78	0.049	0.159**	0.202*	0.404**	0.187**
-No repurchase	39	0.053	0.177	0.224**	0.375	0.173**
-Repurchase	39	0.045	0.141***	0.181	0.433**	0.201
		Year 2000				
All OSE firms	261	0.041	0.202	0.166	0.370	0.223
Non announcing firms	181	0.025	0.245	0.227	0.305	0.203
Announcing firms	80	0.061	0.181	0.169	0.379	0.211
-No repurchase	20	0.036	0.204	0.159**	0.374	0.228
-Repurchase	60	0.052	0.197	0.184	0.361	0.209
		Year 2001				
All OSE firms	245	0.043	0.203	0.154	0.378	0.222
Non announcing firms	145	0.047	0.203	0.150	0.359	0.243
Announcing firms	100	0.039	0.203	0.161	0.406	0.193**
-No repurchase	47	0.049	0.231	0.170	0.370	0.182**
-Repurchase	53	0.030	0.178	0.153	0.438**	0.203

to have a slightly smaller (although insignificantly different) market capitalization than non-announcing firms. If foreign investors are tracking the value weighted return on the OSE, they are also likely to be invested in the largest firms on the exchange. A potential reason for why nonfinancial owners has a greater stake in repurchasing firms may be that some firms use their repurchased shares (treasury shares) as payment in transactions with other firms. In addition, the reason may simply be that the treasury stock is captured in this measure such that the numbers also reflect that firms own their own stock.[48]

Another statistic that represent an alternative measure of concentration is the number of owners. One problem with the average ownership fraction by different owner types,

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[48]We do not examine in what degree the firms own stock contribute to the difference. Since the owners in the VPS data are anonymized and represented by a unique number, it is difficult to remove the repurchasing firms own shareholdings.

examined in table 4, is that it may to a large degree capture the ownership by the largest owners of a type. The number of owners by different owner types may give additional information with respect to the preferences of different shareholder groups. In table 5 we examine the average number of owners by owner type across the different firm groups as well as the mean total number of owners. Compared to the previous table there are a few interesting things to note. First of all, firms that announce a repurchase plan seem to have a larger number of owners than firms that do not announce a plan. However, the difference is not significant when looking at the total number of owners. This is mainly because the cross sectional variation in these numbers are very large. Also when testing for differences in medians there is no significant difference between announcing and non-announcing firms.[49] However, the difference seem to be mainly due to those firms that actually execute repurchases, which on average had more than 4000 owners, while non-announcing firms had about 2400 owners.

Initially one could expect there to be a higher number of owners in repurchasing firms. First, a greater number of owners in announcing firms is expected in the sense that we found that the ownership concentration is lower in these firms. Thus, one explanation discussed before could be that dispersed ownership result in insufficient monitoring, such that firms initiate repurchases to distribute cash and mitigate the agency costs of cash. However, a high number of potentially small owners may also be a reason for why firms want to repurchase shares in the first place. For example, by reducing the number of owners, and increasing the concentration, the firm may improve the external monitoring of the firm by increasing the proportional ownership of some owners, or reduce the likelihood of a successful takeover. In addition, some firms in Norway explicitly state that they intended to repurchase shares to remove "odd-lot" owners.[50] Compared to the results when we examined the fraction owned by each owner-type, some additional patterns appear. The average number of owners of all types, except individuals, is significantly higher in announcing firms.

Overall, the number of state owners, foreigners, financial and non-financial owners is significantly higher in announcing firms. This reflects the finding that firms that announce repurchase plans have a lower concentration than non-announcing firms. Furthermore, the differences are the largest in firms that actually repurchase shares, which may be a strong motivation for why these firms repurchase shares.

5.3 Insider ownership in repurchasing firms

One very important owner is the insider which is potentially better informed about current earnings and the future prospects of the firm. In addition, although the general stockholder meeting has voted for initiating a repurchase plan, the manager is the one that decides if and when to execute repurchases. Agency theory predicts that a firm with a large outside shareholder may help mitigate agency costs through his incentives to monitor and power to intervene in the decision process. Similarly, when the manager has a stake in the firm, the agency problem may also be lower as there is a convergence of interest (Jensen and

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[49]The median number of owners in non-announcing firms is 816, while it is 1473 for announcing firms for the whole sample period.

[50]One example of this is Storebrand (STB) which at the beginning January 1999 gave an offer to shareholders that owned less than 8 shares to sell their shares back to the company. Of the total 74000 shareholders at the time, 39000 owned less than 8 shares. Since this is a *targeted repurchase* it is left out of the analysis, since we only examine open market repurchases.

Table 5: Number of owners by owner type for repurchasing vs. non-repurchasing firms
The table shows the average number of owners for 5 different types of owners. We split firms into five groups. "All OSE firms" are all firms listed on the OSE. These firms are divided into two groups. The first group is "Non announcing firms" containing all firms listed at the OSE that does not announce a repurchase plan during our sample period. The second group is "Announcing firms" which consists of firms that announce a repurchase plan. This group is further divided into firms that announce, but do not repurchase any shares ("No repurchase") and firms that announce and repurchase shares ("Repurchase"). Tests for differences in means between the different groups of announcing firms are performed relative to the group of non-announcing firms. A significant difference at the 1%, 5% and 10% is denoted by ***, ** and * respectively.

| | | Average number of owners | | | | | |
| | | | | | | Non- | |
Firm group	Firms	All	State	Foreign	Financial	financial	Individual
				Whole period			
All OSE firms	301	2901	4	131	43	159	2564
Non announcing firms	152	2371	3	79	32	118	2138
Announcing firms	149	3443	6**	185***	53***	201***	2998
-No repurchase	54	2136	4	143	48***	168**	1773
-Repurchase	95	4185*	7***	208***	57***	219***	3695*
				Year 1999			
All OSE firms	271	2813	4	137	44	171	2456
Non announcing firms	193	2274	3	114	37	143	1976
Announcing firms	78	4147**	6**	196*	60***	240***	3645**
-No repurchase	39	2142	4	149	53*	178	1758
-Repurchase	39	6153**	8**	243*	67***	303***	5532**
				Year 2000			
All OSE firms	261	2808	4	137	46	172	2447
Non announcing firms	181	2080	3	88	37	139	1813
Announcing firms	80	4454***	6**	250***	66***	248***	3884**
-No repurchase	20	6865***	10***	448**	87***	361***	5959***
-Repurchase	60	3650*	5*	183**	60**	210**	3192
				Year 2001			
All OSE firms	245	3328	6	156	47	175	2944
Non announcing firms	145	3320	5	114	40	157	3004
Announcing firms	100	3341	7	219**	58**	200	2858
-No repurchase	47	2441	5	173*	53	175	2035
-Repurchase	53	4139	8*	259*	62**	222*	3588

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Meckling, 1976) between the inside- and outside owners. However, as discussed in section 2, there may also be a conflict between inside- and outside owners. First of all, the manager may not have any incentives to actually execute repurchases even though the shareholders have voted for a repurchase plan. Alternatively, the manager may have incentives to secure their position in the firm by increasing their ownership fraction (entrenchment) through repurchasing. One example would be to resist hostile takeovers that, if successful, would threaten their position in the firm and make them loose control over the firms resources. As argued by Bagwell (1991) and others, a repurchase may be used as an effective measure to to reduce the probability of takeovers. For the outside owners, this would reduce their wealth if the takeover is expected to be a valuable restructuring within the firm that could lead to a more efficient use of firm resources. As shown by Denis (1990) the price effect for a firm announcing a defensive repurchase is highly negative which suggests that defensive repurchases are associated with losses for the shareholders of the target firm.

A large part of the literature also focus argue that insiders use repurchases to convey private information to the market, and that this is a potential reason for why a positive announcement effect is observed. Ignoring the credibility issues related to announcements motivated by undervaluation, discussed in Fried (2002) among others, one would expect insiders to have a higher ownership in firms announcing a repurchase plan due to mispricing, than firms that do not. Furthermore, in models by Brennan and Thakor (1990) and Barclay and Smith (1988) the manager also use repurchases to increase his ownership in an undervalued firm and thereby transfer wealth from uninformed shareholders to himself and the remaining shareholders. The model in Isagawa (2000) more explicitly focus on the credibility issues related of open market repurchase, and argue that when the manager has stock options or own shares in the firm, it may be optimal for him to initiate a repurchase program and substitute repurchases for dividends. The prediction of these models is that firms with high insider ownership are more likely to initiate repurchases, or that the insider ownership is expected to increase in undervalued firms. In line with the predictions in Isagawa (2000), Li and McNally (2002) find that repurchasing firms in Canada have a higher insider ownership on average. In addition, Fenn and Liang (2001) find that repurchase activity is positively related to the amount of management options in Canadian firms. They argue that their results suggest that managers use repurchases to increase the value of these options by substituting repurchases for dividends.

Further, as argued by Fried (2002), managers motivation for repurchasing shares may also be related to managerial opportunism. This in the sense that managers may want to initiate an open market repurchase both when the firm is undervalued and overvalued, which is in contrast to the undervaluation hypothesis where the managers want to initiate a repurchase plan only in the cases when the firm is undervalued. Relative to the undervaluation hypothesis, the manager opportunism hypothesis does not have any clear-cut predictions with respect to the insider ownership in repurchasing firms unless these firms are systematically undervalued.

To investigate these issues further, table 6 provide statistics on the average insider ownership for all insiders as well as for primary insiders for the same groups of firms as before. We find a large difference in average insider ownership in firms that announce a repurchase plan relative to non-announcing firms. On average for the whole sample period, insiders in announcing firms own more than twice (20%) the fraction of insiders in non-announcing firms (8%). This difference is also systematic and significant for the separate years. However, when we examine more closely the groups of announcing firms that actually repurchase or not, some differences appear. The results suggests the firms

The table shows descriptive statistics for the total and primary insider ownership across the same groups as in table 3. The *, ** and *** denotes a significant difference in means between the non-announcing firms and the announcing firms at the 10%, 5% and 1% levels respectively. We also test whether the mean insider ownership in the sub-groups of repurchasing/non-repurchasing firms are significantly different from the non-announcing firms. The test depends on whether the population variances of the two groups are equal or not. If the variances are equal, then the t-stat is calculated as $t = (\bar{x}_a - \bar{x}_b)/\sqrt{s^2(1/n_a + 1/n_b)}$ where $\bar{x}_a$ and $\bar{x}_b$ are the means for the two groups respectively, n_a and n_b are the number of firms in each group while s^2 is the pooled standard deviation calculated as $s^2 = [(n_a - 1)s_a^2 + (n_b - 1)s_b^2]/[n_a + n_b - 2]$, where s_a^2 and s_b^2 are the standard deviation of the ownership variable for the non-announcing and announcing firms respectively.

| | Mean insider fraction | | | |
| | Whole | Separate years | | |
	sample	1999	2000	2001
		All insiders		
All OSE firms	0.139	0.144	0.149	0.146
Non announcing firms	0.079	0.110	0.110	0.099
Announcing firms	0.199***	0.226***	0.234***	0.212***
-No repurchase	0.177***	0.202**	0.228*	0.109
-Repurchase	0.211***	0.249***	0.236**	0.305***
		Primary insiders		
All OSE firms	0.081	0.081	0.085	0.089
Non announcing firms	0.045	0.059	0.065	0.077
Announcing firms	0.115***	0.135***	0.131***	0.105
-No repurchase	0.131***	0.176***	0.179***	0.053
-Repurchase	0.106***	0.094	0.114*	0.151**

that actually repurchase seem to have the highest total insider ownership of the two groups. This may indicate that insiders retain their shares in repurchasing firms, increasing their ownership proportion.

When looking at only the ownership by the primary insiders (managers and members of the board), the results are similar for the whole sample period. Moreover, primary own on average 11.5% in firms that initiate a repurchase program, but only 4.5% in non-announcing firms. For the subgroups of announcing firms, primary insiders have a higher ownership in firms that do not repurchase any shares, which is the opposite as the result for all insiders. The difference becomes even more apparent when looking at the separate years. We do not have a good explanation for this difference between primary insiders and all insiders. When looking at separate years, the difference in primary ownership is not significantly different for announcing firms in 2001.

Relative to the different models and hypotheses discussed earlier, this finding is consistent both with mispricing, entrenchment, expropriation and the model of Isagawa (2000). Relative to an agency story, where repurchases is used to mitigate agency costs, we would expect to see a lower insider ownership in announcing firms. Thus, combined with the findings earlier, where firms with low concentration and more dispersed ownership initiate repurchase programs, the high insider stake may suggest that mitigation of agency costs is a less important motivation for why firms repurchase. On the other hand, it might be that both are important reasons for why firms initiate repurchase programs, but that this differ among firms.

To further investigate the difference in insider ownership between announcing and non-announcing firms we examine the distribution of insider ownership in more detail. The main reason for examining this more closely is that the insider data may overestimate the true insider holdings. The construction of the insider data is based on the actual reports from the transactions reported by insiders to the OSE.[51] However, since insiders are not required to report to the OSE when leaving the firm, or his subsequent transactions, the holdings of these insiders persist in the data. One effect of this is that the insider fraction in some instances may become very high, and in some instances 100%. This is of course not possible since the firm in that case would not be listed on the OSE. Despite this bias, we do not expect there to be more extreme insider firms among the announcing firms than among the non-announcing firms except if insiders are more active in on of the groups. However, we want to examine the effect of this bias more closely. To do this, we remove all firms with more than 90% insider ownership, and recalculate the insider statistics.

The results from the truncations are reported in table 7. In panel A of the table, we examine the cross-sectional distribution of the total insider ownership for the whole period. If there is a systematic bias towards one of the groups removing the extreme observations should make the two distributions more similar. Doing this decreases the mean total insider fraction for the non-announcing firms from 8% to 7%, and for the announcing firms from 20% to 14%. However, the difference in means is still significant at the 1% level. Also for the separate years, there is a decrease in the mean for both groups. For 1999 the difference in insider ownership becomes insignificant, but for 2000 and 2001 it is still significant at the 1% level. When we perform the the same exercise for the primary insiders the results go in the same direction, but the change is less pronounced since there is fewer firms with extreme primary insider ownership.

Removing the insider fractions above 90% seems to reduce both averages similarly for the two groups, such that there is no systematic bias towards the announcing firms. However, an insider fraction>90% is still not uninteresting, because it captures a feature in the data in that insiders are more active in these firms. Thus, we do not remove them from the rest of the analysis, but acknowledge that there is a potential bias relative to the insider data.

5.4   Changes in ownership in repurchasing firms

So far, we have examined the average ownership in firms that announces a repurchase plan. We now turn to examining how the various ownership variables change during the course of the repurchase program. This is done by examining the ownership characteristics one month before firms executes their first repurchases, relative to the ownership characteristics for the same firms 12 months and 24 months afterwards. Thus, for each ownership variable we have a cross section of values before the firms execute their first repurchase and a cross section of values 12 (and 24) months after the firms initial repurchase. Note that the months vary across firms, such that the analysis is essentially similar to an event study where firms that experience an event at different points in time are aligned in event time. One concern with this is that there may have been a trend in the ownership variables through the sample period, and that the change reflect these trends. However, in table 2 there is not any indication that there has been a large change in the average for any of the variables across all firms at the OSE during the sample period. In

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[51]An insider is required to report any transaction to the OSE before 10 am the following day.

Table 7: Distribution of total insider ownership

The table shows the distribution of total insider ownership across the two groups of announcing and non-announcing firms. In first part of panel A ("Full sample"), we use all firms in the sample. In the second part ("Truncated") we remove all firms that have an average insider ownership greater than 90% for both groups. We test whether the means of the cross sectional distributions are equal with *, ** and *** denoting a significant difference at the 10%, 5% and 1% levels respectively. The tests are adjusted for differences in variances between the two distributions if the variance is significantly different. In panel B we examine the distribution of insider ownership across firms that announce/do not announce within each year.

Panel A: Cross sectional distribution of insider ownership - whole period

| | Firms | Insider ownership distribution | | | | | | std.dev |
		p25	Median	Mean	P75	p90	max	mean
Full sample								
-Non-announcing	152	0.000	0.00	0.08	0.05	0.26	1.00	0.19
-Announcing	149	0.002	0.04	0.20***	0.27	0.70	1.00	0.30
Truncated sample								
-Non-announcing	144	0.000	0.00	0.07	0.04	0.24	0.88	0.16
-Announcing	139	0.001	0.03	0.14***	0.21	0.59	0.87	0.22

Panel B: Cross sectional distribution of insider ownership - separate years

| | Firms | Insider ownership distribution | | | | | | std.dev |
		p25	Median	Mean	P75	p90	max	mean
Year 1999								
Full sample								
-Non-announcing	193	0.000	0.00	0.11	0.08	0.39	1.00	0.22
-Announcing	78	0.001	0.05	0.23***	0.33	0.93	1.00	0.33
Truncated sample								
-Non-announcing	182	0.000	0.00	0.09	0.06	0.34	0.88	0.17
-Announcing	69	0.001	0.03	0.13	0.17	0.43	0.87	0.20
Year 2000								
Full sample								
-Non-announcing	181	0.000	0.00	0.11	0.06	0.41	1.00	0.24
-Announcing	80	0.003	0.06	0.23***	0.40	0.81	1.00	0.32
Truncated sample								
-Non-announcing	169	0.000	0.00	0.07	0.05	0.30	0.88	0.16
-Announcing	73	0.003	0.04	0.16***	0.24	0.51	0.85	0.23
Year 2001								
Full sample								
-Non-announcing	145	0.000	0.00	0.10	0.05	0.26	1.00	0.24
-Announcing	100	0.003	0.06	0.21***	0.34	0.69	1.00	0.29
Truncated sample								
-Non-announcing	135	0.000	0.00	0.07	0.03	0.21	0.88	0.16
-Announcing	94	0.002	0.04	0.16***	0.29	0.51	0.88	0.22

addition, since different firms execute their first repurchase throughout the entire sample period, this will mitigate the effect from a trend in the ownership variables.

To examine whether there is a change in the various ownership variables before and after the initial repurchases, we run a paired test for differences in means, where the null hypothesis is that the cross sectional mean for each variable is equal before and after the initial repurchase. The results from this analysis is shown in table 8. The left section of the table shows the results when we examine the change over a 12 month period after the firms execute their first repurchase, while the right part of the table shows the results for changes over a 24 month period. For each variable the table shows the cross sectional mean one month before firms repurchase for the first time ("before"), and the mean 12 or 24 months after the initial repurchase ("after"), the p-value from the paired test, and an indicator for the change in the mean ("direction"). Note that the means before are different when we use a 12 month period from when we use a 24 month period. This is because we loose observations when we examine the longest period since we only have ownership data through 2002 such that firms repurchasing for the first time in 2001 drop out of the sample.

As would be expected, the repurchases increase the concentration both relative to the total fraction owned by the 5 largest owners as well as relative to the Herfindahl index. However, the change in the Herfindahl index is only significant at the 5% level when we consider the 24 month change in the index. Relative to the separate ownership fractions of the five largest owners, only the largest owner has a significant increase in the fraction, which suggests that the change in concentration is to a large degree is due to the increased ownership of the largest owner. The ownership fraction of all- and primary insiders increases, but not significantly. The fraction owned by the state increases significantly both for the 12 and 24 month periods. One reason for this may be that the state often is a long-term investor, and are more likely to retain its shares through the repurchase period, increasing its proportional ownership when the firm repurchase. On the other hand the ownership of institutional (financial) and individual investors decreases when firm repurchase shares. There may be several reasons for this. If personal investors are afraid of being expropriated (Brennan and Thakor, 1990) or has a preference for dividends they may reduce their ownership in repurchasing firms. Alternatively, since both institutional and personal investors probably are those owners that trade most frequently (as opposed to the state, foreigners and other companies) among the different owner types, they are more likely to sell their shares back to the company when it purchase shares in the open market. Interestingly, the decrease in institutional ownership is opposite of what Grinstein and Michaely (2001) find for a sample of public firms in the US. Why this difference appear is difficult to say. However, it may be argued that this is something one would expect to see. Shleifer and Vishny (1986) argue that firms pay dividends to attract institutions. In addition, many institutional investors also have restrictions with respect to investing in non-dividend paying firms. From this point of view, one would expect institutions to reduce their ownership if firms that substitute repurchases for dividends.

Finally, when we examine the change in the number of owners of the different owner types, we find that the average total number of owners declines during both periods, and that there is a decrease in the number of financial, non-financial and individual owners, while the number of foreign owners is relatively stable. In addition, the number of state owners increase during the 24 month period which reflect that these owners not only retain their shares, but that repurchasing firms may attract investors of this type.

Table 8: Changes in ownership in repurchasing firms

The table show the results from a paired test for differences in means for the 12 month and 24 month period after firms repurchase shares for the first time. For each period, the table shows the average for the respective variable one month before the firms execute their first repurchase ("before"), 12 (or 24) months afterwards ("after"), the p-value from the test for the mean before and after being equal, as well as a column showing the direction of the change ("direction"). The numbers in parentheses below each mean show the standard deviation of the mean for the respective variable.

Concentration	12 month period (N=90)				24 month period (N=67)			
	before	after	p-value	direction	Before	After	p-value	direction
Herfindahl index	0.138	0.166	0.09	+	**0.110**	**0.160**	0.02	+
	(0.177)	(0.236)			(0.085)	(0.194)		
5 largest owners	**0.522**	**0.545**	0.04	+	**0.509**	**0.565**	<0.01	+
	(0.205)	(0.218)			(0.174)	(0.212)		

Ownership fraction	12 month period (N=90)				24 month period (N=67)			
	before	after	p-value	direction	before	after	p-value	direction
1st largest	0.265	0.288	0.10	+	**0.242**	**0.288**	0.02	+
	(0.193)	(0.231)			(0.143)	(0.207)		
2nd largest	0.108	0.106	0.58	-	0.113	0.118	0.38	+
	(0.065)	(0.067)			(0.06)	(0.066)		
3rd largest	0.066	0.067	0.97	+	0.066	0.071	0.18	+
	(0.036)	(0.038)			(0.029)	(0.039)		
4th larges	0.047	0.048	0.50	+	0.049	0.050	0.48	+
	(0.025)	(0.027)			(0.022)	(0.024)		
5th largest	0.036	0.036	0.66	+	0.039	0.038	0.53	-
	(0.016)	(0.017)			(0.016)	(0.017)		
All insiders	0.227	0.235	0.60	+	0.228	0.235	0.71	+
	(0.336)	(0.336)			(0.328)	(0.319)		
Primary insiders	0.107	0.115	0.56	+	0.106	0.121	0.46	+
	(0.23)	(0.24)			(0.225)	(0.247)		
State	**0.043**	**0.048**	0.01	+	**0.053**	**0.060**	<0.01	+
	(0.114)	(0.118)			(0.13)	(0.137)		
Foreigners	0.167	0.176	0.49	+	0.181	0.220	0.09	+
	(0.183)	(0.208)			(0.188)	(0.251)		
Financials	**0.176**	**0.158**	0.05	-	**0.186**	**0.140**	<0.01	-
	(0.152)	(0.141)			(0.127)	(0.102)		
Non-financials	0.410	0.426	0.16	+	0.378	0.397	0.29	+
	(0.248)	(0.258)			(0.223)	(0.244)		
Individuals	**0.206**	**0.193**	0.04	-	**0.203**	**0.185**	0.05	-
	(0.172)	(0.171)			(0.161)	(0.162)		

Number of owners	12 month period (N=90)				24 month period (N=67)			
	before	after	p-value	direction	before	after	p-value	direction
All owners	4521	4219	0.35	-	5410	4892	0.25	-
	(9044)	(8543)			(10312)	(9519)		
State	7	7	0.16	+	**7**	**10**	<0.01	+
	(11)	(13)			(12)	(15)		
Foreigners	219	214	0.84	-	262	262	0.99	+
	(484)	(479)			(553)	(553)		
Financials	60	57	0.20	-	**66**	**57**	0.02	-
	(65)	(67)			(69)	(65)		
Non-financials	**242**	**215**	<0.01	-	**276**	**222**	<0.01	-
	(314)	(283)			(352)	(277)		
Individuals	3993	3725	0.37	-	4799	4341	0.26	-
	(8340)	(7849)			(9515)	(8765)		

6　The probability of announcement

Having examined the ownership structure characteristics of firms that use repurchases, we now examine whether the ownership structure affect the propensity for a firm to announce a repurchase plan. Thus, in this section we examine in more detail whether there are systematic relation between the ownership structure of firms and the probability of seeing a firm announcing a repurchase plan during the following period, conditional on ownership variables at a fixed point in time. To do this we estimate a binary regression model for estimating the effect of various ownership variables on the propensity for firms to announce (Ann) a repurchase program. The general model to be estimated is,

$$Prob(\text{Ann}) = \mathsf{F}(\beta'\mathbf{x}) \tag{1}$$

where $\beta'\mathsf{x}$ is the index function, with x containing the explanatory variables for each firm, β is a vector of coefficients and $\mathsf{F}(\cdot)$ is the cumulative distribution function. The model is estimated as a binary regression model by assuming that a variable $\text{Ann} \in \{1, 0\}$, which is the event of a firm announcing a repurchase plan or not, is related to a set of explanatory variables $\mathbf{x}$.[52] We estimate models based on both a probit and logit specification by maximum likelihood.[53] However, since the results the two specifications are very similar, we report only results from the logit estimation.[54]

6.1　Variable selection

Before we continue, we need to select variables (x) that may be argued to be important for why firms initiate a repurchase plan. Since the set of ownership variables available to us has been examined earlier in the paper, the estimation results are likely to reflect many of the patterns found in the descriptive part. However, by estimating a model we are better able to address the relative importance of the various variables.

The first variable we include in the analysis is the *insider fraction*. As discussed earlier, agency theory predict that higher insider ownership align the interests of inside- and outside owners such that the need for external monitoring is reduced. In that case, the need for cash distribution to mitigate agency costs would be lower such that firms with high insider ownership should *not* be expected to initiate repurchase programs as often as firms with low insider ownership. Alternatively, insiders may also want to initiate a repurchase plan to maximize their future wealth, to increase the value of their options, entrench themselves, counter takeovers or to expropriate outside shareholders. To examine whether a very high insider ownership has any effect on the propensity for firms to initiate a repurchase program, we also create a dummy variable ("High insider ownership") which is equal to 1 if the insider stake is larger than 33% and zero if not.[55] If the insiders have a large stake in the firm, they may vote against the initiation of a repurchase program, effectively stopping it. Alternatively, they may also force a repurchase program through, if they have a strong preference for repurchases.

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[52]A more detailed explanation is provided in appendix A.

[53]The proc logistic, proc probit in addition to the proc mixed procedures, provided in SAS v.8.2 are used for the numerical optimizations.

[54]Also as noted in Greene (2000), the difference between a logit and probit specification is generally very small unless for very large samples.

[55]The threshold is not related to any theoretical predictions, but merely reflect whether insiders has a super minority (1/3).

Another variable that is predicted by agency theory to be important for the quality of corporate governance is ownership *concentration*. A higher concentration is expected to improve monitoring such that the need for additional mechanisms to restrict managers to waste cash, such as repurchases, are reduced. In addition, we create a dummy variable to examine whether firms with a large controlling shareholder are more or less likely to announce a repurchase plan. The dummy variable ("Largest owner >67%") is equal to one if the largest shareholder has a super-majority (ownership fraction > 2/3). A very large owner may have very strong incentives to monitor the management of the firm, reducing the need for additional mechanisms to discipline management. Alternatively, a large controlling shareholder can also effectively block the proposal of a repurchase plan by voting against it.

We also have information about the type of the largest owner. Moreover, we know whether the largest owner is a state-, foreign-, financial-, nonfinancial- or individual owner. Since the identity of the largest owner may be important with respect to the incentive to monitor, we create dummies, which are interacted with the fraction owned by the largest owner to examine this. For example, it might be that personal owners are better monitorers than other owners, such as large corporations or the state, because the quality of the firm affect their wealth more directly. On the other hand, it may be that institutional investors are more competent with respect to how the firm should be run and have a preference for dividend payments which would make them more inclined to vote against the proposal of a repurchase program.

Another variable which may affect the motivation for why a firm announces a repurchase plan is the *dividend* history of a firm. If firms are reluctant to reduce their dividends and engage in dividend smoothing, as suggested by Lintner (1956) and Brav et al. (2003), a firm that has paid dividends previously may be less likely to initiate a repurchase plan if it plans on maintaining its dividend rate. In addition, the size of the firm may be important since larger firms generally have more shareholders and potentially a more dispersed ownership.

In addition, we examine various model specifications to investigate whether the total number of owners, the number of owners by the different owner-types as well as their ownership proportions affect the propensity for firms to announce a repurchase plan. With respect to the discussion earlier, a high number of owners may be a motivation for firms to repurchase shares in the first place.

6.2   Estimation results

We estimate the models in the beginning of 1999, 2000 and 2001 with a prediction period of 12 months. Thus, for each year we use the most recent information before we estimate the models.[56] Furthermore, all firms that were not yet listed at the beginning of the estimation year is excluded from the estimation for the respective year.

Table 9 report the correlations between various variables in, 1999 and 2000, that we examine in the various models. The lower triangular part of the table show the correlations for January 1999 and the upper triangular part of the table shows the correlations for January 2000. For each pair of variables, the table shows the correlation with the associated p-value from a test of the correlation being equal to zero. First of all, most of the correlations are of the same magnitude and sign for the two years which is because most of the ownership variables are very persistent across time. In addition, the

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[56]For 1999 we use data from December 1998, for 2000 we use data for December 1999 and so on.

Table 9: Variable correlations

The table shows the cross sectional correlations between various ownership variables on two dates. The lower triangular part of the matrix shows the correlations across companies in January 1999, and the upper triangular part shows the correlations in January 2000. For each pair of variables the table shows the Pearson correlation coefficient and the p-value from a test of the correlation being equal to zero. Correlations that are significantly different from zero are in bold.

	Insider fraction	Herfindahl	Concen-tration	Financial fraction	Foreigners fraction	Nonfinancial fraction	State fraction	Individuals fraction	MCAP	largest 1	largests 2	largest 3	largest 4	largest 5
Insider fraction	– –	-0.04 0.70	0.12 0.20	-0.08 0.43	0.06 0.50	0.13 0.17	-0.09 0.33	-0.12 0.22	-0.03 0.74	0.00 0.96	**0.27** <.01	0.18 0.05	0.14 0.14	0.16 0.09
Herfindahl	0.11 0.17	– –	**0.84** <.01	0.07 0.45	0.12 0.19	0.22 0.02	0.13 0.17	**-0.55** <.01	0.16 0.12	**0.98** <.01	**-0.40** <.01	**-0.53** <.01	**-0.65** <.01	**-0.69** <.01
Concentration	0.19 0.02	**0.84** <.01	– –	0.00 0.99	0.20 0.03	**0.29** <.01	0.10 0.26	**-0.64** <.01	0.14 0.19	**0.90** <.01	0.07 0.47	-0.08 0.41	**-0.27** <.01	**-0.35** <.01
Financial (fraction)	-0.01 0.88	0.01 0.93	-0.11 0.15	– –	-0.22 0.02	**-0.35** <.01	-0.05 0.57	-0.20 0.03	**0.34** <.01	0.05 0.56	-0.16 0.07	-0.08 0.36	-0.05 0.59	-0.03 0.72
Foreigners (fraction)	-0.10 0.19	0.07 0.35	0.14 0.06	-0.16 0.03	– –	**-0.44** <.01	-0.09 0.34	**-0.30** <.01	**0.29** <.01	0.14 0.13	0.17 0.07	0.03 0.74	-0.04 0.68	-0.08 0.40
Nonfinancial (fraction)	**0.23** <.01	0.13 0.08	**0.27** <.01	**-0.34** <.01	**-0.48** <.01	– –	**-0.27** <.01	**-0.30** <.01	-0.12 0.27	**0.25** <.01	0.03 0.71	0.00 0.97	-0.08 0.40	-0.07 0.46
State (fraction)	-0.10 0.19	**0.20** <.01	0.15 0.05	-0.08 0.27	-0.05 0.49	**-0.27** <.01	– –	-0.17 0.06	**0.26** <.01	0.14 0.13	-0.12 0.19	-0.10 0.29	-0.08 0.41	-0.08 0.41
Individuals (fraction)	-0.08 0.34	**-0.39** <.01	**-0.49** <.01	**-0.20** <.01	**-0.36** <.01	**-0.24** <.01	**-0.19** <.01	– –	**-0.52** <.01	**-0.60** <.01	0.00 0.99	0.12 0.21	**0.23** <.01	**0.25** <.01
MCAP	0.01 0.87	0.06 0.46	0.07 0.35	0.16 0.04	**0.35** <.01	-0.17 0.03	**0.29** <.01	**-0.46** <.01	– –	0.18 0.09	-0.09 0.41	-0.03 0.78	-0.06 0.58	-0.04 0.69
largest 1	0.14 0.07	**0.96** <.01	**0.88** <.01	-0.05 0.51	0.07 0.34	**0.19** <.01	**0.21** <.01	**-0.42** <.01	0.06 0.42	– –	**-0.33** <.01	**-0.46** <.01	**-0.60** <.01	**-0.64** <.01
largest 2	**0.21** <.01	-0.14 0.08	**0.33** <.01	-0.16 0.04	0.12 0.11	0.18 0.02	-0.13 0.10	-0.14 0.07	0.03 0.75	-0.08 0.29	– –	**0.68** <.01	**0.55** <.01	**0.47** <.01
largest 3	0.00 0.96	**-0.37** <.01	0.10 0.17	-0.12 0.12	0.08 0.32	0.14 0.07	-0.10 0.21	-0.08 0.28	0.05 0.54	**-0.32** <.01	**0.53** <.01	– –	**0.81** <.01	**0.74** <.01
largest 4	-0.05 0.53	**-0.51** <.01	-0.11 0.15	0.01 0.89	0.11 0.16	-0.03 0.70	-0.09 0.22	-0.02 0.75	-0.04 0.64	**-0.46** <.01	**0.30** <.01	**0.74** <.01	– –	**0.90** <.01
largest 5	0.00 0.99	**-0.56** <.01	-0.22 0.00	0.08 0.31	0.09 0.23	-0.05 0.53	-0.10 0.18	-0.04 0.61	0.05 0.57	**-0.51** <.01	**0.21** <.01	**0.59** <.01	**0.82** <.01	– –

correlations for 2001 are similar to those shown for 1999 and 2000. As expected, several of the variables are highly correlated. First of all, the insider fraction (all insiders) has the highest correlation with the fraction owned by nonfinancial owners (although only significant for 1999) and the second largest owner.[57] Although not shown in the table, the correlation between primary insider ownership and the total insider ownership is about 0.85, and highly significant. The Herfindahl index[58] has a correlation of more than 0.8 with the concentration measure (sum of fraction owned by the five largest owners) and a correlation of 0.96 with the fraction owned by the largest shareholder in 1999, and a negative correlation with the 3rd-5th largest shareholders.

Furthermore, the ownership fraction owned by the largest owners both in aggregate and separately is not correlated with the size of the firm (MCAP). Also, relating to the previous discussion on the ownership of foreign investors, we see that their ownership fraction is significantly positively correlated with the size of the firm indicating that they are mainly investing in the largest companies to track the OSE all share index for diversification reasons. Furthermore, the fraction owned by individual owners are negatively correlated with the concentration measures, the ownership of the largest owner as well as the fraction owned by the other owner types. Another correlation that is not shown in the table, is the correlation between the dividend other variables. The dividend has the highest correlation with market capitalization, with correlation of about 0.22, which indicate that larger firms pay more dividends. However, the dividend variable is not highly correlated with any other variables.

Table 10 report the estimation results when we estimate the propensity for firm to announce a repurchase plan during each year given the ownership characteristics at the beginning of the year.[59]

For each year we estimate three different models with various variable combinations that are not highly correlated. In model (1) for each year, we examine the concentration (fraction owned by the 5 largest owners), the insider ownership fraction, the firm size (natural log of the market capitalization), a dummy variable for whether the firm paid dividends in the previous year. In model (2) we examine whether the identity of the largest owner is important by including the ownership fraction of the largest owner conditional on whether he is a state-, foreign-, financial-, nonfinancial- or individual owner. In addition we include the the dividend dummy and the market capitalization. In model (3) we examine the effect of a large controlling owner and high insider ownership.[60]

The results from the estimation reflect to a large degree what was found in the descriptive part of the analysis. However some new results appear. First, looking at model (1), the concentration does not seem to be important for any year with respect to whether the

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[57]This points to one problem with the data. We are unable to distinguish cases where the largest owners also are primary insiders.

[58]The Herfindahl index is the sum of the squared ownership fractions of all owners in a firm.

[59]Since we model the probability of announcement, the sign of the parameter estimates reflect the direction that the independent variable affect the probability of announcement. To evaluate the effect of a variable on the probability of announcement, one can calculate the change in the probability $\mathrm{Prob(Ann)} = \exp(x'\beta)/[1 + \exp(x'\beta)]$ by keeping the other variables fixed at their sample means, and vary the mean of the variable under study. The term $\exp(x'\beta)$, with all x's at the sample means is the odds ratio. For example, in model (1) for 1999, and increase in the insider ownership from 0% to 20% increases the probability of announcement by 5%.

[60]The number of firms with an insider ownership greater than 33% is 35 in 1999, 43 in 2000 and 42 in 2001. For the large shareholder dummy, 18 firms had a controlling shareholder in 1999, 34 in 2000 and 36 in 2001. These two variables has an insignificant negative correlation of -0.03 for 1999 and 2000, and 0.04 for 2001.

Table 10: The probability of announcement - 12 month interval

The table shows the results from the estimation of a logit model, $Prob(Ann) = F(\beta'x)$, with the table showing the β estimates for the independent variables for three different model specifications each year. The models are estimated at the beginning of each year, with the dependent variable equal to 1 if the firm announces a repurchase plan during the year, and equal to zero if it does not. The table shows the estimation results when we estimate the model looking 12 months forward from January each year. The independent variables are the aggregate fraction owned by the five largest owners (concentration), the fraction owned by all insiders of the firm (insider fraction), the natural log of the market capitalization, a dummy for whether the firm paid dividend the previous year (Dividend). In addition we have interactive dummies (interacted with the fraction owned by the largest owner) for whether the largest owner is a state-, foreign-, financial-, nonfinancial- or individual owner. In model (3) we also examine whether the insiders owns more than 33% of the firm (High insider ownership) and whether the largest owner has a super-majority (Largest owner >67%) in addition to the market capitalization and whether the firm has paid dividend the previous year.

Independent variable	Model 1999 (1)	Model 1999 (2)	Model 1999 (3)	Model 2000 (1)	Model 2000 (2)	Model 2000 (3)	Model 2001 (1)	Model 2001 (2)	Model 2001 (3)
Intercept	-4.82**	-5.53***	-4.13**	-7.99***	-8.13***	-8.47***	-6.34***	-5.63***	-7.2***
Concentration	0.68	.	.	-0.98	.	.	0.38	.	.
Insider fraction	1.05**	.	.	1.53***	.	.	1.83***	.	.
MCAP (log)	0.23**	0.27**	0.21**	0.46***	0.44***	0.46***	0.32***	0.32***	0.38***
Dividend	-1.06***	-1.04***	-0.88***	-1.68***	-1.74***	-1.74***	-0.81**	-0.74**	-0.91***
largest state	.	2.18	.	.	0.25	.	.	0.23	.
largest foreign	.	-1.61	.	.	0.26	.	.	2.99	.
largest financial	.	6.28*	.	.	4.88	.	.	1.36	.
largest nonfinancial	.	1.69**	.	.	1.14	.	.	0.34	.
largest individual	.	4.25*	.	.	1.26	.	.	0.61	.
Largest owner >67%	.	.	-1.64*	.	.	-1.80**	.	.	-2.67**
Large insider	.	.	0.62*	.	.	0.81**	.	.	1.47***
N(Announcing)	80	80	80	84	84	84	96	96	96
N(Non announcing)	125	125	125	97	97	97	84	84	84
Pseudo R square	0.06	0.13	0.06	0.18	0.16	0.19	0.13	0.11	0.12
AIC	269	259	272	221	231	222	236	247	238
Likelihood ratio (p value)	<.001	<.001	0.02	<.001	<.001	<.001	<.01	<.01	<.01
Hosmer/Lemeshow	0.13	0.03	0.35	0.91	0.79	0.90	0.02	0.34	0.05
% concordant	64.2	68.0	63.3	74.8	73.2	75.6	69.8	68.1	70.5

firm announces a repurchase plan, while the propensity for firms to announce is positively related to the insider ownership for all years. In addition, the results also suggest that large firms are more likely to announce, at least for 2000 and 2001. Since the correlation between concentration and firm size is very low, it does not reflect that large firms announce because they have a more dispersed ownership. Furthermore, whether the firm has paid dividends the previous year is a very important decision variable across all years and model specifications. This indicates that firms that historically has paid dividends are smoothing dividends, and reluctant to reduce dividends to facilitate a repurchase program. Relative to the identity of the largest owner, we do not find any systematic significant relationship across the years.

In model (2), we examine whether the identity of the largest owner may contribute to the announcement of a repurchase program. For 1999, the results indicate that firms where the largest owner is another firm (nonfinancial) or an institutional owner are more likely to initiate a program. However, across different years, there is no evidence that the identity of the largest owner is important.

Although, the identity of the owner is not important, the size of the owner might be. To check this, model (3) examines whether a controlling owner or a large insider is important with respect to whether a firm announces a repurchase plan. The result indicate that a large controlling shareholder reduces the probability of observing an announcement. As discussed earlier, this may be because firms with a very large shareholder are closely monitored such that additional mechanisms to discipline management are *not* needed. Alternatively, large owners are may also resist the proposal of a repurchase plan. Thus, if a large owner prefers dividends, or has a preference against repurchases, he can effectively block any proposal of a repurchase program. The dummy for high insider ownership is positive for all years, but less significant in 1999. In table 11 we extend the estimation period to 24 months, and estimate the models for 1999 and 2000. The results are similar, but somewhat stronger than the results in table 10.

We also estimate models examining whether the quick ratio as a proxy for liquidity affect the propensity for firms to announce a repurchase plan. However, it is not significant. Appendix B show additional model estimations where we also investigate the total number of owners and the number of owners by different owner-types. Before interpreting these results, it is important to note that the number of owners is highly correlated with the size of the firm. In addition, the number of owners in each category is also highly correlated with eachother. Thus, in tables 12 and 13 in the appendix we see that the market capitalization is rendered insignificant due to the multicolinearity. Additional models, with each ownertypes ownership fraction are also estimated, but not shown in a table. The results for the ownership fractions by type of owner are not significant except for the fraction owned by individuals which is has a negative effect. For models with the separate ownerships of the five largest owners, the results are ambiguous. This because the ownership proportions of the largest 3rd-5th owners are strongly negatively correlated with the the ownership of the largest owner, and positively correlated with eachother. However, when estimating separate models, we find that the ownership of the largest owner has a negative effect on the propensity to initiate a repurchase program, consistent with the result for the dummy variable for the controlling shareholder in table 10.

One thing to note about the estimations is that we do not remove firms that has previously announced a repurchase plan. Since several of the variables are highly persistent, firms that are more likely to announce every year, will be included in the model estimation every year. To study the effect of this, we also estimate models where all firms that has

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Table 11: The probability of announcement - 24 month interval

The table shows the results from the estimation of a logit model, $Prob(\texttt{Ann}) = \texttt{F}(\beta'\texttt{x})$, with the table showing the β estimates for the independent variables for four different model specifications starting in 1999 and 2000. The models are estimated at the beginning of each year, with the dependent variable equal to 1 if the firm announces a repurchase plan during the year, and equal to zero if it does not. The table shows the estimation results when we estimate the model looking 24 months forward from January each year. The models are estimated in January each year. The independent variables are the total fraction owned by the five largest owners (concentration), the fraction owned by the insiders of the firm (insider fraction), the natural log of the market capitalization, a dummy for whether the firm paid dividend the previous year, the total number of owners ("number of owners") and the number of owners by various owner-types, a dummy for whether the insiders owns more than 33% of the firm (High insider ownership) and a dummy for whether the largest owner has a super-majority (Largest owner >67%).

Independent variable	Model 1999			Model 2000		
	(1)	(2)	(3)	(1)	(2)	(3)
Intercept	-5.22**	-5.53***	-5.42**	-6.33***	-6.81***	-6.84***
Concentration	-0.02	.	.	-0.88	.	.
Insider fraction	1.59***	.	.	1.76***	.	.
MCAP (log)	0.30***	0.31***	0.31**	0.40***	0.41***	0.42***
Dividend	-1.12***	-0.98***	-1.12***	-1.66***	-1.66***	-1.69***
largest state	.	-0.81	.	.	-1.18	.
largest foreigner	.	-2.05	.	.	-0.93	.
largest financial	.	4.91*	.	.	4.78	.
largest nonfinancial	.	0.71**	.	.	1.45*	.
largest individual	.	2.71*	.	.	2.26	.
Largest owner >67%	.	.	-1.57**	.	.	-2.47***
High insider ownership	.	.	1.10***	.	.	0.94**
N(Announcing)	117	117	117	118	118	118
N(Non announcing)	94	94	94	74	74	74
Pseudo R square	0.09	0.10	0.10	0.16	0.16	0.19
AIC	281	287	280	231	241	229
Likelihood ratio (p value)	<.001	<.001	0.02	<.001	<.001	<.001
Hosmer/Lemeshow	0.45	0.39	0.92	0.91	0.67	0.86
% concordant	66.2	66.7	68.4	74.8	71.2	76.7

announced in previous years are removed from the sample. For example, when estimating the model for 2000, we remove all firms that announced before 2000. Although the results for 1999 remains the same, the results for 2000 becomes weaker while the estimation in 2001 is problematic since we are left with very few firms in both categories. However, it is not obvious that we should remove firms that has announced the previous year since it is the characteristics of these firms that we are interested in.

To summarize, the results from the model estimations above is not supportive of an agency story where firms initiate a repurchase program to mitigate agency problems. Although announcing firms have more shareholders, and a lower concentration on average, other variables seem more important in explaining the propensity for firms to initiate a repurchase program. The variables that are the most important decision variables are the previous dividend history of the firm, the insider ownership, and the existence of a large, controlling, shareholder. Another interesting finding is that the identity of the largest owner, or the identity of owners in general, is not important for the decision to initiate a repurchase program.

Although these findings may be interpreted in several ways, the results are in line with models where insiders have incentives to support a repurchase program to maximize their future wealth when they have a stake in the company (Isagawa, 2000), expropriate outside shareholders or to entrench themselves and reduce the probability of takeovers. On the other hand this interpretation is not unambiguous as the existence of a controlling shareholder decreases the probability of announcement. This is the opposite of what is the prediction in the model by Brennan and Thakor (1990). One implication from their model is that large shareholders will prefer repurchases to dividends, while small shareholders will prefer dividends. Our results instead suggest that controlling shareholders oppose repurchases or that additional mechanisms for distributing excess cash is not needed when a large shareholder is in place to monitor the management.

7 Conclusion

This study provide a detailed examination of the ownership in Norwegian firms that initiates repurchase programs. The main motivation is that a repurchase is an important corporate event, which has the effect of altering the ownership structure. In addition, few studies study in detail the ownership in firms that initiate repurchase programs. Since a repurchase is a flexible way for firms to distribute cash, it may be used by managers as a self imposed disciplinary mechanism which reduce cash holdings and mitigate agency costs when other corporate governance mechanisms are not in place. On the other hand, theoretical models also suggest that managers can use repurchases to pursue their own objectives. For example, if there is asymmetric information between the manager and outside shareholders, a repurchase can be used to increase his ownership in undervalued firms transferring wealth from outside owners to himself and the remaining shareholders. In addition, a repurchase may decrease the probability of value enhancing takeovers which would benefit shareholders, but threaten the position of the manager and potentially make him loose control over the firms resources.

The paper documents some interesting patterns in the ownership structure of Norwegian firms that initiate repurchase plans. Moreover, the descriptive statistics indicate that the ownership concentration in firms that announce repurchase plans is much lower than in non-announcing firms. This is to a large degree because the largest shareholder in these

firms has a much lower stake in the firm. In addition, announcing firms also have a much higher number of shareholders across all owner-types. These findings are consistent with an agency theoretical explanation for why firms repurchase shares. Because owners in these firms potentially have a much lower incentives to monitor management, repurchases can be used as an additional mechanisms to mitigate agency costs (Jensen, 1986). However, the large number of shareholders may also be the main reason for firms repurchasing shares in the first place. By removing the smallest shareholders, the concentration potentially increases, such that monitoring quality improves as the remaining shareholders increases their cash-flow and voting rights.

When examining the insider ownership in announcing firms, another picture emerges. The results suggest that repurchasing firms have a much higher insider ownership than non-announcing firms. This finding is not consistent with an interpretation where firms with dispersed ownership uses repurchases to mitigate agency costs of free cash. Agency theory (Jensen and Meckling, 1976) predicts that the interests of inside- and outside shareholders converge when the insider ownership increases. Thus, from a monitoring perspective, we would expect repurchasing firms to instead have a lower insider ownership. This finding support models where firms with high insider ownership is expected to repurchase shares. These models predict that managers with a stake in the firm (through stock ownership or options) use repurchases to increase their expected future payoffs (Isagawa, 2000). In addition, the manager can use repurchases to increase his (and remaining shareholders) ownership proportion in an undervalued firm or to deter takeovers (Bagwell, 1991).

When examining how the ownership composition changes in firms that repurchase shares, we find that the concentration increases as would be expected. This increase in concentration, seem to be mainly driven by an increased ownership of the largest owner. In addition, the fraction owned by institutions and personal investors decreases. This may both be because these investors trade more actively than the other owner types such that they have a higher probability of selling shares back to the firm. Alternatively they may have a preference for dividends, making them reduce their ownership in firms that substitute dividends for repurchases.

The paper also examines whether ownership variables can be used to say something about firms propensity to initiate a repurchase program. This is done by estimating a binary model for the probability of observing a firm announcing a program during each year, given the ownership composition at the beginning of the year. The results reflect to a large degree the findings in the descriptive analysis. Moreover, the findings would be in line with models where insiders have incentives to support the initiation of a repurchase program either to maximize the future value of their wealth (Isagawa, 2000), expropriate outside shareholders or to entrench themselves.

On the other hand the finding that the existence of a controlling shareholder decreases the probability of observing the introduction of a repurchase program. There are several interpretations for this finding. One is that a controlling shareholder may oppose a repurchase program. Alternatively, additional mechanisms for distributing excess cash is not needed when a large shareholder is in place with strong incentives to monitor the management. Interestingly, this finding is the opposite of what is the prediction in the model by Brennan and Thakor (1990). In their model, large shareholders prefer repurchases to dividends, while small shareholders has a preference for dividends. With respect to the identity of the largest owner in general, we find no evidence that the type of this owner is important for the decision to initiate a repurchase program. Finally, the results also strongly suggest that firms that paid dividends in the previous year are less likely to initi-

ate a repurchase program. This is likely related to dividend smoothing, and that firms are reluctant to cutting dividends as suggested in studies by Lintner (1956) and Brav et al. (2003).

A The probability of observing an announcement

At a general level, the model for the probability of announcement (Ann) can be written as,

$$Prob(\text{Ann}) = F(\beta'\mathbf{x}) \tag{2}$$

where $\beta'x$ is the index function, with x as a matrix of explanatory variables for each firm, β is a vector of coefficients and $F(\cdot)$ is the cumulative distribution function. The model is estimated as a binary regression model by assuming that a variable Ann$\in \{1, 0\}$, which is the event of a firm announcing a repurchase plan or not, is related to a set of explanatory variables $\mathbf{x}$. A linear combination of these variables constitute an index A^* which is related to Ann in the following way,

$$A^* = \beta'\mathbf{x} + \epsilon_i = \beta_0 + \beta_1 x_{i1} + \beta_2 x_{i2} + ... + \beta_k x_{ik} + \epsilon_i \tag{3}$$

$$\text{and} \quad \text{Ann} = 1 \text{ if } A^* > 0 \tag{4}$$

$$\text{Ann} = 0 \text{ if } A^* \leq 0 \tag{5}$$

where $\beta'\mathbf{x}$ is the index function, and the error term ϵ_i has a logistic or normal distribution with mean 0 and variance 1. Finally, we can write the probability that Ann$= 1$, the probability of observing the announcement of a repurchase plan during the next M months, as,

$$Prob(\text{Ann}) = Prob(A^* > 0) = Prob(\beta'\mathbf{x}) > 0 = Prob(\epsilon_i > -\beta'\mathbf{x}) \tag{6}$$

Since both the normal and logistic distributions are symmetric, this can be expressed as,

$$Prob(\text{Ann}) = Prob(A^* > 0) = Prob(\epsilon < \beta'\mathbf{x}) = F(\beta'\mathbf{x}) \tag{7}$$

where $F(\cdot)$ defines the cumulative distribution function for ϵ. If $F(\cdot)$ is assumed to be a logistic distribution, the model is referred to as a logistic model, and if assumed to be the normal distribution, the model is referred to as a probit model.

B   Additional estimation results

Table 12: The probability of announcement (number of owners) - 12 month interval

The table shows the results from the estimation of a logit model, $Prob(Ann) = F(\beta'x)$, with the table showing the β estimates for the independent variables for four different model specifications each year. The models are estimated at the beginning of each year, with the dependent variable equal to 1 if the firm announces a repurchase plan during the year, and equal to zero if it do not. The table shows the estimation results when we estimate the model looking 12 months forward from January each year. The models are estimated in January each year. The independent variables are the total fraction owned by the five largest owners (concentration), the fraction owned by the insiders of the firm (insider fraction), the natural log of the market capitalization, a dummy for whether the firm paid dividend the previous year, the total number of owners ("number of owners") and the number of owners by various owner-types, a dummy for whether the insiders owns more than 33% of the firm (High insider ownership) and a dummy for whether the largest owner has a super-majority (Largest owner >67%).[width=0.5]

Independent variable	Model 1999			Model 2000			Model 2001		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Intercept	-4.65**	-0.84	-1.66	-8.16**	-7.77***	-7.43*	-6.35***	-4.10	-3.54
Concentration	0.96	.	0.90	-0.47	.	-1.21	0.19	.	0.63
Insider fraction	0.98*	.	0.95*	1.44***	.	1.31**	1.85***	.	1.67***
MCAP (log)	0.16	-0.04	-0.02	0.39***	0.38**	0.39**	0.36***	0.25	0.16
Dividend	-1.10***	-0.69***	-0.94***	-1.65***	-1.59***	-1.52***	-0.84***	-0.56	-0.66**
Number of owners	0.14	.	.	0.18	.	.	-0.08	.	.
State owners	.	-0.18	-0.09	.	-0.30	-0.21	.	-0.23	-0.10
Foreign owners	.	0.39**	0.32*	.	0.45**	0.48**	.	0.32*	0.20
Financial owners	.	-0.07	-0.04	.	-0.20	-0.30	.	0.09	0.24
Nonfinancial owners	.	0.60	0.61**	.	0.13	0.13	.	0.15	0.16
Individual owners	.	-0.34	-0.33	.	-0.05	-0.09	.	-0.36	-0.29
N(Announcing)	80	80	80	84	84	84	96	96	96
N(Non announcing)	125	125	125	97	97	97	84	84	84
Pseudo R square	0.07	0.09	0.10	0.19	0.19	0.21	0.13	0.11	0.14
AIC	270	272	270	221	228	224	236	247	242
Likelihood ratio (p value)	0.01	0.01	0.01	<.01	<.01	<.01	<.01	<.01	<.01
Hosmer/Lemeshow	0.47	0.99	0.35	0.78	0.76	0.53	0.02	0.34	0.03
% concordant	64.5	67.1	68.2	75.20	75.1	76.5	69.8	68.1	69.2

Table 13: The probability of announcement (number of owners) - 24 month interval

The table shows the results from the estimation of a logit model, $Prob(\mathtt{Ann}) = F(\beta'x)$, with the table showing the β estimates for the independent variables for four different model specifications starting in 1999 and 2000. The models are estimated at the beginning of each year, with the dependent variable equal to 1 if the firm announces a repurchase plan during the year, and equal to zero if it do not. The table shows the estimation results when we estimate the model looking 24 months forward from January each year. The models are estimated in January each year. The independent variables are the total fraction owned by the five largest owners (concentration), the fraction owned by the insiders of the firm (insider fraction), the natural log of the market capitalization, a dummy for whether the firm paid dividend the previous year, the total number of owners ("number of owners") and the number of owners by various owner-types, a dummy for whether the insiders owns more than 33% of the firm (High insider ownership) and a dummy for whether the largest owner has a super-majority (Largest owner >67%).

Independent variable	Model 1999			Model 2000		
	(1)	(2)	(3)	(1)	(2)	(3)
Intercept	-5.05**	-1.95	-1.26	-6.47***	-5.54	-5.27
Concentration	0.54	·	-0.18	-0.48	·	-0.90
Insider fraction	1.48***	·	1.50**	1.69***	·	1.46**
MCAP (log)	0.17	0.08	0.00	0.35***	0.28*	0.30*
Dividend	-1.21***	-0.82**	-0.95***	-1.62***	-1.51***	-1.48***
Number of owners	0.31**	·	·	0.14	·	·
State owners	·	-0.14	-0.14	·	-0.42	-0.32
Foreign owners	·	0.54***	0.55***	·	0.37*	0.38*
Financial owners	·	-0.34	-0.25	·	0.03	-0.06
Nonfinancial owners	·	0.58	0.70	·	0.19	0.23
Individual owners	·	-0.35*	-0.36*	·	-0.10	-0.14
N(Announcing)	117	117	117	118	118	118
N(Non-announcing)	94	94	94	74	74	74
Pseudo R-square	0.11	0.13	0.15	0.17	0.17	0.19
AIC	278	280	272	232	239	235
Likelihood ratio (p-value)	<.001	<.01	<.01	<.01	<.01	<.01
Hosmer/Lemeshow	0.12	0.74	0.85	0.25	0.45	0.39
% concordant	68.3	70.1	73.4	74.4	74.7	75.9

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