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Citation

HUANG, Sheng and Thakor, Anjan. Investor Heterogeneity, Investor-Management Agreement and Open Market Share Repurchase. (2011). *Financial Intermediation Research Society Conference, 6-8 June 2011, Sydney*. Research Collection Lee Kong Chian School Of Business.

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Investor Heterogeneity, Investor-Management Agreement and Open-Market Share Repurchases

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This version: June 2010

Abstract

This paper develops a new theoretical explanation for why a firm conducts open-market stock repurchases, tests the main predictions associated with this explanation and finds empirical evidence in support. Investors may disagree with the manager about the firm's investment projects. A repurchase causes a change in the investor base as investors who are less prone to agree with the manager tender their shares. The model thus has the following predictions. First, a firm is more likely to buy back shares when the level of investor-management agreement is lower. Second, the post-repurchase agreement improves. Our empirical tests provide strong support for these predictions. The results are robust to controls for information asymmetry, diversity of opinion among investors, and other factors that may drive a firm's share repurchase decision. Overall, the evidence is consistent with a repurchase being a strategic payout mode intended to improve alignment between management and shareholders.

JEL Classification: G30, G35

Keywords: stock repurchase, corporate payout, agreement, investor heterogeneity

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We thank Thomas Chemmanur, Fangjian Fu, Ron Giammarino, Radha Gopalan, Todd Gormley, Jarrad Harford, Roger Loh, Rong Wang, Scott Weisbenner and seminar participants in Singapore Management University for helpful comments. All remaining errors are our own.

1. Introduction

The past two decades have seen dramatic changes in corporate payout policy. Stock repurchases have increased in popularity while the proportion of dividend-paying firms has declined substantially (Fama and French (2001), Grullon and Michaely (2002), and Skinner (2008)). Chetty and Saez (2006) find share repurchases have surged even after the dividend tax reform in 2003 which reduced the tax disadvantage of dividends for investors.¹ In the ideal world of Modigliani and Miller (1958), a firm's payout mix should not matter for the firm value. Why would a firm prefer to pay out cash through a share repurchase instead of a dividend?

The existing literature has offered various explanations for why firms repurchase stock (see Allen and Michaely (2003) and DeAngelo, DeAngelo and Skinner (2008) for a summary). Perhaps the most popular is the information asymmetry/signaling hypothesis (see, for example, Constantinides and Grundy (1989), Dann (1981), Ofer and Thakor (1987), and Vermaelen (1981)). Under this hypothesis, a firm buys back shares when its management has private information that its stock is undervalued, so the repurchase decision signals this private information. Empirical studies have provided strong support for the signaling hypothesis in the context of self-tender offer repurchases.²

However, in the context of open-market repurchases, the signaling story has a few holes.³ First, with open-market repurchases, all that the market knows is the aggregate amount of repurchases approved by the Board of Directors, not the exact timing of the repurchase or how much the firm is repurchasing when it is actually repurchasing its stock.⁴ This makes it

¹ The Jobs and Growth Tax Relief Reconciliation Act signed into law in May 2003 cut the dividend tax rate over 20 percentage points, from 38.6% to 15%. As Chetty and Saez (2005, 2006) document, the dividend tax cut has induced an increase in dividend payments and dividend initiation. Yet it appears that the literature has not yet reached a consensus on whether the initiation and increase in dividends substitute for repurchases following the dividend tax cut in 2003. See Chetty and Saez (2006), and Brown, Liang and Weisbenner (2007).

² For examples, see Asquith and Mullins (1986), Comment and Jarrell (1991), D'Mello and Shroff (2000) and Louis and White (2007).

³ Comment and Jarrell (1991) state that "the bulk of buyback activity is conducted through open-market repurchase programs and dutch-auction self-tender offers, methods which have less signaling effectiveness than the conventional fixed-price offer. This suggests that most stock buyback activity may be principally motivated by objectives other than (or in addition to) signaling stock undervaluation."

⁴ A similar argument in the literature about the problem with considering open market repurchase programs as costly signals is that the programs are not firm commitments and firms vary substantially

hard to see theoretically how the repurchase could act as a signal when investors are not aware of the repurchase when it occurs.⁵ Empirically too the signaling argument for open-market repurchases encounters difficulties. For example, in contrast to the implication of the signaling hypothesis that repurchasing managers possess favorable private information about their firms, Grullon and Michaely (2004) find no evidence of operational improvement in firms that announced share repurchase programs.⁶ Moreover, the survey evidence in Brav, Graham, Harvey and Michaely (2005) suggests that managers do not use open-market repurchases specifically as a signaling tool.

A second hole in the signaling story is that it suggests that firms would tend to repurchase stock during periods of low market valuation because that is when undervaluation is the most likely. Yet, we witnessed large amounts of open-market repurchases during the bull market of 2002-2007. Dittmar and Dittmar (2008) explicitly show that aggregate repurchases increase in stock market valuation.

As an alternative to signaling, we offer a new explanation for open-market repurchases. It is based on the idea that management can use a repurchase to realign the firm's investor base. Specifically, we argue that different generations of investors may have heterogeneous prior beliefs about the probability of the firm's future investment opportunities, and thus there may be a divergence of opinions over whether the firm's cash flow should be paid out to shareholders or be invested. For example, some investors may endorse the view that the firm should diversify into a new line of business through acquisitions, while others may view diversification as a bad idea. Management would like to invest in all projects it believes to

in the completion rates of these programs. See, for example, Stephens and Weisbach (1998) and Rau and Vermaelen (2002).

⁵ Oded (2005) presents an asymmetric-information based signaling model to explain the positive announcement returns of open-market repurchase programs. Yet the literature has also documented several sources of announcement returns that are unrelated to signaling. See Babenko (2009), Dittmar (2000), Grullon and Michaely (2004), and Maxwell and Stephens (2003) among others. Further, Babenko, Tserlukevich and Vedrashko (2009) suggest that while managers may buy stock prior to a repurchase program announcement, it is likely to be motivated by maximizing personal profits rather than an intention to convey information. For an asymmetric-information justification for open-market repurchases that does not involve signaling, see Brennan and Thakor (1990).

⁶ Lie (2005) shows that firms with actual repurchases after open-market repurchase program announcements experience relative improvements in operating performance relative to their control firms. However, Gong, Louis and Sun (2008) suggest that the reported improvement in operating performance is very likely to be driven by pre-repurchase downward earnings management rather than a genuine growth in profitability.

have positive NPV, but it also cares about whether investors will endorse its decisions since this will affect the firm's stock price, something management is concerned with. An open-market repurchase is a mechanism for the firm to buy out investors who are more likely to disagree with management, thereby increasing the likelihood of investor endorsement of managerial decisions by concentrating ownership in the hands of investors more likely to agree with management.

Even when a firm buys back shares at the market price and thus no premium is offered as typically observed in a tender offer or even a Dutch auction repurchase, we argue the repurchase can serve the purpose of getting rid of disagreeing investors. This is because the marginal shareholders at any stock price who are indifferent between selling and holding their stock are willing to sell if there is a buy order at the market price. The open market repurchase creates the buy orders.⁷ Furthermore, either due to wealth constraints or risk aversion, investors who are better aligned with management might not absorb all shares sold by those disagreeing investors, which makes the firm's buyback necessary to change the investor base.

We develop a simple theoretical model that is based on this idea. It produces two predictions. First, the likelihood of a firm undertaking a repurchase is higher when its agreement parameter is lower. Second, the investor-management agreement improves subsequent to the repurchase. In pursuing the empirical test of the first hypothesis, we employ an identification strategy that relies on firm fixed-effect estimations to circumvent a potential endogeneity problem that our agreement proxies and the decision to repurchase may have both been driven by some unobserved intrafirm variation (see Khwaja and Mian (2008)). Using different measures of the agreement between investors and management, we find strong empirical support for it. In testing the second hypothesis, we extract a straightforward implication of the model and then test it. Specifically, the model suggests that firms that repurchase their shares to increase investor-management agreement will experience larger abnormal price reactions to acquisition announcements than otherwise-comparable firms that do not engage in pre-acquisition repurchases. This is because higher agreement implies a greater propensity on the part of investors to endorse management decisions. Our empirical

⁷ Using firms' supplementally disclosed repurchase trading data, Cook, Krigman and Leach (2004) document that open market repurchases increase market liquidity of repurchasing firms' stock.

tests validate this prediction.

Our theory predicts low investor-management agreement prior to the repurchase, which necessarily means low stock price. Thus, our prediction of the link between a firm's repurchase decision and its stock price is consistent with that of the information asymmetry/signaling hypothesis. The difference is that in the signaling hypothesis, the pre-repurchase undervaluation is due to investors' lack of information that the manager possesses, while in our theory, it is because of the investors' different interpretation of the *publicly available* information. Furthermore, disagreement (and thus undervaluation) can arise even in the absence of information asymmetry.

To clearly delineate our agreement explanation from the signaling hypothesis, we perform several checks in addition to controlling for stock price. First, we rely on firm fixed-effect estimation to exploit within-firm variation. It helps to alleviate the information asymmetry concern as this problem should be more pronounced in a cross-firm comparison. Second, to address the concern that our agreement proxies may be related with information asymmetry, we include several measures of information asymmetry that do not share any apparent link with investor-management agreement. The results on those measures are mixed. And yet the statistical and economic magnitudes of the estimates on our main agreement proxies are largely unaffected. Finally, one of our main agreement proxies, the number of months that a firm beats its EPS forecast in a year, is subject to an alternative interpretation: the earnings surprise suggests information asymmetry. The higher the number is, the more severe is the information asymmetry. Therefore, it generates a prediction that the likelihood of a repurchase is positively related to this proxy, while our theory suggests the opposite. The results support our prediction. In sum, although our study does not rule out information asymmetry as a possible motivation, the results we find suggest that agreement has an incremental explanatory power in a firm's repurchase decision.

The notion of agreement between investors and management is related to diversity of opinion among investors (e.g., Chen, Hong and Stein (2002), Hong, Scheinkman and Xiong (2006) and Miller (1977)). They also differ to some extent. Intuitively, investors can disagree among themselves but agree with the management as a whole. In contrast, investors can

disagree with the management but share considerable agreement among themselves.⁸ While it is not indispensable to draw a distinct line between agreement and diversity of opinion, we conduct several more tests to distinguish our agreement theory from diversity of opinion interpretation. First, one of our main agreement proxies mentioned above, the number of months that a firm beats its EPS forecast in a year, is clearly divorced from disagreement among investors. The results based on this proxy support our theory. Second, we follow Chen, Hong and Stein (2002) and create a diversity of opinion proxy – breadth of ownership – that is not related to investor-management agreement. Inclusion of this variable does not alter our results, while we find the diversity of opinion interpretation is also supported. Third, some studies (e.g., Diether, Malloy and Scherbina (2002)) interpret high analysts' EPS forecast dispersion as diversity of opinion among investors, while we use it as a proxy for disagreement between investors and management. The prediction of the diversity of opinion interpretation, in contrast with ours, is that a firm is less likely to make a repurchase with higher dispersion, because diversity of opinion combined with short sale constraints can lead to stock overvaluation. The results are consistent with our agreement interpretation.

Besides providing empirical evidence to support the investor-management agreement model of open-market repurchases, we also provide additional evidence that casts doubt on the signaling motivation. We do this by noting that if an open-market repurchase announcement was a signal, then information asymmetry should diminish after the repurchase announcement, so the abnormal stock price reaction to *subsequent* signals should be smaller. And if earnings surprise is an indicator of information asymmetry, there should be positive surprise for earnings announcements made prior to the repurchase announcement and the surprise should be subdued following the repurchase announcement. We find, however, that the abnormal announcement returns accompanying earnings announcements for the quarter (or the two quarters) subsequent to a repurchase announcement are significantly greater than those for the quarter (or the two quarters) prior to the announcement. And we show that this finding cannot be explained solely on the basis of pre-repurchase downward earnings management in firms

⁸ “Agreement”, “investor-management agreement” and “agreement between investors and management” are used interchangeably throughout the paper, and so are “diversity of opinion” and “diversity of opinion among investors”.

with actual repurchases in the year of the repurchase announcement (Gong, Louis and Sun (2008)). It is rather, at least partially, consistent with an expected improvement in agreement following the repurchase announcement which fuels higher firm valuation. In addition, we do not find evidence of earnings surprise that is consistent with the signaling hypothesis either.

Our paper is related to the shareholder heterogeneity argument by Bagwell (1991b, 1992) that firms face upward-sloping supply curves for their shares. Bagwell (1991a) provides a theoretical argument that a stock repurchase can be used as a takeover deterrent. As shareholders with the lowest valuations tender their shares, the repurchase skews the distribution of remaining shareholders and makes the takeover more expensive. Stulz (1988) shows that management could repurchase shares to increase the fraction of the votes it controls, and the strengthened control contributes to firm value by increasing the premium offered if a hostile takeover attempt is made to the firm. In our paper, the heterogeneity among shareholders is that investors have different propensities to agree with management, and we extend Bagwell's insight to show that investor-management agreement provides an impetus for repurchases. And higher firm valuation is associated with improvement in investor-management agreement.

Our paper contributes to the literature that examines a firm's preference for repurchase in the payout mix. Studies like Guay and Harford (2000) and Jagannathan, Stephens and Weisbach (2000) argue that firms prefer the flexibility of using repurchases rather than dividends to adjust payouts in response to transitory cash flow shocks, because dividends represent a more rigid payout commitment. Another strand of research relates the surge in repurchases to the growing use of stock options to compensate managements and employees (e.g., Babenko (2009), Fenn and Liang (2001), Kahle (2002) and Weisbenner (2004)). We control for these well-documented factors and find that our agreement factor remains significant in a firm's repurchase decision.

Our paper is also related to the growing literature on the corporate finance and contracting implications of disagreement based on differences in beliefs. See, for example, Abel and Mailath (1994), Allen and Gale (1999), Boot, Gopalan and Thakor (2006, 2008), Coval and Thakor (2005), Dittmar and Thakor (2007), Kandel and Pearson (1995), and Van den Steen (2004, forthcoming).

The rest of the paper is organized as follows. Section 2 develops the testable hypotheses. Section 3 describes the sample and the variables used in the empirical tests. Section 4 discusses the empirical methodology, tests of the main hypotheses and the main results. Section 5 provides evidence that open-market repurchase announcements do not diminish information asymmetry. Section 6 concludes.

2. Hypotheses Development and Empirical Predictions

Imagine a firm whose manager makes decisions that affect the firm's value. The manager always seeks to make decisions that maximize the value of the firm, but investors may disagree that a particular decision is value-maximizing. If investors agree with the manager, they value the firm at V_G , and if they disagree they value it at $V_B < V_G$. The probability that an investor group i will agree with the manager is ρ_i . Thus, investors group i assigns a value V_i to the firm, where

$$V_i = \rho_i V_G + (1 - \rho_i) V_B$$

Either due to wealth endowment constraints or risk aversion or both, each investor group i holds a limited fraction of the firm's shares. Thus, in equilibrium the firm will be held by investors with different agreement parameters, ρ_i . The lowest agreement parameter will be that of the marginal group of investors, with inframarginal investors having higher values of ρ_i . It is clear that V_i is strictly increasing in ρ_i .

For simplicity, assume that the amount of wealth invested in the firm by any investor group is the same across all investor groups that are long in the stock⁹, and that the distribution of the mass of investors is uniform across $\rho \in [\rho_0, \rho_{max}]$, where ρ_0 is the ρ of the marginal investor in the stock and ρ_{max} is the ρ of the investor with the highest ρ in the stock. The firm's stock price will then be:

$$V_0 = \rho_0 V_G + (1 - \rho_0) V_B$$

Let $B(\cdot)$ be the benefit to the firm that the manager perceives from increasing the agreement of the marginal investor. That is, if the firm repurchases stock at the prevailing

⁹ This assumption is reasonable if investors are risk neutral and wealth constrained with equal wealth endowments. More generally, we would expect investors with higher ρ 's to invest more. However, the results are even stronger with that specification.

market price V_0 or a slightly higher price, the first shareholders to sell will be the marginal investors with $\rho = \rho_0$, and then as the firm repurchases increasing amounts, it will have to pay higher prices in order to induce investors with higher value of ρ to sell. A repurchase will lead to the post-repurchase ρ of the new marginal investors, call it ρ^* , being higher than ρ_0 , the pre-repurchase ρ of the marginal investors.

Thus, the increase in ρ due to a repurchase in which $\$C$ is spent on the repurchase is

$$\Delta\rho(C, \rho_0) = \rho^*(C) - \rho_0$$

We assume that $B(\cdot)$ is an increasing and concave function of $\Delta\rho$ and that $\rho^*(C)$ is increasing in C . Viewing C as an investment in the repurchase, the firm chooses C to maximize its net benefit from the repurchase as:

$$\pi = B(\Delta\rho(C)) - C$$

The first-order condition is:

$$\partial\pi/\partial C = B'(\cdot) \partial\Delta\rho/\partial C - 1 = 0$$

Since there is an equal mass of investors at every ρ and the distribution of ρ 's is uniform, it follows that, for any fixed C , the $\Delta\rho$ that is achieved will be smaller as ρ_0 increases. This is because it costs the firm more money to buy the marginal investors out in a repurchase as the stock price increases, and the stock price is increasing in ρ_0 . That is, $\partial\Delta\rho/\partial C$ will be decreasing in ρ_0 . Moreover, $\partial^2\Delta\rho/\partial C^2 < 0$. Given this, and the assumptions on $B(\cdot)$, it follows that the second-order condition for a unique maximum is satisfied.

Some predictions are apparent from this. Controlling for the amount of money spent in the repurchase, the higher the pre-repurchase agreement parameter, the smaller will be post-repurchase improvement in agreement. Thus, a firm is more likely to undertake an open-market repurchase when the agreement parameter is lower. And the agreement improves following the repurchase. That is, we have the following testable hypotheses:

Hypothesis 1: The lower the investor-management agreement parameter, the more likely is the firm to undertake a repurchase.

Hypothesis 2: The post-repurchase investor-management agreement improves.

3. Data Description and Definition of Variables

3.1. Data and Sample Construction

We construct our initial sample by starting with all US firms in COMPUSTAT from 1987 to 2006 that list their common stocks in NYSE, Nasdaq or AMEX. We omit all utility and financial firms whose primary SIC classification is between 4900 and 4999 and between 6000 and 6999, respectively. As discussed later, we rely on firm fixed-effect estimation in testing Hypothesis 1. Thus, for a firm to be included in our sample, we require that its main annual accounting and returns data are available for at least three consecutive years in the sample period. We obtain firm-level accounting data from COMPUSTAT, returns data from CRSP, institutional shareholding data and mutual funds holding data from CDA/Spectrum, analysts' EPS forecast data from I/B/E/S in Thomson Financial, managerial ownership and unexercised options data from ExecuComp, and open-market repurchase announcement data from Securities Data Corporation (SDC). After matching the institutional shareholding data with the initial sample, our final sample consists of 55035 firm-years for 6291 firms.¹⁰

3.2. Definition of Variables

We first discuss our measure of share repurchase. Then we focus on the main measures to proxy for agreement. In order to distinguish our agreement (between investors and management) theory from other hypotheses, such as information asymmetry/signaling hypothesis and diversity of opinion among investors, we also discuss measures we employ for information asymmetry and diversity of opinion, as well as other control variables.

Share Repurchase

Following the approach taken in Fama and French (2001) and Skinner (2008), we measure share repurchases as net repurchases, netting out any associated stock reissuance used in employee stock ownership and executive stock option plans, and in payment to the acquired firm in a merger and in other corporate activities.¹¹ Specifically, as in Skinner (2008), we

¹⁰ When we match the analysts' EPS forecast data with the initial sample in using the analysts' EPS forecast as proxies for agreement, more firms are dropped from the sample due to the lack of data in I/B/E/S.

¹¹ By using net repurchases instead of raw repurchases, we focus on repurchases that are less likely to be motivated by undoing the dilution of EPS from stock options (e.g. Kahle (2002) and Weisbenner

measure repurchases for year t as the change in common treasury stock (Compustat item 226) from year $t-1$ to year t , if the firm uses the treasury stock method for repurchases. If the firm uses the “retirement” method which is inferred from the fact that treasury stock is zero in the current and prior year, we take repurchases for year t as the difference between purchases (Compustat item 115) and sales (Compustat item 108) of common and preferred stock in year t . If either of these amounts is negative, repurchases are set to zero.¹²

Investor-management Agreement

We use four proxies for investor-management agreement: institutional shareholding, analysts’ EPS forecast dispersion, the number of months a firm’s actual EPS beats the analysts’ forecast in a fiscal year, and the dual-class control premium. We discuss each below.

(i) Institutional shareholding as a percentage of a firm’s total shares outstanding at the fiscal year-end:

Relative to individual investors, institutional investors arguably have better access to information about the firm and bear lower costs in information production. Thus, the differences in beliefs between institutional investors and management are less likely to be due to limited information access for investors, and more likely to be due to different interpretations of the same information (as in Kandel and Pearson (1995)). The idea in using institutional shareholding as a proxy for agreement is that when institutional investors disagree with managers, they are likely to “vote with their feet” by selling their shares in the firms. It is consistent with the finding of a survey of institutional investors by McCahery, Sautner, and

(2004)), or by funding firms’ acquisitions or pension plans.

¹² An accurate measurement of open-market repurchases is empirically difficult. Banyl, Dyl and Kahle (2008) find higher error rates in commonly used estimators of share repurchases. Our measure here is an approximation of open-market repurchases, as it may also include repurchases of securities other than common stock and other forms of common stock repurchases such as self-tender offers. However, transactions other than open-market repurchases only represent a small fraction of firms’ repurchase activity (Stephens and Weisbach (1998), Jagannathan, Stephens and Weisbach (2000), and Grullon and Michaely (2002)). Further, to reduce the potential impact of those transactions on our results, we drop observations with net repurchases that are in the top 5% by size (which is equivalent to 12.84% of market value of equity or more in our sample) as such observations typically involve tender offers and transactions other than open-market repurchases (Fenn and Liang (2001) and Comment and Jarrell (1991)); we find that our results are not affected.

Starks (2010).¹³ Also, Parrino, Sias and Starks (2003) find that institutional ownership declines in the year prior to forced CEO turnover.¹⁴ Thus, *ceteris paribus*, we can interpret a significant intertemporal drop in institutional ownership as an expression by institutional investors that they disagree with management at that point in time.

Admittedly, another potential channel through which institutional investors exert influence on management is monitoring and pressing management to make the desired changes to eliminate disagreement.¹⁵ The incentives to do this will depend, of course, on the size of the ownership stake and whether the institution plans to maintain its investment for a sufficiently long time. Investors with larger ownership stakes and those planning to be long-term investors are more likely to exert pressure on management through private discussions or by sponsoring a proxy proposal for shareholder voting if private negotiations fail (e.g. Carleton, Nelson and Weisbach (1998)). This view is consistent with Chen, Harford and Li (2007) who find that only independent long-term institutions actively monitor firms' acquisition decisions and benefit from this monitoring.¹⁶

The existing empirical studies on the effect of institutional shareholder activism have generated mixed results¹⁷. Grinstein and Michaely (2005) find evidence that an increase in overall institutional ownership or higher shareholdings by the five largest institutions is not followed by an increase in payouts either through repurchases or dividends, contradicting the notion that institutional investors attempt to reduce agency conflicts by prompting management to pay out cash. As we show later, a firm is less likely to buy back shares following an increase in overall institutional shareholding. Thus, the Grinstein and Michaely (2005) finding is more consistent with our story than with the agency hypothesis.

To reflect the potential differences between institutions in their responses to perceived disagreement with management, we categorize institutions into groups based on their holdings

¹³ Admati and Pfleiderer (2009) and Edmans (2009) examine theoretically how the exit of large shareholders alleviates the agency problem between managers and shareholders.

¹⁴ Gopalan (2006) explicitly shows that institutional investors' share selling can take a disciplinary role in a firm's acquisition decision.

¹⁵ For studies examining institutional investors' decision between intervention and trading, see Huddart (1993), Admati, Pfleiderer and Zechner (1994), and Kahn and Winton (1998).

¹⁶ Recently, Klein and Zur (2009) and Brav, Jiang, Partnoy and Thomas (2008) document the success of activist hedge funds in monitoring.

¹⁷ See Chen, Harford and Li (2007) for a summary of the literature on the shareholder wealth effect of activism.

and their potential business ties with the firms they invest in. Following the literature, we consider shareholdings by the largest institutional investor (Top1 holdings), by institutions with at least 5% of the outstanding shares (Blockholdings) and by the second largest to the fifth largest institutions (Top2-5 holdings). In analyzing the net benefit and thus the incentive to monitor based on the investors' ownership stakes, we would expect that institutions with relatively small ownership positions in a firm (neither the Top1 investor nor blockholders) are those more likely to "vote with their feet" when they disagree with management, while institutions with the largest ownership stakes are those most likely to stay invested and pressure management for changes.

Based on an institution's potential business ties with the firms they invest in, following Brickley, Lease and Smith (1988) and others in the literature, we also classify banks and insurance companies (type 1 and 2 institutions in CDA/Spectrum institutional classification) as "grey institutions", and investment companies and independent investment advisors (type 3 and 4 institutions in CDA/Spectrum) as "independent institutions". The existing or potential business ties with the firms they invest in may make the grey institutions less willing to challenge management decisions, and they are less likely to sell their holdings even when they disagree with management. Instead, without business relationships, independent institutions are more likely to sell their holdings when they disagree with management if activism is costly. Thus, a significant drop in the shareholdings of independent institutions is a stronger sign of lowered investor-management agreement than is a similar change in the shareholdings of grey institutions.

In our subsequent discussion of the empirical methodology in Section 4, we mention that we use firm fixed-effect estimation to exploit the within-firm variation of institutional ownership over time to detect disagreement. This is motivated by the fact that the level of institutional holdings varies significantly across firms. This cross-sectional variation may be driven by a variety of factors related to the manner in which institutional investors allocate their funds across securities. Their level of agreement is likely to be just one of these factors. However, institutional investors are typically not high-frequency traders, so when they sell their holdings in a firm, it is likely to be because they have observed a management decision that they do not endorse. Thus, a drop in institutional ownership to below its average level

within a firm (after properly accounting for the time trend of overall institutional ownership) is an indication of a decrease in agreement, and our interest is in examining whether it is during these times of relatively low agreement that repurchases occur.

We also include the number of institutional investors for a given firm as a control variable for the following reason. There may be a reduction in agreement for existing institutional investors who then reduce their holdings, but this may happen at a time when some new institutional investors (with relatively low agreement parameters) add the firm to their portfolios, thereby offsetting the lower holdings of the existing investors. The overall level of agreement declines, even though the overall institutional ownership is unchanged. Controlling for the number of institutional investors enables us to deal with this. With that control, a decrease in institutional ownership, holding fixed the number of institutional investors, will make a repurchase more likely, so the change in institutional ownership is predicted to have a negative sign. By contrast, holding fixed the change in institutional ownership, an increase in the number of institutional investors means a decrease in overall agreement, which makes a repurchase more likely. So the number of institutional investors is predicted to have a positive sign.

(ii) Analysts' EPS forecast dispersion:

Following Dittmar and Thakor (2007), we define this proxy as the standard deviation of analysts' EPS forecasts in the fiscal year-end prior to the actual repurchase divided by book equity. Assuming that all analysts have equal access to information, any divergence of opinions among analysts must reflect disagreement among them. And to the extent that disagreement among analysts is highly correlated with disagreement between investors and management, we interpret higher analysts' forecast dispersion as implying lower investor-management agreement.¹⁸

(iii) The number of months that a firm's actual EPS beats the analyst forecast in

¹⁸ Analysts (and investors) can share significant agreement with management while disagreeing with each other, and thus it might be a crude proxy for investor-management agreement. We will return to this issue later.

a fiscal year:

We use I/B/E/S to collect analysts' monthly forecasts of a firm's year-end EPS. Using the mean analysts' forecast as the measure of analyst consensus in a month, we see if a firm's actual EPS outperforms the analyst consensus for every month of a year. The idea, discussed in Dittmar and Thakor (2007), is that delivering better-than-expected earnings can enhance management credibility with investors and can make it less likely that investors will challenge management decisions. Thus, we expect that investors' propensity to agree with the manager increases with the persistence of superior performance over time. This variable takes values between zero and twelve (the number of months in a year), with higher values implying higher agreement.

There are cases of missing analyst forecasts for some months in a year for some firms. This will bias downward the value of this agreement variable. To tackle this issue and verify robustness, we also use the *proportion* of months (with available analyst forecasts) that the firm beats the forecast.

(iv) **Dual-class control premium:**

We follow Dittmar and Thakor (2007) and use the control premium for dual-class stock as an alternative proxy for agreement. Due to the limited data availability on this proxy, we focus on the three main proxies discussed above in presenting the results and use this proxy as a robustness check.

Firms with dual-class ownership structures typically have two share classes that have equal cash flow rights but divergent voting rights. The insider-held voting stock has more voting or control rights and thus trades at a premium relative to the widely-held non-voting stock. The difference in the prices at which voting and non-voting shares trade represents the value of voting. Of course, the right to vote has value only if there is a non-zero probability that one may vote against management. A shareholder who is certain to endorse every managerial decision has no reason to pay extra for the right to vote. Instead, the more likely a shareholder is to disagree with the manager, the higher will be the value the shareholder will attach to the right to vote. Thus, we predict that a dual-class firm is more likely to conduct open-market repurchases when the control premium is higher (designating lower

manager-shareholder agreement).

To measure the control premium, we need to have the prices of the two classes of stock and hence we focus on firms with dual-class stock when both classes trade. After imposing the sampling restrictions as discussed in Section 3.1, we find 96 firms with dual-class stock trading in 893 firm-years. Using the CRSP monthly pricing data, we measure the control premium as the superior stock price minus the inferior stock price divided by the inferior stock price for a given month. Then we have an aggregate annual control premium by taking the median of the monthly premium for each firm-year. To verify robustness, we also use the mean (or the sum) of the monthly premium; we find that the results are largely unaffected.

Information Asymmetry

The information asymmetry/signaling hypothesis predicts low stock returns prior to a repurchase, thus we control for the firm's pre-repurchase stock returns, as well as the market returns (defined as the value-weighted market return from CRSP) to deal with the possibility that information asymmetry may also be related to the market condition. Yet our agreement hypothesis also predicts pre-repurchase low stock returns due to low investor-management agreement. Controlling for stock returns alone, thus, is not sufficient to draw a distinction between these two hypotheses. Furthermore, one may argue that some of our agreement proxies may be related to information asymmetry.

As discussed later, we rely on firm fixed-effect estimation to explore within-firm variation in examining a firm's repurchase decision. Therefore, the effect of any unobserved time-invariant firm characteristics that are related to information asymmetry will be eliminated. Additionally, large firms are more likely to be included in our sample as we use institutional ownership and analyst forecast data. The advantage of the estimation method and our sampling of relatively large firms both work to help alleviate the information asymmetry problem to some extent, which is more of a severe concern in cross-sectional studies and in small firms.

Nevertheless, to further disentangle the effect of agreement from that of asymmetric information, we include several measures of information asymmetry that are not related to

agreement.¹⁹ One proxy is the firm-specific stock return variation, Psi , developed in Durney, Morck, Yeung and Zarowin (2003).²⁰ Based on Roll's (1988) observation that low R^2 statistics for common asset pricing models is due to firm-specific return variation that is not associated with public information, they show that firms and industries with lower market-model R^2 statistics exhibit higher association between current returns and future earnings. The idea is that greater firm-specific variation in stock prices implies that more information about future earnings is incorporated into the stock price and hence there is less information asymmetry. Specifically, the firm-specific stock return variation of a given firm-year is defined as $Psi = \log\left(\frac{1-R^2}{R^2}\right)$, where R^2 is obtained from regressing a firm's weekly stock returns on market return and industry return (defined at the two-digit SIC level) for the given year. Intuitively, the higher the level of Psi , the lower is the information asymmetry between the investors and managers of a firm.

Following the literature (e.g. Dierkens (1991) and Moeller, Schlingemann and Stulz (2007)), we also include two other proxies for information asymmetry: the firm's idiosyncratic volatility and the standard deviation of the earnings announcement abnormal return. The former measure, labeled as *Volatility*, is the standard deviation of the residuals from a market model regression of the daily stock returns for all trading days in a year. The latter, labeled as *Earnings residual (std)*, is measured as the standard deviation of all three-day (-1,+1) cumulative abnormal returns (CAR) around earnings announcements over the past five years. The earnings announcement dates are obtained from I/B/E/S and a minimum of four announcements is required to compute the CAR standard deviation. We estimate the CAR using the CRSP equally weighted index and the market model where the parameters for the market model are estimated over the (-205, -6) day interval.

It is worthwhile to note that one plausible argument against our use of the number of months that a firm beats its EPS forecast as an agreement proxy is that the earnings surprise can be interpreted as an indicator of asymmetric information. And the higher value this

¹⁹ The firm fixed-effect estimation requires proxies for information asymmetry whose values vary intertemporally for a given firm. Many commonly-used proxies for information asymmetry in cross-sectional studies, however, do not satisfy this intertemporal property.

²⁰ This proxy has been increasingly used in the literature. See, for example, Morck, Yeung and Yu (2000), Durney, Morck and Yeung (2004) and Dittmar and Thakor (2007).

variable has, the greater can be the magnitude of information asymmetry. Using this variable, thus, also allows us to distinguish between agreement and information asymmetry hypothesis.

Diversity of Opinion among Investors

The notion of agreement is related to diversity of opinion among investors (e.g., Miller (1977) and Hong, Scheinkman and Xiong (2006)). They also differ to some extent. Intuitively, investors can disagree among themselves but agree with the management as a whole. Chen, Hong and Stein (2002), Diether, Malloy and Scherbina (2002), and Diether (2004) among others suggest that diversity of opinion among investors combined with short-sale constraints that keep out pessimistic investors can lead to higher price and lower subsequent returns. Thus, it follows that a firm is less likely to repurchase its overvalued shares. In contrast, investors can disagree with the management but share considerable agreement among themselves. This makes the analysts' EPS forecast dispersion a crude proxy for investor-management agreement if we do not control explicitly for diversity of opinion among investors themselves.

To delineate the effect of agreement from that of diversity of opinion, we include a proxy for diversity of opinion following Chen, Hong and Stein (2002) – change in breadth of ownership – that has little to do with agreement.²¹ It, labeled as *Breadth of ownership*, is defined as the number of mutual funds who hold a long position in the stock in the year end prior to the repurchase (year -1) minus the number holding the stock in the previous year end (year -2), and divide by the total number of available mutual funds reporting in both year ends.

Some studies (e.g., Diether, Malloy and Scherbina (2002)) interpret analysts' EPS forecast dispersion as a proxy for diversity of opinion.²² The link of stock overvaluation with high dispersion thus suggests that a firm is less likely to conduct an open market repurchase in time of high dispersion, a prediction opposite to ours as we interpret dispersion as a proxy for agreement. Therefore, this variable is useful in making a distinction between agreement and diversity of opinion in explaining a firm's repurchase decision.

²¹ Recent literature, for instance, Dittmar and Thakor (2007) and Moeller, Schlingemann and Stulz (2007), also uses this proxy for diversity of opinion.

²² Johnson (2004) challenges this interpretation. Thakor and Whited (forthcoming) also provides a test of this interpretation against the investor-management agreement interpretation.

Other Control Variables

We also include other control variables that have been used in the stock repurchase literature (e.g. Jagannathan, Stephens and Weisbach (2000)). We measure firm size as the natural log of sales. A larger firm is more likely to pay out cash through dividends or repurchases. Return on assets is the ratio of operating income to total assets. Non-operating income is the ratio of non-operating income (Compustat item 61) to total assets. Jagannathan, Stephens and Weisbach (2000) and Guay and Harford (2000) find that firms tend to pay out “temporary”, non-operating cash flows through repurchases, and use dividends to distribute “permanent”, operating cash flows. The market-to-book ratio is a measure of growth opportunities. Intuitively, firms with higher growth opportunities prefer to retain earnings and invest more. Capital expenditure is the ratio of capital expenditure to total assets, and debt ratio is long-term debt divided by total assets. Firms with higher capital expenditures and debt ratios are more likely to have exhausted earnings and thus less likely to pay out cash through repurchases. Managerial ownership is defined as shares owned (excluding options) by the top five firm executives divided by the number of total shares outstanding. Managerial options are the total number of unexercised options by the top five firm executives that were vested. In order to reduce the impact of outliers, we follow the literature and winsorize all continuous variables at the 1st and 99th percentile.

3.3. Summary statistics

Figure 1 plots the increase in dollar value of net repurchase from 1988 through 2006, while *Figure 2* shows the normalized value by the aggregate market capitalization of all firms and that of repurchasing firms in the same time period. Aggregate repurchases peaked in 1999 beginning from the end of 1980s, and then dropped slightly afterwards. However, since 2003 there has been an increase, with the most dramatic increase occurring through 2006. By the end of 2006, the total dollar value of net repurchases had almost tripled from its historical peak in 1999. Similar to Dittmar and Dittmar (2008), we find that the market-cap normalized net repurchase value moves in pace with the stock market and business cycles and also

indicates the intensiveness of repurchase activity in the middle and through the end of 1990s and after 2003. Overall, consistent with the literature (e.g. Grullon and Michaely (2002) and Skinner (2008)), *Figures 1* and *2* demonstrate that share repurchases have become an increasingly significant payout mode, even after the dividend tax cut in 2003. In addition, the sharp increase in repurchases since 2003 suggests that the initiation and increase in dividend payments following the Jobs and Growth Tax Relief Reconciliation Act may not have come at the expense of a reduction in share repurchases.

Figure 3 plots the proportion of firms that make open-market repurchases by year. We examine separately firms that make repurchases only and firms that engage in both repurchasing shares and paying dividends in a given year. Before 1997, the proportion of firms that made repurchases only does not differ from that of firms that paid out cash through both repurchases and dividends. Yet during 1997-2006, there is a high growth in the fraction of firms that repurchased shares without paying dividends, even though the growth rates vary over time and seem to be correlated with stock market valuations. The evidence in *Figure 3* strengthens the finding in *Figures 1* and *2* that share repurchases have been an increasingly significant phenomenon.

Table 1 provides summary statistics for the 55035 firm-year observations for 6291 firms from 1987 through 2006. As shown in *Panel A*, an average firm makes net repurchases once every five years. The annual net repurchases are valued at about 3.4% (median 1.9%) of the firm's market value of equity, 7.3% (median 3.8%) of the firm's book value of equity, and 3.6% (median 1.8%) of the firm's book value of total assets. *Panel B* of *Table 1* presents summary statistics on the four measures of investor-management agreement. The average (median) institutional shareholding is about 35% (31%) of the firm's total shares outstanding. Consistent with the literature (e.g. Gompers and Metrick (2001)), we find that overall institutional ownership increases over time. The largest institution (Top1) and the succeeding four largest institutions (Top2-5) in a firm own an average (median) 7.5% (6.6%) and 11.3% (11.5%) of the total shares outstanding. Institutions that have at least a 5% ownership stake (Blockholders) take an average (median) of 17.5% (14.5%) of the total share outstanding. Independent institutions, on average, hold more shares than grey institutions, with mean (median) holdings being 16% versus 7% (10% versus 4.7%). For analysts' EPS forecast

dispersion divided by book equity, the average (median) is 0.76×10^{-3} (0.09×10^{-3}). The mean (median) number of months a firm's EPS beats the analysts' EPS forecast in a fiscal year is 5.74 (5). Note that after merging our sample with the I/B/E/S database, we are left with an unbalanced panel of 34151 firm-years for 4299 firms. For the 96 firms with traded dual-class stocks, the mean (median) control premium of the superior stocks is 0.05 (0.005). *Panel C* of *Table 1* reports summary statistics for firm-level accounting variables and stock returns which are comparable with other studies. *Panel D* of *Table 1* provides information on the three information asymmetry measures, the diversity of opinion proxy, as well as managerial ownership and options.

4. Empirical Analysis and Results of Investor-Management Agreement

This section discusses the methodology and results of our empirical tests of the two hypotheses as well as alternative interpretations of our results and robustness checks.

4.1. Tests of Hypothesis 1

Hypothesis 1: The lower the investor-management agreement parameter, the more likely is the firm to undertake a repurchase.

4.1.1. Empirical Methodology

To test this hypothesis, we could perform a cross-sectional comparison of the pre-repurchase agreement parameters of repurchasing firms, and relate these parameters to the repurchase decisions cross-sectionally. However, there is an endogeneity problem in that the agreement parameters and the decision to repurchase may have both been driven by some unobserved intrafirm variation. Specifically, firms vary significantly in their payout decisions, payout modes and magnitudes of cash distributions, and these differences persist over time. The literature has shown that large and mature firms are more likely to distribute cash through repurchases or dividends or both relative to small and young firms. Moreover, institutional investors form clienteles in terms of the types of firms they wish to invest in. For instance, prudence considerations lead institutional investors to prefer firms with large market capitalizations, sufficient liquidity and low volatility (Del Guercio (1996) and Gompers and

Metrick (2001)). Finally, analysts' earnings forecast dispersions also vary across different types of firms, typically being lower for low-growth and mature firms than for high-growth firms. Thus, if the same unobservable time-invariant factors that determine investor clienteles and cross-sectional variations in analysts' forecast dispersions are also those that influence firms' repurchase decisions, then there is an identification problem. Ignoring this problem may lead us to erroneously conclude that a firm with higher institutional ownership and lower analysts' EPS forecast dispersion is more likely to undertake a repurchase.

To tackle this identification problem and mitigate the concern about potentially omitted variables, we rely on firm fixed-effect regressions and exploit within-firm variations while controlling for any time effects, similar to Khwaja and Mian (2008).²³ With this firm fixed-effect approach, the effect of any unobserved firm-specific factors that may have driven both the agreement level and the decision to repurchase is completely absorbed since we make the comparison across different time periods for the same firm. Specifically, the variables of interest like the repurchase decision and the level of manager-investor agreement, as well as other control variables, are time-demeaned for a given firm, and they should be interpreted as the deviation from the average level for the firm. For instance, we interpret a drop in institutional ownership of a firm in a given year to below its average level as a decrease in agreement. We include yearly dummies to control for the potential time trend of the variables, e.g. the trend of increasing overall institutional ownership over time as documented by Gompers and Metrick (2001).

Specifically, we examine how firm i 's repurchase decision in year t is affected by the firm's lagged agreement parameters and other lagged control variables in year $t-1$, based on the following baseline linear probability model²⁴:

$$Repurchase_{it} = \alpha + \beta_1 * Agreement_{it-1} + \beta_2 * Controls_{it-1} + \mu_i + \eta_t + \varepsilon_{it}$$

²³ In examining the impact of a bank's liquidity shock on its loan supply to client firms, Khwaja and Mian (2008) adopt a firm fixed-effect approach to address the possible correlation of a firm's productivity shock with both the change in loan size and the bank's liquidity shock, which generates an identification problem. With this firm fixed-effect approach, the effect of a firm-specific productivity shock is completely absorbed and the impact of a bank's liquidity shock on the change in loan size is identified.

²⁴ Estimation with a non-linear logit model results in a loss of over 40% of the sample, as firms drop out if they either undertook repurchases every year or never repurchased during the sample period. Thus, using this approach is fraught with a serious sample selection problem.

The dependent variable $Repurchase_{it}$ is a dummy which equals one if firm i makes positive net repurchases in year t and zero otherwise. We use a dummy variable because the model only predicts that firms with lower agreement parameters are more likely to undertake repurchases; the model does not predict that, conditional on repurchasing, these firms will repurchase more.²⁵ A comprehensive set of control variables are included, like “transitory” non-operating cash flows, market-to-book ratio and firm size, to account for those well-documented factors in explaining a firm’s repurchase decision. Our primary interest is in examining whether the estimated coefficients of the three main agreement parameters are statistically significant and economically meaningful. The hypothesis predicts that the coefficients of institutional shareholdings and the number of months that a firm’s EPS beats the forecast are negative and that of analysts’ EPS forecast dispersion is positive.

4.1.2. Baseline Results

Table 2 presents the baseline results. The first through fifth columns report results using institutional shareholdings as a proxy for agreement. First, results obtained using the overall institutional shareholdings are presented in the first column. The coefficient of this proxy is negative and statistically significant. It suggests that a lower overall institutional ownership, which connotes lower investor agreement, is associated with a high likelihood of the firm undertaking a repurchase.

Then, we examine how the effect varies for institutional investors with different stakes in a firm. In the second and third columns, we use shareholdings by all institutions except the largest one (Top1) and by the largest institution (Top1) only as a proxy, respectively. The results indicate that firms buy back shares following a lower holding of those institutions with relatively smaller stakes.²⁶ In additional tests, we repeat the analysis using the shareholdings by the blockholders (results not tabulated but available upon request). As in the case of the largest institutional investor’s shareholding, we do not find evidence that a firm’s repurchase decision is related with blockholders’ shareholdings. This suggests that, disagreement induces

²⁵ Skinner (2008) suggests that the overall level of repurchases is determined by earnings while other factors help explain the timing of repurchases.

²⁶ In untabulated results, we also find that firms are more likely to undertake a repurchase following a decline in the aggregate holding of the second to the fifth largest institutional investors (Top2-5).

the largest institutional investor and blockholders to intervene in managerial decisions through private negotiations and other mechanisms, whereas it leads other institutional investors to sell their shares.

We conduct further robustness checks that strengthen the support for this hypothesis. By dividing institutions into the two categories – independent and grey – we expect to capture the notion that when independent institutional investors disagree with management, they are more likely to sell their shares, whereas grey institutions are less likely to sell shares because of potential or existing business ties with the firm. The fourth and fifth columns of *Table 2* present results using the holdings by independent institutions and by grey institutions as a proxy for agreement, respectively. The estimated coefficient of the holdings by independent institutions is significantly negative, while that of the holdings by grey institutions is significantly positive.²⁷ The results support the idea that firms are more likely to repurchase shares in response to an expression of lower agreement by independent institutions. The positive association between the holdings of grey institutions and the repurchase decision, however, suggests that grey institutions absorb part of the shares sold by independent institutions.

Consistent with the literature, the estimated coefficients of other explanatory variables have the predicted signs and are statistically significant. The likelihood of an open-market repurchase increases in a firm's "permanent" cash flows, "transitory" cash flows, firm size and the number of institutional investors, and decreases in a firm's stock price, growth opportunities, capital expenditures and leverage. Also, the significantly positive coefficient of market return suggests that firms are more likely to repurchase during market upturns. Although a positive coefficient of the number of institutional investors is consistent with our agreement hypothesis, one might be concerned with a potential multicollinearity problem given the correlation between the number of institutional investors and institutional shareholdings. We thus conduct an additional test for multicollinearity and do not find that it is a significant concern.

²⁷ According to CDA/Spectrum, the classification of institution types in 1998 and beyond is not accurate due to a mapping error. Many banks, insurance companies, investment companies and independent investment advisors have been misclassified as type 5 (endowment and others) institutions. We repeat our analysis for the period 1987-1998 and find qualitatively similar results.

The sixth and seventh columns of *Table 2* provide regression results in which the other two main proxies for agreement are employed. Results in both columns support our agreement hypothesis. The estimated coefficient of analysts' EPS forecast dispersion (the sixth column) is positive and statistically significant, while that of the number of months that a firm's EPS beats the forecast in a year (the seventh column) is significantly negative. We repeat the analysis with a different measure, the proportion of months with available analyst forecasts that the firm beats the forecast. The results (untabulated) remain unaltered. The estimated coefficients of other explanatory variables mimic those obtained previously when institutional shareholdings are used as an agreement proxy.

We verify the robustness of the above results by repeating the analysis employing the fourth proxy for agreement, dual-class control premium. Results are presented in the eighth column of *Table 2*. The estimated coefficient of dual-class control premium is 0.056 and statistically significant. It indicates that, when the premium of its voting shares over the non-voting shares increases as investors are more prone to disagree with managers, a dual-class firm is more likely to conduct open-market repurchases. The estimated coefficients of other control variables have signs consistent with those obtained using the three main proxies for agreement (except capital expenditure), except that they are not statistically significant for growth opportunities, leverage ratio and firm size, probably due to the small size of this subsample.

Overall, we find that firms buy back shares when they are faced with relatively low investor-management agreement. This finding holds for all the four agreement proxies we employ and is robust after controlling for other factors that are shown to affect a firm's repurchase decision in the literature.

4.1.3. Tests of Information Asymmetry Hypothesis

Our agreement hypothesis centers on the idea that investors can disagree with managers even in absence of information asymmetry. Yet one may argue that some of our agreement proxies may be related to information asymmetry, which makes the interpretation of our results difficult. As discussed in Section 3.2, our firm fixed-effect estimation method helps to alleviate such a concern. To more convincingly distinguish our agreement hypothesis

from the information asymmetry hypothesis, we proceed to conduct further tests in the following two ways.

First, we include in the baseline regressions above three measures of information asymmetry that are unlikely to be confounded by any apparent link with our main agreement proxies. For each information asymmetry measure, we first regress the repurchase decision on the measure alone, and then we conduct a second regression which includes both that measure and our three main agreement proxies. The information asymmetry hypothesis predicts that the likelihood of repurchase decreases in *Psi*, and increases in *Volatility* and *Earnings residual (std)*. In all regressions, we also include the control variables used in the baseline regressions as in *Table 2*, but to conserve space, we do not report them. For the agreement proxy involving institutional shareholdings, we only report the proxy using the holdings by all institutions except the Top1 institution. The results are presented in *Table 3*.

We find at best mixed evidence on the information asymmetry hypothesis. From *Panel A* of *Table 3*, consistent with the information asymmetry hypothesis, we find that the coefficients of *Psi* are negative, but they are not significant in the sample with dispersion data available. In *Panel B* and *C*, however, the coefficients of *Volatility* and *Earnings residual (std)* are both negative, which contradicts the information asymmetry hypothesis, although those of the latter measure are not significant.

Nevertheless, the results on all our main agreement proxies hold even after controlling for the information asymmetry measures. Furthermore, we find that the inclusion of our agreement proxies does not alter the economic or statistical significance of the three information asymmetry measures in a significant way, and vice versa. It confirms that the three measures are not related to investor-management agreement.

Second, we differentiate between our agreement theory and the alternative information asymmetry hypothesis by employing a proxy of agreement that also relates to the alternative interpretation, but with an opposite prediction: the number of months that a firm beats its EPS forecast in a year. The result, shown in the seventh column of *Table 2*, supports our agreement theory, invalidating the alternative information interpretation.

4.1.4. Diversity of Opinion among Investors

As discussed earlier, our idea of agreement is related to, but also differs from that of diversity of opinion among investors. To assure ourselves that our agreement proxies capture the difference of views between investors and management beyond the different opinions among investors, we employ an approach similar to Dittmar and Thakor (2007) and perform the following checks. First, one of our agreement proxies, the number of months that a firm beats its EPS forecast in a year, is clearly divorced from diversity of opinions among investors. The result of this “one-sided” test has been shown to support our agreement theory.

Then, we perform a second “one-sided” test by including *Breadth of ownership* in our baseline regressions. This variable captures the different opinions among investors but is not related to investor-management agreement. We are thus able to examine whether our main agreement proxies have any incremental explanatory power in a firm’s repurchase decision after accounting for diversity of opinion. The first six columns of *Table 4* present the results of *Breadth of ownership* and the three main agreement proxies. Other control variables in the baseline regressions are included here, but not reported. The coefficients of *Breadth of ownership* are negative and statistically significant (except that they are marginally significant in the sample with dispersion data available), consistent with the stock overvaluation interpretation. Our previous results persist through all three agreement proxies, despite the inclusion of *Breadth of ownership*.

Some studies use idiosyncratic volatility as a proxy for diversity of opinion (see Boehme, Danielsen and Sorescu (2006) for references). The results in *Panel B* of *Table 3* seem to be rather consistent with this interpretation, in which the link of diversity of opinion (high volatility) with stock overvaluation predicts a lower likelihood of repurchase. In examining the effect of information asymmetry and diversity of opinion on acquirer abnormal returns, Moeller, Schlingemann and Stulz (2007) find that the variable, *Breadth of ownership*, becomes insignificant after controlling for idiosyncratic volatility. Thus, to address the concern that the diversity of opinion proxy we use, *Breadth of ownership*, may be noisy, we conduct a further robustness test by including both *Breadth of ownership* and *Volatility* in our baseline regressions. The results are presented in the last six columns of *Table 4*. The coefficients of both the two variables are significantly negative, and our results on the three agreement proxies are robust. This suggests that investor-management agreement and diversity of opinion

among investors both affect the repurchase decision.

Finally, our use of analysts' forecast dispersion as an agreement proxy provides a "two-sided" test in discriminating between our agreement theory and diversity of opinion interpretation, because the latter offers the opposite prediction. The robust findings on dispersion in *Table 2* through *Table 4* strengthen the support for our agreement theory and contradict the diversity of opinion interpretation of dispersion.

4.1.5. Executive Financial Incentives

Some studies on corporate payout policy relates the surge in repurchases in the 1990s to the growing use of stock options to compensate managements and employees or to reduce dilution from employee stock option plans (e.g., Babenko (2009), Fenn and Liang (2001), Kahle (2002) and Weisbenner (2004)). In our study, we measure repurchases as net repurchases, netting out any associated stock reissuance used in employee stock ownership and executive stock option plans, and in payment to the acquired firm in a merger and in other corporate activities. Thus, our agreement explanation of repurchase is unlikely to be affected by the firm's dilution reduction consideration. We focus on the impact of managers' financial incentives and examine the robustness of our agreement explanation.

We measure managers' financial incentives using the top five firm executives' stock ownership and unexercised stock options that were vested and thus exercisable. We obtain the data from ExecuComp and thus focus on relatively large firms which results in a significant cut of our sample size. *Table 5* reports the results of including the two variables regarding managers' financial incentives as well as measures of information asymmetry and diversity of opinion in the baseline regressions. We find our main results hold for two of our main agreement proxies. The coefficients of the third proxy, number of months that a firm beats its EPS forecast in a year, are small in magnitude and not significant. It is possibly because large firms in this subsample typically have a history of smooth earnings, and thus there is not sufficient within-firm variation in this variable. Consistent with the literature, the coefficients of management stock ownership are significantly negative and those of stock options are significantly positive, suggesting that managers are more likely to buy back shares with lower management stock ownership and more unexercised exercisable stock options.

4.1.6. Alternative Interpretations and Robustness Tests

The results we present thus far support the investor-management agreement hypothesis. In this subsection, we further test this hypothesis against other alternative interpretations. The purpose is not to rule out these interpretations, but rather to document that investor-management agreement has incremental power to explain a firm's open-market repurchase decision, relative to the other motivations.

Financial Flexibility View

One influential view of why repurchases are preferred to dividends in a firm's payout mix is the financial flexibility inherent in repurchases (e.g. Jagannathan, Stephens and Weisbach (2000) and Guay and Harford (2000)). The evidence supporting this view is that firms with higher "temporary", non-operating cash flows tend to choose repurchases, while those with higher "permanent" operating cash flows pay dividends. And repurchasing firms also have more volatile cash flows. Thus, the correlation between repurchase decisions and investor-management agreement may be driven by the possible correlation between cash flow volatility and investor-management agreement.

To address this issue, we perform two checks. First, we have controlled for operating cash flows and non-operating cash flows, and the estimated coefficients have the expected signs and are highly significant in different specifications. Second, we focus on firms with below-median non-operating cash flows or below-median volatility of cash flows, and reexamine the relationship between repurchases and agreement for this subset of firms. We find that the results are robust for these firms. The three main proxies for agreement are negatively and significantly related to a firm's repurchase decisions for those firms with below-median non-operating cash flows. Qualitatively similar results hold for firms with below-median volatility of cash flows, except that the relationship is only marginally significant when we use analyst EPS forecast dispersion as a proxy for agreement. When we look at firms with below-median but above-25-percentile volatility of cash flows, the relationship between repurchase and analyst EPS forecast dispersion resumes its significance. Overall, the results indicate that, even under the circumstance that the benefit of financial

flexibility is less likely to be a factor in driving a firm's repurchase decisions, the effect of investor-management agreement persists.

Growth opportunity

Another potential concern is that the relationship between repurchase decisions and agreement may arise simply because firms with limited growth opportunities may choose to pay out cash that they do not need for investments by repurchasing stock. This argument is consistent with the survey evidence in Brav, Graham, Harvey and Michaely (2005) which suggests that managers make repurchase decisions after investment decisions. If this is so, then the documented relationship between investor-management agreement and repurchase may merely be a reflection of the firm's limited investment opportunities.

This issue is partly dealt with by the fact that we have controlled for investment opportunities using market-to-book ratios. Yet, the imprecise measurement of the market-to-book ratio as a proxy for investment opportunities creates difficulty in interpreting the results. To tackle this measurement issue, we use the preceding three-year sales growth of a firm as an additional proxy for investment opportunities following Datta, Iskandar-Datta and Raman (2001), and proceed as follows.

First, we find that our regression results based on market-to-book ratios are robust when we replace market-to-book with this additional proxy for investment opportunities. Second, we split the sample into high and low growth opportunities groups based on the median preceding three-year sales growth. The correlation between repurchase decisions and agreement holds even for the group of firms with high growth opportunities. Third, we conduct a joint test of the growth opportunities interpretation and the financial flexibility interpretation by examining firms with above-median preceding three-year sales growth and below-median non-operating cash flows. Even within firms that are least likely to pay out cash through repurchases due to the high growth opportunities and limited financial flexibility, we find the impact of agreement on a firm's repurchase decisions is robust for all the three main proxies of agreement. These results suggest that a repurchase is more than a conventional payout mechanism that firms with limited growth opportunities use to distribute cash to shareholders. Rather, it is also used strategically to improve the agreement between investors

and management.

4.2. Tests of Hypothesis 2

Hypothesis 2: The post-repurchase investor-management agreement improves.

Our theory predicts that the post-repurchase improvement in agreement decreases in the pre-repurchase agreement level after controlling for the amount of money spent in the repurchase. Yet, a direct examination of this prediction encounters some empirical difficulties. First, although it is intuitive to use the agreement proxies to measure the pre-repurchase agreement level, using the same variables to proxy for the post-repurchase agreement is subject to some interpretation problem. To illustrate, take the example of the analysts' forecast dispersion proxy. The theory predicts that disagreeing investors will tender their shares in an open market repurchase, and thus the investor-management agreement improves after the repurchase. And yet those similarly disagreeing analysts may continue their coverage of the firm anyway regardless of whether the firm conducts a repurchase. Therefore, although the analyst-management agreement closely mimics the investor-management agreement prior to a repurchase, it might not be the case afterwards. Additionally, there is also a potential concern involved in pursuing a direct test of the post-repurchase improvement in agreement by regressing the change in agreement level on the pre-repurchase agreement level. Namely, there might be a mechanical relation between the dependent "change in agreement" variables and their initial values, even though it is theoretically plausible that a negative relationship does exist (indeed, our theory predicts that).

Therefore, instead of conducting a direct test of Hypothesis 2 using our agreement proxies, we investigate, without loss of flavor, a prediction of this hypothesis. Specifically, we examine how investors' reaction to managerial decisions changes after a firm undertakes a repurchase. Our theoretical argument predicts that, due to the enhanced agreement between investors and management after a repurchase, investors are more likely to endorse managerial decisions after a repurchase than before. The empirical difficulty in testing this prediction is that most management decisions are either not observable or are not readily identifiable. One corporate event that allows us to circumvent this difficulty is acquisitions made by

repurchasing firms. The public announcement of an acquisition is accompanied by details of the deal, so the price reaction to the announcement reflects the extent to which investors endorse management's decision to acquire rather than a resolution of information asymmetry.²⁸ Despite that, we follow Moeller, Schlingemann and Stulz (2007) and control for information asymmetry to examine the robustness of our results. We expect firms that undertake repurchases to increase investor-management agreement will experience larger abnormal price reactions to acquisition announcements than otherwise-comparable firms that do not engage in pre-acquisition repurchases.

Specifically, we compare the abnormal returns to a firm's acquisition announcements made in the year preceding and in the year following an actual repurchase.²⁹ Following the literature (e.g., Moeller, et al. (2007) and Masulis, Wang and Xie (2008)), we require the sample of acquisitions meet the following criteria: the deal value is at least \$1 million and is at least 1% of the acquirer's market capitalization measured on the eleventh day prior to the acquisition announcement; the acquirer controls less than 50% of the target prior to the deal and a successful acquirer owns 100% of the target afterwards; and the deal status is classified as completed, unconditional or withdrawn in SDC. The deal characteristics that we control for include target ownership status, method of payment and deal size. We create two indicator variables, denoted by *Public* and *Equity*, where *Public* equals one if the target is a public company and *Equity* equals one if the acquisition is paid either fully or partially with stock. The variable *Deal size* is the ratio of the deal value to the acquirer's market capitalization measured on the eleventh day prior to the acquisition announcement.

We examine the three-day (-2, 0) cumulative abnormal returns (CAR), estimated using the CRSP equally weighted index and the market model. In cases in which a firm makes multiple acquisitions in a given year, we use the average CAR of all acquisitions in that year weighted by the deal values, and the deal characteristics variables including *Public*, *Equity* and *Deal size* are also deal-value-weighted. We focus on a subset of firm-years with acquisitions

²⁸ Dittmar and Thakor (2007) explain why acquisition announcement returns are likely to be unaffected by asymmetric information.

²⁹ Note that here we use actual repurchase rather than repurchase program announcement because a significant number of firms do not acquire any shares subsequent to a program announcement (see, for instance, Stephens and Weisbach (1998)).

observed in both the preceding year and the subsequent year, and estimate the impact of repurchases based on the following baseline model:

$$\begin{aligned} \text{Change in CAR}_{it-1 \text{ to } t+1} = & \alpha + \beta_1 * \text{Repurchase}_{it} + \beta_2 * \text{Change in Deal Characteristics}_{it-1 \text{ to } t+1} \\ & + \beta_3 * \text{Controls} + \eta_t + \varepsilon_{it} \end{aligned}$$

where *Change in CAR*_{it-1 to t+1} is the CAR of the acquisition that firm *i* makes in year *t+1* minus the CAR of the acquisition that the firm makes in year *t-1*. *Repurchase*_{it} is a dummy that equals one if the firm repurchases shares in year *t*. In addition to the changes in deal characteristics variables, we also include control variables at the firm level and changes in them from year *t-1* to year *t+1*, like free cash flow (defined as operation income before depreciation net of interest expense, tax and total dividend payment, denominated by book value of assets), stock returns, market returns, market-to-book ratio and the natural log of sales. Year dummies are included in each regression, and robust standard errors are clustered at the firm level.

We present the results in *Table 6*. Overall, we find that investors value deals made after repurchases significantly higher than if no repurchases were made. There is some evidence that the change in CARs is negatively associated with the free cash flow that a firm has. Our results hold even after we control for the level and change of free cash flow, alleviating the concern that the higher investor valuation might be merely driven by the mitigation of agency problem after the repurchase which is implied by the reduction in free cash flow. The repurchase dummy variable is correlated with the change in stock returns, as improved investor-management agreement also implies a higher stock price following a repurchase. The literature (e.g. Ikenberry, Lakonishok and Vermaelen (1995, 2000) and Peyer and Vermaelen (2009)) has documented a positive long drift in stock returns for repurchasing firms. Yet, the repurchase dummy variable is statistically significant even after controlling for the change in stock returns.

To examine whether our main finding is affected by information asymmetry and diversity of opinion, we include in the baseline model the three information asymmetry measures – *Psi*, *Volatility* and *Earnings residual (std)* and the diversity of opinion measure – *Breadth of ownership*. Consistent with Moeller et al. (2007), we find that higher diversity of

opinion leads to lower bidder abnormal returns for acquisitions of public firms paid for with equity. Also, there is weak evidence that bidders with more asymmetric information are fared worse when acquiring public targets paid for with equity (except the *Earnings residual (std)* measure), although the coefficients are not statistically significant possibly due to the small sample size. Our main results are robust to these controls, indicating that investors overall value managerial decisions more after the repurchase than before.

5. Effect of Repurchase Announcement on Information Asymmetry

As discussed in the introduction, the early literature considers information-asymmetry-induced signaling as an important motive for open-market repurchases. If so, we would expect that information asymmetry would decline following the announcement of a repurchase program, as the announcement conveys favorable information that was initially available only to managers. The empirical finding in Grullon and Michaely (2004) contradicts this argument. They do *not* find operational improvements following repurchase announcements in those firms. Lie (2005) finds that actual repurchases, and not announcements per se, portend future improvements in profitability, although the findings of Gong, Louis and Sun (2008) suggest that the documented post-repurchase improvement in performance may be an illusion created by pre-repurchase *downward* earnings management. In this section, we provide additional evidence to collaborate their findings.³⁰

We examine changes in investors' valuation of a firm's cash flows.³¹ If the information asymmetry/signaling hypothesis holds, the abnormal earnings-announcement returns before the repurchase announcement should be higher than those after the repurchase announcement. The reason is that information asymmetry is supposed to be lower after the repurchase announcement, so the information content of any signal should be smaller.

We also investigate how earnings surprise changes around a repurchase announcement. Following the standardized unexpected earnings (SUE) effect literature, we define earnings

³⁰ Massa, Rehman and Vermaelen (2007) also provide a different perspective from the undervaluation argument and show that a repurchase may be a strategic reaction to other firms' repurchase decisions in the industry.

³¹ The previous literature has shown that repurchase announcements are not followed by an increase in cash flows.

surprise as announced earnings that exceed (fall short of) a proxy for the market's expectation of earnings (see Livnat and Mendenhall (2006) for a complete reference). If earnings surprise is an indicator of information asymmetry, the signaling hypothesis predicts a significantly positive surprise for earnings announced prior to the repurchase announcement and the surprise subdued after the repurchase announcement. Specifically, to capture how the market's expectation of earnings evolves in response to a repurchase announcement, we compute analysts' forecast based earnings surprise (SURP) using quarterly earnings minus the most recent mean consensus analysts' forecast for that quarter, which is then normalized by the firm's stock price at the end of the prior month.³²

We obtain repurchase announcements data from SDC. We focus on open market repurchases that are not announced along with other repurchase modes like privately negotiated repurchases, tender-offer or Dutch-auction repurchases. Following the literature (e.g., Guay and Harford (2000)), if a firm has more than one announcement within any given year, we only consider the first one. The three-day (-1, +1) abnormal earnings-announcement return (CAR) for a given firm is calculated using the CRSP equally-weighted index return and the market model. Following Chan, Ikenberry and Lee (2004), we drop extreme observations involving excess returns above 25% and below -25%.³³ We examine the changes in earnings-announcement CAR and in SURP induced by the repurchase announcement for two windows: the quarter prior to and subsequent to the repurchase announcement, (-1 quarter, +1 quarter); two quarters prior to and two quarters subsequent to the repurchase announcement, (-2 quarters, +2 quarters). For the latter window, the SURP and CAR are averaged over quarters.

For the overall sample, *Table 7* shows that the earnings-announcement CARs are significantly negative for the quarter and two quarters preceding the repurchase announcement. However, investors respond positively for the subsequent quarter and two quarters following the repurchase announcement. This runs counter to the prediction of the information

³² We thank Roger Loh for generously providing us the SURP data. Another commonly used earnings surprise calculation takes the earnings in the same quarterly horizon in the prior year as a proxy for the market's expectation of the current quarterly earnings (see, for instance, Chordia and Shivakumar (2006)). We believe the SURP definition is more suitable in our context.

³³ About 3% of the observations are dropped. Winsorizing the excess returns, instead of dropping the extreme observations, does not affect the results.

asymmetry/signaling hypothesis. Instead, the stronger market responses to earnings announcements after repurchase announcements seem to be consistent with our argument that investors expect an improvement in investor-management agreement triggered by share repurchases. If the announced programs are implemented, investors who are less prone to agree with management will tender their shares, concentrating ownership in the hands of investors who agree more with management, boosting the firms' stock prices.

Table 7 also reports both the mean and median SURPs around the repurchase announcement. From the results on the overall sample, we find no support for the signaling hypothesis. The mean and median SURPs are not significantly different from zero, either before or after the repurchase announcement (except that the mean SURP for the first quarter after the announcement is negative and significant at the 10% level).

We also consider the following alternative explanation for the abnormal earnings-announcement returns around repurchase announcements that we find. Gong, Louis and Sun (2008) find that managers deflate earnings prior to open-market repurchase announcements in firms that actually repurchase shares shortly after the repurchase announcements, while there is no evidence of such downward earnings management for firms that announce repurchases but do *not* actually buy back shares.³⁴ Thus, the positive post-repurchase earnings-announcement CARs might be due to the fact that post-repurchase realized earnings exceed expectations (irrationally) formed on the basis of pre-repurchase deflated earnings. To test this, we partition the sample into two groups – firms with actual repurchases in the year of the repurchase announcement and firms that do not actually repurchase in the year of the repurchase announcement.³⁵ And then we investigate the changes in abnormal earnings-announcement returns for each group.

³⁴ In a similar spirit, Brockman, Khurana and Martin (2008) find that managers often manipulate information flow by increasing the percentage and magnitude of bad news announcements during the one-month period prior to repurchase announcements.

³⁵ Lie (2005) finds that actual repurchases are usually conducted soon (during the quarter or in the following quarter) after the repurchase announcement. To account for cases that a repurchase is announced at the end of the year for a given firm, we also form the groups based on whether there are actual repurchases in the year or in the year following the repurchase announcement and find the results are qualitatively unaffected. In addition, as a robustness check, we follow Gong, Louis and Sun (2008) and Lie (2005) and require a firm's actual repurchases exceed 1% of the firm's market value to be included into the group classified as having made actual repurchases. We find that the results are robust to this more stringent classification.

Consistent with the finding of Gong, Louis and Sun (2008), the results, also reported in *Table 7*, show that the significantly negative earnings-announcement CARs for the two quarters prior to the repurchase announcement are observed only for firms with actual repurchases. And the significantly negative mean pre-repurchase-announcement SURPs for those firms are consistent with the earnings lower than the market's expectation, although the median SURPs are zero. However, there is only weak evidence that the mean post-repurchase-announcement SURPs become less negative, while the medians remain insignificantly different from zero. Neither the mean nor the median SURPs for firms without subsequent actual repurchases are significantly different from zero, no matter before or after the repurchase announcement. Overall, the evidence from SURPs for either group of firms does not reconcile with the predictions of the signaling hypothesis.

Nevertheless, we find significantly positive earnings-announcement CARs subsequent to the repurchase announcement not only in firms with subsequent actual repurchases, but also in firms without, the magnitudes of which are *not* significantly different from each other. This is hard to explain solely on the basis of pre-repurchase downward earnings management explanation, because firms that do not actually repurchase are unlikely to deflate pre-repurchase earnings. Rather, the finding is more consistent with investors responding positively in anticipation of an improvement in agreement resulting from actual repurchases (despite no shares repurchased ex post).³⁶ Therefore, it is possible that both the potential pre-repurchase downward earnings management and the expected improvement in agreement are working in concert to generate the significantly positive post-repurchase-announcement CARs.

In sum, the positive change in the abnormal earnings-announcement returns around the repurchase announcement is unlikely to be due to a decline in information asymmetry, as predicted by the signaling hypothesis. A direct examination of the earnings surprise does not lend support to the signaling hypothesis either. Further, while we do not rule out the possibility that higher firm valuation following the repurchase announcement is due to pre-repurchase

³⁶ There is no evidence that the market accurately predicts at the time of the repurchase announcement which firms will actually repurchase shares (Lie (2005)). Bhattacharya and Dittmar (2008) find no difference in repurchase announcement returns between firms that repurchase shares and firms that do not repurchase shares during the quarter or the quarter following the repurchase announcement.

downward earnings management in some firms, it is, at least partially, explained by an expected improvement in agreement following the repurchase announcement.

6. Conclusion

In this study, we present a new explanation for open-market share repurchases and provide supporting empirical evidence. We also provide a link between a firm's open-market share repurchase decision and its investment decision. Investors may disagree with management about investment decisions, which will adversely affect the firm's stock price. A repurchase causes a change in the investor base as investors less prone to agree with management tender their shares when the firm repurchases. Consequently, firm ownership becomes concentrated in the hands of investors more prone to agree with management, which enhances investor-management agreement. Our empirical evidence strongly supports this motive for open-market repurchases.

Consistent with the more recent literature (e.g. Grullon and Michaely (2004) and Lie (2005)), we also show that a firm's repurchase decision is unlikely to be related to information asymmetry and signaling. We infer the impact of a repurchase announcement on information asymmetry from the change in abnormal earnings-announcement returns and change in earnings surprise around the repurchase announcement. There is little evidence that an announcement of an *open-market* repurchase diminishes information asymmetry.³⁷ In our study of investor-management agreement, we control for information asymmetry and the results still hold.

In the previous literature (e.g. Allen and Gate (1999), Dittmar and Thakor (2007), and Van den Steen (2004)), the extent of agreement has been taken as exogenously given. Our findings show that firms may undertake actions to affect the level of manager-investor agreement. Future research could explore other implications of such proactive firm initiatives.

³⁷ Clearly, this argument does not extend to tender offer repurchases, where there is strong evidence of statistically significant abnormal announcement returns with great magnitudes.

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Table 1
Summary Statistics

This table provides summary statistics for an unbalanced panel of 6291 firms from 1987 to 2006 (55035 firm-years).

Panel A presents summary statistics for repurchase characteristics. *Frequency* is the proportion of years that a firm has positive net repurchase in the sample period. *Repurchase/Market cap*, *Repurchase/Book equity* and *Repurchase/Assets* are the dollar amount of net repurchase if it is positive, divided by the prior year end market value of equity, book value of equity and total assets, respectively.

Panel B reports summary statistics for the four measures of investor-management agreement: *institutional shareholdings*, is defined as the natural log of one plus the percentage of institutional ownership in the firm's total shares outstanding; *analysts' EPS forecast dispersion*, the standard deviation of analysts' EPS forecasts in the fiscal year-end divided by book equity; *Number of months beating EPS forecast*, the number of months that a firm's EPS beats forecast in a year; and *dual-class control premium*, the median difference in monthly stock price between voting and non-voting shares in a firm-year divided by the price of non-voting shares.

Panel C reports firm-level accounting variables and stock returns of the sample.

Panel D provides information on the three information asymmetry measures: *Psi*, Idiosyncratic volatility (*Volatility*) and standard deviation of the three-day (-1,+1) cumulative abnormal returns around earnings announcements over the past five years (*Earnings residual (std)*), the diversity of opinion proxy – change in ownership breadth (*Breadth of ownership*), as well as managerial ownership and executive options holding. *Managerial ownership* is defined as shares owned (excluding options) by the top five firm executives divided by the number of total shares outstanding. *Managerial options* is the total number of unexercised options held by the top five firm executives that were vested.

	Mean	Median	Standard Deviation	N
Panel A: Net repurchase				
Frequency	0.229	0.167	0.250	6291
Repurchase/Market cap	0.034	0.019	0.039	14571
Repurchase/Assets	0.036	0.018	0.044	14571
Repurchase/Book equity	0.073	0.038	0.089	14571
Panel B: Measures of agreement				
Institutional shareholdings (%)				
Overall	35.06	31.04	26.16	55035
Top1	7.48	6.57	5.58	55035
Top2-5	11.35	11.51	7.85	55035
Blockholder	17.47	14.50	11.44	35220
Independent	15.77	9.96	15.46	51704
Grey	7.09	4.66	7.25	51894
Analyst forecast dispersion ($\times 10^3$)	0.76	0.09	3.29	26313
Number of months beating EPS forecast	5.74	5.00	4.89	34151

Dual-class control premium	0.050	0.005	0.422	893
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Panel C: Firm characteristics

Sales (\$MM)	1391.73	137.62	7002.37	55035
Operating income	0.09	0.12	0.18	55035
Non-operating income	0.01	0.01	0.02	55035
Capital expenditure	0.07	0.05	0.07	55035
Market-to-book	3.04	1.93	3.78	55035
Debt ratio	0.16	0.12	0.17	55035
Stock returns	0.16	0.04	0.67	55035
Market returns	0.13	0.13	0.16	55035

Panel D: Other control variables

<i>Psi</i>	2.00	1.86	1.39	52066
Volatility	0.04	0.03	0.02	54748
Earnings residual (std)	0.07	0.06	0.04	31914
Breadth of ownership	0.0037	0.0008	0.0127	41761
Managerial ownership	0.05	0.01	0.09	15080
Managerial options (MM)	0.948	0.447	1.503	15080

Table 2
The Effect of Agreement on the Repurchase Decision

This table presents results from firm fixed-effect regressions where the dependent variable equals one if the firm makes repurchase in year t and zero otherwise. The agreement proxy is indicated at the top of each column. One of the agreement parameters, institutional shareholding, is defined as the natural log of one plus the percentage of institutional ownership in the firm's total shares outstanding. Five different measures of institutional shareholding are used: Columns (1) uses shareholdings by all institutions investing in the firm; Columns (2) uses shareholdings by all institutions except the Top1 institution; Columns (3) uses shareholding by the Top1 institution which holds the largest ownership in the firm; Columns (4) uses shareholding by independent institutions which include investment companies and independent investment advisors (type 3 and 4 institutions in CDA/Spectrum); Columns (5) uses shareholding by grey institutions which include banks and insurance companies (type 1 and 2 institutions in CDA/Spectrum). The other three agreement parameters are used as follows: Column (6) uses analysts' EPS forecasts dispersion, defined as the standard deviation of the firm's analyst EPS forecasts as of the year-end prior to repurchase divided by the book value of equity; Column (7) uses the number of months that the firm's actual EPS beats the analysts' forecast in a year; and Column (8) uses dual-class premium, the median difference in monthly stock price between voting and non-voting shares in a firm-year divided by the price of non-voting shares. All other control variables are defined in the definition of variables part in the text and are measured as of the year prior to repurchase. All regressions include year dummy variables. Robust standard errors are clustered by firm and p-values are reported in parentheses. *, ** and *** indicate significance at 10%, 5% and 1%, respectively.

	Agreement Proxies							
	Institutional Ownership			Analyst's EPS Forecast		Dual-class		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Agreement $_{t-1}$	-0.012** (0.016)	-0.024*** (0.000)	-0.001 (0.752)	-0.011** (0.012)	0.015*** (0.001)	1.914** (0.045)	-0.001*** (0.006)	0.056*** (0.000)
Stock return $_{t-1}$	-0.042*** (0.000)	-0.042*** (0.000)	-0.042*** (0.000)	-0.044*** (0.000)	-0.042*** (0.000)	-0.051*** (0.000)	-0.047*** (0.000)	-0.096*** (0.001)

Market return $t-1$	0.166*** (0.000)	0.166*** (0.000)	0.166*** (0.000)	0.180*** (0.000)	0.163*** (0.000)	0.237*** (0.000)	0.211*** (0.000)	0.335** (0.040)
Number of institutions $t-1$ (log)	0.058*** (0.000)	0.069*** (0.000)	0.049*** (0.000)	0.063*** (0.000)	0.046*** (0.000)			
Operating income $t-1$	0.166*** (0.000)	0.167*** (0.000)	0.165*** (0.000)	0.174*** (0.000)	0.176*** (0.000)	0.345*** (0.000)	0.254*** (0.000)	0.602** (0.034)
Non-operating income $t-1$	0.901*** (0.000)	0.898*** (0.000)	0.904*** (0.000)	0.974*** (0.000)	0.891*** (0.000)	1.579*** (0.000)	1.579*** (0.000)	2.835** (0.045)
Capital expenditure $t-1$	-0.250*** (0.000)	-0.248*** (0.000)	-0.249*** (0.000)	-0.272*** (0.000)	-0.264*** (0.000)	-0.419*** (0.000)	-0.341*** (0.000)	0.048 (0.924)
Market-to-book $t-1$	-0.002*** (0.001)	-0.002*** (0.000)	-0.002*** (0.001)	-0.002*** (0.002)	-0.002*** (0.004)	-0.002 (0.294)	-0.002 (0.171)	-0.017 (0.165)
Debt ratio $t-1$	-0.300*** (0.000)	-0.299*** (0.000)	-0.301*** (0.000)	-0.309*** (0.000)	-0.311*** (0.000)	-0.493*** (0.000)	-0.449*** (0.000)	-0.251 (0.193)
Sales $t-1$ (log)	0.024*** (0.000)	0.023*** (0.000)	0.024*** (0.000)	0.026*** (0.000)	0.024*** (0.000)	0.071*** (0.000)	0.064*** (0.000)	0.062 (0.210)
Constant	0.117*** (0.000)	0.111*** (0.000)	0.105*** (0.001)	0.077** (0.023)	0.086** (0.011)	0.004 (0.953)	0.093* (0.060)	0.184 (0.604)
Observations	55035	55035	55035	51704	51894	26313	34151	893
Number of firms	6291	6291	6291	6249	6224	3343	4299	96
R-squared	0.048	0.048	0.048	0.051	0.050	0.069	0.065	0.121

Table 3
The Effect of Agreement on the Repurchase Decision: Controls for Information Asymmetry

This table presents results from firm fixed-effect regressions where the dependent variable equals one if the firm makes repurchase in year t and zero otherwise. Three main agreement parameters, indicated at the top of columns, are used as follows: shareholdings by all institutions except the Top1 institution where shareholding is defined as the natural log of one plus the percentage of those institutions' ownership in the firm's total shares outstanding, analysts' EPS forecasts dispersion defined as the standard deviation of the firm's analyst EPS forecasts as of the year-end prior to repurchase divided by the book value of equity, and the number of months that the firm's actual EPS beats the analysts' forecast in a year. Three measures of information asymmetry include Psi , Idiosyncratic volatility (*Volatility*) and standard deviation of the three-day (-1,+1) cumulative abnormal returns around earnings announcements over the past five years (*Earnings residual (std)*). Other control variables used in *Table 2* are included but not reported here for the sake of brevity. All regressions include year dummy variables. Robust standard errors are clustered by firm and p-values are reported in parentheses. *, ** and *** indicate significance at 10%, 5% and 1%, respectively.

Panel A: Psi as information asymmetry measure						
	Agreement Proxies					
	(1)	(2)	(3)	(4)	(5)	(6)
	Institutional (except Top1) Ownership		Analysts' EPS Forecast Dispersion		Number of Months Beating EPS Forecast	
Agreement _{t-1}		-0.021*** (0.001)		2.090** (0.034)		-0.001*** (0.008)
Psi_{t-1}	-0.006*** (0.000)	-0.004** (0.015)	-0.004 (0.145)	-0.004 (0.134)	-0.004* (0.084)	-0.004* (0.086)
Constant	0.159*** (0.000)	0.129*** (0.000)	0.001 (0.985)	-0.003 (0.968)	0.084 (0.109)	0.087* (0.096)
Other controls	YES	YES	YES	YES	YES	YES
Observations	52066	52066	25406	25406	32611	32611
N. of firms	6035	6035	3249	3249	4130	4130
R-squared	0.045	0.049	0.069	0.070	0.065	0.066

Panel B: Idiosyncratic volatility as information asymmetry measure

	Agreement Proxies					
	(1)	(2)	(3)	(4)	(5)	(6)
	Institutional (except Top1) Ownership		Analysts' EPS Forecast Dispersion		Number of Months Beating EPS Forecast	
Agreement _{t-1}		-0.029*** (0.000)		2.577*** (0.007)		-0.001*** (0.009)
Volatility _{t-1}	-1.172*** (0.000)	-1.041*** (0.000)	-2.861*** (0.000)	-2.927*** (0.000)	-2.579*** (0.000)	-2.574*** (0.000)
Constant	0.190*** (0.000)	0.168*** (0.000)	0.115* (0.072)	0.113* (0.078)	0.192*** (0.000)	0.194*** (0.000)
Other controls	YES	YES	YES	YES	YES	YES
Observations	54748	54748	26274	26274	34057	34057
N. of firms	6256	6256	3340	3340	4288	4288
R-squared	0.046	0.049	0.070	0.071	0.067	0.068

Panel C: Earnings residual (sd) as information asymmetry measure

	Agreement Proxies					
	(1)	(2)	(3)	(4)	(5)	(6)
	Institutional (except Top1) Ownership		Analysts' EPS Forecast Dispersion		Number of Months Beating EPS Forecast	
Agreement _{t-1}		-0.035*** (0.000)		2.175** (0.045)		-0.001** (0.047)
Earnings residual (std) _{t-1}	-0.230 (0.116)	-0.217 (0.136)	-0.185 (0.305)	-0.190 (0.292)	-0.249 (0.124)	-0.248 (0.124)
Constant	0.039 (0.515)	0.008 (0.901)	-0.004 (0.950)	-0.008 (0.909)	0.032 (0.616)	0.037 (0.555)
Other controls	YES	YES	YES	YES	YES	YES
Observations	31914	31914	25014	25014	28808	28808
N. of firms	3964	3964	3159	3159	3590	3590
R-squared	0.061	0.064	0.070	0.071	0.065	0.066

Table 4
The Effect of Agreement on the Repurchase Decision: Controls for Difference of Opinions among Investors

This table presents results from firm fixed-effect regressions where the dependent variable equals one if the firm makes repurchase in year t and zero otherwise. Three main agreement parameters, indicated at the top of columns, are used as follows: shareholdings by all institutions except the Top1 institution where shareholding is defined as the natural log of one plus the percentage of those institutions' ownership in the firm's total shares outstanding, analysts' EPS forecasts dispersion defined as the standard deviation of the firm's analyst EPS forecasts as of the year-end prior to repurchase divided by the book value of equity, and the number of months that the firm's actual EPS beats the analysts' forecast in a year. Other control variables used in *Table 2* are included but not reported here for the sake of brevity. All regressions include year dummy variables. Robust standard errors are clustered by firm and p-values are reported in parentheses. *, **, and *** indicate significance at 10%, 5% and 1%, respectively.

	Agreement Proxies											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Institutional (except Top1) Ownership	Institutional (except Top1) Ownership	Analysts' EPS Forecast Dispersion	Analysts' EPS Forecast Dispersion	Number of Months Beating EPS Forecast	Number of Months Beating EPS Forecast	Institutional (except Top1) Ownership	Institutional (except Top1) Ownership	Analysts' EPS Forecast Dispersion	Analysts' EPS Forecast Dispersion	Number of Months Beating EPS Forecast	Number of Months Beating EPS Forecast
Agreement _{t-1}		-0.025*** (0.001)		2.136* (0.053)		-0.001** (0.017)		-0.033*** (0.000)		2.950*** (0.007)		-0.001** (0.028)
Breadth of ownership _{t-1}		-0.646*** (0.001)		-0.317 (0.122)		-0.384* (0.052)		-1.021*** (0.000)		-0.465** (0.024)		-0.544*** (0.006)
Volatility _{t-1}								-2.253*** (0.000)		-3.459*** (0.000)		-3.384*** (0.000)
Constant		0.083* (0.066)		-0.016 (0.800)		0.064 (0.274)		0.134*** (0.004)		0.108 (0.105)		0.192*** (0.001)
Other controls		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	41761	41761	25464	25464	30119	30119	41651	41651	25426	25426	30066	30066
N. of firms	4900	4900	3215	3215	3712	3712	4889	4889	3211	3211	3707	3707
R-squared	0.050	0.055	0.069	0.070	0.065	0.066	0.053	0.057	0.072	0.073	0.069	0.069

Table 5
The Effect of Agreement on the Repurchase Decision: Controls for Managerial Ownership and Options

This table presents results from firm fixed-effect regressions where the dependent variable equals one if the firm makes repurchase in year t and zero otherwise. Three main agreement parameters, indicated at the top of columns, are used as follows: shareholdings by all institutions except the Top1 institution where shareholding is defined as the natural log of one plus the percentage of those institutions' ownership in the firm's total shares outstanding, analysts' EPS forecasts dispersion defined as the standard deviation of the firm's analyst EPS forecasts as of the year-end prior to repurchase divided by the book value of equity, and the number of months that the firm's actual EPS beats the analysts' forecast in a year. *Managerial ownership* is defined as shares owned (excluding options) by the top five firm executives divided by the number of total shares outstanding. *Managerial options* is the total number of unexercised options held by the top five firm executives that were vested. Other control variables used in *Table 2* are included but not reported here for the sake of brevity. All regressions include year dummy variables. Robust standard errors are clustered by firm and p-values are reported in parentheses. *, **, and *** indicate significance at 10%, 5% and 1%, respectively.

	Agreement Proxies											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Institutional (except Top1) Ownership	Analysts' EPS Forecast Dispersion	Number of Months Beating EPS Forecast	Institutional (except Top1) Ownership	Analysts' EPS Forecast Dispersion	Number of Months Beating EPS Forecast	Institutional (except Top1) Ownership	Analysts' EPS Forecast Dispersion	Number of Months Beating EPS Forecast	Institutional (except Top1) Ownership	Analysts' EPS Forecast Dispersion	Number of Months Beating EPS Forecast
Agreement _{t-1}	-0.047** (0.019)	6.442** (0.037)	-0.000 (0.853)	-0.068*** (0.000)	8.000*** (0.005)	-0.000 (0.714)	-0.050** (0.021)	5.847* (0.059)	0.000 (0.747)	-0.037* (0.073)	5.471* (0.075)	0.000 (0.891)
Managerial ownership _{t-1}	-0.224** (0.014)	-0.257** (0.025)	-0.258*** (0.009)	-0.224** (0.011)	-0.205* (0.077)	-0.227** (0.018)	-0.232** (0.016)	-0.231* (0.050)	-0.251** (0.017)	-0.222** (0.015)	-0.236** (0.043)	-0.258** (0.012)
Managerial options _{t-1}	0.012** (0.014)	0.012** (0.012)	0.013*** (0.008)	0.011** (0.019)	0.012*** (0.009)	0.013*** (0.005)	0.010** (0.035)	0.012** (0.013)	0.013*** (0.008)	0.010** (0.025)	0.012** (0.015)	0.013*** (0.009)
Psi_{t-1}	-0.003 (0.355)	-0.008** (0.049)	-0.005 (0.144)									
Volatility _{t-1}				-4.042*** (0.000)	-4.984*** (0.000)	-4.564*** (0.000)						
Earnings				0.257	0.192	0.134						

Table 6
The Effect of Repurchase on Investors' Valuation of M&A Decisions

This table presents results from OLS regressions where the dependent variable is the change in CARs of acquisition announcements from the year preceding ($t-1$) to the year following a repurchase ($t+1$). *Repurchase dummy* equals one if the firm makes repurchase in year t and zero otherwise. *Deal Size* is the transaction value of an acquisition divided by the market capitalization of the bidder measured at the 11th day prior to the acquisition announcement. *Equity* is a dummy that equals one if the acquisition is paid either fully or partially with stock and zero otherwise. *Public* is a dummy that equals one if the target is a public company and zero otherwise. *Infoasy/dop* represents either the information asymmetry measure or the diversity of opinion proxy, as indicated at the top of columns. *Infoasy/dop*×*Equity* represents $(Infoasy/dop_{t+1}-Infoasy/dop_{t-1}) \times (Equity_{t+1}-Equity_{t-1})$. *Infoasy/dop*×*Public* represents $(Infoasy/dop_{t+1}-Infoasy/dop_{t-1}) \times (Public_{t+1}-Public_{t-1})$. *Equity*×*Public* represents $(Equity_{t+1}-Equity_{t-1}) \times (Public_{t+1}-Public_{t-1})$. *Infoasy/dop*×*Equity*×*Public* represents $(Infoasy/dop_{t+1}-Infoasy/dop_{t-1}) \times (Equity_{t+1}-Equity_{t-1}) \times (Public_{t+1}-Public_{t-1})$. *Free cashflow* is defined as operation income before depreciation net of interest expense, tax and total dividend payment, denominated by book value of assets. Other variables are as defined earlier. All regressions include year dummy variables. Robust standard errors are clustered by firm and p-values are reported in parentheses. *, ** and *** indicate significance at 10%, 5% and 1%, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
			<i>Psi</i>	Volatility	Earnings residual (std)	Breadth of ownership
Repurchase dummy _t	0.013** (0.045)	0.014** (0.035)	0.013** (0.050)	0.013** (0.047)	0.010* (0.086)	0.011* (0.081)
Deal Size _{t+1} – Deal Size _{t-1}		0.013*** (0.000)	0.016*** (0.000)	0.016*** (0.000)	0.014*** (0.007)	0.018*** (0.000)
Equity _{t+1} – Equity _{t-1}		-0.014*** (0.008)	-0.008 (0.104)	-0.007 (0.147)	-0.007 (0.168)	-0.007 (0.200)
Public _{t+1} – Public _{t-1}			-0.028*** (0.000)	-0.028*** (0.000)	-0.029*** (0.000)	-0.022*** (0.000)
Infoasy/dop _{t+1} – Infoasy/dop _{t-1}			-0.002 (0.289)	0.080 (0.792)	0.333** (0.020)	0.000 (0.998)
Infoasy/dop×Equity			0.001 (0.693)	0.313 (0.452)	-0.513** (0.026)	-0.086 (0.423)
Infoasy/dop×Public			0.003 (0.361)	0.698 (0.309)	-0.138 (0.676)	0.018 (0.897)
Equity×Public			0.001 (0.891)	-0.002 (0.798)	-0.005 (0.630)	-0.001 (0.886)
Infoasy/dop×Equity×Public			-0.006 (0.307)	-1.252 (0.214)	0.474 (0.355)	-0.575*** (0.006)
Infoasy/dop _t			-0.001 (0.532)	0.153 (0.626)	0.027 (0.790)	0.007 (0.930)
Free cashflow _{t+1} – Free cashflow _{t-1}	-0.067 (0.369)	-0.060 (0.421)	-0.059 (0.433)	-0.059 (0.435)	-0.125** (0.032)	-0.144*** (0.009)
Stock return _{t+1} – Stock return _{t-1}	0.003 (0.459)	0.001 (0.712)	0.001 (0.733)	0.002 (0.704)	0.004 (0.365)	0.003 (0.510)
Market return _{t+1} – Market return _{t-1}	-0.011	-0.013	-0.004	-0.010	0.027	0.007

	(0.763)	(0.727)	(0.913)	(0.778)	(0.464)	(0.842)
Market-to-book _{t+1} – Market-to-book _{t-1}	0.002	0.002*	0.002*	0.002	0.003*	0.001
	(0.226)	(0.091)	(0.090)	(0.102)	(0.088)	(0.303)
Sales(log) _{t+1} – Sales(log) _{t-1}	-0.003	-0.001	-0.002	-0.001	-0.000	0.004
	(0.775)	(0.907)	(0.850)	(0.945)	(0.993)	(0.605)
Free cashflow _t	-0.150*	-0.152*	-0.154*	-0.143	-0.022	-0.023
	(0.098)	(0.091)	(0.097)	(0.108)	(0.676)	(0.599)
Stock return _t	-0.003	-0.001	-0.001	-0.000	-0.004	-0.003
	(0.681)	(0.875)	(0.848)	(0.994)	(0.480)	(0.671)
Market return _t	0.027	0.023	0.023	0.026	-0.026	0.025
	(0.547)	(0.610)	(0.593)	(0.548)	(0.543)	(0.557)
Market-to-book _t	0.000	0.000	0.000	0.000	0.000	-0.000
	(0.968)	(0.951)	(0.759)	(0.909)	(0.774)	(0.736)
Sales (log) _t	0.001	0.001	0.000	0.001	0.001	0.002
	(0.730)	(0.751)	(0.896)	(0.487)	(0.402)	(0.220)
Constant	-0.019	-0.021	-0.014	-0.026	-0.063*	-0.040*
	(0.455)	(0.415)	(0.643)	(0.412)	(0.081)	(0.075)
Observations	1462	1462	1453	1462	1194	1246
R-squared	0.043	0.062	0.081	0.083	0.094	0.084

Table 7
Abnormal Earnings-announcement Returns and Earnings Surprise around the Repurchase Announcement

This table reports the three-day (-1,+1) abnormal earnings-announcement returns (CAR) and analysts' forecast based earnings surprise (SURP) around the repurchase announcement from 1988 to 2006. Comparisons are made for two windows: the quarter prior to and subsequent to the repurchase announcement, (-1 quarter, 1 quarter); and two quarters prior to and two quarters subsequent to the repurchase announcement, (-2 quarters, 2 quarters). For the later window, the abnormal returns are averaged over quarters. Means and medians for the overall sample are presented first, followed by a breakout based on whether firms undertake actual repurchases in the year of the repurchase announcement. The significance levels of the means (medians) are based on a two-tailed *t*-test (two-tailed Wilcoxon rank test). *, **, and *** denote significance at the 0.10, 0.05, and 0.01 levels, respectively.

	Overall sample		Firms with actual repurchases in the year of the repurchase announcement		Firms that do not repurchase in the year of the repurchase announcement	
	Before	After	Before	After	Before	After
Quarter window (-1, 1)						
CAR mean	-0.0049***	0.0067***	-0.0052***	0.0067***	-0.0037	0.0066***
CAR median	-0.0028***	0.0037***	-0.0027***	0.0034***	-0.0030	0.0043***
SURP mean	-0.0031	-0.0071*	-0.0018***	-0.0011**	-0.0068	-0.0234
SURP median	0	0	0	0	0	0
obs.	3549	3456	2592	2520	957	936
Quarter window (-2, 2)						
CAR mean	-0.0019**	0.0058***	-0.0019**	0.0058***	-0.0021	0.0059***
CAR median	-0.0004*	0.0032***	-0.0008*	0.0033***	0.0006	0.0030***
SURP mean	-0.0014	-0.0088	-0.0012***	-0.0011*	-0.0018	-0.0295
SURP median	0.00014	0.00012	0.00013	0.00015	0.00019	0
obs.	3546	3452	2591	2518	955	934

Figure 1: Aggregate net repurchases, 1988-2006



Figure 2: Ratio of aggregate net repurchases to aggregate market capitalizations, 1988-2006

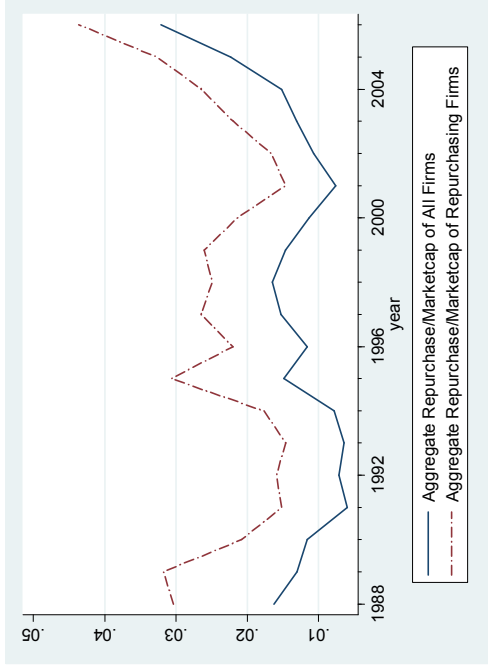


Figure 3: Fraction of firms that have undertaken net repurchases, 1988-2006

