Accelerated Share Repurchases

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Abstract:
Between 2004 and 2008, $131 billion of stock was repurchased via accelerated share repurchases (ASRs), and in 2007 ASR announcements represented about 26% of the total number of repurchase program announcements. ASRs are credible commitments by firms to repurchase shares immediately. Including an ASR in a repurchase program reduces the flexibility that firms have to alter an announced program in response to subsequent changes in the price and liquidity of its stock, unexpected shocks to cash flow and/or investment, etc. Thus, we investigate whether firms' decisions to include ASRs in their repurchase programs are associated with factors expected to influence the costs of lost flexibility and the benefits of enhanced credibility and immediacy. Consistent with the costs of lost flexibility being important determinants of ASR adoption, we find that the choice to undertake an ASR as well as the fraction of a repurchase program to conduct via an ASR are significantly negatively associated with the variability of the firm's share price and the stock market *illiquidity* of the firm's shares. We also find that firms are more likely to undertake ASRs in situations where the benefits of credibility and immediacy are larger, e.g., as defenses against unwanted takeover attempts and as distributions of the proceeds of asset sales. Additionally, we document that ASR announcements are associated with positive average abnormal stock returns.

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1. Introduction

A fundamental area of research in financial economics is the study of firms' payout policies. The level, frequency, and form of payouts have individually and collectively been the subject of considerable investigation.[1] This paper examines a relatively recent and important innovation in the share repurchase form of payouts, namely, accelerated share repurchases (ASRs). Specifically, we analyze the determinants of the choice to include an ASR as part of a repurchase program as well as the choice of the fraction of the shares in a program to be obtained via an ASR. We also document the stock price reactions to announcements of ASRs.

In an accelerated share repurchase, a firm enters into a contract with an intermediary, typically an investment bank, whereby the intermediary immediately delivers a specified number of the firm's shares in exchange for cash based on an agreed upon price per share (ordinarily the most recent closing price). The intermediary obtains the shares that it delivers to the repurchasing firm by borrowing them, typically from institutions. The intermediary then covers its short position by purchasing shares in the market over a specified time period, normally several months. The ASR contract also includes a provision whereby the repurchasing firm is required to compensate or is entitled to receive compensation from the intermediary in shares or cash for part or all of the difference between the initial price per share paid to the intermediary and the estimated price per share the firm would have paid for the shares in an open market repurchase (OMR) conducted during the same period over which the intermediary buys the shares to cover its short position. Thus, the intermediary essentially acts as the firm's proxy in borrowing the firm's shares. In sum, ASRs are repurchases with an associated

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[1] For a review of the payout literature, see Allen and Michaely (2003).

forward contract that can be settled in cash or shares of the firm.[2] Figure 1 illustrates the structure and timeline of an ASR and the Appendix includes a description of the common provisions observed in ASR contracts.

For a sample of repurchase programs announced between 1996 and 2008, we collect data on whether or not the programs included an ASR as well as details of the ASR transactions. The magnitude and frequency of ASRs have increased dramatically in recent years. Over the period 2004 to 2008, $131 billion of stock was repurchased via ASRs, and, in 2007, ASR announcements (97) represented about 26% of the total number of program announcements (376) as illustrated in Figure 2. Further, over the period 2004 to 2008, the frequency and dollar volume of ASRs have generally exceeded that of privately negotiated repurchases, fixed-price self-tender offers, Dutch-auction self-tender offers, and large special dividends as illustrated in Figures 3 and 4. Lastly, we note that in recent years the "boilerplate" language used by firms to announce repurchase program authorizations has evolved to generally include ASRs as potential mechanisms by which share repurchases will be implemented.[3] In short, ASRs have become part of the repurchase vernacular and an important element of repurchase program activity.

We analyze the stage of payout policy formulation where a firm has concluded that a share repurchase is the optimal mechanism for distributing cash to shareholders and

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[2] The Financial Accounting Standards Board's Emerging Issues Task Force (EITF) has, by consensus, agreed that an entity should account for an accelerated share repurchase as two separate transactions: (a) as shares of common stock acquired in a treasury transaction recorded on the acquisition date and (b) a forward contract indexed to its own common stock. See EITF Issue No. 99-7 "Accounting for an Accelerated Share Repurchase Program." Also, see Dickinson, Kimmel, and Warfield (2008) for the accounting consequences of ASRs.

[3] For example, H.B. Fuller Co. announced in 1996 that, "Terms of the program allow the company to make such purchases from time to time at prevailing prices in the open market, by block purchase or in private transactions." H.B. Fuller Co. announced in 2007 that, "Under the program, the Company, at management's discretion, may repurchase shares for cash on the open market from time to time, in privately negotiated transactions or block transactions, or through an accelerated repurchase agreement."

it now must decide how best to execute the repurchase. Given the vast majority of announced repurchase programs in recent years have been executed predominantly via OMRs (as opposed to self-tender offers or privately negotiated repurchases) where firms announce authorizations to repurchase shares periodically at market prices, we initially consider the decision to undertake ASRs relative to the alternative of repurchase programs comprised entirely of OMRs. In a subsequent section of the paper, we consider the decision to undertake an ASR relative to executing repurchase programs, in part, via self-tender offers or privately negotiated transactions.

In contrast to conducting an OMR-only repurchase program, including an ASR in a program commits the firm to actually repurchase shares and the firm receives these shares immediately. Consequently, the larger the ASR portion of a repurchase program, the less flexibility the firm retains to significantly alter the program in response to subsequent changes in the price and liquidity of its stock, unexpected shocks to cash flow and/or investment, etc. In other words, the choice to undertake an ASR in a repurchase program represents a substantial partial exercise of the "flexibility option" inherent in a repurchase program that would otherwise be comprised entirely of an OMR. Therefore, factors affecting the costs of early exercise of the flexibility option inherent in an OMR should be important determinants of a firm's choice to include an ASR in a repurchase program, a possibility we refer to as the *flexibility hypothesis*.

In an ASR, the repurchasing firm is credibly committed by contract to repurchase a significant number of shares immediately from the intermediary. In contrast, Stephens and Weisbach (1998) document that, three years after an OMR announcement, a substantial number of firms have repurchased no shares, about ten percent of firms repurchased less than five percent of the shares authorized, and just more than half of

3

firms bought back the total number of shares authorized.[4] Further, although the OMR portion of a repurchase program is often constrained by "safe harbor" rules limiting repurchase implementation, an ASR is not bound by these constraints.[5] Thus, the ASR portion of a repurchase program permits the firm to more credibly and quickly accomplish certain goals, e.g., signaling information to shareholders, adjusting capital structure, defending against an unwanted takeover attempt, avoiding dilution from the exercise of employee stock options, or managing reported earnings per share through changes in shares outstanding. To the extent that certain objectives of a repurchase would be better met with enhanced credibility and rapid completion of the repurchase, the particular objectives for a program should also influence a firm's decision to include an ASR in the program as well as the fraction of the repurchase to complete via an ASR, a possibility that we refer to as the *credibility and immediacy hypothesis*.

We find that the choice to undertake an ASR as well as the fraction of a repurchase program to conduct via an ASR are significantly negatively associated with the variability of the firm's share price and the stock market *illiquidity* of the firm's shares. We also find that firms with greater imbalances between their cash flow and investment needs rely less heavily on ASRs in their programs. Taken together, these findings are strongly consistent with the predictions of the flexibility hypothesis.

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[4] The standard language used to announce OMR programs justifies any actual repurchase outcome from zero to 100% of the total authorization, e.g., IRIS International's 2008 announcement notes that, "The timing and actual number of shares repurchased will depend on a variety of factors including the common share price, corporate and regulatory requirements and other market and economic conditions. The share repurchase program may be suspended or discontinued at any time."

[5] For an open market repurchase to qualify for "safe harbor" protection a firm must satisfy the four criteria detailed in the U.S. Securities and Exchange Commission's (SEC) rule 10b-18 anti-manipulation guidelines. These four criteria are: (1) on any one day, firms may not purchase more than 25% of the average daily trading volume of their own shares during the prior four weeks, block trades and privately negotiated transactions are exempt from this guideline; (2) firms may not purchase their own shares in the opening and closing one-half hours of trading; (3) firms may not purchase their own shares at a price higher than the last independent bid, or the last reported sale price; and (4) all purchases on a single day must be executed through the same brokerage firm. This rule was adopted in November, 1982. An ASR does not qualify for "safe harbor."

We find that firms tend to include ASRs and complete a greater fraction of repurchase programs via ASRs when the firms have recently completed asset sales or been the targets of unsolicited takeover attempts. We also find that while firms conducting ASRs tend to have fewer growth opportunities, their recent stock price performance is significantly better than firms not conducting ASRs. We find no indication that ASRs are disproportionately undertaken near the end of a reporting period, e.g., a fiscal quarter end, as would be expected if an important objective for ASRs is to manage reported earnings per share (EPS) via altering average shares outstanding. We also find that the likelihood firms undertake ASRs is increasing in the relative size of the repurchase program consistent with managers preferring ASRs when completing a program via OMRs would require a substantial managerial time commitment. Taken together, these results are consistent with the predictions of the credibility and immediacy hypothesis.

The time series of ASR activity is also shown to vary with changes in the firm characteristics that our analysis indicates are important in firms' decisions to include ASRs in their repurchase programs. For instance, the standard deviation of returns and illiquidity increased during the recent upheaval in financial markets. Given these changes, our model both predicts a sharp drop in the number of ASRs in 2008, an outcome which we observe in the data, and has significant out-of-sample predictive power. We also find that relative to alternative repurchase methods and large special dividends, ASRs appear to serve a unique role and, thus, represent an important innovation in the payout methods available to managers.

We also examine abnormal stock returns around ASR announcements. We find that ASRs announced simultaneously with repurchase programs are associated with

positive and significant abnormal returns. Further, we find that ASRs announced subsequent to repurchase programs are also associated with positive and significant abnormal returns consistent with shareholders viewing these transactions as incrementally wealth increasing relative to repurchase programs comprised entirely of OMRs. Cross-sectional determinants of ASR abnormal returns are also investigated. We find that the abnormal returns at ASR announcement are positively associated with the fraction of shares that are repurchased via ASR, negatively associated with recent prior stock performance, and negatively associated with the firm having been the recent target of a takeover attempt, consistent with ASRs reducing the likelihood of a successful acquisition. We also find that the likelihood that a firm announces an ASR subsequent to announcing a repurchase program is decreasing in the program announcement abnormal return perhaps consistent with firms choosing to undertake an ASR to enhance the credibility of the signal inherent in the program announcement when that signal was weakly received by the market.

Our findings contribute generally to the literature on share repurchases and specifically to the nascent literature on accelerated share repurchases. The earliest paper to make note of ASRs was Cook and Kim (2006). In an unpublished working paper, Cook and Kim mention that accelerated share repurchase programs are only one method of buying back shares using derivative contracts. They document that firms engaging in repurchases using derivative contracts are generally larger (in total assets) than OMR firms. Unlike the present study, Cook and Kim do not investigate the relative importance of the flexibility inherent in OMRs or the immediacy of ASRs in determining firms' choices to undertake ASRs as part of their repurchase programs.

Marquardt, Tan, and Young (2009) investigate the use of ASRs to manage

earnings in a sample of 70 ASRs. Specifically, Marquardt et al. hypothesize that managers have incentives to undertake ASRs when their compensation depends in part on reported EPS. Marquardt et al. document that 57.5% of firms that conduct ASRs disclose that managers' annual bonuses explicitly depend on EPS versus only 30.0% of firms that undertake only OMRs. Again, the Marquart et al. paper does not investigate the relative importance of the flexibility inherent in OMRs or the immediacy of ASRs in determining firms' choices to undertake ASRs as part of a repurchase program.

In a contemporaneous working paper, Chemmanur, Cheng, and Zhang (2008) investigate some of the same hypotheses as the present paper. However, despite the similarities in the papers' aims and the samples of ASRs examined, the conclusions reached by the papers in terms of what factors are associated with the decision to include an ASR as part of a repurchase program are very different. While Chemmanur et al. note prominently in their hypothesis development that an ASR does not permit a repurchasing firm the flexibility to change or discontinue a share repurchase as in an OMR, they do not include in their analysis any variables that proxy for the relative value of this flexibility across firms. In contrast, the present paper finds these variables to be the most important determinants of the choice to include an ASR in a program and the fraction of a repurchase program to complete via an ASR. Further, our treatment of ASRs as part of repurchase programs is distinct from that of Chemmanur et al. who classify firms as strictly conducting OMRs versus ASRs. The strict classification of firms as ASR versus OMR is not consistent with certain features of the data that reveal how ASRs are used by firms and leads to differences in sample construction. Thus, the difference in results and conclusions across the two papers are largely attributable to several important variables omitted by Chemmanur et al. as well as differences in sample construction.

Michel, Oded, and Shaked (2009) report a positive average announcement period abnormal return and negative post-announcement drift in the stock market performance of ASR firms. Michel et al. interpret this pattern of returns as indicating that the information content of ASRs is negative but the market does not recognize the full extent of the "negative news" in an ASR at announcement. Also, Akyol, Kim, and Shekhar (2009) investigate the efficacy of ASRs as takeover defenses.

This paper proceeds as follows. In Section 2, we develop the hypotheses to be tested. We describe our sample construction in Section 3. We report results in Section 4 and offer a concluding discussion in Section 5.

2. Hypothesis development

When a board of directors authorizes managers to distribute cash via a share repurchase, a portfolio of options is created where the various methods with which the repurchase may be executed determine the properties of the options embedded in the authorized program, e.g., see Ikenberry and Vermaelen (1996) and Oded (2005). Open market repurchases are the dominant form of repurchase method in recent years. Thus, at least initially, we frame the decision to include an ASR in a repurchase program against the alternative of a program comprised entirely of an OMR.

In the case of an OMR-only program, managers announce that they have received approval to repurchase (either a dollar amount or a specified number of) shares periodically at market prices over a relatively open-ended time frame. Note that this repurchase method preserves maximum flexibility in terms of if and when shares will be repurchased as well as the price at which shares will be repurchased. As Stephens and Weisbach (1998) points out, "An open-market repurchase program allows managers the

flexibility to purchase less stock than planned if the stock becomes more expensive or more stock if it remains less expensive… such adjustments would not be possible if the manager were required either to precommit to a specific quantity, or dollar value, of share repurchases or to precommit to the timing of these repurchases."

Including an ASR in a program credibly commits the firm to repurchase a certain number of shares immediately and forgo the flexibility to adjust the size and timing of the repurchases (at least for the portion of the program that is executed via ASR) based on subsequent changes in the market for its shares or its cash flow/investment needs. In other words, including an ASR in a program represents an early partial exercise of the option to adjust the size and timing of the repurchases to changing market or firm conditions. As evidenced by the cross-sectional variation in both the amount and timing of actual repurchases in OMR programs, e.g., see Stephens and Weisbach (1998) and Cook, Krigman, and Leach (2003), firms clearly utilize this flexibility. Consequently, factors that determine the value of the flexibility option inherent in an OMR-only program should be directly related to the costs of conducting an ASR and, all else equal, these factors should be important determinants of a firm's choice to conduct an ASR as well as the fraction of the repurchase to effect via an ASR, a possibility we refer to as the *flexibility hypothesis*.

The cost of an ASR resulting from the early exercise of the flexibility option will clearly vary across firms. For instance, because the value of the flexibility option inherent in an OMR is increasing in the volatility of the firm's stock price, greater uncertainty in a firm's stock price increases the cost of exercising the option to subsequently adjust the repurchase amounts and timing. Thus, the flexibility hypothesis predicts that firms with greater stock market volatility will be less likely to choose to

conduct an ASR.

Barclay and Smith (1988) posit that the stock market liquidity of a firm's shares should be an important determinant of a manager's choice of payout form, i.e., dividend versus repurchase. Brav, Graham, Harvey, and Michaely (2005) report that, in surveys and interviews, more than half of corporate executives "feel that the liquidity of their stock is an important or very important factor affecting their repurchase decisions." Similarly, Brockman, Howe, and Mortal (2008) find that firms initiating repurchases have significantly greater stock market liquidity than firms not initiating repurchases and repurchase size is increasing in the liquidity of the repurchasing firms' shares. While the results from these papers apply to the general decision to repurchase, these findings also suggest that the cost of credibly committing to quickly repurchase shares via an ASR will be less for firms with higher stock market liquidity. Purchasing large numbers of shares quickly has a greater impact on the price of less liquid shares, incrementally increasing the average price paid for the less liquid shares. Thus, the flexibility hypothesis predicts that firms with less liquid stock will be less likely to conduct an ASR.

Guay and Harford (2000) and Jagannathan, Stephens, and Weisbach (2000) also examine the determinants of payout method choice and find that greater variability of operating income is associated with a higher probability of observing a repurchase versus a dividend. A firm with less predictable cash flows or investment opportunities stands to benefit more from the ability to adjust its payout policy in response to unanticipated changes in cash flows or investment needs. Thus, under the flexibility hypothesis, greater variability of cash flow and/or greater imbalance between cash flow and investment needs are expected to be associated with a reduced probability of including an ASR in a repurchase program and, when included, less reliance on the ASR as a fraction of the

10

total program authorization.

In summary, the flexibility hypothesis predicts that, all else equal, the costs of an ASR are greater for firms with greater stock price uncertainty, less stock market liquidity of its shares, less predictable cash flows, and greater imbalance between cash flow and investment needs.

It could be argued that an OMR-only program where shares are repurchased as rapidly as possible and in which these repurchases are easily verifiable by outsiders would eventually lead to approximately the same outcome as an ASR-only program. Nonetheless, immediacy of impact and credibility of commitment clearly distinguish the ASR portion of a repurchase program from the OMR portion and cannot be completely replicated via OMR. An ASR credibly commits the firm by contract to repurchase a certain number of shares from the intermediary. Thus, outsiders need not expend resources verifying that the repurchase has taken place as the intermediary ensures that the repurchasing firm meets its obligations under the ASR contract.[6] Additionally, the firm receives the shares immediately in an ASR and, hence, the effects of an ASR on the firm's capital structure, ownership structure, and financial position are immediate. Just as the costs of an ASR (in terms of the foregone flexibility option inherent in an OMR) are expected to vary across firms, the benefits of enhanced credibility and immediacy of including an ASR are also expected to vary with the underlying objectives for a repurchase and firm characteristics, a possibility that we refer to as the *credibility and immediacy hypothesis*.

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[6] Verifying repurchases of shares has become easier in recent years as the SEC has required since December, 2003 that all U.S. listed firms to report monthly volume and price data on their repurchase activity in their quarterly filings (see Purchases of Certain Equity Securities by Issuers and Others, Exchange Act Release No. 33-8335 at http://www.sec.gov/rules/final/33-8335.htm). However, given the need to access quarterly filings for this information, OMR repurchases can still only be verified with significant time lags.

Many studies investigate the signaling motivation for repurchases, i.e., the notion that repurchases can be used to signal better future prospects or a willingness on the part of managers to distribute free cash flow to shareholders rather than overinvest. Regardless of the particular information being signaled, an ASR or a rapidly completed and verifiable OMR could serve to convey this information, albeit with a delay in credibility for the OMR. Including an ASR strengthens the credibility of the signal as shareholders do not have to wait to determine and verify the share purchases as they must with an OMR. The value of a stronger signal varies across firms. Presumably, a firm facing declining investment opportunities and generating large free cash flows or receiving a large non-recurring free cash flow would benefit more from a stronger signal of its commitment to return cash to shareholders, e.g., see Jensen (1986) and Grullon and Michaely (2004). Similarly, firms that face greater undervaluation might view including an ASR in a program as strengthening this signal as well.

An ASR is also expected to increase the effectiveness of a repurchase program as a takeover defense. Bagwell (1991) demonstrates that a Dutch-auction repurchase decreases the likelihood of a takeover if the supply curve for shares is positively sloped, e.g., see Brown and Ryngaert (1991). Also, Billet and Xue (2007) find empirical support for the role of repurchases as takeover defenses in a sample of OMRs. In this context, the inclusion of an ASR in a repurchase program increases the effectiveness of a program as a takeover defense because the ASR ensures the necessary number of shares is repurchased immediately. Therefore, an ASR is more likely in a repurchase program implemented to defend against a takeover, particularly when the takeover threat is imminent, e.g., see Akyol, Kim, and Shekhar (2009).

Firms can use a repurchase to adjust capital structure. Hovakimian, Opler, and

Titman (2001) find that repurchases tend to move firms toward their "target" capital structures. If the benefit of a capital structure adjustment increases as the distance from the target level increases, then, to the degree that adjusting the capital structure motivates a repurchase program, an ASR could be more likely in firms that are further from their target capital structure because the effects of an ASR are more immediate. Therefore, in a repurchase program motivated by capital structure adjustment, the likelihood of an ASR increases as the firm's distance from its target capital structure increases.

Managers can use share repurchases to manipulate reported quarterly accounting information.[7] With an ASR, the number of shares outstanding adjusts as soon as the shares are delivered to the firm by the intermediary, which occurs immediately after the ASR agreement is in place. With an OMR, the adjustment does not occur until the firm buys the shares in the market. As a result, an ASR has a larger impact on the average number of shares outstanding used in the calculation of the accounting ratios in the quarter in which it is undertaken. This is particularly true if the announcement is near the end of a quarter when managers are in the best position to predict actual earnings (the numerator of EPS) relative to expected earnings and to determine if they need to "borrow a penny" via a share repurchase. Therefore, in repurchase programs motivated by a managerial interest to quickly manipulate accounting ratios, an ASR is more likely as a quarter-end approaches.

Naturally, an OMR-only program requires managers to devote time and attention to deciding whether or not to repurchase each day and at which price to repurchase. Thus, another potential benefit of ASRs is that they free management from some of the demands on their time associated with administering OMRs. Consequently, for firms

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[7] See for example Hribar, Jenkins, and Johnson (2006), Bens, Nagar, Skinner, and Wong (2003), Brav, Graham, Harvey, and Michaely (2005).

where managerial time is particularly valuable, we would expect to see these firms make more frequent use of ASRs. The difficulty in estimating the value of management time makes testing this prediction difficult, e.g., see Rajan and Wulf (2006); however, we note that, holding the value of managerial time constant, programs that authorize managers to repurchase larger fractions of outstanding equity would require more managerial attention. Thus, as a proxy for the time that managers would spend on a repurchase, we calculate the size of the program authorization relative to a firm's outstanding equity. Presumably, larger programs would be more likely to include ASRs.

In summary, the credibility and immediacy hypothesis predicts that the benefits of enhanced credibility and immediacy of ASRs are larger for firms where the repurchases are motivated by a desire on the part of managers to: signal their willingness to return cash to shareholders in an expedited manner, signal undervaluation, defend against unwanted takeover attempts, significantly alter capital structure, manage reported earnings per share, or reduce the amount of managerial time and effort expended in executing repurchase programs.

3. Sample formation and descriptive statistics

3.1. ASR sample

We search the U.S. Securities Exchange Commission (SEC) Edgar online database for any filing that mentions an accelerated share repurchase. The Edgar Full-Text searchable database includes a rolling window of the previous four years of SEC filings. Our initial search was conducted on October 2, 2007; hence, we obtained search results for all filings dated October 2, 2003 and later. We have continued to access the database quarterly to update the sample of ASRs to include those reported after October,

2007. Given the rolling time window limitation of the Full-Text database, we also search

Factiva for any newswire or business publication story that mentions an ASR in the

period January, 1996 through December, 2008.[8]   For those firms identified in a news

story as having announced an ASR, we corroborate the news reports by reviewing

contemporaneous SEC filings of these firms. Our search efforts identify a total of 256

distinct ASR transactions.

From the filings, announcement stories, and actual ASR agreements, we gather

information, where available, about the ASR transactions, e.g., dates, dollar values, prices

at which the agreements were negotiated, the mode of payment at settlements, the firms'

stated motivations, the identities of the intermediaries, etc. When we cannot get an exact

ASR announcement date from a newswire report, we use as the announcement date the

first day the information appears to be available to the public, i.e., the filing date of 10-K

or 10-Q in which the ASR was first disclosed.[9]

Panel A of Table 1 details the number of ASR transactions announced in each

year of the sample period. The earliest ASR in our sample was announced in 1997. The

number of ASRs is very small for each year in the sample prior to 2004; however, the

number of ASRs increases dramatically each year beginning in 2004 and reaches a high

of 97 in 2007 before declining to 25 in 2008. Figure 2 plots the ratio of ASRs to total

repurchase programs announced for each year of the sample period as an approximate

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[8] Keywords for the Edgar search were: accelerated share repurchase OR accelerated share buyback OR accelerated stock buyback or accelerated stock repurchase OR accelerated equity buyback OR accelerated equity repurchase OR overnight share repurchase OR overnight share buyback OR overnight stock buyback OR overnight stock repurchase OR overnight equity buyback OR overnight equity repurchase. The search terms for the Factiva search were: "(accelerated or overnight) and (share or equity or stock) and (repur* or buyback or buy-back or buy back)".

[9] We use a filing date in 36 instances (of 256 total ASR announcements). For the 2004-2008 period, we use the filing date in 28 instances (of 243 total ASR announcements). Given potentially confounding information in filings, we assess the robustness of our abnormal returns results to the exclusion of these observations. The results are very similar to those reported with one notable exception, namely, the coefficient on prior stock performance is no longer significant at conventional levels.

indication of how important ASR activity has become among repurchase programs. While not reported in Table 1, we observe at least one ASR in 35 of the 48 Fama and French (1997) industry classifications with banking, insurance, utilities, retail, and business services the most frequently represented industries.

Panel B of Table 1 reports the transaction characteristics of the ASRs in our sample. The mean (median) deal size is $530.55 ($250.00) million which represents, on average, 5.3% of the outstanding equity of the firms at the time of the announcements. For reference, Grullon and Michaely (2004) report that, for the period 1980 through 1997, the average repurchase program authorization represents 6.8% of outstanding equity. Considering an ASR is generally only a portion of a repurchase program and is completed over a very short time frame in comparison with the OMR portion of the program, ASRs are clearly significant buyback events for firms. On average, the shares repurchased via ASR comprise approximately 58.0% of the total program authorization.

For the 93 transactions for which we are able to obtain information on the price per share paid to the intermediary at the initiation of the ASR, we compute the percentage difference between the price paid to the intermediary under the ASR agreement and the closing price of the stock on the previous trading day. The mean (median) percentage difference between the ASR agreement price and the previous closing price is 0.13% (0.00%). The vast majority of ASRs do not involve the intermediary receiving any significant premium or accepting any discount for the shares they deliver to the repurchasing firm. We are able to obtain the details of the settlement period for 178 of the ASRs in our sample, and the average settlement period was approximately 140 calendar days. In the 103 (71) instances where the intermediary made (received) a payment to (from) the repurchasing firm at settlement, the payment averaged $54.2

($33.5) million. Approximately 42% of the contracts were settled in cash with the remainder settled in shares of the repurchasing firm. Finally, we note that 23.8% of ASRs in our sample included a cap, floor, or collar provision associated with the settlement terms.

Panel C reports the stated motivations, if any, for our sample of ASRs. Approximately 31% of firms mention undervaluation as one of the motivations for the ASR transaction.[10] The next most frequently stated motivation is the desire to alter capital structure. We are able to identify the intermediary for 191 ASRs. Panel D reports the frequencies that various entities served as the intermediaries for the ASRs. In a few instances where there was more than one intermediary identified, we assign credit for the transaction equally across the intermediaries named. Goldman Sachs is the most commonly identified intermediary, with a share of 52.33 deals. J.P. Morgan is the next most common intermediary with 21.33 deals. We document a total of 15 distinct investment banks serving as ASR intermediaries. The market for ASR intermediaries appears fairly competitive with a Herfindahl Index of 1,322 (1,374) based on the number (dollar value) of transactions.

3.2. Repurchase programs

Our sample of repurchase program announcements is obtained primarily from the Securities Data Corporation (SDC) database on Mergers and Acquisitions. Initially, we consider repurchase programs announced between January, 1996 and December, 2008. We match each of our ASRs with a repurchase program identified in SDC or via a search

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[10] When we compare measures that might indicate undervaluation across the subsamples of ASR firms that state undervaluation as a motivation and those that do not, we find somewhat surprising results. Means and medians of the natural logarithm of market-to-book ratios are significantly higher for the ASR firms stating undervaluation as a motivation and there are no significant differences in prior stock performance.

of Factiva.[11] While 62 of the ASRs are announced simultaneously with a repurchase program, the remaining ASRs are announced sometime after a repurchase program. Thus, we match each of these ASRs with the repurchase program that immediately preceded the ASR announcement. Note that our treatment of ASRs as part of repurchase programs is distinct from that of Chemmanur et al. (2008) and Marqaurdt et al. (2009) who classify firms as strictly conducting OMRs versus ASRs. The strict classification of firms as ASR versus OMR is not consistent with certain features of the data that reveal how ASRs are used by firms. For instance, nearly 25% of our sample ASRs are announced simultaneously with OMRs and the overwhelming majority of ASRs are announced within one year of an OMR program announcement which indicates that ASRs and OMRs are not merely substitutes in repurchase programs.

The 256 ASRs in our sample can be linked to 217 distinct repurchase programs. Of these 217 distinct repurchase programs associated with ASRs, 205 (94.5%) are related to ASRs announced after 2003. For those firms that conduct multiple ASRs within a single repurchase program, we only include the first ASR in the program in the ASR election analysis below. The maximum number of ASRs by a firm in a particular repurchase program is three.

4. Results

4.1. Univariate comparisons

As reported in Table 1, nearly 95% of the ASRs in our sample were undertaken after 2003. Thus, we limit our sample period to 2004 through 2008 when analyzing ASR election choice. This ensures that we are comparing firm characteristics over a period

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[11] A total of 151 of the 217 distinct program announcements associated with ASRs are from SDC. We identify the remaining program announcements via searches in Factiva.

when ASRs are common enough to not be considered extremely rare events.[12] Table 2 reports characteristics of repurchasing firms based on their election to include an ASR in a repurchase program or not. Stock price, volume of trade information, and financial statement data are obtained from the merged Center for Research in Security Prices (CRSP) and Compustat databases.

ASRs require an intermediary to borrow a significant number of the repurchasing firm's shares. Thus, for firms whose securities are subject to binding short sale constraints, including ASRs in their repurchase programs may not be feasible. As an indication of a firm's available supply of borrowable securities, we follow Diether and Werner (2008) and calculate the imputed interest rate that a short-seller would have to pay to a lender.[13] If the imputed loan fee in the calendar month prior to the repurchase announcement is greater than the 90th percentile for all stocks on the same exchange over all months in the period 2002 to 2008, then we code a dummy variable (short-sale constrained), to equal one and zero otherwise. As reported in Table 2, no firm conducted an ASR when, in the month prior to the announcement, its imputed loan fee exceeded the 90th percentile of all firms on the same exchange over the same period. To ensure that we are comparing ASR election across firms for which an ASR is feasible, we restrict our analysis to those program announcements by firms that are not short sale constrained. Note that this restriction excludes 60 programs without ASRs from the analysis.[14]

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[12] Differences across firms including an ASR versus those not including an ASR are very similar to those reported when we include all sample years in the analysis.

[13] Imputed loan fees are calculated each month for all firms on NYSE and Amex as -0.009*the natural log of market equity-0.021*the natural log of book to market (as in Fama and French 1993) -0.308*the return in month t-1-0.177*the return over months t-12 to t-2-0.494*institutional ownership as a fraction of shares outstanding-0.049*natural log of stock price+0.219*natural log of turnover+3.357*standard deviation of daily returns over the prior twelve months-0.096*natural log of one plus the number of analysts+30.474*risk free rate+1.925. We calculate loan fees for Nasdaq firms using the same variables but with Nasdaq-specific coefficients.

[14] When we include the 60 programs for which the firms' shares were short-sale constrained, the results of Table 3 are very similar with two perhaps notable exceptions. The coefficient on the recent asset sale

As an indication of the uncertainty regarding the value of a firm's shares, we calculate the standard deviation of daily stock returns for the period starting 210 trading days prior to the repurchase announcement and ending 10 trading days prior to the repurchase announcement, where day 0 is the date on which the repurchase program is announced or the day the ASR is announced if the program included an ASR (and the ASR was not announced simultaneously with the program). While firms not including an ASR in their program have a mean (median) standard deviation of returns of 0.022 (0.020), firms including an ASR have a mean standard deviation of 0.016 (0.015). Thus, ASR firms have less volatile share prices than non-ASR firms and the difference in means (medians) is highly significant as indicated by a *t*-test (Wilcoxon rank sum test).

As an indication of the stock market liquidity of a firm's shares, we calculate the Amihud (2002) measure of illiquidity. Amihud defines illiquidity as the ratio of the daily absolute return to the (dollar) trading volume on that day. This ratio gives the absolute (percentage) price change per dollar of daily trading volume, or the daily price impact of the order flow. We average daily illiquidity for each firm over the period starting 76 trading days prior to the repurchase announcement and ending 10 trading days prior to the repurchase announcement. To minimize the influence of extreme values, we use the natural logarithm of illiquidity in our tests. As indicated in Table 2, firms not including ASRs in their repurchase programs have markets for their shares that are significantly less liquid (higher logarithm of illiquidity) than firms including ASRs in their programs.

As a measure of firm size, we calculate the natural logarithm of the book value of

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variable enters the regression with a p-value of 0.108 and the coefficient on High-hedge enters with a p-value of 0.099. We have also conducted the analysis on the subsets of repurchase programs where all firms were required to have a minimum of 10% institutional ownership or to not have been subject to failures to deliver relative to outstanding shares greater than the 90th percentile for all firms over the same period. In both cases the results are similar to those reported indicating that the reported results are robust to the choice of proxy for short sale constraints.

total assets (Compustat item 6). Firms conducting ASRs tend to be larger relative to those firms that do not conduct ASRs. As an indication of a firm's balance sheet liquidity position, we calculate the ratio of cash and short term securities (item 1) to total assets. As an indication of the firms' free cash flow available for payout to shareholders, we follow Acharya, Almeida, and Campello (2007) and measure free cash flow by subtracting the sum of depreciation (item 14), tax payments (item 16), interest expense (item 15) and dividends (sum of items 19 and 21) from gross operating income (item 13) and scaling the difference by total assets. Somewhat surprisingly, firms including ASRs in repurchase programs have significantly smaller holdings of cash and marketable securities relative to assets and slightly lower levels of free cash flow relative to assets.

We also calculate the standard deviation of free cash flow scaled by total assets for the five year period preceding the repurchase or ASR announcement. We require a minimum of three consecutive years of operating income to calculate standard deviation of free cash flow. Firms electing to undertake ASRs have significantly less volatile free cash flows. Note that firms including ASRs in their programs having less volatile cash flows may account for why these firms also hold less cash on their balance sheets since, all else equal, reduced uncertainty in cash flows would prompt firms to hold less cash as a precaution against unanticipated changes in cash flows.

We also calculate the correlation between a firm's free cash flow and the median R&D expenditures of its industry (defined at 3-digit Standard Industrial Classification (SIC) level) for the three years preceding the ASR and/or repurchase program announcement. A large positive correlation indicates that a firm generally has higher cash flows when the median R&D investment in its industry is high and so the firm's need for a hedging program to help better align its cash flows and investment needs is

21

low, e.g., see Froot, Scharfstein, and Stein (1993). A large negative correlation would imply that the firm will not have free cash flow to invest when industry median investment is high and, as such, the firm's need for a hedging program to better align cash flow and investment needs is high. We follow Acharya et al. (2007) and create indicator variables to classify firms into groups based on the sign and magnitude of the correlation between cash flow and investment needs. High-hedge takes a value one if a firm's correlation between cash flow and investment needs is less than -0.2 and zero otherwise. Low-hedge takes a value one if the firm's correlation coefficient is greater than 0.2 and zero otherwise. Firms conducting ASRs are significantly less frequently identified as high-hedge relative to those firms conducting repurchases comprised entirely of OMRs. This is consistent with firms avoiding ASRs when the correlation between their cash flows and investment needs are low. The frequencies that ASR versus non-ASR firms are identified as low-hedge firms do not significantly differ across the two groups.

As an indication that a firm's repurchase program might be motivated by a desire on the part of its managers to signal their willingness to return non-recurring cash inflows to shareholders, we search SDC to determine if the firm completed an asset sale in the six months prior to the announcement of the repurchase program or ASR. Approximately 24% of firms undertaking an ASR completed an asset sale in the prior six months compared with only 10% of firms not undertaking an ASR. Thus, it appears that the ASR decision is in part driven by a desire of managers to signal a willingness to return the proceeds of asset sales to shareholders in an expedited fashion. We also use SDC to determine if a firm was the target of a takeover attempt in the six months preceding the

announcement of its repurchase program or ASR.[15] Consistent with an ASR being more likely when employed as part of a takeover defense, we find that firms conducting an ASR were significantly more likely to have been the target of a takeover attempt than firms not including an ASR in a repurchase program.

Repurchases may be used to signal that a firm will not overinvest in response to declining investment opportunities, e.g., Grullon and Michaely (2004). Alternatively, repurchases may be used to signal better future prospects, e.g., Vermaelen (1981). Regardless of the particular information intended to be conveyed through the repurchase, including an ASR strengthens the signal. As a proxy for a firm's growth opportunities or undervaluation, we calculate the natural log of the firm's market to book ratio as the natural log of the ratio of market value of assets to book value of assets where market value of assets is market value of equity (item 24*item 25) plus book value of assets (item 6) minus book equity (item 60) minus deferred taxes (item 74). The mean and median values of this variable are smaller for ASR firms but the differences are not statistically significant. As an additional proxy for potential undervaluation, we also calculate a measure of prior stock performance, i.e., the abnormal return over the period beginning 43 days prior to the announcement and ending four days prior to the announcement. Previous literature documents that firms generally experience significant negative performance prior to announcing OMR programs, a pattern that is evident in our sample of non-ASR programs as well. Interestingly, the average abnormal return prior to a firm announcing an ASR is indistinguishable from zero but significantly greater than

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[15] For those firms undertaking an ASR, we searched Factiva for any indication of "footsteps." Our footsteps variable takes a value of one if the ASR firm was the subject of takeover speculation, an outright bid, an interfirm acquisition attempt, or a proxy fight in the six months prior to the ASR announcement date. We found that approximately 13.4% of ASR firms were the subject of a takeover attempt in the six months prior to announcing an ASR. The classification of takeover involvement using the data from SDC revealed fewer takeover attempts than the more thorough search of newswires. For consistency, we use the SDC-based takeover attempt variable since it is available for all firms announcing a repurchase program.

for programs without ASRs perhaps consistent with ASRs being motivated by factors other than a desire to signal undervaluation.

We examine capital structure differences across ASR election by calculating leverage as long term debt (item 9) plus debt in current liabilities (item 34) divided by total assets. ASR firms have higher debt ratios than non-ASR firms with the median difference across the two groups significant at the five percent level. As an indication of how a firm's actual leverage ratio compares with its "target" leverage ratio, we calculate the difference between predicted leverage as in Hovakimian, Opler and Titman (2001) and actual leverage.[16] ASR firms have actual leverage ratios that are closer to their predicted ratios than do non-ASR firms. Further, the difference between median actual and median predicted leverage is significantly smaller for ASR firms relative to non-ASR firms. To the extent that being further from their optimal capital structure might prompt a firm to view an ASR more favorably given the relative speed with which they can effect changes in capital structure, it is perhaps somewhat surprising that ASR firms are closer to their optimum debt levels than non-ASR firms.

As an indication of whether or not ASR activity might in part reflect an effort on the part of managers to manipulate reported earnings per share, we record the timing of ASR and repurchase program announcements relative to fiscal quarter ends. End of quarter is a dummy variable that takes a value of one if the announcement date of the ASR (or program to repurchase) is in the last month of a firm's fiscal quarter. ASRs do not appear significantly more likely to be announced in the last month of a quarter than are repurchase programs that do not include ASRs.

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[16] Target leverage is the predicted value obtained by regressing debt of all firms in Compustat between 2002 and 2008 on firm level explanatory variables including the log of assets, capital expenditures scaled by total assets, market to book ratios, R&D expenses scaled by sales, value of property, plant and equipment scaled by total assets, selling expenses scaled by sales, and industry dummies (coded at the 2-digit SIC code level).

As an indication of whether the size of the program and, consequently, the time managers might have to devote to completing the program via OMRs, we calculate the size of the announced program relative to the value of common equity outstanding. Larger programs are significantly more likely to include an ASR.

In sum, the univariate analysis reveals that firms including ASRs in their repurchase programs have less variable stock prices, greater stock market liquidity, greater firm size, less variable cash flows, less imbalance between cash flows and investment needs, more frequent recent asset sales and unsolicited takeover attempts, better recent stock performance, smaller deviations from "target" leverage ratios, and larger program authorizations than firms not including ASRs in their repurchase programs.   Additionally, no short-sale constrained firms included ASRs in their repurchase programs. While the univariate results are informative and consistent with our hypotheses, the usual caveats about making inferences based on univariate comparisons apply. Thus, we next turn our attention to multivariate investigation of the choice to include an ASR as part of a repurchase program.

4.2. Logit regressions of ASR choice

We hypothesize that an ASR is undertaken if the benefits from the ASR outweigh the costs. We define the latent variable y_i^* as the expected net benefit from including an ASR in a repurchase program. The net benefit is assumed to be a linear function of the observed characteristics in Table 2 and an error term ε_i:

$$y_i^* = \alpha + \sum_{j=1}^{M} \beta_j x_{ji} + \sum_{k=1}^{N} \beta_k x_{ki} + \varepsilon_i \qquad (1)$$

where the x_j variables represent the cost associated with the loss of flexibility inherent in

an ASR and the x_k variables represent the benefits associated with enhanced credibility and immediacy. Because the net benefit of an ASR is unobservable, we define the observable dichotomous variable *ASR* which equals one if an ASR is included in the repurchase program and zero otherwise. We then use a logit analysis to estimate the equation:

$$ASR_i = \delta + \sum_{j=1}^{M} \gamma_j x_{ji} + \sum_{k=1}^{N} \gamma_k x_{ki} + \eta_i. \qquad (2)$$

Table 3 reports the results of logit regressions explaining ASR choice. The coefficients on the independent variables are reported along with their p-values in parentheses. Reported p-values are based on robust standard errors clustered by firm.

As in the univariate tests, we limit the analysis in Table 3 to ASRs announced in 2004 or later. We also limit the analysis in Table 3 to those programs announced by firms which are not short-sale constrained. Other than short-selling its own shares, the key features of an ASR could be nearly duplicated by a repurchasing firm (especially if the firm were willing to forfeit 10b-18 protection) with a large, easily verifiable, expedited OMR. Thus, the intermediary in an ASR functions as a proxy through which a firm can borrow its own shares. As indicated in panel D of Table 1, there is a relatively competitive market for providing this service. Thus, the only real "supply" hurdle a firm might face in conducting an ASR is if an intermediary cannot borrow the firm's shares. Hence, by conducting our analysis on all programs except for the 60 that were deemed short-sale constrained, we can reliably interpret the coefficients on the specifications below as reflecting how the firms' characteristics are associated with the firms' demand for an ASR, i.e., the net benefits to the firm of conducting an ASR.[17]

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[17] This approach is similar to that taken in other repurchase contexts utilizing an intermediary, e.g., self-tender offers as in Lie (2002). Further, this approach is often taken in much of the literature examining

26

As reported in specification (1), firms with greater stock price volatility are significantly less likely to include ASRs as part of their repurchase programs. Similarly, firms with less liquid markets for their shares are significantly less likely to undertake ASRs. The coefficient on High-hedge is negative but not quite significant at conventional levels (p=0.103). These findings are consistent with the flexibility hypothesis. The asset sale indicator enters with a positive and significant coefficient consistent with ASRs being motivated, in part, by the desire of managers to signal a willingness to pay out non-recurring cash inflows to shareholders. Firms that were the subject of recent takeover interest and firms with lower market to book ratios were also more likely to include an ASR. The negative coefficient on market to book can be interpreted as a signal by firms with declining growth options of a commitment not to overinvest or a signal of undervaluation. As in the univariate analysis, the coefficient on prior stock price performance is positive indicating that ASRs are not announced subsequent to relatively poor performance as would be expected if ASRs were strong signals of undervaluation. Lastly, firms with larger program authorizations are more likely to conduct ASRs. In sum, these results are consistent with the flexibility hypothesis and the credibility and immediacy hypothesis.

Next, we examine the characteristics of firms that announce a repurchase program and an ASR simultaneously. A simultaneous ASR might be an indication that, in light of the objective of the repurchase, enhanced credibility and immediacy are viewed as being particularly valuable. Specification (2) reports the results of a logit regression in which the dependent variable equals one for simultaneous ASRs. The sample excludes

securities issuance where the role of the intermediary (underwriter) is less mechanical, e.g., initial public offerings as in Pagano, Panetta, and Zingales (1998) and seasoned equity offerings as in Gao and Ritter (2010).

programs that include a subsequent ASR. As before, firms with greater stock price volatility or firms with less liquid markets for their shares are less likely to undertake simultaneous ASRs. All else equal, smaller firms, firms with larger cash holdings, firms with less variable free cash flows, firms facing the threat of a takeover, firms with fewer growth opportunities, firms with better prior stock performance, and firms further below their target leverage ratios are more likely to include simultaneous ASRs in their repurchase programs consistent with the benefits of credibility and immediacy being larger for these firms.

While the preceding analysis investigates the decision to include an ASR in a repurchase program, we now turn our attention to the fraction of the authorized repurchase that is completed via an ASR. In specification (3), we report the results of a Tobit regression where the dependent variable is the fraction of the authorized repurchase that is completed via an ASR. Interestingly, not only is the decision to include an ASR in a program associated with the flexibility variables, but also the fraction of the repurchase program completed via an ASR is also significantly associated with variables that proxy for the value of flexibility. Specifically, firms with greater share price variability, less liquid markets for their shares, greater imbalance between cash flow and investment needs complete significantly less of their repurchase programs via ASRs consistent with the flexibility hypothesis. Further, firms that have completed asset sales, were the targets of takeover attempts, have less valuable growth opportunities, experience better recent stock price performance, and have larger program authorizations conduct a larger portion of their repurchase programs via ASR consistent with the credibility and immediacy hypothesis.

To gauge the economic magnitude of the estimates, we select the model in

specification (1) of Table 3 and calculate the effect of changes in the explanatory variables on the implied probability of including an ASR in the repurchase program. We vary the explanatory variables, one at a time, from the 25th percentile level to the 75th percentile level for scalar variables and from zero to one for dummy variables. All other variables are held constant at their sample means. For the standard deviation of returns variable, the estimated probability of including an ASR in the repurchase program of the firm decreases from 11.8% to 3.8%. The corresponding estimates for the Ln(Illiquidity) variable are 13.2% to 3.5%. These results indicate that the probability of including an ASR in a repurchase program decreases sharply as the variability of a firm's share price or the illiquidity of its stock increases. For the asset sale (takeover) variable, the estimated probability of including an ASR in the repurchase program increases from 5.8% to 8.1% (5.8% to 17.3%) as the variable changes from zero to one. As Ln(Market-to-book) increases, the estimated probability of including an ASR in the repurchase program decreases from 7.3% to 4.8%. Also, an increase in prior stock performance corresponds to an increase in the probability of an ASR from 5.2% to 7.3%. Finally, increasing the size of the program authorization corresponds to a change in the estimated probability of including an ASR in the repurchase program from 4.7% to 7.0%. Thus, the factors that are found to be statistically significant in the analysis above are also economically significant in the decision to include an ASR in a repurchase program.

4.3. Robustness and additional results

In unreported results, we find that the inverse relation between illiquidity and the likelihood of ASR inclusion is robust to alternative measures of illiquidity. Specifically, we consider three alternative measures; the natural logarithm of quoted spread, calculated

as the log of the ratio of the offer price minus the bid price to the trade price; the log of the effective spread as defined in Lee (1993); and the log of the price impact measure defined in Huang and Stoll (1996). We substitute these measures for Ln(Illiquidity) into the logit regression in specification (1) of Table 3. The resulting coefficients on the measures of illiquidity are -1.105, -1.352, and -1.362, respectively, and each is significant at the 1% level. Thus, greater illiquidity, as proxied for by any of the alternative measures, is associated with a decreased probability of including an ASR in a program.

In the results reported in Table 3, we place no restriction on how timely the ASR announcement is relative to the repurchase program announcement. When we rerun specification (1) of Table 3 excluding the 27 ASRs in our sample that are not announced within 365 days of a program, the results are very similar to those reported.

Given the upheaval in financial markets in 2008, we also repeated our analysis on the subsample of repurchase programs announced prior to 2008. The results are very similar to those reported in Table 3, with one notable exception. Namely, the coefficient on the High-hedge variable also enters specification (1) with a negative and significant (10% level) coefficient.

The logit analysis in Table 3 assumes a linear relation between ASR choice and our independent variables. To allow for possible nonlinearities, we mean center the variables found to be significant in specification (1) of Table 3 and include squared terms of the mean centered variables. The coefficients on the linear variables remain significant with the exception of illiquidity. The coefficient on squared standard deviation of returns is positive but not significant, the coefficient on squared illiquidity is negative and significant, and the coefficients on squared market to book, prior stock performance, and program size are not significant. The sign and significance of the

30

remaining coefficients remain unchanged except the coefficient on leverage difference becomes positive and significant at the 10% level.

4.3.1. Why do ASRs decline in 2008?

Figure 2 reveals that the ratio of ASR announcements to repurchase program announcements increases from 2004 through 2007 and then drops sharply in 2008.[18] To investigate whether our model of ASR choice explains the sharp drop in ASRs, we estimate the probability of including an ASR for each firm that announces a repurchase program. Specifically, we estimate the coefficients of specification (1) in Table 3 based on the 2004 to 2007 data. We use the coefficient estimates to predict the probability of an ASR for the in-sample programs in 2004 through 2007 and the out-of-sample programs in 2008. We define an indicator variable, Predicted ASR, equal to one if the estimated probability is above a specified threshold and zero otherwise. Because the unconditional probability of an ASR for the in-sample firms is 16.99%, we define the threshold as the in-sample 83.01^{th} percentile of Predicted ASR. The resulting threshold probability is 32.52%. Therefore, Predicted ASR equals one if the estimated probability of including an ASR in a repurchase program is greater than 32.52% and zero otherwise.

The predicted and observed percentages of ASRs for each year are reported in Table 4. Strikingly, the predicted (observed) percentage drops sharply from 20.2% (20.5%) in 2007 to 9.0% (6.4%) in 2008. Consistent with our model, the results suggest that the decrease in ASRs in 2008 results to a large degree from changes in the characteristics of repurchasing firms.

As an out-of-sample test of the validity of our predictions, we divide the 2008

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[18] Note that no ASRs were announced during the period in September, 2008 when the SEC banned short selling in the stocks of 799 financial firms.

31

repurchase programs into three groups based on the estimated probability of an ASR. Within each tercile, we total the number of ASRs observed. The totals, listed from the lowest third to the highest third, are 1, 4 and 14 respectively. A Pearson chi-squared test rejects the hypothesis that the proportion of ASR firms is the same in each tercile with a p-value of 0.000. This suggests that our ASR model has significant power, out-of-sample, to predict which firms will include an ASR in a repurchase program. This also suggests that the dramatic increase in ASRs over the years 2004-2007 will not likely turn out to be simply a historical curiosity as ASR activity would be predicted to rebound as volatility of share prices and the illiquidity of firms shares revert to more "normal" levels.

4.3.2. ASRs Relative to Other Repurchase and Payout Methods

While we characterize ASRs relative to OMR-only programs in the analysis above, other repurchase and payout methods are potential alternatives to ASRs. Thus, we investigate whether firms' decisions to conduct ASRs are associated with their past or concurrent use of alternative repurchase or payout methods. Figures 3 and 4 report, respectively, the annual frequency and dollar volume of ASRs, fixed-price self-tender offers, Dutch-auction self-tender offers, privately negotiated repurchases, and large special dividends (defined as greater than five percent of the market value of equity). As can be seen in Figure 3, the frequency of ASRs first exceeds fixed-price self-tenders and Dutch-auction self-tenders in 2004 and continues to exceed the respective types of self-tender offers through 2008. ASR activity first exceeds privately negotiated repurchases in 2005 and continues to exceed privately negotiated deals through 2008. ASR frequency first exceeds large special dividends in 2005 and continued to exceed large specials until 2008 when large specials again become more frequent than ASRs. Largely similar

patterns are also evident in dollar volumes as shown in Figure 4.

Visual inspection of Figure 3 suggests that aggregate ASR frequency in recent years is positively correlated with that of the alternatives other than perhaps privately negotiated repurchases. It should also be noted that there are important distinctions between ASRs and the alternatives included in the figures. Thus, we consider below the relative choice of ASRs versus the various alternatives in light of these differences.

In contrast to ASRs, Peyer and Vermaelen (2005) document that most privately negotiated repurchases are announced after the transaction with no intent by the firm to repurchase more shares. Also, only about 109 out of 737 transactions in their sample are conducted at market prices with the majority involving a premium (greenmail) or discount. Further, the zero premium deals are typically repurchases from insiders who exercise options and prefer to sell shares to the firm. Nonetheless, we include dummy variables in specification (1) of Table 3 indicating, respectively, whether a firm had completed a privately negotiated repurchase in the three years prior to the program announcement or in the one year after the program announcement (as the vast majority of ASRs in our sample are observed within one year of a program announcement). In short, neither dummy enters the regression significantly suggesting that, at the firm level, ASRs serve a unique role relative to privately negotiated repurchases.

Note that while tender offer repurchases, like ASRs, are credible commitments to repurchase and can be completed relatively quickly, tender offer repurchases (both fixed-price and Dutch-auction) nearly always result in selling shareholders receiving significant premiums, e.g., see Comment and Jarrell (1991). As an indication of whether or not ASRs are substituting for tender offer repurchases, we include dummy variables in specification (1) of Table 3 reflecting whether a firm had completed a fixed-price tender

offer or a Dutch-auction repurchase, respectively, in the three years prior to the program announcement or the one year ahead of the program announcement. In the specification including the Dutch-auction dummies, neither of the dummies is significant. In the specification including the fixed-price dummies, the variable reflecting prior fixed-price repurchase activity is positive and significant. Further, we note that no firm that conducted an ASR in a program also conducted a fixed-price tender offer in the same program (which makes including the dummy for concurrent fixed-price offers infeasible). This outcome could be interpreted as indicating ASRs are perfect substitutes for fixed-price repurchases or that ASRs and fixed-price repurchases are used to achieve entirely different objectives. Given the large premiums conveyed in fixed-price repurchases and the absence of any premium in ASRs, the latter interpretation seems more likely. Thus, taken together, these results suggest that ASRs serve a unique role relative to self-tender offers.

On a continuum of the credibility of commitment among payout types, it could be argued that ASRs would lie near declaring a special cash dividend, e.g., see DeAngelo, DeAngelo, and Skinner (2000). Thus, we create dummy variables indicating whether a firm had completed a large special dividend in the three years prior to the program announcement or the one year ahead of the program announcement. In short, no firm that paid a large special dividend also undertook an ASR. Given that large specials are often issued as part of major corporate restructurings (average payout of 17.3% of the market value of equity over 2004-2008) whereas ASRs (average 5.3% of the market value of equity over 2004-2008) are not, this suggests that the objectives for these respective transactions differ substantially. As a further indication, we create dummy variables reflecting whether a firm had issued any special dividend in the three years prior to the

program announcement or the one year ahead of the program announcement. Neither dummy enters the regression significantly suggesting that ASRs serve a unique role relative to special dividends.

In sum, ASRs appear to represent an important innovation relative not only to OMR-only programs, but also to alternative payout methods like self-tender offers, privately negotiated repurchases, and large special dividends. It does not appear that ASRs are simply substituting for alternative payout methods. Thus, our characterization of the choice to include an ASR as being relative to an OMR-only program appears to accurately reflect how ASRs are used in practice.

4.4. Abnormal returns analysis

Table 5 reports the abnormal returns for the repurchase announcements in our sample. We calculate the three- and seven-day cumulative abnormal returns (CARs) in the windows -1 to +1 and -3 to +3, respectively, in trading days relative to the repurchase announcement. CARs are calculated using the standard event study methodology, e.g., see Brown and Warner (1980). The parameters of the market model are estimated over 255 trading days, ending 46 days prior to the announcement using the CRSP value-weighted index as the market portfolio and requiring a minimum of 100 trading days over the estimation window. The results for the two windows are tabulated in panels A and B.

With the exception of the returns for programs associated with subsequent ASRs, mean and median returns for all groups of ASR announcements and program announcements are positive and significantly different from zero at the 5% level for both time windows. Additionally, with the exception of the returns for programs associated with subsequent ASRs in the seven-day window, positive announcement returns are

significantly more frequent than negative announcement returns for all groups as indicated by sign tests. The evidence suggests that, on average, ASR announcements and program announcements are value increasing events.

Within the context of the credibility and immediacy hypothesis, a plausible objective for an ASR after a repurchase program has already been announced is because the response to the program announcement was weak and the firm wants to send a more credible signal. In this case, we would expect program announcements associated with subsequent ASRs to have lower announcement returns than program announcements not associated with any ASR. We test this conjecture for the pattern of returns with a t-test (Wilcoxon rank sum test) of the difference in means (medians) across the two groups. The mean and median returns to programs without ASRs are uniformly larger than those for programs with subsequent ASRs with the differences between the median returns of the two groups significant for the three-day and the seven day window. Thus, the results of the univariate tests suggest that a lower abnormal return at program announcement may be a consideration in a firm's election to conduct a subsequent ASR.

In Table 6, we analyze ASR announcement returns in a multivariate setting. The dependent variable in the first two specifications is the three-day cumulative abnormal return around ASR announcement and the abnormal returns regressions include all ASR announcements from 1996 to 2008. In specification (1), we include all of the independent variables considered in the logit regressions of Table 3 as well as the percentage of the firm's outstanding equity that is repurchased in the ASR. Larger ASRs, as a fraction of the firm's outstanding equity, are associated with greater announcement returns. Insofar as larger ASRs send stronger signals, this result supports the credibility and immediacy hypothesis. In contrast, ASRs announced when firms are targets of

takeover attempts are met with lower abnormal returns perhaps owing to the reduced likelihood that the proposed acquisitions will be completed in light of the ASRs.

Specification (2) adds indicator variables for the stated motivations for the ASRs as independent variables. While the analyses in specification (1) includes a dummy variable indicating whether or not a firm had recently completed an asset, this variable is not included in specification (2) because of its similarity to the dummy variable indicating that one of the firm's stated motivations for the ASR was to distribute cash relating to the sale of assets. The stated motivation to buy back shares the firm had issued as payment in an acquisition is associated with a significantly more positive stock market reaction perhaps consistent with prior evidence that returns to bidders using cash as consideration are more positive than returns to bidders using equity as consideration, e.g., see Travlos (1987).[19] The only other stated motivation that is significantly related to ASR announcement returns is the purpose of buying back shares issued in a benefit plan which enters the regression with a negative and significant coefficient consistent with buybacks to avoid dilution from employee option exercises conveying less value-relevant information, e.g., see Kahle (2002). We also note that that the percentage of equity acquired via ASR remains significant in specification (2).

Interestingly, the uncertainty in returns, the illiquidity of the firm's shares, and the imbalance between the firm's cash flows and investment needs are not significantly related to the announcement returns in either of the specifications. Taken together the

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[19] As indicated in panel C of Table 1, there are a total of four ASRs with a stated motivation to buy back shares issued in a recent acquisition. In an effort to better assess how well this result might generalize beyond these four transactions, we use data from SDC to construct a variable reflecting a firm's actual recent acquisition activities. Specifically, we create an indicator variable that takes a value of one if a firm completed an acquisition of another firm using stock as consideration in the six months prior to the ASR announcement. This variable takes a value of one for 29 out of the 238 ASRs included in the regression reported in specification (2) of Table 6. When this variable is included in this regression in place of the stated motivation variable, the coefficient is small and insignificant.

abnormal returns results and those from Table 3, that reveal these characteristics are related to the decision to include an ASR in a program, it appears that firms consider these characteristics when deciding to include an ASR such that differing values of the characteristics themselves are then unrelated to announcement returns. The market-to-book ratio is not significantly associated with announcement returns while prior stock performance is significantly negatively associated with announcement returns. The results for prior stock performance are similar to findings in the literature examining program announcements, e.g., see Kahle (2002) or Allen and Michaely (2003). Lastly, we note abnormal returns at ASR announcement are not significantly associated with undervaluation as a stated motivation.

Specification (3) reports the results of a logit regression where the dependent variable takes a value of one if a firm announced an ASR subsequent to announcing a repurchase program and zero otherwise. We include the market response to the repurchase program announcement that preceded the announcement of the ASR. The significantly negative coefficient on the program announcement return is consistent with an ASR being a mechanism to send a more credible signal to the market after a relatively weak response to the program announcement. As in Table 3, we also find subsequent ASRs are associated with better prior stock performance than program announcements.

In unreported analysis, we find similar results using seven-day abnormal announcement returns with the exception that in specifications (1) and (2) the coefficient on free cash flow is positive and significant, the coefficient on ASR percentage of equity is not significant, and the stated motivations are not significant.

5. Conclusion

This paper investigates ASRs, a recent and important innovation in share repurchase transactions, relative to both open market repurchases and other alternative methods of distributing excess cash to shareholders. ASRs are credible commitments by firms to repurchase shares immediately. Including an ASR in a repurchase program reduces the flexibility that firms have to alter an announced program in response to subsequent changes in the liquidity and price of its stock, firm conditions, etc. However, ASRs provide the benefits of enhanced credibility of commitment and immediate execution. Thus, we investigate whether firms' decisions to include ASRs in their repurchase programs are associated with factors expected to influence the costs of lost flexibility and the benefits of enhanced credibility and immediacy.

We find that the choice to undertake an ASR and the fraction of a repurchase program to conduct via an ASR are significantly negatively associated with proxies for the costs of lost flexibility. We also find that firms are more likely to undertake ASRs in situations where the benefits of credibility and immediacy are larger. Additionally, we investigate the abnormal returns around the announcement of an ASR. We find that ASR announcements are associated with positive and significant abnormal returns. This result holds for ASRs announced simultaneously with a repurchase program and ASRs announced subsequent to the repurchase program announcement. These results suggest that ASRs are, on average, value increasing events and add incremental value when announced subsequent to a repurchase program announcement.

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Appendix: Common Provisions in ASR Contracts
Based on our review of 119 ASR agreements, we describe below the most common contractual provisions included in the agreements, e.g., see
http://www.sec.gov/Archives/edgar/data/354869/000095015206000339/l18060aexv99w1.htm

Standard provisions of ASR agreements:
- Date on which the intermediary will deliver the initial shares to the firm
- Number of initial shares the intermediary will borrow and deliver
- Price the firm will pay the intermediary for each initial share delivered
- Time period in which intermediary will purchase shares to cover its short position
- Time period over which the settlement price will be calculated
- Define volume weighted average price (VWAP) per share over specified period using only trades that qualify under SEC Rule 10b-18(b), i.e., excluding trades at the opening and during the last 30 minutes of the trading session (or last 10 minutes for liquid stocks) and trades where price exceeds the highest independent bid or the last independent transaction price
- Calculate settlement price as VWAP minus a discount to compensate firm for opportunity cost of full prepayment for initial shares when intermediary actually acquires these shares (closes its short position) over a period of several months
- Rights of each party to determine the method of settlement, i.e., cash or shares
- Provisions to reimburse the intermediary for costs incurred if receive primary shares at settlement, e.g., private placement agreement, discount at resale, etc.
- Stipulations for altering the agreement based on regular and extraordinary dividends, merger announcements, market disruptions, etc.
- Requirement that firm must use the intermediary to repurchase any shares between ASR initiation and settlement
- Statement that firm will not attempt to evade SEC Rule 10b5-1 (insider trading) and will not seek to control or influence the intermediary's purchases or sales
- Statement that the firm will give the intermediary written notice of a distribution of shares relating to Regulation M
- Reference definitions in the 2002 ISDA Equity Derivatives Definitions

Non-Standard provisions of ASR agreements, in approximate order of most frequently observed to least frequently observed:
- Stipulate a maximum or minimum number of shares to be repurchased
- Specify a maximum cost (basis points per annum) that the intermediary is willing to incur to borrow the firm's shares
- Specify a per share brokerage fee to be paid to the intermediary for initial shares
- Specify an up-front fee to be paid to the intermediary
- Define multiple delivery dates for the initial shares
- Define intermediate settlement dates

Figure 1: Accelerated share repurchase structure and timeline

In an accelerated share repurchase, a firm enters into a contract with an intermediary, typically an investment bank, whereby the intermediary immediately delivers a specified number of the firm's shares in exchange for cash based on an agreed upon price per share (ordinarily the most recent closing price). The intermediary obtains the shares that it delivers to the repurchasing firm by borrowing them, typically from institutions. The intermediary then covers its short position by purchasing shares in the market over a specified time period, normally a few months. The ASR contract also includes a provision whereby the repurchasing firm is required to compensate or is entitled to receive compensation from the intermediary in shares or cash for part or all of the difference between the initial price per share paid to the intermediary and the estimated price per share the firm would have paid for the shares in open market repurchases (OMRs) conducted during the same period over which the intermediary buys the shares to cover its short position. Thus, the intermediary essentially acts as the firm's proxy in borrowing the firm's shares. In sum, ASRs are repurchases with an associated forward contract that can be settled in cash or shares of the firm.

t = 0

```
                  Shares and enter
                  forward contract
ASR     <--------------------------  Intermediary   <---------------------------  Institutions
Firm    -------------------------->                 Loan shares to intermediary
        Cash and enter forward
        contract
```

t = 1, 2,...

```
                                            Shares
Intermediary  <-------------------------------------  Institutions
              Cash                                     and
              ------------------------------------->   Shareholders
              ------------------------------------->
              Return borrowed shares to institutions
```

t = T

```
ASR     <------------------->  Intermediary
Firm    Settle forward contract
        in cash or shares
```
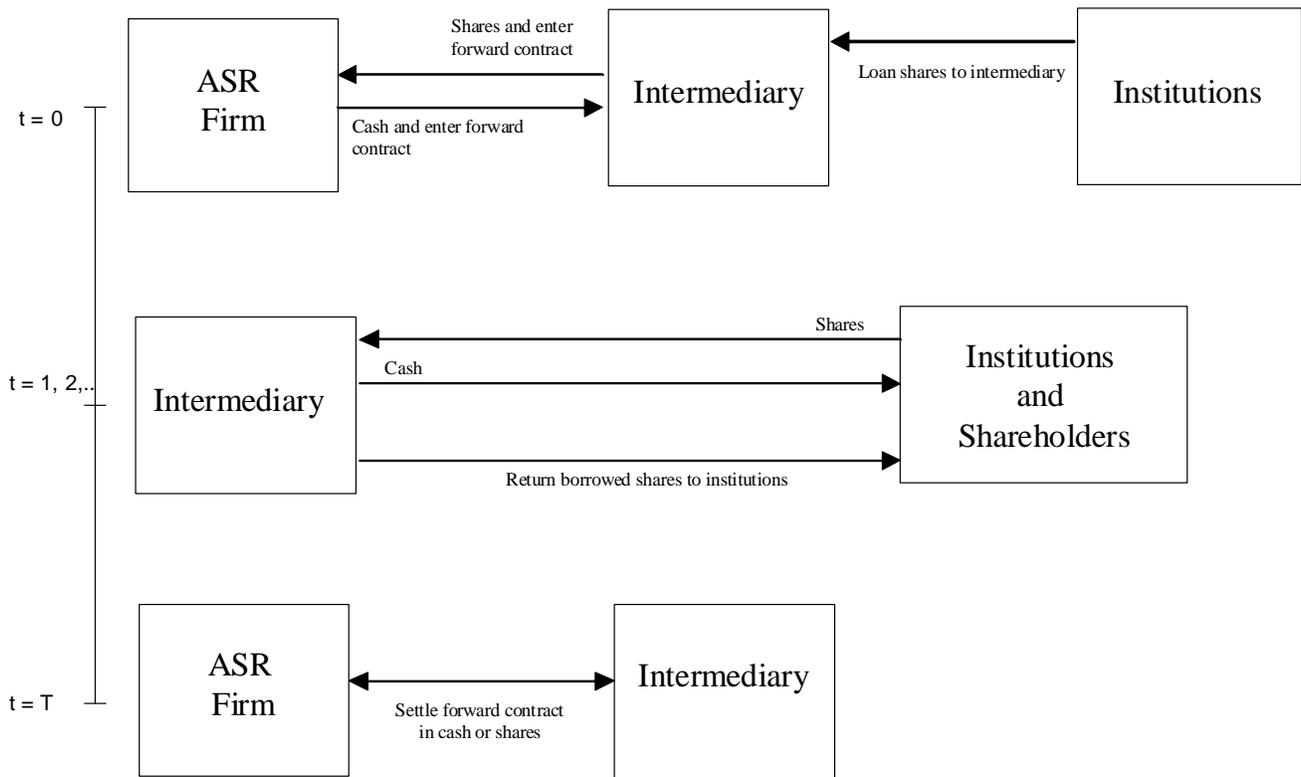
Figure 2: Ratio of announced ASRs to repurchase program announcements by year
For each year of the sample period we calculate the ratio of ASR announcements to total repurchase programs announcements.
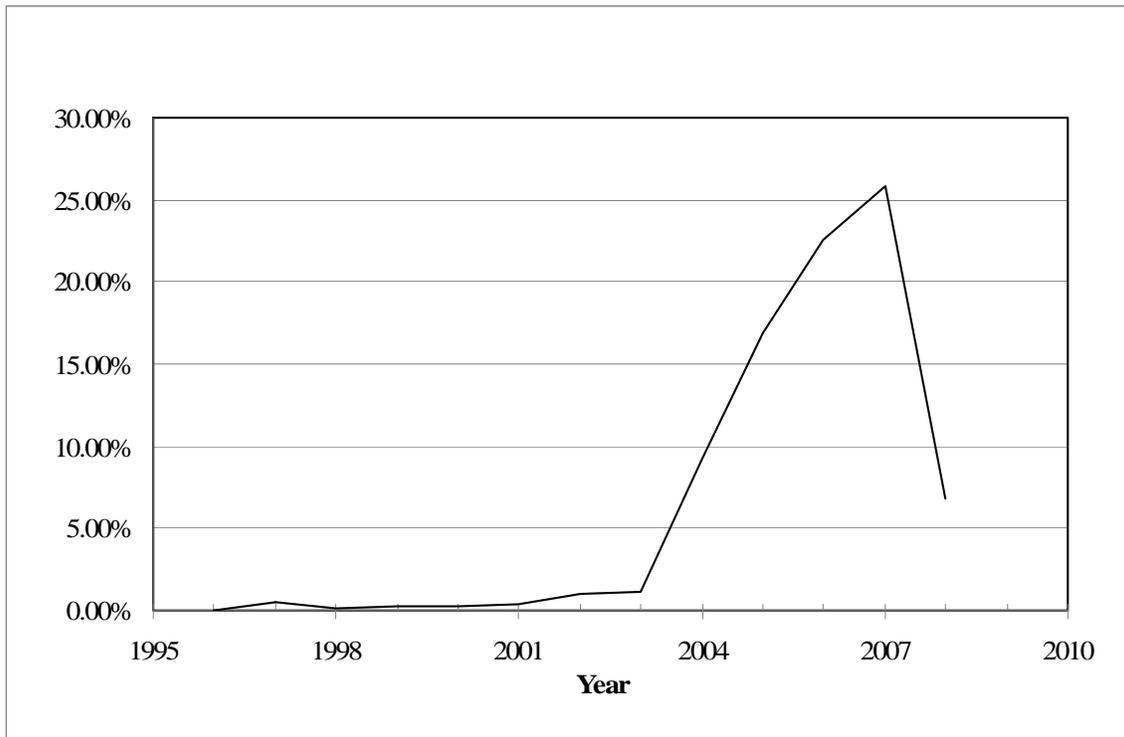
Figure 3: The frequency of ASRs and potential alternatives to ASRs by year

For each year of the sample period we report the frequency of announcements of: ASRs, privately negotiated repurchases, fixed-price self-tender offers, dutch-auction self-tender offers, and large special dividends (defined as greater than five percent of outstanding equity). Data on self-tender offers and privately negotiated repurchases are from SDC and data on special dividends are from CRSP.
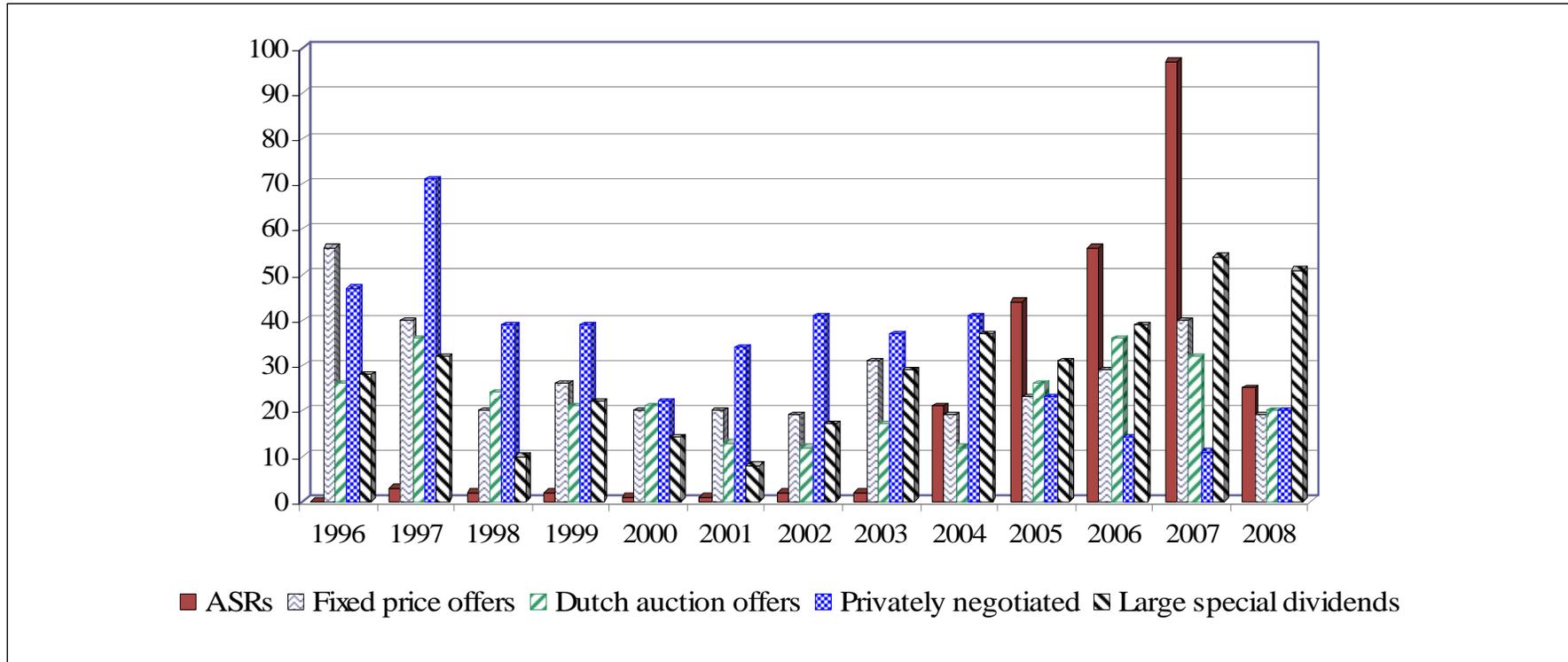
Figure 4: The dollar volume of ASRs and potential alternatives to ASRs by year
For each year of the sample period we report the dollar volume of completed: ASRs, privately negotiated repurchases, fixed-price self-tender offers, dutch-auction self-tender offers, and large special dividends (defined as greater than five percent of outstanding equity). Data on self-tender offers and privately negotiated repurchases are from SDC and data on special dividends are from CRSP.
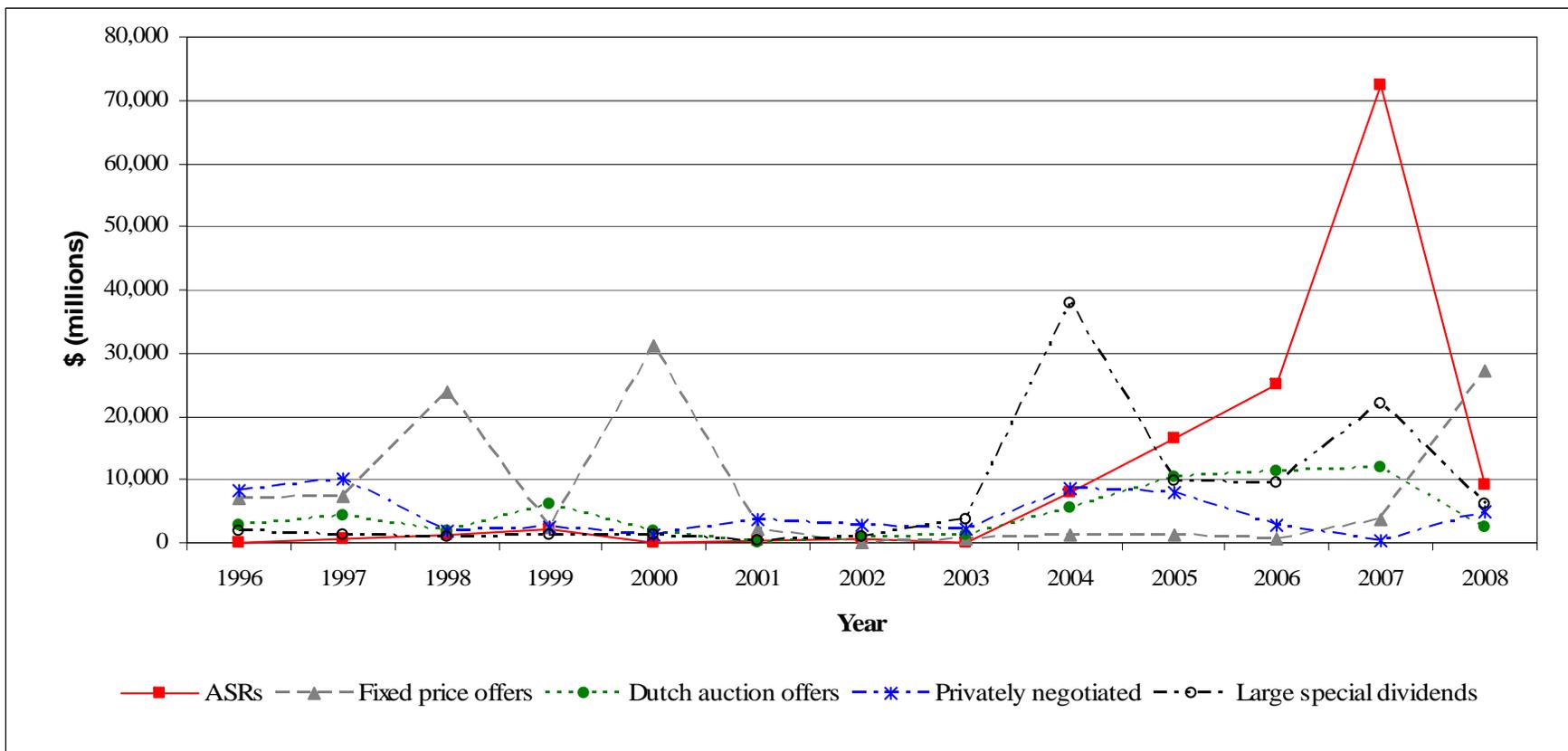
Table 1: Frequency of ASRs by year and transaction characteristics
The sample includes 256 accelerated share repurchase (ASR) transactions announced between 1996 and 2008. Details of the transactions were obtained from SEC filings and searches of newswires archived by Factiva. Panel A reports the frequency of announced ASRs by year. Panel B reports the size of the ASRs in terms of dollars allocated to repurchase shares, the percentage of outstanding equity repurchased in the ASR, and the percentage of the shares in the program repurchased via ASR. Percentage price difference is the difference between the price paid to the intermediary under the ASR agreement and the closing price on the day prior to the ASR agreement divided by the prior day's price. Also reported are days to settlement, the size of the settlement in dollars paid by the intermediary to the firm or by the firm to the intermediary, and the frequency the settlement is paid in cash. The frequencies with which the ASR agreements include caps and or floors are also reported. Panel C reports the frequencies that firms stated particular motivations (not mutually exclusive) for undertaking ASRs. Panel D reports the frequency with which investment banks were identified as serving as intermediaries for the ASR transactions in the sample.

Panel A: ASR transactions by year

Year	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
ASRs	0	3	2	2	1	1	2	2	21	44	56	97	25

Panel B: ASR transaction characteristics

	N	Mean	Median	Minimum	Maximum
Amount ($mill)	256	530.55	250.00	10.69	12,500.00
Percentage of equity	256	5.27%	3.48%	0.26%	44.13%
Percentage of announced program	256	58.03%	50.70%	5.00%	100.00%
Percentage price difference	93	0.13%	0.00%	-9.49%	11.21%
Days to settlement	178	139.97	131.00	5.00	372.00
Settlement paid by intermediary ($mill)	103	54.17	22.00	0.00	914.71
Settlement paid by firm ($mill)	71	33.51	11.90	0.00	523.00
Cash settlement	174	41.95%	0.00	0.00	1.00
Agreements with collars, caps or floors	256	23.83%	0.00	0.00	1.00

Panel C: Stated motivation

	Number of ASRs	Percentage of ASRs
Undervaluation	79	30.86%
Capital structure adjustment	24	9.38%
Cash from sale of assets/division/equity	21	8.20%
Buy back shares issued in benefit plan	8	3.13%
Return cash to shareholders	13	5.08%
Buy back shares related to conversion	8	3.13%
Buy back shares issued in an acquisition	4	1.56%
No stated motivation	125	48.83%

Panel D: Intermediaries

	Number of ASRs	Percentage of ASRs
Goldman Sachs	52.33	20.44%
Bank of America	21.33	8.33%
J.P. Morgan	20.67	8.07%
Merrill Lynch	15.50	6.05%
Lehman Brothers	15.33	5.99%
Credit Suisse	14.50	5.66%
UBS	14.00	5.47%
Citibank	12.83	5.01%
Others	24.50	9.57%
No information	65.00	25.39%

Table 2: Characteristics of firms by ASR election

		N	Programs without ASRs	N	Programs with ASRs	Difference
Short-sale constrained	[Mean]	1,228	0.049	205	0.000	0.049***
	[Median]		0.000		0.000	0.000***
Std. dev returns		1,168	0.022	205	0.016	0.006***
			0.020		0.015	0.005***
Ln(Illiquidity)		1,168	-6.181	205	-8.251	2.070***
			-6.792		-8.417	1.625***
Assets		1,158	17,484	199	30,410	-12,925**
			1,572		8,363	-6,791***
Ln(Assets)		1,158	7.452	199	9.051	-1.598***
			7.360		9.032	-1.672***
Cash/assets		1,158	0.173	199	0.124	0.049***
			0.097		0.058	0.039***
Free cash flow		1,151	0.055	196	0.049	0.006
			0.044		0.038	0.006
Std. dev. free cash flow		1,158	0.039	202	0.023	0.016***
			0.019		0.012	0.007***
High-hedge		1,158	0.187	202	0.119	0.068**
			0.000		0.000	0.000**
Low-Hedge		1,158	0.170	202	0.183	-0.013
			0.000		0.000	0.000
Asset sale		1,168	0.103	205	0.239	-0.136***
			0.000		0.000	0.000***
Takeover		1,168	0.024	205	0.078	-0.054***
			0.000		0.000	0.000***
Ln(Market-to-book)		1,151	0.444	197	0.389	0.055
			0.420		0.312	0.108
Prior stock performance		1,168	-0.043	205	-0.001	-0.042***
			-0.027		0.004	-0.031***
Leverage		1,154	0.174	199	0.202	-0.028**
			0.136		0.192	-0.056***
Leverage difference		1,148	0.040	199	0.010	0.030**
			0.066		0.009	0.057***
End of quarter		1,168	0.252	205	0.293	-0.041
			0.000		0.000	0.000
Program percentage of equity		1,168	0.073	205	0.103	-0.030***
			0.058		0.079	-0.021***

Table 2: Characteristics of firms by ASR election (continued)

The initial sample includes 256 accelerated share repurchase (ASR) transactions announced between 1996 and 2008. We match each ASR with the repurchase program that is simultaneous with or immediately precedes the ASR announcement. Repurchase program announcement data are obtained from the Securities Data Corporation and searches of Factiva. For those firms that conduct multiple ASRs within a repurchase program, we only include the first ASR in the program in the analysis below. We limit the analysis below to ASRs announced in 2004 or later. Short-sale constrained is a dummy variable that takes a value of one if the imputed interest rate on borrowing the firms shares (calculated as in Diether and Werner (2008)) for the calendar month prior to the announcement exceeds the 90th percentile of all firms on the same exchange over the 2002 to 2008 period. We limit the analysis to programs that are not short sale constrained. Standard deviation of returns is calculated over the period starting 210 trading days prior to the repurchase announcement and ending 10 trading days prior to the repurchase announcement, where day 0 is the date on which the repurchase program is announced or the day the ASR is announced if the program included an ASR (and the ASR was not announced simultaneously with the program). Illiquidity is the Amihud (2002) measure of illiquidity defined as the absolute (percentage) price change per dollar of daily trading volume, or the daily price impact of the order flow measured over the period starting 76 trading days prior to the repurchase announcement and ending 10 days prior to the repurchase announcement. Assets is book value of total assets (Compustat item 6). Cash/assets is the ratio of cash and short term securities (item 1) to total assets. Free cash flow is gross operating income (item 13) minus the sum of depreciation (item 14), tax payments (item 16), interest expense (item 15) and dividends (sum of items 19 and 21) scaled by total assets. Standard deviation of free cash flow is calculated over the five year period preceding the repurchase or ASR announcement. High-hedge takes a value of one if a firm's correlation between cash flow and median industry (3-digit SIC code) R&D expenditures is less than -0.2 and zero otherwise. Low-hedge takes a value one if the firm's correlation between cash flow and median industry (3-digit SIC code) R&D expenditures is greater than 0.2 and zero otherwise. Asset sale is a dummy variable that takes a value of one if a firm completed an asset sale in the six months prior to the announcement of the repurchase program or ASR. Takeover is a dummy variable that takes a value of one if a firm was the target of a takeover attempt in the six months preceding the announcement of its repurchase program or ASR. Market to book is the ratio of market value of assets (common shares outstanding (item 25) times calendar year closing price (item 24) plus total assets (item 6) minus common equity (item 60) minus deferred taxes (item 74)) to book value of assets (item 6). Prior stock performance is the cumulative abnormal return over the period starting 44 trading days prior to the announcement and ending four days prior to the announcement. Leverage is long term debt (item 9) plus debt in current liabilities (item 34) divided by total assets. Leverage difference is defined as a firm's target leverage minus its actual leverage. Target leverage is estimated as in Hovakimian et al. (2001). End of quarter is a dummy variable that takes a value of one if the announcement date of the ASR (or repurchase program) is in the last month of the quarter. Program percentage of equity is the percentage of outstanding equity that the program authorizes for repurchase. Significance of differences in means (medians) is assessed using a *t*-test (Wilcoxon rank sum test). ***, **, and * denote significance at the 0.01, 0.05, and 0.10 level, respectively.

Table 3: Logit regressions of ASR election and Tobit regressions of fraction of repurchase via ASR
Specification (1) reports the results of a logit regression where the dependent variable takes a value of one if a firm included an ASR in its repurchase program and zero otherwise. Specification (2) reports the results of a logit regression where the dependent variable takes a value of one if a firm announces an ASR simultaneously with a repurchase program announcement and zero if a program is not associated with an ASR. Specification (3) reports the results of a Tobit regression where the dependent variable is the fraction of the authorized repurchase that is completed via ASR. Independent variables are as defined in Table 2. The coefficients on the independent variables are reported along with their p-values in parentheses. Reported p-values are based on robust standard errors clustered by firm. ***, **, and * denote significance at the 0.01, 0.05, and 0.10 level, respectively.

Specification	(1)	(2)	(3)
Regression	Logit	Logit	Tobit
Dependent variable	ASR	Simultaneous ASR	Percentage of announced program
Std. dev. returns	-100.264***	-88.343***	-46.650***
	(0.000)	(0.001)	(0.000)
Ln(Illiquidity)	-0.344***	-0.618***	-0.169***
	(0.002)	(0.002)	(0.000)
Ln(Assets)	-0.124	-0.485*	-0.067
	(0.409)	(0.067)	(0.209)
Cash/assets	0.003	1.914**	-0.149
	(0.997)	(0.034)	(0.647)
Free cash flow	-1.026	-2.364	-0.543
	(0.481)	(0.446)	(0.534)
Std. dev. free cash flow	0.690	-11.948**	0.716
	(0.889)	(0.045)	(0.417)
High-hedge	-0.453	-0.275	-0.263**
	(0.103)	(0.525)	(0.042)
Low-hedge	-0.082	-0.261	-0.021
	(0.745)	(0.480)	(0.857)
Asset sale	0.397*	0.527	0.235**
	(0.097)	(0.230)	(0.033)
Takeover	1.187***	1.813***	0.482**
	(0.001)	(0.001)	(0.010)
Ln(Market-to-book)	-0.554**	-1.167***	-0.231**
	(0.016)	(0.004)	(0.023)
Prior stock performance	2.417**	3.181**	1.020**
	(0.014)	(0.039)	(0.018)
Leverage difference	0.971	3.081**	0.427
	(0.135)	(0.013)	(0.137)
End of quarter	0.216	0.285	0.117
	(0.263)	(0.428)	(0.204)
Program percentage of equity	7.122***	10.250***	2.711***
	(0.000)	(0.000)	(0.000)
Constant	-1.904**	-2.692**	-0.922**
	(0.020)	(0.034)	(0.015)
Observations	1,323	1,183	1,323
Pseudo R-Squared	0.198	0.237	0.166

Table 4: Predicted and observed frequencies of ASRs
Panel A tabulates the yearly predicted and observed frequency of ASRs as a percentage of repurchase program announcements. The probability of an ASR is estimated from the logit analysis in specification (1) of Table 3 using the 2004 to 2007 subsample. If the predicted probability is above the threshold probability that yields the observed number of ASRs within the subsample (32.52%) then we define the observation as a predicted ASR. If the probability is below the threshold then an ASR is not predicted. The probability of an ASR for the out-of-sample observations in 2008 is also calculated based on the in-sample coefficient estimates. The same threshold probability is applied to the out-of-sample observations. Panel B divides the out-of-sample observations in 2008 into terciles based on the estimated probability of an ASR. The first column of the panel tabulates the total number of programs without an ASR and the second column tabulates the total number of programs with an ASR. The p-value from a Pearson chi-square test that the proportion of ASR firms is the same in each tercile is listed at the bottom of the panel. *** denotes significance at the 0.01 percent level.

Panel A:Yearly predicted and observed frequencies of ASRs

Year	Predicted Percentage ASR	Observed Percentage ASR
2004	13.13%	10.61%
2005	10.97%	16.03%
2006	21.81%	18.11%
2007	20.23%	20.52%
Out of sample		
2008	9.03%	6.35%

Panel B: Observed ASRs by estimated probability tercile

	ASR = 0	ASR = 1
Lowest 3rd	98	1
Middle 3rd	96	4
Highest 3rd	86	14
p-value		*0.000***

Table 5: Abnormal returns at ASR and repurchase program announcement

Panel A reports three-day cumulative abnormal returns for ASR and share repurchase program announcements. The ASR sample includes 256 ASRs announced between 1996 and 2008. Of these, 243 ASRs were announced between 2004 and 2008. ASRs announced between 2004 and 2008 are further subdivided into ASRs that are announced subsequent to a repurchase program announcement and ASRs that are announced simultaneously with a repurchase program announcement. Difference V–VI denotes the difference in abnormal returns between programs associated with subsequent ASRs and programs not associated with an ASR. Panel B reports seven-day cumulative abnormal returns for ASR and share repurchase program announcements. Significance of tests that mean (median) abnormal returns are different from zero are assessed using a *t*-test (Wilcoxon signed rank test). Significance of the number of positive versus number of negative is assessed using a sign test. ***, **, and * denote significance at the 0.01, 0.05, and 0.10 level, respectively.

Panel A: Three- day abnormal return

	Mean	Median	N	Positive, Negative
All ASRs (1996-2008)	1.43***	0.95***	256	182, 74***
2004-2008				
I. ASRs (2004-2008)	1.42***	0.95***	243	171, 72***
II. Subsequent ASR (2004-2008)	1.34***	0.93***	184	129, 55***
III. Simultaneous ASR (2004-2008)	1.70**	2.01***	59	42, 17***
IV. All programs (2004-2008)	1.40***	1.06***	1,337	866, 471***
V. Programs associated with subsequent ASR (2004-2008)	0.81**	0.34*	151	87, 64*
VI. Programs not associated with any ASR (2004-2008)	1.46***	1.21***	1,129	741, 388***
Difference V - VI	-0.65	-0.86**		

Panel B: Seven- day abnormal return

	Mean	Median	N	Positive, Negative
All ASRs (1996-2008)	1.88***	1.35***	256	172, 84***
2004-2008				
I. ASRs (2004-2008)	1.94***	1.25***	243	164, 79***
II. Subsequent ASR (2004-2008)	1.73***	1.08***	184	125, 59***
III. Simultaneous ASR (2004-2008)	2.60***	1.66**	59	39, 20***
IV. All programs (2004-2008)	1.58***	1.18***	1,337	812, 525***
V. Programs associated with subsequent ASR (2004-2008)	0.78	0.40	151	81, 70
VI. Programs not associated with any ASR (2004-2008)	1.62***	1.30***	1,129	692, 437***
Difference V - VI	-0.84	-0.90**		

53

Table 6: OLS regressions of ASR abnormal returns and logit regression of ASR election

Specification	(1)	(2)	(3)
Regression	OLS	OLS	Logit
Dependent Variable	Three-day abnormal return	Three-day abnormal return	ASR
Percentage of equity	0.226**	0.228**	
	(0.023)	(0.030)	
Std. dev. returns	0.564	0.544	-102.377***
	(0.299)	(0.318)	(0.000)
Ln(Illiquidity)	-0.001	-0.001	-0.306**
	(0.424)	(0.576)	(0.017)
Ln(Assets)	0.000	-0.000	-0.074
	(0.999)	(0.902)	(0.667)
Cash/assets	0.008	0.008	-1.037
	(0.738)	(0.749)	(0.292)
Free cash flow	0.181	0.187	-2.380
	(0.138)	(0.110)	(0.285)
Std. dev. free cash flow	-0.041	-0.046	4.008
	(0.323)	(0.271)	(0.152)
High-hedge	0.004	0.003	-0.520
	(0.600)	(0.703)	(0.131)
Low-hedge	0.007	0.007	-0.103
	(0.383)	(0.348)	(0.719)
Asset sale	-0.003		0.339
	(0.530)		(0.203)
Takeover	-0.027**	-0.026**	1.094**
	(0.019)	(0.032)	(0.019)
Ln(Market-to-book)	0.002	0.002	-0.395
	(0.753)	(0.777)	(0.154)
Prior stock performance	-0.058*	-0.061**	1.907*
	(0.073)	(0.048)	(0.088)
Leverage difference	-0.023	-0.021	0.197
	(0.315)	(0.384)	(0.788)
End of quarter	0.004	0.003	0.139
	(0.420)	(0.512)	(0.508)
Program percentage of equity	-0.075	-0.079	5.044**
	(0.308)	(0.293)	(0.010)
Undervaluation		-0.001	
		(0.871)	
Return cash to shareholders		0.002	
		(0.899)	
Buy back shares issued in a takeover		0.024*	
		(0.063)	
Buy back shares related to conversion		0.003	
		(0.817)	
Buy back shares issued in benefit plan		-0.017**	
		(0.013)	
Cash from sale of assets/division/equity		-0.006	
		(0.472)	
Capital structure adjustment		0.001	
		(0.944)	
Program abnormal return			-4.992**
			(0.020)
Constant	-0.021	-0.013	-1.962**
	(0.422)	(0.618)	(0.035)
Observations	238	238	1,222
Adjusted R-squared	0.124	0.113	-
Pseudo R-Squared	-	-	0.187

Table 6: OLS regressions of ASR abnormal returns and logit regression of ASR election (continued)
Specifications (1) and (2) report the results of OLS regressions where the dependent variable is the three-day cumulative abnormal return at ASR announcement. The analysis includes all ASR announcements between 1996 and 2008. Percentage of equity is the percentage of outstanding equity repurchased in the ASR. Undervaluation, return cash to shareholders, buy back shares issued in an acquisition, buy back shares related to conversion, buy back shares issued in benefit plan, cash from sale of assets/division/equity, capital structure adjustment are dummy variables reflecting the stated motivations (not mutually exclusive) for undertaking ASRs. If the firm stated a particular motivation for the ASR at announcement, then the corresponding variable takes a value of one and zero otherwise. Specification (3) reports the results of logit regression where the dependent variable takes a value of one if a firm announced an ASR subsequent to announcing a repurchase program and zero for programs not associated with an ASR. We limit the logit analysis to ASRs announced in 2004 or later. Program abnormal return is the three-day cumulative abnormal return at the announcement of the repurchase program. The coefficients on the independent variables are reported along with their p-values in parentheses. Reported p-values are based on robust standard errors clustered by firm. ***, **, and * denote significance at the 0.01, 0.05, and 0.10 level, respectively.