Share Repurchases as a Tool to Mislead Investors: Evidence from Earnings Quality and Stock Performance [1]

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Abstract

Classic signaling theory suggests that in an economic environment which results in a pooling equilibrium, investors who have difficulty ascertaining firm quality should expect managers in low-quality firms to occasionally mimic valuation signals otherwise associated with high-quality firms. Few papers have empirically validated this simple, well-established idea. As such, we consider open market share repurchases, a transaction long held in suspicion as lacking the credibility of a costly signal, and thus potentially susceptible to mimicking.

No clean measure of managerial intent exists; program size and ex-post completion rates are ineffectual in the context of this transaction. Instead, we use earnings quality as a noisy proxy. Firms which aggressively employ discretionary accruals, particularly those which also show lagging stock performance, exhibit traits which suggest that executives may have been under pressure to boost stock prices. Using this measure, we ex-ante identify a set of firms which, while benefiting in the short-term from a buyback announcement, do not show the same improvement in post-announcement operating and stock performance otherwise observed.

Consistent with simple notions of signaling theory, this evidence suggests that some open market buybacks may be announced with the intent of manipulating investor opinion. While not complete, this paper provides some insight into the more general empirical phenomenon of underreaction; some level of investor skepticism about this type of corporate announcement is justified.

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1. Introduction

Perhaps one of the most well developed literatures in financial economics relates to corporate signaling. In a world where valuation is noisy, companies who view themselves as undervalued will try to engage in activities which signal their quality. If investors have difficulty distinguishing high- and low-quality firms and if the signal poses few barriers for low-quality firms to mimic, economic theory suggests that this is an environment ripe for a pooling equilibrium where some managers may potentially abuse investors by announcing a signal with the intent of misleading the market. Given the challenge of identifying managerial intent, few papers have carefully explored this darker aspect of signaling theory.

We consider open market stock repurchases (OMSR) as a window on this problem. While many studies discuss the potential economic benefits that stock buybacks in theory may provide and others empirically document the benefits that shareholders historically realize, open market programs have long been criticized for their lack of credibility as quality signals (e.g. Vermaelen (1981) and Comment and Jarrell (1991)). Compared to fixed-price buyback methods, open market buyback programs are simply authorizations, not commitments, which permit management to repurchase stock at their whim, if at all. This authorization poses few barriers to managers who might want to engage in mimicking behavior. Reporting and disclosure requirements surrounding actual transactions are minimal in the U.S. and the authorizations themselves pose few costs to initiate. Historically, managers have not borne any reputational penalty for announcing and then failing to buy back stock.

Given the tempting environment seemingly evident with open market buybacks, an interesting empirical question is whether, among the general pool of buybacks which appear to be done to enhance shareholder value, a subset of cases exists where managers may have intended to mislead the market. In other words, is there any ex-ante evidence consistent with the notion that some managers may be announcing open market buybacks with the intention of misleading investors?[1] Unfortunately, of course, no pure measure of managerial intent exists. Whatever measure we might develop will, at best, be an indirect, noisy proxy. One indirect proxy that might readily be considered is program size; larger programs are uniformly viewed in the literature as stronger signals. This is particularly true of fixed price programs where markets can generally rely on managers to follow through and where credibility of the program is generally not questioned. While there is ample evidence that markets do initially react more favorably to larger open market buyback programs, program size, regrettably, is not a convincing or

[1] Two recent papers address the possibility of an OMSR announcement being motivated by non-valuation based factors. Bens, Nagar, Skinner, and Wong (2003) find that repurchases are used to offset EPS dilution when employee stock options are exercised. In a more recent paper, Hribar, Jenkins, and Johnson (2006) argue that repurchases may potentially manipulate reported earnings by noting that a disproportionately large number of repurchasing firms would have missed analysts' forecasts had the stock repurchase not occurred. While these two papers suggest manipulative intent, neither paper is a direct test.

compelling measure of managerial intent. Because of the inherent flexibility of open market repurchases, managers have freedom to set program size irrespective of whatever intention they might have.[2] Firms can and do initiate programs of any size even if they have no immediate intention of buying back stock.[3] Further, managers who do not wish to overtly signal the market can "hide" a large buyback program by executing a series of smaller programs in sequence over time. Thus, essentially by construction, it is difficult to interpret program size as a reliable, credible quality signal.

Another obvious measure is the ex-post completion rate.[4] Here too, numerous features confound this measure such that it offers little insight into managerial intent at the time the buyback was initiated. OMSRs often take several years to execute and firm circumstances can easily change, thus altering whatever real economic reason might have initially motivated a buyback. Yet even without this noise, simple reasoning suggests that actual buyback behavior is path dependent on prices. Assume, a stock is somehow undervalued and the firm chooses to initiate a buyback program. If the market price rapidly increases to fair value in response, mispricing will no longer be a motive for this company to continue with the program. Given that few penalties exist for non-completion, we should not anticipate that managers will necessarily continue with the repurchase program at this higher share price. This path-dependent transaction behavior is empirically validated in several papers including Ikenberry, Lakonishok and Vermaelen (2000) who study monthly buyback trading behavior of Canadian managers. In a more recent paper, Chan, Ikenberry and Lee (2004) show price dependent buyback behavior for U.S. companies as well.

In sum, the two most readily evident measures of managerial intent, program size and ex-post completion rate, are of little use. As an alternative, we consider earnings quality as a proxy for the propensity of managers to falsely signal or otherwise potentially mislead investors. This flows as an extension of an emerging literature regarding earnings management. Chan, Chan, Jegadeesh and Lakonishok (2006) recently argue that earnings quality may indeed be a reflection of managerial intent to

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[2] In fact, Ikenberry and Vermaelen (1996) provide a theoretical framework which suggests that most firms should be expected to continually have in place buyback authorizations given their low-cost and flexibility. In such a world, one would expect these announcements to lose signaling power.

[3] While one does not expect that managers will deliberately mention this aspect in the popular press, consider the following quote from Robert Shaw, Chairman and CEO of Shaw Industries who in 1998 stated "We don't have any specific plans (to buy back stock now), but we do want to be able to go into the market when buying opportunities present themselves. This is a continuation of a stock repurchase program we have had in place for a number of years."

[4] Several papers evaluate actual buyback activity and factors which affect completion rates. Core, Guay, Richardson, and Verdi (2006) show that firms with high accruals tend to buy back fewer shares compared to other firms. In a related paper, Lie (2005) finds that post-announcement operating performance improvements and positive earnings announcement returns are generally limited to firms which actually buy back stock. Chan, Ikenberry, and Lee (2007) also show that the long-run return drifts following program announcements are positively related to their actual buyback activity and that managers appeared to have some skill in timing the stock market. These papers provide some evidence that actual buyback activity can be used as a way to discern the motivation of managers.

mislead investors. They find that managers sometimes use accruals to report earnings that are stronger than the actual economic reality of the firm. To the extent that investors have a myopic view of earnings (for example, Hand (1990)), earnings manipulation strategies may have some efficacy. Sloan (1996) points out that while managers may make discretionary accounting decisions that inflate current earnings, the accruals used to accomplish this are not sustainable in the long-run. In the short-run, however, when organic earnings growth is not in line with market expectations, managers who perceive pressure from declining stock prices may be tempted to use accruals to inflate earnings and mislead investors.

In such a world where managers are under pressure to manipulate earnings, perhaps it is also the case that they are prone to deploy other techniques to affect market opinion. In these cases, one wonders if managers might also consider using open market share repurchases in a potentially deceiving way. If the cost (direct and/or indirect to either management or to the firm) of announcing an open market program is low and investors are not able to discern the intention of company executives at the announcement, it may be the case that managers, aware of the otherwise positive signaling effects, will consider share repurchases as another mechanism with which to mislead investors and boost stock prices. Jensen (2005), in a similar line of reasoning, strongly advocates that earnings management is unethical and akin to "lying." While this may be an extreme view, his argument is consistent with this notion that managers who adopt aggressive accounting practices are essentially engaging in behaviors which attempt to mislead investors. Perhaps the buyback programs announced by such firms are a simple extension of this more general ethical problem.

To validate this hypothesis, some key questions of interest are: 1) is there any evidence that managers of buyback firms with low earnings quality may be under pressure to boost stock prices?, 2) is there evidence that investors recognize this pressure and react accordingly, thus unraveling the signal at the announcement of an OMSR?, and 3) is the operating and long-run stock return performance of suspect buyback firms lower compared to the general case as predicted by classic economic signaling theory?

We examine a sample of 7,628 open market repurchases announced in the U.S. between 1980 and 2000. Regarding the first question, managers who use aggressive accounting techniques, generally speaking, are indeed under greater pressure than otherwise to take action to reverse a negative information environment; immediately prior to the announcement of an OMSR, poor earnings quality firms are experiencing problems including a relatively sharp decline in abnormal stock returns. Sales are dropping, realized earnings announcement returns are significantly negative and financial analysts are making negative forecast revisions. This is true despite the fact that reported earnings are rapidly increasing in these same firms. Further, managers in low earnings quality firms tend to own more vested, exercisable options than managers of other buyback firms, suggesting that they have greater incentive than otherwise to pay attention to stock prices.

These results paint a picture consistent with the notion that this subset of company executives may have been prone to use OMSRs to mislead investors. In the short-run, we find that, consistent with the evidence regarding earnings myopia, the market does *not* sort out differences in earnings quality across buyback programs as they are announced. Thus with respect to our second question, the answer is no; in both high- and low-earnings quality firms, the initial market reaction is roughly the same, about 2%.

In the long run though, the results are generally consistent with the notion that managers in poor quality firms, as theory suggests, may have been misleading the market. The operating performance of low-earnings quality firms significantly deteriorates after a buyback announcement. In contrast to what we see more generally in stock buybacks, the long-horizon stock return performance of poor earnings quality firms is lower compared to the general case and is not significantly different from zero. When we focus on more suspicious cases where one might expect a greater sense of desperation, our findings generally strengthen.

Thus in response to the final question we raise, the answer is yes; we do find evidence consistent with classic theories of costly signaling that in cases where barriers to mimic are low, we find at least some evidence of mimicking behavior. The fact that this behavior is potentially successful in the short-term may explain why this cheating behavior persists. This conclusion runs counter to a well-established literature which commonly portrays repurchases in a generally beneficial light. In at least a portion of buyback cases (and in a manner consistent with the signaling literature), managers appear to be taking advantage of positive signaling effects from buyback programs which investors are not initially able to discern. Just as managers in the short-run are able to manipulate earnings to their advantage, it also appears that some companies may be using share buyback announcements as low-cost signals with which to mislead investors.

One might expect that if managers send misleading signals to the market, the company's stock will later be penalized and thus significantly underperform the market. On the other hand, one also does not expect stock prices to diverge away from (below) fair value. As such, this limits the price "correction" one anticipates for mimicking firms to only the reversal of the initial buyback announcement return. Recall, however, that the scale of this return is only around 2%, a level of mispricing that is difficult to distinguish from noise in the long-run. Unless one assumes that falsely signaling firms are overvalued at the time of the buyback announcement, one does not anticipate any significant long-term abnormal performance (positive or negative). Generally speaking, firms which announce buyback programs have, on average, suffered from a relative decline in stock price performance. Yet for firms with poor earnings quality, this decline is remarkable; these firms collectively *underperformed the market by roughly -20%* in the year prior to buyback announcement Moreover, among these high discretionary accrual firms , those with poor stock price performance in the quarter preceding the buyback announcement (and, thus, may

have been under greater pressure from investors) have underperformed the market in the year prior relative terms by -40%. In these cases where prices have fallen and operating performance has deteriorating, the notion that these firms are still overvalued and should suffer further from a negative post-announcement drift unlikely.

In a world where both high-quality firms which are undervalued and a second set of low-quality firms which attempt to mimic that they too are undervalued co-exist, if we assume market underreaction due to investor skepticism or some other trait, then one can anticipate what stock performance, on average, over longer horizons should be; firms which are truly undervalued at the time of a repurchase announcement should exhibit a positive abnormal return drift while mimicking firms should not.

Of course given that we do not have true insight into managerial intent, our approach to sorting out firm quality may be confounded by other factors. Managerial hubris is one such possibility. Managers in poorly performing firms, including those who have engaged in earnings manipulation, may in fact have misguided or over-inflated views and may announce an OMSR not with the intent to further manipulate investors, but rather because they perceive a buyback to be a truly value-enhancing decision, a decision that ex-post was simply incorrect. In many cases, these firms have lost substantial market-cap prior to the announcement, thus lending some credence to this view. Yet while our evidence is noisy, the fact that poor earnings quality firms actually buy back less stock than other firms seems inconsistent with managerial hubris; if hubris were a dominant factor, one would expect the opposite.

We also consider other key economic motivations including the perceived need to distribute free cash or increase firm leverage. Neither alternative seems to account for this subset of firms where managers appear to be "borrowing a signal" in an attempt to mislead the market. The fact that the free cash flow hypothesis is not supported also casts doubt on a related explanation relating to firm maturity. Recently, Grullon and Michaely (2004) offer a new important economic interpretation of repurchases and the role they play in firms entering a mature phase of development with a declining investment opportunity set, thus reducing a given firm's need for capital spending. In such an environment, we might expect firms with abundant cash flow to engage in stock buybacks. While this economic description may indeed apply to repurchases more generally, this alternative explanation would not seem to explain the actions of managers in firms with poor earnings quality. These firms, on average, report a steep reduction in cash flow from operations prior to a program announcement, thus reducing the need to use repurchases as a mechanism to reduce agency costs. Furthermore, subsequent to an announcement, the fact that these firms generally do not show material changes in their cash balances nor do they repurchase stock at the same pace as other firms points to a conclusion that this sub-set of buybacks most likely was not the consequence of deliberate decisions by managers who recognized some perceived shift in their firm's economic maturity.

The fact that some firms may be falsely misleading investors may explain why some investors hold a natural suspicion to buyback program announcements and may also provide modest insight into the more general long-run underreaction phenomena. Numerous papers conclude that markets appear to underreact to key signals. The presence of some company managers whose desire is to mislead investors may provide some justification for this initial hesitation by investors. While one still expects prices in a rational world to be "fair" and thus not lead to predictable return drifts, if investors hold an irrationally high level of skepticism about manager intentions, this provides at least some foundation for why underreaction may be a prevalent phenomenon.

The next section describes the data and methods we use in this paper. Section 3 presents summary statistics about our sample including announcement returns and firm characteristics. Section 4 reports long-run stock return and operating performance. In Section 5, we consider alternative return estimation models and also investigate the robustness of our findings. We summarize the paper in Section 6.

2. Data and methods

2.1 Sample formation

We form a sample of open-market repurchase announcements from two sources. The first is from the *Wall Street Journal Index* for the period 1980-1990; the second is from Securities Data Corporation (SDC) which begins comprehensive coverage in 1985. We evaluate return and operating performance four years subsequent to the buyback announcement and thus terminate our sample at the end of 2000. We eliminate firms whose return information is not present on CRSP or whose accounting information is not available on annual Compustat. To reduce time clustering, we eliminate announcements that occurred in the fourth quarter of 1987. To mitigate the impact of skewness in our long-run return estimates, we exclude firms whose share price at the time of repurchase announcement is below $3 (Loughran and Ritter (1996)). The final sample includes 7,628 separate cases.

2.2 Measuring earnings quality

Accounting accruals are a common measure of earnings quality (Beneish and Vargus (2002), Chan, Chan, Jegadeesh and Lakonishok (2006)). Accruals are derived from an accounting identity which links earnings and cash flows. Specifically, earnings are equal to cash flows plus accruals. The intent of accruals is to allow those preparing accounting statements to make adjustments that deviate from cash flows, deviations which, in their opinion, better reflect the firm's fundamental operations. While standards are in place governing how these accruals are determined, a substantial degree of subjectivity exists. This flexibility provides managers an opportunity to potentially distort reported earnings.

In a purely efficient market, these maneuvers are, by definition, ineffectual. Yet, a rich literature

including Hand (1990) and Sloan (1996) argues that investors incorporate information in less than purely efficient ways. These papers argue that investors seem to "fixate" on reported earnings and either ignore or are unaware of the extraordinary accruals affecting earnings which may be less likely to recur in the future. A recent paper by Dechow and Ge (2006) lends credence to the idea that investors may misunderstand the transitory impact of special accounting treatments, thus allowing managers to be able to guide or shape investor expectations despite the fact that, in the long-run, this manipulation is not sustainable.[5]

To gauge earnings quality, we follow Sloan (1996) and Chan, Chan, Jegadeesh and Lakonishok (2006) to define accruals in equation (1), with Compustat annual item numbers in parentheses.[6]

$$\text{Accruals} = (\Delta\text{CA} - \Delta\text{Cash}) - (\Delta\text{CL} - \Delta\text{STD} - \Delta\text{TP}) - \text{DEP} \quad (1)$$

where
- ΔCA = change in current assets (4)
- ΔCash = change in cash (1)
- ΔCL = change in current liabilities (5)
- ΔSTD = change in debt included in current liabilities (34)
- ΔTP = change in taxes payable (71)
- DEP = depreciation and amortization expense (14)

Accruals are measured at the fiscal year-end prior to the repurchase announcements. We assume a four-month reporting lag to avoid look-ahead biases and scale all accruals by average total assets (TA).

One shortcoming of this approach is that some portion of total accruals is not discretionary, but rather is tied directly to firm growth and thus less subject to managerial manipulation. For example, as high growth firms increase in scale, one expects increases in accounts receivable and inventories. To the extent that there are not offsetting changes in current liabilities, this leads to a non-discretionary increase in accruals. To control for this possibility, we follow convention in the earnings management literature and decompose accruals using the Jones (1991) model

$$\frac{Accruals_i}{TA_i} = a_0 \frac{1}{TA_i} + a_1 \frac{\Delta Sales_i}{TA_i} + a_2 \frac{PPE_i}{TA_i} + \varepsilon_i, \quad (2)$$

[5] Perhaps the most prescient example of this was Enron Corporation in 2001. Immediately prior to filing bankruptcy, Enron had its best quarter for reported earnings. Ex-post, we now know that the market was unable to initially discern the extraordinary discretion management used and its auditors agreed to, decisions which served to obfuscate the true underlying nature of the firm.

[6] One concern of using annual data is that the estimate of earnings quality may be stale and thus a weak measure of managerial intent. To address this, we repeated our analysis using quarterly data and found the results to be similar. However, because we lose a significant number of sample observations, we continue to report evidence using annual data.

where ΔSales is the change in sales (Compustat annual item number of 12) and PPE is property, plant and equipment (Compustat annual item number of 7). Consistent with prior work, we define non-discretionary accruals (NDA) as the fitted values from this model for a given firm. Discretionary accruals (DA) are then defined as the residual for a given case away from its respective expected value. We follow Teoh, Welch and Wong (1998) and estimate coefficients in model (2) each year for each of the 48 Fama-French (1997) industries using all NYSE/AMEX/NASDAQ stocks.[7] We then compute NDA and DA for each repurchase firm as:

$$NDA_i = (\hat{\alpha}_0 + \hat{\alpha}_1 \Delta Sales_i + \hat{\alpha}_2 PPE_i) / TA_i \qquad DA_i = Accruals_i / TA_i - NDA_i \qquad (3)$$

To create relative measures of earnings quality, we calculate DA values for all firms with available data on Compustat. Quintile cutoff points are then defined across this universe each year, thus allowing us to identify a DA quintile rank for each sample firm.

2.3 Measuring abnormal long-run stock returns

We estimate abnormal stock performance both prior to and following a buyback announcement using a variety of techniques. Because of its ability to provide a more meaningful interpretation, much of our analysis relies on an annual buy-and-hold returns approach (BHRs). Barber and Lyon (1997) point out that the implied investment strategy from this procedure is both feasible and replicable, and seemingly indicative of what a long-horizon investor might earn. For each sample firm, a benchmark is formed using five firms with comparable market-cap, book-to-market ratio and DA. Statistical inferencing is accomplished via a bootstrap method as advocated by Lyon, Barber and Tsai (1999). The details of this rather standard method are described more fully in Appendix A.

2.4 Measuring abnormal operating performance

We evaluate operating performance using a variety of metrics including earnings, accruals, cash flows and sales. We also consider performance based on Return on Assets (or ROA) and use this measure to identify a matching control-firm with which to estimate abnormal operating performance. Here, ROA is defined as EBITDA (operating income before depreciation, Compustat item 13) scaled by average total assets. The choice of EBITDA is recommended by Barber and Lyon (1996) and is commonly adopted in many papers which evaluate operating performance (for example, Jain and Kini (1994) for IPOs, Loughran and Ritter (1997) for SEOs, and Grullon and Michaely (2004) for repurchases).

[7] For industries with less than 10 firms in a given year, we parameterize the model using coefficients estimated from all available firms at that time. To reduce the impact of outliers on the regression model, observations with extreme values, which are defined as those above 10 or below -10, of accruals, ΔSales and PPE are dropped when coefficients are estimated using regression equation (2).

We define abnormal operating performance by taking the ROA of each buyback firm and subtracting the concurrent ROA of a benchmark firm matched on the basis of industry, DA, and pre-event performance. In our study, controlling for DA is important since firms with very high (or low) discretionary accruals are expected to report reversals in future performance; accruals, by definition, cannot be sustained in the long-run. Therefore, we identify a matching firm for a given target by locating all firms with the same two-digit SIC code and in the same DA quintile, and then choosing the company with the closest pre-event ROA as that of the sample firm. We require that the matching firm's pre-event ROA be within the range of (80%, 120%) of the sample firm's pre-event ROA. Since ROA for some sample firms approaches zero, this method can become restrictive. In these cases, we check that pre-event ROA is within one percentage point of that of the target firm. If no match is identified this way, we relax the industry requirement to the one-digit SIC level and repeat the above steps. If this fails, we disregard industry and DA restrictions and search the closest ROA firm within the earnings filter range above. If we still do not have a match at this point, we simply identify one firm with the closest ROA match to the sample firm, thus minimizing the following condition[8]:

$$\min \left| \mathrm{ROA}_{\text{t-1, sample firm}} - \mathrm{ROA}_{\text{t-1, matching firm}} \right| \tag{4}$$

3. Firm characteristics around share repurchase announcements

3.1 Summary statistics

Table 1 reports summary information for firms in our sample. Panel A reports summary information for the overall sample period as well as two sub-periods. The average five-day announcement-period abnormal return is 1.80% and significantly positive. Consistent with earlier studies, firms announcing buyback programs are generally poor performers prior to the announcement, a result that is in sharp contrast to firms choosing to issue stock where there is evidence of a sharp run-up in stock price.[9] The mean raw return for sample firms in the year prior to an OMSR announcement is 1.56%; adjusted for size, book-to-market and DA effects, this equates to an abnormal return of -14.55%. The mean intended buyback amount is about 7.5% of the share base. Panel A also reports mean rank characteristics for size, book-to-market equity ratio (B/M) and discretionary accruals. Generally speaking, the typical buyback firm in our sample is similar to the underlying universe with respect to

[8] Among repurchase firms with valid ROAs, 56.5% of the sample matched in the most restrictive form described above. At the next level, 21.6% were matched at the less restrictive 1-digit SIC-code and within the same DA quintile. Further, 7.5% met the ROA filter restriction but not using the industry and DA requirement. The remaining 14.4% of sample firms were matched according to equation (4) without an ROA filter. As a robustness check, we considered a separate approach based on a Fama-French (1997) industry classification scheme rather than using SIC codes as described above. The results were similar to those reported here.

[9] See several papers including Loughran and Ritter (1995), for example.

market-cap, B/M and their use of accruals.

Panel B reports evidence similar to Panel A, but conditioned on discretionary accruals (DA) quintiles. For firms ranked in the highest or most aggressive DA quintile, the unexpected accrual is quite high and amounts to 12.0% of their asset base. Interestingly, the average year -1 *raw return* for these firms is quite low, -11.8%. On an adjusted basis, the results are extremely poor. This result is indeed consistent with the notion that managers in High DA firms may have been under pressure to reverse sagging share prices.

Later, we motivate how well DA serves as a mechanism to distinguish managerial intent. However, if we assume for now that firms classified as High DA may indicate that managers were under pressure to mislead investors with an OMSR announcement, an interesting question arises as to how the market initially responds to different buyback cases. If the market could somehow distinguish low-quality firms, one would expect fewer "cheaters" in the sample. Further, one would also expect no positive announcement return to these suspicious announcements. Yet the announcement-period abnormal return is significant for all DA groups. There is no significant difference between the highest and lowest groups, and both are at about 2%.

To focus more narrowly on managers who might be under even greater pressure, we subdivide this High DA group further into two equal groups, High-L and High-H, on the basis of their abnormal stock performance in the quarter preceding the buyback announcement. High-L firms thus represent cases where, even though management used aggressive techniques to support earnings, the stocks nevertheless experience very poor performance. Here, we see that High DA firms with relatively poor prior abnormal performance (High-L) lost more than 20% of their market-cap in the preceding year; on a relative basis, these firms underperformed by -42%. Even among these more extreme cases where investors might reasonably be expected to harbor at least some suspicion, the mean market reaction is about the same as otherwise, 2.0%.

This simple analysis however may be confounded by other factors which we know affect announcement returns. For example, because these firms have suffered such extreme losses, perhaps investors are responding favorably to important value characteristics in High DA buyback announcements, thus masking the results we otherwise anticipate. As such, we report multivariate evidence in Table 2. Again, the coefficients of High DA dummy and High-L dummy are not significant in any of the models and would seem to indicate that the market does not distinguish among programs announced by firms of varying earnings quality. On the other hand, the market does not appear to ignore all aspects associated with mispricing. For example, coefficients relating to firm size and BM are consistent with what one would anticipate if investors respond more assertively to cases with greater potential for undervaluation.

3.2 Operating performance, earnings announcement effects and earnings forecast revisions

To better understand the overall performance of repurchasing firms, we turn our attention to operating performance prior to the buyback announcement. In Figure 1, we plot the time-series pattern of four operating performance measures for five fiscal years prior to the OMSR announcement: earnings (operating income after depreciation), accruals, cash flows (earnings minus accruals), and sales.[10] In Panel A of Figure 1, we compare firms classified in the highest quintile with all other firms combined as a group.

For poor quality firms, reported earnings significantly increase before an OMSR announcement despite the fact that sales are *actually decreasing*. Note that cash flows are dropping in years -2 and -1. By definition, it is the accruals these High DA firms employ, which allow them to report comparatively high earnings, even in the presence of a declining economic picture. For firms ranked in the bottom four DA quintiles, we do not observe any significant changes in reported earnings over this same period of time. Cash flows on average, however, are actually rising. In Panel B, we plot operating results for the highest DA quintile conditioned into two sub-groups on the basis of the abnormal return in the quarter prior to the announcement. For High DA firms with very low prior abnormal returns (High-L), we observe cash flows falling more sharply prior to the announcement than otherwise. Conversely, accruals and reported earnings show comparatively more dramatic growth.

In sum, the evidence is consistent with the notion that managers in firms with poor earnings quality at the time of a repurchase announcement are under greater stress compared to the rest of the sample. This finding is even more compelling among cases with extremely poor stock price performance prior to the announcement.

Generally speaking, companies which announce a buyback are under some pressure in the year prior to the announcement. However as a further check into whether managers in poor earnings quality firms might be under even greater pressure which might lead them to engage in manipulative practices, we turn attention to the market reaction to quarterly earnings announcements preceding the buyback. To the extent that these news releases are unanticipated, we gain some sense of market surprise and sentiment. Panel A in Table 3 reports earnings announcement returns for each of the four quarters prior to a buyback announcement for firms ranked in the highest DA quintile and the bottom four DA quintiles combined. Consistent with the pattern established earlier, we again see evidence that the average earnings announcement return is less favorable for firms in the highest DA quintile in the year prior to the buyback announcement. This is particularly true in the quarter immediately prior to the buyback announcement. Here, the average abnormal market return for the bottom four DA quintiles is -0.56%; all firms, on average, seem to be under at least some stress. Yet for firms with poor earnings quality, the average abnormal earnings announcement return is substantially worse, -1.08%. The difference in earnings

[10] Each of these measures is scaled by average Total Assets over the year.

announcement returns for both the mean and median between these two groups is significant at the 0.05 level. Not surprisingly, if we focus more narrowly on the High-L sub-group, the disappointment in the earnings release just prior to the buyback announcement is even more pronounced. Clearly, market sentiment in these firms is unusually poor despite the aggressive use of accounting techniques to report high earnings.

In Panel B of Table 3, we investigate how financial analysts are revising their forecasts prior to an OMSR. We calculate forecast revisions monthly using the change in analysts' earnings forecast scaled by the market price at the end of the month. Analyst forecast revisions are known to follow predictable patterns: historically, analysts have tended to be optimistic early in the forecasting period and then subsequently make downward revisions as the fiscal year-end approaches. Thus, we calculate abnormal forecast revisions for a given month by first subtracting the expected forecast revision from the actual forecast revision. Here, we calculate the expected forecast revision each month using a fourth-order moving average model (Brous and Kini (1993)).[11] The quarterly abnormal forecast revision for a given month is then calculated by summing up abnormal forecast revisions in the previous three months. We examine revisions based on both the average and the median earnings per share (EPS) estimate. The results show that analysts' opinions are abnormally high in the year prior to the repurchase announcement, but become more pessimistic just prior to the announcement of a buyback program. Consistent with the notion that poor earnings quality firms may be under unusually high market pressure, the most extreme shift in expectations is observed in High DA firms. Not surprisingly, the shift is even more evident in firms that suffered the worst stock price performance in the quarter preceding the OMSR. Clearly, market sentiment was declining as prices were falling in response to analysts who were revising downward their earnings forecasts. The difference in abnormal forecast revisions between bottom four DA quintiles and the highest DA quintile is significant at the 1% level in quarter -1. If we focus more narrowly on the High-L and High-H subgroups, we find that negative analyst opinion is concentrated in High-L firms where managers seemingly faced even greater pressure to boost stock prices, a result consistent with evidence reported earlier.

These results suggest that both investors and financial analysts are disappointed in the performance of firms using aggressive accounting policies. Even though these firms are generating comparatively high reported earnings, these earnings seem to be driven by managerial discretion. Overall, the evidence is consistent with the idea that managers in firms with poor earnings quality, especially High-L firms, may have been under pressure to reverse an otherwise negative trend in the marketplace.

[11] We also tried an alternative definition of abnormal forecasts revisions calculated by subtracting the average change in analysts' average (median) EPS forecasts during all months available on IBES (excluding months -6 to 6 around the month end of the calculation), from the average (median) forecast revision. The results were similar to those reported here.

3.3 Executive stock options

While performance in these companies is poor, a further question arises as to whether managers care. Are managers in low earnings quality firms incentivized in such a way that we might expect them to manipulate stock prices? We consider this by evaluating unexercised option ownership positions during the two fiscal years around the buyback. S&P's ExecuComp provides compensation information for the top 5 executives of the firms in S&P 500, S&P MidCap 400 and S&P SmallCap 600 indices. While this covers only a portion of our sample, we evaluate the option position of managers in this database and report the results in Table 4.

For unexercised vested option holdings (which would include both in-the-money and out-of-the-money options), we see that ownership is significantly greater for High DA firms in both the year preceding and the year of a buyback announcement. This is consistent with the idea that managers in low earnings quality firms were indeed incentivized to pay attention to their stock price. In fact, it is plausible that their decision to engage in aggressive reporting practices may, at least in part, have been in response to a general sense of pressure to support their share price for their own personal wealth. Clearly, it would not appear that these managers, at least in the short-term, would actively desire to manipulate prices lower.[12]

Table 4 also allows us to look at how option holdings change after buybacks are announced. We see that, generally speaking, holdings increase significantly after a buyback announcement, a result consistent with findings by Weisbenner (2000), Kahle (2002), and others who argue that managers may use buybacks to manage share "dilution" from the exercise of vested option holdings. Yet Table 4 also shows that the pattern for High DA firms differs; in contrast to each of the other four DA groups, we do not see a significant increase in option holdings between years -1 and +1. As such, this result removes a potential confounding reason for why managers in High DA firms would be announcing buyback. Post-announcement option holdings and the potentially dilutive effects associated with them are comparatively less of an issue in High DA firms.

4. Long-run Performance and Actual Buyback Activity

The evidence to this point suggests that managers in buyback firms with low earnings quality may have been under pressure to take some action or set of actions to stop negative sentiment in the market. Poor stock returns, deteriorating operating performance, negative earnings announcement effects,

[12] This interpretation of manager behavior around stock buybacks differs from a recent paper by Gong, Louis, and Sun (2007). They find that managers may be engaging in pre-event earnings management by deflating earnings prior to repurchase announcements, perhaps in an attempt to driving stock prices lower. While that type of manipulation might be occurring, our focus is on the opposite side of the spectrum where manipulation is seemingly concerned with increasing reported earnings in what appears to be in response to a previous decline in stock price .

negative revisions of financial analysts' earnings forecasts and comparatively higher option holdings by managers prior to buyback announcements are all consistent with this view. In the short-run, we see no evidence that the market reaction is any different between High DA firms and firms classified otherwise. While it is likely that our use of discretionary accruals as a proxy for manager intent is noisy, the results suggest that in the short-run, the market is not recognizing or aware of the potential ability some firms have to send a false signal and is not responding differently to these potentially manipulative behaviors.

In this section, we consider long-run return and operating performance evidence. A rich literature reports evidence of improved performance subsequent to a buyback announcement, particularly with respect to abnormal stock performance. This result is consistent with the idea that, generally speaking, buyback programs are beneficial to shareholders and motivated by some meaningful economic benefit. On the other hand, to the extent that a subset of buybacks is manipulative in intent, we do not expect to find this same general evidence. Absent some fundamental economic benefit, we do not expect to observe any material long-term abnormal performance for High DA firms, either operationally or measured by stock performance. Unless these firms are still overvalued at the time of the buyback announcement, we do not anticipate any abnormal return drift in High DA firms, once this firm characteristic is properly controlled for in the cross-section.

4.1 Long-term stock performance

Table 5 shows the long-term buy-and-hold returns (BHRs) of sample firms. Consistent with prior studies (e.g., Ikenberry, Lakonishok and Vermaelen (1995)), we see a turn-around in abnormal returns surrounding a buyback announcement for the overall sample. While the average prior one-year abnormal return is -14.6% (see Table 1), the average compounded four-year post-announcement abnormal return is +11.2%. When long-term performance is conditioned by DA quintile, we find strikingly different results. For firms classified in the bottom four DA quintiles, four-year post-announcement abnormal returns are positive and significantly different from zero. Conversely, for the highest DA quintile, the long-term abnormal return is nearly zero, 0.8%, and, of course, not significantly different from zero at conventional confidence levels.

While buyback firms overall do well, the highest DA quintile is the only group which does not show a statistically significant long-horizon drift. When this group is further divided based on stock performance in the quarter prior to buyback announcement, we find even more striking differences. For High-L firms where managements were under greater pressure, the point estimate for the mean four-year post-announcement abnormal return is negative, -11.0% albeit insignificant. Yet for High-H firms, the four-year post-announcement drift is positive and significant, 13.2% (p-value = .045).

The fact that the drift, on average, for the High DA sub-group is about zero but can be subdivided further into two groups which appear to have distinctly separate long-run abnormal drift patterns suggests

that while our approach of using accruals as a proxy for managerial intent may have merit, it is also (not surprisingly) a coarse metric. Moreover, the evidence also suggests that the total number of buyback cases motivated by managers intending to mislead investors is small. Nevertheless, the evidence in Table 5 suggests that there is at least a sub-set of firms, perhaps limited in number, where the motivation for announcing a buyback may differ from the more general case.

4.2 Operating performance

Table 6 reports the operating performance for the highest DA quintile and bottom four DA quintiles firms combined. Panel A reports median unadjusted ROAs while Panel B reports industry and DA-adjusted performance. Panel C cumulates changes in this abnormal performance in the post-announcement period. Taken together, there are noticeable differences in operating performance between the High DA group and all other firms taken together. The bottom four DA quintile firms collectively show a dramatic increase in relative operating performance after the buyback announcement. For example, while abnormal ROA in year -1 is zero (by construction), it jumps to +.81% in year 1 and further to +1.06% in year 2. Conversely, we do not see such a rebound in High DA firms. Instead, relative operating performance for firms using aggressive accounting practices at the time of buyback announcement decreases from zero to -.30% in year 1 (p-value = .079). In year 2, the point estimate decreases further to -.74% although the result is not statistically significant. Recall, the approach used here accounts for the fact that we anticipate a future decline in ROA for High DA firms. Again, when we focus more narrowly on High-L firms, poor performance is indeed quite noticeable in years +1 to +3. Here, the abnormal ROA in these three years is -.78% (p-value = .039), -1.93% (p-value = .014) and -1.68% (p-value =.076), respectively. The results continue to remain disappointing in year +4. Panel C suggests that when changes in abnormal ROAs are measured cumulatively, we see meaningful differences, both statistically as well as economically, in operating performance between bottom four DA quintiles and High DA quintile firms even after controlling for both industry and DA effects.[13]

4.3 Actual buyback activity

We have been using earnings quality as a proxy of the potential for managers to manipulate or mislead investors. To the extent that there is less of an economic reason supporting these cases, our hypothesis suggests that low earnings quality firms should repurchase fewer shares than other firms.

[13] Lie (2005) also finds that the operating performance improves following OMSR announcements but that this improvement is generally limited to firms which actually buy back shares. High DA firms tend to buy back *fewer* shares (as we will show in Table 7). Given this, we checked to see if the difference in operating performance between High DA firms and other firms is not a simple manifestation of this general result suggested in Lie (2005) using a modified partial adjustment model. This model is suggested by Fama and French (2000) to control for nonlinearities in the relation between future changes in operating performance and lagged levels and changes in operating performance, and has been used by Grullon and Michaely (2004); please refer to their Table III for model specifications. We found that after controlling for the actual buyback activity and other control variables, High DA firms still have significant negative changes in earnings. To save space, these results are not reported here.

This would be particularly true if the share repurchase was unequivocally intended to be a false signal and not confounded with any other economic motive. To investigate whether other factors might be at work here, we evaluate actual buyback activity in the year following the program announcement. As mentioned earlier, actual trading behavior alone provides only a weak window, at best, on managerial intent given the path-dependent nature of buybacks. Actual trades depend on several factors, a key one of which is the path of future stock prices. Nevertheless, one might anticipate that High DA firms will repurchase less stock, particularly after we control for confounding factors.

We estimate actual buyback activity with a widely used measure based on funds reported on the cash flow statement used to redeem stock after adjusting for concurrent changes in preferred stock, (the same method described in Stephens and Weisbach (1998) and Dittmar (2000)). Due to data limitations with this variable, our sample is reduced to 6,211 observations. Stephens and Weisbach (1998) document that firm characteristics, such as prior returns and cash flows, are associated with the amount of stock that firms repurchase. We incorporate this in Tobit regressions of actual buyback amount relative to the market value of equity to examine whether actual buyback amount is significantly different for High DA firms.[14]

The results are reported in Table 7. Consistent with the general economic motives driving buybacks such as responding to mispricing and/or disgorging cash, the regressions show that firms with large repurchase programs and high book-to-market ratios tend to buy back more stock in the first year of the program. Consistent with Stephens and Weisbach (1998), we also see that cash levels on balance are an important factor. Yet after controlling for these economic factors, High DA firms, especially High-L firms, buy back, on average, less stock than expected. Even when we control for path dependency by adding into the regression the abnormal announcement return and the future four-year abnormal return, the coefficient on the High DA dummy variable is negative and significant, a result consistent with the manipulation story.

5. Alternative explanations for the performance of low earnings quality firms

In general, firms announcing a stock buyback show deteriorating operating and stock market performance prior to the announcement. The evidence in Section 3 indicates that the decline is more profound in firms which employ aggressive accounting practices. While it is indeed the case that reported, bottom-line earnings (comparatively) are not suffering due to the use of aggressive accruals, both unadjusted as well as normalized pre-announcement stock returns are noticeably worse for these special cases. General operating performance is falling and investors appear to be revising their

[14] Using the intended program size rather than actual buyback amounts produces qualitatively similar results.

expectations downward. These results are consistent with the notion that this subset of managers who made discretionary decisions to report poor quality earnings were under greater pressure to boost stock prices prior to their buyback announcement.

While the evidence to this point is seemingly consistent with the manipulation story, it is plausible that alternative explanations might be at work. For example, given that managerial intent is unobservable, one cannot casually rule out undervaluation as a driving motive, clearly an extremely common motive for why managers buy back stock. In fact, poor pre-announcement performance has also been argued in many papers, including most recently by Peyer and Vermaelen (2005), as direct evidence in support of the mispricing hypothesis. A further concern skeptics often raise is that long-term stock performance is subject to "bad model problems" (for example, Fama (1998)).

In this section, we address some of these concerns and explore the robustness of our findings. We begin by considering the bad model problem. We then dig deeper and consider whether conventional theories such as mispricing, free cash flow or altering capital structure might somehow explain the evidence we are seeing for poor earnings quality firms.

5.1 Bad model problems

A potential problem with the BHR approach is that the empirical bootstrap used to evaluate statistical significance may suffer from cross-sectional correlations in the residual returns, a point argued by Fama (1998), Mitchell and Stafford (2000), and Brav (2000). The concern is that long holding periods, by design, lead to overlapping time periods in the observations and may lead to cross-sectional correlation in the abnormal return observations if the underlying return model is misspecified. At its core, this is fundamentally a problem of not understanding the true return generating function. Nevertheless, the concern that significance may be overstated is a valid point given our four-year holding periods and the thousands of cases in our sample, thus giving us a false sense of statistical power.

While our concern is primarily *a lack* of significance in a portion of our sample rather than too much, we nevertheless accommodate this by reporting return evidence using a calendar-time approach. The Appendix provides a more careful description of this approach using the Carhart (1997) four-factor model. Here, hundreds of firm-return observations at a given point in time are boiled down to a single portfolio-return observation. This approach not only provides a different method for estimating abnormal return performance with perhaps more appealing significance properties, but also allows us to control for other first-order effects such as momentum as well as the size and book-to-market effects we controlled for earlier.[15] Perhaps more importantly, recent papers in the accounting and finance literatures have identified discretionary accruals as a priced factor in the cross-section (Xie (2001) and Chan, Chan,

[15] Numerous studies adopt this approach. Two recent examples include Clarke, Dunbar and Kahle (2004) and Eberhart, Maxwell and Siddique (2004).

Jegadeesh and Lakonishok (2006)). To exclude the possibility that the comparatively low post-announcement return performance of poor earnings quality buyback firms is simply the manifestation of a more general "DA effect," we amend the Carhart model and add discretionary accruals as an additional factor.

Table 8 reports the results for calendar-time portfolios formed assuming both equal- and log-value-weighted methods. Point estimates for the intercepts are positive for DA quintiles 1 to 4 under both investment strategies and are significant at conventional levels. For High DA firms in quintile 5, the intercepts are not significant as the point estimates are close to zero (0.10% and 0.12% respectively for the equal- and the log-value-weighted approaches).

As before, we consider the manipulation story more carefully by subdividing the poor earnings quality quintile by the abnormal return in the quarter preceding the buyback announcement. Given this return-based sorting method, the momentum control provided through the calendar-time approach has some appeal. Yet consistent with our findings to this point, we do not find evidence of a positive drift in firms where managers conceivably were under relatively greater pressure to buy back stock. Firms classified as High-H have positive and significant (only when the log-value-weighted approach is used) intercepts, while those ranked as High-L do not.

The results suggest that the long-term return evidence reported here is not primarily the consequence of a bad model problem. Firms with aggressive reporting practices do not show the same long-horizon abnormal performance more generally observed in buyback companies.[16]

5.2 Undervaluation, free cash flow, maturity, leverage and dilution from employee stock options

Next, we consider whether these results can be innocently reconciled with other commonly mentioned economic reasons for why firms buy back stock. Several studies including Chan, Ikenberry and Lee (2004) show that among several plausible motivations for share repurchases, undervaluation appears to be a primary one. Clearly, the comparatively lower post-announcement return and operating performance for firms in the highest DA quintile is not consistent with the undervaluation hypothesis.

Yet corporate finance theory also suggests that firms may use buybacks to disgorge cash and reduce free cash flow or to adjust capital structure. Perhaps these other more appealing economic motives are somehow confounded with firms classified as High DA. We investigate this in Table 9 by reporting

[16] In unreported work, we also consider several other robustness checks. To further address the overlapping nature of our data, we considered evidence which excludes follow-up buyback announcements within the four-year horizon we apply in Table 8. Although, the sample is roughly cut in half, both the BHAR and the five-factor model results are similar to those reported here in Tables 5 and 8. We also investigated whether our findings were sensitive to our estimate of discretionary accruals. We explored the same method of Kothari, Leone, and Wasley (2005). They design a performance-matched discretionary accrual measure by subtracting a matching firm's DA from that of a given sample firm where the matching firm is selected from the same industry and with a similar return on assets. Again, the long-run return evidence is similar to what we report here.

changes in industry-median-adjusted abnormal cash relative to total assets and leverage ratio for each discretionary accrual group. When considering the first hypothesis, obtaining a careful handle on "slack" resources in a given firm is not straightforward. Rather than using a flow measure of free cash flow that might be subject to measurement problems driven by the choice of accrual level, we use a stock measure defined as cash plus short-term investments (Compustat item 1) over total assets.[17] This same measure was recently used by Grullon and Michaely (2004) to examine the free cash flow hypothesis. We apply an industry-median adjustment by subtracting the median level of cash plus short-term investments over total assets of each firm's respective industry.

The free cash flow and leverage hypotheses both predict that buyback programs are intended to significantly alter firms' free cash flow and/or leverage. The results show that while we generally see significant decreases in cash for most DA quintiles, the change in the point estimate for High DA firms is close to zero. The fact that cash balances did not significantly decline after the program was introduced is also consistent with the lower level of actual buyback activity documented in Table 7 for High DA firms.[18]

The evidence here also suggests that the poor performance of High DA firms is not explained by the maturity hypothesis recently advanced by Grullon and Michaely (2004). Clearly, while these firms are under earnings pressure, cash flows in these firms, as was shown earlier, are contracting at the time of the buyback announcement. Furthermore, while the evidence in Table 9 is generally consistent with the maturity story, the fact that cash levels in High DA firms subsequent to a buyback announcement, particularly those firms ranked with very poor stock price performance, do not show a material decrease seems inconsistent with the idea that these managers were carefully weighing and considering factors associated with the maturity hypothesis and behaving accordingly when enacting these buyback programs.

A second primary reason firms repurchase stock is to alter capital structure by increasing leverage. In a similar fashion, we report changes in industry-adjusted leverage ratios defined as the ratio of total debt (total current liabilities plus total long-term debt, Compustat item 5 plus item 9) to total assets between year -1 and year 1. We do not find any significant increase in leverage for High DA firms. This is inconsistent with the idea that share repurchases of High DA firms might have been motivated to

[17] We use cash levels rather than cash flows in this analysis. Lehn and Poulsen (1989) use a flow measure defined as EBITDA - income tax + changes in deferred tax - interest expenses - dividends for preferred stocks - dividends for common stocks. The downside to such an approach is that this measure is directly affected by accruals. Given our context, this measure, by definition, is not an appealing way to examine the free cash flow hypothesis. Nevertheless, as a check, we did use this flow-based measure; qualitatively, the results do not change.

[18] When we focus more narrowly on High-L and High-H firms, High-L firms show an insignificant decrease in cash (-0.41% with t-statistics of -0.86) whereas High-H firms display some increase in cash (0.11% with t-statistics of 0.28). The decrease in cash for High-L appears to be caused not by an intentional decision to disgorge cash, but instead (given the results in Table 6 and 7) by a sharp and significant drop in operating performance during year one.

increase leverage.

It has been argued (particularly in the popular press) that stock repurchases are affected by compensation plans. Jolls (1998), Fenn and Liang (2001) and Weisbenner (2000) point out that firms may buy back shares to avoid "dilution" when employee stock options are exercised. This motivation has seemingly grown in importance in recent years as incentive stock options plans assumed an increasing component of compensation in the 1990s. The evidence in Tables 1 through 5 provides some insight as to whether stock options may be a factor in High DA cases. The stock returns of High DA firms during year -1 are very poor. The average raw return was -11.8% and even more dramatic -23.4% for High-L firms. As such, outstanding employee options in these firms are *becoming less in-the-money.* Stated differently, managers in High DA firms would seemingly have less reason to worry about dilution from a flurry of option exercises in the near future when performance is so poor. In addition, the results in Table 4 show that top management's vested option holdings did not significantly increase after buyback announcements for High DA firms.

One might argue though that due to the severe drop in prices that High-DA firms experience, managers may have engaged in market timing under the impression it was a "good time" to buy back shares, perhaps for the purpose of preventing *future* dilution. This, however, assumes that managers think their shares are undervalued and have foresight that a rebound in performance is pending. Of course, none of this is supported by the long-run performance evidence of low earnings quality firms. In addition, the actual buyback activity of High DA firms presented earlier also shows that they tend to buy back significantly *fewer* shares than others.

In sum, firms buy back stock for a variety of reasons that are well supported in the literature. In this study, we have focused attention on High DA firms arguing that this may proxy for a subset of managers who may be under pressure to lift share prices and, thus, may be using a buyback announcement as a low-cost method to mislead investors. Clearly, our proxy is noisy and while one cannot completely rule out that managers in High DA firms might also be responding to conventional economic motives such as leverage or dilution, by the same token it is also hard to rule out the manipulation hypothesis. To this point, our robustness checks have been univariate in nature. As a final check in the next section, we consider these factors together in a multivariate framework.

5.3 Regression analysis

In this section, we return to the abnormal stock return evidence and make one last check to see if the relatively lower return performance of High DA firms can somehow be explained by a factor other than the manipulation hypothesis. To do this, we use a multivariate environment to evaluate long-run abnormal stock returns in the context of the free cash flow, leverage, and undervaluation hypotheses. According to the manipulation story, the performance of repurchasing firms with low earnings quality is

likely to be lower compared to other firms unless some other value-enhancing, economic factor is present. While we do observe this in a univariate setting, we now re-examine this in a multivariate framework by regressing long-run abnormal four-year returns (at the firm level) on a dummy representing the highest DA quintile (or representing High-L firms) along with other independent variables, such as market capitalization, B/M ratio, cash, leverage, the size of the repurchase program, the prior one-year abnormal return and the actual buyback amount.

We see in Table 10 that in models one and two, the coefficients on the High DA quintile dummy are not statistically significant after controlling for other factors. In model three, we focus on the High DA firms with poor pre-announcement returns (i.e., High-L firms), a group where manipulative intent is a strong possibility. Here, the coefficient on the High-L dummy is significantly negative after controlling for various factors. The results are consistent with the manipulation story, at least for the cases where concern over possible manipulation is highest.

Similar to the results reported in Chan, Ikenberry and Lee (2004), long-run abnormal stock returns are significantly positively related to firm size and the percentage of shares announced to repurchase.[19] The findings with respect to leverage are also consistent with their work. Firms with low leverage do not show higher long-run returns, a result inconsistent with the leverage story.

Regarding the impact of actual buyback activity, the coefficient on this variable in models one and two (where we interact actual buyback activity with a High DA dummy) suggests that the positive effect of actual buyback activity is significantly greater for High DA firms. When we substitute the High-L dummy for the High DA dummy in model three, we also see significant results; we observe high significance for the High-L dummy term and when it is interacted with actual buyback activity. Given our earlier conclusion that DA is likely a noisy metric of managerial intention, this finding is consistent with the manipulation story; High-L firms, where managers announce a program but *do not* follow through with actual purchase show poorer long-run performance. Managers who are under pressure to repurchase stock due to a slump in performance, even after using accounting conventions to support earnings, cannot benefit shareholders in the long-run simply by announcing a buyback program.

6. Summary and conclusion

This paper considers a generally unexplored area within the signaling literature. While a rich empirical literature on signaling exists, no paper has explored the potential that some low-quality firms

[19] Due to how we consider the free cash flow hypothesis, the results here differ from those reported in Chan, Ikenberry and Lee (2004). If instead we use their definition of free cash flow based on Lehn and Poulsen (1989), free cash flow becomes a significant variable in the regression. Yet even with this alternative definition of free cash flow, the conclusions do not change; High-L-related variables remain significant.

may be engaging in mimicking behaviors, a clear implication when the cost to signal is low and the penalty for sending a false or conflicting message is negligible.

As such, we empirically consider whether, as suggested in a pooling signaling equilibrium, at least some low-quality firms send signals that suggest otherwise. Among the set of low-cost signals, we look at companies which announce open market stock repurchase programs, a corporate transaction long criticized as lacking costly credibility. Previous academic studies have examined a number of reasons for why firms repurchase stock. Among the many motives, one in particular, the potential that buybacks may signal undervaluation, has been a key focus of several papers. Likewise, it is also for this same reason that low-quality firms might wish to mimic this low-cost signal by announcing an open market buyback program. The market, on average, reacts positively to the announcement of open market share repurchases yet, by design, these programs are not binding and are structured for flexibility. These programs afford managers the ability to authorize a buyback even if there is no intention to buy back stock, thus creating the potential for cheap talk (e.g., Bhattacharya and Dittmar (2004)) and the possibility that some programs may be designed to manipulate investor opinion.

Evaluating ex-post whether a program might have been announced with the intention of manipulation is not straightforward. Two obvious metrics, program size and ex-post buyback activity, fail at this task. We focus on earnings quality as a proxy for the potential to mislead investors. Previous studies document that managers use discretionary accruals (DAs) to increase reported earnings in an attempt to manipulate stock prices. To the extent that these attempts to manage earnings are not successful, managers may need to turn to other devices to boost stock prices. In such a case, authorizing and then announcing an open market share repurchase program may serve as an inexpensive mechanism to send a false signal to manipulate market expectations.

Using 7,628 programs announced between 1980 and 2000, we find that manipulation may be a principle motive for at least some firms. Managers of firms which are using accruals to inflate earnings also seem to be under comparatively greater stress to falsely signal. Further, these same managers also tend to be exposed to greater incentive compensation effects through executive options and thus have more personal wealth at risk.

Despite the efforts of managers to pad their earnings, information flow in the market place for these firms is unexpectedly negative prior to a buyback announcement. Although earnings are not falling per se, sales, cash flows adjusted for accruals and stock returns are suffering. Analysts are revising their earnings estimates down and the market reaction to quarterly earnings announcements is negative in these suspect firms prior to a buyback announcement.

While any metric will necessarily be an indirect measure of managerial intent, the evidence we see from buyback firms with high discretionary accruals seems consistent with what one might expect if

this tool is a useful indicator of the potential for managerial manipulation. Sloan (1996) argues that investors seem to fixate on accounting earnings and do not pay attention to the underlying operations of the firm. Consistent with this and other studies about investor recognition of accruals, we find that the market initially does not seem to pay attention to earnings quality when buyback programs are first announced. For example, the mean announcement period abnormal return for firms with poor earnings quality is similar to the general case. Yet over longer horizons, the evidence is quite different. Generally speaking, post-announcement abnormal return drifts are positive and both economically and statistically significant. Yet, for firms with low earnings quality, we see no evidence of this generally favorable long-run performance, even after controlling for the sub-par, cross-sectional return effects often observed in high DA firms. When low-earnings quality firms are subdivided further into two groups on the basis of their prior quarterly abnormal stock return, poor post-announcement return performance (generally speaking) is more evident in firms seemingly under greater pressure to manipulate investor perception.

This same conclusion of poor ex-post relative stock performance is also validated when real operating performance is evaluated. Consistent with manipulation, the operating performance of high DA firms shows clear evidence of deterioration not only before the announcement, but afterwards as well. Further, unlike other buyback firms, these suspect firms, on average, do not show material decreases in their cash holdings or leverage.

The notion that these firms may be misleading investors when they announce a buyback is robust to concerns over bad model problems. We also investigate other economic motivations that might innocently account for our findings, including the idea that the buybacks of interest here may be a rational response to changes in a maturing company's opportunity set. While there may indeed be cases where these buyback programs were motivated by factors well-reported in the literature, these alternatives do not seem to explain the broader conclusion seemingly evident for low earnings quality firms.

Consistent with classic signaling theory, the evidence seems to suggest that a subset of managers when announcing a share buyback, may have done so with the intent to mislead investors. While one cannot rule out hubris as a possible motive, this too would not seem to hold. Clearly prices are falling and one might expect managers to defensively buy back stock if hubris were an important factor. On the other hand, the fact that these managers do not follow through and aggressively repurchase stock is generally not consistent with this story.

One might wonder that if some repurchases are manipulative in intent, why it is that the market does not penalize these stocks. While low-earnings quality firms do not show positive abnormal long-run return performance, by the same token we see no evidence of a negative drift. Instead, their long-term stock performance is comparable to firms with similar firm characteristics such as size, B/M and DA,

suggesting that buyback announcements made by low earnings quality firms had no long-term signaling effect. One key reason may simply be that while managers in High DA firms may be working to manipulate investor perception, their market price at the time of the buyback is not overvalued. In fact, High DA firms who announce a buyback have typically suffered steep declines in market capitalization in the prior year. After such losses, it may be the case that managers are simply hoping to prevent any further erosion in price. Further, given the fact that the magnitude of the initial announcement effect for all firms (including High DA firms) is small, roughly 2%, a price change of this magnitude when corrected later will be difficult to distinguish and leaves little economically material drift to estimate.

The fact that some company executives appear to be misleading the market may provide some insight into why, more generally, investors seem to react with skepticism to buyback announcements. If investors cannot, ex-ante, sort through this potentially misleading behavior, this may provide some rationale as to why underreaction is often observed in empirical studies of corporate transactions. In the general case, the market seems to slowly correct this underreaction over time as additional information arrives, resulting in positive information shocks and long-term abnormal return performance. If investors are fully rational, one expects no drift even in the presence of manipulating managers. Yet in a world where investors are on guard for misleading behavior, the propensity to underreact is perhaps better understood.

Clearly, while previous studies provide strong evidence in support of many of the traditional economic stories used to motivate share repurchases, this paper finds some evidence that at least some open market buyback programs may be intended to manipulate investor opinion.

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Appendix A

1.1 *Event-time, buy-and-hold abnormal returns*

We focus much of our evaluation on buy-and-hold abnormal returns. While a conventional cumulative abnormal return (CAR) approach is straightforward to estimate, it implicitly assumes frequent rebalancing, thus implying high transaction cost. Further, while we eliminate sample firms whose price is below $3 per share, frequent rebalancing does induce an upward return bias due to bid-ask bounce (Blume and Stambaugh (1983) and Conard and Kaul (1993)).

We calculate annual BHRs for each firm in our sample for the year before and the four years following the repurchase announcement, where each year is defined as 252 trading days. For each event-year, portfolio returns are computed based on BHRs of sample firms, assuming an equal-weighted investment strategy. Longer horizon portfolio returns are obtained by compounding annual portfolio returns across event years. Since BHRs are right-skewed and due to the fact that compounding can amplify performance with the return horizon even when there is no abnormal return after the first period (Fama (1998) and Mitchell and Stafford (2000)), we exclude extreme observations within the top 0.75 percentile of returns when computing post-event annual portfolio performance (the results are similar if we use top 0.5 or 1 percentile as the cutoff value).

We follow Lee (1997) and Chan, Ikenberry and Lee (2004) and estimate abnormal return performance using a five matching firm method. These control firms are formed on the basis of market-cap, book-to-market ratio (B/M), and DA. Size and B/M are controlled based on previous findings that these are two important factors which explain cross-sectional stock returns (e.g., Fama and French (1992, 1993, and 1996) and Lakonishok, Shleifer, and Vishny (1994)). In addition, we control for DA given that recent studies also identify DA as priced in the cross-section (Xie (2001) and Chan, Chan, Jegadeesh and Lakonishok (2006)). To identify matching firms for a given repurchase firm, we first identify all firms that are in the same DA quintile. We then divide these firms into size terciles and select all firms classified in the same size tercile as the repurchase firm. Among those firms that are classified in both the same DA quintile and subsequently in the same size tercile, we choose five firms with the closest B/M ratio to our sample firm. The abnormal return is obtained by subtracting the matching firm portfolio return from the repurchasing portfolio return.

For statistical inferencing, we employ bootstrapping to obtain empirical *p*-values as recommended by Lyon, Barber and Tsai (1999). Specifically, we randomly replace each sample firm with another firm in the same DA, size and B/M group at the time of the repurchase announcement, and thus form a "pseudo" portfolio. For each repurchasing firm, a matching pool is first defined by identifying firms which have not announced a share repurchase for the previous four years, which are in the same DA quintile and in the same size and B/M terciles. Size and B/M terciles are formed independently within

each DA quintile. We calculate BHRs and then abnormal BHRs for this particular pseudo-portfolio as if it were our sample portfolio. We repeat this process for 1,000 trials to form an empirical distribution of abnormal returns. The statistical significance of the sample portfolio abnormal performance is measured by the empirical *p*-value, the fraction of the distribution of pseudo abnormal returns that are greater than that of the original sample abnormal return.

1.2 *Calendar-time abnormal returns derived from factor models*

In each month during our sample period, we form a portfolio of repurchase firms that have announced share repurchases at any point in the previous four years and then compute the portfolio return. We reform the portfolio every month by including new cases and discarding old ones. As a result, a time series of portfolio returns is available to run a four-factor model (Carhart (1997)) regression as follows:

$$R_{p,t} - R_{f,t} = \alpha + \beta(R_{m,t} - R_{f,t}) + sSMB_t + hHML_t + wWML_t + e_t \qquad \text{(A1)}$$

where R_p is the sample firm portfolio return, R_f is the risk-free rate, R_m is the market portfolio return, *SMB* is the small-firm portfolio return minus big-firm portfolio return, *HML* is the high book-to-market portfolio return minus low book-to-market portfolio return, and *WML* is the winner portfolio return minus loser portfolio return. *SMB* and *HML* are used to control size and book-to-market effects, respectively. *WML* is added to incorporate momentum effects as documented by Jegadeesh and Titman (1993). The abnormal returns of repurchase firms is estimated and then tested based on the statistical significance of the regression intercept.

One of our objectives is to examine the relationship between long-run performance of repurchase firms and their earnings quality (proxied by their DA quintile ranking). However if we are not careful, any relationship we find may be the manifestation of a general DA effect documented in studies of cross-sectional stock returns. For example, Xie (2001) and Chan, Chan, Jegadeesh and Lakonishok (2006) show that DA is negatively related to future stock returns. The return predictability of accruals, as Sloan (1996) reports, mainly derives from the discretionary component of accruals.

To control for the DA effect historically observed in returns, we modify the factor model regressions by adding an earnings quality factor into the Carhart four-factor model as shown in equation (A2):

$$R_{p,t} - R_{f,t} = \alpha + \beta(R_{m,t} - R_{f,t}) + sSMB_t + hHML_t + wWML_t + gGMB_t + e_t \qquad \text{(A2)}$$

where *GMB* is the return to the good earnings quality portfolio return minus that of the bad earnings quality portfolio return and the others are defined the same as those in equation (A1). The earnings quality factor is constructed as follows. We first search all firms, covered in both CRSP and Compustat, with available accounting accruals. We estimate the Jones (1991) model (based on equation (2)) on all firms for which we have data in order to estimate their discretionary accruals (based on equation (3)).

At the end of June of year t, we first identify the firms in each of six size and B/M groups as specified in Fama and French (1993). We divide each size and B/M group into three DA groups based on their estimated discretionary accruals at the end of fiscal year t-1. We then keep track of each group's returns over the next 12 months from July of year t. The earnings quality factor is the simple average of monthly returns of the six Low-DA groups (good earnings quality firms) across six size and B/M groups minus the simple average of monthly returns of six High-DA groups (bad earnings quality firms) across six size and B/M groups. This allows the *GMB* factor to be independent from the size and B/M factors. Value-weighted returns for these factor mimicking portfolios are then calculated similar to Fama and French (1993).

To apply this five-factor model, each month we form a portfolio that is composed of firms that have announced a share repurchase program within the last four years. In order to season these portfolios, portfolio formation occurs in 1983 even though our sample period starts in 1980. We exclude calendar month with less than twenty firms in the portfolio. Although not reported here, we checked the sensitivity of our results using different exclusion criteria; our findings, though, were similar to those reported here. Previous studies argue that the abnormal performance (if any) of corporate events occurs in small stocks only (Fama (1998), Mitchell and Stafford (2000) and Brav, Geczy, and Gompers (2000)). Therefore, as a further check, we estimate the calendar-time portfolio approach assuming both equally- and log-value-weighting formation strategies. We use log value-weights however, rather than unadjusted value-weights, to reduce the perverse impact that occurs by including firms with extremely large and right-skewed market capitalizations. As mega-cap firms announce buybacks, estimating calendar time performance using a value-weighting leads, by definition, to a weak test environment given the resulting noisy and undiversified portfolios formed using this method (for further discussion, see Loughran and Ritter (2000)).

Table 1
Summary Statistics

This table reports the summary statistics of 7,628 open-market share repurchases during 1980 and 2000, except the fourth quarter of 1987. Each sample firm is required to have accounting accruals at least four months prior to the repurchase announcement. *N* is the number of announcements. *5-day AR* is the repurchase announcement return measured over the 5-day window (-2, 2) minus the corresponding CRSP value-weighted index return. *REP-1* and *MAT-1* are average raw returns over the one-year period prior to the announcement of share repurchases for repurchasing firms and size, BM and DA matched control firms, respectively. *AR-1* is the difference between REP-1 and MAT-1. *% shares* is the percentage of shares announced to buy back relative to total outstanding shares. Accruals are defined as changes in non-cash current assets, minus changes in current liabilities excluding short-term debt and taxes payable, and minus depreciation. *DA* is the discretionary accruals based on Jones (1991), which is the residual of the following regression:

$$\frac{Accruals_i}{TA_i} = a_0 \frac{1}{TA_i} + a_1 \frac{\Delta Sales_i}{TA_i} + a_2 \frac{PPE_i}{TA_i} + \varepsilon_i .$$

Size quintile (1 is the smallest) is based on the market value of equity of repurchase firm at the month-end prior to the announcement relative to all NYSE firms. *BM quintile* (1 is the smallest) is based on the ratio of the book value to the market value of equity. *DA quintile* (1 is the smallest) is the DA quintile ranking relative to all stock universe. Panel A reports summary statistics sorted by years, while Panel B reports results based on DA quintiles. The rows of "NonH-High" test the differences between the bottom four DA quintiles and the highest DA quintile. Numbers in the parentheses are *t*-statistics. *High-L* (*High-H*) represents the highest DA quintile with prior one-quarter abnormal return that is below (above) the median prior one-quarter abnormal return of the highest DA quintile firms.

Panel A: By year

Year	N	5-day AR	REP -1	MAT -1	AR-1	% shares	DA	Size quintile	B/M quintile	DA quintile
1980-1990	1,718	2.22% (13.02)	3.99%	11.43%	-7.44% (-8.85)	7.88%	-0.0043	3.39	2.81	2.89
1991-2000	5,910	1.67% (12.86)	0.86%	17.48%	-16.62% (-22.35)	7.33%	-0.0113	2.81	2.82	2.88
All	7,628	1.80% (16.65)	1.56%	16.11%	-14.55% (-23.93)	7.45%	-0.0097	2.94	2.82	2.88

Panel B: By discretionary accruals quintile ranking

DA quintile	N	5-day AR	REP -1	MAT -1	AR -1	% shares	DA	Size quintile	B/M quintile
Low	1,015	2.33% (7.40)	6.72%	22.67%	-15.96% (-7.91)	7.66%	-0.1720	2.62	2.78
2	1,762	1.81% (8.12)	7.61%	19.45%	-11.83% (-9.36)	7.39%	-0.0429	3.06	2.69
3	1,908	1.42% (7.17)	3.22%	17.97%	-14.75% (-14.12)	7.22%	-0.0067	3.33	2.79
4	1,735	1.70% (8.10)	-0.09%	12.18%	-12.27% (-11.47)	7.36%	0.0252	2.95	2.91
High	1,208	2.06% (6.53)	-11.84%	8.45%	-20.29% (-11.09)	7.82%	0.1204	2.39	2.94
NonH - High		-0.24% (-0.93)	16.21% (12.32)	9.62% (5.07)	6.59% (3.52)	-0.41% (-1.68)	-0.1695 (-29.42)	0.59 (15.32)	-0.15 (-3.49)
High-L	604	2.01% (4.03)	-23.35%	19.08%	-42.44% (-14.11)	7.46%	0.1191	2.24	2.74
High-H	604	2.10% (5.46)	-0.33%	-2.18%	1.85% (1.12)	8.18%	0.1217	2.55	3.14

Table 2
Regressions of Announcement-period Abnormal Returns

This table reports regression results of announcement-period abnormal returns. The dependent variable is the repurchase announcement return measured over the 5-day window (-2, 2) minus the corresponding CRSP value-weighted index return. *High DA dummy* is l for the top DA quintile based on the quintile ranking of DA obtained from the Jones (1991) model, and 0 elsewhere. *High-L dummy* is 1 if a sample firm belongs to the top DA quintile and its one-quarter abnormal return prior to repurchase announcement is below the median prior one-quarter abnormal return of the highest DA quintile firms, and 0 elsewhere. *Size decile* (1 being the smallest) is based on the market value of equity at the month-end prior to the repurchase announcement. *B/M quintile* (1 being the lowest) is based on the ratio of the book equity value at the previous fiscal year-end to total market value at month-end prior to the announcement. *CASH quintile* is based on the industry median-adjusted cash plus short-term investment over total assets. *LEV quintile* is based on the industry median-adjusted ratio of the total debt to total assets at the fiscal year-end prior to the announcement. *High BM dummy* is l for the top BM quintile, and 0 elsewhere. *High CASH dummy* is 1 for the top CASH quintile, and 0 elsewhere. *Low LEV dummy* is 1 for the bottom LEV quintile, and 0 elsewhere. *Shares announced* is the percentage of announced repurchase shares relative to total outstanding shares at the month-end prior to the announcement. *Prior one-year abnormal return* is the prior one year buy-and-hold returns compounded from 252 days before (or the listing date) up to three days before the announcement for repurchasing firms minus the compounded return of the matching firms over the same period. Numbers in parentheses are White (1980) heteroskedasticity-adjusted *t*-statistics.

Model	1	2	3
Intercept	0.0227	0.0298	0.0294
	(3.45)	(9.08)	(9.08)
High DA dummy	-0.0017	-0.0016	
	(-0.53)	(-0.51)	
High-L dummy			0.0000
			(-0.01)
Size decile	-0.0032	-0.0032	-0.0032
	(-7.35)	(-7.71)	(-7.65)
BM quintile	0.0019		
	(1.98)		
CASH quintile	-0.0003		
	(-0.36)		
LEV quintile	0.0011		
	(1.13)		
High BM dummy		0.0102	0.0102
		(2.93)	(2.94)
High CASH dummy		-0.0008	-0.0007
		(-0.26)	(-0.23)
Low LEV dummy		-0.0034	-0.0034
		(-1.19)	(-1.20)
Shares announced	0.0724	0.0727	0.0726
	(4.68)	(4.72)	(4.71)
Prior one-year abnormal return	0.0025	0.0028	0.0028
	(1.16)	(1.29)	(1.30)
N	6,747	6,747	6,747
Adjusted-R^2	0.016	0.017	0.017

Table 3
Quarterly Earnings Announcement Returns and Abnormal Analysts' Forecast Revisions

This table presents the quarterly earnings announcement returns (Panel A in %) and abnormal forecast revisions (Panel B in %) in the one-year period prior to repurchase announcement for the bottom four DA quintiles (NonH) and the top DA quintile (High). In Panel A, the earnings announcement return is defined as the buy-and-hold return compounded from day -2 to +2 relative to the quarterly earnings announcement date minus the CRSP value-weighted index return over the same interval. Extreme abnormal return observations above 20% or below –20% are excluded. Quarter -1 represents the quarter with earnings announcement date right before the repurchase announcement. Numbers reported are mean returns, and numbers in brackets are median returns, and the number in the third row of each cell is the number of observations. In Panel B, an abnormal forecast revision at quarter -1 indicates the sum of three monthly forecast revisions during the 3 months right before repurchase announcements. In each month, the monthly forecast revisions are defined as the changes in analysts' earnings forecasts, all scaled by market price at the end of the month. The abnormal forecast revision equals the forecast revision minus the expected forecast revision based on the fourth-order moving average model in Brous and Kini (1993). All numbers are based on analysts' average EPS forecast revisions, and numbers in brackets are based on median forecast revisions. For both Panels A and B, the rows of "NonH-High" show the differences between the bottom four DA quintiles and the top DA quintile. ***, **, and * indicate the significance level of 1%, 5%, and 10%, respectively, based on *t*-statistics for means and the Wilcoxon *z*-statistics for medians. *High-L* (*High-H*) represents the highest DA quintile with prior one-quarter abnormal return that is below (above) the median prior one-quarter abnormal return of the highest DA quintile firms.

DA quintiles	Event Quarters			
	-4	-3	-2	-1
Panel A: Earnings announcement returns				
NonH	0.394***	0.425***	0.065	- 0.555***
	[0.094***]	[0.112]***	[- 0.032]	[- 0.527]***
	5,672	5,735	5,749	5,732
High	0.251	0.191	-0.021	- 1.076***
	[- 0.164]	[- 0.009]	[- 0.235]	[- 1.098***]
	1,024	1,045	1,057	1,051
NonH - High	0.143	0.234	0.086	0.521**
	[0.258]	[0.121]	[0.203]	[0.571**]
High-L	0.548	0.268	- 0.285	-2.531***
	[- 0.083]	[0.147]	[- 0.544]	[-2.390***]
	488	540	502	495
High- H	- 0.019	0.118	0.217	-0.220
	[- 0.391]	[- 0.186]	[- 0.039]	[- 0.038]
	536	540	555	556
Panel B: Abnormal forecast revisions				
NonH	0.051***	0.054***	0.027***	-0.008*
	[0.054***]	[0.057***]	[0.027***]	[-0.008*]
High	0.137***	0.227***	0.087***	-0.060***
	[0.135***]	[0.199***]	[0.090***]	[-0.061***]
NonH - High	-0.086***	-0.173***	-0.060**	0.052***
	[-0.081***]	[-0.142***]	[-0.063**]	[0.053***]
High-L	0.214***	0.327***	0.181***	-0.107***
	[0.211***]	[0.276***]	[0.182***]	[-0.110***]
High- H	0.061*	0.127***	-0.008	-0.011
	[0.060*]	[0.122***]	[-0.003]	[-0.011]

Table 4
Stock Option Holdings of Top-Executives

This table presents the unexercised vested options held by CEOs and top-five executives. To standardize the option holdings, we divide the option holdings by total shares outstanding. Year -1 (Year 1) is the fiscal year before (of) repurchase announcement. *Diff* column shows the changes in the percentage between Year 1 and Year -1. Each measure is with 0.5 percentile winsorization for top-bottom observations. The rows of "NonH-High" test the differences between the bottom four DA quintiles and the top DA quintile. *High-L* (*High-H*) represents the highest DA quintile with prior one-quarter abnormal return that is below (above) the median prior one-quarter abnormal return of the highest DA quintile firms. Numbers in parentheses are *t*-statistics and numbers in italics are the numbers of observations. In Diff column, ***, ** and * indicate that the difference is significantly different from zero based on *t*-statistics at the 1%, 5% and 10% significance levels, respectively.

DA quintiles	Unexercised vested options to share outstanding					
	CEOs Only			Top-Five Executives Combined		
	Year-1	Year1	Diff	Year-1	Year1	Diff
All	0.53%	0.62%	0.12%***	1.26%	1.38%	0.14%***
	1,991	*2,274*	*1,983*	*2,763*	*2,993*	*2,763*
Low	0.45%	0.60%	0.16%***	1.29%	1.52%	0.25%***
	232	*273*	*232*	*327*	*361*	*327*
2	0.48%	0.57%	0.11%***	1.22%	1.32%	0.10%***
	507	*571*	*504*	*674*	*736*	*674*
3	0.45%	0.54%	0.13%***	1.09%	1.21%	0.15%***
	600	*675*	*599*	*830*	*882*	*830*
4	0.65%	0.71%	0.12%***	1.32%	1.42%	0.13%***
	457	*519*	*455*	*652*	*699*	*652*
High	0.76%	0.75%	0.07%	1.70%	1.73%	0.07%
	195	*236*	*193*	*280*	*315*	*280*
NonH - High	-0.25%	-0.16%		-0.49%	-0.39%	
	(-2.55)	(-1.86)		(-3.83)	(-3.46)	
High-L	0.72%	0.74%	0.07%	1.76%	1.81%	0.04%
	97	*119*	*96*	*140*	*157*	*140*
High-H	0.80%	0.76%	0.06%	1.64%	1.66%	0.11%
	98	*117*	*97*	*140*	*158*	*140*

Table 5
Long-Run Buy-and-Hold Returns

This table presents long-run buy-and-hold abnormal returns (in %). Panel A presents the results over the full sample period (1980-2000), and panel B and C show the results for two sub-periods, 1980-1990 and 1991-2000, respectively. Annual buy-and-hold returns (BHRs) for individual firms are first calculated by compounding the daily returns of each repurchase firm for 252 days, or up to the delisting date (whichever is earlier). For each event year, portfolio returns are computed based on BHRs of sample firms, assuming an equal-weighted investment strategy. The annual BHRs are computed after excluding those observations within the top 0.75 percentile of annual returns among sample firms to reduce potential problems from the extreme skewness of BHRs. Four-year long-run returns are then obtained by compounding the annual portfolio returns over time, starting from year 1. *REP* refers to the repurchasing firms and *MAT* refers to the size/BM/DA matching firms. *AR* represents the abnormal buy-and-hold return, the difference between BHRs of repurchasing and corresponding matching firms. The *p*-value is based on an empirical distribution obtained via bootstrapping. *High-L* (*High-H*) represents the highest DA quintile with prior one-quarter abnormal return that is below (above) the median prior one-quarter abnormal return of the highest DA quintile firms.

DA quintile	REP	MAT	AR	*p*-value
Panel A: Full period				
All	78.68	67.53	11.15	0.000
Low	88.17	79.34	8.82	0.075
2	85.15	71.94	13.21	0.003
3	79.19	64.54	14.65	0.003
4	76.12	62.55	13.57	0.007
High	64.31	63.48	0.83	0.184
High-L	51.78	62.72	-10.95	0.628
High-H	77.51	64.32	13.19	0.045
Panel B: 1980-1990				
All	86.00	80.74	5.26	0.003
Low	89.70	92.46	-2.76	0.396
2	92.45	85.89	6.56	0.027
3	90.02	76.78	13.25	0.027
4	82.08	77.45	4.63	0.113
High	70.24	74.01	-3.77	0.495
High-L	57.28	79.69	-22.41	0.770
High-H	76.87	70.56	6.31	0.335
Panel C: 1991-2000				
All	76.51	63.62	12.89	0.000
Low	87.55	75.76	11.79	0.084
2	82.71	67.30	15.41	0.013
3	75.93	60.88	15.06	0.003
4	74.26	58.16	16.10	0.006
High	62.65	60.74	1.91	0.139
High-L	50.30	59.71	-9.42	0.578
High-H	77.77	62.00	15.77	0.045

Table 6
Operating Performance

This table presents the median operating performance (in %) around repurchase announcements for the bottom four DA quintiles (NonH) and the top DA quintile (High). The operating performance is measured by return-on-assets (ROAs) defined as operating income before depreciation divided by average total assets. Year 1 (-1) represents the fiscal year of (prior to) the repurchase announcement. Panel A shows raw ROAs without any adjustment. Panel B presents abnormal ROAs obtained by subtracting matching firm's ROAs from repurchase firm's ROAs. In the same 2-digit SIC-code industry and DA quintile as of repurchase sample firm, we select the matching firm whose pre-event ROA is within 80% to 120% or ±0.01 of the sample firm's pre-event ROA. If more than one firm satisfies the condition, we choose the firm with closest pre-event ROA as of the sample firm. On the other hand, if no matching firm is found, we then search 1-digit SIC-code industry. When this fails, we relax the industry and DA requirement but keep the earnings filter restriction. If there is still no firm which meets the criterion, we search all possible firms with similar pre-event ROA. Panel C shows the cumulative changes in ROAs, which cumulates the changes in abnormal ROAs starting from year 1. The rows of "NonH - High" test the differences between the bottom four DA quintiles and top DA quintile. *High-L* (*High-H*) represents the highest DA quintile with prior one-quarter abnormal return that is below (above) the average prior one-quarter abnormal return of the highest DA quintile firms. Numbers in parentheses are *p*-values based on Wilcoxon median tests.

DA quintile	Event year				
	-1	1	2	3	4
Panel A: Unadjusted ROAs					
NonH	16.97	16.52	15.60	15.22	14.79
High	17.51	14.99	12.94	12.63	12.39
NonH-High	-0.53	1.53	2.66	2.59	2.41
	(0.094)	(0.000)	(0.000)	(0.000)	(0.000)
High-L	18.40	16.00	12.66	12.16	11.51
High-H	16.44	14.17	13.10	12.96	12.90
Panel B: Abnormal ROAs					
NonH	0.00	0.81	1.06	1.32	1.65
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
High	0.00	-0.30	-0.74	-0.44	-0.70
	(0.001)	(0.079)	(0.114)	(0.659)	(0.956)
NonH-High	0.00	1.11	1.80	1.76	2.34
	(0.148)	(0.000)	(0.000)	(0.000)	(0.000)
High-L	0.00	-0.78	-1.93	-1.68	-1.58
	(0.112)	(0.039)	(0.014)	(0.076)	(0.238)
High-H	0.00	-0.16	-0.06	0.53	0.29
	(0.001)	(0.738)	(0.729)	(0.210)	(0.214)
Panel C: Cumulative changes in abnormal ROAs					
NonH		0.69	0.96	1.26	1.55
		(0.000)	(0.000)	(0.000)	(0.000)
High		-0.55	-0.95	-0.43	-0.83
		(0.022)	(0.065)	(0.468)	(0.782)
NonH-High		1.23	1.91	1.69	2.37
		(0.000)	(0.000)	(0.000)	(0.000)
High-L		-1.11	-2.09	-1.64	-1.54
		(0.017)	(0.011)	(0.065)	(0.167)
High-H		-0.08	-0.40	0.37	0.00
		(0.462)	(0.956)	(0.360)	(0.338)

Table 7
Actual Repurchase Activity

This table presents the Tobit regression results. The actual buyback amount is obtained from quarterly cash flow statements on funds used to redeem stock during the first year of repurchase announcement, and adjusted for concurrent changes in preferred stock. Firms without actual buyback information are excluded from the analysis. The dependent variable is the actual buyback amount relative to market value of equity. *High DA dummy* is l for the top DA quintile based on the quintile ranking of DA estimated from the Jones (1991) model, and 0 elsewhere. *High-L dummy* is 1 if a sample firm belongs to the top DA quintile and its one quarter return prior to repurchase announcement is below the median prior one-quarter abnormal return of the highest DA quintile firms, and 0 elsewhere. *Size decile* (1 being the smallest) is based on the market value of equity at the month-end prior to the repurchase announcement. *Shares announced* is the percentage of announced repurchase shares relative to total outstanding shares at month-end prior to the announcement. *Abnormal announcement return* is the difference between the sample firm's compounded five-day return over days –2 to +2 relative to the announcement and the compounded return of the CRSP value-weighted index over the same period. *Prior one-year abnormal return* is the prior one year buy-and-hold returns compounded from 252 days before (or the listing date) up to three days before the announcement for repurchasing firms minus the compounded return of the matching firms over the same period. *B/M quintile* (1 being the lowest) is based on the ratio of the book equity value at the previous fiscal year-end to total market value at month-end prior to the announcement. *CASH quintile* is based on the industry median-adjusted cash plus short-term investments over total assets. *LEV quintile* is based on the industry median-adjusted ratio of the total debt to total assets at the previous fiscal year-end. *High BM dummy* is l for the top BM quintile, and 0 elsewhere. *High CASH dummy* is 1 for the top CASH quintile, and 0 elsewhere. *Low LEV dummy* is 1 for the bottom LEV quintile, and 0 elsewhere. *Four-year abnormal return* is the buy-and-hold return compounded from three days after the announcement date up to the fourth anniversary of announcement date for repurchasing firms minus the compounded return of the matching firms over the same period. Year dummy variables are included, but not reported. Numbers in parentheses are *p*-values.

Model	1	2	3	4
Intercept	0.900	3.062	0.753	3.023
	(0.101)	(0.000)	(0.167)	(0.000)
High DA dummy	-0.486	-0.548		-0.550
	(0.035)	(0.017)		(0.017)
High-L dummy			-0.763	
			(0.014)	
Size decile	0.067	-0.002	0.070	-0.003
	(0.046)	(0.960)	(0.037)	(0.923)
Shares announced	0.260	0.264	0.259	0.263
	(0.000)	(0.000)	(0.000)	(0.000)
Abnormal announcement return	-0.075	-0.120	-0.150	-0.088
	(0.950)	(0.920)	(0.900)	(0.941)
Prior one-year abnormal return	0.393	0.491		0.497
	(0.014)	(0.002)		(0.002)
BM quintile	0.444		0.459	
	(0.000)		(0.000)	
CASH quintile	0.190		0.187	
	(0.003)		(0.003)	
LEV quintile	0.023		0.016	
	(0.738)		(0.816)	
High BM dummy		0.816		0.806
		(0.002)		(0.002)
High CASH dummy		-0.094		-0.110
		(0.667)		(0.615)
Low LEV dummy		0.192		0.201
		(0.350)		(0.327)
Four-year abnormal return				0.126
				(0.005)

Table 8
Long-Run Abnormal Returns Based on a Five-Factor Model

This table reports long-run abnormal returns based on a five-factor model. In addition to the four factor Carhart (1997) model, we add one more factor, earnings quality as measured by discretionary accruals. The five-factor model is specified as follows:

$$R_{p,t} - R_{f,t} = \alpha + \beta(R_{m,t} - R_{f,t}) + sSMB_t + hHML_t + wWML_t + gGMB_t + e_t$$

where R_p is the repurchase firm portfolio return in a given month, R_f is the risk-free rate, R_m is the market portfolio return, *SMB* is the small-firm portfolio return minus big-firm portfolio return, *HML* is the high book-to-market portfolio return minus low book-to-market portfolio return, *WML* is the winner portfolio return minus loser portfolio return, and *GMB* is the good earnings quality portfolio return minus bad earnings quality portfolio return. In each month from 1983 to 2000, we form a calendar-time portfolio by including sample firms that have announced repurchase programs in the past 48 months. The portfolio returns are computed by either equal-weighting or log value-weighting individual firm's returns. Months with less than 20 stocks in the portfolio are excluded from the regression. *N* is the number of months used to run regressions. Numbers in parentheses are *t*-statistics. *High-L* (*High-H*) represents the highest DA quintile with prior one-quarter abnormal return that is below (above) the median prior one-quarter abnormal return of the highest DA quintile firms.

DA quintile	Equal-weights								Log value-weights							
	α	β	s	h	w	G	N	Adj R^2 (%)	α	β	s	h	w	g	N	Adj R^2 (%)
All	0.0038	1.0209	0.4994	0.2196	-0.2215	-0.1522	216	93.81	0.0036	1.0227	0.3627	0.1917	-0.1699	-0.1932	216	93.81
	(4.31)	(47.87)	(18.67)	(6.21)	(-8.53)	(-1.87)			(4.49)	(51.79)	(14.64)	(5.85)	(-7.07)	(-2.57)		
Low	0.0041	1.0886	0.6664	0.2266	-0.2438	0.0383	204	90.59	0.0040	1.1089	0.5563	0.1872	-0.2119	-0.0123	204	90.59
	(3.22)	(35.36)	(17.08)	(4.33)	(-6.43)	(0.31)			(3.44)	(39.32)	(15.57)	(3.91)	(-6.10)	(-0.11)		
2	0.0052	1.0255	0.4318	0.2113	-0.2476	-0.1122	216	90.58	0.0049	1.0254	0.3064	0.1831	-0.1949	-0.0981	216	90.58
	(4.79)	(38.84)	(13.04)	(4.82)	(-7.71)	(-1.12)			(4.68)	(39.78)	(9.48)	(4.28)	(-6.21)	(-1.00)		
3	0.0036	0.9844	0.3471	0.2534	-0.1844	-0.2552	216	91.71	0.0033	0.9935	0.2193	0.2348	-0.1424	-0.2767	216	91.71
	(3.84)	(43.14)	(12.13)	(6.70)	(-6.64)	(-2.94)			(3.74)	(45.42)	(7.99)	(6.47)	(-5.35)	(-3.32)		
4	0.0038	1.0410	0.4846	0.2549	-0.1912	-0.2464	216	91.21	0.0035	1.0317	0.3580	0.2233	-0.1468	-0.3100	216	91.21
	(3.61)	(40.31)	(14.96)	(5.95)	(-6.08)	(-2.50)			(3.52)	(42.58)	(11.78)	(5.55)	(-4.98)	(-3.36)		
High	0.0010	1.0133	0.7459	0.1808	-0.2907	-0.0065	216	86.82	0.0012	1.0075	0.6163	0.1225	-0.2188	-0.1174	216	86.82
	(0.72)	(28.51)	(16.73)	(3.07)	(-6.72)	(-0.05)			(1.08)	(35.90)	(17.51)	(2.63)	(-6.41)	(-1.10)		
High-L	-0.0001	1.0838	0.8813	0.2094	-0.4233	0.1725	169	81.34	-0.0005	1.0452	0.7595	0.0834	-0.3010	-0.1584	169	81.34
	(-0.03)	(19.32)	(13.42)	(2.28)	(-6.37)	(0.81)			(-0.26)	(23.69)	(14.70)	(1.15)	(-5.76)	(-0.94)		
High-H	0.0021	1.0012	0.6318	0.2205	-0.2284	-0.1207	211	86.70	0.0024	1.0072	0.5182	0.1881	-0.1829	-0.1600	211	86.70
	(1.51)	(29.57)	(14.81)	(3.92)	(-5.59)	(-0.94)			(2.00)	(34.90)	(14.25)	(3.93)	(-5.25)	(-1.46)		

Table 9
Changes in Cash and Leverage Ranked by Discretionary Accruals

This table presents cash and leverage changes between year -1 and year 1 sorted by discretionary accruals (DA) quintiles. *Cash* is defined as cash plus short-term investments over total assets and is adjusted for industry median. *Leverage* is based on the ratio of the total debt to total assets and is adjusted for industry median. *High-L* (*High-H*) represents the highest DA quintile with prior one-quarter abnormal return that is below (above) the median prior one-quarter abnormal return of the highest DA quintile firms. *Year -1* is the fiscal year prior to the repurchase announcement while *Year 1* is the fiscal year which contains the repurchase announcement. *N* is the number of firms in each group with available cash and leverage. Numbers in parentheses are *t*-statistics.

DA quintile	N	Cash	Leverage
		Year -1 to 1	Year -1 to 1
Low	986	-0.38% (-1.07)	-0.05% (-0.14)
2	1739	-0.90% (-3.97)	0.24% (1.09)
3	1900	-0.56% (-2.83)	0.47% (2.31)
4	1715	-0.57% (-2.54)	0.43% (1.92)
High	1172	-0.15% (-0.49)	0.00% (0.01)
High-L	583	-0.41% (-0.86)	0.21% (0.47)
High-H	585	0.11% (0.28)	-0.16% (-0.35)

Table 10
Cross-Sectional Regressions of Long-Run Abnormal Returns

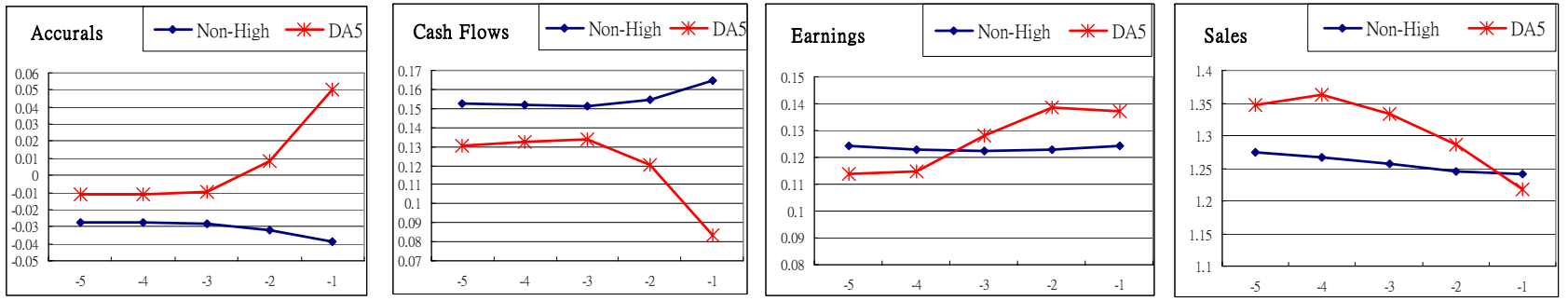
This table reports cross-sectional regression results of long-run abnormal returns. The dependent variable is four-year abnormal stock return. *High DA dummy* is l for the top DA quintile based on the quintile ranking of DA obtained from the Jones (1991) model, and 0 elsewhere. *High-L dummy* is 1 if a sample firm belongs to the top DA quintile and its one-quarter abnormal return prior to repurchase announcement is below the median prior one-quarter abnormal return of the highest DA quintile firms, and 0 elsewhere. *Size decile* (1 being the smallest) is based on the market value of equity at the month-end prior to the repurchase announcement. *B/M quintile* (1 being the lowest) is based on the ratio of the book equity value at the previous fiscal year-end to total market value at month-end prior to the announcement. *CASH quintile* is based on the industry median-adjusted cash plus short-term investment over total assets. *LEV quintile* is based on the industry median-adjusted ratio of the total debt to total assets at the fiscal year-end prior to the announcement. *High BM dummy* is l for the top BM quintile, and 0 elsewhere. *High CASH dummy* is 1 for the top CASH quintile, and 0 elsewhere. *Low LEV dummy* is 1 for the bottom LEV quintile, and 0 elsewhere. *Shares announced* is the percentage of announced repurchase shares relative to total outstanding shares at the month-end prior to the announcement. *Prior one-year abnormal return* is the prior one year buy-and-hold returns compounded from 252 days before (or the listing date) up to the date before the announcement for repurchasing firms minus the compounded return of the matching firms over the same period. *Actual buyback* is the actual buyback amount divided by average market value of equity. Year dummy variables are included, but not reported. Numbers in parentheses are White (1980) heteroskedasticity-adjusted *t*-statistics.

Model	1	2	3
Intercept	0.1493	0.2121	0.2242
	(1.58)	(3.58)	(3.82)
High DA dummy	-0.0524	-0.0448	
	(-1.05)	(-0.89)	
High-L dummy			-0.1558
			(-2.37)
Size decile	0.0152	0.0139	0.0127
	(2.67)	(2.57)	(2.35)
BM quintile	0.0220		
	(1.80)		
CASH quintile	-0.0159		
	(-1.46)		
LEV quintile	0.0135		
	(1.13)		
High BM dummy		0.0557	0.0509
		(1.26)	(1.15)
High CASH dummy		0.0427	0.0405
		(1.15)	(1.09)
Low LEV dummy		-0.0829	-0.0820
		(-2.38)	(-2.35)
Shares announced	0.6829	0.7092	0.7104
	(2.46)	(2.56)	(2.56)
Prior one-year abnormal return	-0.0795	-0.0619	-0.0703
	(-1.99)	(-1.56)	(-1.75)
Actual buyback	0.1764	0.1827	0.1850
	(0.71)	(0.73)	(0.77)
Actual buyback × High DA dummy	1.1860	1.1830	
	(1.84)	(1.84)	
Actual buyback × High-L dummy			2.1400
			(2.46)

Figure 1
Operating Performance based on Earnings Components around Repurchase Announcement

This figure plots operating performance based on earnings components for the Highest DA quintile (DA5) and bottom four DA quintiles (Non-High). *Earnings* are operating income after depreciation. *Accruals* are defined as changes in non-cash current assets, minus changes in current liabilities (excluding short-term debt and taxes payable) and minus depreciation. *Cash flows* are earnings less accruals. Earnings, accruals, cash flows and sales are scaled by average total assets. These graphs plot performance from year -5 to year -1 prior to repurchase announcement, where year -1 is the fiscal year prior to the repurchase announcement. Panel B plots evidence where the Highest DA quintile is sub-divided into two groups by whether the prior one-quarter abnormal return is below (High-L) or above (High-H) the median for all firms in the highest DA quintile.

Panel A: NonHigh vs. High DA



Panel B. High-L vs. High-H