



Share repurchases as a potential tool to mislead investors[☆]

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ABSTRACT

A rich literature argues that stock repurchases often serve as positive economic signals beneficial to investors. Yet due to their inherent flexibility, open-market repurchase programs have long been criticized as weak signals lacking commitment. We evaluate whether some managers potentially use buyback announcements to mislead investors. We focus on cases where managers were seemingly under heavy pressure to boost stock prices and might have announced a repurchase only to convey a false signal. For suspect cases, the immediate market reaction to a buyback announcement does not differ from that generally observed. However over longer horizons, suspect firms do not enjoy the improvement in economic performance otherwise observed. Suspect firms repurchase less stock. Further, managers in suspect firms have comparatively higher exposure to stock options, a potentially endogenous result suggesting greater sensitivity to both stock valuation and to future equity dilution. Overall, the results suggest only a limited number of managers may have used buybacks in a misleading way as “cheap talk.” Yet as theory also suggests, we find no long-run economic benefit to this behavior.

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1. Introduction

Many studies consider the potential economic value of a stock repurchase and the reasons why company executives might wish to engage them. A well-developed literature documents that shareholders have historically realized positive abnormal returns subsequent to a repurchase announcement, indicating at least some economic benefit on average. On the other hand, open-market stock repurchase programs (OMSRs) have long been criticized for lacking credibility as a quality signal (e.g., [Vermaelen, 1981](#); [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. The concern is that open-market authorizations pose few barriers to managers who might wish to engage in mimicking behavior. Reporting and disclosure requirements surrounding actual transactions are minimal in the U.S. and these authorizations, at their initiation, impose few costs or limitations on the company or its management. Further, managers have historically not borne any reputational penalty for announcing and then failing to buy back stock.

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Given this lack of downside penalty or risk, an interesting empirical question is whether, among the general population of buybacks, a subset of cases exists where the evidence might suggest that managers announced open-market buyback programs with the intent of misleading investors. Given that executive compensation is often highly linked to firm value, these managers would seemingly face strong incentives to boost stock prices. Fried (2005) raises the notion that open-market share repurchases (OMSR) could be used as a false-signaling device. Even though one expects natural market mechanisms and government regulation to prevent managers from sending false signals, there is anecdotal evidence of managers taking advantage of regulatory loopholes within or outside legal boundaries. Many academic papers find that managers seem to engage in stock price manipulation prior to important corporate events (e.g., annual meetings (Dimitrov and Jain, 2008) and equity offerings (Teoh et al., 1998)). Moreover, Bhojraj et al. (2009) find that low earnings quality firms which beat analyst forecasts, even marginally, enjoy short-term stock price benefits by cutting discretionary expenditures. A recent paper by Peng and Roell (2008) provides a theoretical perspective of this type of behavior and how stock based compensation can lead managers to engage in costly, short-term price manipulation.

Of course, no pure, ex-ante 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 (e.g., Comment and Jarrell, 1991). 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 a compelling measure of managerial intent. Because of the inherent flexibility of open-market repurchases, managers have the freedom to set program size irrespective of whatever true intention they might have.¹ Firms can and do initiate programs even if they have no immediate intention of buying back stock.² 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 and credible quality signal.

Another obvious measure one might consider for measuring managerial intent is the ex-post completion rate. Here too, numerous issues confound this measure such that it offers little insight into managerial intent. Open-market buybacks 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 future stock prices. Suppose a stock is somehow undervalued and the firm chooses to initiate a buyback program. If, in response, the market price rapidly increases to fair value, mispricing will no longer be a motive for this company to continue with the program. If executing the transaction bears some cost but no penalty exists for non-completion, it would not be unreasonable to find that these firms, ex-post, either repurchase no stock or buy back only a small fraction of the original program despite the best of intentions. This path-dependent buyback behavior is empirically validated in several papers including Ikenberry et al. (2000) and Chan et al. (2004). On the other hand, the firms without any intention to repurchase shares but where subsequent price shocks alter their plans may, ex-post, be observed as buying back a significant number of shares. As such, it is difficult to identify managerial intent by simply looking at ex-post completion rates.

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. The argument in favor of this as an objective measure of managerial intent follows from an emerging literature regarding earnings management. Chan et al. (2006) argue that earnings quality may indeed be a proxy of managerial intent to mislead investors. They find that managers sometimes use accruals to report earnings that are stronger than the actual economic reality of the firm. 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. In a world where managers are under pressure to boost stock prices, earnings manipulation may serve as an objective proxy for the management’s propensity to mislead the market. 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, at least temporarily, boost stock prices. Perhaps the buyback programs announced by these suspect firms are a simple extension of a more general ethical problem.

To investigate this hypothesis, three key questions are of interest to us: 1) Is there any evidence that our measure of managerial intent in buyback firms suggests these companies were under abnormal pressure to boost stock prices? 2) Is there evidence that investors recognize this pressure and react accordingly, thus unraveling the signal at the time of an OMSR announcement? and 3) Is the operating and long-run stock return performance of suspect buyback firms lower compared to the general case?

We examine a sample of 7628 open-market repurchases announced in the U.S. between 1980 and 2000. Regarding the first question, we find that managers in firms with poor earnings quality appear to be under greater pressure to reverse an otherwise negative information environment. For example, 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

¹ 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 open-market repurchase announcements to lose signaling power.

² 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.”

announcement returns are significantly negative and financial analysts are making negative forecast revisions. This is true despite the fact that in these same firms, reported earnings are increasing (due in part to discretionary accounting actions). Further, managers in these low earnings quality firms also tend to have more exercisable stock options compared to other buyback firms suggesting that management was also relatively more incentivized to boost stock prices and sensitive to the firm's stock price. This scenario indeed suggests an environment where managers would seem to have been under abnormal pressure to boost stock prices.

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 when 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%. Given that the market does not “unravel” this announcement effect, this finding may explain how a desire by managers to mislead investors might persist over time.

As to our final question, the results are generally consistent with the notion that managers in at least some firms with poor earnings quality may have been misleading investors. Compared to other buyback cases, the operating performance of low earnings quality firms significantly deteriorates after a repurchase announcement. Further, the long-horizon abnormal stock return performance of these cases is lower compared to the general case and not significantly different from zero. When we focus more narrowly on the most suspicious announcements where stock returns right before the buyback announcement were very low (where one might expect a greater sense of desperation), the evidence generally strengthens. Thus in response to our final question relating to firm performance, the answer is yes; we do find a performance difference consistent with what we would expect if some OMSRs were announced in a potentially misleading way.³

It is important to note, however, that the prevalence of these suspect cases is most likely not too high. First, the number of these extreme cases is low, well below 10% of the sample. Further, given our inability to observe true managerial intent, our approach is noisy and only a proxy; some of these suspect cases are undoubtedly misclassified. Moreover, we cannot rule out the possibility that announcements made by firms with poor earnings quality may have been motivated by other contributing factors. For example, it is difficult to completely rule out managerial hubris. Managers in poorly performing firms, including those who have engaged in earnings manipulation, may have misguided or over-inflated views of their firms' value when they announced an OMSR. In many cases, these firms have lost substantial market-cap prior to the announcement. Therefore, it is possible that managers might have genuinely perceived a buyback as a truly value-enhancing decision, a decision that ex-post was simply incorrect. On the other hand, firms with poor earnings quality *repurchase less* stock than other firms, a result inconsistent with managerial hubris. If hubris were a dominant factor, one would expect the opposite.

Another competing explanation though relates to “option dilution.” Managers in firms with poor earnings quality, for whatever reason, hold greater vested stock option positions, and exercise more options after the announcement of an OMSR. This exposure, perhaps endogenously induced, suggests two possible confounding motives. The first is that managers whom we view as suspect in their intentions may instead have used OMSRs to offset future equity dilution from options. While the data do not strongly bear out this concern, one cannot rule out this possibility. A second related factor is that managers may have used OMSR announcements to create a short-term signaling benefit allowing them to personally benefit from exercising stock options following their announcement. While the gains to such maneuvering are limited, it is difficult to dismiss this possibility as motivating some of the cases we otherwise view as suspicious.

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 two years subsequent to the buyback announcement and 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 7628 separate cases.

³ In separate but related work, Gong et al. (2008) also examine the relationship between long-run performance and earnings quality for a set of open-market share repurchasing firms. The main focus of their work differs from that here. They present a thesis that managers in low accrual firms may be intentionally deflating earnings immediately prior to an open-market repurchase announcement. To the extent investors are earnings-myopic, the inference of Gong et al. is that managers were deliberately working to lower stock prices, thus permitting firms to potentially use a share repurchase to engage in wealth transfer from selling shareholders. Our paper focuses on the opposite end of the spectrum. Our focus is on companies whose share price is suffering even after managers seem to have engaged in earnings management to boost stock prices.

2.2. Developing a proxy for managerial intent

While a rich theoretical literature posits the economics of corporate signals and the possibility that in some cases poor quality firms might falsely signal, few empirical papers explore this notion. Given the difficulty in identifying managerial intent, this is understandable. In the context of OMSRs, program size and ex-post program completion rates cannot serve this role and no obvious proxy exists. As such, we consider earnings management as an indirect measure.

Recently, accounting accruals have been used as a way to measure earnings quality (Chan et al., 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 govern 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 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.

In the Appendix, we provide specific details on how we estimate abnormal accruals. However for our purposes, we need only focus on the outcome of that process and on those firms which, when ranked in the cross-section, are in the highest quintile having abnormally elevated accruals (High DA firms). As a more refined metric, we also evaluate a subset of firms that not only are rated as High DA but also suffered poor stock performance in the quarter leading into the announcement. These firms were conceivably under even more pressure to report a positive information signal, perhaps a signal such as an open-market share repurchase program.

2.3. Measuring abnormal performance

We estimate several measures of abnormal stock performance both prior to and following a buyback announcement. Because of its ability to provide a more meaningful interpretation, much of our analysis relies on a quarterly 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 discretionary accruals. Statistical inferencing is accomplished via a bootstrap method as advocated by Lyon et al. (1999). To conserve space, the details of this standard method are saved for the Appendix.

We also evaluate operating performance using a variety of metrics including earnings, accruals, cash flows and sales. For each of these operating measures, an appropriate benchmark is critical. We use a matching control-firm approach to make these comparisons and to develop significance tests. Again, in the spirit of conserving space and to avoid distraction from our central question, we save the details of this approach for the Appendix.

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 for 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 large run-up in stock price.⁴ The mean unadjusted total 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 as well as average values of market capitalization in 2007 billion dollars (SIZE), B/M, industry median-adjusted cash flow to total assets (CASH), and industry median-adjusted total debt to total assets (LEV). Generally speaking, the typical buyback firm in our sample is similar to the underlying universe with respect to 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

⁴ See several papers including Loughran and Ritter (1995), for example.

Table 1
Summary statistics.

Panel A: By year														
Year	N	5-day AR	REP-1	MAT-1	AR-1	% Shares	DA	Size quintile	B/M quintile	DA quintile	Size	B/M	CASH	LEV
1980–1990	1718	2.22%***	3.99%	11.43%	−7.44%***	7.88%	−0.0043	3.39	2.81	2.89	1.70	0.72	0.04	−0.02
1991–2000	5910	1.67%***	0.86%	17.48%	−16.62%***	7.33%	−0.0113	2.81	2.82	2.88	2.00	0.58	0.05	−0.03
All	7628	1.80%***	1.56%	16.11%	−14.55%***	7.45%	−0.0097	2.94	2.82	2.88	1.94	0.61	0.05	−0.03
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	Size	B/M	CASH	LEV	
Low	1015	2.33%***	6.72%	22.67%	−15.96%***	7.66%	−0.1720	2.62	2.78	0.90	0.61	0.09	0.00	
2	1762	1.81%***	7.61%	19.45%	−11.83%***	7.39%	−0.0429	3.06	2.69	2.05	0.58	0.07	−0.02	
3	1908	1.42%***	3.22%	17.97%	−14.75%***	7.22%	−0.0067	3.33	2.79	2.98	0.58	0.04	−0.03	
4	1735	1.70%***	−0.09%	12.18%	−12.27%***	7.36%	0.0252	2.95	2.91	1.86	0.64	0.04	−0.04	
High	1208	2.06%***	−11.84%	8.45%	−20.29%***	7.82%	0.1204	2.39	2.94	1.10	0.68	0.04	−0.03	
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)	0.99 (4.29)	−0.08 (−4.55)	0.02 (4.03)	0.01 (1.20)	
Panel C: By prior quarter abnormal return														
High-L	604	2.01%***	−23.35%	19.08%	−42.44%***	7.46%	0.1191	2.24	2.74	1.22	0.60	0.05	−0.04	
High-H	604	2.10%***	−0.33%	−2.18%	1.85%	8.18%	0.1217	2.55	3.14	2.43	0.76	0.02	−0.02	
NonH-L	3211	1.36%***	−7.23%	24.36%	−31.59%***	7.07%	−0.0346	2.88	2.72	1.75	0.57	0.07	−0.03	
NonH-H	3209	2.14%***	15.41%	10.75%	4.66%***	7.68%	−0.0336	3.20	2.87	1.22	0.63	0.04	−0.02	
NonH-L		−0.66% (−1.23)	16.12% (9.62)	5.28% (1.71)	10.84% (3.46)	−0.39% (−1.15)	−15.38% (−23.05)	0.64 (11.69)	−0.02 (−0.34)	0.53 (1.29)	−0.03 (−1.38)	0.02 (2.42)	0.01 (1.41)	

This table reports the summary statistics of 7628 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, B/M 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. *Size* is the market value of equity of repurchase firms at the month-end prior to the announcement, expressed in 2007 billion dollars. *B/M* is the ratio of the book value to the market value of equity available prior to repurchase announcement. Discretionary accruals (*DA*) are defined as in Jones (1991) and further detailed in the Appendix. *Size quintile* and *B/M quintile* are the quintile rankings of size and B/M relative to NYSE firms, respectively. *DA quintile* is the DA quintile ranking relative to all stocks in the universe at a given time. For all quintile rankings, the smallest has value of 1. *CASH* is defined as the industry median-adjusted cash plus short-term investment over total assets. *LEV* is the industry median-adjusted ratio of the total debt to total assets at the fiscal year-end prior to the announcement. Panel A reports summary statistics sorted by years, while Panel B and C report results sorted by DA quintiles and prior quarter abnormal returns, respectively. *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. *NonH-L* (*NonH-H*) represents the bottom four DA quintiles with prior one-quarter abnormal return that is below (above) the median prior one-quarter abnormal return of the firms in bottom four DA quintiles. *, ** and *** represent 10%, 5% and 1% significant levels, respectively, based on *t*-tests. *NonH-High* and *NonH-L-High-L* test differences between the bottom four DA quintiles and top DA quintile and between *NonH-L* and *High-L* groups, respectively. Numbers in the parentheses are *t*-statistics.

to these suspicious announcements. Yet the announcement-period abnormal return is significantly positive for all groups including High DA firms, around 2%.

To focus more narrowly on managers who might be under even greater pressure, in Panel C we subdivide this High DA group further into two equal sized groups, High-L and High-H, on the basis of their size and B/M-adjusted abnormal stock performance in the quarter preceding the buyback announcement. High-L firms represent cases where, even though management used aggressive techniques to support earnings, the stocks nevertheless experience poor return performance. Similarly, we divide the other four DA quintiles as a group into two sub-groups as well on the basis of abnormal return in the prior quarter (NonH-L and NonH-H).

For the High DA firms with relatively poor prior abnormal performance (High-L), we find that they lost more than 23% of their market-cap in the preceding year; on a relative basis, these firms underperformed by −42%. Yet even among these more extreme cases, the mean market reaction to a buyback announcement is about the same as otherwise, 2.0%.⁵

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 in the recent past, 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 suggest 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 B/M are consistent with what one would anticipate if investors respond more assertively to cases with greater potential for undervaluation.

⁵ In further work not reported here, we checked for whether there might be some concentration of High DA or High-L firms among those buyback firms with low announcement return, but we could find no evidence of concentration.

Table 2
Regressions of announcement-period abnormal returns.

Model	1	2	3
Intercept	0.0230 (0.000)	0.0397 (0.000)	0.0395 (0.000)
High DA dummy	−0.0027 (0.440)	−0.0026 (0.468)	
High-L dummy			−0.0034 (0.544)
Log(size)	−0.0041 (0.000)	−0.0051 (0.000)	−0.0051 (0.000)
Log(1 + B/M)	0.0270 (0.000)		
CASH	−0.0104 (0.254)		
LEV	0.0032 (0.610)		
High B/M dummy		0.0110 (0.001)	0.0109 (0.002)
High CASH dummy		−0.0023 (0.509)	−0.0023 (0.519)
Low LEV dummy		−0.0032 (0.282)	−0.0032 (0.284)
Shares announced	0.0645 (0.000)	0.0704 (0.000)	0.0702 (0.000)
Prior one-year abnormal return	−0.0110 (0.000)	−0.0095 (0.001)	−0.0097 (0.001)
N	6755	6755	6755
Adjusted-R ²	0.0224	0.0199	0.0199

This table reports regression results of announcement-period abnormal returns. The dependent variable is the repurchase announcement return measured over a 5-day window (−2, 2) minus the corresponding CRSP value-weighted index return. *High DA dummy* is 1 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. *Log(size)* is the natural log of the market value of equity at the month-end prior to the repurchase announcement. *Log(1 + B/M)* is the natural log of one plus 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* is the industry median-adjusted cash plus short-term investment over total assets. *LEV* is the industry median-adjusted ratio of total debt to total assets at fiscal year-end prior to the announcement. *High B/M dummy* is 1 for the top B/M 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 month-end prior to the announcement. *Prior one-year abnormal return* is the prior one-year buy-and-hold return 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 *p*-values based on White (1980) heteroskedasticity-adjusted *t*-statistics.

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 Fig. 1, we plot the time-series pattern of four operating performance measures for five years prior to the OMSR announcement: earnings (operating income after depreciation), accruals, cash flows (earnings minus accruals), and sales.⁶ In Panel A of Fig. 1, we compare firms classified in the highest DA quintile with all other firms combined.

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, most companies which announce a buyback seem to be 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

⁶ Each of these measures is scaled by average Total Assets over the year.

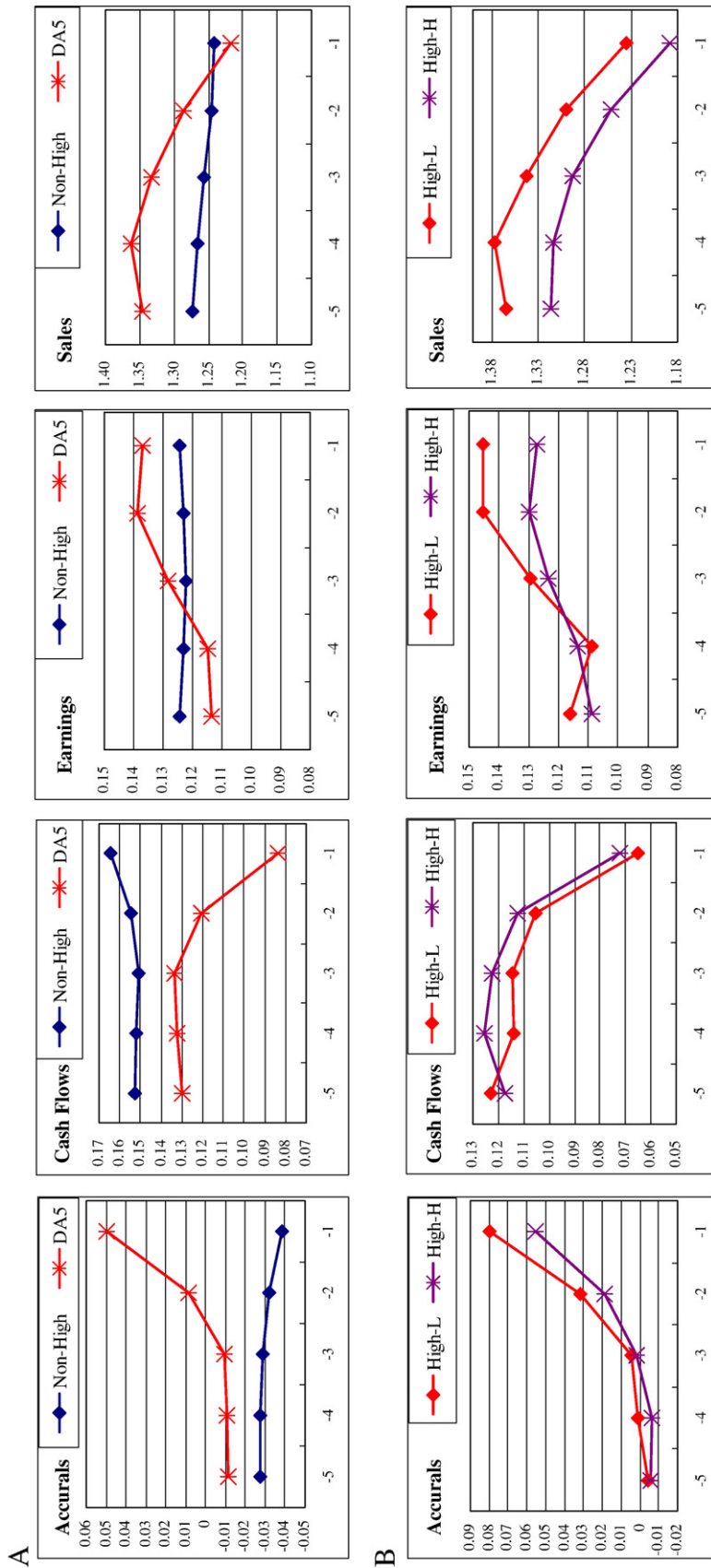


Fig. 1. Operating performance based on earnings components around repurchase announcement. This figure plots operating performance based on earnings components for the Highest DA quintile (DA5) and bottom four DA quintiles (Non-High). *Accruals* are operating income after depreciation. *Accruals* are 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 A plots evidence for High DA firms (DA5) against all other DA firms combined (Non-High). Panel B plots evidence where the Highest DA quintile is subdivided into two groups by whether the prior one-quarter size and B/M-adjusted abnormal return is below (High-L) or above (High-H) the median for all firms in the highest DA quintile.

Table 3
Quarterly earnings announcement returns and abnormal analysts' forecast revisions.

DA groups	Event quarters			
	–4	–3	–2	–1
<i>Panel A: Earnings announcement returns</i>				
NonH	0.394*** [0.094***]	0.425*** [0.112***]	0.065 [–0.032]	–0.555*** [–0.527***]
High	0.251 [–0.164]	0.191 [–0.009]	–0.021 [–0.235]	–1.076*** [–1.098***]
NonH-High	0.143 [0.258]	0.234 [0.121]	0.086 [0.203]	0.521** [0.571**]
High-L	0.548 [0.083]	0.268 [0.147]	–0.285 [–0.544]	–2.531*** [–2.390***]
High-H	–0.019 [–0.391]	0.118 [–0.186]	0.217 [–0.039]	–0.220 [–0.038]
NonH-L	0.494*** [0.081**]	0.506*** [0.149***]	0.073 [–0.056]	–1.655*** [–1.597***]
NonH-H	0.296*** [0.150**]	0.345*** [0.047**]	0.058 [–0.009]	0.501*** [0.351***]
NonH-L – High-L	–0.054 [–0.002]	0.238 [0.002]	0.357 [0.488]	0.876** [0.793***]
<i>Panel B: Abnormal forecast revisions</i>				
NonH	0.051*** [0.054***]	0.054*** [0.057***]	0.027*** [0.027***]	–0.008* [–0.008*]
High	0.137*** [0.135***]	0.227*** [0.199***]	0.087*** [0.090***]	–0.060*** [–0.061***]
NonH-High	–0.086*** [–0.081***]	–0.173*** [–0.142***]	–0.060** [–0.063**]	0.052*** [0.053***]
High-L	0.214*** [0.211***]	0.327*** [0.276***]	0.181*** [0.182***]	–0.107*** [–0.110***]
High-H	0.061* [0.060*]	0.127*** [0.122***]	–0.008 [–0.003]	–0.011 [–0.011]
NonH-L	0.105*** [0.107***]	0.097*** [0.101***]	0.069*** [0.068***]	–0.019*** [–0.018***]
NonH-H	–0.004 [0.001]	0.010 [0.011]	–0.016 [–0.014]	0.004 [0.003]
NonH-L – High-L	–0.109** [–0.104**]	–0.230*** [–0.175***]	–0.112** [–0.114***]	0.088*** [0.092***]

This table presents 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. 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. *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. *NonH-L* (*NonH-H*) represents the bottom four DA quintiles with prior one-quarter abnormal return that is below (above) the median prior one-quarter abnormal return of the firms in bottom four DA quintiles. *NonH-High* and *NonH-L – High-L* test differences between the bottom four DA quintiles and top DA quintile and between NonH-L and High-L groups, respectively. ***, **, and * indicate significance levels of 1%, 5%, and 10%, respectively, based on t-statistics for means and the Wilcoxon z-statistics for medians.

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%, again suggesting that all firms, on average, seem to be under at least some stress prior to a buyback announcement. Yet for firms with poor earnings quality, the average abnormal earnings announcement return is substantially worse, –1.08%. The difference in 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. Management would indeed appear to be under heavy market pressure to report good news.

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).⁷ 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 occurs 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 the 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 two High DA sub-groups, the High-L and High-H sub-groups, we find that negative analyst opinion is more 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.

3.3. Executive stock options

While the prior performance of companies which announce repurchases is generally poor, a further question arises as to whether managers care about stock prices. 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 following the buyback announcement. 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. Although this data source is limited and covers less than 40% of our sample, we evaluate the cases we find in that database. Given the limited sample though, we should take caution to not over-interpret the results reported 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 two years following a buyback announcement. This is consistent with the idea that managers in low earnings quality firms were indeed incentivized by their stock. 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 and thus their own personal wealth. This finding contrasts with Gong et al. (2008). Clearly, given their ownership, it would not appear that these managers, at least in the short-term, would desire to manipulate prices lower.

Table 4 also reports changes in option holdings 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. We see that executives in High DA (and High-L) firms also significantly increase their option holdings when the analysis is extended to two years after repurchase announcement. These results thus provide some credence to the possibility that stock options may play an important role in High DA firms and explain why they choose to announce OMSR programs.

To more closely examine this possibility, we directly check option exercise activity around buyback announcements in Table 4. The results show that top executives of High DA (High-L) firms, compared to those in NonH (NonH-L) firms, exercise significantly more options during the first two years after buyback announcement. These results suggest that firms which may have been using share buyback announcements in a misleading way may have also been responding to a greater expected need to prevent dilution from option exercises.

4. Post-announcement performance and actual buyback activity

In this section, we consider two-year return and operating performance evidence subsequent to an OMSR with special emphasis on the suspicious cases we have identified. 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 announced with manipulative intent, we do not expect to find this same result. Absent some fundamental economic benefit, we do not expect to observe any material positive 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 (possibly from prior earnings manipulation), we do not anticipate any abnormal return drift in High DA firms once this firm characteristic is properly controlled for in the cross-section.

⁷ 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.

Table 4
Stock option holdings and exercises of top executives.

DA quintiles	Unexercised vested options					Exercised options				
	Year – 1	Year 1	Year 2	Year 2 – Year – 1	Year 1 – Year – 1	Year – 1	Year 1	Year 2	Year 2 – Year – 1	Year 1 – Year – 1
All	1.26%	1.38%	1.51%	0.30%***	0.14%***	0.21%	0.27%	0.27%	0.06%***	0.06%***
	2763	2993	2871	2632	2763	2713	2943	2821	2582	2713
Low	1.29%	1.52%	1.71%	0.46%***	0.25%***	0.23%	0.28%	0.32%	0.09%***	0.05%***
	327	361	347	312	327	322	356	342	307	322
2	1.22%	1.32%	1.43%	0.23%***	0.10%***	0.22%	0.26%	0.26%	0.04%*	0.04%*
	674	736	705	643	674	666	728	697	635	666
3	1.09%	1.21%	1.36%	0.31%***	0.15%***	0.17%	0.23%	0.23%	0.07%***	0.06%***
	830	882	856	801	830	819	871	845	790	819
4	1.32%	1.42%	1.58%	0.31%***	0.13%***	0.23%	0.29%	0.25%	0.03%*	0.06%***
	652	699	660	610	652	639	686	647	597	639
High	1.70%	1.73%	1.78%	0.26%***	0.07%	0.26%	0.33%	0.36%	0.11%***	0.08%**
	280	315	303	266	280	267	302	290	253	267
NonH – High	– 0.49%	– 0.39%	– 0.29%	0.04%	0.07%	– 0.05%	– 0.07%	– 0.10%	– 0.06%	– 0.02%
	(– 3.83)	(– 3.46)	(– 2.55)	(0.44)	(0.94)	(– 1.69)	(– 1.75)	(– 2.36)	(– 0.63)	(– 0.35)
High-L	1.76%	1.81%	1.87%	0.28%**	0.04%	0.31%	0.40%	0.43%	0.12%*	0.09%
	140	157	154	136	140	131	148	145	127	131
High-H	1.64%	1.66%	1.67%	0.25%***	0.11%*	0.23%	0.30%	0.32%	0.09%***	0.08%*
	140	158	149	130	140	138	156	147	128	138
NonH-L	1.28%	1.40%	1.53%	0.30%***	0.15%***	0.24%	0.28%	0.25%	0.01%	0.03%**
	1219	1317	1251	1149	1219	1198	1296	1230	1128	1198
NonH-H	1.14%	1.28%	1.43%	0.31%***	0.15%***	0.17%	0.25%	0.27%	0.10%***	0.08%***
	1264	1361	1317	1217	1264	1247	1344	1300	1200	1247
NonH-L – High-L	– 0.49%	– 0.40%	– 0.34%	0.02%	0.10%	– 0.07%	– 0.12%	– 0.18%	– 0.11%	– 0.05%
	(– 2.91)	(– 2.49)	(– 2.05)	(0.14)	(0.80)	(– 1.42)	(– 1.65)	(– 2.39)	(– 0.96)	(– 0.37)

This table presents the unexercised vested options held by top-five executives and the options exercised by top-five executives. To standardize the option holdings and exercises, we scale them by total shares outstanding. Year – 1 (Year 1) is the fiscal year before (of) repurchase announcement. The columns of Year 2 – Year – 1 and Year 1 – Year – 1 show the changes between Year 2 and Year – 1 and changes between Year 1 and Year – 1, respectively. Each measure is with 0.5 percentile winsorization for top–bottom observations. 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. NonH-L (NonH-H) represents the bottom four DA quintiles with prior one-quarter abnormal return below (above) the median prior one-quarter abnormal return of the firms in bottom four DA quintiles. NonH – High and NonH-L – High-L test differences between the bottom four DA quintiles and top DA quintile and between NonH-L and High-L groups, respectively. Numbers in parentheses are *t*-statistics and numbers in italics are the numbers of observations. ***, ** and * indicate that the difference is significantly different from zero based on *t*-statistics at the 1%, 5% and 10% significance levels, respectively.

4.1. Long-term stock performance

Table 5 shows the two-year buy-and-hold abnormal returns (BHARs) of sample firms. Consistent with prior studies (e.g., Ikenberry et al., 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 two-year post-announcement abnormal return is positive, + 8.6% (*p*-value = 0.000). When this stock performance is conditioned by DA quintile, we find strikingly different results. For firms classified in the bottom four DA quintiles (NonH), two-year post-announcement abnormal returns are positive and significantly different from zero (9.5% with *p*-value of 0.000). Conversely, for the highest DA quintile, the two-year abnormal return is much smaller, 3.84%, and not significantly different from zero at conventional confidence levels. Although the abnormal returns of High DA firms are significantly positive in the first few quarters, significance disappears after quarter + 6.

Although not reported here, each of the four DA quintiles which define the NonH group has positive drifts with *p*-values below 5%. 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 seemed to be under greater pressure, their abnormal stock performance is close to zero starting in quarter + 3 and continuing through quarter + 8, with negative average abnormal returns in some quarters, albeit insignificant. Yet for High-H firms, the two-year post-announcement drift is positive and significant, 9.4% (*p*-value = .039). When we examine the bottom four DA quintiles in a similar fashion (i.e., NonH-L and NonH-H), we do not find any meaningful difference in two-year abnormal return between these two groups. This result suggests that the prior returns are not closely related to post-announcement performance for the bottom four DA quintiles.

The fact that the drift, on average, for the High DA sub-group is about zero but when subdivided further on the basis of prior returns leads to distinctly separate two-year 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. When we look at a more refined measure, the results are stronger. Moreover, as we subdivide the evidence further, we also conclude that the total number of buybacks where managers may have been intending to mislead investors, while non-zero, also appears to be limited.

One might expect that if managers send misleading signals to the market, the company's stock would eventually be penalized and thus underperform the market. While plausible, one also does not expect stock prices to diverge away from their fair value. As such, this limits the price "correction" or penalty one might anticipate for mimicking firms to only the reversal of the initial buyback announcement return. Recall, that the scale of this return is only around 2%, a level of mispricing that is difficult to distinguish from noise when evaluating long-

Table 5
Buy-and-hold abnormal returns.

DA groups	+1 Q	+2 Q	+3 Q	+4 Q	+5 Q	+6 Q	+7 Q	+8 Q
All	3.49% (0.000)	3.27% (0.000)	3.47% (0.000)	5.08% (0.000)	6.01% (0.000)	6.50% (0.000)	7.38% (0.000)	8.58% (0.000)
High	3.33% (0.001)	2.76% (0.039)	3.25% (0.048)	5.32% (0.017)	4.30% (0.070)	4.54% (0.087)	3.82% (0.129)	3.84% (0.142)
NonH	3.51% (0.000)	3.37% (0.000)	3.47% (0.000)	4.97% (0.000)	6.28% (0.000)	6.82% (0.000)	8.02% (0.000)	9.50% (0.000)
High-L	3.75% (0.011)	2.67% (0.097)	0.98% (0.351)	-2.27% (0.241)	0.85% (0.566)	-0.72% (0.427)	-1.75% (0.639)	1.66% (0.624)
High-H	2.86% (0.029)	2.75% (0.109)	5.37% (0.032)	8.29% (0.008)	9.58% (0.006)	8.33% (0.032)	9.23% (0.027)	9.36% (0.039)
NonH-L	4.28% (0.000)	3.14% (0.000)	2.80% (0.008)	4.31% (0.000)	5.34% (0.000)	6.32% (0.000)	7.28% (0.000)	8.46% (0.000)
NonH-H	2.71% (0.000)	3.63% (0.000)	4.26% (0.000)	5.81% (0.000)	7.48% (0.000)	7.49% (0.000)	8.95% (0.000)	10.65% (0.000)

This table presents two-year buy-and-hold abnormal returns (in %). Quarterly buy-and-hold returns (BHRs) for individual firms are first calculated by compounding the daily returns of each repurchase firm for 63 days, or up to the delisting date (whichever is earlier). For each event-quarter, portfolio returns are computed based on the BHRs of sample firms assuming an equal-weighted investment strategy. Quarterly BHRs are computed after excluding those observations within the top 0.75 percentile of quarterly returns among sample firms to reduce problems from the extreme skewness. BHRs are obtained by compounding the quarterly portfolio returns over time, starting from quarter +1. We calculate BHRs of both repurchasing firms and corresponding size/BM/DA matching firms. Buy-and-hold abnormal returns (BHARs) are reported below and represent the difference between BHRs of repurchasing and corresponding matching firms. The *p*-value (reported below each number in parentheses) 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. *NonH* represents the firms that are not in the highest DA quintiles. NonH firms are divided into two groups, *NonH-L* and *NonH-H*, based on the one-quarter abnormal return prior to the repurchase announcement.

run returns. Unless one assumes that false-signaling firms are overvalued at the time of the buyback announcement, one does not anticipate any significant long-term abnormal performance (positive or negative). The potential for overvaluation among this subset of firms seemingly would not appear to be high. Generally speaking, firms which announce buyback programs have already suffered from a relative decline in stock price performance. For firms which also have poor earnings quality, the pre-announcement decline is more remarkable; these firms collectively *underperformed the market by -20%* in the year prior to a buyback announcement. Moreover, among these high discretionary accrual firms, those which also experience poor stock price performance in the quarter preceding the buyback announcement have underperformed the market in the prior year by *-42%* on average. In these cases where relative prices have fallen so dramatically, the notion that these firms are still overvalued and should suffer further from a market imposed negative post-announcement drift seems unlikely.

4.2. Operating performance

Table 6 reports operating performance for the highest DA quintile and for the bottom four DA quintiles combined over the four quarters before and eight quarters after a repurchase announcement. Panel A reports median unadjusted ROAs while Panel B reports industry, pre-event performance market-to-book and DA-adjusted ROAs. Taken together, there are noticeable differences in operating performance between the High DA group and all other firms in the post-announcement period. The bottom four DA quintile firms (NonH) collectively show positive abnormal operating performance after the buyback announcement. For example, in Panel B, while abnormal ROA in quarter -1 is 0.10%, it jumps to +0.21% in quarter 1 and further to +0.31% in quarter 3. For each of the eight post-event quarters, abnormal ROAs remain significantly positive for NonH firms.

Conversely, we do not see such outperformance in High DA firms. Instead, relative operating performance for firms using aggressive accounting practices at the time of buyback announcement decreases from 0.06% in quarter -1 to -0.27% in quarter +8 (*p*-value = .000). 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 quarters +5 to +8. When High-L firms are compared with NonH firms with low prior quarter abnormal returns (i.e., NonH-L firms), we still find that High-L firms significantly underperform NonH-L firms in most quarters. This suggests that the poor abnormal performance of High-L firms is not entirely due to the lower prior returns. In unreported results, we cumulate changes in abnormal ROAs over eight post-event quarters and find a remarkably negative performance for High DA, especially for High-L, firms. We also examine operating performance based on annual ROAs (not tabulated here). High DA firms underperform the benchmark by 0.30% in year 1 and 0.74% in year 2 while the other four DA quintiles outperform the benchmark by 0.81% in year 1 and 1.06% in year 2. Moreover, High-L firms perform very poorly: -0.78% in year 1 and -1.93% in year 2. All these results are consistent with what we report in Table 6.⁸

⁸ Lie (2005) also finds that 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.

Table 6
Quarterly operating performance.

DA groups	Event-quarter											
	−4	−3	−2	−1	1	2	3	4	5	6	7	8
<i>Panel A: Unadjusted ROA</i>												
NonH	4.22	4.21	4.24	4.23	4.04	4.03	3.98	3.92	3.83	3.76	3.74	3.70
High	4.31	4.20	4.20	3.91	3.68	3.53	3.46	3.37	3.37	3.13	3.13	3.10
NonH-High	−0.09	0.01	0.05	0.31	0.36	0.49	0.52	0.55	0.47	0.63	0.60	0.60
	(0.041)	(0.957)	(0.129)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
High-L	4.63	4.54	4.45	4.25	3.82	3.68	3.61	3.40	3.40	3.11	3.06	2.99
High-H	3.94	3.94	3.79	3.57	3.58	3.43	3.30	3.33	3.34	3.15	3.24	3.27
NonH-L	4.53	4.53	4.55	4.44	4.16	4.07	3.96	3.93	3.82	3.72	3.71	3.72
NonH-H	3.90	3.99	3.92	3.98	3.94	3.99	3.99	3.92	3.84	3.80	3.75	3.65
NonH-L – High-L	−0.10	−0.02	0.10	0.19	0.33	0.39	0.35	0.54	0.41	0.62	0.65	0.74
	(0.088)	(0.934)	(0.241)	(0.007)	(0.001)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
<i>Panel B: Abnormal ROA</i>												
NonH	0.36	0.38	0.33	0.10	0.21	0.28	0.31	0.18	0.16	0.28	0.26	0.15
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.026)
High	0.46	0.48	0.30	0.06	0.02	0.05	0.06	0.01	−0.10	−0.11	−0.25	−0.27
	(0.000)	(0.000)	(0.000)	(0.002)	(0.651)	(0.976)	(0.448)	(0.728)	(0.042)	(0.075)	(0.015)	(0.000)
NonH-High	−0.10	−0.10	0.02	0.05	0.19	0.22	0.25	0.17	0.26	0.39	0.51	0.42
	(0.002)	(0.042)	(0.707)	(0.280)	(0.012)	(0.000)	(0.009)	(0.105)	(0.001)	(0.001)	(0.000)	(0.000)
High-L	0.56	0.54	0.38	0.03	−0.14	−0.08	0.05	0.00	−0.43	−0.40	−0.62	−0.63
	(0.000)	(0.000)	(0.000)	(0.221)	(0.202)	(0.343)	(0.711)	(0.586)	(0.003)	(0.001)	(0.007)	(0.000)
High-H	0.34	0.42	0.26	0.09	0.18	0.19	0.06	0.04	−0.01	0.13	0.07	0.10
	(0.000)	(0.000)	(0.000)	(0.001)	(0.040)	(0.272)	(0.445)	(0.921)	(0.818)	(0.371)	(0.581)	(0.630)
NonH-L	0.47	0.48	0.38	0.10	0.10	0.14	0.12	0.02	0.01	0.14	0.17	0.06
	(0.000)	(0.000)	(0.000)	(0.000)	(0.009)	(0.002)	(0.008)	(0.504)	(0.506)	(0.417)	(0.565)	(1.000)
NonH-H	0.26	0.28	0.26	0.10	0.33	0.42	0.47	0.30	0.31	0.36	0.33	0.22
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
NonH-L – High-L	−0.09	−0.06	0.00	0.08	0.24	0.22	0.07	0.02	0.44	0.55	0.79	0.69
	(0.021)	(0.346)	(0.910)	(0.091)	(0.029)	(0.041)	(0.576)	(0.879)	(0.012)	(0.001)	(0.007)	(0.000)

This table presents median operating performance (in %) around repurchase announcements for the bottom four DA quintiles (NonH) and the top DA quintile (High). Operating performance is measured by quarterly return on assets (ROAs) defined as operating income before depreciation divided by average total assets. Quarter 1 (−1) represents the quarter of (prior to) the repurchase announcement. Panel A shows unadjusted ROAs, and Panel B presents industry, prior ROAs, M/B and DA-adjusted abnormal ROAs. The details on the calculation of abnormal ROAs are described in the Appendix. *High-L* (*High-H*) represents the highest DA quintile with prior one-quarter abnormal return below (above) the median prior one-quarter abnormal return of all highest DA quintile firms. *NonH-L* (*NonH-H*) represents the bottom four DA quintiles with prior one-quarter abnormal return below (above) the median prior one-quarter abnormal return of all NonH firms. *NonH-High* and *NonH-L – High-L* test differences between the bottom four DA quintiles and top DA quintile and between NonH-L and High-L groups, respectively. Numbers in parentheses are *p*-values based on Wilcoxon median tests.

4.3. Actual buyback activity

We have been using earnings quality as a proxy for the potential of 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. This would be particularly true if the share repurchase was unequivocally intended to be a false signal and was not confounded with any other economic motive. To investigate whether other factors might be at work, 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 fewer shares, particularly after we control for confounding factors.

We estimate actual buyback activity in the year following a given repurchase announcement 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 6323 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 the actual buyback amount relative to the market value of equity to examine whether the actual buyback amount is significantly different for High DA firms.⁹

Although not reported here, we estimated actual buyback activity conditional on DA. The results show that suspect High DA firms do indeed buy back fewer shares during the first year after an OMSR announcement. For example, the mean percentage of market value repurchased (the mean actual buyback relative to program size) is 4.8% (54.0%) for High DA firms versus 5.3% (58.4%) for all other firms. The differences are significant at the 0.05 significance level. Actual repurchase activity is lower, 4.5% (50.8%), for High DA firms with low prior returns (High-L).

⁹ Further, using the intended program size rather than actual buyback amounts produces qualitatively similar results.

As mentioned earlier, given that actual buyback activity is affected by various factors including prior price performance, we examine actual buyback activity in a multivariate setting 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. Yet after controlling for these previously established 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 two-year abnormal return, the coefficient on the High DA dummy variable is negative and significant, a result consistent with the manipulation story. Regarding the role of stock options, option exercise activity is not significantly related to actual repurchase levels. In addition, we do not find any significant difference in the impact of the amount of exercised option on actual buyback activity between High DA (or High-L) and other firms. The results indicate that even though stock options appear to be an important factor for low earnings quality firms in making their OMSR decisions, we do not find evidence that their actual repurchase decisions are closely related to the option exercise activity.

Table 7
Actual repurchase regressions.

Model	1	2	3	4
Intercept	1.2249 (0.045)	3.0355 (0.000)	1.0094 (0.095)	3.0459 (0.000)
High DA dummy	-0.5821 (0.016)	-0.5996 (0.013)		-0.5996 (0.013)
High DA dummy × exercised option	0.5733 (0.636)	0.5813 (0.632)		0.5760 (0.635)
High-L dummy			-0.8360 (0.010)	
High-L dummy × exercised option			0.1496 (0.934)	
Exercised option	-0.3585 (0.456)	-0.5017 (0.297)	-0.2626 (0.576)	-0.5049 (0.294)
Exercised option missing dummy	0.2038 (0.428)	0.0717 (0.780)	0.2231 (0.384)	0.0709 (0.782)
Log(size)	0.1282 (0.033)	0.0076 (0.890)	0.1347 (0.025)	0.0074 (0.893)
Shares announced	0.2595 (0.000)	0.2639 (0.000)	0.2592 (0.000)	0.2639 (0.000)
Abnormal announcement return	-0.3040 (0.799)	-0.1612 (0.893)	-0.3780 (0.752)	-0.1588 (0.895)
Prior one-year abnormal return	0.3798 (0.019)	0.4973 (0.002)		0.4979 (0.002)
Log(1 + B/M)	2.2483 (0.000)		2.3372 (0.000)	
CASH	0.5275 (0.343)		0.4864 (0.379)	
LEV	-0.3738 (0.448)		-0.4431 (0.368)	
High B/M dummy		0.7890 (0.002)		0.7878 (0.002)
High CASH dummy		-0.1008 (0.647)		-0.1017 (0.644)
Low LEV dummy		0.1837 (0.371)		0.1845 (0.369)
Two-year abnormal return				0.0185 (0.859)

This table presents 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, 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 1 for the top DA quintile, 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. *Exercised option* represent the options exercised by top-five executives divided by shares outstanding over two years after the repurchase date. *Exercised option missing dummy* is equal to one if the observation has no valid exercised option from ExecuComp, and zero otherwise. *Log(size)* is the natural log of 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. *Log(1 + B/M)* is the natural log of one plus 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* is the industry median-adjusted cash plus short-term investment over total assets. *LEV* is the industry median-adjusted ratio of the total debt to total assets at the fiscal year-end prior to the announcement. *High B/M dummy* is 1 for the top B/M 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. *Two-year abnormal return* is the buy-and-hold return compounded from three days after the announcement date up to the second 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.

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

While the evidence presented so far is seemingly consistent with the manipulation story, it is plausible that alternative explanations might be at work. We have already identified that the prevention of dilution from anticipated option exercise activity in the future is one such alternative story. However, another possible motive that is difficult to casually rule out relates to undervaluation or perceived mispricing. Many studies cite this as a key issue (e.g., Brav et al, 2005). In fact, poor pre-announcement performance has recently been argued by Peyer and Vermaelen (2009) as direct evidence in support of the mispricing hypothesis. Another confounding issue for example may be the “bad model problem” (Fama, 1998) where results are potentially suspect given difficulties in estimating long-term stock performance.

In this section, we address whether some of these alternative explanations may be at work and explore the robustness of our findings. The goal is not to refute a complete set of alternative stories, but rather to see if some previously reported factor might account for the results we find for High DA firms, particularly for those High DA firms with poor performance prior to the buyback announcement where the incentive to potentially manipulate investor opinion is seemingly high.

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 correlation 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 estimates if the underlying return model is somehow mis-specified. 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 two-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 consider this argument by reporting return evidence using a calendar-time approach. In the Appendix, we provide 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, thus eliminating the overlapping observations problem. 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.¹⁰ Perhaps more importantly, recent papers in the accounting and finance literatures have identified discretionary accruals as a priced factor in the cross-section (Chan et al., 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 calendar-time results for portfolios formed assuming either an equal- or log-value-weighted strategy. Monthly portfolios are formed using buyback firms that have announced buybacks within the past two years. Point estimates for the intercepts are positive for DA quintiles 1 to 4 under both investment strategies and are significant at conventional levels. The key finding though, is that for High DA firms, the intercepts are not significant as the point estimates are close to zero (0.07% and 0.14% respectively for the equal- and the log-value-weighted approaches).

Given that we have subdivided the poor earnings quality quintile by the abnormal return in the quarter preceding the buyback announcement, our approach by definition builds in a potential momentum bias. As such, the momentum factor used in the calendar-time approach indeed has some appeal. Yet even after controlling for downward momentum in our High-L portfolio, we still fail to find any evidence of abnormal drift in firms where managers conceivably were under relatively greater pressure to buy back stock. Moreover, consistent with the evidence reported in Table 5, we also find highly significant alphas for both of the NonH sub-portfolios estimated under either formation style.

In conclusion, while one can never rule out the “bad model” problem completely, we have some assurance in the robustness of the point estimates and their statistical significance. Firms with aggressive reporting practices do not seem to show the same long-horizon abnormal performance more generally observed in buyback companies.¹¹

5.2. Undervaluation, free cash flow, maturity, and leverage

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. Peyer and Vermaelen (2009) find supporting evidence for this same notion; they report that long-run return performance following OMSRs is negatively related to the return observed six-months prior to their announcement. Given that firms in the highest DA quintile also tend to experience poor performance prior to their repurchase announcement, it is logical to presume that perhaps mispricing is also motivating buybacks

¹⁰ Numerous studies adopt this approach including Clarke et al. (2004) and Eberhart et al. (2004).

¹¹ 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. 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 et al. (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.

Table 8
Two-year abnormal returns based on a five-factor model.

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 (4.24)	1.0025 (46.17)	0.4948 (17.65)	0.1989 (5.41)	-0.2266 (-8.58)	-0.2066 (-2.48)	228	93.14%	0.0038 (4.43)	1.0072 (48.47)	0.3763 (14.03)	0.1754 (4.99)	-0.1874 (-7.41)	-0.2210 (-2.77)	228	93.14%
Low	0.0024 (1.75)	1.0560 (31.44)	0.6457 (15.15)	0.1884 (3.28)	-0.2403 (-5.82)	0.0209 (0.16)	201	88.71%	0.0034 (2.48)	1.0709 (32.56)	0.5772 (13.83)	0.1524 (2.71)	-0.2270 (-5.61)	-0.0597 (-0.46)	201	88.71%
2	0.0053 (4.30)	1.0152 (34.68)	0.4210 (11.14)	0.1774 (3.57)	-0.2552 (-7.10)	-0.1494 (-1.33)	226	88.14%	0.0052 (4.31)	1.0051 (35.00)	0.3080 (8.31)	0.1340 (2.75)	-0.2146 (-6.08)	-0.1269 (-1.15)	226	88.14%
3	0.0038 (3.48)	0.9531 (36.66)	0.3506 (10.47)	0.2257 (5.09)	-0.2084 (-6.47)	-0.2363 (-2.34)	222	88.73%	0.0035 (3.29)	0.9684 (38.40)	0.2349 (7.23)	0.2220 (5.17)	-0.1645 (-5.26)	-0.2458 (-2.51)	222	88.73%
4	0.0054 (4.61)	1.0277 (36.52)	0.5025 (13.83)	0.2519 (5.27)	-0.1690 (-4.89)	-0.3678 (-3.40)	225	89.16%	0.0047 (4.29)	1.0280 (39.57)	0.3838 (11.44)	0.2300 (5.21)	-0.1386 (-4.34)	-0.4063 (-4.07)	225	89.16%
High	0.0007 (0.42)	1.0006 (27.01)	0.6826 (14.25)	0.1237 (1.94)	-0.3280 (-7.15)	-0.1871 (-1.31)	223	84.80%	0.0014 (1.03)	1.0194 (31.70)	0.5939 (14.28)	0.1035 (1.87)	-0.2783 (-6.99)	-0.1892 (-1.52)	223	84.80%
High-L	-0.0015 (-0.62)	1.0375 (17.37)	0.7957 (10.82)	0.0500 (0.50)	-0.4176 (-5.72)	-0.0980 (-0.43)	197	74.92%	-0.0016 (-0.73)	1.0332 (18.97)	0.7377 (11.00)	0.0090 (0.10)	-0.3700 (-5.56)	-0.1657 (-0.80)	197	74.92%
High-H	0.0024 (1.41)	0.9968 (24.16)	0.6130 (11.50)	0.2209 (3.14)	-0.2819 (-5.55)	-0.3118 (-1.96)	225	79.83%	0.0030 (2.03)	1.0083 (28.69)	0.5115 (11.26)	0.2060 (3.44)	-0.2235 (-5.16)	-0.2878 (-2.13)	225	79.83%
NonH-L	0.0039 (3.26)	1.0441 (36.93)	0.5543 (15.19)	0.1803 (3.77)	-0.2961 (-8.61)	-0.3308 (-3.05)	228	90.03%	0.0040 (3.54)	1.0452 (38.56)	0.4431 (12.67)	0.1617 (3.53)	-0.2670 (-8.09)	-0.3611 (-3.47)	228	90.03%
NonH-H	0.0046 (4.91)	0.9730 (43.64)	0.3811 (13.24)	0.2500 (6.63)	-0.1316 (-4.85)	-0.0968 (-1.13)	228	91.71%	0.0040 (4.39)	0.9809 (44.37)	0.2676 (9.38)	0.2184 (5.84)	-0.0973 (-3.62)	-0.1098 (-1.29)	228	91.71%

This table reports two-year abnormal returns based on a five-factor model. In addition to four factors used in the 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 1982 to 2000, we form a calendar-time portfolio by including sample firms that have announced repurchase programs in the past 24 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 (10 for High-L and High-H) are excluded from the regression. N is the number of months in a given regression. 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 size and B/M-adjusted abnormal return of the highest DA quintile firms. NonH-L (NonH-H) represents the bottom four DA quintiles with prior one-quarter abnormal return that is below (above) the median prior one-quarter abnormal return of the firms in bottom four DA quintiles.

in High DA firms. On the other hand, we considered this evidence previously in Tables 5 and 6 and concluded otherwise. While firms in the highest DA quintile do show comparatively poor pre-announcement performance, they also continue to show poor post-announcement return and operating performance as well. Unless managers in these firms were misguided in their beliefs, the evidence would not seem consistent with the undervaluation hypothesis. Conversely, the same is not true of other buybacks. Instead, while these firms also suffer material declines prior to announcing a repurchase, they generally show subsequent rebounds in abnormal stock and operating performance, results consistent with undervaluation.

Corporate finance theory also suggests that firms use buybacks to reduce free cash flow either to lessen agency problems (Jensen, 1986) or to react to decreased investment opportunity sets as they mature (Grullon and Michaely, 2004). Although not reported here, we investigated whether these factors might be confounding our results for High DA firms by examining changes in industry median-adjusted abnormal cash relative to total assets for each discretionary accrual group. When considering the agency or maturity hypothesis, obtaining a precise measure of “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 used a stock measure defined as cash plus short-term investments (Compustat item 1) over total assets,¹² the same measure used by Grullon and Michaely (2004). The free cash flow hypothesis predicts that buyback programs are intended to significantly alter firms' free cash flow. Although not reported here, we find that while we see significant decreases in cash for most DA quintiles, the change in the point estimate for High DA firms is *not* significantly different from zero.

Another primary factor why firms repurchase stock is to alter capital structure thus increasing leverage. If managers in High DA were deliberating altering leverage through OMSRs, we would expect to observe increases in leverage after buyback announcements. Here, we estimate 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. Although not reported here, we do not find any significant changes in leverage for High DA firms. Deliberate changes in capital structure by High DA firms would not seem to be a confounding factor.

Finally, one might argue that due to the severe drop in stock prices that High DA firms experience, managers may have engaged in naïve market timing under the impression it was a “good time” to buy back shares. Again, this is a simple variation of the idea 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 fact that actual buyback activity of High DA firms shows significantly *fewer* shares involved compared to other firms seems to refute this idea of naïve market timing.¹³

5.3. Regression analysis

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 this section, we consider these factors together in a multivariate framework.

We use a multivariate environment to evaluate 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 two-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 examine the two-year BHARs in Table 9.¹⁴

¹² As a robustness check, we also estimated a flow measure as motivated by Lehn and Poulsen (1989). The downside to such an approach is that it is directly affected by accruals. Given our context, this measure by definition is not an appealing measure and thus not reported here. Nevertheless, the conclusions reached using this approach do not change.

¹³ In results not reported here, we examine whether firms might choose to issue more shares right after OMSR announcements. For example, managers might personally benefit from manipulation by exercising options or selling acquired shares at inflated prices. We find no evidence of High DA or High-L firms engaging in equity issues more than other types of firms after OMSR announcements. We also considered whether our findings are related to a recent work by Massa et al. (2007). They posit that low-quality firms try to “mimic” the actions made by other higher-quality firms in the same industry (particularly in concentrated industries) in order to avoid creating a negative market perception. As such, one might conjecture whether low-quality firms wishing not to be identified announce a buyback in order to mimic announcements otherwise made by high-quality firms. To test this hypothesis, we considered industry concentration across DA quintiles. We estimated three different approaches to defining industries — four-digit SIC, three-digit SIC, and Fama-French (1997) industry classifications. Regardless of approach, there is no significant difference in mean concentration across various DA groupings. For example, based on the three-digit SIC classification, High DA firms have a Herfindahl Index of 20.0% while all other firms as a group have a mean value of 20.2%. Mimicking does not seem to explain our findings.

¹⁴ In Table 9, due to extreme skewness we exclude cases with abnormal two-year returns in the top 1.5% percentile to avoid their inordinate impact on the regression results.

Table 9

Cross-sectional regressions of two-year abnormal returns.

Model	1	2	3	4
Intercept	−0.2760 (0.000)	−0.0619 (0.302)	−0.2561 (0.000)	−0.0494 (0.409)
High DA dummy	−0.0919 (0.035)	−0.0981 (0.025)		
High DA dummy × exercised option	0.5597 (0.003)	0.5635 (0.002)		
High-L dummy			−0.1971 (0.001)	−0.2122 (0.000)
High-L dummy × exercised option			0.5705 (0.064)	0.5808 (0.054)
Exercised option	0.1500 (0.022)	0.1254 (0.057)	0.1814 (0.005)	0.1575 (0.015)
Exercised option missing dummy	0.0145 (0.621)	0.0045 (0.877)	0.0117 (0.688)	0.0023 (0.938)
Log(Size)	0.0281 (0.000)	0.0132 (0.068)	0.0258 (0.001)	0.0114 (0.117)
Log(1 + B/M)	0.3049 (0.000)		0.2927 (0.000)	
CASH	0.1183 (0.164)		0.1128 (0.183)	
LEV	0.0685 (0.317)		0.0553 (0.419)	
High B/M dummy		0.0979 (0.007)		0.0939 (0.010)
High CASH dummy		0.0297 (0.355)		0.0289 (0.367)
Low LEV dummy		−0.0449 (0.108)		−0.0413 (0.139)
Shares announced	0.6660 (0.004)	0.7618 (0.001)	0.6741 (0.004)	0.7654 (0.001)
Prior one-year abnormal return	−0.0561 (0.023)	−0.0410 (0.088)	−0.0633 (0.011)	−0.0492 (0.044)
Actual buyback	−0.7545 (0.000)	−0.7153 (0.000)	−0.7983 (0.000)	−0.7597 (0.000)
Actual buyback × high DA dummy	0.3950 (0.444)	0.4612 (0.373)		
Actual buyback × high-L dummy			1.3327 (0.048)	1.4291 (0.034)

This table reports cross-sectional regression results of buy-and-hold size and B/M-adjusted abnormal returns. The dependent variable is two-year abnormal stock returns, excluding cases with abnormal returns in the top 1.5% percentile to eliminate their dominating impact on the analysis reported here. *High DA dummy* is 1 for the top DA quintile, 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. *Exercised option* is the options exercised by top-five executives divided by shares outstanding over two years after a buyback announcement. *Exercised option missing dummy* is equal to one if the observation has no valid exercised option data from the ExecuComp, and zero otherwise. *Log(size)* is the natural log of the market value of equity at the month-end prior to the repurchase announcement. *Log(1 + B/M)* is the natural log of one plus 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* is the industry median-adjusted cash plus short-term investment over total assets. *LEV* is the industry median-adjusted ratio of the total debt to total assets at the fiscal year-end prior to the announcement. *High B/M dummy* is 1 for the top B/M 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 size and B/M-matched firms over the same period. *Actual buyback* is the actual buyback amount divided by average market value of equity. Numbers in parentheses are *p*-values based on White (1980) heteroskedasticity-adjusted *t*-statistics.

We see in Table 9 that in models one and two, the coefficients on the High DA quintile dummy are negative and significant (*p*-values of 0.035 and 0.025) after controlling for other factors. Consistent with previous results, High DA firms perform worse than other repurchasing firms holding everything else constant. In models three and four 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 becomes more significantly negative (*p*-value of 0.001) after controlling for various factors, suggesting the relative poor performance of High-L firms in the two years following repurchase announcement.

Regarding the impact of actual buyback activity, the coefficient on this variable in models three and four (where we interact actual buyback activity with a High-L dummy) shows that the positive effect of actual buyback activity is significantly greater for High-L firms. This suggests that actual buyback activity is more crucial in determining abnormal performance of High-L firms, but is only marginally important for High DA firms. In other words, abnormal performance of High-L firms depends critically on whether managers actually bought back stock. To the extent managers are only “bluffing” with a buyback announcement, the results are seemingly consistent with manipulation. High-L firms, where managers announce a program but *do not* follow through with actual repurchase, show significantly

poorer long-run performance than those High-L firms that actually buy back many shares. 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 simply by announcing a buyback program without actually buying back shares.

Turning to option exercise behavior, we do find that executives in High DA firms exercise comparatively more options in the two years following a repurchase announcement (Table 4). Given the concern over earnings dilution that is frequently voiced, we incorporate this as a possible regressor to the models in Table 9 and also as an interaction term with High DA (or High-L). The coefficients for option exercise and for the interaction term are each positive and significant at traditional significance levels. This is consistent with the idea that some buybacks in firms where management was under pressure may be related to the prevention of dilution from future option exercises and in such a case, their stock performance is better than the performance of other low earnings quality firms. It is important, however, that we interpret these results with some measure of caution as we have limited option data for only about a quarter of the firms in the High DA (and High-L) group. Thus, it is difficult to judge with any conviction whether dilution from option exercise is a critical factor.

6. Summary and conclusion

Previous studies have examined a number of reasons for why firms repurchase stock. One motivation in particular, the potential that buybacks are a positive signal to investors, has been a key focus of numerous papers. Yet among the various ways firms repurchase stock, not all carry the same commitment. Given their flexibility and the lack of any meaningful penalty for behaving otherwise, we consider whether Open-Market Share Repurchases (OMSRs) are perhaps used in a misleading way. By design, OMSR programs are not binding and are structured for flexibility. Open-market 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. This idea contrasts sharply with the generally economically favorable and well-motivated reasons the literature has offered as to why managers repurchase stock.

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. While a precise metric of managerial intent cannot be defined, we focus on firms with poor earnings quality as a proxy for this potential to mislead investors. In these cases (especially those cases which also experience poor stock performance right before a buyback announcement), announcing an open-market share repurchase program may serve as an inexpensive mechanism to send a false signal to manipulate market expectations. While this approach may also be noisy, it is reasonable to assume that the propensity for manipulation is higher among firms categorized in this sub-group.

Using 7628 programs announced between 1980 and 2000, we find evidence which suggests that manipulation may have been an important factor in cases where the potential for manipulation was a concern. Using our proxy, we find that managers who were using accruals to inflate earnings are under comparatively greater stress to falsify signal. Despite the efforts of managers to pad their earnings, information flow in the marketplace for these firms is unexpectedly negative prior to a buyback announcement. Although earnings are not falling per se, sales, cash flows adjusted for accruals as well as abnormal 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. Further, these same managers also tend to be exposed to greater incentive effects through option positions, thus having more personal wealth at risk. Taken together, this seemingly points to a management collectively under stress.

Despite this potential for manipulation, 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. Over longer horizons, the evidence is quite different. Generally speaking, post-announcement abnormal return drifts are positive and both economically and statistically significant. However, for firms with low earnings quality, we see a sharp contrast. There is no evidence of 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, comparatively poor post-announcement return performance is readily 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 the manipulation hypothesis, the operating performance of high DA firms shows clear evidence of deterioration after the announcement.

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, book-to-market ratio and DA, suggesting that buyback announcements made by low earnings quality firms had no long-term adverse 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. 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 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 whether the buybacks of interest here may have been a rational response to changes in a maturing company's opportunity set or may have been

motivated by a desire to alter capital structure. None of these other alternatives seems to explain the broader conclusion for low earnings quality firms.

The evidence is consistent with the notion that a subset of managers when announcing a share buyback, may have done so with the intent of misleading investors. While one cannot definitively rule out managerial hubris, this too cannot dismiss the manipulation story. Clearly, prices are falling and it is natural to expect that managers might defensively choose to 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 to that same extent as other buyback companies seemingly contradicts the hubris story.

One important explanation which we do find as a contributing factor relates to future dilution from option exercise activity. For whatever reason, perhaps endogenous to the overall environment, we find that managers in our sample with low earnings quality also tend to hold and exercise comparatively more options. Several studies find that a general desire to avoid “earnings dilution” is an important factor (Jolls, 1998; Fenn and Liang, 2001; Weisbenner, 2000). This possibility may be a contributing factor.

Unfortunately, it is impossible to identify the true motivation or set of motivations behind a given buyback announcement. As such, it is inappropriate to make conclusive statements about whether firms necessarily use share repurchases in misleading ways. However, using a set of seemingly reasonable company attributes, the results indicate that at least some set of repurchasing firms, perhaps a set limited in number, may have used the announcement of an open-market buyback to mislead investors. As expected, while these firms seem to see a small short-term benefit to the announcement, shareholders in these companies do not receive large benefits from buyback announcements otherwise evident in long-horizon evidence.

Appendix A

A.1. Developing a proxy for managerial intent – earnings quality

To gauge earnings quality, we follow Sloan (1996) and Chan et al. (2006) to define accruals in Eq. (1), with Compustat annual item numbers in parentheses.¹⁵

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

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 a repurchase announcement. 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

$$\frac{\text{Accruals}_i}{\text{TA}_i} = a_0 \frac{1}{\text{TA}_i} + a_1 \frac{\Delta\text{Sales}_i}{\text{TA}_i} + a_2 \frac{\text{PPE}_i}{\text{TA}_i} + \varepsilon_i, \quad (2)$$

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 et al. (1998) and estimate coefficients in model (2) each year for each of the 48 Fama and French (1997) industries using all NYSE/AMEX/NASDAQ stocks.¹⁶ We then compute NDA and DA for each repurchase firm as:

$$\text{NDA}_i = (\hat{\alpha}_0 + \hat{\alpha}_1 \Delta\text{Sales}_i + \hat{\alpha}_2 \text{PPE}_i) / \text{TA}_i \quad \text{DA}_i = \text{Accruals}_i / \text{TA}_i - \text{NDA}_i \quad (3)$$

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.

¹⁵ 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.

¹⁶ 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 Eq. (2).

A.2. Event-time, buy-and-hold abnormal returns

We calculate quarterly BHRs for each firm in our sample for the quarter before and the two years following the repurchase announcement, where each quarter is defined as 63 trading days. For each event-quarter, portfolio returns are computed based on BHRs of sample firms, assuming an equal-weighted investment strategy. Longer horizon portfolio returns are obtained by compounding quarterly portfolio returns across event quarters. 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; Mitchell and Stafford, 2000), we exclude extreme observations within the top 0.75 percentile of returns when computing post-event quarterly 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 et al. (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, 1996; Lakonishok, et al., 1994). In addition, we control for DA given that recent studies also identify DA as priced in the cross-section (Chan et al., 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 et al. (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, and 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 1000 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.

A.3. Measuring abnormal operating performance

We evaluate several measures of operating performance. An important issue, however, is identifying abnormal performance. We use a matching firm approach defined on the basis of Return on Assets (ROA). 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).

Following Lie (2005), we define abnormal operating performance by taking the quarterly ROA of each buyback firm and subtracting the concurrent ROA of a benchmark firm matched on the basis of industry, Discretionary Accruals (DA), pre-event return performance, and market-to-book ratio (M/B). In this study, controlling for DA is important since firms with very high (or very low) discretionary accruals would be 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 sample firm by locating all firms at a given point in time with the same two-digit SIC code, and then choosing the company with the closest pre-event one-quarter and one-year ROA, M/B ratio, and DA as the sample firm. We require that the matching firm's pre-event one-quarter and one-year ROA, M/B ratio and DA be within the range of [80%, 120%] of the sample firm's corresponding ROA, M/B ratio and DA, respectively. Since ROA for some sample firms approaches zero, this method can become restrictive with no possible matches. In this case, we check whether pre-event ROA (both one-quarter and one-year) is within one percentage point of that of the target firm – and if so, we continue with the best match given how close the respective ROAs match. If this approach fails, we relax the industry requirement to the one-digit SIC level and repeat the above steps. If this approach fails, we remove the industry restriction altogether. If we still do not have a match at this point, we identify the firm with the closest quarterly ROA, annual ROA, M/B and DA matched to the sample firm, thus minimizing the following condition¹⁷:

$$\begin{aligned} \min & |ROA_{\text{quarter } t-1, \text{sample firm}} - ROA_{\text{quarter } t-1, \text{matching firm}}| \\ & + |ROA_{\text{four quarters ending with quarter } t-1, \text{sample firm}} - ROA_{\text{four quarters ending with quarter } t-1, \text{matching firm}}| \\ & + |M/B_{\text{quarter } t-1, \text{sample firm}} - M/B_{\text{quarter } t-1, \text{matching firm}}| + |DA_{\text{quarter } t-1, \text{sample firm}} - DA_{\text{quarter } t-1, \text{matching firm}}| \end{aligned} \quad (4)$$

¹⁷ Among repurchase firms with valid ROAs, 66.6% of the sample matched in the most restrictive form described above. At the next level, 21.1% matched at the less restrictive one-digit SIC-code level. Further, 6.0% met all filter restrictions, but not using the industry requirement. The remaining 6.3% of sample firms were matched according to Eq. (4). As a robustness check, we also applied a separate approach based on a Fama and French (1997) industry classification scheme. The results are similar to those reported here.

A.4. Calendar-time abnormal returns derived from factor models

In each month during our sample period, we form a portfolio of firms which have announced share repurchases at any point in the previous two years and then compute a 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:

$$R_{p,t} - R_{f,t} = \alpha + \beta(R_{m,t} - R_{f,t}) + sSMB_t + hHML_t + wWML_t + e_t \quad (5)$$

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 the stock 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, Chan et al. (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 Eq. (6):

$$R_{p,t} - R_{f,t} = \alpha + \beta(R_{m,t} - R_{f,t}) + sSMB_t + hHML_t + wWML_t + gGMB_t + e_t \quad (6)$$

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 Eq. (5). 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 Eq. (2)) on all firms for which we have data in order to estimate their discretionary accruals (based on Eq. (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 two years. In order to season these portfolios, portfolio formation occurs in 1982 even though our sample period starts in 1980. We exclude calendar months with less than twenty firms in the portfolio (for High-L and High-H portfolios, we require at least 10 stocks in each calendar month). 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; Brav et al., 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, right-skewed market capitalizations. As mega-cap firms announce buybacks, estimating calendar-time performance using value-weighting leads, by definition, to a weak test environment given the resulting noisy, undiversified portfolios formed using this technique (for further discussion, see Loughran and Ritter, 2000).

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