Do Firms Knowingly Repurchase Stock for Good Reason?

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Abstract

Corporations are repurchasing stock in record numbers. The underling motive varies across firms, however a key underlying belief is that buybacks can enhance shareholder value. We reconsider the empirical evidence following repurchase announcements by focusing on whether managers repurchase stock in a manner consistent with increasing shareholder value. Overall, the long-horizon return drift following repurchase announcements is higher when managers buy back stock compared to when they do not, a result consistent with the undervaluation hypothesis. We also see high abnormal performance for buyback firms with high free cash flow, although overall support for this hypothesis as a source of gain is mixed. Managers do not, however, utilize their informational advantage for personal gain. This may be a consequence of the conservative trading restrictions and oversight that most firms now impose on manager behavior, thus reducing the informativeness of their trades around important corporate events.

Prior to the regulatory framework established in 1982, open market stock repurchase activity in the U.S. was comparatively low.[1] Today, corporate attitudes have shifted and open market repurchases are pervasive. Grullon and Ikenberry (2000) report that as of January 2000, more than half of all S&P 500 stocks have authorized programs in place.[2] While cash distributions to shareholders were once limited primarily to dividends, today repurchases account for roughly half of the capital that companies distribute to their shareholders (Grullon and Michaely (2000)).

Economic theory provides several motivations for why firms might authorize and execute open market repurchase programs. These motives are typically linked to helping the company extract some economic benefit. Managers seem to be aware of these potential benefits as well. In a recent survey of over 1,000 CFOs by *Institutional Investor* magazine, the two most frequently mentioned motivations for stock repurchase programs are consistent with the most well-known and discussed motives offered by financial economists.[3] Nearly half of the CFOs reported that the chief reason for buying back stock is "to add value for shareholders." While arguably a vague response, this motivation is seemingly consistent with a growing academic literature on the undervaluation hypothesis. Here, repurchases can be viewed simply as an investment alternative among all investment projects. When managers sense that market prices are too low compared to true value, they can enhance long-term shareholder interests by buying back stock just as shareholders benefit from managers choosing to invest in any attractive project. Of course, if prices do not deviate from fair value or alternatively if managers have no particular benefit or insight from the their position as insiders, the undervaluation hypothesis predicts no abnormal benefit

[1] After several years of debate, SEC rule 10b-18 was enacted in November 1982. News articles at that time credit this rule with giving firms greater clarity on how and when repurchases should be executed. Some, including the Commissioner of the SEC at that time, argued that the rule substantially reduced the litigation risk firms formerly were facing over potential charges of price manipulation.

[2] Grullon and Ikenberry (2000) find that as of January 2000, 58.2% of the firms in the S&P 500 index had authorized a repurchase program within the preceding three years. Similarly, in a 1998 survey by *Institutional Investor* of a broad cross-section of CFOs, 44.2% responded that they had announced a stock buyback within the past 12 months.

[3] *Institutional Investor*, July 1998, page 30.

to repurchasing stock. In short, repurchases by themselves as a transaction do not uniformly and directly affect economic value, but instead are a response to a fundamental economic discrepancy that managers may perceive on occasion.

The second most common response the CFOs provided was to "return surplus cash." Here, a rich literature, starting with Jensen (1986), has developed around the notion that agency costs are imposed on firms with unnecessarily high free cash flow. To the extent that the market penalizes these firms out of concern that managers may abuse these slack resources and overinvest in sub-optimal projects, managers can recapture this penalty by disgorging slack resources. Historically, cash dividends were one of the few vehicles capable of returning capital to shareholders. Lang and Litzenberger (1989)) find evidence consistent with this hypothesis. However after the adoption of SEC rule 10b-18 in 1982, stock repurchases today have become a popular, and perhaps more importantly, a tax-efficient alternative for accomplishing this task.[4]

The early literature on share repurchases gave credence to these economic theories, generally associating repurchases with increased shareholder wealth (e.g. Ikenberry, Lakonishok and Vermaelen (1995 and 2000)). Yet the evidence is noisy and several papers have raised concern about the economic significance of the evidence (Fama (1998) and Mitchell and Stafford (2000)). With dividends becoming less common over time (Fama and French (2001) and DeAngelo, DeAngelo and Skinner (2000)) and repurchases playing an increasing role in our economy, it is appropriate to examine the economic context surrounding repurchases and the extent to which they are associated with increases in shareholder wealth.

[4] In this paper, we focus attention only on these two broad motivations, undervaluation and free cash flow. Of course, other reasons also exist for buying back stock (see Grullon and Ikenberry (2000) for a recent overview). For example, firms increasingly are using open market programs to achieve dividend substitution (Grullon and Michaely (2000)). Clearly, repurchases are also an integral part of managing and maintaining capital structure. To complicate matters, sorting through some of the various stories that are often mentioned is not so straightforward. For example, some have argued that open market repurchases are important in order to "avoid dilution" when executive stock options mature (for papers dealing with options and repurchases, see for example Jolls (1998), Dittmar (2000), Fenn and Liang (2000) and Weisbenner (2000)). Yet this situation essentially relates to a capital structure question more than it represents a unique motive. While the nuances of each of these motives are interesting, they are beyond the scope of this paper. Instead, we focus our attention on undervaluation and returning excess cash, two key motives where buybacks are considered fundamental to affecting shareholder wealth.

In this paper, we examine the economic role of stock repurchases by considering returns subsequent to repurchase program announcements. Yet we go further and also consider whether managers seem to be aware of or act in a manner consistent with increasing shareholder value after announcing buyback programs. Specifically, do managers appear to knowingly use repurchases to benefit shareholders, particularly in a way consist with what theory might suggest?

We form a comprehensive sample over 5,000 cases announced in the 1980s as well as in the 1990s when repurchases in the U.S. became much more popular. As one might expect, the mean market reaction to repurchase announcements is positive and consistent with the notion that repurchases are looked upon favorably by the market and that shareholders, on average, stand to benefit from this transaction. However, the immediate market reaction to repurchase announcements is rather modest (about 2%) and has been declining over time. This raises some question as to whether the initial market reaction is complete. Thus, we evaluate quarterly earnings announcement returns in the four years following a repurchase announcement to check if the market underreacts to repurchase announcements. The mean quarterly surprise is positive in each of the subsequent 16 quarters, indicating that the initial market reaction is not complete. More importantly, this result also suggests that it is difficult to test various economic theories by simply looking at the initial, short-horizon evidence. Thus we consider long-horizon stock returns.

Long-horizon returns subsequent to repurchase announcements are also favorable, including recent programs announced in the 1990s. For our entire sample period, we find excess performance (inclusive of the initial market reaction) of 6.1% (p-value = 0.000) in the first year, controlling for both size and book-to-market. By year four, the abnormal compounded return is 20.6% (p-value = 0.000).

To see if managers seem to be aware of what they are doing, we condition performance on whether managers execute at least some portion of the buyback program in the year after the program announcement. Overall, the drift is higher in cases where they buyback at least some stock compared to cases where they do not. Moreover, when we consider results on the basis of book-to-market, the drift is

higher for value stocks where mangers actually buyback at least some shares compared to similar cases where they do not. Turning to the free cash flow hypothesis, we also see a substantial long-run drift to firms with high free cash flow. Yet when we look more carefully as to whether these gains are associated with firms that actually disgorged cash, a key attribute of the free cash flow hypothesis, we find no evidence that the drift is limited to high cash flow firms that repurchased stock.

This evidence taken together is consistent with the notion that, managers are perceptive of the potential economic benefit of share repurchases. Moreover, once a buyback is authorized, mangers appear to use discretion when choosing to execute the program to the benefit of their shareholders. A second way to examine whether mangers are aware of the economic benefits of share repurchases is to consider how they use this information for personal gain. Do managers trade in a sympathetic manner? Surprisingly, we find that overall they do not. Despite evidence that insiders seem to be able to identify when their firm's shares are mis-priced (e.g. Lakonishok and Lee (2001), Seyhun (1986), Finnerty (1976) and Jaffe (1974)), managers on average do not use their informational advantage for personal benefit in conjunction with buyback programs. For example, the four-year abnormal return after a repurchase announcement where insiders are also buying on personal account is actually lower compared to when we only observe insider selling. This is consistent with Lee (1997) who considers insider trading activity around the time of seasoned equity offerings, the complimentary transaction to the share repurchase. Lee also finds that while the long-horizon drift subsequent to primary SEOs is negative, managers also do not appear to be using this information to their advantage.

The lack of a linkage between insider trading and abnormal performance around an important corporate event such as a repurchase or an offering may reflect a reluctance by mangers to actively trade on behalf of both themselves and company shareholders at the same time. Insider trades are widely disseminated. Given this and the potential for future litigation, managers may be sensitive to acting in a way that the market could perceive as self-dealing on material valuation discrepancies. Furthermore, this reluctance to trade may be further reinforced by the firm's own legal counsel. For example, a recent

paper by Bettis, Coles and Lemmon (2000) finds widespread use of self-imposed trading restrictions on insiders. None of these limitations is required by the SEC per se, yet the use of trading limits is pervasive and may explain this apparent absence of informativeness of legal, personal trades by managers around important corporate events such as offerings and repurchases.

Of course other plausible reasons also exist as to why long-horizon abnormal returns are favorable, yet not associated with insider trading behavior. One such possibility may relate to signaling. Some firms may use repurchases to counter any negative signal the market might otherwise sense when managers sell stock. Accordingly, managers may be selling stock for personal reasons not associated with any value signal while the firm is simultaneously buying those shares back in the open market

The remainder of the paper is organized as follows. Section I describes the data and performance benchmark and Section II presents methodology issues. In section III, we review the empirical evidence. Section IV provides some concluding remarks.

I. The Sample and Preliminary Evidence

Our sample comes from two sources. The first is from Ikenberry, Lakonishok, and Vermaelen (1995) who evaluate U.S. open market repurchase programs reported in the *Wall Street Journal* from January 1980 to December 1990. Next, we supplement this sample with cases on file at Securities Data Corporation (SDC) for the full period 1980 to 1996.[5] SDC's primary source of information is Reuters, which is broader than the *Wall Street Journal* alone. Each day, SDC scans Reuter's database for all company press releases and news stories. Open market repurchase announcements are one of the transactions that SDC maintains in its Mergers and Acquisitions file. Our analysis requires stock return and accounting information. Thus, we restrict both our sample and eligible benchmark control firms to those cases where stock return information is available on the 1999 daily CRSP tape and accounting information from the 1999 Compustat tapes. Further, we also eliminate cases where the stock price at the

[5] As in previous studies, we also ignore announcements that occurred in the fourth quarter of 1987 to reduce clustering.

time of the repurchase announcement was less than $3 per share.

We consider trading activity in this paper, trades done both on behalf of the firm as well as on behalf of insiders. Stephens and Weisbach (1998) find that a substantial portion of buyback activity overall occurs in the first year of the program. Thus we focus on company repurchase activity in the four quarters following repurchase announcements. We obtain this information from quarterly cash flow statements on funds used to redeem stock, adjusted for concurrent changes in preferred stock.[6] Because of limitations with Compustat data, we lose about 25% of our observations when we condition on this information.

We also consider insider trades made after the announcement.[7] Insider trading data is available on the Securities and Exchange Commission's (SEC) Ownership Reporting System (ORS) data files. We define insider trades as those for 100 shares or more made by directors and officers in the open market and through private transactions including trades associated with the exercise of stock options.

Table I reports summary information for the repurchase sample. Although our 17-year sample period from 1980 to 1996 overlaps with previous studies, the majority of our cases occur after the 1990-91 U.S. economic recession when the U.S. experienced a dramatic increase in the use of repurchases. The mean market-cap decile for announcing firms is roughly at the mid-point between large and small, however market-cap rankings are decreasing over time suggesting that smaller firms are becoming relatively more active in the 1990s compared to the 1980s. The mean B/M quintile rank is also roughly in the middle between value and growth and has been relatively stable over time. Mean program size is for 6.9% of the share base; the median program (not reported here) is slightly smaller, comprising about

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[6] Measuring actual repurchase activity is more difficult than one might expect because of the loose reporting standards in the U.S. Because of this, Stephens and Weisbach (1998) and Jagannathan, Stephens and Weisbach (2000) try different approaches and find that the method used here may overestimate in a few cases the actual amount equity bought back. Much of our analysis depends primarily on simple measures of detecting any activity as opposed to absolute degree, thus this concern should not be too problematic.

[7] We use the same window to consider both insider trades and company buyback activity. In both cases, we considered several other time intervals, however the conclusions were stable.

5% of the sharebase. In the year prior to the announcement, repurchasing firms experience comparatively poor stock returns, underperforming control firms by 8.1%. This suggests that repurchase announcements do not occur randomly in time, but instead follow a contrarian-like philosophy a result consistent with the trading behavior Lakonishok and Lee (2001) observe when managers trade on their own account.

Consistent with most economic stories motivating repurchases, the news of a repurchase program is, on average, received favorably by the market. For our sample, the mean abnormal announcement return is 2.18%, a result consistent with several prior studies, (for example Comment and Jarrell (1991), Ikenberry, Lakonishok, and Vermaelen (1995) and Stephens and Weisbach (1998)). The mean market reaction is decreasing slightly over time. This result is consistent with the notion that because open market programs are relatively low-cost to initially establish and also now rather common, the market may be growing accustomed to regular, recurring repurchase programs, thus reducing the informative impact of programs announced in later years. Further, the relative tax-benefits of repurchasing stock compared to paying the same capital through cash dividend distributions also declined over the same period. Even controlling for repetitive programs, Grullon and Michaely (2000) find that these declining tax-effects of repurchases are detectable.

Yet before continuing, a crucial question is whether the initial market reaction of roughly 2% is really complete. Financial economist, when evaluating economic theories about corporate behavior and decisions, frequently focus on announcement period returns. Short-horizon return performance is straightforward to estimate and typically robust to various methodologies, two appealing properties for empiricists. Yet as researchers interested in economic theory, one hesitates to proceed with too much confidence if the initial market reaction is potentially biased or incomplete, a violation of a key assumption underlying this type of short-run analysis. If the market is slow to respond to the news contained in repurchase announcements, we should see evidence of information surprises in later periods. While there are a variety news events to consider, we focus on earnings announcements, as has been

done in many recent papers including Denis and Sarin (2001) and Brous, Datar and Kini (2001). Clearly, earnings are only a small sub-set of the information shared with investors. Furthermore, this test can be compromised as earnings-related information is often leaked in advance of the actual release. Nevertheless, earnings have an important impact on stock prices (Womack (1996)). They are closely monitored by market participants and companies are often penalized if these realized, bottom-line numbers come in unexpectedly low. While incomplete, evaluating the market response to post-repurchase earnings announcements allows us some opportunity to detect information shocks over a short-window where empirical estimation issues are typically not primary concern (Brown and Warner (1985)).

Table II reports the market response to earnings announcements measured over a window of plus and minus two days surrounding the earnings announcement date recorded by Compustat. We compound returns for a given repurchase firm and compare this to the comparable CRSP value-weighted index return. We investigate quarterly earnings releases up to four years after a repurchase announcement. Overall, we see evidence of positive information surprises throughout the four-year period we examine. In 15 of the 16 quarters, the market response is significantly different from zero at traditional confidence levels. Moreover, these information surprises do not diminish quickly after the initial repurchase announcement. Point estimates for earnings surprises in years 2 through 4 are higher compared to year 1. This suggests that the initial market reaction to repurchase announcements is not complete, but instead may stretch over an extended period of time. Thus in the next section, we evaluate long-horizon stock returns and use this evidence to investigate possible economic sources of these gains.

II. Estimation Issues in Long-Horizon Stock Performance

We estimate long-horizon return performance using annual buy-and-hold returns (BHRs), an approach Barber and Lyon (1997a) and Kothari and Warner (1997) find attractive in comparison to other techniques. One reason favoring this approach is that the implied investment strategy is simplistic and representative of the returns a long-horizon investor might earn. Although a conventional cumulative

abnormal return (CAR) approach is straightforward to estimate, it implicitly assumes frequent rebalancing and thus high transaction costs which are not reflected in the analysis. Frequent rebalancing also introduces upward bias due to bid-ask bounce (Blume and Stambaugh (1983), Roll (1983) and Conard and Kaul (1993)). An alternative method commonly used in recent papers is the calendar-time portfolio approach which not only shares many of these same concerns, but would not be reliable in this paper due to the negligible sample size for a substantial portion of our analysis.

We calculate annual BHRs for each firm in our sample for the year before and the four years following the repurchase announcement, where each year is defined as a uniform block of 252 trading-days. Year +1 starts on the announcement date, capturing the initial market reaction and thus giving us a more complete picture of the economic impact of repurchases. For each event year, portfolio returns are formed from the BHRs of sample firms, assuming an equal-weighted investment strategy. Longer horizon portfolio returns are obtained by compounding one-year portfolio returns across event time. This implicitly assumes annual rebalancing and reduces the possibility of any one firm dominating the portfolio in later years. If a repurchase firm is delisted in the middle of a year, the return calculation for that firm stops on that time and its partial BHR is included in the overall portfolio return for that event year. When moving to the next year in event time, the respective portfolios are rebalanced accordingly among surviving firms.

We estimate abnormal return performance using a single matching-control firm, an approach advocated by Barber and Lyon (1997a). These control firms are formed on the basis of market-cap and book-to-market ratio (B/M), two important factors that explain cross-sectional stock returns during our sample period (e.g., Fama and French (1992, 1993, and 1996), Lakonishok, Shleifer, and Vishny (1994), and Barber and Lyon (1997b)). Size and B/M cut-off points are defined each month based on all NYSE- and Amex-listed common stocks available on both the CRSP and Compustat databases. We first sort stocks by their equity market-caps into deciles. Within each size decile, we define B/M quintile cut-off

points.[8] Here, B/M is calculated as the ratio of the book value of equity from the previous fiscal year-end to the market value of equity from the previous month.[9] Each month, all stocks common to both CRSP and Compustat, including Nasdaq firms are classified in one of these 50 size and B/M portfolios. To identify a single control firm for a given repurchase firm, we go into the same size decile and choose a firm with the closest B/M ratio which also trades on the same exchange. The portfolio return calculations for control firms are the same as for our sample repurchase firms and thus avoid any re-balancing bias between the two groups (Canina, Michaely, Thaler, and Womack (1998)).

For statistical inferencing, we use an empirical simulation method or "bootstrap." Similar approaches have been used in many papers including Brock, Lakonishok, and LeBaron (1992), Ikenberry, Lakonishok, and Vermaelen (1995), Ikenberry, Rankine, and Stice (1996), Lee (1997), Lee and Loughran (1998), and Rau and Vermaelen (1998). Barber and Lyon (1997a) and Kothari and Warner (1997) investigate the validity of this approach. Lyon, Barber and Tsai (1999) conclude that the bootstrap is preferable to alternative methods such as conventional, parametric *t*-statistics and thus we use it here.

For the sample (and also for each sub-sample), we empirically estimate the null distribution of abnormal performance using the following procedure. We begin by taking each firm in the repurchase sample and randomly replacing it with another firm with the same size and B/M ranking at the time of the repurchase announcement. Once each firm in the original sample is replaced, we now have a separate randomly formed portfolio, or "pseudo" portfolio. The key here is that this new pseudo portfolio has the same style or benchmark characteristics as our sample portfolio with one big exception. Unlike our sample portfolio, the new psuedo-portfolio is formed randomly and is not conditioned on any information, thus we don't expect abnormal performance to be affected by anything other than unanticipated noise. We now treat this portfolio exactly the same as we would the repurchase sample

[8] This dependent sorting procedure reduces the correlation often observed between size and other variables, an approach used in several papers (e.g. Jegadeesh (1992) and Ikenberry, Lakonishok and Vermaelen (1995)).

[9] In calculating B/M ratios, we also account for stocks with multiple classes of stocks by considering the market value of traded classes of stock relative to their cumulative book value. To avoid a look-ahead bias (Banz and Breen (1986)), we assume a four-month reporting lag when applying book-equity values.

and calculate BHRs. One can image this as the first "dart" in a dartboard contest where one is randomly drawing estimates of "abnormal" performance under the null. This process is repeated such that 10,000 trials are obtained, thus generating a sample-specific distribution of expected abnormal performance. One obtain *p*-values by simply comparing the abnormal performance estimated for the repurchase sample with the empirical distribution and seeing what fraction of the distribution of abnormal returns is *greater* than that of the test value.

This single-firm approach works very well in a large sample environment and addresses the impact of positive skewness on point estimates of long-horizon abnormal performance. Thus we apply it in all of our large sample analysis. This includes abnormal BHR evidence referring to the "Full Sample." Similarly, we use a single-matching control firm in the regression analysis reported later in the paper. However, using only one control firm leads to noisy point estimates when applied to smaller sub-samples (Lyon, Barber and Tsai (1999)). Thus, for two-way analysis where sample size diminishes (sometimes precipitously), we use five control-firms. Here the same general procedure is followed except that we take five firms with the closest book-to-market ratio as our sample firm and equally weight them to form a single firm as our benchmark. While the skewness bias may slightly affect our point estimates at the margin, this paper is primarily concerned with corporate finance issues and evaluating economic policy. Here the noise from low-power, noisy estimation methods dominates any potential concern caused by skewness biases, thus we make this important change in the two-way sorts. To handle potential concern about skewness, recall that we eliminated sample cases where the share price at the time of the repurchase announcement was less than $3 per shares firms where skewness is more of an issue (Conrad and Kaul (1993), Loughran and Ritter (1996) and Ikenberry, Shockley and Womack (1998)). This same standard was also imposed on all matching firms as well.

As for the potential impact of skewness on inferencing, we are not using conventional, parametric *t*-statistics but instead are basing our inferences on the bootstrap. A primary appeal of this approach is that it makes no distributional assumptions as is typically the case using conventional

methods. Skewness is implicitly handled in each empirical distribution. Further, irrespective of whether we use one- or five-control firms, statistical inferencing is not affected as the two separate distributions both have the same shape. Applied consistently, the resulting p-values, by definition, are unaffected.

III. The Long-Horizon Evidence

A. Univariate Buy-and-Hold Returns

Table III presents long-term BHRs around the repurchase announcement. As we saw earlier in Table I, repurchasing firms experience unusually poor returns in the year prior to a repurchase announcement. The abnormal return for the Full Sample in year -1 of -8.09% is extreme as the bootstrap *p*-value is 1.000 indicating that none of the random portfolios generated an abnormal return this low. In year +1, the abnormal return of 6.10% is also extreme, this time in the opposite direction with an associated *p*-value of 0.000. By year +4, the compounded abnormal return is 20.63% with a *p*-value of 0.000. This result is consistent with our earlier analysis using earnings announcements. Given the comparatively low announcement period returns, it would appear that the market is surprised by new, unanticipated information subsequent to the repurchase announcement. Moreover, this result is not driven by cases in 1980s. Point estimates for the drift from 1991 to 1996 are roughly double in scale compared to the 1980s, the four-year abnormal return being 25.82% (*p*-value = 0.000).

On the right-hand side of table III, we consider performance conditional on how company officials were trading either on behalf of investors through the repurchase program or for themselves through legal insider trades. We begin with this rather simple univariate assessment. Later, we summarize this evidence using regression analysis to account for potentially confounding issues.

Open market programs, by definition, allow substantial flexibility (Ikenberry and Vermaelen (1996), Jagannathan, Stephens, and Weisbach (2000)). In fact, some firms choose not to repurchase any shares at all (Stephens and Weisbach (1998)). The undervaluation hypothesis suggests that, all else the same, managers will execute repurchase programs when they perceive share prices to be trading below fair value. Thus, we consider the post-announcement evidence conditional on whether managers did or

did not buy back any stock in the year following the announcement. Later, we will consider a continuous measure of buyback activity. Overall, we see that the four-year return drift is higher in cases where managers actually bought stock (22.1% (*p*-value = 0.000)) compared to when they did not (14.8% (*p*-value = 0.001). Although this pattern is not evident in the 1980s, this result does appear to hold in the more recent evidence. Companies repurchase shares for a variety of reasons some of which may not be associated with mis-pricing, thus association between actual repurchase activity and long-run performance may be noisy. Yet overall, this initial evidence conditional on actual buyback activity is at least mildly consistent with the notion that fundamental undervaluation is a motivating factor in at least some repurchase programs. Moreover, the fact this mis-pricing is not corrected at the time of the buyback announcement appears to play some role in why managers choose to repurchase stock. In cases where mis-pricing is less pervasive, managers are less aggressive in actually engaging their repurchase programs.

However, if we focus on abnormal returns in year +1, this result between the buys and no-buys is actually reversed. For the overall sample and for both sub-periods, abnormal returns in year +1 (the same period we evaluate for repurchase activity) are comparatively higher in cases where managers bought *no* stock. After four years, the comparison reverts. This suggests at least two things. First, this would seem to indicate that any difference in the overall four-year drift between the two groups is not likely due to price-pressure caused by companies actually executing buyback trades in the open market. Second, it also suggests that even in cases where no shares were bought back, undervaluation may still have played some role in initially establishing the buyback program. Even in cases where no stock is repurchased, we also see evidence of an erosion in share prices prior to the buyback announcement. Subsequent to announcement, we see some evidence of a permanent increase in shareholder wealth in these same cases, albeit lower in magnitude than otherwise.

In sum, the evidence suggests that managers' actions depend, to some degree, on the firm's share price. If markets respond favorably in the year after the announcement, managers are less likely to

buyback stock. Mikkelson and Partch (1988) document a similar response in association with equity and convertible bond offerings. They find managers more prone to canceling offerings when stock prices fall after an offering announcement.

The evidence to this point suggests that managers use discretion in executing programs and tend to execute repurchase programs in ways that generally benefit shareholders. Next, we consider whether managers act accordingly on personal account. In most cases, managers are not trading at all in the year following the buyback announcement. For another large group of cases, we get mixed signals coming from simultaneous buying and selling activity. Thus the number of cases where we see uniform buying (which we refer to as "pure-buying") or uniform selling (which we refer to as "pure-selling") in a given firm is limited. Yet using these comparatively clean indications of managerial intent, we do not find much evidence of informed trading by managers on their own account, both overall as well as in both sub-periods. For both pure-purchases and pure-sales, the four-year drift is positive and significant, yet point estimates are higher for insider-selling cases compared to insider-buying. We considered numerous definitions of buying or selling activity. None of the approaches provided any indication that managers were trading sympathetically with the trades they were executing in the repurchase program.

These results are contrary to the hypothesis that managers are seemingly sensitive to mis-pricing. However one possibility is that managers may be distinguishing trades made on personal account from those made on behalf of shareholders. As a quick check of this, we sub-divided the insider trading groups further into cases where the company did and did not repurchase shares in the year following the repurchase announcement. Although not reported here, we found that irrespective of what trades managers were making on personal account, the four-year abnormal return drift tended to be higher in cases where shares were repurchased. We return to this point later in the regression analysis.

These results contrast with those found in other studies. Karpoff and Lee (1991), for example, find that insiders do appear to use their informed positions to sell prior to equity offerings. Other studies such as, Lee, Mikkelson and Partch (1992), and Raad and Wu (1995) find evidence of increased buying

activity surrounding either tender offer or open-market repurchases, respectively. Yet the legal environment affecting insider trading in all three of these studies, which focus on events in the 1970s and 1980s, has changed dramatically over time (Meulbroek (1992) and Seyhun (1992)). Perhaps more importantly, despite this new SEC vigor in regulating trades potentially made on private information, many firms have gone much further and voluntarily adopted tough rules about when and how insiders can trade. A recent study by Bettis, Coles, and Lemmon (2000) find that over 90% of firms in their sample had policies limiting the ability of managers to trade. Roughly three out of four firms prohibit all trading except within specific windows of time. Some firms go further and actually require company approval for *any* insider trade. Taken together, these rules may have a chilling effect on both a manager's ability and desire to trade their own stock. Furthermore, given the wide publicity and close scrutiny that insider trades receive in the marketplace, managers may simply choose to avoid the appearance of their personal trades being associated with the firm's larger repurchase program. Thus, insider trading around important corporate events, including share repurchases for example, may not be so informative. This result is consistent with Lee (1997) who, like Karpoff and Lee(1991), also considers insider trades subsequent to equity offerings. He looks at cases in the late 1980s and 1990s and finds evidence similar to ours that managers, overall, do not appear to be using their informational advantage for personal gain.

B. Economic Theory and the Source of Gains in Repurchases

In Table IV, we investigate whether the abnormal stock performance accruing to shareholders subsequent to an open market program announcement is occurring in ways generally consistent with economic theory. Specifically, we condition the long-horizon evidence on book-to-market, a variable associated with the undervaluation hypothesis, and free cash flow to sales, a measure associated with the free cash flow hypothesis.

Focusing first on the book-to-market evidence, for the overall sample we see little delineation in abnormal performance across the book-to-market spectrum as the four-year drift in high B/M firms or value stocks (20.40% (*p*-value = 0.000)) is similar to that of low B/M or growth stocks (23.68% (*p*-value

= 0.000)). The results contrast, though, between the two sub-periods. During the 1980s, the drift is more prevalent in value stocks compared to growth. This notion is consistent with the undervalution hypothesis and also consistent with the evidence reported in prior studies. However in the 1990s, the results change. Here, growth firms announcing repurchases do particularly well during the post-announcement period. This is consistent to some extent with Ikenberry, Lakonishok and Vermaelen (2000) who report that Canadian growth-stocks announcing repurchases in the 1990s also did well. On the surface, this result seems contrary to the undervaluation hypothesis. However, these sorts on B/M are noisy and there is variation within each grouping (Lakonishok, Shleifer and Vishny (1994)). When we go further and sort firms according to whether they did or did not buy back stock, we see that the drift tends to be associated with cases where managers were executing the repurchase program. Despite the fact that, in a crude way, these growth companies are relatively expensive and thus seemingly have low potential for mis-pricing, managers in this group appear to self-select and execute programs when they perceive that share prices do not reflect fair value.

Toward the right side of Table IV, we consider evidence for an alternative hypothesis that the high abnormal returns observed following repurchase announcements may be associated with firms distributing excess free cash flow. We measure free cash flow levels (FCF) using the same definition as Lehn and Poulsen (1989).[10] To scale this variable, we considered several approaches. A standard method is to normalize FCF by the market value of equity. While appealing, this variable is substantially redundant with our earlier book-to-market sort.[11] As a compromise, we scale FCF with sales where the correlation with B/M is nearly zero.

If the source of gain evident after repurchases is associated with the free cash flow hypothesis yet

[10] Lehn and Poulsen (1989) define free cash flow as operating income before depreciation (Compustat item #13), minus income taxes (#16), plus change in deferred taxes (change in #35), minus interest expenses (#15), minus preferred stock dividends (#19), and minus common stock dividends (#21).

[11] In fact, the correlation between B/M quintile ranks and FCF/MV is about .4.

the market for whatever reason is slow to respond to this, we should find that the abnormal return drift is more prevalent in high levels of free cash flow firms compared to other cases. We see some evidence consistent with this notion. Point estimates of the four-year drift for high free cash flow firms are higher (38.82% (*p*-value = 0.000)) compared to low free cash flow cases (6.88% (*p*-value = 0.005)). However, an important aspect of the free cash flow hypothesis relates to firms actually disgorging cash. Theory suggests that the benefits from reducing free cash flow should be tied to whether firms actually buy back any stock. When we look further at these high free cash flow firms where the benefits are seemingly more concentrated and separate them according to whether we see any repurchase activity, we see little evidence that the drift is concentrated in firms that disgorged at least some cash. Point estimates of the four-year drift for high cash flow firms that buy back no stock whatsoever are higher than those of comparable firms who actually disgorge at least some cash. Relying on this univariate evidence, support for the free cash flow story is mixed.

This conclusion is similar to Howe, He and Kao (1992) who investigate the free cash flow hypothesis with respect to tender-offer repurchase announcements.[12] Although their analysis is limited to using announcement returns, they do not find support for the free cash flow hypothesis. In the next section, we reconsider not only the mixed evidence on the free cash flow hypothesis using a multivariate approach controlling for all of the of the factors we've examined so far.

C. The Multivariate Evidence

Table V reports regression evidence where the long-horizon evidence that we evaluated on a univariate basis earlier is now considered in a multivariate setting. Here we gain a richer sense of the factors associated with the long-run drift. We consider all of the factors used up to this point in our analysis. We also consider two measures of actual repurchase activity; a dummy indicator variable

[12] Tender-offer repurchases are interesting to consider with respect to the free cash flow hypothesis. Although they are far less common and collectively involve less capital compared to open-market programs, these transactions tend to receive more publicity, usually involve a greater fraction of a given firms' sharebase and have reliable completion rates. Thus this particular form of repurchasing stock would seemingly be an attractive environment to investigate the free cash flow hypothesis when considering only the initial market reaction to a buyback announcement.

which is one if the firm buys back at least some stock and also log (1 + % actual repurchase), a continuous measure of how much companies actually repurchased in the post-announcement year. To test the undervaluation and free cash flow hypotheses, we interact both of these variables with dummy variables indicating whether stocks ranked in the highest B/M quintile (value stocks) or in the highest FCF quintile (high free cash flow stocks).

Although not reported in the tables, these regressions include year dummies to distinguish early years form later years. We begin by evaluating abnormal returns (defined using a single matching firm) in the first year subsequent to the repurchase announcement; models (1) through (4) in the table. While we see some evidence that firms with both high free cash flow and high book-to-market ratios seem to do well in the first year, the variables generally have no power in explaining the cross-section. For example, neither the actual repurchase dummy variable nor the continuously defined repurchase variable is significant. As before, this suggests that price pressure from actual repurchase activity is likely not contributing to the overall drift after repurchase announcements. We also see that insider trading activity does not appear to be associated with performance in the first year after the repurchase announcement.

Turning to the four-year abnormal return evidence (models (5) through (8)), we continue to see evidence supportive of the undervaluation hypothesis but mixed results for the free cash flow hypothesis. For example, we see significant results for the size of the repurchase program; larger programs appear to be associated with a larger drift in four-year returns. Further, when we consider either a simple dummy variable (model 5) or a more continuous measure of repurchase activity (model 6), we find significant results associating actual repurchase activity with a higher post-announcement drift. Yet the interpretation changes slightly depending on how actual repurchase activity is defined. Using the continuously defined variable, we see some support for the undervaluation hypothesis. When we interact this variable with a dummy for high B/M (or value stocks), the resulting coefficient is positive and significant. Conversely, when we interact this variable with a high free cash flow dummy, we see no evidence in support of the free cash flow hypothesis. Moreover, while the coefficients for the

unconditional free cash flow variable (FCF quintile) are positive and thus associate higher free cash flow firms with a higher four-year drift, none of these coefficients is significant at traditional confidence levels. If we define actual repurchase activity using a simple dummy variable approach, the conclusions change slightly. Support for the undervaluation hypothesis diminishes marginally, but we gain at least some support for the free cash flow story. Specifically, we see that when the dummy repurchase variable interacts with high free cash flow, the result is positive and significant. On the other hand, despite this result none of our other free cash flow related variables in that model appear to have significance in the direction one might expect.

In sum, the conclusion from this multivariate analysis is consistent with our earlier univariate conclusions and is generally supportive of the undervaluation hypothesis. Larger repurchase programs and programs where managers buyback more stock are associated with larger four-year drifts. This result is evident for value stocks where the potential for mis-pricing is seemingly more prevalent. Support for the free cash flow hypothesis is mixed. Also, we find that even after controlling for other factors, managers do not appear to use their informational advantage for personal gain.

IV. Conclusions

The 1990s saw a huge increase in the number of firms announcing open market stock repurchases. Today, stock repurchases are prevalent in the U.S. and are gaining importance around the world. Firms repurchase stock for a variety reasons which vary in importance. Yet a common theme managers often volunteer is that, in some cases, stock repurchases themselves contribute toward shareholder value. Specifically, while repurchases may help firms achieve a number of useful objectives, managers rank undervaluation and distributing excess cash as critical and important motives for buying back stock. These are also two of the most commonly discussed motives financial economists offer as to how or why repurchases might affect shareholder wealth.

Previous studies that examined repurchases in the 1980s found that long-run stock returns

following repurchase announcements were indeed positive. These early results seemed to validate the notion that repurchases can be good for shareholders. However, there is reason to pause as some studies question the extent to which repurchases enhance shareholder value.

In this paper, we not only reconsider the general empirical evidence but dig deeper to see whether the actions of managers are also consistent with this underlying notion of using repurchases to increase shareholder value. We do this by considering actual trading of managers both on behalf of themselves and that done on behalf of the company through the repurchase program.

We report empirical evidence for more than 5,000 stock repurchases looking at cases not only in the 1980s, but also in the 1990s when stock repurchases became quite popular. Overall, we find that long-horizon stock performance subsequent to an open market repurchase announcement is positive. Controlling for both size and book-to-market effects, the mean four-year abnormal buy-and-hold return starting at the initial announcement is 20.6% (p-value = 0.000). Moreover, point estimates of the drift observed for more recent cases in the 1990s, are roughly double in scale compared to repurchases announced in the 1980s.

As for the two key motives that are often offered for why firms repurchase stock, the evidence is consistent with the undervaluation hypothesis. When we partition stocks according to whether managers bought any shares in the repurchase program, the drift is higher in cases where managers buy back stock compared to when they do not. This was particularly true of value-stock repurchases where undervaluation would seem to be an important motive. As for the free cash flow hypothesis, the evidence is mixed. The long-run drift after a repurchase announcement is roughly double in magnitude for high free cash flow firms compared to low free cash flow cases. Yet these results are not so robust. An important aspect of the free cash flow hypothesis is that the gains coming from high free cash flow firms should be linked to cases where managers actually disgorge cash. Here the evidence is much less conclusive as firms with high free cash flow and who did not repurchase any shares appear to do just as well as similar companies that did buy back at least some stock.

Overall, the evidence is consistent with the notion that managers do seem to knowingly use repurchases to the advantage of long-term shareholders. Yet an alternative approach to address this issue is to consider trades made by managers on personal account rather than for the corporation. Thus, we consider whether insiders were concurrently buying or selling after the repurchase announcement. Yet, we find no compelling evidence that managers are trading sympathetically with the repurchase program. Looking more carefully, we do not find evidence that performance is higher when managers are exclusively buying stocks on personal account. In fact, the evidence is counter-intuitive; abnormal returns tend to be higher when insiders are *selling* stocks compared to when they are buying following repurchase announcements.

However inferring management's perceptions about their firm by following their personal trading behavior may be problematic. First, managers often hold large, undiversified long-positions in their firms. These positions may be so dominant that even when managers perceive their firm to be under-priced, they may still have personal reasons for selling company stock. In these cases, managers may be using share repurchase programs to offset what the market might otherwise sense as a negative signal. Perhaps more importantly, the climate surrounding insider trading has substantially changed since the 1980s. Information about insider trades is now widely disseminated at low-cost. Further, while insiders are not prohibited from trading, recent evidence finds pervasive use of self-imposed company rules in the U.S. that limit the ability of managers to trade. Taken together, this environment may have a chilling effect on the desire and/or ability of managers to trade the firm's stock, particularly in or around important events such as a repurchase. This may decouple the otherwise informative advantage of insider trades around important corporate events. Lee (1997) also finds this same general result when considering the opposite transaction of a repurchase, the seasoned equity offering. He finds mixed evidence as to whether managers are knowingly responding to their firm's overvaluation when issuing shares using evidence from insider trading behavior.

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Table I
Summary Statistics

The sample includes all open market share repurchase announcements reported in the *Wall Street Journal* from 1980 to 1990 except the fourth quarter of 1987 and those reported by Securities Data Corporation data from 1980 to 1996, with available CRSP daily returns and book-to-market (B/M) ratios. Repurchase announcements are dropped from the sample if the stock price is less than $3.00 at the month end prior to the announcement. *n* represents the number of announcements in each year. *Size decile* (1 is the smallest) of each share repurchase firm is based on the market value of equity at the month end prior to the announcement. *B/M quintile* (1 is the lowest) is based on the ratio of the book value at the previous fiscal year end (given four months reporting lag) to the market value at the month end prior to the announcement. *% shares announced* is the percentage of announced repurchase shares relative to total outstanding shares at the month end prior to the announcement. *5-day AR* represents the announcement-period abnormal return (in %), defined as the announcement-period return of the repurchase firm minus the CRSP value-weighted index return. The announcement-period is a five-day period, two days before up to two days after the announcement date. *REPO* represents repurchasing firms and *MATCH* represents corresponding matching firms, matched based on market value of equity, B/M and exchange. *REPO prior return* and *MATCH prior return* are prior one year buy-and-hold returns (in %) compounded from 252 days before (or the listing date) up to the day before the announcement for repurchasing firms and matching firms, respectively. *DIFF* is the difference between repurchase firms' prior return and matching firms' prior return. ***, **, * denote significance levels of 1%, 5%, and 10%, respectively, using a two-tailed *t*-test.

Year	*n*	*Size decile*	*B/M quintile*	*% shares announced*	*5-day AR*	*REPO prior return*	*MATCH prior return*	*DIFF*
80	79	6.4	3.5	5.40	4.02***	16.07	11.99	4.08
81	80	7.0	2.9	5.12	3.42***	25.35	36.68	-11.33*
82	117	6.3	3.1	6.05	4.62***	-16.58	-5.56	-11.03**
83	50	7.3	3.0	5.37	3.44***	45.57	56.42	-10.84
84	216	6.0	2.7	5.69	3.29***	-10.50	-2.81	-7.69***
85	138	6.6	2.9	9.08	3.32***	16.69	23.28	-6.58**
86	202	6.8	2.9	7.87	3.00***	22.56	26.08	-3.52
87	117	7.0	3.0	8.53	2.97***	21.02	28.16	-7.14
88	230	6.9	3.0	8.43	1.85***	-3.03	-0.17	-2.86
89	411	6.4	2.9	9.58	1.44***	16.52	23.65	-7.13***
90	628	5.7	3.1	7.17	1.82***	-13.16	-7.46	-5.70***
91	195	4.4	2.7	7.43	2.27***	9.84	18.31	-8.47**
92	319	4.4	2.7	7.05	2.42***	9.16	20.56	-11.40***
93	324	4.8	2.8	6.12	1.57***	5.58	25.70	-20.12***
94	655	4.4	3.1	6.27	1.80***	-0.59	7.17	-7.76***
95	729	4.1	3.2	6.28	1.91***	10.14	18.82	-8.68***
96	1,018	4.0	3.3	6.28	2.09***	13.13	20.62	-7.49***
80-90	2,268	6.3	3.0	7.61	2.46***	3.75	9.80	-6.05***
91-96	3,240	4.2	3.1	6.40	1.98***	8.34	17.86	-9.52***
All	5,508	5.1	3.1	6.86	2.18***	6.45	14.54	-8.09***

Table II
Abnormal Earnings Announcement Returns

This table reports post-event buy-and-hold abnormal returns (in %) around the quarterly earnings announcement for repurchase firms. Quarterly earnings announcement dates are obtained from Compustat. *n* is the number of repurchase firms with valid information for a given period. *AEAR* is the abnormal earnings announcement returns, calculated as the compounded return from day –2 to day 2 for the sample relative to its respective earnings announcement date less the CRSP value-weighted index return compounded over the same interval. Mean quarterly returns are reported for each quarter and overall by year relative to the repurchase announcement. ***, **, * denote significance levels of 1%, 5%, and 10%, respectively, using a two-tailed *t*-test.

	Event year 1		Event year 2		Event year 3		Event year 4	
Quarter	*n*	*AEAR*	*n*	*AEAR*	*n*	*AEAR*	*n*	*AEAR*
1	5,185	0.39***	4,983	0.42***	4,681	0.69***	4,179	0.43***
2	5,153	0.23***	4,917	0.31***	4,602	0.50***	4,085	0.52***
3	5,112	0.07	4,856	0.25***	4,532	0.22**	3,917	0.33***
4	5,042	0.23***	4,780	0.45***	4,440	0.51***	3,707	0.21*
Overall Mean		0.24***		0.39***		0.51***		0.38***

Table III
Long-Run Buy-and-Hold Returns Conditioned on Actual Company Repurchase and Insider Trading Group

This table reports compounded long-run buy-and-hold returns in % (BHRs) for sample repurchase and matching firms for one year before and four years following a repurchase announcement. Post-announcement returns are compounded over event years 1 through 4 and assume annual rebalancing. An annual period is defined as 252 days relative to the repurchase announcement day or up to the de-listing date (whichever is earlier). *n* represents the number of firms in each category. *REPO* refers to sample repurchasing firms. *MATCH* refers to the corresponding control firms (matched based on size, B/M and exchange). *DIFF* represents the difference in BHR returns between repurchasing and matching firms. *p*-values are calculated separately for each sample or sub-sample via the empirical bootstrap, simulation procedure described in the text. Actual company repurchase and insider trading data are obtained from Compustat and SEC's ownership tapes, respectively. *Buy* refers to those repurchasing firms that repurchased at least some shares during the one-year period after the repurchase announcement. *Non-buy* refers to those firms that did not repurchase any shares in the year after the repurchase announcement. Firms without available actual company repurchase information on Compustat are classified as missing and not included in either Buy or Non-buy column. *PP* and *PS* represent firms with pure insider purchases and pure insider sales, respectively, during the one-year period after the announcement date. Firms with mixed insider trades are not included in either PP or PS column.

Sample	Event	Full sample					Classified by actual company repurchase						Classified by insider trading group					
							Buy			*Non-buy*			*PP*			*PS*		
period	year	*n*	*REPO*	*MATCH*	*DIFF*	*p*-value	*n*	*DIFF*	*p*-value	*n*	*DIFF*	*p*-value	*n*	*DIFF*	*p*-value	*n*	*DIFF*	*p*-value
	-1	5,508	6.45	14.54	-8.09	1.000	3,705	-12.22	1.000	439	-10.94	1.000	689	-9.79	1.000	380	-11.37	1.000
	1	5,508	26.20	20.11	6.10	0.000	3,705	5.07	0.000	439	9.24	0.000	689	-0.68	0.608	380	10.43	0.000
All	2	5,382	52.82	43.84	8.97	0.000	3,646	7.75	0.000	422	9.51	0.004	680	0.91	0.164	372	19.42	0.002
	3	5,104	85.11	69.43	15.67	0.000	3,514	14.97	0.000	400	11.34	0.018	650	5.62	0.012	357	27.16	0.000
	4	4,774	113.05	92.41	20.63	0.000	3,320	22.12	0.000	379	14.81	0.001	615	10.19	0.001	341	28.58	0.002
	-1	2,268	3.75	9.80	-6.04	1.000	1,500	-6.57	1.000	177	-8.42	1.000	323	-3.28	0.994	217	-8.58	1.000
	1	2,268	23.51	17.93	5.58	0.000	1,500	5.85	0.000	177	10.97	0.011	323	0.85	0.610	217	6.43	0.053
1980-90	2	2,230	44.03	38.91	5.12	0.000	1,484	6.86	0.000	171	11.45	0.083	320	3.30	0.413	209	9.08	0.058
	3	2,159	78.67	67.85	10.82	0.000	1,442	13.22	0.000	167	18.68	0.049	309	8.79	0.154	202	14.80	0.080
	4	2,084	102.52	88.96	13.56	0.000	1,405	17.94	0.000	161	25.78	0.025	300	9.66	0.152	197	12.16	0.208
	-1	3,240	8.34	17.86	-9.52	1.000	2,205	-16.06	1.000	262	-12.65	1.000	366	-15.54	1.000	163	-15.08	0.998
	1	3,240	28.09	21.63	6.46	0.000	2,205	4.54	0.000	262	8.06	0.004	366	-2.04	0.573	163	15.76	0.005
1991-96	2	3,152	59.15	47.37	11.78	0.000	2,162	8.40	0.000	251	8.10	0.010	360	-1.31	0.143	163	33.30	0.001
	3	2,945	89.38	70.30	19.08	0.000	2,072	16.22	0.000	233	5.75	0.048	341	2.78	0.023	155	43.84	0.000
	4	2,690	120.52	94.70	25.82	0.000	1,915	25.27	0.000	218	6.19	0.004	315	11.04	0.001	144	52.11	0.000

Table IV
Long-Run Buy-and-Hold Returns Sorted by Book-to-Market Ratio and Free Cash Flow

This table reports compounded long-run return performance (in %) for groups sorted on the basis of book-to-market ratio (B/M) and free cash flow (FCF). FCF is determined for each repurchasing firm based on Lehn and Paulsen (1989) measure at the time of the announcement and normalized by sales. *Buy* refers to those repurchasing firms that repurchased at least some shares during the one-year period after the repurchase announcement. *Non-buy* refers to those firms that did not repurchase any shares in the year after the repurchase announcement. Firms without available actual repurchasing information on Compustat are classified as missing and not included in either Buy or Non-buy column. *n* represents the number of firms in each category. *DIFF* represents the difference in BHR returns between repurchasing and matching firms. *p*-values are calculated separately for each sample or sub-sample via the empirical bootstrap, simulation procedure described in the text. *Low*, *Mid*, and *High* are composed of the bottom quintile, the next three quintiles, and the top quintile of B/M or FCF, respectively.

		Sorted by book-to-market ratio									Sorted by free cash flow								
	Event	Full sample			*Buy*			*Non-buy*			Full sample			*Buy*			*Non-buy*		
	year	*n*	*DIFF*	*p*-value	*n*	*DIFF*	*p*-value	*n*	*DIFF*	*p*-value	*n*	*DIFF*	*p*-value	*n*	*DIFF*	*p*-value	*n*	*DIFF*	*p*-value
Panel A: All years 1980 - 1996																			
	-1	1,097	-15.69	1.000	909	-19.03	1.000	99	-6.45	0.975	467	-9.50	1.000	332	-11.61	1.000	48	-24.00	0.999
	1	1,097	5.38	0.000	909	6.90	0.000	99	9.41	0.056	467	1.23	0.508	332	-0.14	0.601	48	-2.00	0.702
Low	2	1,078	9.46	0.000	894	14.92	0.000	97	4.35	0.261	455	-2.34	0.386	328	2.76	0.286	45	-17.09	0.925
	3	1,044	20.48	0.000	866	24.52	0.000	94	-1.51	0.388	445	3.12	0.151	322	10.58	0.098	43	-15.19	0.830
	4	996	23.68	0.000	826	31.54	0.000	90	-10.17	0.334	415	6.88	0.005	299	17.27	0.005	41	4.18	0.401
	-1	3,155	-8.54	1.000	2,173	-10.18	1.000	257	-10.91	1.000	2,986	-9.02	1.000	2,352	-9.93	1.000	254	-6.66	1.000
	1	3,155	6.15	0.000	2,173	4.54	0.000	257	13.04	0.003	2,986	4.90	0.000	2,352	4.90	0.000	254	7.40	0.004
Mid	2	3,073	9.21	0.000	2,137	6.50	0.000	247	16.03	0.003	2,917	4.31	0.000	2,313	6.11	0.000	244	10.50	0.028
	3	2,933	13.82	0.000	2,060	11.50	0.000	231	19.26	0.007	2,793	8.63	0.000	2,223	11.54	0.000	232	8.63	0.149
	4	2,753	19.59	0.000	1,941	18.38	0.000	221	30.51	0.000	2,667	11.43	0.000	2,128	17.24	0.000	224	1.85	0.172
	-1	1,256	-0.32	0.081	623	-9.38	1.000	83	-16.39	1.000	1,840	-6.91	1.000	886	-20.01	1.000	120	-13.81	1.000
	1	1,256	6.58	0.000	623	4.27	0.006	83	-2.75	0.355	1,840	8.24	0.000	886	7.21	0.000	120	16.44	0.004
High	2	1,231	7.90	0.000	615	1.19	0.034	78	-4.74	0.474	1,798	18.54	0.000	870	13.01	0.000	118	21.28	0.003
	3	1,127	15.75	0.000	588	12.58	0.002	75	2.96	0.306	1,667	30.19	0.000	840	24.83	0.000	111	35.14	0.000
	4	1,025	20.40	0.000	553	21.42	0.000	68	0.03	0.294	1,513	38.82	0.000	780	36.70	0.000	102	49.74	0.000

Table IV – *Continued*

	Event year	Sorted by book-to-market ratio									Sorted by free cash flow								
		Full sample			*Buy*			*Non-buy*			Full sample			*Buy*			*Non-buy*		
		n	*DIFF*	*p*-value	*n*	*DIFF*	*p*-value	*n*	*DIFF*	*p*-value	*n*	*DIFF*	*p*-value	*n*	*DIFF*	*p*-value	*n*	*DIFF*	*p*-value
Panel B: Subperiod 1980-1990																			
	-1	441	-10.74	1.000	329	-9.53	1.000	34	-8.31	0.928	211	-1.30	0.685	131	-0.37	0.280	14	-22.71	0.913
	1	441	1.16	0.192	329	3.57	0.141	34	5.13	0.347	211	2.87	0.627	131	-2.37	0.636	14	-17.55	0.971
Low	2	431	1.66	0.133	322	8.97	0.034	33	2.30	0.449	205	-9.16	0.960	129	-15.89	0.970	13	-35.57	0.971
	3	424	3.92	0.107	317	13.07	0.025	33	-14.87	0.515	202	-2.81	0.648	128	-8.33	0.737	12	-9.16	0.427
	4	411	7.14	0.125	309	17.48	0.006	32	-24.03	0.739	191	-7.03	0.759	122	-10.93	0.876	11	25.47	0.251
	-1	1,393	-5.89	1.000	936	-6.32	1.000	109	-7.62	1.000	1,418	-5.25	1.000	1,004	-6.20	1.000	123	-2.75	0.990
	1	1,393	7.38	0.000	936	7.31	0.000	109	14.91	0.001	1,418	6.71	0.000	1,004	7.72	0.000	123	13.20	0.002
Mid	2	1,370	6.57	0.000	930	7.44	0.000	106	19.97	0.022	1,391	7.34	0.000	993	10.22	0.000	118	15.39	0.099
	3	1,321	10.91	0.000	900	12.30	0.001	103	37.82	0.012	1,346	13.64	0.000	961	16.57	0.000	115	21.38	0.133
	4	1,275	11.47	0.000	874	13.80	0.002	100	52.15	0.002	1,308	15.82	0.000	939	20.78	0.000	114	26.52	0.074
	-1	434	-1.77	0.771	235	-3.46	0.728	34	-11.06	0.987	580	-9.98	1.000	338	-10.89	1.000	38	-19.89	1.000
	1	434	4.30	0.010	235	3.24	0.079	34	4.19	0.191	580	2.27	0.089	338	1.72	0.280	38	12.96	0.056
High	2	429	4.05	0.007	232	1.83	0.215	32	-5.66	0.798	576	2.50	0.103	335	2.14	0.295	38	15.10	0.065
	3	414	17.90	0.000	225	16.78	0.010	31	-5.43	0.696	555	6.53	0.028	326	4.83	0.173	38	17.51	0.081
	4	398	28.58	0.000	222	35.51	0.002	29	1.65	0.535	530	13.05	0.005	317	13.06	0.020	34	25.31	0.086
Panel C: Subperiod 1991-1996																			
	-1	656	-19.02	1.000	580	-24.43	1.000	65	-5.47	0.925	256	-16.26	1.000	201	-18.93	1.000	34	-24.53	0.999
	1	656	8.21	0.000	580	8.80	0.000	65	11.65	0.039	256	-0.13	0.438	201	1.31	0.509	34	4.40	0.400
Low	2	647	14.66	0.000	572	18.27	0.000	64	5.32	0.222	250	3.57	0.065	199	15.75	0.039	32	-9.51	0.757
	3	620	31.52	0.000	549	30.98	0.000	61	5.67	0.299	243	7.27	0.087	194	22.15	0.018	31	-22.85	0.938
	4	585	36.58	0.000	517	40.43	0.000	58	-1.61	0.139	224	18.53	0.000	177	36.94	0.000	30	-10.98	0.600
	-1	1,762	-10.64	1.000	1,237	-13.11	1.000	148	-13.33	1.000	1,568	-12.43	1.000	1,348	-12.72	1.000	131	-10.33	0.999
	1	1,762	5.18	0.000	1,237	2.43	0.040	148	11.66	0.012	1,568	3.25	0.000	1,348	2.80	0.008	131	1.94	0.146
Mid	2	1,703	11.36	0.000	1,207	5.77	0.002	141	12.95	0.007	1,526	1.49	0.000	1,320	2.93	0.000	126	5.28	0.058
	3	1,612	16.07	0.000	1,160	10.90	0.000	128	3.67	0.085	1,447	4.06	0.000	1,262	7.75	0.000	117	-4.70	0.381
	4	1,478	26.54	0.000	1,067	22.44	0.000	121	12.08	0.005	1,359	7.40	0.000	1,189	14.54	0.000	110	-23.82	0.583
	-1	822	0.45	0.032	388	-12.96	1.000	49	-20.09	1.000	1,260	-5.50	1.000	548	-25.64	1.000	82	-11.00	0.964
	1	822	7.79	0.000	388	4.90	0.011	49	-7.57	0.577	1,260	10.99	0.000	548	10.59	0.000	82	18.05	0.005
High	2	802	10.06	0.000	383	0.68	0.055	46	-4.31	0.253	1,222	26.48	0.000	535	20.01	0.000	80	24.25	0.008
	3	713	13.45	0.000	363	9.32	0.004	44	10.01	0.170	1,112	42.02	0.000	514	37.93	0.000	73	44.56	0.002
	4	627	14.19	0.000	331	11.01	0.003	39	-2.92	0.228	983	51.75	0.000	463	53.01	0.000	68	63.75	0.000

Table V
Cross-Sectional Regressions of Abnormal Returns

This table reports cross-sectional regression results of return performance on various explanatory variables. The dependent variable is either the one- or four-year abnormal return defined as the difference in buy-and-hold returns between a given sample firm and its corresponding match firm. *Size decile* (1 being the smallest) is based on the market value of equity at the month-end prior to the repurchase announcement relative to all stocks covered by CRSP and Compustat. *B/M quintile* (1 being the lowest) is based on the ratio of the book equity value at the previous fiscal year-end to total market value at month-end prior to the announcement. *FCF quintile* uses the Lehn and Paulsen (1989) measure for free cash flows divided by sales. *% shares announced* is the percentage of announced repurchase shares relative to total outstanding shares at month-end prior to the announcement. *% net insider purchase* is defined as the net number of shares insiders purchased relative to the total number of shares traded during the one-year period after the announcement date. *% actual repurchase* represents the percentage of shares that firms bought during the one-year period after the repurchase announcement. *Actual repurchase dummy* is 1 if repurchasing firms bought at least some stock during the one-year period after the repurchase announcement. *High B/M & high FCF dummy* is 1 if the repurchase firm is in both top B/M quintile and top FCF quintile. *Actual repurchase & high B/M (FCF) dummy* is 1 if the repurchase firm bought at least some shares during the one-year period after the repurchase announcement and is in top B/M (FCF) quintile. Year dummy variables are included, but not reported in this table. Numbers in parentheses are White (1980) heteroskedasticity-adjusted *t*-statistics.

	One-year abnormal return				Four-year abnormal return			
Model	1	2	3	4	5	6	7	8
Intercept	0.0093	0.0026	0.0253	0.0343	-0.2087	-0.3945	-0.1498	-0.1759
	(0.16)	(0.04)	(0.41)	(0.45)	(-1.28)	(-2.13)	(-0.89)	(-0.88)
Size decile	0.0007	0.0007	0.0003	0.0009	0.0232	0.0232	0.0227	0.0267
	(0.16)	(0.16)	(0.08)	(0.22)	(2.12)	(2.13)	(2.06)	(2.42)
B/M quintile	0.0011	0.0009	-0.0068	-0.0039	-0.0311	-0.0245	-0.0582	-0.0456
	(0.12)	(0.09)	(-0.69)	(-0.33)	(-1.26)	(-0.99)	(-2.15)	(-1.45)
FCF quintile	0.0119	0.0120	0.0134	0.0051	0.0291	0.0275	0.0366	-0.0230
	(1.30)	(1.30)	(1.36)	(0.43)	(1.06)	(1.00)	(1.20)	(-0.64)
% shares announced	0.0380	0.0262	0.0470	0.0323	0.6477	0.8490	0.6818	0.8626
	(0.27)	(0.19)	(0.34)	(0.24)	(1.75)	(2.39)	(1.83)	(2.42)
% net insider purchase	-1.2252	-1.2269	-1.1857	-1.2010	-4.4142	-4.7307	-4.3336	-4.5676
	(-1.22)	(-1.22)	(-1.17)	(-1.19)	(-0.95)	(-1.03)	(-0.93)	(-0.99)
Log (1+ % actual repurchase)	-0.0717		-0.0127		1.3115		0.6259	
	(-0.36)		(-0.06)		(1.88)		(0.77)	
Actual repurchase dummy		0.0052		0.0021		0.2445		0.1514
		(0.14)		(0.05)		(2.31)		(1.39)
High B/M & high FCF dummy			0.1619	0.1430			-0.0740	-0.1723
			(1.87)	(1.66)			(-0.25)	(-0.57)
Log (1+% actual repurchase)*high B/M dummy			0.3154				3.6011	
			(0.90)				(2.60)	
Log (1+% actual repurchase)*high FCF dummy			-0.6942				-0.4711	
			(-1.37)				(-0.34)	
Actual repurchase & high B/M dummy				0.0007				0.1773
				(0.02)				(1.39)
Actual repurchase & high FCF dummy				0.0105				0.2607
				(0.28)				(2.35)