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Operating performance following open market share repurchase announcements ☆

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Abstract

I document that operating performance improves following 4,729 announcements of open market share repurchase programs from 1981 to 2000. Moreover, the capital market responds favorably to earnings announcements after the program announcements. Further analysis reveals that both the operating performance improvement and the positive earnings announcement returns are limited to those firms that actually repurchase shares during the same fiscal quarter. Last, I report that a subsample of firms that initiate the repurchases in quarters following the program announcements experience improvements after the initiation quarter, suggesting that actual repurchases, and not announcements per se, portend future performance improvements.

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1. Introduction

The last two decades have witnessed a dramatic increase in the use of open market repurchases, and by 1998 the total value of share repurchases (led by open market

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repurchases) exceeded that of dividends (Grullon and Michaely, 2002). According to the survey evidence in Brav et al. (2003), managers regard undervaluation of the stock to be the most important reason for repurchasing shares. If the stock is truly undervalued, share repurchase programs represent positive NPV projects that benefit shareholders. Any undervaluation likely stems from managers expecting future operating performance to be better than the capital market expects. Thus, a side effect of share repurchases is that they convey favorable information to the market about future performance.

Consistent with the notion that open market share repurchases convey favorable information to the capital market, Vermaelen (1981) and Comment and Jarrell (1991) report that the stock market reaction to announcements of open market share repurchase programs is positive. Bartov (1991) provides some evidence that the positive wealth impact is attributable to an improvement in earnings. In particular, he reports that analysts revise upward their earnings forecasts around open market share repurchase announcements relative to control firms and that earnings improve during the announcement year. However, using a much larger sample, Grullon and Michaely (2004) find no evidence that analysts revise their earnings forecasts upward around open market share repurchase program announcements, and only weak evidence that earnings improve during the announcement year. In addition, neither Bartov nor Grullon and Michaely find any evidence of earnings improvements during post-announcement years. Overall, there is little evidence in extant literature that announcements of repurchase programs portend improvements in operating performance. If there is an improvement, it appears to primarily take place during the announcement year. It is difficult, however, to interpret any changes during the announcement year, because they might occur during the fiscal quarters before the announcement or the fiscal quarters afterward. This distinction is important, because it might tell whether decisions to launch open market repurchase programs depend on insiders' expectations of future performance changes and whether performance changes can explain the positive average stock price reaction upon program announcements.

I reexamine changes in operating performance around open market repurchase program announcements using quarterly data. Quarterly data permit me to better disentangle changes in performance immediately before and after the announcements. In addition to reporting performance changes for firms that announce repurchase programs and performance changes net of corresponding changes for industry peers, I report performance changes net of changes for firms with similar pre-event performance. Fama and French (2000) show that past performance patterns affect future performance changes. For example, a firm with superior performance will likely experience a subsequent reversion to the industry norm as other firms imitate its strategy and products. As a result, Barber and Lyon (1996) and Lie (2001) report that when analyzing whether future performance changes unexpectedly for firms with superior performance, the failure to compare the performance changes to those for firms with similar past performance generates biased test-statistics. Because firms that announce repurchases generally exhibit superior performance, I primarily rely on the changes for the sample firms net of the

changes for the firms with similar pre-event performance when making inferences and drawing conclusions.

My sample consists of 4,729 open market share repurchase program announcements from 1981 to 2000. Consistent with prior studies, I find that the stock price reaction to the announcements is positive. The mean and median abnormal stock returns during the 3 days centered on the announcements are 3.0% and 1.9%, respectively. Thus, repurchase program announcements clearly convey favorable information to the capital market. Relative to industry peers, firms that announce repurchases exhibit superior operating performance, but the relative performance declines following the program announcements. The declining performance appears to be attributable to mean reversion, however. Relative to control firms with similar pre-event performance, firms that announce repurchases actually exhibit subsequent performance improvements. The relative performance improvement of the sample firms occurs within two quarters after the program announcements, and appears to persist for at least 2 years thereafter. In other words, both the sample firms and the control firms experience subsequent declines in performance as a result of mean reversion, but the decline is less pronounced during the two quarters after the announcements for the sample firms. If the decline for the control sample accurately measures the expected performance decline in the absence of repurchase program announcements, the sample firms exhibit a performance improvement relative to prior expectations. Thus, my study provides evidence that announcements of open market repurchase programs convey an improvement in subsequent operating performance relative to prior expectations.

In practice, firms that announce intentions to repurchase shares in the open market might not actually do so (Ikenberry and Vermaelen, 1996; Stephens and Weisbach, 1998). Unless a firm "puts its money where its mouth is" by actually repurchasing shares, it is less likely that managers believe that future performance will be better than the market expects and that the shares are undervalued. Consequently, for an announcement to convey favorable information about future performance, it has to be bonded with actual repurchases.

To examine the notion that an open market share repurchase program announcement has to be coupled with actual repurchases to foretell performance improvements, I separately examine two subsamples. The first subsample consists of firms that announce an open market repurchase but do not repurchase any shares in the same fiscal quarter. The second subsample consists of firms that repurchase shares in excess of 1% of total asset value during the announcement quarter. The results are markedly different across these subsamples. Firms that do not repurchase shares during the announcement quarter do not exhibit any improvement in operating performance. In stark contrast, firms that repurchase shares during the announcement quarter exhibit a significant improvement in performance relative to firms with similar pre-event performance. The average relative improvement for these firms is 6–15%, which, if permanent, should give rise to a similar percentage increase in total firm value and an even greater increase in equity value.

I also examine whether actual repurchases in later quarters convey information about performance. I find that even though firms with no share repurchase during

the announcement quarters do not experience performance improvements after the announcement quarters, the subsample of these firms that initiate repurchases in subsequent quarters experience relative performance improvements after the initiation quarters. Thus, the actual repurchases, rather than the announcements of the repurchase programs per se, appear to foreshadow performance improvements.

If firms that announce share repurchase programs exhibit improvements in operating performance and the capital market does not fully capitalize these improvements into the stock prices upon the announcements, the capital market should respond favorably to earnings announcements that follow the repurchase program announcements. In the last part of my study I test this joint hypothesis. The average abnormal stock price reaction to quarterly earnings announcements in the 2 years following repurchase program announcements hovers around 0.3–0.6%. Further inspection reveals that these positive abnormal earnings announcement returns are driven by firms that repurchase shares during the announcement quarter, for which the average returns are 0.5–1.1%. Interestingly, the highest average return of 1.1% is for the repurchase program announcement quarter, consistent with the notion that valuable information about recent repurchases is revealed at this time. In any event, the results corroborate the results on operating performance changes. In sum, there is strong evidence that firms that couple announcements of open market share repurchase programs with actual share repurchases experience subsequent operating performance improvements.

My results have several important implications. First, they suggest that decisions to launch an open market repurchase program and subsequently repurchase shares depend on insiders' expectations of future performance. Second, they suggest that the positive average price reaction upon announcements of share repurchase programs occurs, at least partially, because capital market participants revise upward their expectations for future performance. Last, the results justify the SEC's efforts to regulate repurchases to mitigate the potential for firms to take advantage of inside information about future performance when engaging in open market transactions.

The remainder of the paper proceeds as follows. The next section discusses the hypotheses and past research. Section 3 describes the sample. Section 4 presents empirical results. Finally, Section 5 summarizes and concludes.

2. Hypotheses and past research

2.1. Hypotheses

If managers believe that their firms' shares are undervalued in the market, they likely regard an open market share repurchase program to be a positive NPV project. Consistent with this notion, Brav et al. (2003) report that CFOs and Treasurers deem potential undervaluation of the stock (i.e., that the stock price is low relative to its true value) to be the most important consideration for the decision to repurchase

shares. Because the value of the stock is a function of future cash flow, differences in opinions regarding the value of the stock between managers and the capital market are likely due to differences in expectations of future operating performance. Consequently, managers will initiate share repurchase programs when they expect future operating performance to be better than what the capital market expects. I therefore hypothesize that repurchase program announcements foreshadow future operating performance improvements relative to prior market expectations.

In practice, however, firms that announce open market repurchase programs often do not implement their proposed plans for several years, if at all (Ikenberry and Vermaelen, 1996; Stephens and Weisbach, 1998). This observation forms the basis for my second hypothesis. If the firm refrains from buying shares in the aftermath of a repurchase program announcement, it is less likely that managers believe that future earnings will be better than anticipated by the market and that the shares are truly undervalued. I therefore hypothesize that program announcements foreshadow future operating performance improvements only when the announcements are followed by actual repurchases.

Traditional signaling theory might lead to the same set of hypotheses. Bhattacharya (1979) and Miller and Rock (1985) develop models based on information asymmetry between insiders and outsiders of the firm, which show that payouts can be used to signal future cash flow prospects. Managers (i.e., the insiders) want to maximize the short-term stock price, e.g., because the current shareholders will sell all or part of their shares. They therefore deliberately pay out funds to inflate the stock price, unless doing so imposes a large cost arising from a future shortage of funds (e.g., having to forego valuable investment opportunities or raise costly external funds.) Thus, payout announcements convey favorable information about future prospects, but only to the extent that they are followed by actual payouts. Otherwise, there is no implication for future availability of funds, and, hence, no signaling cost.

The problem with traditional signaling models in the context of announcements of open market repurchase programs is that such announcements do not commit the firm to actually repurchase shares. Without a commitment, the models unravel due to the absence of a signaling cost. Of course, the models could pertain to the actual repurchases instead of just the announcements. However, if this was the case, managers would presumably be much more vocal about these activities. In practice, investors generally learn of the repurchase transactions via financial statements and other sources much later than they actually occurred. Thus, it is unlikely that managers are using actual repurchases primarily as a means to convey information to shareholders. The survey evidence of CFOs and Treasurers in Brav et al. (2003) also shows that managers are unlikely to deliberately use payouts, including dividends and share repurchases, to signal future prospects.

2.2. *Past research on operating performance around payout announcements*

Based on a sample of 185 announcements of open-market repurchase programs between 1978 and 1986, Bartov (1991) documents that analysts revise upward their

earnings forecasts for announcing firms relative to those for control firms. Further, the earnings for the announcing firms improve during the announcement year, prompting him to conclude that repurchase announcements convey favorable information about earnings. Using a much larger sample of 4,443 observations between 1980 and 1997, Grullon and Michaely (2004) find only weak evidence of a performance improvement around open-market share repurchase announcements. To the extent that there is a performance improvement, it occurs during the announcement year, and not in subsequent years. They further find that firms that announce open market share repurchase programs exhibit subsequent reductions in systematic risk and investments. They conclude that the announcements mark the transition to a more mature phase that is characterized by fading investment opportunities. In the face of such fading investment opportunities, repurchases can curtail overinvestment, which might explain the positive stock market reaction. Importantly, both studies focus on the repurchase announcements, and neither considers the effect of actual repurchases that usually, but not always, follow.

In a closely related study, Guay and Harford (2000) examine the permanence of cash flow shocks around share repurchase authorizations and dividend increases. They document positive cash flow shocks during years −1 and 0 relative to both payout events. Unlike the cash flow shock for firms that increase dividends, the cash flow shock for repurchasing firms is not more permanent than that for control firms with a similar cash flow shock.[1] One interpretation of these results is that the cash flow improves around repurchase authorizations, but does not improve further thereafter relative to expectations.

Other studies have examined performance changes around similar events. Studies on self-tender offers have documented evidence that earnings improve around the announcements, especially during the announcement year (Vermaelen, 1981; Dann et al., 1991; Hertzel and Jain, 1991; Lie and McConnell, 1998). Studies on dividend changes are very mixed. Healy and Palepu (1988) find that firms that initiate dividends experience subsequent earnings increases and that firms that omit dividends experience contemporaneous earnings decreases followed by earnings increases. In contrast, DeAngelo et al. (1996) find no evidence that earnings increase following dividend increases. Further, Benartzi et al. (1997) and Grullon et al. (2002) find that firms that increase dividends experience increases in earnings during the same year, but no increases thereafter, whereas firms that decrease dividends experience decreases in earnings during the same year and increases thereafter. Finally, Nissim and Ziv (2001) find that, when controlling for the earnings levels at the end of the event year and other variables likely to affect future earnings, the earnings are abnormally high during the subsequent 2 years for firms that increase dividends and subsequent earnings are normal for firms that decrease dividends.

[1]Guay and Harford (2000) also provide some simple statistics on the permanent cash flow changes, but they are not adjusted for the distinct downward time trend in profitability documented in Barber and Lyon (1996), making them difficult to interpret.

3. Sample

My initial sample of repurchase program announcements originates from Security Data Company's (SDC) Mergers and Acquisitions database, which is available from Thomson Financial. The sample period extends from 1981 to 2000. I exclude regulated firms, i.e., utilities and financial firms. I further exclude observations that SDC classifies as self-tender offers or block repurchases.[2] Finally, I exclude firms that lack data on Compustat or CRSP, including data to estimate operating performance for the fiscal quarter of the repurchase and the prior quarter.

Table 1 presents the distribution of the final sample across the calendar years and fiscal quarters of the announcements. While the number of announcement fluctuates greatly, there is a steady increase until the peak in 1998 with 15.7% of the sample observations, after which there is a rapid decline to 5.5% of the sample observations in 2000.[3] Interestingly, a disproportionately large fraction of announcements, 29.4%, took place during the fourth fiscal quarter. This is partially attributable to the spike in repurchase announcements immediately after the October 1987 stock market crash. In fact, 219 (53%) of the 416 announcements in 1987 occurred in the fourth fiscal quarter.[4] When I exclude announcements in 1987, the fraction of announcements that took place during the fourth fiscal quarter drops to 27.2%. This is still larger than the fractions for the other quarters, perhaps because information is most asymmetric in the fourth quarter.[5]

Table 2 provides descriptive statistics for the sample. The mean (median) firm has book value of assets of $2,664 million ($248 million). The sample firms tend to have large cash ratios and low debt ratios before the announcements. The mean (median) pre-announcement cash ratio is 15.8% (8.6%), while the mean (median) debt ratio is 20.0% (17.4%).

Table 2 also provides the abnormal stock returns around the announcement dates. The abnormal returns are computed using the one-factor model, where the equal-weighted index is used to proxy for overall market returns and the estimation period spans from 250 to 10 days prior to the announcement. The mean and median 3-day announcement period returns are 3.0% and 1.9%, respectively, both of which are statistically different from zero at the 1% level of significance. In comparison, Grullon and Michaely (2004) find mean and median 3-day announcement period returns of 2.7% and 1.8%, respectively. The results reported here and in past studies

[2]Note that excluding repurchases classified as block repurchases eliminates both pure block repurchases as well as open market repurchase programs that might involve negotiated repurchases. For example, on May 30 1985, American Cyanamid Co. announced its intention to purchase 4–5 million shares of its common stock and stated that "such purchases will be made on the New York Stock Exchange or in private transactions in accordance with SEC guidelines designed to minimize market impact." SDC marked this as a block repurchase.

[3]The relatively few observations in the beginning of the sample period is likely to be partially due to spotty coverage by SDC during these years.

[4]Of the 416 announcements in 1987, 377 (91%) occurred in the fourth *calendar* quarter.

[5]Korajczyk et al. (1991) similarly argue that firms should issue equity when information is symmetric, i.e., early in the fiscal year.

Table 1
Sample distribution

Year or fiscal quarter	*N*	Fraction (%)
1981	4	0.1
1982	16	0.3
1983	55	1.2
1984	209	4.4
1985	48	1.0
1986	69	1.5
1987	416	8.8
1988	97	2.1
1989	188	4.0
1990	292	6.2
1991	98	2.1
1992	184	3.9
1993	169	3.6
1994	289	6.1
1995	289	6.1
1996	401	8.5
1997	442	9.3
1998	741	15.7
1999	463	9.8
2000	259	5.5
Quarter 1	1110	23.5
Quarter 2	1078	22.8
Quarter 3	1150	24.3
Quarter 4	1391	29.4
Total	4729	100.0

Distribution of the sample of share repurchase program announcements by the year of announcement and by the fiscal quarter of the announcement. Observations have been excluded if (1) the repurchase takes the form of a self-tender offer or involves a block repurchase, (2) the firm is a financial or utility firm, or (3) the firm lacks data on CRSP or Compustat.

suggest that the market interprets open market share repurchase program announcements as favorable news.

4. Empirical results

4.1. Operating performance for the whole sample

I start by analyzing the operating performance around the open market repurchase program announcements for the whole sample. Unlike past studies, I use quarterly data.[6] If the performance changes during the fiscal year of the

[6]In the appendix, I report results using annual data to facilitate comparison with other studies, especially Grullon and Michaely (2004). The results show that firms that announce repurchases experience performance declines during the announcement year. However, relative to other firms with similar past

Table 2
Descriptive statistics

	Mean	Median	25th percentile	75th percentile
Book value of assets (billions of dollars)	2.664	0.248	0.070	1.131
Cash ratio	0.158	0.086	0.024	0.236
Debt ratio	0.200	0.174	0.039	0.299
Market-to-book ratio	1.962	1.511	1.172	2.183
Announcement period return	0.030	0.019	−0.012	0.063

Descriptive statistics for the sample of firms that announced open market repurchase programs between 1981 and 2000. All financial data are measured at the end of the fiscal year preceding the announcement. Cash ratio is cash and cash equivalents scaled by the book value of assets. Debt ratio is long-term debt and debt in current liabilities scaled by the book value of assets. Market-to-book ratio is the market value of equity plus the book value of debt scaled by the book value of assets. Announcement period returns are the abnormal stock returns measured from the day before through the day after the announcement using a one-factor market model, where the equal-weighted index is used to proxy overall market returns and the estimation period spans from 250 to 10 days prior to the announcement.

announcement, as indicated in Bartov (1991) and the appendix of this study, and to a more limited degree in Grullon and Michaely (2004), it is necessary to partition the year into quarters to assess whether these changes are attributable to changes during the quarters before or after the announcements. I focus on changes from the end of the announcement quarter to future quarters, especially to quarters +4 and +8 relative to the announcement quarter to avoid contamination from seasonal effects.[7] To be prudent, I disregard changes during the announcement quarter, because they partially occurred prior to the announcement and might have been expected at the time of the announcement. Thus, any performance improvement reported here occurred entirely after the announcements.

I examine both unadjusted and adjusted operating performance. Unadjusted performance is simply the operating performance for the firms that announce open market repurchases. Operating performance is measured as operating income

(*footnote continued*)
performance characteristics, the sample firms experience performance improvements during the announcement year. In comparison, Grullon and Michaely (2004) find no statistical improvement in the same relative performance measure during the announcement year, but they do find some performance improvement for the same year using other relative performance measures. One apparent reason for the stronger improvement in relative performance during the announcement year in this study is that the improvement is weaker for the 1981–1997 sample period, which roughly corresponds to the 1980–1997 period employed by Grullon and Michaely. (Interestingly, of the observations that I later categorize as having either no or substantial subsequent repurchases, 58% are in the latter category for the 1981–1997 period, whereas 72% are in the same category for the 1998–2000 period.) Perhaps most importantly, neither this study nor Grullon and Michaely find evidence of significant performance improvements during the years following the announcement year, suggesting that any improvement primarily occurs during the announcement year.

[7]If there are seasonal effects, e.g., typically stronger performance in the last fiscal quarter due to strong holiday sales, the results will be noisy and perhaps biased if the performance for the last quarter is compared to that for the first three quarters. Thus, the performance for the last quarter for a given year should ideally be compared to the performance for the last quarter for other years.

scaled by the average of cash-adjusted assets (i.e., book value of assets less cash and short-term investments) at the beginning and end of the fiscal quarter.[8] Adjusted performance is the unadjusted performance less the performance for control firms.[9]

I generate two sets of control firms. The first set is composed of firms in the same industry that are similar in size. In particular, for each sample firm, I choose as a control firm the firm with the same two-digit SIC code that has book value of assets closest to that of the sample firm. I call the adjusted performance based on these control firms industry-adjusted performance.

The second set of control firms is composed of firms in the same industry that have similar pre-event performance characteristics and market-to-book ratios, roughly as outlined in Lie (2001). For each sample firm, I first identify all firms with the same two-digit SIC code, operating performance within $\pm 20\%$ or within ± 0.01 of the performance of the sample firm in the announcement quarter (quarter 0), operating performance for the four quarters ending with the quarter 0 within $\pm 20\%$ or within ± 0.01 of the corresponding performance for the sample firm, and pre-announcement market-to-book value of assets within $\pm 20\%$ or within ± 0.1 of that of the sample firm. I match on pre-announcement performance characteristics because these characteristics predict future performance (Barber and Lyon, 1996; Fama and French, 2000) and because repurchasing firms exhibit superior performance (Jagannathan et al., 2000). I match on market-to-book ratio because this ratio likely contains information about future operating performance (Fama and French, 2000) and because Dittmar (2000) and Jagannathan et al. (2000) show that, ceteris paribus, firms that repurchase shares have abnormally low market-to-book ratios. If no firms meet the criteria, I relax the industry criterion to a one-digit SIC. Finally, if still no firms meet the criteria, I disregard the SIC code and the performance and market-to-book criteria. From these firms, I choose the firm with the lowest sum of absolute

[8]Subtracting cash from the assets alleviates concerns that scaled performance increases solely because cash is removed from the asset base to finance repurchases. Alternatively, I could scale by sales. However, as argued by Barber and Lyon (1996), because operating income scaled by sales does not measure directly the productivity of assets, it might not capture certain changes in overall performance. For example, a firm that improves overall operating performance by proportionately increasing its sales and operating income without altering its asset base would exhibit no improvement in a sales-based measure. Nohel and Tarhan (1998) show that this is a considerable concern for firms that repurchase shares via self-tender offers, as these firms improve their asset utilization. I nevertheless replicated my analysis using operating income scaled by sales. I find that the sample firms exhibit a subsequent improvement relative to proper benchmark firm based on this measure also, and that the improvement is only statistically significant at the 0.01 level for firms that actually repurchase shares. But the results are less pronounced than those tabulated, suggesting that some of the overall improvement tabulated in this study is attributable to improvements in asset utilization.

[9]An important advantage of simply comparing the performance of the repurchasing firms to the performance of non-repurchasing firms with similar characteristics is that I do not have to assume anything about the functional relations between the performance and the matching characteristics. Fama and French (2000) show that these relations are likely to be very complex, making the use of linear performance models treacherous.

Table 3
Quarterly operating performance

Quarter	N	Unadjusted		Industry-adjusted		Performance-adjusted	
		Mean	Median	Mean	Median	Mean	Median
Panel A: Levels of operating performance							
−2	4649	0.0514[a]	0.0469[a]	0.0181[a]	0.0081[a]	0.0008[b]	0.0005[a]
−1	4729	0.0488[a]	0.0455[a]	0.0156[a]	0.0072[a]	0.0006	0.0003
0	4729	0.0462[a]	0.0442[a]	0.0144[a]	0.0065[a]	0.0002[b]	0.0000
1	4615	0.0450[a]	0.0434[a]	0.0146[a]	0.0063[a]	0.0017[a]	0.0007[a]
2	4505	0.0441[a]	0.0428[a]	0.0141[a]	0.0056[a]	0.0028[a]	0.0013[a]
3	4397	0.0430[a]	0.0419[a]	0.0114[a]	0.0046[a]	0.0019[b]	0.0012[a]
4	4305	0.0426[a]	0.0415[a]	0.0117[a]	0.0048[a]	0.0021[a]	0.0014[a]
5	4232	0.0421[a]	0.0416[a]	0.0107[a]	0.0051[a]	0.0034[a]	0.0017[a]
6	4112	0.0408[a]	0.0416[a]	0.0088[a]	0.0044[a]	0.0026[a]	0.0016[a]
7	3990	0.0403[a]	0.0409[a]	0.0079[a]	0.0045[a]	0.0041[a]	0.0016[a]
8	3872	0.0398[a]	0.0404[a]	0.0079[a]	0.0048[a]	0.0037[a]	0.0018[a]
Panel B: Changes in operating performance							
0 to +1	4615	−0.0011[b]	−0.0003[b]	−0.0004	−0.0002	0.0016[b]	0.0005[a]
0 to +2	4505	−0.0024[a]	−0.0006[a]	−0.0006	−0.0007	0.0028[a]	0.0013[a]
0 to +4	4305	−0.0040[a]	−0.0013[a]	−0.0027[a]	−0.0013[a]	0.0021[a]	0.0012[a]
0 to +8	3872	−0.0075[a]	−0.0031[a]	−0.0049[a]	−0.0010[a]	0.0035[a]	0.0016[a]

Levels of and changes in quarterly operating performance around announcements of open market share repurchase programs. Operating performance is measured as operating income scaled by the average of cash-adjusted assets (i.e., book value of assets less cash and short-term investments) at the beginning and end of the fiscal quarter. Quarter 0 is the fiscal quarter of the announcement. Industry-adjusted operating performance is the paired difference between the operating performance of the sample firms and the operating performance of their respective industry- and size-matched control firms. Performance-adjusted operating performance is the paired difference between the operating performance of the sample firms and the operating performance of their respective industry-, performance- and M/B-matched control firms. N is the number of firms with available data. To mitigate the effect of outliers, the means have been trimmed one percent (i.e., the top 0.5% and the bottom 0.5% of the observations have been excluded when estimating the means). a and b denote that the statistics differ significantly from zero at the 0.01 and 0.05 levels, respectively.

differences, defined as

$$\begin{aligned}&|\text{Performance}_{\text{Quarter 0, Sample firm}} - \text{Performance}_{\text{Quarter 0, Firm } i}|\\&\quad + |\text{Performance}_{\text{Four quarters ending with quarter 0, Sample firm}}\\&\quad - \text{Performance}_{\text{Four quarters ending with quarter 0, Firm } i}|.\end{aligned}$$

If the sample firm lacks operating performance for any of the four quarters ending with the quarter 0, I disregard the second term above. I label the adjusted performance based on these control firms performance-adjusted performance.

Table 3 presents the unadjusted and adjusted operating performance. The unadjusted performance displays deteriorations in performance from the announcement quarter (quarter 0) to future quarters. For example, the mean change in performance during the year from quarter 0 to quarter +4 is −0.0040, which

amounts to a percentage change of $-0.0040/0.0462 = -8.7\%$.[10] The industry-adjusted performance shows that firms that announce repurchases perform better than their respective industry peers both before and after the announcements. However, the superior performance tends to diminish over time, suggesting a mean reversion in performance. Because mean reversion is at least partially predictable, it is critical to control for this when trying to uncover unexpected changes in performance. This is exactly what the performance-adjusted figures are designed to accomplish.

By design, the performance-adjusted figures are close to zero during the announcement quarter, with mean and median of 0.0002 and 0.0000, respectively. Even though the mean is very close to zero, it is statistically different from zero at the 5% level of significance. This statistical (but not economical) significance arises because of a particularly low standard deviation of differences between the performance of the firms that announce repurchases and their performance-matched firms in this quarter.

The changes in performance-adjusted performance from quarter 0 to future quarters show significant improvements. For example, the mean and median changes during the year from quarter 0 to quarter +4 are 0.0021 and 0.0012, respectively, both of which are statistically different from zero at the one percent level. The improvement appears to occur within two fiscal quarters, and persists for at least 2 years. Thus, while the unadjusted performance declines after firms announce open market share repurchases, the decline is less pronounced than that for control firms with similar pre-event performance characteristics. Assuming that the performance decline for the control firms is a good proxy for the expected decline in the absence of repurchase announcements, firms that announce repurchases exhibit a performance improvement relative to pre-event expectations. The performance improvement also appears to be economically significant. Assuming that the changes are permanent and that the cost of capital remains unchanged, the mean performance increase of $0.0021/0.0462 = 4.6\%$ would induce a similar percentage increase in total firm value. Because most of this gain would accrue to equityholders as the residual claimants, the mean increase in equity value would be even higher.

In sum, the evidence in Table 3 shows that firms that announce open market share repurchases tend to exhibit performance improvements from the announcement quarters to future quarters relative to proper benchmarks. Most of the improvement takes place within two quarters and is persistent. Thus, open market share repurchase program announcements appear to convey favorable information about future operating performance. While this conclusion differs from that in Grullon and

[10]Barber and Lyon (1996) advocate the use of medians over means when examining operating performance. This makes sense because operating performance statistics often contain extreme outliers, thereby making means less informative. However, valuable information might get lost when only examining medians. Thus, in my analysis of operating performance, I present medians along with means trimmed one percent, i.e., I exclude the top 0.5% and the bottom 0.5% of the observations in the estimation of means. (Note that medians are actually means trimmed 100%.) An exception is the means in Table 6, which are trimmed at 10% because of the use of much smaller samples. Incidentally, the results are qualitatively similar if I do not trim the means.

Michaely (2004), the evidence is not necessarily contradictory. Grullon and Michaely find slight evidence of an improvement during the announcement year, but no improvement afterwards, prompting them to conclude that open market repurchase program announcements do not convey information about future operating performance. Of course, if most of the improvement occurs within two fiscal quarters of the announcement, yearly data might conceal the subsequent performance improvement. That is, quarterly data combined with performance-matched control firms appear to be needed to uncover the performance improvement subsequent to repurchase program announcements.

4.2. Operating performance for subsamples with no repurchases and significant repurchases

In practice, many companies announce share repurchase programs without following through, and even when they do, it might not be for a while (Ikenberry and Vermaelen, 1996; Stephens and Weisbach, 1998). In this section, I examine whether open market repurchase program announcements have to be bonded with actual repurchases to be followed by performance improvements.

I partition the sample into three categories based on actual repurchases during the fiscal quarter of the announcements. The reason that I partition the sample based on repurchases during the announcement quarter, and not based on repurchases in future quarters, is a concern that past and concurrent performance affects actual repurchase behavior (Stephens and Weisbach, 1998). If I relate the repurchases during the announcement quarter to changes in performance from the announcement quarter to subsequent quarters, the results should be immune to this concern. The repurchase information is taken from Compustat, which Jagannathan et al. (2000) argue is a more accurate source than CRSP for estimating actual share repurchases.[11] The first category consists of firms that did not repurchase any shares during the announcement quarter. Of the 4,729 observations in my sample, 1,119 observations (24%) fit into this category. The second category consists of firms that repurchased shares in excess of 1% of market value of equity during the announcement quarter, and includes 1,843 observations (39%). The third category consists of the 1,767 observations (37%) that did not fit into either of the first two categories, either because they repurchased a very small portion of shares during the announcement quarter or because no information about their repurchase activity is available (which is the case for all quarters prior to 1984).[12]

[11]Rule 10b-18 under the Securities Exchange Act of 1934, which provides a "safe harbor" from charges of manipulation in connection with share repurchases, does not require firms to disclose their repurchases. However, the SEC has proposed new regulation (independent of Rule 10b-18) that would require quarterly disclosure of share repurchase activity. Even then, it could take up to 4 months after the occurrence of the repurchases before investors learn about them. Cook et al. (2003) provide further discussion of Rule 10b-18.

[12]The mean (median) 3-day announcement returns is 0.042 (0.025) for firms with no repurchases during the announcements quarter and 0.025 (0.016) for firms with repurchases in excess of one percent of equity value, and the differences in both means and medians are statistically significant at the 0.01 level. In

Table 4
Quarterly operating performance for firms with no share repurchases during the announcement quarter

Quarter	*N*	Unadjusted		Industry-adjusted		Performance-adjusted	
		Mean	Median	Mean	Median	Mean	Median
Panel A: Levels of operating performance							
−2	1096	0.0519[a]	0.0470[a]	0.0253[a]	0.0105[a]	0.0020[b]	0.0011[a]
−1	1119	0.0474[a]	0.0438[a]	0.0201[a]	0.0083[a]	0.0008	0.0004
0	1119	0.0419[a]	0.0417[a]	0.0139[a]	0.0065[a]	−0.0001	−0.0001
1	1084	0.0409[a]	0.0411[a]	0.0172[a]	0.0053[a]	−0.0007	−0.0004
2	1070	0.0412[a]	0.0413[a]	0.0177[a]	0.0051[a]	0.0016	0.0003
3	1043	0.0392[a]	0.0391[a]	0.0117[a]	0.0032[a]	0.0001	−0.0004
4	1018	0.0385[a]	0.0383[a]	0.0135[a]	0.0033[a]	−0.0013	−0.0001
5	1010	0.0379[a]	0.0395[a]	0.0118[a]	0.0031[a]	0.0003	0.0002
6	985	0.0383[a]	0.0393[a]	0.0116[a]	0.0038[a]	0.0008	0.0003
7	962	0.0379[a]	0.0394[a]	0.0104[a]	0.0050[a]	0.0036	0.0011
8	941	0.0365[a]	0.0386[a]	0.0099[a]	0.0030[b]	0.0014	0.0012
Panel B: Changes in operating performance							
0 to +1	1084	−0.0008	0.0003	0.0012	0.0010	−0.0005	−0.0004
0 to +2	1070	−0.0010	−0.0007	0.0016	0.0000	0.0020	0.0012
0 to +4	1018	−0.0049[a]	−0.0013[a]	−0.0021	−0.0015[b]	−0.0010	0.0000
0 to +8	941	−0.0087[a]	−0.0029[a]	−0.0063[b]	−0.0010	0.0014	0.0011

Levels of and changes in quarterly operating performance around announcements of open market share repurchase programs for firms that did not repurchase any shares in quarter 0. Operating performance is measured as operating income scaled by the average of cash-adjusted assets (i.e., book value of assets less cash and short-term investments) at the beginning and end of the fiscal quarter. Quarter 0 is the fiscal quarter of the announcement. Industry-adjusted operating performance is the paired difference between the operating performance of the sample firms and the operating performance of their respective industry- and size-matched control firms. Performance-adjusted operating performance is the paired difference between the operating performance of the sample firms and the operating performance of their respective industry-, performance- and M/B-matched control firms. *N* is the number of firms with available data. To mitigate the effect of outliers, the means have been trimmed one percent (i.e., the top 0.5% and the bottom 0.5% of the observations have been excluded when estimating the means). a and b denote that the statistics differ significantly from zero at the 0.01 and 0.05 levels, respectively.

Next, I examine the operating performance for the first two categories separately. Table 4 reports results for firms with no share repurchases during the announcement quarter, whereas Table 5 reports results for firms with repurchases in excess of one percent of equity value. Like the overall sample, firms that do not repurchase any shares during the announcement quarter exhibit superior performance relative to industry peers. Moreover, they exhibit performance deterioration from the

(*footnote continued*)
comparison, Bhattacharya and Dittmar (2003) find no difference in the announcement returns between firms that repurchase shares in the announcement quarter or the quarter thereafter and firms that do not repurchase shares in these two quarters. Thus, there is no evidence that the capital market can predict at the time of the repurchase announcement which firms will actually repurchase shares. The larger returns for firms with no repurchases suggest that firms are less inclined to repurchase shares following price increases, consistent with the arguments and results in Ikenberry et al. (2000).

Table 5
Quarterly operating performance for firms with significant share repurchases during the announcement quarter

Quarter	*N*	Unadjusted		Industry-adjusted		Performance-adjusted	
		Mean	Median	Mean	Median	Mean	Median
Panel A: Levels of operating performance							
−2	1817	0.0527[a]	0.0466[a]	0.0175[a]	0.0079[a]	0.0002	0.0000
−1	1843	0.0516[a]	0.0465[a]	0.0159[a]	0.0086[a]	0.0012[b]	0.0008[b]
0	1843	0.0508[a]	0.0459[a]	0.0170[a]	0.0079[a]	0.0005[a]	0.0001[b]
1	1807	0.0502[a]	0.0441[a]	0.0171[a]	0.0080[a]	0.0040[a]	0.0010[a]
2	1761	0.0483[a]	0.0436[a]	0.0156[a]	0.0073[a]	0.0036[a]	0.0022[a]
3	1709	0.0480[a]	0.0437[a]	0.0148[a]	0.0058[a]	0.0042[a]	0.0026[a]
4	1660	0.0475[a]	0.0430[a]	0.0163[a]	0.0071[a]	0.0039[a]	0.0026[a]
5	1621	0.0468[a]	0.0430[a]	0.0148[a]	0.0078[a]	0.0064[a]	0.0028[a]
6	1585	0.0446[a]	0.0421[a]	0.0120[a]	0.0063[a]	0.0057[a]	0.0025[a]
7	1541	0.0442[a]	0.0412[a]	0.0118[a]	0.0061[a]	0.0070[a]	0.0035[a]
8	1492	0.0443[a]	0.0415[a]	0.0126[a]	0.0075[a]	0.0080[a]	0.0028[a]
Panel B: Changes in operating performance							
0 to +1	1807	−0.0005	−0.0004	−0.0005	−0.0006	0.0035[a]	0.0013[a]
0 to +2	1761	−0.0028[a]	−0.0003[b]	−0.0014	−0.0010	0.0033[a]	0.0017[a]
0 to +4	1660	−0.0034[a]	−0.0012[a]	−0.0016	−0.0007	0.0038[a]	0.0024[a]
0 to +8	1492	−0.0063[a]	−0.0037[a]	−0.0008	0.0000	0.0075[a]	0.0037[a]

Levels of and changes in quarterly operating performance around announcements of open market share repurchase programs for firms that repurchased shares in excess of one percent of market value of equity in quarter 0. Operating performance is measured as operating income scaled by the average of cash-adjusted assets (i.e., book value of assets less cash and short-term investments) at the beginning and end of the fiscal quarter. Quarter 0 is the fiscal quarter of the announcement. Industry-adjusted operating performance is the paired difference between the operating performance of the sample firms and the operating performance of their respective industry- and size-matched control firms. Performance-adjusted operating performance is the paired difference between the operating performance of the sample firms and the operating performance of their respective industry-, performance- and M/B-matched control firms. *N* is the number of firms with available data. To mitigate the effect of outliers, the means have been trimmed one percent (i.e., the top 0.5% and the bottom 0.5% of the observations have been excluded when estimating the means). a and b denote that the statistics differ significantly from zero at the 0.01 and 0.05 levels, respectively.

announcement quarter to future quarters. Most strikingly, however, the performance-adjusted figures show no trace of a statistically significant improvement for the same window.

The patterns for unadjusted and industry-adjusted performance for firms with repurchases during the announcement quarter in Table 5 are qualitatively similar to those with no repurchases. However, even though these firms also perform better than their industry peers before the announcements, there is no significant decline in industry-adjusted performance. This is the first hint that these firms perform better than expected in post-announcement quarters. The performance-adjusted figures corroborate these initial findings. In particular, the mean and median performance-adjusted changes from both the announcement quarter to future quarters are all

positive and statistically different from zero at the one percent level. The mean changes hover around 0.004, or 8% of the mean pre-announcement performance, suggesting that the performance improvements are economically important.[13]

On the whole, it is clear that open market repurchase program announcements that are not bonded with actual repurchases do not precede performance improvements, whereas program announcements that are coupled with repurchases in the same quarter do. The results help explain why prior studies have struggled to uncover a strong performance improvement following open market repurchase program announcements, because these studies did not distinguish between repurchase program announcements that are followed up by actual repurchases from other repurchase program announcements. That is, including observations with no simultaneous actual share repurchases weakened the results in prior studies. They also explain why studies of repurchase announcements via self-tender offers, including Dann et al. (1991) and Lie and McConnell (1998), find an accompanying performance improvement despite using much smaller samples than Grullon and Michaely (2004), because self-tender offer announcements generally result in a substantial share repurchase within 2 months.

4.3. *Operating performance after actual repurchase initiations*

Even though firms do not repurchase shares during the announcement quarter, they might naturally repurchase shares in subsequent quarters. Fig. 1 shows the mean repurchases during the quarters after the announcement quarter for firms with either no repurchases or significant repurchases during the announcement quarter. Firms with no repurchases during the announcement quarter experience a peak in repurchase behavior during the post-announcement quarter. It is further interesting to note that firms with significant repurchases during the announcement quarter tend to repurchase more shares in subsequent quarters than firms with no repurchases during the announcement quarter.

To further examine the notion that it is the actual repurchases that convey information about future performance, I study the sample firms with no repurchases during the announcement quarter more closely in an effort to disentangle the announcement effect from the actual repurchase effect. In particular, I identify subsamples of these firms that initiate repurchases in subsequent quarters, and

[13]One potential problem with the analysis of subsamples based on repurchase behavior during the announcement quarter is that it allows some firms only a very short window to repurchase and others a longer window, depending on when they announced in the quarter. The mean (median) number of days between the announcement date and the end of the quarter is 39 (40) for firms with no repurchases during the announcements quarter and 49 (54) for firms with repurchases in excess of 1% of equity value. Thus, the classification of firms appears to be affected by variations in the length of the period remaining of the quarter. Any resulting "misclassification" should bias against finding different results for firms classified as non-repurchasers and repurchasers. Nevertheless, for robustness I exclude (a) firms that are classified as non-repurchasers *and* made the announcement in the last month of the quarter (41% of the non-repurchasers) and (b) firms that are classified as repurchasers *and* made the announcement in the first month of the quarter (41% of the repurchasers). As expected, the results (not tabulated) are qualitatively similar.

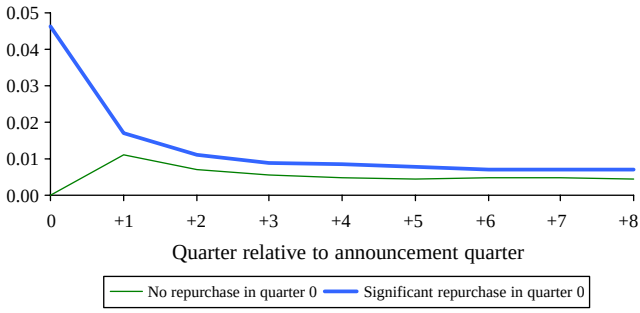

Fig. 1. Actual share repurchases after announcements of repurchase programs. Mean actual share repurchases scaled by market value of equity after announcements of repurchase programs for (a) firms that did not repurchase shares during the announcement quarter (quarter 0), and (b) firms that made significant repurchases during the announcement quarter, where a significant repurchase is defined as a repurchase in excess of one percent of market value of equity. To mitigate the effect of outliers, the means have been trimmed 1% (i.e., the top 0.5% and the bottom 0.5% of the observations have been excluded when estimating the means).

examine the performance after these initiations. I define a firm to initiate a share repurchase in quarter t if the firm (a) did not repurchase shares from the quarter of the share repurchase program announcement through quarter $t-1$ and (b) made repurchases in excess of one percent of market value of equity in quarter t.

Table 6 reports the operating performance after the quarter of the share repurchase initiations. Regardless of whether I examine initiations that take place in quarter $+1$ relative to the announcement quarter or later, or in quarter $+2$ or later (to increase the time elapsed between the announcement and the initiation), there is evidence of subsequent performance improvement when looking at the performance-adjusted figures in the last two columns. This is especially interesting given that the overall sample of firms that do not repurchase shares during the announcement quarter do not experience a subsequent performance improvement. Thus, my evidence suggests that actual repurchases, and not so much announcements of the repurchase program per se, portend performance improvements.

4.4. Abnormal returns around earnings announcements

My evidence indicates that operating performance improves subsequent to announcements of open market share repurchase programs, though only when the announcement is followed up by actual share repurchases. The performance improvement might explain the positive stock price reaction upon the announcement. Because the capital market cannot accurately predict at the time of the announcement whether a firm will actually repurchase shares and because repurchases are not transparent to the market as they occur, I expect that subsequent earnings announcements contain valuable information about recent

Table 6
Operating performance after actual repurchase initiations

Quarter	*N*	Unadjusted		Industry-adjusted		Performance-adjusted	
		Mean	Median	Mean	Median	Mean	Median
Panel A: Performance after initiation qt., where initiation occurs in quarter +1 relative to announc. qt. or later							
0	662	0.0416[a]	0.0402[a]	0.0072[a]	0.0042[a]	0.0003	0.0001
1	648	0.0408[a]	0.0376[a]	0.0075[a]	0.0031[a]	0.0036[a]	0.0013[b]
2	631	0.0402[a]	0.0397[a]	0.0054[a]	0.0015[b]	0.0018	0.0014
3	610	0.0405[a]	0.0387[a]	0.0025	0.0009	0.0013	0.0010
4	591	0.0403[a]	0.0393[a]	0.0055[a]	0.0053[b]	0.0026[b]	0.0019[b]
5	577	0.0392[a]	0.0386[a]	0.0055[a]	0.0023[b]	0.0024	0.0028
6	563	0.0379[a]	0.0381[a]	0.0053[a]	0.0011	0.0009	0.0013
7	547	0.0387[a]	0.0371[a]	0.0039[b]	0.0000	0.0022	0.0008
8	527	0.0391[a]	0.0369[a]	0.0048[b]	0.0002	0.0039[b]	0.0032
0 to +1	648	−0.0001	−0.0005	0.0006	0.0002	0.0032[a]	0.0011[b]
0 to +2	631	−0.0007	−0.0001	−0.0009	0.0002	0.0012	0.0007
0 to +4	591	−0.0007	−0.0004	−0.0001	0.0004	0.0022[b]	0.0019
0 to +8	527	−0.0033[a]	−0.0016[b]	0.0002	0.0002	0.0035[b]	0.0027
Panel B: Performance after initiation qt., where initiation occurs in quarter +2 relative to announc. qt. or later							
0	230	0.0401[a]	0.0391[a]	0.0086[a]	0.0042[b]	0.0003	0.0003
1	223	0.0370[a]	0.0333[a]	0.0060[b]	0.0028	0.0014	0.0006
2	218	0.0374[a]	0.0367[a]	0.0025	0.0003	0.0004	0.0018
3	212	0.0394[a]	0.0378[a]	0.0027	0.0012	0.0023	0.0023
4	205	0.0391[a]	0.0381[a]	0.0042	0.0059	0.0045[a]	0.0034
5	199	0.0353[a]	0.0363[a]	0.0004	−0.0009	0.0020	0.0035
6	195	0.0367[a]	0.0367[a]	0.0036	0.0023	0.0023	0.0040
7	188	0.0375[a]	0.0362[a]	0.0055	0.0007	0.0032	0.0008
8	174	0.0394[a]	0.0371[a]	0.0025	0.0004	0.0068[b]	0.0063[b]
0 to +1	223	−0.0014	−0.0009	0.0004	0.0002	0.0011	0.0007
0 to +2	218	−0.0005	0.0009	−0.0022	−0.0011	0.0000	0.0003
0 to +4	205	−0.0003	−0.0002	0.0001	0.0007	0.0040[b]	0.0035
0 to +8	174	−0.0007	0.0011	−0.0003	0.0017	0.0066[b]	0.0059[b]

Levels of and changes in quarterly operating performance after initiations of actual share repurchases. A firm is defined to initiate a share repurchase in quarter t if the firm (a) did not repurchase shares from the quarter of the share repurchase program announcement through quarter $t-1$ and (b) made repurchases in excess of one percent of market value of equity in quarter t. Operating performance is measured as operating income scaled by the average of cash-adjusted assets (i.e., book value of assets less cash and short-term investments) at the beginning and end of the fiscal quarter. Quarter 0 is the fiscal quarter of the repurchase initiation. Industry-adjusted operating performance is the paired difference between the operating performance of the sample firms and the operating performance of their respective industry- and size-matched control firms. Performance-adjusted operating performance is the paired difference between the operating performance of the sample firms and the operating performance of their respective industry-, performance- and M/B-matched control firms. N is the number of firms with available data. To mitigate the effect of outliers, the means have been trimmed ten percent (i.e., the top 5% and the bottom 5% of the observations have been excluded when estimating the means). a and b denote significantly different from zero at the 0.01 and 0.05 levels, respectively.

repurchases.[14] In particular, I expect that the sample of firms that repurchase significant numbers of shares during the repurchase announcement quarter exhibit a more positive stock price reaction to the announcement of earnings for this quarter (which always succeeds the repurchase program announcement) than other firms.

It is further conceivable that the market underreacts, on average, to the information embedded in the repurchase program announcements. Consistent with such underreaction, Ikenberry et al. (1995) document a long-term positive drift in stock prices after announcements of stock repurchase programs. In addition, there is evidence of underreaction around many other types of corporate announcements (see Ikenberry and Ramnath (2002) for a review). If the capital market fails to fully incorporate the valuation effect of the performance improvement upon the repurchase program announcement, we should observe positive price reactions upon subsequent earnings announcements. Moreover, because the performance improvement is only evident among firms that repurchase shares during the announcement quarter, the subsequent earnings announcement returns should be greater for these firms. In the following, I test these conjectures by examining the abnormal stock returns around quarterly earnings announcements following share repurchases.[15]

Table 7 presents the mean and median abnormal stock returns based on a conventional market model during the 3 days centered on the earnings announcement date. For the overall sample, the abnormal returns are not statistically different from zero around earnings announcements for the two fiscal quarters leading up to the program announcements. The mean and median abnormal returns around the earnings announcements for the fiscal quarter of the repurchase program announcements are 0.61% and 0.09%, respectively, and both are statistically different from zero at the 1% level of significance. The mean abnormal returns around earnings announcements for the subsequent eight quarters range from 0.25% to 0.64% and are all statistically different from zero at the 5%, while the medians for these quarters are somewhat lower and not always statistically different from zero.

Overall, the evidence on earnings announcement returns suggests that the capital market is positively surprised about the operating performance following open market share repurchase program announcements. This corroborates the earlier evidence showing that operating performance improves after the program

[14]Firms often mention in the earnings announcement how many shares they have recently repurchased. For example, NetSolve Inc. announced on October 17, 2000 that "during the quarter ended September 30, 2000, the company repurchased approximately 1.6 million shares of its Common Stock in a series of transactions at an aggregate price of $11.8 million" and Wabtec Corp. announced on October 19, 2000, that "during the quarter, the company repurchased $6 million, or 578,000 shares, of its own stock, as part of a $75 million stock repurchase program." Even if this information is not explicitly mentioned, it is possible to estimate repurchases based on information provided on outstanding shares.

[15]This empirical approach has also been used in other contexts. For example, Cornett et al. (1998), Rangan (1998), Shivakumar (2000), Brous et al. (2001) and Denis and Sarin (2001) examine abnormal stock returns around quarterly earnings announcements following seasoned equity offerings. These studies generally show that the abnormal stock returns tend to be negative, suggesting that the capital market overestimates future earnings of firms making seasoned equity offerings and underestimates the negative information embedded in announcements of seasoned equity offerings.

Table 7
Abnormal stock price returns around earnings announcements

Quarter	All sample firms			Firms with no share repurchases in quarter 0			Firms with share repurchases in excess of one percent of assets in quarter 0		
	N	Mean	Median	*N*	Mean	Median	*N*	Mean	Median
−2	4390	0.0005	−0.0005	1011	0.0021	0.0011	1743	−0.0016	−0.0011
−1	4453	−0.0010	−0.0004	1025	0.0022	0.0013	1763	0.0006	0.0001
0	4466	0.0061[a]	0.0009[a]	1034	0.0007	−0.0006	1769	0.0114[a]	0.0032[a]
1	4415	0.0037[a]	0.0012[a]	1026	0.0021	0.0019	1743	0.0050[a]	0.0009
2	4286	0.0032[a]	0.0014[b]	1003	0.0009	0.0011	1685	0.0054[a]	0.0009[b]
3	4140	0.0030[b]	−0.0006	982	0.0007	−0.0006	1605	0.0053[a]	0.0007[b]
4	3965	0.0043[a]	0.0014[a]	955	0.0036	0.0000	1508	0.0044[b]	0.0009
5	3795	0.0064[a]	0.0011[a]	922	0.0061[b]	0.0026[b]	1436	0.0090[a]	0.0024[a]
6	3669	0.0025[b]	0.0005	898	0.0009	0.0002	1387	0.0053[a]	0.0014[b]
7	3497	0.0059[a]	0.0021[a]	865	0.0037	−0.0004	1305	0.0060[a]	0.0025[a]
8	3298	0.0039[a]	0.0010[a]	824	0.0026	0.0005	1218	0.0056[a]	0.0020[b]

Abnormal stock price returns during the three days centered on the announcements of quarterly earnings announcements. Quarter 0 is the fiscal quarter of the share repurchase announcement. The abnormal returns are computed using the one-factor model, where the equal-weighted index is used to proxy overall market returns and the estimation period spans from 250 to 10 days prior to the earnings announcement. *N* is the number of firms with available data. a and b denote that the statistics differ significantly from zero at the 0.01 and 0.05 levels, respectively.

announcements. One might have expected the earnings announcement returns to only be positive for two quarters after the announcements, because this is when the bulk of the performance improvement occurs. Two factors might explain the continued positive earnings announcement returns. First, there is some improvement even after the first two quarters. Second, the capital market might have expected the initial improvements to reverse, and is therefore positively surprised when they persist. Indeed, Fama and French (2000) show that, ceteris paribus, firms that have experienced past performance improvements tend to experience subsequent performance deteriorations.

Table 7 also reports results separately for firms with no share repurchases during the announcement quarters and for firms with share repurchases in excess of 1% of assets during the announcement quarters. The results differ notably for these subsamples. For firms with no actual share repurchases, the mean and median earnings announcement returns are generally positive but none differs statistically from zero at the 1% level of significance. Thus, there is little evidence that the capital market is positively surprised about the operating performance following repurchase program announcements for these firms. In contrast, for firms with actual share repurchases during the announcement quarter, the mean and median earnings announcement returns are positive for the repurchase program announcement quarter and all eight quarters afterward, and most differ statistically from zero at

either the 1% or 5% level of significance. The mean peaks at 1.14% for the announcement quarter, consistent with the notion that the earnings announcement for the announcement quarter conveys valuable information of recent repurchases. The means range from 0.44% to 0.90% for subsequent quarters, suggesting that the capital market is generally positively surprised about the post-repurchase announcement performance for these firms.

The evidence for the subsamples of firms that do not repurchase shares and those that repurchase shares during the announcement quarter supports the earlier evidence on operating performance changes. That is, firms that announce open market repurchase programs and repurchase a substantial fraction of shares shortly thereafter experience an improvement in operating performance, which in turn gives rise to a positive stock price response upon the public release of the actual repurchases and the performance improvements. Conversely, firms that only announce repurchases experience no subsequent improvement, and, hence, no positive stock price reaction upon subsequent earnings announcements.

4.5. Evidence for subperiods

As noted earlier, there are relatively few observations in the beginning of my sample period. To the extent that this is attributable to spotty and non-random coverage by SDC during these years, selection bias might arise. Most of my analysis should be relatively immune to this problem, because it excludes observations from the earlier years due to lack of repurchase data from Compustat before 1984. Nevertheless, I also examined separately repurchase programs announced before and after January 1, 1990 as a robustness test, and summarize the results in this section.

Irrespective of the subperiod, there is evidence of performance improvements only after those program announcements that are coupled with actual share repurchases. For example, announcements that are coupled with significant actual share repurchases are associated with a median performance-adjusted change from quarter 0 to quarter +4 of 0.0027 (p-value = 0.04) for the earlier period (1981–1989) and 0.0022 (p-value < 0.01) for the later period (1990–2000). In contrast, announcements that are *not* coupled with actual repurchases are associated with a median performance-adjusted change from quarter 0 to quarter +4 of −0.0020 (p-value = 0.15) for the earlier period and 0.0004 (p-value = 0.71) for the later period. The results are qualitatively similar if I examine other intervals or means instead.

Also irrespective of subperiod, the earnings announcement returns for the quarters following program announcements tend to be more positive when the program announcements are coupled with actual repurchases. For the later period, three of the average earnings announcement returns are significantly positive at the 0.01 level for the four quarters following program announcements coupled with significant repurchases, but none of the average earnings announcement returns differ significantly from zero following program announcements that are not coupled with actual repurchases. For the earlier period, one of the average earnings

announcement returns is significantly positive for the four quarters following program announcements coupled with significant repurchases, but none of the average earnings announcement returns differs significantly from zero following program announcements that are not coupled with repurchases (in fact, three of them are negative).

The analysis of subperiods shows that my main results do not appear to be attributable to potential selection bias in the earlier sample period. If anything, the results seem to be stronger for the later period.

4.6. The relation between announcement period returns and performance changes

My results demonstrate that the capital market tends to react positively to announcements of repurchase programs and that the operating performance tends to improve after such announcements relative to proper benchmarks. Thus, it appears that the capital market interprets announcements of repurchase programs to mean that future operating performance will be better than previously expected. It is further possible that the capital market is able to decipher upon the program announcements which companies will experience the greatest unexpected performance improvement. To test this conjecture, I regress the performance-adjusted change in operating performance against the abnormal stock returns during the 3 days centered on the program announcements.

My results indicate that the relation between performance changes and announcement period returns is statistically insignificant when I measure the performance change from either quarter 0 to quarter $+1$ or from quarter 0 to quarter $+4$. However, the relation is positive and statistically significant when I measure the performance change from either quarter 0 to quarter $+2$ (coefficient is 0.054 with a p-value of 0.001) or from quarter 0 to quarter $+8$ (coefficient is 0.097 with a p-value less than 0.001). Thus, my collective evidence suggests that not only does the capital market interpret announcements of repurchase programs as favorable news about future performance, it can also, at least to some extent, predict which firms will enjoy the greatest performance improvements relative to pre-announcement expectations.

5. Summary and conclusion

Although conventional wisdom suggests that announcements of open market repurchase programs signal favorable information about future operating performance, the extant empirical evidence of performance changes is inconclusive. Most recently, Grullon and Michaely (2004) undertake a comprehensive study of open market repurchase program announcements, and report scant operating performance improvements during the fiscal year of the announcements, and no subsequent improvements. Instead, they find evidence that firms that announce open market repurchase programs face deteriorating investment opportunities, in which case repurchases effectively curb overinvestment. However, even under this

explanation for the positive wealth impact of repurchase program announcements, one might expect that the performance would be better than it would have been in the absence of the programs.

I reexamine the changes in operating performance around open market share repurchase announcements. My study differs from prior studies along three dimensions. First, I examine quarterly rather than annual data. If a performance improvement occurs around repurchase program announcements, past evidence suggests that it primarily happens shortly after the announcement (i.e., during the fiscal year of the announcement), pointing to the importance of using finer grids than annual data provide to conceal subsequent improvements. Second, I partition the sample into categories depending on the actual repurchase behavior during the announcement quarter. Firms that merely announce a repurchase program without actually repurchasing shares are less likely to experience a subsequent performance improvement, and the inclusion of these observations in the overall sample might weaken the results. Third, I attempt to validate the analysis of performance changes with an analysis of the capital market's reaction to subsequent earnings announcements. These differences are critical in the sense that my analysis leads to a conclusion that stands in contrast to that of Grullon and Michaely (2003).

Collectively, my results paint a cohesive and intuitive picture. Relative to control firms with equally good performance at the time of the repurchase program announcement, firms that announce repurchases experience a subsequent performance improvement. The improvement mostly occurs within two quarters and persists for at least 2 years thereafter. Further, the capital market responds favorably to earnings announcements for the fiscal quarters after the repurchase program announcements, presumably because the operating performance is stronger than anticipated. However, these results only hold for firms that bond their initial announcement with an actual repurchase in the same quarter. Firms that announce repurchase programs without repurchasing shares in the same quarter experience neither subsequent performance improvements nor positive stock price reactions to subsequent earnings announcements. I therefore conclude that announcements of repurchase programs that are accompanied by actual repurchases forerun performance improvements.

One might also be tempted to conclude that firms should announce repurchase programs even if there are no intentions to actually repurchase shares, because merely announcing a repurchase has no implication for future operating performance but induces an immediate stock price increase. However, it is unlikely that such a stock price increase would be permanent. As the capital market learns that the firm has no intention to repurchase shares, the stock price would likely revert. While further investigation of this issue and potential trading rules around repurchase program announcement could be a fruitful avenue for future research, it is hampered by the endogeneity problem that actual repurchase decisions depend on what happens to stock prices immediately after the announcements of repurchase programs. In any event, such an investigation is beyond the scope of this paper.

Appendix A. Annual operating performance

Levels of and changes in annual operating performance around announcements of open market share repurchase programs. Operating performance is measured as operating income scaled by the average of cash-adjusted assets (i.e., book value of assets less cash and short-term investments) at the beginning and end of the fiscal years. Year 0 is the fiscal year of the announcement. Performance-adjusted operating performance is the paired difference between the operating performance of the sample firms and the operating performance of their respective industry-, performance- and M/B-matched control firms. N is the number of firms with available data. To mitigate the effect of outliers, the means have been trimmed 1% (i.e., the top 0.5% and the bottom 0.5% of the observations have been excluded when estimating the means). a and b denote that the statistics differ significantly from zero at the 0.01 and 0.05 levels, respectively.

		Unadjusted				Performance-adjusted			
		Whole sample		Whole sample		1981–1997		1998–2000	
Year	N	Mean	Median	Mean	Median	Mean	Median	Mean	Median
Panel A: levels of operating performance									
−2	4377	0.208[a]	0.189[a]	0.004[a]	0.001[a]	0.004[a]	0.001[a]	0.004[a]	0.001[a]
−1	4614	0.211[a]	0.190[a]	0.003[a]	0.001[a]	0.003[a]	0.001[a]	0.003[a]	0.001[a]
0	4599	0.186[a]	0.180[a]	0.016[a]	0.008[a]	0.012[a]	0.007[a]	0.024[a]	0.015[a]
1	4334	0.165[a]	0.167[a]	0.012[a]	0.010[a]	0.012[a]	0.010[a]	0.012	0.013[a]
2	4049	0.157[a]	0.162[a]	0.010[a]	0.008[a]	0.011[a]	0.008[a]	0.009	0.006
3	3604	0.151[a]	0.153[a]	0.006	0.006[b]	0.004	0.006[b]	0.012	0.006
Panel B: changes in operating performance									
−1 to 0	4529	−0.025[a]	−0.006[a]	0.009[a]	0.005[a]	0.004	0.002[b]	0.020[a]	0.008[a]
−1 to +1	4259	−0.045[a]	−0.016[a]	0.005	0.006[a]	0.004	0.004[b]	0.008	0.011[b]
−1 to +2	3979	−0.057[a]	−0.024[a]	0.003	0.002	0.002	0.004	0.005	0.000
−1 to +3	3542	−0.065[a]	−0.033[a]	−0.002	0.001	−0.004	0.001	0.003	0.000

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