

Long-run Stock Performance following Stock Repurchases

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Abstract

Studies examining long-term performance after stock repurchases provide mixed results. I point out two substantive problems in samplings of early studies. First, we should distinguish whether or not firms actually repurchase shares following announcements of repurchase programs. Second, as some firms frequently announce repurchase programs, we should consider overlapping announcements during the performance estimation period to avoid any confounding effects. Using a sample that corrects for these problems and the calendar portfolio regression method, I find strong evidence that firms that announce repurchase programs infrequently and repurchase shares actually experience significant long-term abnormal returns. These findings provide an explanation of why some previous studies failed to find significant positive long-term performance.

JEL Classification: G30, G32, G35

Keywords: Stock repurchase program, Long-run stock return, Underreaction

1. Introduction

In an earlier study that investigated the long-term price behavior of tender offer repurchasers following repurchase program announcements, Lakonishok and Vermaelen (1990) report that the portfolio of repurchasing firms earns significant positive abnormal buy-and-hold returns. This positive return is mainly due to small firms in the sample whose stock prices had substantially decreased prior to the repurchase, while large firms experienced positive abnormal returns prior to the repurchase and zero abnormal returns afterwards.¹ Ikenberry, Lakonishok, and Vermaelen (1995) report similar results for open-market share repurchase: Over a 4-year period after the announcement, the buy-and-hold strategy outperforms the market index by 12.1%. This return is mainly driven by high book-to-market stocks in the sample. High book-to-market stocks (also referred to as 'value' stocks) experience an average abnormal return of 45.3%, whereas low book-to-market stocks (also referred to as 'glamour' stocks) experience essentially no abnormal performance. Ikenberry, Lakonishok, and Vermaelen (2000) extended their prior study by investigating the long-term performance of open-market stock repurchases in Canada. The three-year holding period strategy shows abnormal performance of roughly 7% per year.

To investigate whether observed patterns in post-announcement stock return behavior is driven by market timing skills of managers or an aggregate time-series version of pseudo market timing bias, Chan, Ikenberry, and Lee (2004, 2007) reexamined long-term stock return drifts following open-market repurchase announcements. Their study found robust and significant evidence of positive long-term stock return, using both the buy-and-hold returns method and

calendar-time portfolio method. They concluded that managers possess some timing ability and that pseudo-market timing explains, at best, only a small portion of the buyback return drift.²

Taken together, these studies appear to strongly support the existence of long-term positive drift in stock prices for three to four years after announcements of both tender offers and open-market repurchase programs. In addition, the abnormal performance is mainly driven by small size and high book-to-market ratio firms. These studies interpret their findings of long-term positive performance as the result of the market's underreaction or delayed reaction to the positive signal sent by the repurchase announcement. Because the undervaluation signal is not fully revealed around the announcement date, stock prices drift upwards during the post-announcement period. Therefore, it is possible to earn abnormal returns by trading the repurchasing firms' stock after the announcement, which violates the implication of the efficient market hypothesis. The literature documents some evidence that the market underreacts to many other types of firm-specific announcements (see Ikenberry and Ramnath, 2002, for a review).

Not all studies report evidence of abnormal stock performance following stock repurchase announcements. Fama (1998) argues that the long-term return anomalies are sensitive to methodology and that tend to either diminish or disappear when the calendar-time portfolio approach is used. Mitchell and Stafford (2000) and Bradford (2008) find no evidence of long-run abnormal stock return after announcements of repurchase programs using the calendar-time portfolio regression method. Mitchell and Stafford (2000) summarize the potential problems of the mean buy-and-hold abnormal return - the most popular estimator of long-term abnormal performance amongst most early studies - as follows:

“The preferred methodology in this literature is to calculate average multiyear buy-and-hold abnormal returns and conduct inferences via a bootstrapping procedure. We show that this

methodology is severely flawed because it assumes independence of multiyear abnormal returns for event firms, producing test statistics that are up to four times too large. After accounting for the positive crosscorrelations of event firm abnormal returns, we find virtually no evidence of reliable abnormal performance for our samples.”

Reviewing the existing literature, I find potentially important and significant flaws in the sampling method of most early studies. First, long-term share performance was measured regardless of whether or not the announcements were followed by actual share repurchases. In an open-market repurchase, the firm typically buys back shares in the open market over a long time period. As management retains the right to decide when and how many shares are actually repurchased, it can choose to buy more or less shares than the number initially authorized for repurchase, or sometimes buying no shares at all. The firm has no legal obligation to complete the announced repurchase program. In fact, a significant fraction of firms that announce repurchase programs ultimately do not buy any shares (Ikenberry and Vermaelen, 1996; Stephens and Weisbach, 1998).³

If a repurchase program signals managerial beliefs about the firm’s future performance or maximizes shareholder wealth, it is crucial to distinguish between firms that repurchase shares and firms that choose not to complete the announced repurchase program. Management is less likely to launch repurchases unless it believes that the expected performance of the firm’s stock is better than expected by the market, even after the repurchase program was announced. Lie (2005) compared long-term operating performance following open-market repurchase announcements between a group of firms that do not purchase any shares in the announced quarter and a group of firms that initiate the repurchases in the same quarter. Lie found that only the latter group experiences improvements in operating performance. This finding implies that actual repurchases, not announcements themselves, predict future operating performance

improvements. As a firm's operating performance is incorporated into its stock price, we must focus on firms that actually repurchase their shares in order to evaluate the long-term share performance correctly.

Another problem with previous sampling methodology is that most early studies failed to consider the frequency of repurchase program announcements made by each firm. If signaling inside information of undervaluation is an important motive behind share repurchases, it is not conceivable that a firm sends such a signal on a frequent or regular basis. As Jagannathan and Stephens (2003) argue, firms that frequently repurchase their shares likely have different reasons or motives than firms that repurchase infrequently.

Therefore, we should take into account the total number of repurchase programs announced by each firm during the sampling period. There are two reasons why it is important to focus on the frequency of repurchase programs: First, as the recent spike in stock repurchase activity shows, some firms repeatedly repurchase their shares. It is not uncommon that a firm announces multiple repurchase programs during a short time period. If the firm announced and initiated new stock repurchase programs during the performance estimation period following its announcement of a repurchase program, the confounding effect would contaminate a clean estimation of price performance subsequent to the first repurchase program.

Second, it has been reported in the literature that the wealth effect of announcements declines as a firm repeatedly launches a major corporate event. For example, announcement reactions become less favorable in subsequent deals if the firm makes frequent acquisitions (Fuller, Netter, Stegemoller, 2002; Billett and Qian, 2005). Announcement return also declines as firms buy back more and more shares (Jagannathan and Stephens, 2003). As infrequent

repurchasers earn a much stronger announcement return than frequent repurchasers, one might expect that post-announcement share performance of these two groups will differ.

This paper attempts to resolve the controversy regarding the long-term stock performance of repurchase firms using a sample that rectifies the problems discussed above. Analyzing abnormal performance over long horizons of up to three years following repurchase program announcements, results of this study shed new insight into why some existing studies failed to find significant positive long-term performance.

Two main results exist: Strong evidence of significant abnormal long-term performance of infrequent repurchasers who actually repurchase shares during the first four quarters following their announcements is found. This finding indicates that the two sampling issues, whether or not firms actually repurchase shares and how frequently a firm announces repurchase programs, could have influenced results reported in previous studies. However, these findings are at odds with the notion of the efficient market theory that the stock market incorporates all relevant information quickly and completely as it becomes available. One argument that can reconcile this conflicting evidence is the view that the market underreacts to the announcement of repurchase programs because the market does not necessarily view the announcement as a firm commitment to actually repurchase the shares.

In addition, early studies document that both size and book-to-market value of equity provide significant explanatory power for subsequent market performance, and that the post-announcement abnormal performance is mainly driven by small and high book-to-market value of equity stocks in their samples. This phenomenon does not occur in this study's sample: The

positive abnormal returns appear across different sizes and book-to-market value of equity portfolios.

The remainder of this paper is organized as follows: Section 2 describes the data and methodology. Section 3 presents the main empirical results of the paper. Section 4 contains the summary and concluding remarks.

2. Data and Methodology

2.1. Data

The sample is drawn from the SDC Platinum Mergers and Acquisitions database.⁴ The database contains information on stock repurchases since the 1980s. 1994 is designated as the starting year of my sample due to the fact that the data coverage is more comprehensive in and after 1994. The data includes repurchase programs announced by firms that are listed on the NYSE, AMEX, or the NASDAQ. The announcement date is defined as the initial authorization date of a program, which is when a company's board of directors first authorizes the repurchase program.⁵

I exclude repurchasing firms that do not have data available on the CRSP monthly returns database for the 6-month period prior to the announcement month and up to the 36-month period after the announcement month. Firms should have stock price, number of shares outstanding, and nonnegative book values of equity data prior to the announcement month on the Compustat, enabling calculation of their size and book-to-market value of equity ratios. The initial sample consists of 9,551 repurchase programs that were announced between 1994 and 2007 by 5,014 firms.

While many earlier studies about stock repurchases examined either open-market repurchases or tender offers only, there are also some studies that successfully aggregated all types of repurchases (for example, Skinner, 2008; Dittmar, 2000). This study's sample includes all stock repurchases, regardless of the method used. Consistent with Dittmar's (2000) rationale for the aggregation of data, we can obtain a better insight into the long-run stock performance of stock repurchases by including all types of repurchases. However, this study also subdivides the sample into open-market repurchases and tender offer repurchases and examine whether there is a significant difference between these two types of repurchases.

As discussed earlier, firms that announce intentions to repurchase shares often do not actually do so. To sort out whether firms actually make repurchases, I calculate each firm's repurchases in the fiscal quarters from the announcement quarter through quarter $t+4$, based on the Dittmar and Dittmar (2008) methodology. Repurchases in each fiscal quarter are computed as Compustat data item PRSTKCY (purchase of common and preferred stock) less any decrease in preferred stock. PRSTKCY is a year-to-date item. Therefore, each quarter's repurchases, except the first quarter of the fiscal year, are the current quarter's PRSTKCY minus the previous quarter's PRSTKCY. Preferred stock is measured as, in order of preference, data item PSTKRV (redemption value), item PSTKL (liquidating value), or item PSTK (carrying value). After calculating each quarter's repurchases, total repurchases over the one-year period from the announcement quarter through quarter $t+4$ were calculated.

Depending on whether total repurchases for the one-year period are positive or zero, the sample is divided into two subsamples: One subsample consists of firms that have a positive number of repurchases and the other subsample consists of firms that have no repurchases. The

first subsample includes 7,136 repurchase programs, which is 75% of the full initial sample. The remaining 25% includes 2,415 repurchase programs that fall into the second subsample.

Calculations of the value of total repurchases during the first four quarters divided by the market value of equity resulted in mean and median values of 5.73% and 3.46%, respectively.

The group of firms that have a positive number of repurchases is further stratified into two groups depending on the frequency of repurchases. If a repurchasing firm does not announce any additional repurchase programs during the three-year period after the first repurchase program announcement, it is defined as an infrequent repurchaser. If there are one or more overlapping repurchase program announcements during the same period, it is defined as a frequent repurchaser. Imposing this restriction reduces the sample of 7,136 repurchase programs to 4,208 repurchase programs. Table 1 describes this sample distribution.

(Insert Table 1 here)

2.2. Methodology: Calculation of Abnormal Returns

Whether the positive abnormal returns reported by many early studies are due to underreaction or delayed reaction as argued by most early studies, or simply the result of methodology problems as argued by Fama (1998) and Mitchell and Stafford (2000), is an issue of ongoing debate. Most of previous studies reporting positive long-run abnormal performance are based on the buy-and-hold abnormal return (BHAR) method. While some scholars assert that the BHAR is the appropriate estimator because it “precisely measures investor experience,” some other scholars argue against the BHAR methodology because it suffers from the crosscorrelation problem and the bad model problem (for a comprehensive discussion of event study methodology to measure long-horizon abnormal performance, see Barber and Lyon, 1997,

Kothari and Warner, 1997, Fama, 1998, Lyon, Barber, and Tsai, 1999, Brav, 2000, and Mitchell and Stafford, 2000).

The cross-correlation problem arises because matching on the basis of several firm-specific characteristics cannot completely remove the correlation between event firms' returns. The bad model problem arises because no benchmark provides a perfect estimate of the expected return, and errors from the difference between the return of an event firm and its benchmark are compounded in computing long-term buy-and-hold returns. As an alternative, Fama (1998) advocates a monthly calendar-time portfolio approach for measuring long-horizon abnormal return.

Using the calendar-time portfolio approach, abnormal return is estimated based on the Fama–French (1993) three-factor model.⁶ Applying this approach, monthly returns in calendar time for a portfolio of repurchase firms are calculated. A portfolio is formed for each calendar month, consisting of all firms that have experienced repurchase program announcement within the τ months prior to the given month. At the beginning of each month, the portfolio is rebalanced so that portfolios are equally weighted. Excess returns of the event portfolio are regressed on the three Fama-French (1993) factors as follows:

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

where $R_{p,t}$ is the event portfolio's return in month t ; $R_{f,t}$ is the one-month Treasury bill rate, observed at the beginning of the month; $R_{m,t}$ is the monthly market return in month t ; SMB_t is the average return on small market-capitalization portfolio minus the average return on three large market-capitalization portfolios; HML_t is the average monthly return on two high book-to-market equity portfolios minus the average monthly return on two low book-to-market equity portfolios

(see Fama and French (1993) for a detailed description of SMB_t and HML_t). The ordinary least square regression is estimated on portfolio returns. The intercept, α , measures the average monthly abnormal return on portfolios of event firms.

3. Empirical Results

3.1. Firms with actual repurchases vs. firms without actual repurchases

First, the share performance for the full sample that includes all repurchase programs, regardless of whether actual repurchases are made, is analyzed. As stated earlier, a total of 9,551 repurchase programs were announced by 5,014 firms during 1994 to 2007. Abnormal returns are computed over five time periods: from month -6 to month -1, month 0, from month 1 to month 12, from month 1 to month 24, and from month 1 to month 36. Month 0 is the month of the announcement. Results are shown in Panel A of Table 2.

The literature documented that repurchases, particularly open-market repurchases, have been associated with significantly negative returns prior to the announcement followed by positive returns to the announcement. Consistent with these findings, results of this study show strong evidence of negative abnormal return prior to announcement of repurchase programs, followed by positive market reaction to the announcement. The average monthly abnormal return on portfolios of event firms, which is measure by the intercept of the calendar portfolio regression, is -0.71% ($t = -4.03$) during the 6-months time period prior to the announcement month and 1.12% ($t = 2.77$) in the announcement month. However, there is no evidence of meaningful long-term abnormal performance for three years subsequent to the announcement, which is consistent with Mitchell and Stafford (2000) and Bradford (2008). The average monthly abnormal returns over the windows of (1, 12), (1, 24), and (1, 36) are 0.03% ($t = 0.20$),

0.02% ($t = 0.14$), and 0.02% ($t = 0.19$), respectively. The monthly average abnormal return is consistently less than 0.03% with very low t -statistics.

Next, the full sample is stratified into two subsamples depending on whether the firm actually repurchased shares during the four quarters subsequent to the announcement. Results for firms with actual repurchases are reported in Panel B and results for firms without actual repurchases are reported in Panel C of Table 2. The results are strikingly different between these two subsamples: First, the average monthly abnormal returns over the windows of (-6, -1) is significantly negative with a value of -0.59% ($t = -2.85$) in Panel B, but it is not significantly negative with a value of -0.39% ($t = -1.40$) in Panel C. These results are consistent with the undervaluation hypothesis. The firm may repurchase stock as a signal to the market that the stock is undervalued, or invest in its own stock.

Second, the average monthly abnormal returns over the windows of (1, 12), (1, 24), and (1, 36) are 0.33% ($t = 1.75$), 0.34% ($t = 1.95$), and 0.35% ($t = 2.04$), respectively, for firms that actually made repurchases.⁷ These monthly returns are equivalent to around 4% per year. The corresponding monthly abnormal returns for firms that did not make repurchases are -0.19% ($t = -0.72$), -0.11% ($t = -0.52$), and -0.08% ($t = -0.39$), or from almost -1% to -2.3% per year. These negative returns, although they are not significant, are remarkably different from the significantly positive returns of the first subsample, firms with actual repurchases. The difference of the monthly abnormal returns between the two subsamples is statistically significant. These results strongly support the hypothesis discussed earlier that managers are likely to initiate repurchasing shares only when the projected performance of their stocks will be better than expected by the market. Otherwise, they would avoid repurchasing shares. The significantly negative pre-

announcement return, -0.59% ($t = -2.85$), for the first subsample (firms with actual repurchases), but insignificant negative pre-announcement return, -0.39% ($t = -1.40$), for the second subsample (firms without actual repurchases) is additional evidence to support the contention that managers try to time the market in stock repurchases.

(Insert Table 2 here)

3.2. Infrequent repurchasers vs. frequent repurchasers

The sample of firms with actual repurchases is further stratified into two groups depending on frequency of repurchase program announcements during the sampling period. The first subsample consists of firms that did not announce any other repurchase programs during the three-year post-announcement evaluation period. Other firms are included in the second subsample.

The results are also strikingly different between these two subsamples: Infrequent repurchasers experience much better share-price performance than frequent repurchasers. The average monthly abnormal returns for infrequent repurchasers over the windows of (1, 12), (1, 24), and (1, 36) are 0.40% ($t = 1.75$), 0.45% ($t = 2.44$), and 0.46% ($t = 2.59$), respectively, whereas the corresponding returns for frequent repurchasers are 0.20% ($t = 0.95$), 0.21% ($t = 1.19$), and 0.21% ($t = 1.26$), respectively. The annualized abnormal returns are near or over 5% for the first subsample, whereas they are nearly 2.5% per year for the second subsample. The average abnormal return on portfolios of infrequent repurchasers is twice as large as the return for the frequent repurchasers. Infrequent repurchasers earn not only a stronger announcement return, as reported by Jagannathan and Stephens (2003), but also a stronger post-announcement period return.

One possible explanation for this finding is different managerial motives between frequent repurchasers and infrequent repurchasers. As Jagannathan and Stephens (2003) contend, it is unlikely that a firm could credibly signal share-price undervaluation on a regular and frequent basis if the firm repurchases shares primarily to signal managerial optimism about future prospects of the firm. While the motives of firms that repurchase occasionally may be to signal undervaluation of stocks, firms that repurchase most frequently are likely to substitute repurchases for dividend increases. Grullon and Michaely (2002) report that U.S. corporations have gradually substituted repurchases for dividends over the last two decades or so, and that the motivation behind the recent surge in share repurchase activity is that firms prefer to distribute more of their cash flow through repurchases and less through dividends.⁸ In sum, repurchase programs that are motivated by managers who perceive their stock as undervalued, rather than other motives, may well experience better long-term performance.

In conclusion, the findings of this study support the hypothesis that the market underreacts to announcement of repurchase programs because the market does not view the announcement per se as firm commitments to actually repurchase the shares. A Board of Directors' decision to repurchase shares, particularly via open-market repurchases, simply authorizes managers to purchase shares in the future at their discretion. Actual repurchases subsequent to announcements would reduce uncertainty and convey additional managerial optimism about future prospects of the firm. The market conceives the actual repurchase as confirmation of favorable inside information released at the time of announcement and reacts favorably to the actual repurchase activity. Furthermore, it appears that managerial motives and firm characteristics implied in frequency of repurchases are also incorporated into the stock price.

(Insert Table 3 here)

3.3. Open-market repurchases vs. tender offer repurchases

Three basic methods are used to repurchase shares resulting three repurchase types: open-market repurchase, privately negotiated repurchase, and tender offer repurchase. Open-market repurchase is the most commonly used method, accounting for 54.45% of this study's full sample. The next most commonly used method (37.19% of our sample) is a combination of open-market and negotiated repurchase. Negotiated repurchases account for 4.30% of the sample. The remainder of the sample is tender offer repurchases that take place in the form of either Dutch-auction tender offers or fixed-price tender offers.

Most early studies about long-term post-announcement performance focused on open-market repurchases. Although it is the least frequently used method, tender offer is an important method because its size is far larger than other methods. Post-announcement stock return of open-market repurchases and tender offer repurchases is analyzed.⁹ From the sample that make actual repurchases during the first four quarters and also have no overlapping repurchase program announcement during the three-year estimation period, open-market repurchase programs and a combination of open-market repurchase and negotiated repurchase programs are classified as open-market repurchases, and Dutch-auction tender offers and fixed-price tender offers are classified as tender offers. The calendar portfolio regression results are reported in Table 4.

The average monthly abnormal return prior to the announcement is significantly negative for open-market repurchases with a return of -0.90% ($t = -3.17$), whereas it is not significant for tender offers with a return of -0.40% ($t = -0.69$). Brav, Harvey, and Michaely (2005) surveyed

financial managers and found that they prefer open-market repurchases to dividends because of the opportunity to time the market or increase earnings per share. This finding provides additional evidence to support the contention that managers try to time the market when they buy back shares via the open market, although whether managers possess market timing skills or it is simply a result of systematic contrarian trading behavior taking advantage of price declines is a controversial issue. This finding is also consistent with the view of Jagannathan, Stephens, and Weisbach's (2000) that the flexibility inherent in repurchase programs is one reason why managers prefer open-market repurchases to dividends.

Consistent with prior studies is the result that tender offers earn a considerably larger abnormal return (6.27%) in the announcement month than open-market repurchases (0.77%). Both open-market and tender offer repurchases experience significant positive return subsequent to the announcement, but tender offers consistently outperform open-market repurchases by approximately 0.20% each month. The average monthly abnormal returns for open-market repurchases over the windows of (1, 12), (1, 24), and (1, 36) are 0.43% ($t = 1.84$), 0.45% ($t = 2.41$), and 0.44% ($t = 2.52$), respectively, whereas the corresponding returns for tender offer repurchases are 0.68% ($t = 1.72$), 0.66% ($t = 2.19$), and 0.64% ($t = 2.41$), respectively. While there is no definitive explanation for this result, it is generally believed that tender offer repurchases provide a more powerful and credible signal about the firm's future prospect than open-market repurchases because of its nature of commitment to repurchase shares.

(Insert Table 4 here)

3.4. Explanatory power of firm size and book-to-market ratio

Subsequent to Fama and French (1992) study reporting that firm size and book-to-market

value equity influence cross-sectional stock returns, early studies documented that both size and book-to-market value of equity provide significant explanatory power for subsequent market performance, and that post-announcement abnormal performance is mainly driven by small and high book-to-market value of equity stocks in their samples. The sample is divided into 25 portfolios based on the size of the firm, and the book-to-market value of equity ratio (BE/ME), to ascertain whether the same phenomenon occurs in this study's sample.

First, five size portfolios are formed based on the market value of equity from Compustat for all NYSE firms at the end of each quarter. The market value of equity of a firm is calculated as the product of price per share and the number of shares outstanding. Next, within each the five size portfolios, five BE/ME portfolios are similarly formed according to their BE/ME at the end of each quarter. BE/ME is calculated as the ratio of the book equity value (COMPUSTAT data item CEQQ) to its market equity value. All firms with actual repurchases and infrequent repurchases are assigned to the 25 portfolios on the basis of the market value equity and BE/ME at the end of last quarter prior to the announcement of repurchase programs.

Panel A of Table 5 displays the distribution of the sample firms according to the size and BE/ME classifications. A little over 40% of the sample firms fall into the bottom size quintile. The rest of sample firms are almost equally distributed across the other four size quintiles. There is no distinctive pattern in the distribution over the BE/ME quintiles. Firms are almost equally distributed in the BE/ME quintiles. However, small firms tend to be tilted toward high BE/ME quintiles, which are often referred to as "value" stocks. On the other hand, large firms appear to be tilted toward low BE/ME quintiles, which are often called "glamour" stocks.

Panel B of Table 5 reports intercepts from calendar portfolio regressions over a three-year post-announcement estimation period.¹⁰ The intercepts measure the average monthly abnormal return on 25 size and book-to-market value of portfolios of sample firms. Surveying the table, we see that there is no clear pattern in the occurrence of positive and significant intercepts. To be consistent with prior studies, we would expect to see that only the small size quintiles and high BE/ME quintiles have significant intercepts. But results of this study show that large size quintile and low BE/ME quintiles also have significant intercepts. The results of this study do not provide support for the importance of firm size and BE/ME ratio as explanatory variables for post-announcement positive price drift: Neither size nor BE/ME ratio are identified as driving the positive returns.

Finding that “value” companies announcing a repurchase program experience higher postannouncement abnormal returns than “glamour” companies, Ikenberry, Lakonishok, and Vermaelen (2000) contend that repurchases are driven more by undervaluation than by other motives. However, my findings that contradict the pattern observed by early studies may support the findings of recent surveys that the primary motivation for repurchasing shares may have changed over time from signaling undervaluation to other possible reasons.

(Insert Table 5 here)

4. Summary and Discussion

Prior studies examining long-term performance after stock repurchases provided mixed results. While most studies that used the buy-and-hold portfolio return method found positive abnormal returns, studies that used the calendar-time portfolio method failed to find positive returns. I identify two substantive problems in the sampling methodologies of early studies: First,

whether firms actually followed through with repurchases was overlooked as a potential factor affecting returns. Second, as many firms repeatedly repurchase shares, they may have overlapping announcements during the performance estimation period. Using a sample that corrected for these problems, I reexamine share performance over the three-year post-announcement period.

A full sample analysis including all repurchase programs announced during 1994 to 2007, without correcting for the above mentioned sampling problems, shows the results that essentially the same as the findings of Mitchell and Stafford (2000) and Bradford (2008). Long-term performance is not significantly positive. When the full sample is stratified into firms with actual repurchases and those without actual repurchases, however, the results are strikingly different across these two subsamples: Firms that initiate repurchasing shares during the four quarters from the announcement quarter experience significant returns over a three-year period after the announcement. Firms that do not initiate repurchasing shares experience negative return, although not significant, over the same period.

When the sample of firms with actual repurchases is further partitioned into a subsample without any overlapping repurchase program announcements in a three-year period after the announcement and a subsample of firms with overlapping announcements, I find again strikingly distinct results across these two subsamples: Infrequent repurchasers earn significantly larger returns than frequent repurchasers. In sum, this study provides strong evidence that firms that announce repurchase programs infrequently and also actually repurchase shares experience significant long-term return drifts.

This study's findings provide one explanation of why some existing studies failed to find significant positive long-term performance using the calendar portfolio regression method. Failure to consider factors such as completion of the announced repurchase program as well as the confounding effects of overlapping repurchase announcements may have led to conflicting findings of previous studies.

A widely accepted theory that can explain subsequent positive long-term share performance is market underreaction, as many prior studies contend. Studies interpret their finding of long-term positive performance as being the result of an underreaction or delayed reaction by the market to an undervaluation signal sent by the repurchase announcement. Underreaction occurs when investors are not yet fully responding to the news of repurchase announcements and some residual information is incorporated into the long-horizon drift.

The underreaction hypothesis is at odds with the notion of the efficient market theory that the stock market incorporates all relevant information quickly and completely as it becomes available. One argument that can reconcile this conflicting evidence is, again, the potential of non-completion of the announced repurchase program. The market underreacts to announcement of repurchase programs because the market does not necessarily view the announcement as a firm commitment to actually repurchase the shares. To the extent that the market does not fully incorporate the effect of the repurchase announcement in a short period, the residual value of the announcement would be revealed over a longer time period.

Another argument to explain the long-term abnormal return is improvements in operation performance in the context of the free cash flow theory. Jensen's (1986, 1988) theory predicts that managers of firms with cash flow in excess of profitable investment opportunities will have

a tendency to waste it on perquisites or unprofitable investments. The agency hypothesis links investment to cash flows by hypothesizing that managers of these firms are assumed to attach greater value to perquisites and firm size than to the benefits of paying excess cash flow out to shareholders in dividends or stock buybacks. Thus, the key to Jensen's argument is that firms are likely to waste free cash flow on unproductive investments and that shareholders benefit from anything (including repurchases) that prevents these wasteful expenditures. Share repurchases use up excess funds, divert funds from internal investments, or cause the firm to incur debt, which can explain positive stock performance. Studies suggest that repurchase activity may be associated with free cash flows (for example, see Grullon and Michaely, 2004; Nohel and Tarhan, 1998).

Finally, earlier studies state that both size and book-to-market value of equity ratio (BE/ME) provide significant explanatory power for subsequent market performance, and that the post-announcement abnormal performance is mainly driven by small and high BE/ME stocks in their samples. The findings are not supported in this study's sample: Positive abnormal returns appear across different size and BE/ME portfolios. I find no evidence that positive performance is concentrated in firms with small size and high BE/ME. The Fama–French (1993) three-factor model might have accounted for the size effect and the BE/ME effect.

In conclusion, identifying potential flaws in methodology, this study seeks to elucidate contrary findings of previous studies. Positive and significant results support the argument of this study that the sample should be further screened into meaningful groups in order to obtain accurate results. Future studies should be conducted to shed further insight into the causes of long-run abnormal performance of repurchasing firms.

Table 1
Sample Distribution

Year	Full Sample	Firms with actual repurchases	Firms with actual & infrequent repurchases
1994	550	354	247
1995	546	358	239
1996	650	415	275
1997	614	452	306
1998	1,002	713	510
1999	864	565	390
2000	780	499	334
2001	713	420	273
2002	589	374	212
2003	476	377	156
2004	561	513	210
2005	676	642	299
2006	677	633	310
2007	853	821	447
Total	9,551	7,136	4,208

Table 2
Post-Repurchase Performance: Actual Repurchasers vs. Non-repurchasers

Using the calendar-time portfolio approach, excess returns of the event portfolio are regressed on Fama-French three factors as follows: $R_{p,t} - R_{f,t} = \alpha + \beta(R_{m,t} - R_{f,t}) + sSMB_t + hHML_t + \varepsilon_{j,t}$, where $R_{p,t}$ is the event portfolio's return in month t ; $R_{f,t}$ is the one-month Treasury bill rate; $R_{m,t}$ is the monthly market return in month t ; SMB_t is the average return on small market-capitalization portfolio minus the average return on three large market-capitalization portfolios; HML_t is the average monthly return on two high book-to-market equity portfolios minus the average monthly return on two low book-to-market equity portfolios. The intercept, α , measures the average monthly abnormal return on portfolios of event firms. The t -statistic is in parentheses. ***, **, * , denote two-tailed significance at the 1%, 5%, and 10% levels, respectively.

Parameters	Estimation Time Period				
	(-6, -1)	(0, 0)	(1, 12)	(1, 24)	(1, 36)
Panel A: Full sample ($N = 9,551$)					
α	-0.71 (-4.03)***	1.12 (2.77)***	0.03 (0.20)	0.02 (0.14)	0.02 (0.19)
β_p	1.0308 (22.33)***	1.0348 (9.81)***	1.0272 (26.41)***	1.0263 (34.58)***	1.0289 (36.99)***
s	-0.1446 (-2.98)***	-0.1235 (-1.11)	-0.1840 (-4.54)***	-0.1627 (-5.20)***	-0.1548 (-5.16)***
h	0.0280 (0.45)	0.1046 (0.74)	0.2642 (5.08)***	0.3167 (8.00)***	0.3512 (9.29)***
R^2	82.02%	46.41%	84.02%	88.88%	89.62%
F	150.81***	53.80***	178.74***	249.99***	257.83***
Panel B: Firms that actually repurchased shares ($N = 7,136$)					
α	-0.59 (-2.85)***	0.83 (2.21)**	0.33 (1.75)*	0.34 (1.95)**	0.35 (2.04)**
β_p	1.0005 (17.53)***	1.0165 (9.82)***	1.0144 (21.67)***	0.9799 (22.85)***	0.9829 (23.29)***
s	-0.1310 (-2.17)**	-0.1725 (-1.57)	-0.1774 (-3.16)***	-0.1496 (-2.91)***	-0.1606 (-3.17)***
h	-0.119 (-1.6)	0.0045 (0.03)	0.1667 (2.50)**	0.1910 (3.13)***	0.2050 (3.41)***
R^2	71.15%	42.04%	73.47%	75.27%	75.88%
F	146.35***	41.83***	169.89***	186.69***	192.94***

Panel C: Firms that did not repurchase shares ($N = 2,415$)

α	-0.39 (-1.40)	1.24 (2.55)**	-0.19 (-0.72)	-0.11 (-0.52)	-0.08 (-0.39)
β_p	1.0539 (13.87)***	0.9957 (7.47)***	1.3012 (20.43)***	1.2639 (24.88)***	1.1859 (24.90)***
s	-0.1736 (-2.16)**	0.1429 (1.01)	-0.0425 (-0.55)	-0.0478 (-0.78)	-0.0579 (-1.01)
h	0.5671 (5.63)***	0.5456 (3.07)***	0.8675 (9.51)***	0.8637 (11.87)***	0.7997 (11.73)***
R^2	53.82%	25.55%	70.19%	77.81%	77.83%
F	66.83***	19.10***	140.52***	209.24***	209.49***

Table 3
Post-Repurchase Performance: Infrequent Repurchasers vs. Frequent Repurchasers

Using the calendar-time portfolio approach, excess returns of the event portfolio are regressed on Fama-French three factors as follows: $R_{p,t} - R_{f,t} = \alpha + \beta(R_{m,t} - R_{f,t}) + sSMB_t + hHML_t + \varepsilon_{j,t}$, where $R_{p,t}$ is the event portfolio's return in month t ; $R_{f,t}$ is the one-month Treasury bill rate; $R_{m,t}$ is the monthly market return in month t ; SMB_t is the average return on small market-capitalization portfolio minus the average return on three large market-capitalization portfolios; HML_t is the average monthly return on two high book-to-market equity portfolios minus the average monthly return on two low book-to-market equity portfolios. The intercept, α , measures the average monthly abnormal return on portfolios of event firms. The t -statistic is in parentheses. ***, **, * , denote two-tailed significance at the 1%, 5%, and 10% levels, respectively.

Parameters	Estimation Time Period				
	(-6, -1)	(0, 0)	(1, 12)	(1, 24)	(1, 36)
Panel A: Infrequent repurchasers ($N = 4,208$)					
α	-0.86 (-3.05)***	0.89 (1.86)*	0.40 (1.75)**	0.45 (2.44)**	0.46 (2.59)**
β_p	1.0481 (13.46)***	0.8491 (6.49)***	0.9995 (17.48)***	0.9748 (21.41)***	0.9832 (22.56)***
s	-0.1115 (-1.35)	0.0975 (0.70)	-0.0811 (-1.18)	-0.0774 (-1.42)	-0.0756 (-1.44)
h	-0.1262 (-1.25)	0.1332 (0.76)	0.1936 (2.38)**	0.2074 (3.20)***	0.2086 (3.36)***
R^2	59.45%	23.65%	64.20%	72.75%	74.78%
F	86.97***	17.65***	110.01***	163.71***	181.86***
Panel B: Frequent repurchasers ($N = 2,928$)					
α	-0.68 (-2.54)**	0.72 (1.86)*	0.20 (0.95)	0.21 (1.19)	0.21 (1.26)
β_p	0.9484 (12.96)***	1.0811 (10.20)***	1.0643 (20.56)***	0.9861 (22.74)***	0.9835 (23.53)***
s	-0.1641 (-2.12)***	-0.1649 (-1.47)	-0.2143 (-3.45)***	-0.2031 (-3.90)***	-0.2256 (-4.50)***
h	-0.1072 (-1.13)	0.1947 (1.38)	0.1952 (2.64)**	0.1979 (3.19)***	0.2226 (3.73)***
R^2	57.23%	41.56%	71.33%	75.15%	76.30%
F	78.93***	40.07***	151.79***	184.51***	196.37***

Table 4
Post-Repurchase Performance: Open-market Repurchases vs. Tender offer Repurchases

Using the calendar-time portfolio approach, excess returns of the event portfolio are regressed on Fama-French three factors as follows: $R_{p,t} - R_{f,t} = \alpha + \beta(R_{m,t} - R_{f,t}) + sSMB_t + hHML_t + \varepsilon_{j,t}$, where $R_{p,t}$ is the event portfolio's return in month t ; $R_{f,t}$ is the one-month Treasury bill rate; $R_{m,t}$ is the monthly market return in month t ; SMB_t is the average return on small market-capitalization portfolio minus the average return on three large market-capitalization portfolios; HML_t is the average monthly return on two high book-to-market equity portfolios minus the average monthly return on two low book-to-market equity portfolios. The intercept, α , measures the average monthly abnormal return on portfolios of event firms. The t -statistic is in parentheses. ***, **, * , denote two-tailed significance at the 1%, 5%, and 10% levels, respectively.

Parameters	Estimation Time Period				
	(-6, -1)	(0, 0)	(1, 12)	(1, 24)	(1, 36)
Open-market Repurchases ($N = 3,995$)					
α	-0.90 (-3.17)***	0.77 (1.56)	0.43 (1.84)*	0.45 (2.41)**	0.44 (2.52)**
β_p	1.0220 (13.11)***	0.8605 (6.37)***	0.9966 (17.37)***	0.9664 (21.07)***	0.9680 (22.16)***
s	-0.1244 (-1.51)	0.0646 (0.45)	-0.1116 (-1.62)	-0.0801 (-1.45)	-0.077 (-1.47)
h	-0.1588 (-1.57)	0.0890 (0.49)	0.1528 (1.87)*	0.1771 (2.71)**	0.1861 (2.99)**
R^2	58.84%	23.39%	64.22%	72.35%	74.26%
F	84.80***	17.40***	110.10***	160.45***	176.94***
Tender Offers ($N = 171$)					
α	-0.40 (-0.69)	6.27 (6.37)***	0.68 (1.72)*	0.66 (2.19)**	0.64 (2.41)**
β_p	0.6232 (3.90)***	0.7452 (3.07)***	0.7695 (8.00)***	0.7237 (9.89)***	0.7700 (11.78)***
s	0.1777 (1.05)	-0.1254 (-0.47)	0.3505 (3.04)***	0.1616 (1.84)*	0.1648 (2.10)**
h	0.5462 (2.57)**	0.5791 (1.72)*	0.6231 (4.52)***	0.3567 (3.40)***	0.3725 (3.98)**
R^2	8.70%	9.09%	29.76%	37.33%	45.79%
F	5.37**	3.43*	24.72***	34.75***	49.27***

Table 5
Distribution of Sample Firms by 25 Size and Book-to-Market Value of Equity Portfolios
and Intercepts from Calendar-Time Portfolio Regressions

25 event portfolios are formed on size and book-to-market equity based on NYSE breakpoints. Excess returns of the event portfolio are regressed on Fama-French three factors as follows: $R_{p,t} - R_{f,t} = \alpha + \beta(R_{m,t} - R_{f,t}) + sSMB_t + hHML_t + \varepsilon_{j,t}$, where $R_{p,t}$ is the event portfolio's return in month t ; $R_{f,t}$ is the one-month Treasury bill rate; $R_{m,t}$ is the monthly market return in month t ; SMB_t is the average return on small market-capitalization portfolio minus the average return on three large market-capitalization portfolios; HML_t is the average monthly return on two high book-to-market equity portfolios minus the average monthly return on two low book-to-market equity portfolios. The intercept, α , measures the average monthly abnormal return on portfolios of event firms. The t -statistic is in parentheses. ***, **, * denote two-tailed significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Distribution of event sample firms by size and book-to-market value of equity

	Book-to-Market Ratio					Total
	Low	2	3	4	High	
Small	3.49	5.17	7.67	9.57	17.57	43.46
2	3.27	3.92	4.88	3.42	3.18	18.68
3	3.62	3.62	3.10	2.51	1.63	14.47
4	3.53	3.73	2.38	1.55	0.94	12.12
Large	4.42	2.64	1.98	1.72	0.50	11.27
Total	18.33	19.07	20.01	18.77	23.82	100.00

Panel B: Intercepts from the calendar portfolio regressions of 25 size and book-to-market value of equity portfolios

	Low	2	3	4	High
Small	0.55 (1.86)*	0.42 (1.63)	0.60 (1.90)*	0.32 (1.74)*	0.59 (3.23)***
2	0.80 (2.40)**	0.39 (1.40)	0.21 (0.88)	0.06 (0.26)	0.01 (0.04)
3	0.46 (1.40)	0.39 (1.77)***	0.13 (0.59)	0.43 (1.73)*	0.07 (0.20)
4	0.06 (0.23)	0.23 (1.00)	-0.05 (-0.19)	-0.09 (-0.28)	0.98 (2.54)**
Large	0.42 (2.10)**	0.10 (0.39)	0.52 (1.83)*	0.06 (0.22)	0.07 (0.17)

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Endnotes

¹ Lakonishok and Vermaelen (1990) argue that this result suggests that corporate restructuring activity may be an important motive for tender offer repurchases by large firms whereas tender offer repurchases by small firms may be an attempt to signal underevaluation of the firm.

² The notion of managerial market timing skills is contentious. Ginglinger and Hamon (2007) contend that share repurchases largely reflect contrarian trading rather than managerial timing ability.

³ Stephens and Weisbach (1998) investigate whether firms actually follow through with the repurchase announcements reported by SDC. Using various proxies for actual open market share repurchases, they estimate that the average firm acquires between 74% and 82% of announced shares in the three years following the announcement.

⁴ There have been issues regarding the way that SDC collects the data. Some scholars have questioned the accuracy of the SDC database, particularly the announcement date and aggregate dollar amount of repurchases (Oswald and Young, 2004; Jagannathan, Stephens, Weisbach, 2000). I hand-collected some repurchase announcement cases from a variety sources and compared them with the SDC database. I found a small number of reporting errors such as inaccurate announcement dates and multiple reporting of a repurchase program. This may be an unavoidable limitation for using a large sample collected from a database.

⁵ A repurchase program may have multiple board authorizations. These subsequent announcements authorize changes in the previously announced programs, such as an expansion of an existing program. These subsequent authorizations are not included in the sample.

⁶ The Eventus software program is used to calculate the abnormal returns of the Fama-French three-factor model.

⁷ The significant abnormal returns after the announcement provide support for Ikenberry, Lakonishok, and Vermaelen (2000).

⁸ In contrast to the dividend substitution hypothesis, Jagannathan, Stephens, and Weisbach (2000) provide evidence that repurchases have not replaced dividends as the primary payout vehicle. Dividends and repurchases are used at different places in the business cycle by different types of firms. Stock repurchases are used by firms with higher temporary, non-operating cash flows. Therefore, aggregate stock repurchases are volatile and vary considerably with the business cycle.

⁹ There is ample evidence in the literature that fixed-price or Dutch-auction tender offer repurchases generate much larger positive announcement returns than open market repurchases. Several studies report average abnormal announcement-period returns of 3 - 5% for open market repurchases (see Dann, 1981; Vermaelen, 1981; Comment and Jarrell, 1991; Ikenberry, Lakonishok, Vermaelen, 1995; Grullon and Michaely, 2002; Chan, Ikenberry, and Lee, 2004), and 8 - 15% for fixed-price or Dutch-auction tender offers (Comment and Jarrell, 1991; Louis

and White, 2007). It is possible to argue that fixed-price and Dutch-auction tender offers convey the strongest credible signals of managerial conviction about future prospects of the firm, based on the premise that a signal must be costly to be credible. Managers who intend to credibly signal their private information may choose a tender offer over an open market program. Open market repurchase programs are simply authorizations, not firm commitments, which allow managers to repurchase shares at their sole discretion.

¹⁰ The same conclusions hold for calendar portfolio regressions over one-year and two-year post-announcement estimation periods.