PREDICTABILITY OF STOCK RETURNS AND OPEN MARKET REPURCHASES

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PROJECT SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF BUSINESS ADMINISTRATION

In the Financial Risk Management Program
of the
Faculty
of
Business Administration

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SIMON FRASER UNIVERSITY

Term Fall Year

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Abstract

We find that stock returns are driven, at least in part, by open market share repurchases by the firm. We also find that the amount of open market repurchases can be predicted, at least in part, by the pre-repurchase stock performance. Further analysis reveals that post-announcement return anomalies are more significant for firms that follow their announcements by conducting actual repurchases during the four quarters following the announcement quarter. In addition, the amount of shares repurchased is a better predictor of returns for firms that announce only once within one year.

Keywords: Actual Repurchases; Abnormal Returns

JEL Classification: G30, G35

We wish to dedicate this paper to our dearest families for their continuous support, not only during this past year, but also throughout our lives. Without their support, we would never have made it this far.

Acknowledgements

We would like to thank our senior supervisor Dr. Alexander Vedrashko for his precious support, patience, comments and encouragement helped us in all of our research and writing of this thesis. It has been a tremendous rewarding and cheerful; experience working with Dr. Alexander Vedrashko. We also would like to express special thanks to Mr. Nan Guo who gives advice and assistance on our SAS coding. In addition, thank our families, friends and fellow classmates for giving us all the encouragement and help during this project.

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1: Introduction

Recent studies show that share repurchases as an alternative to dividend payments play an increasingly important role in corporate payout policy. U.S. corporations used more cash to repurchase shares than to pay dividends since 1998 (Grullon and Ikenberry 2000). Furthermore, as mentioned by Banyi, Dyl and Kahle (2008), many researchers (Fenn and Liang 2001; Guay and Harford 2000; Grullon and Michaely 2002; Kahle 2002) start to explore the consequences of firms' replacing dividends by open market repurchases and the stock performance anomalies triggered by repurchase announcements.

The purpose of our paper is to find whether corporate repurchase information is useful to equity investors. We find few study on the direct relationship between stock returns and repurchases in the literature. Thus, our research makes a contribution to investors, corporate managers, and academics who want to study the ability of actual repurchases to predict stock returns or vice versa.

Current studies focus on either the announcement anomalies (Peyer and Vermaelen 2009; Ikenberry, Lakonishok, and Vermaelen 1995) or the accounting performance improvements (Grullon and Michaely 2004; Lie 2005; Gong, Louis, and Sun 2008), rather than the long-term predictability of post-announcement stock returns. Only one study, Cook, Krigman, and Leach (2004), investigates the relationship between daily stock returns and daily repurchases. Its focus, however, is not on the return predictability, but rather is on the liquidity and repurchase timing.

Lie (2005) differentiates firms that actually buy back shares after open market repurchase announcements from those that do not. He finds better operating performance is associated with significant actual repurchase activities, and not announcements per se. Gong, Louis, and Sun (2008) also find endogenous association between the actual repurchase amount and earnings

management. Those findings imply a possible inner link between the actual repurchase amounts and stock abnormal returns. We conjecture that the stock performance in the post-repurchase period is also likely to be driven by the actual repurchase activities. We posit that the greater the company's buyback, the better its stock performance will be. Consistent with our conjecture, we find a significant positive relationship between the amounts of open market share repurchases and future stock returns. We also conjecture that the undervaluation of the stock provides an incentive to buybacks. Consistent with our conjecture, we find a negative correlation between the repurchase amount and the preceding stock performance. This finding is consistent with the Traditional Signalling Hypothesis (TSH) (Ikenberry, Lakonishok, and Vermaelen 1995).

As a first step, we examine quarterly stock performance around the time of the repurchase announcement quarter to determine the market reaction in the prior and post announcement quarters, using a much larger and more recent sample of 5114 open market repurchase events from 1996 to 2006. We find evidence of a significant negative average stock abnormal return in the quarter prior to the announcement and the announcement quarter, while the negative significance disappears in the four quarters after the announcement. Thus, we conclude that, in contrast to the findings reported by Gong, Louis, and Sun (2008), the market may not show an immediate positive reaction to firms' repurchase activities; however, the stock performance has a potential to out-perform in the long run.

In spite of the average pessimistic market reaction mentioned above, we test the association between stock returns and companies' actual repurchase amount (as a percentage of total shares outstanding). We find that stock abnormal returns in the current quarter are positively related to the actual repurchase amount in the previous quarter. This finding would enable investors to predict future stock performance based on the observed actual repurchase amount in the current quarter. In addition, we analyze the relationship between the actual repurchase amount in the current quarter and the stock performance in the previous quarter, and find that the repurchase amount in the current quarter is affected by the preceding abnormal performance of

the stock. Lastly, as a robustness check, we form two subsamples; one consists of companies with positive actual repurchases during the repurchase announcement quarter and the four subsequent quarters, and the other is formed by companies that do not make additional repurchase announcements during the one year after the announcement date. Consistent with our conjecture, we find that the significance between the abnormal return in the post-announcement period and the actual repurchase amount in the prior quarter is not driven by the non-repurchases and repeated-announcement events.

The remainder of the paper is organized as follows. The next section provides the overview of the literature and our choice of abnormal return measurement. Section 3 describes the sample selection procedure. Section 4 discusses measurement of variables. Section 5 investigates whether stock abnormal performance can be predicted with actual repurchase activities. Section 6 analyzes the evidence on the association between stock returns and future repurchase amounts. Section 7 provides the results for the two subsamples mentioned above. The study concludes in section 8.

2: Literature Review

During the past 20 years, the market has witnessed a dramatic increase in corporate share buyback activities. Open market share repurchases have become the most common way to repurchase shares (Berk and Demarzo 2009). The other two important ways of repurchasing shares are tender offers, Dutch auctions, and targeted repurchases. From 1985 to 2004, totalling $1.8 trillion, 89% of the total share repurchases value (Banyi, Dyl and Kahle 2008) was performed through open market repurchases. Numerous studies offer plausible reasons for why firms execute open market repurchase. The most popular hypothesis is signalling, which means repurchases signal managers' information to the market (Berk and Demarzo 2009). Other potential explanations for repurchases include: solving the agency problem, reorganizing the firm's capital structure (Baker, Powell and Veit 2003), achieving finer financial leverage (Dittmar 2000) and countering diluting effects of employee and management stock options (Fenn and Liang 1997).

Many academic researchers report that stock abnormal returns depend on the open market repurchase activities. Ikenberry, Lakonishok, and Vermaelen (1995) report that the average abnormal four-year buy-and-hold return, after the initial announcement is 12.1%, using a sample of 1239 announcement events from 1980 to 1990.

Grullon and Michaely (2004) find a significant predicting power of accounting variables towards the post-announcement price drift both in the short run and in the long run. Lie (2005) states that markets might under-react to embedded information in the repurchase announcement as investors may still have doubts about the credibility of the repurchase information, thus the stock market will not immediately respond to the repurchase information until it confirms that the

actual repurchase activity from the company's earnings report. Lie then shifts the emphasis on stock abnormal returns around post-repurchase earnings announcement.

Gong, Louis, and Sun (2008) also find positive and significant long-term abnormal returns following open market repurchase announcements. They use a sample of 1720 firms that execute actual repurchases in the announcement quarter or in the subsequent quarter, from 1984 to 2002.

Cook, Krigman, and Leach (2004) study the direct relationship between daily stock returns and daily repurchases on a unique sample of 64 repurchasing firms and find that daily abnormal returns are associated with companies' subsequent daily repurchase activity. However, that study has been constrained by the data availability in the U.S., since companies are obligated to publish only quarterly repurchase activities. Its results contribute primarily to the market microstructure literature, rather than the long-term return predictability.

2.1 Methodology of Measuring Long-term Abnormal Returns

Traditional measurements, like the Capital Asset Pricing Model (CAPM), Fama–French three-factor model, or more recently Carhart's (1997) four-factor model, are widely adopted for calculating abnormal returns. In these approaches, inferences about the abnormal return are based on estimating alpha from a multifactor time-series regression and its statistical significance. Loughran and Ritter (2000) point out that since these time-series regressions weight each period equally, they have lower power to detect abnormal performance if managers time corporate events to coincide with misevaluations. In addition, CAPM, Fama–French (1993) three-factor model and Carhart's (1997) four-factor model are based on a general factor model which lead to a reasonable suspicion that those risk factors (i.e. SMB) do not fully compensate for risk.

Researchers have sought to improve the measurement of long-term abnormal returns from various perspectives. Characteristic-based matching approach is considered as a finer

alternative to those traditional measurements. This approach requires one to match an event firm with a non-event firm who has similar characteristics or share the same quintiles. In this paper, we follow Daniel et al. (1997) who refer to four types of comparison groups: Two-digit matched, four-digit matched, sized-matched and performance matched, based on the firms' Standard Industrial Classification (SIC) code.

3: Sample Selection

We acquire the full sample of open market repurchase announcements from the Security Data Company's (SDC) Mergers and Acquisitions database and combine it with data from Compustat and the Center for Research in Security Prices (CRSP) databases. We then set the sample time range to be from 1996 to the first half of 2006 and contain 5,293 open market share repurchase announcements in our sample. We exclude 61 announcements with unavailable announcement amounts because we cannot determine how much the firms planned to repurchase relative to how much they did repurchase based on Compustat. For the 5,232 events that have been identified, we estimate the value of actual repurchases in a given quarter based on Compustat quarterly year-to-date data item "PRSTKCY- purchase of common and preferred stock" and normalize it by firms' market value of equity. Since the actual repurchase data is quarterly, we require that each firm can only have one announcement event in each fiscal quarter. By doing so, we further exclude 118 announcements. The final sample includes 5,114 open market repurchase announcements.

4: Variables Measurement

4.1 Actual Repurchase

Our research relies on the accurate measurement of the number of shares actually bought back by the announcing firms. However, a precise measurement of actual repurchase amount is not readily available. Our repurchase proxy, Compustat data item "purchase of preferred and common stock-PRSTKCY" is an aggregation of many other types of security transactions besides open market share repurchases, and this may potentially cause overestimation of share repurchases. In spite of that, PRSTKCY is by far the most common measure of the quarterly actual repurchase dollar amounts (Stephens and Weisbach 1998; Gong, Louis, and Sun 2008).

Table 1 reports announcement statistics for the open market repurchase sample. The most observations occur in 1998 with 906 events, followed by 1999 with 776 events, which is consistent with the findings of Peyer and Vermaelen (2008). All the statistics are based on the full sample of 5,114 open market repurchase announcements that occurred between 1996 to the first half of 2006. "Number of events" indicates the number of announcements in each calendar year or in each quarter.

4.2 Stock Performance

Our first task is to investigate whether there are long-run abnormal returns after the announcement of open market repurchases. Following Gong, Louis, and Sun (2008), we compute quarterly abnormal returns for announcing firms using Daniel et al. (1997)'s portfolio-matching measure. This portfolio-matching measure assumes that announcing firms differ from the other similar non-announcing only in that they have experienced the event, and as a result, the return difference between announcing firms and non-announcing portfolios is the abnormal return. This

measure uses the return of a universe portfolio of stocks as the benchmark return that is matched to the announcing firm's raw returns each quarter based on the dimensions of size (market value of equity) and book-to-market ratio. Fama-French's 25 portfolios formed on size and book-to-market obtained from Kenneth French's website are used here as the benchmark portfolios. These 25 portfolios are constructed monthly from 1996 to 2006 and are the intersections of five portfolios formed on firm size and five portfolios built on book to market ratio. Quarterly return of the benchmark portfolio is then calculated based on the monthly return of each of the 25 portfolios. With the size and book-to-market ratio breakpoints already available from Kenneth French's website, we assign each event firm to one of the 25 benchmark portfolios according to its size and book-to-market ratio rank in each quarter. The quarterly abnormal returns are calculated as the raw return minus the benchmark portfolio return.

Table 2 presents the abnormal return mean and median statistics for each of the five quarters around open market announcement, excluding return outliers on both sides.

In the repurchase announcement quarter (quarter 0) and the prior quarter (quarter -1), returns are significantly negative. The possible explanations could be the market under-reaction hypothesis (Ikenberry, Lakonishok, and Vermaelen 1995; Lie 2005), that markets cannot fully capture the information conveyed from repurchases announcements. Comment and Jarrel (1991) point out the firms tend to announce open market repurchase programs following a decline in their share price, when their stock is more likely to be undervalued. However, what is not expected in our research is the quarterly abnormal returns for the post announcement quarters 1, 2, and 3 are also negative, although the t-tests do not show a great significance. This suggests that instead of excelling their industry peers, the announcing firms, on average, even fail to perform better.

This result, to some extent, is inconsistent with the literature that reports robust long-term abnormal returns in the post-announcement period (Gong, Louis, and Sun 2008; Peryer and Vermaelen 2008). Possible explanations could be our method of choice to calculate quarterly

return instead of monthly return and the different way of selecting samples. We did not use the Fama-French (1993) three-factor model combined with Ibbotson's RATS method adopted by Peyer and Vermaelen (2008) who did find persistent long-term anomalies in the post-announcement period. Gong, Louis, and Sun (2008) arrive at a similar conclusion as Peryer and Vermaelen (2008), but apply different processes in selecting repurchase events (only companies which did actual repurchases within the announcement quarter or the subsequent quarter remain).

Findings in Lie (2005) can provide another explanation for our result, as he indicates that stock investors will not be fully informed of the company's repurchase activity until the post-repurchase earnings announcement date, thus we may not observe robust anomalies in subsequent announcement quarters. From the third and fourth quarter following the announcement quarter, the negative abnormal return begins to lose significance, which to certain extent implies a stock performance improvement of the abnormal returns after the repurchase announcement.

4.3 Control Variables

Since previous studies have shown that firm size is a significant factor in explaining abnormal returns and small firms tend to have higher abnormal returns on average, we include firm size as a factor in all our regressions. The firm size factor is obtained by taking the log of the total book value of assets (Compustat quarterly data item ATQ). Earnings per share (EPS, Compustat item OPEPSQ) is used to proxy a company's operating performance, and firms with higher earnings per share are more likely to expect a higher return. Price earnings ratio (P/E) is applied to measure whether the stock is over- or under-valued (Berk and Demarzo 2009), as a lower price earnings ratio is more likely to expect a higher abnormal return.

In addition, we control for the effect of interest rate changes because expected stock returns are believed to be systematically related to market risk and interest rate. Our Interest rate quarterly change is calculated based on the differencing of quarterly 3-month T-bill rates. The quarter 3-month T-bill rate is the average monthly rate of the relative fiscal quarter of each event

firm. We obtain monthly 3-month T-bill rates from the Federal Reserve Statistical Release website.

In order to explain actual repurchases, we adopt cash, leverage ratio, and size as controls in our models. Cash, (Compustat year-to-date item OANCFY), deflated by market value of equity, is the operating cash flow in the previous quarter, and as Lie (2000) points out, repurchase-increasing firms have more excess cash than their peers do in the industry. Leverage ratio (Lev) is long-term debt (Compustat item: DLTTQ) plus debt in current liabilities (Compustat item: DLCQ) divided by total assets (Compustat item: ATQ). Size is the natural logarithm of a firm's total assets. We also use Tobin's Q, the market value of equity plus the book value of debt scaled by the book value of assets, to represent the firm's investment opportunity (Lie 2000; Grullon and Michaely 2002).

5: The Relation between Actual Repurchase and Subsequent Quarter's Abnormal Return

Ikenberry, Lakonishok, and Vermaelen (1995) find that open market share repurchase announcements are followed by long-run firm abnormal performance during 1980 - 1990. Lie (2005) points out that open market repurchase announcements lead to operating performance improvement following the announcement, and this improvement is more significant for firms that have actually repurchased shares after the repurchase announcement. In Ikenberry, Lakonishok, and Vermaelen's (1995) research of post-announcement abnormal returns, they do not take actual repurchase into consideration and only relate abnormal return with repurchase announcement events. Lie (2005) considers actual repurchase as a factor for explaining post-announcement firm performance, but his focus is on the accounting measure "operating performance" instead of the capital market responses. Inspired by Ikenberry, Lakonishok, and Vermaelen (1995) and Lie (2005), we are curious whether there exists a relation between actual repurchase and subsequent abnormal return, or in other words, whether actual repurchase predicts post-repurchase abnormal return. As a result, we model abnormal returns as a function of the share repurchased amount (the open market repurchase dollar amount normalized by the firm's market value of equity) and several other control variables. Our choice of control variables is guided by the prior discussion.

$$AbRet_i^j = \alpha_0 + \alpha_1 Rep_i^{j-1} + \alpha_2 AbRet_i^{j-1} + \alpha_3 P/E_i^{j-1} + \alpha_4 EPS_i^{j-1} + \alpha_5 Int.change_i^{j-1} + \alpha_n year\ dummy, \quad (1)$$

where i is the announcement event, j is the quarter after the announcement[1], j= -1, …, 4. Rep (j-1) is the percentage of shares outstanding repurchased in the previous quarter, AbRet (j-1) is the quarterly abnormal return for the previous quarter, EPS (j-1) is the earnings per share in the previous quarter, P/E (j) is the ratio of current quarter's stock price scaled by previous quarter's EPS, and Interest rate change (j-1) is the change in quarterly 3-month T-bill rates.

If the amount of share repurchase by firms can really predict abnormal return in the subsequent quarter, we expect the coefficient on Repurchase (j-1), α_1, to be significantly positive.

We use clustering (by firm and Fama-French 22 industries) to correct for heteroskedasticity and also include year dummies in our regression. The regression is cross-sectional. It should be noted that the results remain unchanged if we cluster by firm and year.

Table 4 contains results of the regression of the post-repurchase quarterly abnormal return on the fraction of shares the firm actually repurchases. In Quarter 1, which is the first quarter after the announcement quarter, the coefficient on the previous quarter's repurchases (0.2742) is positive and significantly different from zero. For the subsequent quarters, Quarters 2 and 3, we also see significantly positive coefficients on the previous quarter's repurchases. The coefficient loses its significance in Quarter 4, and we believe it is because the repurchase signalling effect is gradually disappearing when the repurchasing time point becomes more and more far away from the initial repurchase announcement date, and the market has fully incorporated all favourable information provided by the repurchase announcement and subsequent repurchases. Overall, the evidence strongly suggests that the proportion of the shares outstanding that firm repurchases is a significant determinant of post-repurchase abnormal returns.

[1] For example $AbRet_i^0$ is the abnormal return of event i in the announcement quarter.

6: The Relation between Actual Repurchase and Previous Quarter's Abnormal Return

Vermaelen (1981) and Comment and Jarrell (1991) both conclude that repurchase announcements signal positive information about firm value. The firms themselves, who usually cite undervaluation as the primary motivation for the repurchase, support the signalling hypothesis. 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. We ask the following questions: does the signalling hypothesis apply to actual share repurchase and do managers time the actual repurchases when they believe their firm's stock is undervalued? In order to answer these two questions, we estimate the following model[2]:

$$Rep_i^j = \alpha_0 + \alpha_1 AbRet_i^{j-1} + \alpha_2 Rep_i^{j-1} + \alpha_3 Cash_i^{j-1} + \alpha_4 Tobin'sQ_i^{j-1} + \alpha_5 Lev_i^{j-1} + \alpha_6 Size_i^{j-1} + \alpha_n year\ dummy \qquad (2)$$

In Model (2), AbRet (j-1) is the quarterly abnormal return for the previous quarter. Rep (j-1) is the percentage of shares outstanding repurchased in the previous quarter. Cash (j-1) is the balance of cash from operating in the quarter before the actual repurchase quarter. Tobin's Q (j-1) is the market-to-book ratio in the quarter before the actual repurchase quarter. Lev (j-1) is the ratio of debt to market value of equity in the quarter before the actual repurchase quarter. Lev also explains repurchases to a certain extent because many managers borrow funds to buy back firm's

[2] In Model (1) and Model (2), i is the announcement event, j is the quarter after the announcement, j= -1, 0, 1, 2, 3, 4. For example $AbRet_i^0$ is the abnormal return of event i in the announcement quarter.

shares. Size (j-1) is the log of the value of total assets in the quarter before the actual repurchase quarter. Since previous studies have shown that firm size is a significant factor in explaining abnormal returns and small firms tend to have higher abnormal returns on average, we include size in our regression. The regression is cross-sectional, and we use clustering (firm and Fama-French 22 industry) to correct heteroskedasticity and also include year dummies in our regression. The results have no significant difference when we clustered using firm and year.

Results reported in Table 5 provide evidence that the proportion of shares repurchased is determined by the level of the previous quarter's abnormal return. The regression results indicate that there is a significantly negative association between abnormal returns and subsequent repurchases in Quarters 2 and 3 after the announcement. However, in Quarters 0, 1 and 4, the regression provides no evidence that low abnormal returns lead to higher level of actual repurchases.

7: Subsamples and Robustness Checks

Open market programs usually last for several months or even years. In practice, not all announcements lead to actual repurchases. Lie (2005) defines a carry-through repurchase announcement as an announcement followed by actual share repurchase during the fiscal quarter of the announcement and/or the subsequent quarter. We adjust Lie's (2005) definition and extend the carry-through period from two quarters to five quarters including the announcement quarter in Model (2) and four quarters following the announcement quarter in Model (1). In the carry-though subsample, we exclude all announcements that end with no shares repurchased in the announcement quarter and subsequent four quarters, and the sample is reduced to approximately 3800 announcement observations. Then we replicate the regression analysis for this carry-through subsample. Without zero-repurchase announcements, we expect to see the coefficient on Repurchase (j-1), α_1, to be greater, in other words, a more significant positive relation between abnormal returns and the actual repurchases in the previous quarter. Table 6 presents the results. In Quarter 3, the coefficient on Repurchase (j-1) is 1.0830, and it is positive at a higher confidence level (1%) than that for the full sample (5%). We also find a significant predictive relation between repurchases and stock returns in Quarter 4 in the subsample. All coefficients on the Repurchase variable approximately double in magnitude in the subsample of repurchasing firms relative to the full sample. Consistent with our expectation, we find a more significantly positive relation between abnormal returns and previous quarter's proportion of shares repurchased.

Table 7 reports the result of Model (2) for the carry-through subsample. The only significantly negative coefficient on the previous quarter's abnormal return appears in Q2, Q3 and

Q4. In other two quarters, the coefficients on previous quarter's abnormal return show no significance at all.

Our second subsample is designed to include only one announcement for each firm from Q0 to Q4. The purpose of this subsample is to mitigate confusion if actual repurchases from the initial announcement overlap with subsequent announcements in the four-quarter window after the initial announcement. Then we repeat the same analyses that have been done to the full sample and the carry-through subsample. Table 8 and 9 report the estimation results of Model (1) and Model (2) for the subsample without repeated announcements in the announcement quarter and the following four quarters.

In Table 8, the results of the post-repurchase quarterly abnormal return on the fraction of shares the firm actually repurchases further prove our hypothesis that the proportion of the shares outstanding the firm repurchases is a significant determinant of post-repurchase abnormal returns. In Q1 and Q3, the coefficients on the previous quarter's repurchases are positive and significantly different from zero. The coefficient loses its significance in Q4 for the same reason we have stated in the full sample section.

Table 9 presents estimation results of Model (2) for this subsample. The results are similar to those of the full sample. In Q2 and Q3, there are significantly negative coefficients on previous quarter's repurchase, meaning that firms time their actual repurchase actions to take advantage of periods when their equity is more undervalued by the market. In Q0, Q1 and Q4, the coefficients are not significantly different from zero.

8: Conclusion

Earlier studies report that accounting performance improvement is associated with actual open market repurchases. The empirical evidence provided in this paper indicates that the stock performance of firms engaged in share repurchase activity can be predicted by actual open market repurchases or vice versa. These results have important implications for investors, in that firms' actual repurchases activities can at least partially contribute to future stock performance. In addition, our results indicate that the undervaluation of the stock, to a certain extent, is an important explanatory factor to firms' actual repurchase activities.

Several extensions to this study may be suggested. Our paper only reveals the dependencies between current actual repurchase amount and future stock performance or vice versa, while there can be an endogenous dependence between actual repurchases and stock performance. The issue is which of the two economic variables plays the dominant or causal role, and whether the actual repurchases lead stock performance or vice versa. To solve this problem, we could apply a simultaneous equation model to get a closer look.

The issue of measuring actual repurchase amount has also been mentioned in our paper. Currently, researchers acquire actual open market repurchase information from Compustat and CRSP. However, Banyi, Dyl and Kahle (2008) question the accuracy of the estimations of open market actual repurchases amount reported from those data sources. In order to obtain a more reliable result, we would use a finer approach to assess the actual amount of the open market repurchase and retest our results. As noted earlier, we could choose the portfolio matching procedure advocated by Barber and Lyon (1997) to measure stock performance.

Overall, this paper went beyond the effects of the repurchase announcements per se on stock returns. It has made the first step to explore the anomalies in stock returns triggered by actual open market repurchases and reveal relationship between the two.

Appendix

Table 1

Open Market Share Repurchase Announcement Sample Distribution

Distribution of the sample of share repurchases program announcements by the year of the announcement. The sample only includes open market repurchase programs. Tender-offer and Dutch auction repurchase programs are excluded from the sample.

Calendar Year/ Quarter	Number of Events
1996	630
1997	658
1998	906
1999	776
2000	695
2001	343
2002	341
2003	223
2004	299
2005	197
The first half of 2006	46
Total	5114

Table 2.1

Long-term Abnormal Returns around Open Market Repurchase Announcements

Table 2 reports quarterly abnormal returns for each of the five quarters around the open market announcement quarter. Quarter 0 is the fiscal quarter of the share repurchase announcement. Abnormal returns for the announcing firms in each quarter are calculated using Daniel et al. (1997) portfolio-matching procedure. For each of the five quarters, the abnormal return mean is the simple average of all the available quarterly abnormal returns. N is the number of observations. A two-sided t-test and the Wilcoxon signed-rank test are conducted for the mean and median, respectively. For the abnormal return mean and median, significance at the 10% (*), 5% (**), and 1% (***) levels is provided.

Quarter	N	Mean	Median	Max	Min	StdDev
-1	5114	-0.0478***	-0.0448***	0.6005	-1.0398	0.2043
0	5114	-0.0292***	-0.0293***	0.7442	-0.8973	0.2257
1	5114	-0.0047	-0.0152***	0.7532	-1.0739	0.2159
2	5114	-0.0007	-0.0105***	0.7907	-0.8435	0.2203
3	5114	-0.0029	-0.0153***	0.8485	-0.9937	0.2268
4	5114	0.0001	-0.0153***	0.8482	-0.8757	0.2262

Table 2.2

Quarterly Open Market Actual Repurchase Amount as Percentage of Market Value

This table reports the open market actual repurchase amount in each event quarter. The actual repurchase amount is calculated by the open market repurchase dollar amount (Compustat item: PRSTKCY) normalized by the firm's market value of equity.

Quarter	N	Mean	Median	Max	StdDev
-1	5114	0.0070	0.0000	0.0827	0.0146
0	5114	0.0118	0.0035	0.1064	0.0193
1	5114	0.0099	0.0023	0.0971	0.0171
2	5114	0.0079	0.0001	0.0970	0.0159
3	5114	0.0066	0.0000	0.0897	0.0142
4	5114	0.0060	0.0000	0.0824	0.0133

Table 3

Descriptive Statistics of Other Explaining Variables

Descriptive statistics for the sample of firms that announced open market repurchase programs between 1996 and 2006. All financial data are measured at the end of the fiscal quarter of the announcement.

Size is the log of the value of total assets. Lev is long-term debt and debt in current liabilities scaled by the book value of assets. Cash is cash from operating. EPS is earnings per share from operating. P/E ratio is the quarterly stock price scaled by previous quarter's EPS. Tobin's Q is the market value of assets scaled by the book value of assets. The Interest rate change is the change in the quarterly 3-month T-bill rates. N is the number of observations.

	N	Mean	Median	Max	Min	StdDev
Size	5114	6.19	6.14	12.00	2.09	2.13
Lev	5114	0.65	0.22	6.90	0.00	1.13
Cash	5114	57.99	2.00	1558	-151.31	213.84
EPS	5114	0.32	0.27	2.16	-0.61	0.45
P/E	5114	49.82	53.15	529	-292.41	115.54
Tobin's Q	5114	1.34	1.04	6.90	0.67	1.01
Int. change	5114	-0.02	0.00	0.53	-1.26	0.37

Table 4

The Relation between Actual Repurchase and Subsequent Quarter's Abnormal Return

The dependent variables are quarterly abnormal returns in fiscal quarters one through four (Q1-Q4) following the announcement quarter. Rep (j-1) is the percentage of shares outstanding repurchased in the previous quarter. AbRet (j-1) is the quarterly abnormal return for the previous quarter. EPS (j-1) is the earnings per share in the previous quarter. P/E (j) is the ratio of current quarter's stock price scaled by previous quarter's EPS. Interest rate change (j-1) is the change in quarterly 3-month T-bill rates. N is the number of observations. Significance at the 10% (*), 5% (**), and 1% (***) levels is provided. The significance tests are based on heteroskedasticity-consistent standard errors adjusted for clustering at the firm and industry levels.

	Q1	Q2	Q3	Q4
$AbRet_i^j = \alpha_0 + \alpha_1 Rep_i^{j-1} + \alpha_2 AbRet_i^{j-1} + \alpha_3 P/E_i^{j-1} + \alpha_4 EPS_i^{j-1} + \alpha_5 Int.change_i^{j-1} + \alpha_n year\ dummy$				
Rep (j-1)	0.2742**	0.5442***	0.4793**	0.1969
AbRet(j-1)	0.1274***	0.0939***	0.1517***	0.1707***
P/E ratio(j)	0.0002***	0.0002***	0.0002***	0.0003***
EPS(j-1)	0.0724***	0.0928***	0.1045***	0.1037***
Interest rate change(j-1)	0.0014***	-0.0283***	0.0317***	-0.0517***
Year dummy	Yes	Yes	Yes	Yes
Number of Observations	5114	5114	5114	5114

Table 5

The Relation between Actual repurchase and Previous Quarter's Abnormal Return

The dependent variables are the percentages of shares outstanding repurchased in the fiscal quarter of the announcement and quarters one through four (Q1-Q4) following the announcement. AbRet (j-1) is the quarterly abnormal return for the previous quarter. Rep (j-1) is the percentage of shares outstanding repurchased in the previous quarter. Cash (j-1) is the balance of cash from operating in the quarter before the actual repurchase quarter. Tobin's Q (j-1) is the market value of assets scaled by the book value of assets in the quarter before the actual repurchase quarter. Lev (j-1) is the ratio of debt to market value of equity in the quarter before the actual repurchase quarter. Size (j-1) is the log of the value of total assets in the quarter before the actual repurchase quarter. Significance at the 10% (*), 5% (**), and 1% (***) levels is provided. The significance tests are based on heteroskedasticity-consistent standard errors adjusted for clustering at the firm and industry levels.

	Q0	Q1	Q2	Q3	Q4
$Rep_i^j = \alpha_0 + \alpha_1 AbRet_i^{j-1} + \alpha_2 Rep_i^{j-1} + \alpha_3 Cash_i^{j-1} + \alpha_4 Tobin'sQ_i^{j-1} + \alpha_5 Lev_i^{j-1} + \alpha_6 Size_i^{j-1} + \alpha_n year\ dummy$					
AbRet(j-1)	-0.0005	-0.0021	-0.0023***	-0.0024***	-0.0012
Rep(j-1)	0.4159***	0.2263***	0.2826***	0.2315***	0.2720***
Cash(j-1)	0.0302***	0.0199***	0.0120***	0.0164***	0.0118***
Tobin's Q(j-1)	-0.0001	0.0000	0.0002	0.0002	0.0004**
Lev(j-1)	-0.0006*	-0.0006**	-0.0005***	-0.0003	-0.0000
Size(j-1)	-0.0003**	0.0001	0.0002*	0.0002**	0.0001
Year Dummy	Yes	Yes	Yes	Yes	Yes
Number of Observations	5114	5114	5114	5114	5114

Table 6

The Relation between Actual Repurchases and Subsequent Quarter's Abnormal Returns, Excluding Announcements with No Shares Actually Repurchased

The dependent variables are quarterly abnormal returns in fiscal quarters one through four (Q1-Q4) following the announcement quarter. The sample excludes announcements with no shares actually repurchased in the announcement quarter and four quarters following the announcement quarter. Rep (j-1) is the percentage of shares outstanding repurchased in the previous quarter. AbRet (j-1) is the quarterly abnormal return for the previous quarter. EPS (j-1) is the earning per share in the previous quarter. P/E (j) is the ratio of current quarter's stock price scaled by previous quarter's EPS. Interest rate change (j-1) is the change in quarterly 3-month T-bill rates. Significance at the 10% (*), 5% (**), and 1% (***) levels is provided. The significance tests are based on heteroskedasticity-consistent standard errors adjusted for clustering at the firm and industry levels.

	Q1	Q2	Q3	Q4
$AbRet_i^j = \alpha_0 + \alpha_1 Rep_i^{j-1} + \alpha_2 AbRet_i^{j-1} + \alpha_3 P/E_i^{j-1} + \alpha_4 EPS_i^{j-1} + \alpha_5 Int.change_i^{j-1} + \alpha_n year\ dummy$				
Rep(j-1)	0.5187**	1.2359***	1.0830***	1.2662***
AbRet(j-1)	0.1410***	0.1860***	0.2329***	0.2575***
P/E ratio(j)	0.0000	0.0000	0.0001***	0.0001***
EPS(j-1)	0.0676***	0.0948***	0.1076***	0.0935***
Interest rate change(j-1)	0.0317	-0.0365**	0.0317***	-0.0004
Year dummy	Yes	Yes	Yes	Yes
Number of Observations	3814	3819	3816	3810

Table 7

The Relation between Actual Repurchases and Previous Quarter's Abnormal Returns, Excluding Announcements with No Shares Actually Repurchased

The dependent variables are the percentages of shares outstanding repurchased in the fiscal quarter of the announcement and quarters one through four (Q1-Q4) following the announcement. The sample excludes announcements with no shares actually repurchased in the announcement quarter and four quarters following the announcement quarter. AbRet (j-1) is the quarterly abnormal return for the previous quarter. Rep (j-1) is the percentage of shares outstanding repurchased in the previous quarter. Cash (j-1) is the balance of cash from operating in the quarter before the actual repurchase quarter. Tobin's Q (j-1) is the market value of assets scaled by the book value of assets in the quarter before the actual repurchase quarter. Lev (j-1) is the ratio of debt to market value of equity in the quarter before the actual repurchase quarter. Size (j-1) is the log of the value of total assets in the quarter before the actual repurchase quarter. Significance at the 10% (*), 5% (**), and 1% (***) levels is provided. The significance tests are based on heteroskedasticity-consistent standard errors adjusted for clustering at the firm and industry levels.

	Q0	Q1	Q2	Q3	Q4
$Rep_i^j = \alpha_0 + \alpha_1 AbRet_i^{j-1} + \alpha_2 Rep_i^{j-1} + \alpha_3 Cash_i^{j-1} + \alpha_4 Tobin'sQ_i^{j-1} + \alpha_5 Lev_i^{j-1} + \alpha_6 Size_i^{j-1} + \alpha_n year\ dummy$					
AbRet(j-1)	0.0001	-0.0019	-0.0035***	-0.0027***	-0.0014*
Rep(j-1)	0.3464***	0.1484***	0.2268***	0.1898***	0.2310***
Cash(j-1)	0.0159***	0.0128***	0.0048	0.0140***	0.0104***
Tobin's Q(j-1)	-0.0010***	-0.0008***	-0.0003*	-0.0003	-0.0000
Lev(j-1)	0.0010**	0.0005	0.0009	0.0003	0.0004
Size(j-1)	-0.0003**	0.0001	0.0002*	0.0003***	0.0002*
Year dummy	Yes	Yes	Yes	Yes	Yes
Number of Observations	3814	3812	3819	3816	3810

Table 8

The Relation between Actual Repurchase and Subsequent Quarter's Abnormal Return, Excluding Repeated Announcements

The dependent variables are quarterly abnormal returns in fiscal quarters one through four (Q1-Q4) following the announcement quarter. The sample includes only repurchase announcements by firms that do not make another announcement during four fiscal quarters following the announcement quarter. Repurchase (j-1) is the percentage of shares outstanding repurchased in the previous quarter. Abnormal return (j-1) is the quarterly abnormal return for the previous quarter. EPS (j-1) is the earning per share in the previous quarter. P/E (j) is the ratio of current quarter's stock price scaled by previous quarter's EPS. Interest rate change (j-1) is the change in quarterly 3-month T-bill rates. Significance at the 10% (*), 5% (**), and 1% (***) levels is provided. The significance tests are based on heteroskedasticity-consistent standard errors adjusted for clustering at the firm and industry levels.

	Q1	Q2	Q3	Q4
$AbRet_i^j = \alpha_0 + \alpha_1 Rep_i^{j-1} + \alpha_2 AbRet_i^{j-1} + \alpha_3 P/E_i^{j-1} + \alpha_4 EPS_i^{j-1} + \alpha_5 Int.change_i^{j-1} + \alpha_n year\ dummy$				
Repurchase(j-1)	0.8536***	0.4328*	1.0226***	0.3025
Abnormal return(j-1)	0.1082***	0.0659***	0.1198***	0.1562***
P/E ratio(j)	0.0002***	0.0003***	0.0002***	0.0003***
EPS(j-1)	0.0953***	0.1073***	0.1270***	0.1176***
Interest rate change(j-1)	0.0234	-0.0608**	0.0286	-0.1040
Year dummy	Yes	Yes	Yes	Yes
Number of Observations	2234	2234	2234	2234

Table 9

The Relation between Actual Repurchases and Previous Quarter's Abnormal Returns, Excluding Repeated Announcements

The dependent variables are the percentages of shares outstanding repurchased in the fiscal quarter of the announcement and quarters one through four (Q1-Q4) following the announcement. The sample includes only repurchase announcements by firms that do not make another announcement during four fiscal quarters following the announcement quarter. AbRet (j-1) is the quarterly abnormal return for the previous quarter. Rep (j-1) is the percentage of shares outstanding repurchased in the previous quarter. Cash (j-1) is the balance of cash from operating in the quarter before the actual repurchase quarter. Tobin's Q (j-1) is the market value of assets scaled by the book value of assets in the quarter before the actual repurchase quarter. Lev (j-1) is the ratio of debt to market value of equity in the quarter before the actual repurchase quarter. Lev also explains repurchases to a certain extent because many managers borrow funds to buy back firm's shares. Size (j-1) is the log of the value of total assets in the quarter before the actual repurchase quarter. Significance at the 10% (*), 5% (**), and 1% (***) levels is provided. The significance tests are based on heteroskedasticity-consistent standard errors adjusted for clustering at the firm and industry levels.

	Q0	Q1	Q2	Q3	Q4
$Rep_i^j = \alpha_0 + \alpha_1 AbRet_i^{j-1} + \alpha_2 Rep_i^{j-1} + \alpha_3 Cash_i^{j-1} + \alpha_4 Tobin'sQ_i^{j-1} + \alpha_5 Lev_i^{j-1} + \alpha_6 Size_i^{j-1} + \alpha_n year\ dummy$					
AbRet(j-1)	-0.0012	-0.0014	-0.0023**	-0.0024**	-0.0005
Rep (j-1)	0.3589***	0.2481***	0.2843***	0.2165***	0.2146***
Cash(j)	0.0303***	0.0167***	0.0072**	0.0152***	0.0102***
Tobin's Q(j-1)	-0.0002	-0.0002	0.0000	-0.0000	0.0002
Lev(j-1)	-0.0007***	-0.0005	-0.0005*	-0.0005**	-0.0000
Size(j-1)	-0.0002	0.0001**	0.0004***	0.0002*	0.0001
Year dummy	Yes	Yes	Yes	Yes	Yes
Number of Observations	2234	2234	2234	2234	2234

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