
*International Review of Accounting, Banking and Finance*

**Volume 5, No. 2, Spring 2013 Page35~54**

**IRABF**

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# Corporate Transparency on Market-Timing Ability through Dutch Auction Stock Repurchase

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**Abatract:** In this paper, we examine whether low transparency (LT) firms with more information asymmetry problems are able to earn higher market-timing profits through Dutch auction stock repurchase. The results show that the market is aware of the information price discount of LT firms. Therefore, the market reacts more positively to LT firms' Dutch auction repurchase announcements. However, the more positive market reactions will not eliminate the market timing profits completely. Therefore, LT firms outperform HT firms and earn higher market-timing profits in the long run because information asymmetry problems slow down information discovery. The findings indicate LT firmsare more successful at timing Dutch auction than HT firms.

JEL: G10, G14, G34.

Keywords: Stock Repurchase; Dutch Auction; Market-timing; Corporate Transparency; Disclosure; Corporate Finance, Behavioral Finance; Market Efficiency and Anomalies

# I. Introduction

In this paper, we examine the impact of transparency on corporations' market-timing ability through Dutch auction stock repurchase. More specifically, we examine whether low transparency (LT) firms can more successfully buy back outstanding shares at discounted prices through Dutch auction repurchase than HT firms.

LT firms have more information asymmetry problems (Diamond and Verrecchia (1991)), while such information asymmetry problems can cause the market price of the firm to deviate from its intrinsic value. The adverse selection problem can also cause the less informed market to discount the stock of LT firms as a form of compensation or information discount (Beatty and Ritter (1986)), while such a price discount can provide LT firms with more opportunities to repurchase shares at more discounted prices than HT firms.

While the pros and cons of corporate transparency have been examined in numerous studies,[19] none of the studies has examined whether low transparency allows managers to time Dutch auction repurchase more efficiently, even though managers' market timing intent and success have been well documented in SEO and repurchase literatures.[20]

At the first glance, it may seem counter intuitive for market timers to repurchase shares through Dutch auction because it provides stronger undervaluation signals to the market by buying back all desired shares at the same specified price.[21] However, while such stronger

[19] For example, higher quality disclosure can reduce the cost of debt (Sengupta (1998) and Schrand and Verrecchia (2004)), cost of equity when firms have low analyst following (Botosan (1997)), and cost of IPO (Ang and Brau (2002)); lead to higher firm valuation (Healy, Hutton, and Palepu (1999)), better firm performance (Lang and Lundholm (1993)), higher profitability (Singhvi and Desai (1971)), increased stock responsiveness to earnings (Price (1998) and Gelb and Zarowin (2002), improved capital allocation (Diamond and Verrechia (1991)), increased institutional ownership and analyst following (Healy, Hutton, and Palepu (1999)), reduced analyst forecast dispersion (Mensah et al. (2003)), and easier detection of earnings management (Hirst and Hopkins (1998)). Almazan, Surez, and Titman (2004) argue that since the market in general reacts more to negative news than to good news, increasing transparency may reduce firm value. Healy, Hutton, and Palepu (1999), Verrecchia (1983), Darrough and Stoughton (1990), Admati and Pfleiderer (2000), and Wagenhofer (1990) all suggest that disclosure can reveal proprietary information to potential competitors and reduce the firm's competitive advantage. Botosan and Plumlee (2002) find that increase in timeliness disclosure can increase cost of equity capital. Bushee and Noe (2000) find that timely disclosure tends to attract transient investors and increase stock return volatility.

[20] Graham and Harvey (2001) find that about two-thirds of managers admit that equity price is a very important factor when issuing equity. Baker and Wurgler (2000) find that firms are more likely to issue (repurchase) stock when their market values are relatively higher (lower) than past market value and when market-to-book is high (low). Myers and Majluf (1984) show that since managers with insider information have the incentive to issue overvalued stock, investors react negatively to SEO announcement. However, such negative market reaction is often incomplete. Ritter (1991), Loughran and Ritter (1995), and Spiess and Affleck-Graves (1995) find that IPO and SEO firms under-perform non-issuing firms in the long run.

[21] In Dutch auctions, all shares are purchased at the same price, while the repurchase price is set as the lowest price necessary to buy back the number of desired shares. For example, a corporation wants to buy back 2,000 shares of stock. Investor A is willing sell 1,000 shares at $30 per share, investor B is willing to sell 1,000 shares at $32 per share, and investor C is willing to sell 1,000 shares at $35 per share. In Dutch auctions, the repurchase price will be equal to $32 per share for all 2,000 shares repurchased. While some may argue that companies chose to remain LT for market-timing purposes should prefer to buy back shares through open market repurchase in the above example, rather than through Dutch auction, since the first 1,000 shares can be repurchased at $30 per share. However, this is

signals will trigger stronger market reactions and reduce the market-timing profits on the "per share" basis, Dutch auction may allow corporations to earn higher market-timing profits through larger repurchase sizes. Note that companies which are trying to time the market by repurchasing large number of shares will prefer Dutch auction over the more popular open market repurchase to prevent their repurchase price from surging irrationally high from such sudden increase in demand of their shares.

In this study, our findings are consistent with our hypotheses. We find that even though more positive market reactions at announcements will eliminate some of the market-timing profits in the short run, LT firms are still more successful at timing stock repurchase through Dutch auction than HT firms. Therefore, we find that lower transparency provides firms with information advantages over outside investors that even strong undervaluation signals, such as Dutch auction announcements, cannot eliminate completely.

To determine if LT firms are more successful at market timing through Dutch auction, we first examine the market reactions around the announcement date to see whether the market reacts differently to announcements of LT firms because of information asymmetry problems. In addition, since complete price correction may not occur immediately around announcements, we also examine the long-term performance of the sample firms to determine if LT firms can more successfully repurchase stocks at lower prices. If such information advantage allows LT firms to buy back their stock at lower prices, LT firms should outperform HT firms and non-repurchase firms in the long run.

Consistent with the hypotheses, we find that while LT firms do experience more immediate positive market reactions at announcements, since LT firms have to face information asymmetry discount. However, such price corrections are incomplete in the short run, and therefore are insufficient to eliminate market-timing profits completely. With slower and incomplete price adjustments in the short run, LT Dutch auction firms outperform their HT counterparts and non-repurchase firms in the long run.

In the following sections, we will present the specific hypotheses examined in this study, the methodologies used to test the stated hypotheses, the empirical results, and the conclusions of this study.

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only true with smaller repurchases. With large repurchase, the sudden demand increase in the secondary market can drive the stock price up to higher than $32 per share, causing the repurchase firms to buy back shares at inflated prices. Therefore, companies that try to time the market through large repurchases should prefer Dutch auction over open market repurchase. This explains why the size of open market repurchase is typically much smaller than that of Dutch auction.

## 2. Hypotheses

***H1:*** **The theory of information asymmetry problems predicts more positive market reaction to low transparency firms' Dutch repurchase announcements. However, since information asymmetry problems can also slow down price discovery, such more positive market reaction may not completely eliminate market-timing profits.**[22]

Information asymmetry and signaling theory can help to predict the market reactions of LT firms. Market reaction is a function of the information asymmetry problems and therefore a function of the magnitude of mispricing. LT firms have more information asymmetry problems and are more likely to be traded at larger discounts because of the adverse selection effect caused by higher information risk. Therefore, if the undervaluation signal can reduce the information asymmetry problems between the market and LT firms, such reduction in information asymmetry problems may reduce the price discount. More importantly, such reduction in information asymmetry problems will cause the market to react more positively to the announcement of LT firms. On the other hand, HT firms have fewer information asymmetry problems and hence smaller magnitude of mispricing. Therefore, repurchase announcement will mainly function as an undervaluation signal, yet will not reduce much of the information asymmetry or mispricing. As a result, HT firms will receive less positive market reactions than LT firms, while everything else being equal.

Signaling theory can also help to predict market reactions. Vermaelen (1981) finds that firms often use repurchase to signal undervaluation. Based on signaling theory, repurchase announcements can signal that the firm expects higher returns in the future. Therefore, repurchase announcements often trigger positive market reactions. Note that for the undervaluation signal to be credible, the signal must be observable and costly to imitate (Spence (1973) and Stephens and Weisbach (1998)). Since firms that announce Dutch auctions are subject to strict SEC regulation, the market should perceive the Dutch auction announcement of LT firms to be equally credible as those of HT firms.

However, if the market perceives the signal of LT firms to be less credible than those of HT firms because of the information asymmetry problems, the market should react less immediately and less positively to LT firms' repurchase announcements, while waiting for other confirming information.Note that it is such less immediate reaction received by LT firms that

[22] Note that since market reactions are very likely to be incomplete in the short term, long-term studies are provided to determine if LT firms can actually time repurchases more efficiently than HT firms can.

allows LT firms to time the repurchase more efficiently and to outperform HT firms in the long run.

To thoroughly understand how the market perceives the credibility of LT firms, we examine the market reactions, as well as the long-term performance of the Dutch action repurchase firms because of the potentially delayed or incomplete market reactions.

***H2:*** **If the level of corporate transparency is a key to the firm's market-timing ability, then low transparency firms should outperform high transparency firms and non-repurchase firms in the long run, while high transparency firms may not perform significantly different from the non-repurchase firms.**

Studies have found the market tends to under-react to announcements and cause post-event drift. Ikenberry, Lakonishok, and Vermaelen (1995) find long-term positive performance post repurchase announcement, especially when the firm has low market-to-book ratios.[23] Their findings indicate the price correction at repurchase announcement is often incomplete. Therefore, if LT firms are more likely to be traded at discounts and have lower market-to-book ratios than HT firms as a result of price discount, then LT firms should be more likely to outperform HT firms in the long run. More importantly, LT firms should outperform HT firms in the long run if the low transparency allows managers to time the market more efficiently and more successfully when the market under-reacts to the repurchase announcements of LT firms due to their information asymmetry problems. In addition, since HT firms are less likely to be mispriced, while their signals are more likely to be perceived as credible signals, the market should be able to incorporate the repurchase announcement more immediately and more accurately at announcement. Such immediate and positive market reactions indicate that HT firms should earn less or no market-timing profits.

## 3. Data and Methodology

In this study, repurchase data between 1980 and 2007 are obtained from Security Data Corporation's Merger and Acquisition database. Data on stock price, returns, and shares

[23] Ikenberry, Lakonishok, and Vermaelen (1995) examine the long-term performance post open market repurchase by using data between 1980 and 1990 and find an average of 12.1 percent BHAR in the four-year period. Mitchell and Stafford (2000) examine the size and book-to-market matched firms BHARs and find OMRs with three-year equal- (value-) weighted buy-and-hold return of 15.6 (7.9) percent. On the other hand, tender offers experience 8.7 (-0.7) percent average BHAR based on equal (value) weighting.

outstanding are obtained from CRSP, while financial data are obtained from COMPUSTAT. Corporate transparency is proxied by IBES analyst forecast dispersion.

The analyst forecast dispersion has been used to measure transparency or information asymmetry in several empirical studies.[24] To measure analyst forecast dispersion, the standard deviation of forecast is scaled by the stock price to facilitate comparisons across firms. Industrial median is subtracted from the scaled dispersion measure to adjust for the cross-industry variation in scores due to differences in subcommittee composition and in industry characteristics. Since the forecast dispersion is used to measure transparency rather than announcement effect, we follow Lang and Lundholm (1996) by averaging the dispersion across the twelve monthly reporting periods on the IBES tape during the company's fiscal year. This average analyst forecast dispersion prior to announcement is then used to proxy for corporate transparency of the firm. Note that all financial institutions, public utilities companies, and transportation companies are eliminated from the sample.[25]All privately negotiated deals and privatization repurchases are eliminated. Furthermore, we exclude events that occur in the fourth quarter of 1987 because the market crash may cause time-clustering problems.[26]

We first examine the different firm characteristics between the LT portfolio and HT portfolio. Mean and median of firm size, market-to-book ratio, Tobin's Q,[27] operating income, quick assets, leverage ratio, prior-year return,[28] and size of repurchase announcement (measured in percentage to market value of equity prior to the announcement) are provided.

The choice of the above characteristics is determined based on the hypotheses in this paper and on previous empirical studies. Dittmar et al. (2002) finds that repurchase firms are in general larger, have lower market-to-book ratio (based on median MTB), higher post-announcement returns (median), higher cash flow (median), and lower leverage (median). Fama and French (2000) find that small firms are more likely to buyback a larger proportion of the outstanding stocks when doing so. Lang and Lundholm (1993) find that LT firms are more likely to be smaller than HT firms, while Vermaelen (1981) argues that small firms are less likely to be covered by analysts; therefore, they have more information asymmetry problems and are more likely to be mispriced as a result. Jensen (1986) states that firms use stock

[24]Lang and Lundholm (1996), Healy, Hutton, and Palepu (1999), and Finnerty and Yan (2006).
[25]Grullon and Michaely (2004) also do not use such sample elimination procedure, while Wang and Johnson (2005) find that whether including this particular sample firms will not change the results.
[26]Bartov (1991), Stephens and Weisbach (1998), and Ikenberry et al. (1995) also exclude this sample period, McNally (1999) does not drop the sample firms that announce repurchase in the fourth quarter of 1987 market crash, while Netter and Mitchell (1989) examine only the sample of repurchase activities after the 1987 market crash.
[27] Tobin's Q is calculated as sum of market value of equity and book value of debt divided by total assets.
[28]Dittmar et al. (2002) examines one year prior returns based on both equal-and value-weighted market index. We also use size, book-to-market, and industry matched firm return to examine the prior-year return.

repurchase to distribute excess cash. Jagannathan et al. (2000) find firms with more volatile cash flows or higher prior and post operating and non-operating income are more like to announce repurchase than dividend increase. Bagwel (1991) and Opler and Titman (1996) show that firms use repurchase to increase their leverage ratios and bring them closer to the optimal capital structure.[29] Since different industries tend to have different optimal capital structure, we use industrial median to proxy for the optimal capital structure for the firm.

### 3.1. Tests of Market Reaction to Repurchase Announcement

To examine the market reaction, we use three different benchmarks to calculate cumulative abnormal returns, CARs. Other than using CRSP returns as a benchmark, matched firms are also chosen based on size and book-to-market ratio;[30] and on size, book-to-market ratio, and industry.[31] The three-day event window [-1, 1] is commonly used[32] to examine market reaction of announcement in case sometimes news may not be reported in the journal or newspaper until the next day.

When using the market model, the abnormal return is the difference between the actual return and the fitted return predicted by the market model. The parameters of the market model are calculated over a 100-day period beginning 165 days prior to the announcement and ending 65 days prior to the announcement. The CRSP equal-weighted and value-weighted index returns are used to proxy for the market returns.[33]

To find the matched firm for each repurchase firm, we first purge all firms that have announced any repurchase in the past three years from the matched firm sample. Loughran and Ritter (1995) argue using benchmarks that include issuing firms can reduce the power of the model. Therefore, purging firms that have announced repurchase in the past five years from the sample can avoid the cross-sectional dependence and weakening of statistical power problems (Loughran and Ritter (1995), and Speiss and Affleck-Graves (1995)). This purged sample is used to identify matched firms for all following tests.

Next, size and book-to-market reference portfolios are constructed based on Fama and French (1993) and Lyon, Barber, Tsai (1999) methodology. Size and book-to-market NYSE

[29] Note that firms with lower leverage can increase their leverage either when the repurchase is financed through debt or through internal cash flow, which will reduce the retained earnings and market value of equity of the firm. Therefore, the leverage ratio theory predicts that high leverage would discourage repurchase.
[30] Fama and French (1992, 1993) and Lakonishok et al. (1994).
[31] This method is used by Ikenberry et al. (1995).
[32] Such as Stephens and Weisbach (1998) and Gelb (2000).

[33] Sholes-Williams betas are used in some studies to adjust for the bias based by non-synchronous trading. However, the adjustment often provides the same results as without the adjustment.

breakpoints in each of the sample years are calculated to assign the repurchase firms and purged sample firms to the appropriate size and book-to-market portfolio. Note the 2 by 3 division is preferred over the 5 by 5 division in this study because Dutch auction and fixed-price tender offers both have small sample sizes. Size is the market value of firm equity, which is calculated as price times shares outstanding prior to the repurchase announcement. Book value of equity is calculated as the book value of common equity plus deferred taxes and investment tax credits for fiscal year t-1. Book-to-market equity is book value divided by the June 30th market value of equity. Each year, a NYSE size breakpoint is calculated based on the 50th percentile of size of all firms listed on the NYSE in the given year, while the book-to-market breakpoints are calculated based on the 30th and 70th percentiles of book-to-market of all firms listed on the NYSE in the given year. All NYSE, AMEX, and NASDAQ stocks are assigned to one of the six portfolios based on NYSE breakpoints. The absolute values of the size differences with the benchmark portfolio firms are then ranked, assigning a "1" to the firm with the smallest absolute value of size difference. The same procedure is used to rank the matched portfolio's firms based on the absolute value of the differences in the book-to-market equity ratio. Ranks from the size match and the book-to-market equity match are added together, and the firm with the smallest ranked sum is assigned as the final matched firm.[34]

To determine if the market reacts to repurchase announcement differently when the firms have different levels of transparency, we perform several tests. The T-test is used to determine if the CARs from the high and LT firms are significantly different from one another. The Wilcoxon ranked-sum test is used to determine if LT firms have more positive CARs than HT firms.

### 3.2. Long-term Performance

Long-term abnormal return estimation can be very sensitive to the model choice and methodology used since small errors in the short-horizon studies can be compounded in the long term and cause significant mis-specified results. To ensure our findings are robust, Fama and French (1993) three-factor model and Ibbotson's return across time and securities RATS procedure factor model by Ibbotson (1975) are used.

While some researchers advocate CARs and BHARs in the long-term study, however, CAR cannot accurately measure the wealth change of the investor, while BHARs tend to compound the small estimation errors in the short term into a large inflated error in long-term studies.

[34] In our long-term study, if the matched firm delists during the return period then the next closest matched firm is used for the remainder of the period.

Furthermore, BHAR also ignores the cross-sectional dependence of event-time abnormal returns overlapping in calendar time can inflate test statistics (Fama (1998)). Other modified BHARs have also been criticized in long-term studies. Ikenberry, et al. (1995) Brown and Warner (1980)), Mitchell and Stafford (2000) argue that the bootstrapping procedure assumes event-firm abnormal returns are independent, while corporate announcements and actions are not always random events. Cluster in the industry or the economy, such as like merger waves, can occur. Therefore, Fama (1998) recommends calendar-time portfolio approach to examine the long-term performance because a) monthly returns suffer fewer bad model problems than daily returns, b) monthly calendar-time portfolios can account all cross-correlations of event-firm abnormal returns in the portfolio variance, and c) calendar-time approach can better approximate the normal distribution and provide more reliable statistical inference.

The intercept from the following regression represents the abnormal performance that cannot be predicted by the three-factor model. Since Ang and Zhang (2004) find the WLS provides more reliable results than the OLS, while the calendar-time approach four-factor model tends to over-reject the null hypothesis, we use the WLS calendar-time approach three-factor model in the analysis.

The Fama and French (1993) three-factor model is given as:

$$r_{it} = \alpha_0 + \alpha_1 MKT_t + \alpha_2 SMB_t + \alpha_3 HML_t + e_{it} \quad (1)$$

Where *i* represents the low or high transparency portfolio, while $r_{it}$ represents the monthly return of the low transparency and high transparency portfolios, respectively, in excess of T-bill rate at month t, starting at $t = 1$, the month following the repurchase announcement. MKT represents the excess monthly return on the value-weighted market proxy at time t. SMB and HML represent monthly returns on value-weighted zero-investment portfolios, which are calculated as the small portfolio return minus the large portfolio return and the high book-to-market return minus low book-to-market return, respectively.[35] The intercept reflects the average monthly abnormal return. More importantly, we separate LT firms and HT firms into different portfolios to examine their abnormal portfolio performance individually before testing the abnormal return of holding a zero-investment portfolio by buying LT and selling HT firms.

The zero-investment portfolio regression is presented below:

$$r_{Lt} - r_{Ht} = \alpha_0 + \alpha_1 MKT_t + \alpha_2 SMB_t + \alpha_3 HML_t + e_{it} \quad (2)$$

Note that in this regression, the only difference is the dependent variable. The dependent variable is now monthly return of low transparency portfolio minus that of high transparency

[35] The factor loadings and risk-free rates will be obtained from Kenneth French's web site at: ttp://mba.tuck.dartmouth.edu/pages/faculty/ken. french/data_library.html.

portfolio. Zero-investment abnormal return is calculated for each of the six size and book-to-market portfolios.

Since Loughran and Ritter (1995) argue that the calendar-time approach has low power to detect abnormal performance for it weights each month equally when the number of events can vary greatly across different months, we also use Ibbotson's return across time and securities RATS procedure factor model (1975) to examine the long-term performance. This RATS procedure (1975) utilizes an event-time approach, rather than calendar-time approach when using the three-factor model. Since the risk of the equity is likely to change after repurchase, caused by changes in leverage, the RATS procedure can adjust such changes more appropriately. By using this approach, the intercept measures the abnormal return for each event month from month 1 to month 60. The average month abnormal return is summed up to calculate the long-term CAR.

## 4. Results

In this study, the Dutch auction sample consists of 117 firm year observations and 112 completed repurchases. In Table 1, we examine the firm characteristics of Dutch auction firms. Consistent with the information asymmetry discount, LT firms have higher book-to-market ratio than HT firms. Note that the book-to-market of HT firms is negative because it is adjusted and divided by the industry median to allow direct cross-industry comparisons. Consistent with Lang and Lundholm (1993), we also find LT firms to be smaller than HT firms. In addition, LT firms have lower growth rate, measured by Q, and higher leverage. The lower growth rate indicates less need for external capital and therefore disclosure. LT firms are less likely to issue stock when external funds are needed since stock issuance will require LT firms to disclose information to a large number of external shareholders and potentially reduce the information advantage of LT firms. Therefore, LT firms are more likely to have higher leverage than HT firms. Next, we find LT firms to have more excess cash, measured by quick assets. The higher excess cash is consistent with the lower growth of LT firms, since lower growth firms are less likely to find positive NPV projects are more likely to have excess cash. While LT firms do announce larger Dutch auction than HT firms in the sample, the p values are only around 0.10 in this table. However, not provided in the table, we find Dutch auction to be twice the size of open market repurchase in both the LT and HT samples.

**Table 1: Characteristics of Repurchase Firms Based on Corporate Transparency**

Target firms are classified into low transparency and high transparency target portfolios based on the industry-adjusted analyst forecast dispersion. Size of the firm is market value of common stock at the end of fiscal year before the first bid. BTM, book-to-market, is calculated as book value of equity divided by market value of equity in fiscal year *t*-1. Q is calculated as market value of assets divided by book value of assets. Operating income is calculated as operating income scaled by total assets. Quick Assets are (cash + receivables + marketable securities) / market value of common stock. Leverage = long-term debt / market value of common stock. Industry-adjusted variables are calculated based on industry median. All variables are winsorized at 1% and 99%. When the firm announces more than one open market repurchase in a calendar year, only the first observation is included. Announced Repurchase Size is measured based on the % sought variable obtained from SDC. Mean, (median), and [p-value] are reported below.

**Dutch Auction**

| | LT | HT | LT - HT | p-value of t test (Wilcoxon Test) |
|---|---|---|---|---|
| **Size in Millions** | 1380.27<br>(340.21)<br>[<.0001]*** | 3133.04<br>(1095.30)<br>[<.0001]*** | -1752.77<br>(-755.09) | 0.0189**<br>(<.0001)*** |
| **Industry-Adjusted BTM** | 0.13<br>(0.10)<br>[0.0016]*** | -0.04<br>(-0.05)<br>[0.1315] | 0.17<br>(0.15) | 0.0002***<br>(0.0003)*** |
| **Industry-Adjusted Q** | -0.02<br>(-0.01)<br>[0.7884] | 0.22<br>(0.08)<br>[0.0019]*** | -0.24<br>(-0.09) | 0.0126**<br>(0.0269)** |
| **Industry-Adjusted Operating Income** | 0.05<br>(0.06)<br>[<.0001]*** | 0.07<br>(0.06)<br>[<.0001]*** | -0.02<br>(0.00) | 0.1550<br>(0.6412) |
| **Industry-Adjusted Quick Assets** | 0.20<br>(0.01)<br>[0.2209] | -0.11<br>(-0.07)<br>[0.1503] | 0.31<br>(0.08) | 0.0841*<br>(0.0536)* |
| **Industry-Adjusted Leverage** | 0.35<br>(0.08)<br>[0.0028]*** | 0.06<br>(0.00)<br>[0.1218] | 0.29<br>(0.08) | 0.0158**<br>(0.0084)*** |
| **Announced Repurchase Size** | 16.58%<br>(15.00%)<br>[<.0001]*** | 14.72%<br>(13.00%)<br>[<.0001]*** | 1.86%<br>(2.00%) | 0.1132<br>(0.1069) |
| **Repeat** | 8.70%<br>(0.00%)<br>[0.0041]*** | 9.29%<br>(0.00%)<br>[0.0002]*** | -0.59%<br>(0.00%) | 0.8782<br>(0.8801) |

Next, we examine market reactions to repurchase announcements shown in Table 2. Three benchmarks are used to calculate CARs, in three separate panels, to ensure that the findings are robust. Whether the market reaction is measured based on CRSP returns; size and book-to-market matched firm returns; or size, book-to-market, and industry matched firm returns; results are similar in most cases, while results are the more statically significant with value-weighted returns. LT Dutch auction firms receive more immediate positive market

reactions than their HT counterparts around announcements. This more positive market reaction is consistent with the theory that stock of LT firms are more likely to be mispriced and discounted because of information asymmetry problems. In addition, they are more likely to be mispriced by a larger magnitude because accurate valuation of LT firms is difficult. Investors who are aware of the larger magnitude of underpricing caused by information asymmetry are more likely to react more positively.

**Table 2: Market Reaction of Repurchase Firms**

Three benchmarks are used for the CAR calculation. The first benchmark is CRSP value- and equal-weighted returns. In this case, the CAR is calculated based on Brown and Warner (1985) methodology. The second benchmark is the size and book-to-market matched returns, while the last benchmark is the size, book-to-market, and industry matched returns. Industry matching is done based on the 2-digit SIC codes. Only purged sample firms are used for the firm characteristic matching to avoid statistical problems.

**Panel A: Market Reaction for Dutch Auction Firms base on CRSP Returns**

| | **Value-Weighted CAR (-1,1)** | **Equally-Weighted CAR (-1, 1)** |
|---|---|---|
| **Overall Sample** | 5.37%<br>(4.11%)<br>[<.0001]*** | 8.10%<br>(6.54%)<br>[<.0001]*** |
| **LT targets** | 8.51%<br>(5.52%)<br>[<.0001]*** | 9.93%<br>(8.32%)<br>[<.0001]*** |
| **HT Targets** | 4.62%<br>(3.39%)<br>[<.0001]*** | 7.05%<br>(5.29%)<br>[<.0001]*** |
| **LT minus HT**<br>**(P-Value of T Test)**<br>**[P-Value of Wilcoxon Test]** | 3.89%<br>(0.0094)***<br>[0.0525]* | 2.88%<br>(0.0818)*<br>[0.0663]* |

**Panel B: Reaction for Dutch Auction Firms based on Size and Book-to-Market Matched Returns**

| | **Value-Weighted CAR (-1,1)** | **Equally-Weighted CAR (-1, 1)** |
|---|---|---|
| **Overall Sample** | 5.73%<br>(4.20%)<br>[<.0001]*** | 8.71%<br>(7.14%)<br>[<.0001]*** |
| **LT targets** | 8.06%<br>(5.24%)<br>[<.0001]*** | 10.72%<br>(8.98%)<br>[<.0001]*** |
| **HT Targets** | 5.16%<br>(3.30%)<br>[<.0001]*** | 7.54%<br>(6.33%)<br>[<.0001]*** |
| **LT minus HT**<br>**(P-Value of T Test)**<br>**[P-Value of Wilcoxon Test]** | 2.90%<br>(0.0789)*<br>[0.2611] | 3.18%<br>(0.1524)<br>[0.2611] |

**Panel C: Market Reaction for Dutch Auction Firms based on Size, Book-to-Market, and Industry Matched Firms**

| | Value-Weighted CAR (-1,1) | Equally-Weighted CAR (-1, 1) |
|---|---|---|
| **Overall Sample** | 4.92%<br>(3.64%)<br>[<.0001]*** | 6.61%<br>(6.54%)<br>[<.0001]*** |
| **LT targets** | 8.07%<br>(6.32%)<br>[<.0001]*** | 6.88%<br>(9.99%)<br>[0.0071]*** |
| **HT Targets** | 4.15%<br>(2.67%)<br>[<.0001]*** | 6.44%<br>(5.26%)<br>[<.0001]*** |
| **LT minus HT**<br>**(P-Value of T Test)**<br>**[P-Value of Wilcoxon Test]** | 3.92%<br>(0.0228)**<br>[0.1163] | 0.44%<br>(0.8670)<br>[0.1163] |

Next, since prior empirical results have found that the market reactions at announcements are often incomplete, we examine the long-term post announcement performance to determine if LT firms are in fact able to earn higher market profits. Results are shown in Table 3. Consistent with the hypothesis, the intercept of the calendar-time approach 3-factor model shows LT (HT) Dutch auction firms (do not) outperform non-repurchase firms in the three- and five-year periods. However, the overall zero investment portfolio returns, while positive and consistent with the hypothesis, are never statistically significant, potentially because relatively small sample size in this study.

## Table 3: Calendar-Time Approach Factor Analyses

In Panels A and B, C and D, E and F, long-term performance of open market, Dutch auction, and fixed-price tender offer firms are provided. LT and HT targets are classified based on industry median-adjusted analyst forecast dispersion. $r_{it} = \alpha_0 + \alpha_1 MKT_t + \alpha_2 SMB_t + \alpha_3 HML_t + e_{it}$ where *i* represents the LT or HT portfolio, while $r_{it}$ represents the monthly return on the LT and HT portfolios, respectively, in excess of T-bill rate at month t, starting at $t = 1$, the month following the merger completion date. MKT represents the excess monthly return on the value-weighted market proxy at time *t*. SMB and HML represent monthly returns on value-weighted zero-investment portfolios, which are calculated as the small portfolio return minus the large portfolio return and the high book-to-market return minus low book-to-market return, respectively. The intercept reflects the average monthly abnormal return. In addition, a zero-investment portfolio is used to determine if a long position in LT target portfolio and a short position in HT target portfolio will provide positive long-term abnormal returns. Again, the intercept will represent the monthly abnormal return obtained from the zero-investment portfolio.

**Panel C: Dutch Auction**
**One-Year Abnormal Performance based on Calendar-Time Approach 3-Factor Model**

| | Intercept | Market | SMB | HML |
|---|---|---|---|---|
| **LT Firms** | 0.62 | 1.19 | 0.57 | 0.86 |

| | | | | |
|---|---|---|---|---|
| | (0.3642) | (<.0001)*** | (0.0039)*** | (0.0019)*** |
| **HT Firms** | -0.02<br>(0.9696) | 0.82<br>(<.0001)*** | 0.35<br>(0.0011)*** | 0.60<br>(<.0001)*** |
| **LT – HT** | 0.14<br>(0.8678) | 0.54<br>(0.0117)** | 0.31<br>(0.1757) | 0.33<br>(0.3138) |

**Three-Year Abnormal Performance based on Calendar-Time Approach 3-Factor Model**

| | **Intercept** | **Market** | **SMB** | **HML** |
|---|---|---|---|---|
| **LT Firms** | 1.14<br>(0.0106)** | 1.04<br>(<.0001)*** | 0.72<br>(<.0001)*** | 0.81<br>(<.0001)*** |
| **HT Firms** | 0.22<br>(0.3455) | 0.85<br>(<.0001)*** | 0.40<br>(<.0001)*** | 0.50<br>(<.0001)*** |
| **LT – HT** | 0.67<br>(0.1823) | 0.07<br>(0.5937) | 0.24<br>(0.0867) | 0.26<br>(0.1475) |

**Five-Year Abnormal Performance based on Calendar-Time Approach 3-Factor Model**

| | **Intercept** | **Market** | **SMB** | **HML** |
|---|---|---|---|---|
| **LT Firms** | 0.94<br>(0.0312)** | 1.01<br>(<.0001)*** | 0.65<br>(<.0001)*** | 0.55<br>(0.0005)*** |
| **HT Firms** | 0.27<br>(0.1528) | 0.81<br>(<.0001)*** | 0.33<br>(<.0001)*** | 0.52<br>(<.0001)*** |
| **LT – HT** | 0.96<br>(0.1059) | 0.16<br>(0.3036) | 0.32<br>(0.0465)** | 0.05<br>(0.8035) |

As a robustness check, we next use RATs procedure by Ibbotson (1975) to examine the long-term performance of the Dutch auction firms in Table 4. Results provided using RATs procedure are similar to yet stronger than those provided by the calendar-time approach 3-factor model in Table 3. The results are shown in Table 4. While both LT and HT firms earn positive CARs post the one-year period, the difference in CARs is statistically significant in the 24- and 48-month periods. Consistent with the market-timing hypothesis of this paper, we find that LT firms do earn statistically higher CARs than their HT counterparts in the 24- and 48-month periods post announcements.

### Table 4: RATS Procedure Factor Analyses

The abnormal return is calculated based on the Fama-French three-factor model. Firms are classified into LT and HT portfolios. However, the returns, $r_{it}$, used in the regression are event-time excess returns of individual firms within the portfolio starting from the month after announcement.

$r_{it} = \alpha_0 + \alpha_1 MKT_t + \alpha_2 SMB_t + \alpha_3 HML_t + e_{it}$ , MKT represents the excess monthly return on the value-weighted market proxy at time *t*. SMB and HML represent monthly returns on value-weighted zero-investment portfolios, which are calculated as the small portfolio return minus the large portfolio return and the high book-to-market return minus low book-to-market return, respectively. The intercept reflects the average abnormal return in the specified event month of the portfolio. The abnormal returns are then cumulated to calculate CARs. Panels A and B present results of completed repurchase firms, while Panel C presents results of cancelled and incomplete repurchase firms.

**Panel C: Dutch Auction**
**Abnormal Returns based on RATS Procedure Factor Analysis**

| Month | AR of LT Firms | CAR of LT Firms | AR of HT Firms | CAR of HT Firms | Difference in CAR [LT-HT] |
|---|---|---|---|---|---|
| **1** | -3.79<br>(0.0025)*** | -3.79<br>(0.0008)*** | 1.90<br>(0.0489)** | 1.90<br>(0.0177)** | -5.69<br>(0.8957) |
| **2** | 1.33<br>(0.4112) | -2.46<br>(0.1475) | 0.25<br>(0.8171) | 2.15<br>(0.0704)* | -4.61<br>(0.5482) |
| **3** | 2.33<br>(0.1897) | -0.13<br>(0.9577) | -0.20<br>(0.8407) | 1.95<br>(0.1965) | -2.08<br>(0.1021) |
| **4** | -0.01<br>(0.9950) | -0.14<br>(0.9593) | 0.86<br>(0.4070) | 2.81<br>(0.1460) | -2.95<br>(0.4388) |
| **5** | -3.33<br>(0.0145)** | -3.47<br>(0.3041) | 0.79<br>(0.4774) | 3.60<br>(0.1235) | -7.07<br>(0.4870) |
| **6** | 0.79<br>(0.5519) | -2.68<br>(0.4206) | 0.23<br>(0.8408) | 3.83<br>(0.0926)* | -6.51<br>(0.4181) |
| **12** | 1.85<br>(0.4065) | 2.03<br>(0.7454) | 2.25<br>(0.0560)* | 6.34<br>(0.0725)* | -4.31<br>(0.1266) |
| **24** | 5.34<br>(0.2178) | 20.70<br>(0.0131)** | -0.86<br>(0.3444) | 11.21<br>(0.0117)** | 9.49<br>(0.0155)** |
| **36** | -0.69<br>(0.7130) | 26.63<br>(0.0062)*** | -2.66<br>(0.0203)** | 14.48<br>(0.0127)** | 12.15<br>(0.1257) |
| **48** | -2.18<br>(0.3061) | 24.56<br>(0.0311)** | 1.29<br>(0.6185) | 20.19<br>(0.0023)*** | 4.37<br>(0.0499)** |
| **60** | -2.00<br>(0.2631) | 26.75<br>(0.0170)** | -0.48<br>(0.7146) | 18.07<br>(0.0079)*** | 8.68<br>(0.1258) |

## 5. Conclusion

The results in this study are consistent with our market-timing hypotheses. We find LT firms to experience more immediate positive market reactions around announcements, while the more positive market reactions are the results of prior information asymmetry discount. More importantly, the long-term results indicate that such more positive market reactions observed among LT firms are incomplete, because of information asymmetry problems. The abnormal long-term performance indicates that the slower and incomplete price adjustment in the short run allows LT firms to time Dutch auction repurchase more successfully and profitably than their HT counterparts.

## References

Admati, Anat R., and Paul Pfleiderer, 2000, Forcing firms to talk: financial disclosure regulation and externalities, Review of Financial Studies 13, 479-519.

Almazan, Andres, Javier Suárez, and Sheridan Titman, 2004, Stakeholders, Transparency and Capital Structure, NBER Working Paper 10101, 42.

Ang, James S., and James C. Brau, 2002,Firm Transparency and the Costs of Going Public, Journal of Financial Research 1, 1-17.

Ang, James S., and S. Zhang, 2004, An evaluation of testing procedures for long horizon event studies, Review of Quantitative Finance and Accounting 23, 251-274.

Bagwell, Laurie Simon, 1991, Share Repurchase and Takeover Deterrence, RAND Journal of Economics22, 72-88.

Baker, Malcolm, and Jeffrey.Wurgler, 2000, The equity share in new issues and aggregate stock returns, Journal of Finance 55, 2219-2257.

Bartov, Eli, 1991, Open-market stock repurchases as signals for earnings and risk changes, Journal of Accounting and Economics 14, 275-294.

Beatty, Randolph P., and Jay R. Ritter, 1986, Investment Banking, Reputation and Underpricing of Initial Public Offerings, Journal of Financial Economics15, 213-232.

Botosan, C. A. 1997.Disclosure level and the cost of equity capital.The Accounting Review July, 323-249.

Botosan, Christine A., and Marlene A. Plumlee, 2002, A re-examination of disclosure level and the expected cost of equity capital, Journal of Accounting Research 40, 21-40.

Brown, Stephen J., and Jerold B. Warner, 1980, Measuring security price performance, Journal of Financial Economics 8, 205-258.

Bushee, Brian, and Christopher F. Noe, 2000, Disclosure quality, institutional investors, and stock return volatility, Journal of Accounting Research 38, 171-202.

Darrough, Masako, and Neal M. Stoughton, 1990, Financial disclosure policy in an entry game, Journal of Accounting and Economic 12, 219–43.

Diamond, Douglas W., and Robert E. Verrecchia, 1991, Disclosure, Liquidity, and the Cost of Capital, Journal of Finance 46, 1325-1359.

Dittmar, Amy K., and Robert F. Dittmar, 2002, Stock Repurchase Waves: An Explanation of the Trends in Aggregate Corporate Payout Policy, Working Paper.

Fama, Eugene, 1998, Market efficiency, long-term returns, and behavioral finance, Journal of Financial Economics 25, 283-306.

Fama, Eugene, and Kenneth R. French, 1992, The Cross-Section of Expected Stock Returns, Journal of Finance47, 427-65.

Fama, Eugene, and Kenneth R. French,1993, Common risk factors in the returns on stocks and bonds, Journal of Financial Economics 33, 3-55.

Fama, Eugene, and Kenneth R. French, 2000, Disappearing Dividends: Changing Firm Characteristics or Lower Propensity to Pay?Journal of Financial Economics 60, 3-43.

Finnerty, John D., and An Yan, 2006, Convertible securities in merger transactions and the resolution of the double-sided asymmetric information problem, Working Paper.

Gelb, David, 2000, Managerial Ownership and Accounting Disclosures: An Empirical Study, Review of Quantitative Finance and Accounting 15,169-185.

Gelb, David, and Paul Zarowin, 2002, Corporate Disclosure Policy and the Informativeness of Stock Prices, Review of Accounting Studies 7, 35-52.

Graham, John R, and Campbell Harvey, 2001, The Theory and Practice of Corporate Finance: Evidence from the Field,Journal of Financial Economics 60, 187-243.

Grullon, Gustavo, and Roniichaely, 2004, The Information Content of Share Repurchase Programs, Journal of Finance 59, 651-680.

Healy, Paul M., Amy P. Hutton, and Krishna G. Palepu, 1999, Stock performance and intermediation changes surrounding sustained increases in disclosure, Contemporary Accounting Research 16, 485-520.

Hirst, D. Eric, and Patrick E. Hopkins, 1998, Comprehensive Income Reporting and Analysts' Valuation Judgments,Journal of Accounting Research 36, 47-75.

Hutton, Amy P., Gregory S. Miller, and Douglas J. Skinner, 2004, Effective voluntary disclosure, Unpublished working paper, Harvard Business School.

Ibbotson, Roger G., 1975, Price Performance of Common Stock New Issues, Journal of Financial Economics, 235-272.

Ikenberry, David, Josef Lakonishok, and Theo Vermaelen, 1995, Market underreaction to open market share repurchases, Journal of Financial Economics 39, 181-208.

Jagannathan, Murali, Clifford P. Stephens, and Michael S. Weisbach, 2000, Financial flexibility and the choice between dividends and stock repurchases, Journal of Financial Economics 57, 355-384.

Jensen, Michael C., 1986, Agency costs of free cash flow, corporate finance, and takeovers, American Economic Review 76, 323-329.

Lakonishok, Josef., Robert W. Vishny, and Andrei Shleifer, 1994, Contrarian Investment, Extrapolation and Risk, Journal of Finance 49, 1541-1578.

Lang, Mark, and Russell Lundholm, 1993, Cross-sectional determinants of analyst ratings of corporate disclosures, Journal of Accounting Research 31, 246-271.

Lang, Mark, and Russell Lundholm, 1996, Corporate disclosure policy and analyst behavior, The Accounting Review 71, 467-492.

Loughran, Tim, and Jay R. Ritter, 1995, The new issues puzzle, Journal of Finance 50, 23-51.

Lyon, John D., Brad M. Barber, and Chih-Ling Tsai, 1999, Improved methods for tests of long-run abnormal stock returns, Journal of Finance 54, 165-202.

McNally, William J., 1999, Open Market Stock Repurchase Signaling, Financial Management 28, 55-67.

Mensah Yaw M., and Robert Werner, 2003, Cost efficiency and financial flexibility in institutions of higher education, Journal of Accounting and Public Policy 22, 293-323.

Mitchell, Mark L., and Erik Stafford, 2000, Managerial decisions and long-term stock price performance, Journal of Business 73, 287-329.

Myers, S., and N. Majluf, 1984, Corporate financing and investment decisions when firms have information that investors do not have. Journal of Financial Economics 13, 187-221.

Netter, Jeffry M., and Mark L. Mitchell, 1989, Stock-repurchase announcements and insider transactions after the October 1987 stock market crash, Financial Management 18, 84-96.

Opler, Tim, and Sheridan Titman, 1996, The Debt-Equity Choice: An Analysis of Issuing Firms, Journal of Finance 36, 1-24.

Price, Renee A., 1998, Price Responsiveness of Informed Investors to Increases in `Financial Statement Disclosure Quality, Working Paper.

Ritter, Jay R, 1991, The Long-run Performance of Initial Public Offerings, Journal of Finance 46, 3-27.

Schrand, Catherine, and Robert E. Verrecchia, 2004, Disclosure Choice and Cost of Capital: Evidence from Underpricing in Initial Public Offerings, Working Paper – University of Pennsylvania

Sengupta, Partha, 1998, Corporate disclosure quality and the cost of debt, AccountingReview 73, 459-474.

Singhvi, Surendra S., and Harsha B. Desai, 1971, An Empirical Analysis of the Quality of Corporate Financial Disclosure, The Accounting Review 46, 129-138.

Spence, A Michael, 1973, Job Market Signaling, The Quarterly Journal of Economics, MIT Press 87, 355-74.

Spiess, Katherine D., and John Affleck-Graves, 1995, Underperformance in long-run stock returns following seasoned equity offerings, Journal of Financial Economics 38, 243-267.

Stephens, Clifford, and Michael S. Weisbach, 1998, Actual share reacquisitions in open market repurchase programs, Journal of Finance 53, 313-334.

Vermaelen, Theo, 1981, Common stock repurchases and market signaling,Journal of Financial Economics 9, 139-183.

Verrecchia, Robert E., 1983, Discretionary disclosure, Journal of Accounting and Economics 5, 179-194.

Wagenhofer, Alfred, 1990, Voluntary disclosure with a strategic opponent, Journal of Accounting and Economics 12, 341–63.

Wang, Jin, and Lewis D. Johnson, 2005, Why Do Firms Announce Open-Market Repurchase Programs? Review of Financial Studies 18, 271-300.