

MARKET-TIMING ABILITY OF LOW TRANSPARENCY THROUGH FIXED-PRICE TENDER OFFER STOCK REPURCHASE

Y. Ling Lo, Western Kentucky University

ABSTRACT

In this paper, I examine whether low transparency (LT) firms with more information asymmetry problems have more market-timing opportunities and are able to earn higher market-timing profits through fixed-price tender offer stock repurchase. I find LT firms are more likely to announce larger repurchase than high transparency (HT) firms. In addition, the long-term performance shows that LT firms do earn higher market-timing profits than HT firms, because of incomplete and less immediate market reactions.

INTRODUCTION

In this paper, I examine the impact of transparency on corporate management's market-timing ability through fixed-price tender offer stock repurchase. More specifically, I examine whether low transparency (LT) can provide managers with more market-timing opportunities and profits through such stock repurchase. The study of fixed-price tender offer stock repurchase is important because the size of repurchase of fixed-price tender offer is in general much bigger than the size of other forms of stock repurchase, such as open market repurchase and Dutch auction.

Corporate advocates of higher corporate transparency have identified several advantages that are linked to high transparency;ⁱ however, others have found that higher transparency has significant downside effects.ⁱⁱ While the literature of corporate disclosure has been well examined in numerous studies, none of the above studies has examined whether low transparency allows managers to time stock repurchases more efficiently, even though managers' market timing intent and success have been well documented in SEO and repurchase literatures.ⁱⁱⁱ

LT firms have more information asymmetry problems (Diamond and Verrecchia (1991)), while such information asymmetry problems can cause the market price to deviate from its intrinsic value. In addition, 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)). More importantly, less informed investors will be willing to sell the stock at a reservation price that is below the fair market value viewed by the manager of LT firms because of the information asymmetry problems. On the other hand, managers of LT firms with complete information will treat the price discount as undervaluation and an opportunity for timing the share repurchases if the magnitude of undervaluation is big enough to generate market timing profit. By contrast, high transparency (HT) firms have little or no information asymmetry problem.

Therefore, the stock of HT firms is more likely to be priced at or close to the intrinsic value. In addition, when the stock of HT firms is undervalued, the magnitude of the undervaluation may not be big enough to generate market timing profit. Consequently, managers of HT firms have fewer market-timing opportunities and smaller market-timing profits than managers of LT firms do.

To determine if LT firms are more successful in market timing through stock repurchase, I examine (1) whether the market reacts less immediately to repurchase announcements of LT firms because the market views the undervaluation signal of LT firms to be less credible as a result of information asymmetry problems and (2) whether LT firms outperform HT firms in the long run after the repurchase activities.

Consistent with the hypotheses, I find LT firms are more likely to announce larger repurchase and are more likely to time the stock repurchase repeatedly, indicating that they are more successful in timing the stock repurchase. Therefore, LT firms have more market-timing opportunities. In addition, I examine the market reactions at announcement and the long-term performance post the repurchase. I find LT firms to experience smaller market reactions, while such market reaction is incomplete. In the long run, LT firms earn more robust and more significant positive profits than HT firms post repurchase. My results are consistent with my hypotheses; LT firms do earn higher market-timing profits through fixed-price tender offer.

In the following sections, I 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.

HYPOTHESES

Both theoretical and empirical studies agree that LT firms have more information asymmetry problems and that increasing disclosure can reduce information asymmetry problems. However, the flip side of information asymmetry is that managers would have more of an information advantage than the outside investors, and such an information advantage provides more chances for opportunistic market timing behavior. Therefore, reducing information asymmetry problems by improving transparency may reduce the opportunity and size of timing gains through repurchase.

Since LT firms have more information asymmetry problems than HT firms, stock of LT firms is more likely to be traded at discount because of the higher information risk. In addition, the information asymmetry problems also predict difficulty in accurate firm valuation. Therefore, mispricing and higher price dispersion are also more likely to occur among LT firms.^{iv} Such larger scale of price dispersion and deeper discount of LT firms can provide managers with more market-timing opportunities. The larger the price discount, the higher the market-timing profit, while everything else being equal. Therefore, the above mentioned market-timing opportunity and large price discount can encourage market-timing behavior and guarantee profits.

On the other hand, HT firms with fewer information asymmetry problems are more likely to find their stocks priced at or close to the fair market values. Therefore, HT firms should have a fewer market-timing opportunities and earn lower market-timing profits.

H1 Low transparency firms should have more market-timing opportunities and earn higher market-timing profits through fixed-price tender offer stock repurchase than high transparency firms should.

Based on signaling theory, repurchase announcements can signal that the firm expects higher returns in the future. In addition, the signal also indicates that the firm has enough financial resources to implement the repurchase in addition to investing in all of its positive NPV projects.

Therefore, repurchase announcements often trigger positive market reactions (Spence (1973) and Stephens and Weisbach (1998)).

However, information asymmetry theory predicts that the market will perceive the announcement of LT firms to be less creditable because of the information asymmetry problem. With more information asymmetry, investors tend to react to the announcement with more caution, while such slower and less immediate market reactions may allow LT firms to more successfully purchase the stock at lower prices and therefore earn higher market-timing profits in the long run.

A few empirical results indicate that LT firms' signals may be less credible than those of HT firms. Price (1998) finds a positive relationship between the level of disclosure and responsiveness to earnings. Therefore, his result indicates that the market should respond to the announcement of HT firms more promptly. In addition, investors of LT firms are more cautious; they want to wait for other confirming information before reacting on the announcement instead of taking the undervaluation signal for granted.

H1 Signaling theory predicts that, if low transparency firms' signals are less credible than those of high transparency firms, low transparency firms should receive less immediate and less positive market reactions than high transparency firms,^v while such less immediate market reactions will allow low transparency firms to buy back stocks at lower prices and earn higher market-timing profits in the long run. Therefore, low transparency repurchase firms should outperform high transparency repurchase firms and non-repurchase firms in the long run.^{vi}

DATA

In this study, repurchase data are obtained from Security Data Corporation's Merger and Acquisition database. Repurchase firms are classified into open market repurchase, Dutch auction, and fixed-price tender offer samples. All fix-price tender offer events are then verified through Lexis-Nexis. Data on stock price, returns, and shares 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.^{vii} 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, I follow Lang and Lundholm (1993, 1996) by averaging the dispersion across the twelve monthly reporting periods on the IBES tape during the company's fiscal year.

While some studies only include the firms' first-time share repurchase activities in the sample to reduce noise (Wang and Johnson (2005)), I include the repeated events in the study to determine if firms with multiple repurchases behave more opportunistically. However, when the long-term performance is examined, firms that have carried out another repurchase in the past five years are excluded to avoid statistical problems.^{viii} Note that all financial institutions, public utilities companies, and transportation companies are eliminated from the sample. All privately negotiated deals and privatization repurchases are eliminated. Furthermore, I exclude events that occur in the fourth quarter of 1987 because the market crash may cause time-clustering problems.^{ix}

TESTS

a. Tests of repurchase announcement and actual repurchase activities

In Table 1, I first display the different firm characteristics between the LT portfolio and HT portfolio. Mean and median of firm size, market-to-book ratio, Tobin's Q, operating income, quick assets, leverage ratio, prior-year return, size of repurchase announcement measured in percentage to market value of equity prior to the announcement, and the proportion of repeated repurchase firms.

The choice of the above characteristics is determined based on the hypotheses in this paper and on previous empirical studies.^x

b. Tests of Market Reaction to Repurchase Announcement

To examine the market reaction, I use cumulative abnormal returns, CARs, based on the market model; on size and book-to-market controlled; and on size, book-to-market, and industry controlled non-repurchase firm returns (Ikenberry, Lakonishok, and Vermaelen (1995)). Fama and French (1992, 1993) and Lakonishok, Shleifer, and Vishny (1994) suggest size and book-to-market matched firms to control for firm characteristics. I use 2 short-term event windows, [-1, 1] and [-1, end of the announcement month] to examine the market reactions. The three-day event window is commonly used to examine market reaction of announcement in case sometimes news may not be reported in the journal or new paper until the next day. The second event window is included since the long-term performance of the repurchase firms is calculated based on monthly returns starting from the month following the announcement date, while using only the [-1, 1] window in the short-term study will leave out the performance of the sample period between day 1 after the announcement and the beginning to the next month, leaving loop holes in the study. Therefore, the second short-term event window is used to provide a more complete examination.

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.^{xi}

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

c. Long-term Performance

In the long-term performance, only firms that actually carry out the announced repurchases are examined. 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. Therefore, I use several different measures such as CARs estimated based the Brown and Warner (1980) approach, BHARs based on size and book-to-market matching bootstrapping methodology (Brock, Lakonishok, and LeBaron (1992)), Calendar-time approach three-factor model (Fama and French (1993)), and Ibbotson's RATS (Returns Across Time and Securities) three-factor model (Ibbotson (1975) and Ikenberry et al. (1995)) to examine the long-term performance.

RESULTS

In this study, the final fixed-price tender offer sample consists of 89 firm year observations and 79 completed repurchases. In Table 1, I examine the firm characteristics of fixed-price tender offer firms. Consistent with Lang and Lundholm (1993), who find the level of transparency is positively correlated to firm size and firm performance, I also find LT firms to be smaller and to have lower operating income, 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 the LT firms to disclose information to a large number of external shareholders and potentially reduce the information advantage of the LT firms. Therefore, LT firms are more likely to have higher leverage than HT firms. Lastly, LT firms are more likely to announce larger share repurchase and more likely to repeat the stock repurchase in the future. The larger repurchase announcement is consistent with the hypothesis that LT firms have more market-timing opportunities and can earn higher market-timing profits because of the larger magnitude of mispricing caused by information asymmetry problems.

Next, I examine market reactions to repurchase announcements. Three benchmarks are used to calculate CARs. 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.

Results of fixed-price tender offer firms are consistent with the hypothesis. LT firms' announcements are viewed as less credible; therefore, the market reacts less immediately and less positively in the short run.

In Table 3, I use CARs and BHARs to examine the long-term performance of repurchase firms. Only firms that actually carry out the repurchases are examined. Again, consistent with the hypothesis and my earlier findings, LT firms do earn higher CARs and BHARs in the long run. CARs provide stronger results than BHARs, while the small sample problem may explain some of the statistical insignificance in the results.

In Table 4, calendar-time approach FF factor model provides consistent yet stronger results. LT firms outperform HT firms in the three- and five-year windows post the repurchase.

For an additional robustness check, RATS procedure factor model is used in Table 5. In this case, only LT firms earn statically significant positive returns in the 36-, 48-, and 60-month period, while HT firms do not earn statistically significant profits in the long run.

TABLES

Table 1				
CHARACTERISTICS OF REPURCHASE FIRMS BASED ON CORPORATE TRANSPARENCY				
<p>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. Book value of equity is calculated as book value of common stock equity plus deferred taxes, plus investment tax credit. 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. Repeat dummy is equal to 1 when the firm announces more than one open market repurchase. Mean, (median), and [p-value] are reported below.</p>				
	LT (N = 44)	HT (N = 45)	LT - HT	p-value of t test (Wilcoxon Test)
Size in Millions	741.36 (236.18) [0.0001]***	1568.53 (650.27) [0.0003]***	-827.17 (-414.09)	0.0164** (0.0248)**
Industry-Adjusted BTM	0.30 (0.18) [0.0044]***	-0.10 (-0.05) [0.0953]*	0.40 (0.23)	0.0009*** (0.0002)***
Industry-Adjusted Q	-0.11 (-0.07) [0.0777]*	0.53 (0.15) [0.0039]***	-0.64 (-0.22)	<.0001*** (0.0006)***
Industry-Adjusted Operating Income	0.01 (0.01) [0.4682]	0.07 (0.06) [<.0001]***	-0.06 (-0.05)	0.0011*** (<.0001)***
Industry-Adjusted Quick Assets	0.18 (0.01) [0.5038]	-0.17 (-0.12) [0.2125]	0.33 (0.13)	<.0001*** (0.0525)*
Industry-Adjusted Leverage	0.76 (0.17) [0.0398]**	0.05 (-0.01) [0.5457]	0.71 (0.18)	0.2267 (0.0171)**
Announced Repurchase Size	31.04% (21.90%) [<.0001]***	23.56% (15.50%) [<.0001]***	7.47% (6.40%)	0.2605 (0.3291)
Repeat	9.09% (0.00%) [0.0441]**	4.44% (0.00%) [0.1596]	4.65% (0.0%)	0.3898 (0.3900)

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 base on CRSP Returns		
	Value-Weighted CAR (-1,1)	Value-Weighted CAR (-1, End-of-the-Month)
Overall Sample	7.96% (3.38%) [<.0001]***	7.95% (4.44%) [<.0001]***
LT targets	4.39% (3.02%) [<.0001]***	4.42% (4.44%) [<.0001]***
HT Targets	9.60% (5.07%) [<.0001]***	9.53% (4.45%) [0.0008]***
LT minus HT (P-Value of T Test) [P-Value of Wilcoxon Test]	-5.21% (0.0424)** [0.8087]	-5.11% (0.1437) [0.5853]
Panel B: Market Reaction based on Size and Book-to-Market Matched Returns		
	Value-Weighted CAR (-1,1)	Value-Weighted CAR (-1, End-of-the-Month)
Overall Sample	8.81% (4.00%) [<.0001]***	9.42% (4.43%) [<.0001]***
LT targets	4.79% (2.63%) [0.0003]***	4.26% (4.31%) [0.0047]***
HT Targets	10.37% (5.52%) [<.0001]***	11.42% (4.43%) [0.0003]***
LT minus HT (P-Value of T Test) [P-Value of Wilcoxon Test]	-5.58% (0.0710)* [0.6002]	-7.16% (0.0799)* [0.5926]
Panel C: Market Reaction based on Size, Book-to-Market, and Industry Matched Firms		
	Value-Weighted CAR (-1,1)	Value-Weighted CAR (-1, End-of-the-Month)
Overall Sample	9.07% (4.08%) [<.0001]***	10.92% (5.65%) [0.0001]***
LT targets	6.95% (6.06%) [<.0001]***	4.63% (7.53%) [0.0426]**
HT Targets	9.71% (3.95%) [0.0007]***	12.79% (4.40%) [0.0042]***
LT minus HT (P-Value of T Test) [P-Value of Wilcoxon Test]	-2.76% (0.4840) [0.6052]	-8.16% (0.2038) [0.5682]

Table 3
LONG-TERM CARS AND BHARS OF THE REPURCHASE FIRMS

In Panel A, cumulative abnormal returns (CARs) are estimated based on the Brown and Warner approach (1980). 12-, 36-, and 60-month CARs from the month after the original announcement date are calculated for the high transparency (HT) and low transparency (LT) repurchase, based on both CRSP value- and equal-weighted index returns. Standard errors are calculated using month -36 to +48 from the announcement. Firms are classified as completed repurchase firms when the repurchase is at least partially completed. In Panel B, Bootstrapping methodology is used to calculate the long-term buy-and-hold abnormal returns. (Brock, Lakonishok, and LeBaron (1992)). The matching firm is determined based on the size, book-to-market, and 2-digit SIC code of the repurchase firm. Matching is done each year post repurchase announcement to adjust for the change of market value of equity post stock repurchase. The matching sample is purged of any firm that announced any type of stock repurchase in the past five years. NYSE breakpoints are calculated each year. Size is the market value of firm equity as of June 30th. 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.

Panel A: cumulative abnormal returns (CARs)			
	One-year Value-Weighted CAR	Three-year Value-Weighted CAR	Five-year Value-Weighted CAR
Completed Sample (median) [P-value]	2.78% (3.16%) [0.5255]	24.98% (16.05%) [0.0003]***	30.38% (21.55%) [0.0004]***
LT targets N = 39 (median) [P-value]	-0.65% (1.58%) [0.9057]	26.52% (21.56%) [0.0040]***	38.45% (36.08%) [<.0001]***
HT Targets N = 40 (median) [P-value]	4.15% (3.16%) [0.5344]	22.72% (12.05%) [0.0300]**	22.93% (7.25%) [0.1089]
LT Targets minus HT targets (P-Value of T Test) [P-Value of Wilcoxon Test]	-4.80% (0.5126) [0.9024]	3.80% (0.9634) [0.5796]	15.52% (0.5488) [0.5271]
Long-Term BHARs of Completed Fixed-Price Tender Offer Firms			
	One-year Value-Weighted BHAR	Three-year Value-Weighted BHAR	Five-year Value-Weighted BHAR
Completed Sample (median) [P-value]	-6.26% (-10.80%) [0.3578]	19.45% (-1.60%) [0.0351]**	26.22% (29.58%) [0.0518]*
LT targets N = 39 (median) [P-value]	18.50% (12.10%) [0.1006]	42.81% (38.17%) [0.0236]**	33.60% (3.48%) [0.2143]
HT Targets N = 40 (median) [P-value]	-19.42% (-10.80%) [0.0192]**	7.04% (-1.60%) [0.3986]	22.30% (29.58%) [0.0988]*
LT Targets minus HT targets (P-Value of T Test) [P-Value of Wilcoxon Test]	37.92% (0.0063)*** [0.2484]	35.77% (0.0579)* [0.4862]	11.30% (0.6874) [0.9804]

Table 4
CALENDAR-TIME APPROACH FACTOR ANALYSES OF COMPLETED REPURCHASE FIRMS

Long-term performance of fixed-price tender offer firms are provided. LT and HT targets are classified based on industry median-adjusted analyst forecast dispersion. $r_{it} = \alpha_i + b_i \text{MKT}_t + s_i \text{SMB}_t + h_i \text{HML}_t + e_{it}$ 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 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.

Abnormal Performance or Intercept of Calendar-Time Approach 3-Factor Model			
	One Year	Three Year	Five Year
LT Firms	-0.49 (0.4335)	1.06 (0.0043)***	0.70 (0.0164)**
HT Firms	-0.25 (0.6858)	0.17 (<.0001)***	0.18 (<.0001)***
LT – HT	-0.04 (0.9660)	1.12 (0.0420)**	0.47 (0.2390)

Table 5
RATS Procedure Factor Analyses of Completed Repurchase Firms

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. $r_{it} = \alpha_i + b_i \text{MKT}_t + s_i \text{SMB}_t + h_i \text{HML}_t + e_{it}$. 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.

Abnormal Returns and Cumulative Abnormal Returns based on Analyst Forecast Dispersion					
Month	AR of LT Firms	CAR of LT Firms	AR of HT Firms	CAR of HT Firms	Difference in CAR
1	0.51 (0.8394)	0.51 (0.7986)	-2.35 (0.2929)	-2.35 (0.2282)	2.86 (0.30345)
2	-1.18 (0.4335)	-0.67 (0.7950)	-3.34 (0.1591)	-5.69 (0.0696)*	5.02 (0.2138)
3	0.37 (0.7823)	-0.30 (0.9162)	2.17 (0.5326)	-3.52 (0.3860)	3.22 (0.5145)
4	-1.71 (0.1265)	-2.01 (0.5351)	-0.46 (0.7699)	-3.98 (0.4030)	1.97 (0.7302)
5	2.21 (0.2623)	0.20 (0.9596)	-1.25 (0.4614)	-5.23 (0.2489)	5.43 (0.3591)
6	0.69 (0.6451)	0.89 (0.8328)	1.39 (0.2831)	-3.84 (0.3872)	4.73 (0.4382)
12	-2.36 (0.1881)	-5.00 (0.4358)	2.87 (0.1616)	-4.14 (0.4999)	-0.86 (0.9227)
24	-1.54 (0.3090)	15.36 (0.2303)	-4.95 (0.0652)*	-3.63 (0.6785)	18.99 (0.2189)
36	3.81 (0.2267)	35.90 (0.0070)***	0.84 (0.6872)	6.44 (0.5180)	29.46 (0.0687)*
48	-2.36 (0.5864)	28.80 (0.0230)**	1.17 (0.6760)	14.07 (0.2230)	15.73 (0.3557)
60	-0.92 (0.5244)	29.55 (0.0162)**	-1.68 (0.5208)	14.81 (0.2702)	14.74 (0.4083)

CONCLUSION

Consistent with the market-timing hypothesis, I find LT firms are more successful in timing fixed-price tender offer repurchase through size of the announcement, less immediate market reactions and more positive long-term performance. Therefore, remaining lower transparency can be beneficial to the corporation.

ENDNOTES

ⁱ 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)), increased stock responsiveness to earnings (Price (1998) and Gelb and Zarowin (2002)), improved capital allocation (Diamond and Verrecchia (1991)), increased institutional ownership and analyst following (Healy, Hutton, and Palepu (1999)), reduced analyst forecast dispersion (Mensah et al. (2003)), reduced agency problems and perquisites (Bushman and Smith (2001)), discouraged earnings manipulation attempts (Hutton et al. (2004)), and easier detection of earnings management (Hirst and Hopkins (1998)).

ⁱⁱ 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) and Verrecchia (1983) 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.

ⁱⁱⁱ 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.

^{iv} Managers of the firm may not be concerned with the undervaluation caused by low transparency unless the firm needs to raise external capital, the insiders need to sell their shares holdings, or the insiders need to exercise their stock options. Since LT firms are more likely to be traded at discount because of the adverse selection problem and higher information risk perceived by investors, such price discount also indicates that the managers will need to signal the undervaluation to the outside investors in order to bring up the market value of the stocks before raising capital in the external market, selling their insider holdings in the market, or exercising their stock options at high prices. Billett and Xue (2004) find that repurchase announcement returns is positively related to the likelihood of the firm's need to raise equity in the future. They find that the closer the SEO is (within three months) following the repurchase, the less negative market reaction the SEO firm receives.

^v 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.

^{vi} 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.

^{vii} Lang and Lundholm (1996), Healy, Hutton, and Palepu (1999), and Finnerty and Yan (2006).

^{viii} Overlapping return calculation periods can pose serious cross-sectional dependence problem (Brav (2005), Cowan and Sergeant (1996)) and cause inflated t-statistics.

^{ix} 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.

^x Dittmar (2000) 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 are, 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. Comment and Jarrell (1995), Comment et al. (1995), and Lakonishok and Vermaelen (1990) find that repurchase firms tend to have poor stock performance in the prior year. Jensen (1986) states that firms use stock 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, even though Howe, He, and Kao (1992) examine fixed-price tender offers and do not find results consistent with the free cash flow theory. Bagwell and Shoven (1988) and Opler and Titman (1996) show that firms use repurchase to increase their leverage ratios and bring them closer to the optimal capital structure.

^{xi} 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.

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