

The Credibility of Stock Repurchase Signals
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Abstract

The information hypothesis has been tested in the context of stock repurchase tender-offers and open-market stock repurchases. Favorable stock price reactions to repurchase tender-offer announcements and subsequent positive earnings surprises are documented by early empirical studies. However, recent studies find that earnings decline for the year after the repurchase announcement and the U.S. has the least stringent regulations on repurchase in terms of execution and disclosure. Since both stock repurchases and earnings management are important managerial choices, this paper links these two managerial choices by exploring the credibility of stock repurchase signals. A major innovation of this paper is to classify stock repurchase into completed repurchase programs versus incomplete repurchase programs. Do companies with incomplete repurchase programs behave and perform differently? Using discretionary accrual as a measure of earnings management, we show that discretionary accrual is a negative and significant predictor of future ROA for firms with incomplete repurchases but not for those firms with completed repurchase programs. Moreover, our empirical results show that the firm with a higher degree of earnings management, a greater percentage of outstanding shares that the firm attempts to buyback, and without disclosing the funding sources in the repurchase announcement tends to have a higher probability leaving the stock repurchase program incomplete.

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1. Introduction

Traditionally, stock repurchases have been interpreted as positive signals based on the rationale behind stock repurchase. Under the information hypothesis, the stock repurchase announcement is seen as a positive signal because it indicates management's favorable outlook on future performance.¹ Several empirical studies find evidence consistent with this theory (Vermaelen, 1981; Dann, 1981; Comment and Jarrel, 1991; Ikenberry et al, 1995), whereas some other literature provides evidence contradictory to information hypothesis, such as Bartov (1991) and Jagannathan and Stephens (2003). Bartov (1991) discovers that prior to the announcement of open-market repurchases, unexpected earnings are higher and positive only to turn subsequently negative after repurchase announcements. Bartov's finding for the year after the repurchase announcement is inconsistent with the information hypothesis.² In addition, Jagannathan and Stephens (2003) examine open-market share repurchase announcements over the period 1991 to 1995 and find that earnings tended to fall in the years after these events. Kahle (2002) investigates the relationship between open market repurchases and

¹ For an overview of this argument, see Rau and Vermaelen (2002).

² Although Bartov's (1991) findings indicate a significantly positive earnings in the second year following the repurchase announcements, Huang, Liano, and Pan (2003) document a negative relation between repurchases and profitability estimated by earnings change, earnings, or abnormal earnings in subsequent years.

employee options and suggests that while the traditional motives still exist, described by the signaling and free cash flow hypothesis, neither of these hypotheses can explain the surge in buybacks during the 1990s. Kahle concludes that the recent innovations in compensation policy, particularly the growing use of stock options by companies, have caused changes in not only the payout policy, but also the incentives for stock repurchase.

The mixed empirical results of stock repurchases motivate us to explore the following question of the credibility of the signal: Can it possibly be that false repurchase signal are sent by managers who intend to benefit from it due to their current holdings of employee options ready to be exercised or their insider trading activities? It has long been argued that corporate executives utilize a wide range of methods to manage reported earnings. Since the recent accounting scandals, the earnings management of publicly listed corporations has received tremendous attention from the financial media, regulatory agencies, and investors. Increasing the transparency of financial reporting to avoid earnings management and promoting communications with investors to prevent misleading reported earnings for all listed corporations have been widely considered as major issues at the heart of the debate for corporate governance reform.³ Recently, Kim, Schremper, and Varaiya (2004) provide evidence that among the ten largest stock markets, the US has the least stringent regulations for stock repurchase in terms of bringing the repurchase intention into practice for executing the program. The finding from Kahle (2002) suggests that when a buyback isn't a buyback, employee options can be the rationale behind stock shares repurchase. Therefore, we conjecture that managers may intentionally use stock repurchase announcement as a signal to benefit from exercising their stock options.⁴

This study investigates the possibility of earnings management around open-market repurchase announcements, especially for those firms leaving repurchase programs incomplete. In addition, because an open-market repurchase announcement is not considered a commitment or obligation of future actions, the initialization of a repurchase program could merely be an attempt by management to raise stock prices at little or no cost. Both *The Wall Street Journal* (March 7, 1995) and *Fortune* (September 4, 1995) have pointed out that actual repurchases are small relative to the amount of shares announced by the firms.

Differing from previous literature on the relation between future earnings and stock price responses to repurchase announcements (either tender offer or open market), this paper examines how firms manage reported earnings prior to open-market repurchase announcements based on whether or not the repurchase program is completed. We attempt to explore whether the probability of leaving a repurchase incomplete is associated with the intention of earnings management.

By examining open market sharer repurchases from 1995 to 2000, we find that the discretionary current accruals, a measure of earnings management (Teoh et al., 1998a,b; Louis, 2002), present an increasing trend for pre-stock repurchase announcement, but a decreasing trend for post announcement. The findings from logistic models suggest that if a firm has incentives manipulating its earnings through discretionary accruals in shifting income from the future, the firm has a higher probability of leaving the repurchase initiation incomplete. As a result, we would expect to find higher levels of pre-stock repurchase discretionary accruals and lower post-stock repurchase earnings changes, i.e. a negative relation between pre-stock repurchase discretionary accruals and subsequent earnings

³ A growing literature on corporate governance and investor protection has been developed by La Porta, Lopez-de-Silanes, Shleifer and Vishny (2000), Zingales (2000), and Core, Holthausen, and Larcker (1999).

⁴ As long as the market takes information hypothesis as given, managers may take advantage of false signal through stock repurchase.

changes. The negative relationship between discretionary accruals and post-repurchase earnings is more significant for the firms that left their repurchase program incomplete.

Furthermore, our empirical results suggest that firms which announced stock repurchase and completed the program consistently have larger values of returns on asset than the firms that left the program incomplete. By conducting a logistic model, we find that the firm with a higher level of discretionary accruals has a higher probability of leaving the repurchase program incomplete.

The rest of the paper is organized as follows: section 2 reviews the literature related to stock repurchases and earnings management, while section 3 describes the data and sample. This is followed by section 4, on the hypotheses and methodology. Empirical results are presented in section 5 with section 6 concluding.

2. Literature Review

The studies conducted by Dittmar (2000) and Barth and Kasznik (1999) focus mainly on the motives of firms repurchasing stocks due to information asymmetry suggesting that managers and investors evaluate the values of stocks differently. The incidence of information asymmetry leads to share price under-valuation. Stock repurchase can be viewed as a sign that the stock price is undervalued. Ikenberry, Lakonishok, and Vermaelen (1995) confirm this argument by showing that positive abnormal stock returns are earned after repurchase announcements are made, with gains continuing to be captured in the subsequent one to three years. A firm can freely distribute cash flows by stock repurchases or dividend payment, repurchasing the stocks instead of paying out dividends can lead to greater benefits for the firm if the stocks are purchased at a price below intrinsic value. Compared to dividend payments, stock repurchase is not viewed as a commitment to shareholders. Jagannathan, Stephens, and Weisbach (2000) and Guay and Harford (2000) contend that a firm tends to use dividend payments rather than stock repurchases to distribute earnings only if higher permanent operating cash flows are presented to the firm, while the main purpose of stock repurchases is to distribute temporary free cash flows, it could be motivated by the excess capital hypothesis, optimal leverage hypothesis, and takeover deterrence hypothesis.⁵

Vermaelen (1981) discovers the trend for positive stock prices responses to tender-offer stock repurchase announcements. In addition, Vermaelen observes positive unexpected earnings after the repurchase announcement. Dann, Masulis, and Mayers (1991) document positive earnings surprises following repurchase tender offers. They conclude that announcement stock price reactions are positively correlated with earnings surprises over the concurrent and subsequent two years. Hertz and Jain (1991) use tender-offer stock repurchases as their sample to test the relation between future earnings and stock repurchases. Their evidence shows that tender-offer repurchase announcements convey favorable information about the future prospects of the firms; therefore the information hypothesis is supported and is consistent with the signaling model.

However, research by Grullon and Michaely (2003) indicates that the cash-flow-signaling hypotheses cannot explain why firms repurchase their shares. They find no evidence that repurchasing firms experience an improvement in future profitability. Their findings are corroborated by Jagannathan and Stephens (2003), who examine open-market share repurchase announcements and find earnings fall in the years after the repurchase announcement events. Bartov (1991) conducts a test for open-market stock repurchases announcements and earnings information. In his study, when

⁵ Detailed review of the motives for stock repurchases includes Easterbrook's (1984) excess capital hypothesis, Opler and Titman's (1996) optimal leverage hypothesis, and Dittmar's (2000) takeover deterrence hypothesis.

unexpected earnings are measured by $E_t - E_{t-1}$ (the difference between the actual earnings of two consecutive years), he finds that $E_t - E_{t-1} > 0$ at $t = -2, -1$, and 0 (t is the year relative to the repurchase announcement and $t = 0$ represents the year of announcement), while at $t = 1$, $E_t - E_{t-1} < 0$. Most significantly, $E_t - E_{t-1}$ is highest at $t = -1$, one year before the announcement. The results suggest that the unexpected earnings are higher and positive before the repurchases announcement, while they become negative during the year of the announcement, which is inconsistent with the information hypothesis.⁶

In addition, as Kahle (2002) introduces that executives' stock options provide alternative incentive for a firm to buyback their shares, we conjecture that behind this rationale, incentive managers may conduct earnings management to maximize their option payoffs.

The financial media such as *The Wall Street Journal*, and *Fortune* raise the issue that the announcement of repurchases may merely be an attempt by managers to raise stock price at little or no cost. In addition, Billett and Xue (2003) also raise a concern about the credibility of repurchase announcements. They conjecture that repurchases may be attempts to falsely signal undervaluation with the subsequent seasoned equity offerings (SEOs) as the mean to benefit from the false signal. Billett and Xue mention that the market may need to verify that the firm actually completes the repurchase program for the signal to be credible, which suggests that asymmetric information will be reduced as the firm actually completes the shares repurchase.

Literature suggests that managers are likely to manipulate their earnings around the events of specific financial policy changes. Teoh, Welch and Wong (1998a, b) use discretionary accruals as a measure of earnings management and find evidence supporting earnings management prior to IPO and SEO. Aharony et al. (2000) confirm the existence of earning management for IPO. By investigating stock merger events, Louis (2002) finds evidence supporting earnings management around M&A. Charitou and Lambertides (2003) indicates the association of bankruptcy and earnings management. Based on the logic that stock repurchase is also an event related to a firm's capital structure decision (Opler and Titman, 1996) and earnings distribution, this paper explores whether earnings management exists around open-market share repurchases.

Stephens and Weisbach (1998) investigate the factors that motivate firms to "actually" repurchase shares. They find that the time and magnitude of *actual* shares repurchase are consistent with the asymmetric information (undervaluation) hypothesis and cash flow considerations. Hence, whether a firm does follow up their program by completing repurchase at a portion of or all desired shares, their tendency to buyback may be based on a credibility measure of the repurchase initiation.

Given the findings inconsistent with the signaling theory and alternative views about the credibility of stock repurchase announcement in existing literature, this study provides new empirical evidence for the credibility of repurchase announcement and links the incentives of earnings management to stock repurchase announcements, especially for those firms that leave the repurchase incomplete.

3. Data and Sample

The data in this study are from the SDC's Worldwide Merger and Acquisition database, where we gather repurchase data in which firms made the repurchase initial authorization between 1995 and 2000. The data provide names of firms that repurchased their stocks, the announcement date, status of repurchase program (i.e. completed, suspended, or terminated), type of repurchase (i.e. open-market or tender offer), and number of shares the firm seeks to repurchase.

⁶ Bartov (1991) finds the unexpected earnings reverse to significantly positive in the second year following the repurchase announcement.

Jagannathan et al. (2000) point out that SDC reports duplicate entries of share repurchase announcement when the same announcement is reported by different sources on different days. As such, we eliminate these duplicate announcements from our sample. Firms are also excluded if their accounting data are not available from COMPUSTAT database. To compute discretionary accounting accruals for the year prior to the repurchase, we eliminate firms from the data if their prior year's total asset values are unavailable. However, to avoid survivorship bias, we do not require that firms have accruals data for the entire period. Finally, due to the highly-regulated character of financial firms, in this study we only include non-financial firms whose SIC codes are less than 6000 and larger than 6999.

When a stock repurchase program is announced, it can be implemented by one of the following techniques: Dutch auction (DA), fixed price tender offer (FPOL), odd lot (OL), negotiated (NG), or open market repurchase (OPR). A mixed technique such as the open market blended with the negotiated method (OPNG) may also be used. The open market repurchase technique is the most commonly employed, ranging from 45.7% (year 2000) to 60.41% (year 1997). The analyses of this study focus on open-market stock shares repurchase.

Panel A of Table 1 reports that, about 21.4% (year 2000) to 54% (year 1996) of the repurchase authorizations were completed. This study uses the status of repurchase program (completed or incomplete programs) recorded in the Securities Data Corporation (SDC) database to examine the credibility of the repurchase announcement and link it to the possibility of managing reported earnings along with the stock repurchase announcement. SDC database defines a "completed" repurchase program if all of the shares that the board wants to repurchase under the authorization have been repurchased. On the other hand, an incomplete repurchase program may be due to the fact that either the board has chosen to temporarily suspend repurchase activity under a program or that the board has decided to withdraw the repurchase authorization.

In addition, based on the information provided by the SDC, the status (completed or incomplete) of all existing repurchase programs is updated at the time when there is a repurchase news released by firms. The SDC database applied in this paper has updated the status of completion up to January 2003.⁷ Hence, "incomplete" status means that up to January 2003, firms that had announced repurchase programs between 1995 and 2000 did not actually buyback any shares.

As shown in Panel A of Table 1, 36% and 64% of the open market repurchase programs are completed and incomplete on average, respectively from 1995 to 2000, with an increasing trend of incomplete repurchase from 1997 to 2000.

The accounting data of firms with repurchase programs are gathered from the COMPUSTAT yearly database. Panel B of Table 1 presents the descriptive statistics of firm characteristics (e.g., total assets, ratio of market values to book values, debt ratio) in the year the repurchase programs are initiated. In addition, the average ratios of (non-) operating income to total assets over the four-period from fiscal year -3 to 0 are reported; fiscal year 0 represents the year of repurchase initialization.

(See Table 1)

4. Hypotheses and Methodology

⁷ Stephens and Weisbach (1998) report that a typical repurchase program lasts for three years, which suggests that firms that announced repurchase programs before year 2000 are unlikely to further complete the shares repurchase if the status of repurchase is still incomplete as of January 2003. To confirm the results that apply to incomplete repurchase programs, we further use a more conservative method by choosing firms that initially authorized shares repurchase prior to the year 1998 and the repurchase status stays incomplete in January of 2003. The results support our finding from Table IV. Specifically, earnings management is more severe if the firms announced repurchase but left the program incomplete. This empirical result is available upon request.

4.1 Hypotheses

In this study, we focus on firms that have made announcements to participate in an open-market stock buyback program, but the repurchase can be in completed or incomplete status. Based on the information hypothesis, the incentive of repurchases announcement is due to stock undervaluation. However, the inconsistent results with information hypothesis in extant literature (Bartov, 1991; Jagannathan and Stephen, 2003; Grullon and Michaely, 2004) motivated us to investigate whether earnings management exists prior to the announcement of shares repurchase can be a possible explanation, especially for managers holding stock options of the firms and intend to gain benefits from temporarily higher stock price.⁸ Stephens and Weisbach (1998) argue that the popularity of open-market repurchase program is less likely due to managers' attempts to manipulate their firm's stock price than it is the inherent flexibility of these programs with respect to the timing and quantity of actual stock repurchase. In actuality, the concerns about the credibility of stock repurchase have been raised in recent literature. For example, the media such as *The Wall Street Journal*, and *Fortune* indicate that the announcement of repurchases may merely be an attempt by managers to raise stock price at little or no cost; Billett and Xue (2003) confirm that repurchases may be attempts to falsely signal undervaluation with the subsequent seasoned equity offerings (SEOs) as the mean to benefit from the false signal.

Billett and Xue (2003) suggest that the market may need to verify that the firm actually *completes* the repurchase program for the signal to be credible, and to a larger extent, asymmetric information will be reduced. Following their research, we use the status of the repurchase program as a measure of credibility to investigate whether the incentives of earnings management are associated with the probability of leaving repurchase incomplete. Hence, based on the possibility that share repurchase may be a false signal along with the possibility of earnings management, we develop the following hypotheses competing with information hypothesis (posited in the alternative form):

Hypothesis 1: False signaling hypothesis

If a firm announces its intention to repurchase stock but leaves the program incomplete, the firm is more likely to engage in earnings management prior to the announcement.

The alternative hypothesis indicating that if a firm announced to buyback its stocks but did not complete the repurchase program, the information is more likely a false signal and executives may have engaged in earnings management through accruals prior to its announcement of stock repurchase. In other words, if earnings management occurs among incomplete buyback firms, then this would inflate earnings before and at the point of announcement; that is, E_{-1} and E_0 are higher compared to earnings post repurchase announcement, E_1 .

Hypothesis 2: Managerial entrenchment hypothesis

If top managers decide to leave the stock repurchase program incomplete, the negative effect of earnings management prior to repurchase announcements on future earnings changes will be more severe.

If repurchase announcements can be a false signal, then those firms that leave repurchase program incomplete will identify a more significantly negative relation between pre-stock repurchase discretionary current accruals and post-stock repurchase return on asset. Specifically, the subsequent return on assets will be negatively correlated with pre-stock repurchase discretionary current accruals reflecting the impact of earnings management.

Hypothesis 3: Funding transparency hypothesis

⁸ Kahle (2002) provides evidence that the incentives of stock repurchase can be associated with the existence of executives' stock options.

A firm without disclosing the funding sources in the repurchase announcement and with a greater percentage of outstanding shares that the firm attempts to buyback tends to have a higher probability leaving the stock repurchase program incomplete.

We conjecture that if a firm did not disclose the funding sources and announced a greater percentage of share repurchase, the credibility of stock repurchase signals is lower so that the probability of leaving the repurchase program incomplete is higher.

4.2 Methodology

4.2.1 Earnings management model

In formulating a system to estimate the earnings management of publicly listed firms, we adopt the models used by Teoh et al. (1998a, b) and Louis (2007) and use discretionary current accrual model to estimate the unexplained accrual or the level of earnings management. We follow the methodology in Teoh et al. (1998a) in decomposing the accrual so that discretionary and nondiscretionary accruals can be obtained.⁹

A current accrual model is employed in this study since current accruals are easier to be manipulated by managers. Thus the amount of discretionary current accrual (i.e., total accruals before depreciation and amortization) could act as a proxy for the level of earnings management conducted by the firms and can be estimated by:

$$CA_{i,t} = \Delta[AR_{i,t} + INV_{i,t} + OCA_{i,t}] - \Delta[AP_{i,t} + TP_{i,t} + OCL_{i,t}] \quad (1)$$

For firm i at year t , where

$CA_{i,t}$ = current accruals, $AR_{i,t}$ = accounts receivables, $INV_{i,t}$ = inventory, $OCA_{i,t}$ = other current assets, $AP_{i,t}$ = accounts payable, $TP_{i,t}$ = tax payable, and $OCL_{i,t}$ = other current liabilities. Specifically, the current accrual is estimated as the change in non-cash current assets less the change in current liabilities.

Furthermore, we regress current accruals against the change of sales. Taking into account of heteroskedasticity, we deflate each variable by the book value of assets from the year prior to repurchase announcements, $TA_{i,t-1}$.

$$\frac{CA_{i,t}}{TA_{i,t-1}} = a_0 \cdot \frac{1}{TA_{i,t-1}} + a_1 \cdot \frac{\Delta Sales_{i,t}}{TA_{i,t-1}} + \varepsilon_{i,t} \quad (2)$$

where

$\Delta Sales_{i,t}$ = the change in sales from the previous year (t-1) for firm i , $TA_{i,t-1}$ = the total assets of firm i in year t-1, a_0 and a_1 are the regression coefficients, and $\varepsilon_{i,t}$ is the error term of the regression model.

The nondiscretionary current accruals (NDCA) represent the portion of current accruals dictated by the firm's sales growth, and is viewed as independent of managerial control.¹⁰ It can be estimated by:

$$NDCA_{i,t} = \hat{a}_0 \cdot \frac{1}{TA_{i,t-1}} + \hat{a}_1 \cdot \frac{\Delta Sales_{i,t} - \Delta AR_{i,t}}{TA_{i,t-1}} \quad (3)$$

where

$NDCA_{i,t}$ = nondiscretionary current accruals in year t for firm i , $\Delta AR_{i,t}$ = the change in accounts receivables in year t for firm i , and \hat{a}_0 and \hat{a}_1 are the coefficient estimates from equation (2).

⁹ For details of the methodology, see Teoh et al. (1998a) and Xie, Davidson, and Dadalt (2001).

¹⁰ See Teoh et al. (1998a).

The remaining current accruals are the scaled discretionary current accruals (DCA) and are the portion of current accruals subject to manipulation by management:

$$DCA_{i,t} = \frac{CA_{i,t}}{TA_{i,t-1}} - NDCA_{i,t} \quad (4)$$

Therefore, $DCA_{i,t}$ is used as proxy for earnings management in this paper.

We investigate hypothesis 1 by implementing a multivariate cross-sectional regression of the change in return on asset (ΔROA) in year 1 and year 2 on variables in year -1. In addition, to adjust for heteroskedasticity, OCF and MV are scaled by the total assets of year t-2. Mathematically, the model is written as

$$\Delta ROA_{i,t+j} (j=1 \text{ or } 2) = \alpha_1 + \delta_1 DCA_{i,t-1} + \delta_2 NDCA_{i,t-1} + \delta_3 \frac{OCF_{i,t-1}}{TA_{i,t-2}} + \delta_4 \frac{MV_{i,t-1}}{TA_{i,t-2}} + e_{i,t+j} \quad (5)$$

where

$j = 1$ or 2 . $\Delta ROA_{i,t+j}$ = changes in return on asset of firm i in year j after initial announcement of stock repurchase program at time t , and ROA_{t+j} = (earnings before taxes and interest expenses) _{$t+j$} / (total assets) _{$t+j-1$} .¹¹ For the year before firm i announced the repurchase program, $DCA_{i,t-1}$ = discretionary current accruals, $NDCA_{i,t-1}$ = non-discretionary current accruals, $OCF_{i,t-1}$ = operating cash flows, $MV_{i,t-1}$ = market value of equity; $TA_{i,t-2}$ = total assets of firm i in two-year before initial announcement of repurchase program, α_1 is the intercept of the regression model, δ_1 , δ_2 , δ_3 , and δ_4 are the regression coefficients, and $e_{i,t+j}$ is the error term of the regression model.

Equation (5) is to evaluate the ability of pre-stock repurchase accruals in explaining the earnings performance in post-stock repurchase years. If a firm uses discretionary accruals to shift incomes from the future, we expect to find a negative relation between pre-stock repurchase discretionary accruals and subsequent earning changes. If this is so, δ_1 is expected to be negative, which would reject the information hypothesis of repurchases announcement.

4.2.2 Logistic model

In order to link the probability of leaving a repurchase program incomplete and the incentives of earnings management, we conduct a logistic model analysis. The model is to test whether those firms with a larger value of discretionary current accruals, a measure of earnings management, have higher possibility leaving the repurchase program incomplete.

The logistic regression model can be written as:

$$\text{Logit}(p) = \log\left(\frac{p}{1-p}\right) = \alpha + \beta' \times x,$$

where

p is the probability of leaving a repurchase program incomplete and defined as $Pr(Y = 1 | x)$, $Y = 1$ if the repurchase program is incompleting, and $Y = 0$ if the repurchase program is completed;

x is a vector of explanatory variables, which are pre-stock repurchase discretionary current accruals, the number of shares firms intended to buyback at the time of announcement, firm size, and

¹¹ The estimate of ROA is similar to the approach used by Core et al (1999), Teoh et al. (1998a), and Gao and Shrieves (2002).

debt ratio. α is the intercept, and β is the vector of slope parameters. Thus the probability of a repurchase program left to be incomplete can be represented by $p = \frac{e^{\beta x}}{1 + e^{\beta x}}$.

5. Empirical Results

5.1 Testing earnings management hypothesis

Net income essentially comprises cash flows from operations and accruals. Since prior research suggests that long-term accruals are less prone to the effects of manipulation from managers, because they are more visible, than current accruals, we therefore focus on short-term accruals by analyzing the relationship between the trend of earnings and the trends of its components (i.e., discretionary, non-discretionary current accruals, and operating cash flows).¹²

Table 2 presents summary statistics on asset-scaled net income, cash flows from operation, discretionary current accruals, and non-discretionary current accruals in the two years surrounding the repurchase announcement. Evidence in Table 2 shows higher earnings prior to the repurchase announcement and lower earnings following the repurchase announcement, which is consistent with the findings of Bartov (1991). In addition, the stable movement of cash flows from operation, the increase in discretionary current accruals, and the decrease in non-discretionary current accruals in the two years prior to the repurchase announcement suggest that net income changes are probably caused by the changes of discretionary current accruals, which is subject to manipulation by managers.¹³ Hence, there is a possibility that earnings management exists among the firms announcing their entrance into an open-market repurchase program.

To further investigate the effects of earnings management prior to the repurchase announcement on the firm's post-repurchase performance, we conduct a multivariate time-series and cross-section regression analysis. The results of testing hypothesis 1 are shown in Table 3. As expected, current accruals and operating cash flows have inverse effects on the changes of returns on asset two years after repurchase. In addition, among the factors significantly affecting $\Delta ROA_{i,t+2}$, discretionary current accruals have a dominating effect, in terms of magnitude and the significance level. In other words, the earnings management prior to repurchase announcement has both significant and inverse effects on the firm's post repurchase performance.¹⁴

Bartov's (1991) findings suggest that the unexpected earnings are higher and positive before the repurchases announcement, while becoming negative at the announcement year. He also takes issue with regard the interpretation of $\Delta E_t < 0$, a result considered inconsistent with the information hypothesis. Although Bartov did not further investigate this inconsistency, his study provides insights to the potential problem of earnings management and is the basis of this research. In addition to providing evidence on the rejection of the information hypothesis, we solve the puzzle raised by Bartov (1991).

This paper links the incentive of earnings management prior to stock repurchase announcements to the changes in post-repurchase earnings via the change in the return on asset. We show that earnings management is likely to occur among buyback firms, a phenomenon that would inflate company earnings before and on the announcement year. Thus, earnings prior to or on the year

¹² For example, see Kreutzfeldt and Wallace (1986), Guenther (1994), and Teoh et al. (1998a).

¹³ See Teoh et al. (1998a).

¹⁴ Regression results of the effects of total current accruals on the change of ROA are reported in Panel B of Table 3.

of repurchase announcements (E_{-1} and E_0 , respectively), are significantly higher than that on the year after repurchase announcements (E_1).

5.2 Earnings management in the groups of completed repurchase v.s. incompleting repurchase

5.2.1 Comparisons of post-stock repurchase announcement ROA of completed and incompleting groups

To test hypothesis 2, we compare the return on assets of the two groups. As shown in Table 5, firms that completed their repurchases program consistently have higher ROA than those firms leave repurchase incomplete. One-tailed t-test for mean difference between complete and incomplete groups further confirms the above finding. Wilcoxon signed rank test shows that the median of ROA for completed firms is significantly higher than that of incomplete firms.

Next, we impose equation (5) on two groups: (1) firms that have announced *and* completed the repurchases (hereafter completed group), and (2) firms that have announced but did not complete the repurchases (hereafter incomplete group). An initiated repurchase program could become incomplete with the termination, pending, suspension, and extension of the program, among which pending and termination contribute most to the incompleting of stock repurchase¹⁵.

Because the repurchase announcement is neither a commitment nor an obligation to repurchase shares - with the possibility of firms releasing false signals and taking advantage of positive reactions from the market to the announcement - we conjecture that as long as the market recognizes the incompleting of the repurchase program, the impact of earnings management will be larger for the incomplete group than the complete group.

Panel A of Table 4 reports the descriptive statistics of firm size and repurchase contents including buyback shares and the percentage of targeted shares for both completed and incomplete groups. The number of observations differs for each variable due to the fact that some firms announced the number of shares they attempted to buyback, but not the percentage of targeted repurchase shares. For example, there were 1045 firms in the incomplete group that announced shares to be repurchased using the open market technique, of which 999 of them also announced the percentage of targeted shares.

Firms in the incomplete group announced more shares (3.6 million) and a higher percentage of outstanding shares (7.86%) that they attempted to buyback than those in the completed group (3.4 million shares and 6.37%). In addition, compared to firms in the completed group, the average firm size in the incomplete group is smaller in terms of total assets. The mean value of assets for the incomplete group and completed group are about \$2.22 billion and \$2.69 billion, respectively.

In Panel B of Table 4, the sample with incomplete repurchase programs exhibit significant negative effects of earnings management prior to repurchase announcements on both $\Delta ROA_{i,t+1}$ and $\Delta ROA_{i,t+2}$ at the 10% and 5% level, respectively. In addition, the larger inverse response to $\Delta ROA_{i,t+2}$ for firms with incomplete repurchase programs is consistent with our prediction.

On the other hand, for firms that completed their stock repurchases, their discretionary current accruals prior to repurchase announcements have insignificant negative effects on both $\Delta ROA_{i,t+1}$ and $\Delta ROA_{i,t+2}$. The mixed results suggest that in the first year and the second year after the repurchase announcement discretionary accruals are negative and significant predictor of future ROA for incomplete firms.

5.3 Results of logistic model

¹⁵ See the notes from the SDC.

The regression analysis of the logistic model examines the attributes of the probability for leaving repurchase program incomplete. As shown in Table 6, results indicate that a firm with higher DE ratio intends to leave repurchase programs incomplete and smaller firms have the same attempt in which firm size is measured by asset value and the capital structure measured by the ratio of total liabilities to equity, whereas they are insignificant in determining the probability of incomplete repurchase.

Table 6 shows that for the firm with higher pre-stock repurchase discretionary accruals tends to have significantly higher probability leaving the repurchase program incomplete. In addition, the probability of an incomplete repurchase is significantly higher if the greater percentage of outstanding shares that the manager “attempts” to buyback in the repurchase announcement. Higher discretionary accruals prior to the stock repurchase suggest a greater incentive of managing earnings. As a result, the above finding provides a linkage between the probability of conducting earnings management and the probability of leaving repurchase program incomplete. Consistent with the findings of Kim et al. (2004), the loose regulation of stock repurchases in the U.S. market in terms of execution and disclosure for firms that do not disclose the funding sources for their repurchase programs have a higher probability of leaving repurchase programs incomplete at the 1% significant level.

6. Conclusions

A large body of academic literature has examined the extent to which earnings management occurs around the events of specific financial policy changes, such as initial public offerings (Teoh et al., 1998b, Aharony et al, 2000), M&A (Louis, 2002), seasoned equity offerings (Teoh et al., 1998b), and bankruptcy (Charitou and Lambertides, 2003). In addition, empirical results in extant literature provide evidences against signaling information hypothesis, (Bartov, 1991; Jagannathan and Stephens, 2003; Grullon and Michaely, 2004), which suggest that stock repurchase conveys information of stock undervaluation. Kahle (2003) argues that when a buyback isn't a buy back, the incentive of stock repurchase can be attributed to the existence of employee and executive stock options. Moreover, the credibility of such signal has been raised by Billett and Xue (2003), *The Wall Street Journal*, and *Fortune*. Integrating the issues of earnings management and signal credibility, this paper associates the inconsistency of information hypothesis with managerial incentives of manipulating earnings. Using open-market share repurchases data during the period 1995-2000, our empirical evidence indicates that earnings management is likely to occur among buyback firms through managing their discretionary current accruals.

Specifically, firms appear to inflate their earnings prior to and during the year of stock repurchase announcements. The earnings management inversely and significantly affects the firm's post-repurchase performance measured by the change of return on assets. Separating the sample into firms with completed or incomplete repurchase programs, we find that the inverse effects of earnings management prior to repurchase announcements on future earnings changes are significant for firms with incomplete repurchase programs. Announcement of an open-market repurchase program may be an attempt by management to raise the firm's stock price at little or no cost to the firm itself. The firm with a higher level of discretionary current accruals is more likely to leave the repurchase program more incomplete when compared with the completed repurchase group. Moreover, our empirical results show that the firm with a higher degree of earnings management, a greater percentage of outstanding shares that the firm attempts to buyback, and without disclosing the funding sources in the repurchase announcement tends to have a higher probability leaving the stock repurchase program incomplete.

The above findings have important implications for investors and regulators. In sum, we conclude that stock repurchase announcements may be a false signal and the firm's value may actually be overvalued instead of undervalued.

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Table 1
Panel A: Frequency Distribution of the Completion of Open Market Stock Repurchase Programs

	Completed ⁽ⁱ⁾		Incomplete ⁽ⁱⁱ⁾		Total
	Frequency	Percent	Frequency	Percent	
1995	75	44.4%	94	55.6%	169
1996	128	53.8%	110	46.2%	238
1997	124	46.4%	143	53.6%	267
1998	136	31.0%	303	69.0%	439
1999	83	29.1%	202	70.9%	285
2000	53	21.4%	195	78.6%	248

Note:

(i) A completed repurchase program is defined as all of the shares that the board wants to repurchase under the authorization have been repurchased.

(ii) Incomplete repurchase programs include the possibility of extension, pending, suspended, and terminated programs.

Table 1
Panel B: The Statistics of Firm Characteristics

	Total assets	MV/BV	DR	OPI	NOPI
Mean	2507.15	2.67	0.19	0.191	0.0134
Median	295.04	1.91	0.13	0.192	0.0074
Std. Dev.	11078.84	4.58	0.23	0.158	0.1697
N	1641	1635	1633	867	869

Note: Total assets are measured in millions of dollars.

Total assets (TA), market values (MV), and book values (BV) are obtained at the end of the fiscal year of the repurchase announcement, or fiscal year 0. Debt ratio (DR) is the ratio of long-term debt at fiscal year 0 to total assets at fiscal year -1. Operating income (OPI) is the average ratio of operating income to total assets measured over the four-year period from fiscal year -3 through 0. Non-operating income (NOPI) is the average ratio of non-operating income to total assets measured over the four-year period from fiscal year -3 through 0. Each year's (non-) operating income is deflated by its corresponding prior year's assets.

Table 2

Statistics of asset-scaled net income (NI), discretionary current accruals (DCA), nondiscretionary current accruals (NDCA), and cash flows from operations (OCF), in percent, from year -2 to +2 surrounding the repurchase announcement year (year 0)

Year	-2	-1	0	1	2
Observations					
NI	1521	1625	1646	1540	1213
DCA	1454	1574	1599	1500	1177
NDCA	1493	1609	1486	1534	1208
OCF	1519	1625	1635	1540	1213
Mean					
NI	6.562 ^a	6.716 ^a	5.479 ^a	3.712 ^a	3.754 ^a
DCA	0.581	0.946 ^b	1.101 ^a	-0.207	-0.528 ^b
NDCA	3.267 ^a	2.796 ^a	0.839 ^a	0.899 ^a	1.040 ^a
OCF	11.198 ^a	10.458 ^a	10.108 ^a	10.155 ^a	9.923 ^a
Median					
NI	6.980 ^a	7.192 ^a	6.409 ^a	5.166 ^a	4.825 ^a
DCA	0.199	0.355 ^a	0.353 ^a	-0.101	-0.498 ^a
NDCA	0.950 ^a	1.059 ^a	0.660 ^a	0.511 ^a	0.509 ^a
OCF	10.543 ^a	11.254 ^a	10.676 ^a	10.419 ^a	10.337 ^a

Note: ^a represents statistical significance at the 1% level, using t-tests for the mean and Wilcoxon signed ranks tests for the median.

^b represents statistical significance at the 5% level, using t-tests for the mean and Wilcoxon signed ranks tests for the median.

^c represents statistical significance at the 10% level, using t-tests for the mean and Wilcoxon signed ranks tests for the median.

Table 3
Panel A: Regression Analysis of Current Accruals on ΔROA

$$\Delta ROA_{i,t+j} (j=1 \text{ or } 2) = \alpha_1 + \delta_1 DCA_{i,t-1} + \delta_2 NDCA_{i,t-1} + \delta_3 \frac{OCF_{i,t-1}}{TA_{i,t-2}} + \delta_4 \frac{MV_{i,t-1}}{TA_{i,t-2}} + e_{i,t+j} \quad (5)$$

where $\Delta ROA_{i,t+j}$ = changes in return on asset of firm i in year j (j=1 or 2) after initial announcement of repurchase program, TA = total asset, DCA = discretionary current accruals, NDCA = non-discretionary current accruals, OCF = operating cash flows, and MV = market value of equity.

	Intercept	DCA	NDCA	OCF	MV	R ²	ADJ-R ²	N	F
$\Delta ROA_{i,t+1}$	-0.01	-0.04	-0.11 ^a	-0.07 ^a	-0.04 ^a	0.036	0.033	1301	12.05 ^a
t-statistics	(-1.35)	(-1.21)	(-3.09)	(-3.40)	(-6.14)				
$\Delta ROA_{i,t+2}$	0.01	-0.16 ^a	-0.23 ^a	-0.15 ^a	-0.03	0.040	0.036	1018	10.48 ^a
t-statistics	(0.41)	(-2.92)	(-3.93)	(-5.43)	(-1.43)				

Note: ^a represents statistical significance at the 1% level
^b represents statistical significance at the 5% level
^c represents statistical significance at the 10% level

Panel B: Regression Analysis of Total Current Accruals on ΔROA

$$\Delta ROA_{i,t+j} (j=1 \text{ or } 2) = \alpha_1 + \delta_1 TotalCA_{i,t-1} + \delta_3 \frac{OCF_{i,t-1}}{TA_{i,t-2}} + \delta_4 \frac{MV_{i,t-1}}{TA_{i,t-2}} + e_{i,t+j} \quad (5-1)$$

where $\Delta ROA_{i,t+j}$ = changes in return on asset of firm i in year j (j=1 or 2) after initial announcement of repurchase program, TA = total asset, TotalCA = total current accruals, OCF = operating cash flows, and MV = market value of equity.

	Intercept	TotalCA	OCF	MV	R ²	ADJ-R ²	N	F
$\Delta ROA_{i,t+1}$	-0.01	-0.07 ^a	-0.08 ^a	-0.04 ^a	0.034	0.032	1301	15.37 ^a
t-statistics	(-1.30)	(-3.04)	(-3.83)	(-6.21)				
$\Delta ROA_{i,t+2}$	0.00	-0.19 ^a	-0.19 ^a	-0.03 ^c	0.039	0.036	1018	13.63 ^a
t-statistics	(0.36)	(-4.60)	(-5.52)	(-1.71)				

Note: ^a represents statistical significance at the 1% level
^b represents statistical significance at the 5% level
^c represents statistical significance at the 10% level

Table 4
Samples of Completed and Incomplete Repurchase Programs
Panel A
Descriptive Statistics of Repurchase Shares and Percentage of Targeted Repurchase Shares

Group	Shares ⁽ⁱ⁾	Percent ⁽ⁱⁱ⁾	Total assets ⁽ⁱⁱⁱ⁾	Shares	Percent
		<u>Mean</u>		<u>Number of Obs.</u>	
Completed	3400386	6.37	2694.86	599	568
Incomplete	3584094	7.86	2222.50	1045	999
		<u>Standard Deviation</u>			
	Shares	Percent	Total assets		
Completed	6854995	5.32	10973.93		
Incomplete	8093569	6.52	11093.14		

Note: (i) Shares represent the announced shares to be repurchased; (ii) Percent is the *announced* buyback shares as a percent of the firm's outstanding shares at the time of the repurchase announcement. The difference between the observations of firms announced the intended number of buyback shares and the intended percent of buyback shares is due to the fact that some firms only announced the number of buyback shares and not the percentage. (iii) Total assets are measured in millions of dollars, and are obtained at the end of the fiscal year of the repurchase announcement, or fiscal year 0.

Table 4
Panel B

Regression Analysis of Current Accruals on ΔROA

For Firms with Completed or Incomplete Repurchase Programs

$$\Delta ROA_{i,t+j} \text{ (j=1 or 2)} = \alpha_1 + \delta_1 DCA_{i,t-1} + \delta_2 NDCA_{i,t-1} + \delta_3 \frac{OCF_{i,t-1}}{TA_{i,t-2}} + \delta_4 \frac{MV_{i,t-1}}{TA_{i,t-2}} + e_{i,t+j} \quad (5)$$

where $\Delta ROA_{i,t+j}$ = changes in return on asset of firm i in year j (j=1 or 2) after initial announcement of repurchase program, TA = total asset, DCA = discretionary current accruals, NDCA = non-discretionary current accruals, OCF = operating cash flows, and MV = market value of equity.

	Intercept	DCA	NDCA	OCF	MV	R ²	ADJ-R ²	N	F
Completed									
$\Delta ROA_{i,t+1}$	0.03 ^a	-0.04	-0.35 ^a	-0.18 ^a	-0.03	0.08	0.07	492	10.78 ^a
t-statistics	(3.08)	(-0.84)	(-4.45)	(-4.16)	(-1.29)				
$\Delta ROA_{i,t+2}$	0.03 ^b	-0.11	-0.25 ^a	-0.27 ^a	-0.08 ^a	0.09	0.08	428	10.37 ^a
t-statistics	(2.37)	(-1.36)	(-2.65)	(-4.79)	(-2.75)				
Incomplete									
$\Delta ROA_{i,t+1}$	-0.02 ^a	-0.08 ^c	-0.04	-0.05 ^b	-0.03 ^a	0.04	0.03	809	7.35 ^a
t-statistics	(-3.13)	(-1.75)	(-1.10)	(-1.99)	(-5.13)				
$\Delta ROA_{i,t+2}$	-0.01	-0.20 ^a	-0.19 ^b	-0.16 ^a	-0.01	0.03	0.02	590	4.35 ^a
t-statistics	(-0.90)	(-2.82)	(-2.32)	(-3.05)	(-0.38)				

Note: ^a represents statistical significance at the 1% level
^b represents statistical significance at the 5% level
^c represents statistical significance at the 10% level

Table 5**Comparison of ROA of the Complete and Incomplete Repurchase Groups**

Firms are categorized in the completed group if they announced the stock repurchase and completed the intended buyback shares. Firms are in incomplete group, if they announced stock repurchase, but left the program incomplete.

Group		Median					Mean				
		(t-2)	(t-1)	t ₀	t+1	t+2	(t-2)	(t-1)	t ₀	t+1	t+2
Complete	ROA	0.0871	0.0949	0.0880	0.0727	0.0660	0.1025	0.1130	0.0923	0.0826	0.0694
	% Δ in ROA ⁽ⁱⁱ⁾										
			8.96%	7.27%	17.39%	9.22%		10.24%	18.32%	10.51%	15.98%
InComple	ROA	0.0806	0.0827	0.0680	0.0501	0.0396	0.0968	0.0606	0.0664	0.0416	0.0351
	%Δ in ROA										
			2.61%	17.78%	26.32%	20.96%		37.40%	9.57%	37.35%	15.63%
$\Delta ROA_{Group}^{(i)}$		0.65% ^a	1.22% ^a	2.00% ^a	2.26% ^a	2.64% ^a	0.57% ^a (0.13)	5.24% ^a (2.77)	2.59% ^a (2.88)	4.10% ^a (4.75)	3.43% ^a (3.18)

(i) $\Delta ROA_{Group} = ROA(\text{Complete}) - ROA(\text{Incomplete})$

(ii) $\% \Delta \text{ in ROA} = [ROA_{(t+i)} - ROA_{(t+i-1)}] / ROA_{(t+i-1)}$, $i = -1, 0, 1, 2$.

^a denotes statistical significance at the 1% level, using one sided t-tests for the mean and Wilcoxon signed ranks tests for the median.

The parentheses are t-value.

Table 6
Analysis of logistic model

Logistic regression model: $\text{Logit}(p) = \log\left(\frac{p}{1-p}\right) = \alpha + \beta' \times x$,

where p is the probability of leaving a repurchase program incomplete and defined as $Pr(Y = 1 | x)$, $Y = 1$ if the repurchase program is incomplete, and $Y = 0$ if the repurchase program is completed;

x is a vector of explanatory variables, $x = [\text{pre-stock repurchase discretionary current accruals (DCA)}, \text{non-discretionary current accruals (NDCA)}, \text{operating cash flows (OCF)}, \text{the number of shares firms intended to buyback at the time of announcement (PerSh)}, \text{the ratio of total liabilities to equities (DE)}, \text{firm size (lnTA)}, \text{and the disclosure of funding source (Fund=1 if the firms do not disclose the funding source, otherwise Fund=0)}].$ α is the intercept parameter, and β is the vector of slope parameters, i.e. $\beta = [\beta_1, \beta_2, \beta_3, \dots, \beta_9, \beta_{10}]$. The probability of a repurchase program left to be incomplete can be

represented by $p = \frac{e^{\beta'x}}{1 + e^{\beta'x}}$.

Variables	Parameters Estimate	Chi-Square
Intercept	0.020	0.006
DCA _(t-2)	-0.176	0.451
DCA _(t-1)	19.381 ^c	2.993
DCA _t	-1.881	1.087
DCA _(t+1)	16.134	0.611
NDCA _(t-1)	2.152	0.035
OCF _(t-1)	0.215	0.271
PercentShare	0.052 ^a	17.774
DE _(t-1)	0.014	0.113
lnTA _(t-1)	-0.041	1.375
Fund	0.470 ^a	14.456

Note: ^a denotes statistical significance at the 1% level
^b denotes statistical significance at the 5% level
^c denotes statistical significance at the 10% level