The Effect of FASB Statement No. 123R on Stock Repurchases: An Empirical Examination of Management Incentives

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Abstract

This study examines management's response to the change in accounting for the stock option-based compensation imposed by SFAS No. 123R. SFAS 123R mandates the valuation and expense of employee stock options based on their fair market value. As a consequence, its implementation is expected to reduce reported income. To cope with this impact, management may be motivated to decrease the use of stock options as part of compensating employees and engage in stock repurchases in an attempt to increase the value of outstanding employee stock options. Our findings demonstrate a significant decrease in the number of stock options issued and a significant increase in the number of options vested and shares repurchased for all industries in the S&P 500 following SFAS 123R implementation. For industries that made extensive use of employee stock options in their compensation schemes, there is a contemporaneous increase in repurchases and leverage in the post SFAS 123R period, which may suggest that some of the buybacks may have been funded with debt. The results highlight changes in management incentives to repurchase stock in order to influence share prices and the unintended consequences of accounting rule changes.

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Key words: SFAS 123R; share repurchases; employee stock option grants;

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1. Introduction

In 1995 the Financial Accounting Standards Board (FASB) issued rule SFAS No. 123 that encouraged companies to expense the "fair value" of employee stock options as part of compensation expense. Under SFAS No. 123, companies were allowed to use options' "intrinsic value", which is the current market price less the exercise price. Since most employee stock options are granted at the money (when exercise price is equal to the market price), no expense was generally required to be recorded.[1] This allowed companies the benefit of the incentive compensation without the requirement to record any corresponding financial statement expense, which is believed to have been responsible for the popularity of employee stock options.

SFAS No. 123R was issued December 16, 2004 and became effective for all public company reporting periods after December 15, 2005. The primary impact of the new rule is that corporations are now required to record the "fair market value" of options issued to employees as an expense when the stock options are granted. SFAS No. 123R also requires that all unvested employee stock options be valued and expensed at the time management applies the new rule. To avoid this expense, corporations have decreased their use of stock options as part of attracting and compensating talented employees, and have chosen to accelerate the vesting of underwater options (those with a strike price below the current market price) prior to implementing the rule.

Options lose their incentive value once the stock price falls sufficiently below the exercise price, as the option holder perceives little chance of exercising the option. This loss of incentive value is often used as justification for issuing new options or repricing existing options. Under SFAS No. 123R, repricing or reissuing outstanding options, which had been common for

[1] Hall and Murphy (2002) note that 94% of options granted to S&P 500 CEOs in 1998 had exercise prices equal to the market price on the grant date.

out-of-the-money options, requires the options to be valued and expensed in the same manner as new options, which severely diminished the possibility of issuance of new or repriced options.

The acceleration of vesting for many employee stock options, the reduced possibility of new or repriced options issues, and their limited life created a "use-it-or-lose-it" situation for employee stock option holders. The immediate effect of the new rule was that many corporations, especially IT companies, either eliminated or curtailed the use of employee stock options as part of their compensation schemes.[2] The limited issuance of new employee stock options provided new incentive for management to attempt to influence share prices in order to maximize the value of outstanding employee stock options in the post SFAS No. 123R environment.

It is generally accepted that stock repurchases can be used to increase the market value of a firm's stock (see Ikenberry, Lakonishok, and Vermaelen, 2000; Chan, Ikenberry, and Lee, 2004; Bradford, 2008; Urs and Theo, 2009) and are more likely employed if insiders have large share holdings (Li and McNally, 2003) or a large number of stock options outstanding (Kahle, 2002). By leveraging existing research, this study investigates the change in management incentives following the implementation of SFAS 123R, and provides evidence that the new accounting rule has altered the historical relationship between stock repurchases and employee stock options. From the three-year pre- to the three-year post SFAS 123R, the number of employee stock options granted by the S&P 500 companies in our sample has declined on average by approximately 28%, while the employee stock options vested (proxied by the number of exercisable stock options) has increased on average by nearly 16% and the number of outstanding employee stock options has dropped by 4%. Over the same period, the number of

[2] Hayes, Lemmon and Qiu (2012) observe that in inflation-adjusted dollar terms, during the three years prior to the implementation of SFAS No. 123R, options are the largest component of CEO compensation; in the three years after the implementation, long term incentive awards become the largest component of CEO compensation.

stock repurchased more than doubled, from approximately 11 million to more than 26 million. After taking into account the traditional share repurchase hypotheses (signaling, anti-dilution, leverage, agency and hedging), we show that in the three-years following the implementation of SFAS No. 123R share repurchases were motivated by the declining issuance of the new employee stock options and the accelerated vesting of the existing options, which prompted firms' management to attempt to increase the stock price to maximize the value of these options. To our knowledge, this is the first paper that explores the impact of the change in the accounting rule for the issuance of employee stock options (SFAS No. 123R) on management's stock repurchase motivation.

The results of this study are broadly useful to regulators and investors alike. For regulators, this research demonstrates the potential for unintended consequences of changes in existing rules, as they can distort decision making and cause resources to be misallocated. SFAS No. 123R was intended to accelerate the convergence between U.S. GAAP and International Financial Reporting Standards (IFRS). As this convergence process continues, the importance of understanding the unintended consequences of accounting rule changes will increase. For investors, this research demonstrates that historical relationships in capital markets may change due to intended or unanticipated events. If investors do not understand these changes, they may make decisions based on expected relationships that are no longer valid.

The remaining part of this paper is organized as follows. Section 2 reviews the related literature and presents our hypotheses. In Section 3 we describe the data and provide a preliminary analysis. Section 4 discusses the methodology and summarizes the empirical results. Section 5 concludes.

2. Related Literature

A large body of work has been devoted to explaining the reason(s) management engages in stock repurchases. Among the accepted hypotheses, the most common are signaling, anti-dilution, leverage, agency and hedging. Firms repurchase stocks when they believe their stock price is undervalued (signaling hypothesis) or to counter the dilution effects of employee stock options (anti-dilution hypothesis). Stock repurchases have also been used to achieve what firms perceive as their optimum capital structure (leverage hypothesis), to redistribute excess cash flows to shareholders (agency hypothesis), or to hedge option grant price risk exposure (hedging hypothesis).

According to the signaling theory, the repurchase of shares is a signal to outsiders that managers believe the company's stock is currently undervalued or that its earnings will be better than analysts anticipate (Vermaelen, 1981; Ofer and Thakor, 1987; Stephens and Weisbach, 1998; Comment and Jarrell, 1991; Dittmar, 2000; Brav, Graham, Harvey, and Michaely, 2005). The repurchase communicates the undervaluation, thereby creating demand for the shares and subsequently an increase in share price to its proper level.

The anti-dilution hypothesis explains the relationship between employee stock options and repurchases as a means to counter the dilution effect of exercised employee stock options on earnings-per-share (Bens, Nagar, Skinner, and Wong, 2003; Weisbenner, 2000). The granting and exercise of employee stock options increases the denominator in the earnings-per-share (EPS) calculation. Repurchasing shares can be used to offset this EPS dilution. A positive relationship between stock repurchases and the size of executive and employee stock option programs is documented by Bens, et al. (2003); Fenn and Liang (2001); Hurtt, Kreuze, and Langsam (2008); and Kahle (2002) among others.

The leverage hypothesis suggests that firms may use debt to finance repurchases in order to achieve what they perceive as their optimum capital structure (Bagwell & Shoven, 1988; Hovakimian, Opler, and Titman, 2001; Lie, 2002). McNally (1999) notes that the use of debt to finance share repurchases may increase firm value by increasing their tax shield. Vermaelen (1981) finds that using debt to finance share repurchases results in higher returns at share repurchase announcement. These results suggest that the market is cognizant of how share repurchases can be used by management to achieve desired capital structures, and values these actions.

The separation of management from ownership in a corporate setting gives rise to a potential principle-agent conflict. The agency hypothesis assumes that left to their own devices, managers will tend to use company resources in a manner that maximizes their own benefit. Easterbrook (1984) , Jensen (1986) and Grullon and Michaely (2004) argue that payouts to shareholders can minimize the resources that management controls and reduce agency risk. Stock repurchases have been shown to be positively associated with temporary components of earnings and cash flows (Skinner, 2008; Lee and Meng Rui, 2007; Dittmar and Dittmar, 2002; Jagannathan, Stephens, and Weisbach, 2000).

More recently, it has been noted that agency problems may also arise from stock option grants to executives. The exercise of stock options has been shown to have a significant impact on cash flows (Ciccotello, Grant, & Grant, 2004). First, the exercise of stock options provides a cash inflow related to the exercise price that employees pay to acquire shares. Second, the stock option expense recognized for tax purposes at stock option exercise decreases tax payments. Third, the company's decision about how to fund the exercises: use treasury shares, issue shares or repurchase shares also impacts associated cash flows. The impact of employee stock options

on a firm's cash flows suggests a separate agency problem that may arise from the relation between share repurchases and executive stock options.

Grullon and Michaely (2004) find a positive market reaction to repurchases when they involve a reduction in free cash flows. This suggests managers in firms with higher free cash flows would be more inclined to pursue share repurchases to impact their shares' market value. However, using free cash flows to repurchase shares may in fact be another manifestation of the principle-agent conflict when managers use repurchases to increase share prices and the value of employee stock options. In sum, if managers attempt to avoid agency problems they will return cash to owners by repurchasing shares, which will cause a positive relationship between current share repurchases and cash or earnings at the beginning of the period.

Employee stock option grants may have up to a five-year vesting period. Since most employee stock options have exercise prices that are set as the market price of the stock at the grant date, there is uncertainty about the underlying stock price at the time the option is exercised. To mitigate the stock price risk, the firm could buy shares at the grant date and later sell these shares to employees when they exercise their options. This strategy would remove some of the uncertainty surrounding the opportunity costs of the employee stock option grants. Rogers (2006) supports this hedging hypothesis with findings of a positive relationship between employee stock option grants and contemporaneous stock repurchases. Theoretically these results could also be consistent with the anti-dilution hypothesis discussed earlier, the difference arising from whether managers attempt to counter EPS dilution when stock options are issued or when they are exercised.

The overarching hypothesis put forth in this paper is that the implementation of SFAS No. 123R created a disincentive for the use of employee stock options as a compensation

scheme, and motivated companies to repurchase stock in an attempt to increase share prices and thereby maximize the value of outstanding employee stock options. If the implementation of the new accounting rule did impact management's stock repurchase decisions, we should observe significant changes in the relationships between stock repurchases and employee stock options.

3. Data and preliminary analyses

In order to assess management's reaction to the implementation of SFAS No. 123R, we focus on the relationship between stock option grants and the stock repurchase activity three fiscal years (2002-2004) prior to and three fiscal years (2005-2007) subsequent to the original effective date of SFAS No. 123R, which was December 15, 2005. The implementation date of SFAS No. 123R was delayed so that it became effective as of the beginning of the first annual reporting period that commenced after December 15, 2005 (i.e. the fiscal year beginning January 1, 2006 for calendar year firms). However, the relatively late date (April 14, 2005) of this decision makes us believe that stock repurchase and stock option decisions would have already been made by management based on the original effective date. Thus, in this study, we consider December 15, 2005 as the effective date of SFAS No. 123R. The pre and post SFAS No. 123R time periods we use are also consistent with those of Hayes, Lemmon and Qiu (2012).

Our initial sample includes all S&P 500 companies that had stock options outstanding during the six-year period surrounding the implementation of SFAS No. 123R. Consistent with Hayes, Lemmon, and Qiu (2012), we retain only non-regulated firms in our sample; financial institutions (SIC code between 6000 and 6999) and utilities (SIC code between 4900 and 4999), which were regulated at the time, were excluded. Based on the composition of the S&P 500 index in 2007, 123 of the 500 firms were in the financial and utility sectors, and, thus,

eliminated. One entity, Microsoft Corporation, elected to adopt the fair value provision under FAS 123 and therefore was not impacted by the requirements of SFAS No. 123R. Microsoft Corporation was also eliminated from our sample.

For the remaining 376 firms, data were obtained from COMPUSTAT and the individual firms' SEC 10-K and 10Q filings. Effective December 2003, the SEC required firms to disclose on a quarterly basis the number of shares repurchased. This information was not consistently reported in COMPUSTAT until fiscal year 2004. Prior information was manually collected from firms' 10-Ks. Firms for which the data was not available during the six year period surrounding SFAS 123R were eliminated. The final sample consists of 257 firms.

Recently, employee stock options as a compensation incentive have gained ground in all industries, but they have been particularly popular among tech companies. According to a 2006 Credit Suisse First Boston report five industries accounted for an estimated 41% of the 2006 pretax option compensation costs for S&P 500 companies (Carache & Zion, 2006): semiconductors and semiconductor equipment; pharmaceuticals; communications equipment; computers and peripherals; and software. Although we expect SFAS No. 123R to have affected all firms using employee stock options, we hypothesize that its impact on the firms in the five industries mentioned above was the most severe. In order to compare and contrast the repurchase activity between a sample that had extensively used stock options as a management incentive and is expected to be significantly impacted by the implementation of SFAS No. 123R, and a sample that would be marginally affected by the new accounting rule, we break our entire sample into two sub-samples: the primary and the secondary samples.

Our primary sample consists of firms in industries that we hypothesize the implementation of SFAS No. 123R impacted the most: semiconductors and semiconductor

equipment; pharmaceuticals; communications equipment; computers and peripherals; and software. Of the 257 firms in our entire sample, 48 firms are in these industries and eligible to be included in the primary sample. The secondary sample consists of the remaining 209 firms.

Figure 1 illustrates the changes in the number of shares repurchased, options exercisable, options exercised, options granted, and options outstanding over the six-year period bracketing the SFAS No. 123R implementation. The dominance of the primary sample during this period is quite obvious. On average, the number of the options outstanding at the beginning of each year for firms in the primary sample ranged between 141 millions and 174 millions; that of the secondary sample fluctuated between 25 millions and 30 millions. The number of options granted by the primary sample declined from 34 millions in 2002 to 18 millions in 2007. In the secondary sample, it went down from 6 millions to 3 millions. The average number of the options exercisable and exercised in the primary sample rose from 80 millions to 114 millions, and from 10 millions to 27 millions, respectively. In the secondary sample it increased from 16 millions to 21 millions and from 3 millions to 6 millions, respectively. Concomitant with the above changes in the options market, from 2002 until 2007 the number of shares repurchased by the primary sample more than doubled, from 25 million to approximately 66 million, while that of the secondary sample increased fivefold, from 5 to 25 million.

< Insert Figure 1 here >

Table 1 reports the summary statistics of the variables included in our analysis (and described below) for the full sample (Panel A) as well as the primary and secondary samples (Panel B). Detailed information about each variable is provided in the Appendix.

1. *Shares repurchased* (*REPURCHASED*). An important variable in this study is shares repurchased, which we measure as the actual number of shares repurchased as a fraction of

the total common shares outstanding. Prior stock repurchase research has primarily relied on the dollar value of repurchases divided by the prior year end market value of equity as the measure of share repurchases (Dittmar, 2000; Dittmar and Dittmar, 2002; Fenn and Liang, 1998; Gong, Louis and Sun, 2008) or the announced number of shares a firm intended to repurchase (Chan, Ikenberry, Lee and Wang, 2010; Grullon and Michaely, 2004; Jagannathan and Stephens, 2003; Lie, 2005). However, the use of the dollar value of repurchases obscures the impact of repurchases due to the share price fluctuations throughout the repurchase periods: it tends to overestimate repurchases in an increasing market and underestimate repurchases in a declining market. In addition, the announcement of repurchases is not an accurate indicator of the number of shares that a company will actually repurchase, as firms that announce repurchases often do not follow through with them.[3] The use of actual shares repurchased (instead of the dollar value of repurchases or the announced number of shares a firm intends to repurchase) is more consistent with the change in the financial reporting rules that went into effect December 2003 and that require companies to report more detailed information about their share repurchases.

2. *Stock Options Granted (GRANTED),* is the ratio of stock options granted to the common shares outstanding. Given the change in the management motivation to repurchase shares after the implementation of SFAS No. 123R, we expect to see a deviation from the historical positive relationship between options granted and share repurchases.
3. *Exercisable Stock Options* (*EXERCISABLE).* It is the ratio of total stock options exercisable to the common shares outstanding. We use it as proxy for vested stock options.

[3] Stephens and Weisbach (1998) found that on average firms acquire approximately 80 percent of the shares announced as repurchase targets within three years of the repurchase announcement.

4. *Exercised Stock Options (EXERCISED)* is the ratio of total options exercised to the common shares outstanding. We use this variable to control for the dilutive effects of employee stock options.
5. *Market to Book Ratio* (*MTB*) is the ratio of the market value of equity, given by the price per share multiplied by the number of shares outstanding, divided by the book value of equity. It is measured at the beginning of the period in which the repurchases are made. *MTB* is a measure for growth opportunities and is used to control for the signaling effect of share repurchases.
6. *Firm Leverage (DEBT)* is defined as the ratio of long-term debt to total assets. It is used to control for the leverage effect.
7. *Cash and Operating Income (CASH, FCF, and OPINC).* Variables Cash (*CASH*), the ratio of cash and short term investments to total assets, Free Cash Flow (*FCF*), the ratio of free cash flow to the book value of equity, and Operating Income (*OPINC*), defined as the income before extraordinary events to total assets, are used to control for the agency problems effect. The agency hypothesis suggests that if managers are attempting to avoid agency problems they will return cash or operating income to owners by repurchasing shares. *CASH* is measured at the beginning of the repurchase period in order to reflect the cash position prior to the repurchase decision.

As reported in Panel A, during the 2002-2007 period, the average company in our sample has purchased back about 3% of its shares outstanding, granted employee stock options representing about 1.5% of its shares outstanding, had a market value approximately 3.8 times greater than its book value, financed 17% of its assets with debt, and had 14% of its assets in cash. In addition, its exercisable and exercised employee stock options were approximately 5.5%

and 1.4% of its shares outstanding. The profiles of the average companies in the primary and secondary samples were fairly similar, except that exercisable and granted options (as fractions of shares outstanding) were almost twice as large for the primary sample compared to the secondary sample. Additionally, the average company in the primary sample had a higher market to book value, lower leverage and higher cash than the average company in the secondary sample.

<Insert Table 1 here>

In Table 2 we present the summary statistics of the variables described above before and after the implementation of SFAS No. 123R, and the results of the t-test for the equality of the means and the Wilcoxon rank test for the equality of the medians of all these variables pre and post SFAS No. 123R.

As expected, with no exception, the number of repurchased shares as a fraction of the total shares outstanding significantly increased in the post SFAS No. 123R in all three samples we use. On average, the number of buybacks increased from 1.6% of total shares outstanding in the 3-year period before SFAS No. 123R to 4.4% in the 3-year post SFAS No. 123R period. The biggest number of shares was repurchased by the firms in the primary sample. Over the same period, the number of options vested (exercisable) accelerated significantly in the primary sample, but declined in the secondary sample. Furthermore, the number of new options granted has systematically declined, with the biggest drop experienced by the primary sample. On average, firms in the five industries hypothesized to be the most affected by the change in the accounting rule have lowered new options granted from 2.9% of total shares outstanding in the pre SFAS No. 123R period to 1.9% in the post period. The results of the Wilcoxon rank test are fairly similar.

In sum, the findings reported in Table 2 confirm our expectations that following SFAS 123R firms reduced the number of new options granted and increased the number of buybacks in an effort to maximize the value of existing employee stock options, with little difference in management behavior between the two samples.

< Insert Table 2 here >

4. Empirical results

4.1. Pre- vs. Post-SFAS 123R

The implementation of SFAS No. 123R is expected to reduce reported income. To cope with this impact, management may be motivated to decrease the use of stock options as part of compensating employees and engage in stock repurchases in an attempt to increase the value of outstanding employee stock options. Our objective in this study is to investigate the change in management incentives following the implementation of SFAS 123R. Particularly, we examine the relationship between stock repurchases and employee stock options before and after the implementation of SFAS 123R in an attempt to understand whether it was changed by the new reporting rule.

In order to test our hypothesis, we use a pooled, time series regression model as follows:

$$\begin{aligned} REPURCHASED_{it} = {} & \alpha_0 + \alpha_1 GRANTED_{it} + \alpha_2 EXERCISABLE_{it} + \alpha_3 EXERCISED_{it} \\ & + \alpha_4 MTB_{it-1} + \alpha_5 DEBT_{it} + \alpha_6 CASH_{it-1} + \alpha_7 FCF_{it} + \alpha_8 OPINC_{it} \\ & + \sum_k \alpha_k X_k \end{aligned} \qquad (1)$$

where $REPURCHASED_{it}$ is the number of shares repurchased by firm i in year t divided by its total shares outstanding, $GRANTED_{it}$ is the number of new stock options granted in year t

divided by common shares outstanding, $EXERCISABLE_{it}$ is the number of stock options exercisable at the end of year t divided by the number of common shares outstanding, $EXERCISED_{it}$ is the number of stock options exercised in year t divided by the number of common shares outstanding, $MTB_{it\text{-}1}$ is the ratio of the market value of equity to the book value of equity, $DEBT_{it}$ is the long-term debt divided by total assets, $CASH_{it\text{-}1}$ is the amount of cash and short term investments divided by total assets, FCF_{it} is the free cashflow divided by the book value of equity, $OPINC_{it}$ is the operating income before extraordinary events divided by total assets, and X_k are year dummies.

Our main focus is on the relationship between stock repurchases and employee stock options, particularly between stock repurchases and options granted and exercisable. Cognizant of the vast literature on the determinants of stock repurchases, we use all other variables as controls for the signaling (*MTB*), anti-dilution (*EXERCISED*), leverage (*DEBT*), and agency (*CASH*, *FCF*, and *OPINC*) hypotheses.

Table 3 presents the matrix of pairwise correlations of Eq. (1) variables over the six-year period surrounding the implementation of SFAS No. 123R. Correlations are relatively low and consistent across all three samples. Noteworthy are those between REPURCHASED and the dependent variables; although not too high, they are in general stronger for the primary sample than for the secondary sample. REPURCHASED is positively related to all variables except GRANTED and MTB (for the primary sample only).

< Insert Table 3 here >

The estimates of the regression coefficients for the 3-year pre and post periods bracketing the implementation of SFAS No. 123R are presented in Table 4, which also reports the test for equality of the regression coefficients between these two sample periods based on Paternoster,

Brame, Mazerolle and Piquero (1998). Panel A reports the results for the full sample, while Panels B and C summarize those for the primary and secondary samples. Consistent with the results in Table 2, after controlling for other reasons for stock repurchases, we find a negative relationship between stock repurchases and options granted throughout the 6-year period bracketing the SFAS 123R implementation for the entire sample and the two sub-samples considered. The relationship is not significant pre- SFAS 123R for any of the three samples, but it becomes statistically and economically significant post SFAS 123R for the full and primary samples. For example, a reduction by one unit in the number of options granted on average by the primary sample in the post-SFAS 123R results in an increase in the number of shares repurchased by 0.80 units.

If stock repurchases were used as a hedging instrument against option grant price risk exposure, as Rogers (2006) argues, firms should repurchase more shares in years when they grant more options. The negative relationship between stock repurchases and options granted that we document, however, confirms our intuition that, given the expense associated with employee stock options reporting following SFAS 123R implementation, management may be motivated to decrease the use of stock options as employee incentives and engage in stock repurchases in an attempt to increase the value of outstanding employee stock options. Furthermore, it appears that this behavior is more prevalent in the five industries that have made heavy use of employee stock options as a performance incentive (primary sample), than in other industries (secondary sample).

The results displayed in Table 4 also show a positive relationship between employee stock options exercisable and stock repurchases, that becomes highly statistically significant after SFAS 123R implementation in all three samples considered. On average, an increase by one unit

in the number of options exercisable by the primary sample in the post-SFAS 123R results in an increase in the number of shares repurchased by 0.66 units. Consistent with Kahle (2002), this finding suggests that as vesting employee stock options accelerated post- SFAS 123R, more shares were repurchased to fund the exercise of these options (option-funding hypothesis). The Chi-squared test for equality of coefficients shows a sharp positive turn in the relationship between shares repurchases and options exercisable from the pre- to the post-SFAS 123R period in the full sample, finding that we attribute entirely to the firms in the primary sample.

Looking at the control variables, results are typically consistent with the known hypotheses of stock repurchases. Firms repurchase more shares when they have more cash or higher operating income (see Dittmar, 2000), and when their employees exercise more stock options (see Fenn and Liang, 2001; Kahle, 2002). Firms with low investment opportunities (proxied by market-to-book ratio) repurchase a lower percentage of shares (see Stephens and Weisbach, 1998; Rogers, 2006). However, the explanatory power of most of these variables increases significantly after SFAS 123R implementation. The significant stock repurchase activity of firms with low growth opportunities in the primary sample in the post- SFAS 123R period makes us believe that management used the buybacks to artificially increase the share price in an attempt to enhance the value of employee stock options.

An additional interesting result in Table 4 is that, in the three years following the change in the accounting rule, firms with higher leverage tended to repurchase significantly more shares than in the previous 3-year period, especially those in the primary sample. Based on the results reported in Table 2, following SFAS 123R implementation, firms in the primary sample increased their repurchase activity and leverage simultaneously, and it is very likely that they funded some of their buybacks with debt. Inconsistent with the leverage hypothesis, this finding

shows once again that in the post-SFAS 123 period management, especially in the primary sample, had additional motives to engage in share repurchases than those stated by traditional hypotheses.

< Insert Table 4 here >

4.2. Primary vs. Secondary Sample

Based on the results reported so far, differences in management behavior between the primary and secondary samples are obvious, but is there any statistically and/or economically significant difference between the two samples? To answer this question we do a test for equality of the regression coefficients between these two sub-samples, both pre- and post-SFAS 123R.

The results reported in Table 5 reveal no significant difference in the use of stock options as a compensation incentive between the primary and secondary samples in the 3-year pre-SFAS 123R period. Looking at the 3-year period following the implementation of SFAS 123R, however, our findings tell a different story. While in both sub-samples stock repurchases are contemporaneously negatively related to option grants, a reduction by one unit in the number of options granted in the post-SFAS 123R results on average in a rise in the number of shares repurchased of nearly 0.55 units more in the primary sample than in the secondary sample. Furthermore, an increase by one unit in the number of options exercisable in the post-SFAS 123R results in an increase in the number of shares repurchased of approximately 0.50 units more in the primary sample than in the secondary sample. Additionally, the lack of investment opportunities and excess cash and operating income were stronger reasons for stock buybacks in the primary sample relative to the secondary sample.

< Insert Table 5 here >

In sum, we argue that SFAS 123R had unintended consequences in that post 123R, companies curtailed the use of employee stock options and used the buybacks as a way to increase the value of the existing stock options. For industries that made extensive use of employee stock options in their compensation schemes, there are significant changes in the magnitude of the repurchase determinants that are not observed in other S&P 500 industries.

5. Conclusions

The implementation of SFAS No. 123R provides a good opportunity to study management's response to the mandated change in accounting for stock based compensation and their subsequent use of share repurchases. SFAS No. 123R mandates the valuation and expensing of employee stock options based on their fair market value. For new options this is required to be done at the time the options are granted, while for outstanding unvested options this is required to be adopted at the time management applied the new rule or the statement effective date whichever comes first. From the financial reporting side, implementation of SFAS No. 123R is expected to reduce reported income. To cope with this impact, management decreased the use of stock options as part of attracting and compensating talented employees.

In this study we examine the relationship between employee stock options and stock repurchases in the 6-year period bracketing SFAS 123R implementation in order to determine whether management aggressively engaged in stock repurchases after the mandate of SFAS No. 123R in an attempt to increase the value of outstanding employee stock options. Industries that extensively made use of stock options as part of their compensation schemes prior to the new reporting rule were analyzed separately from other industries within the S&P 500.

Our findings demonstrate that both groups of industries made significant changes in their stock option granting and stock repurchase activity from the three-year pre- to the three-year post- SFAS 123R period: firms in both subsamples have significantly limited the use of stock option as part of their compensation programs, accelerated vesting the existing options and engaged in repurchase activity post-SFAS 123R implementation. However, when we examine the relationship between option grants and share repurchases, we find that, although negative for both sub-samples, it changes significantly only for firms in the primary sample. For industries that made extensive use of stock options as part of attracting and compensating talented employees, after controlling for the traditional determinants of share repurchases, we find that share repurchases are strongly negatively related to contemporaneous option grants in the 3-year post-SFAS 123R period. This finding supports our hypothesis that implementation of SFAS No. 123R provided significant motivation for industries in the primary sample to curtail the use of employee stock options and engage in stock repurchase activity in an attempt to increase the value of these options in the post SFAS No. 123R environment. On the other hand, firms in the secondary sample seem to exhibit more consistent management behavior across pre and post SFAS No. 123R implementation periods, which demonstrates that the impact of the new accounting rule on management's use of stock repurchases was more severe in industries that made extensive use of employee stock options in their compensation schemes prior to the implementation of SFAS No. 123R.

Appendix

This appendix provides additional details about the definition, sources and timing of the data and variables used in this analysis.

1. **REPURCHASED** is the number of shares repurchased (Compustat CSHOPQ) divided by the common shares outstanding used to calculate the basic earnings per share (Compustat CSHPRI).

$$REPURCHASED_t = \text{Actual Number of Shares Repurchased}_t / CSHPRI_t$$

A change in financial reporting rules requiring companies to report more detailed information about their share repurchases went into effect December 2003. Starting 2004, for most firms repurchase data was reported to Compustat on a quarterly basis (CSHOPQ), which we summed up in order to obtain the yearly repurchase amount. For periods in which no data was available in Compustat, we manually collected these data from companies' 10K and 10Q filings.

2. **GRANTED** is the ratio of stock options granted (Compustat OPTGR) to the common shares outstanding used in calculating basic EPS (Compustat CSHPRI).

$$GRANTED_t = OPTGR_t / CSHPRI_t$$

The data for the total options granted (OPTGR) was obtained from Compustat for post 2004 periods. For 2004 and prior periods, total options granted data was collected from 10K filings.

3. **EXERCISABLE** is the ratio of total options exercisable (Compustat OPTEX) to the common shares outstanding used in calculating basic EPS (Compustat CSHPRI).

$$EXERCISABLE_t = OPTEX_t / CSHPRI_t$$

The data for the total options exercisable (OPTEX) was obtained from Compustat for post 2004 periods. For 2004 and prior periods, options exercisable data was collected from 10K filings.

4. **EXERCISED** is the ratio of total options exercised (Compustat OPTEXD) to the common shares outstanding used in calculating basic EPS (Compustat CSHPRI).

$$EXERCISED_t = OPTEXD_t / CSHPRI_t$$

The data for the total options exercised (OPTEXD) was obtained from Compustat for post 2004 periods. For 2004 and prior period total options exercised data was collected from 10K filings.

5. **MTB** is the ratio of the market value of equity, given by the year-end price per share (Compustat PRCC F) multiplied by the number of shares outstanding (Compustat CSHO), divided by the book value of equity (Compustat SEQ). It is measured at the end of the period prior to the period repurchases are made.

$$MTB_{t-1} = (PRCC\ F_{t-1} * CSHO_{t-1})/SEQ_{t-1}$$

6. **DEBT** is the ratio of long-term debt (Compustat DLTT) divided by total assets (Compustat AT).

$$DEBT_t = DLTT_t / AT_t$$

7. **CASH** is the ratio of cash and short term investments (Compustat CHE) to total assets (Compustat AT). CASH is measured at the beginning of the repurchase period in order to reflect the cash position prior to the repurchase decision.

$$CASH_{t-1} = CHE_{t-1} / AT_{t-1}$$

8. **FCF** is the ratio of free cash flow to the book value of equity (Compustat SEQ).

$$FCF_t = CASHFLOW_t / SEQ_t$$

The free cash flow, CASHFLOW is measured as in Lehn and Poulsen (1989):

$$CASHFLOW_t = EBITDA_t – TXPD_t – XINT_t – DVC_t – DVP_t$$

EBITDA (Compustat EBITDA) is earnings before interest, tax, depreciation and amortization. TXPD (Compustat TXPD) is total income taxes paid. XINT (Compustat XINT) is total interest and related expenses. DVC (Compustat DVC) is the total amount of dividends paid on common stock. DVP (Compustat DVP) is the total amount of dividends paid on preferred stock.

9. **OPINC** is the ratio of income before extraordinary events (Compustat IB) to total assets (Compustat AT).

$$OPINC_t = IB_t / AT_t$$

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Table 1. Descriptive statistics. Full sample period (2002-2007).

Panel A. Full Sample

Variable	Mean	Stdev	25th percentile	50th percentile	75th percentile
REPURCHASED	0.0303	0.0416	0.0000	0.0177	0.0441
GRANTED	0.0153	0.0151	0.0061	0.0122	0.0202
EXERCISABLE	0.0548	0.0334	0.0302	0.0502	0.0734
EXERCISED	0.0143	0.0124	0.0056	0.0112	0.0197
MTB	3.8235	7.2916	2.1738	3.2791	4.9239
DEBT	0.1735	0.1291	0.0791	0.1643	0.2533
CASH	0.1424	0.1597	0.0299	0.0833	0.1936
FCF	0.2630	0.9228	0.1561	0.2307	0.3184
OPINC	0.0687	0.1070	0.0405	0.0722	0.1076

Panel B. Primary & Secondary Sample

Variable	Primary sample (N=48)					Secondary sample (N=209)				
	Mean	Stdev	25th percentile	50th percentile	75th percentile	Mean	Stdev	25th percentile	50th percentile	75th percentile
REPURCHASED	0.0349	0.0469	0.0001	0.0195	0.0524	0.0292	0.0402	0.0000	0.0173	0.0417
GRANTED	0.0240	0.0219	0.0114	0.0194	0.0315	0.0133	0.0122	0.0055	0.0109	0.0179
EXERCISABLE	0.0828	0.0375	0.0566	0.0793	0.1042	0.0484	0.0289	0.0259	0.0445	0.0648
EXERCISED	0.0164	0.0158	0.0060	0.0126	0.0225	0.0138	0.0114	0.0056	0.0111	0.0193
MTB	4.7796	2.9789	2.6929	4.1516	5.8131	3.6039	7.9434	2.0904	3.0821	4.5778
DEBT	0.0958	0.1350	0.0000	0.0372	0.1721	0.1914	0.1209	0.1093	0.1774	0.2648
CASH	0.3414	0.1828	0.1986	0.3000	0.4339	0.0967	0.1120	0.0238	0.0606	0.1267
FCF	0.3340	0.8320	0.0762	0.1828	0.2944	0.2467	0.9419	0.1712	0.2366	0.3245
OPINC	0.0590	0.2096	0.0364	0.0862	0.1268	0.0709	0.0632	0.0413	0.0702	0.1022

Table 2. Descriptive statistics. Pre- and Post-SFAS 123R periods.

Panel A. Full Sample

Variable	Pre SFAS 124R (2002-2004)			Post SFAS 124R (2005-2007)			Mean difference	t-test p-value	Median difference	Wilcoxon sign test p-value
	Mean	Median	Stdev	Mean	Median	Stdev				
REPURCHASED	0.016	0.004	0.025	0.044	0.032	0.049	0.028***	0.000	0.028***	0.000
GRANTED	0.019	0.016	0.017	0.012	0.009	0.012	-0.008***	0.000	-0.007***	0.000
EXERCISABLE	0.056	0.052	0.032	0.054	0.048	0.034	-0.002	0.212	-0.004**	0.027
EXERCISED	0.013	0.009	0.013	0.015	0.013	0.011	0.002***	0.001	0.003***	0.000
MTB	3.839	3.182	9.094	3.808	3.360	4.869	-0.032	0.932	0.179	0.175
DEBT	0.181	0.171	0.128	0.166	0.155	0.130	-0.014**	0.030	-0.016***	0.008
CASH	0.135	0.072	0.164	0.149	0.092	0.155	0.014*	0.087	0.020***	0.000
FCF	0.272	0.229	0.465	0.254	0.234	1.220	-0.019	0.693	0.005	0.330
OPINC	0.056	0.062	0.135	0.081	0.081	0.066	0.025***	0.000	0.019***	0.000

Panel B. Primary Sample

Variable	Pre SFAS 124R (2002-2004)			Post SFAS 124R (2005-2007)			Mean difference	t-test p-value	Median difference	Wilcoxon sign test p-value
	Mean	Median	Stdev	Mean	Median	Stdev				
REPURCHASED	0.016	0.007	0.021	0.054	0.040	0.057	0.038***	0.000	0.033***	0.000
GRANTED	0.029	0.023	0.027	0.019	0.016	0.014	-0.011***	0.000	-0.007***	0.000
EXERCISABLE	0.078	0.072	0.040	0.087	0.084	0.034	0.009**	0.041	0.012*	0.056
EXERCISED	0.014	0.009	0.017	0.019	0.016	0.014	0.005**	0.010	0.007***	0.000
MTB	5.305	4.627	3.439	4.264	4.027	2.322	-1.042***	0.003	-0.600**	0.026
DEBT	0.086	0.026	0.108	0.106	0.047	0.157	0.020	0.210	0.021	0.253
CASH	0.331	0.280	0.190	0.352	0.348	0.175	0.021	0.321	0.068	0.200
FCF	0.293	0.172	0.598	0.365	0.183	1.005	0.071	0.563	0.011	0.928
OPINC	0.029	0.073	0.284	0.089	0.097	0.076	0.061**	0.014	0.024***	0.005

Panel C. Secondary Sample

Variable	Pre SFAS 124R (2002-2004)			Post SFAS 124R (2005-2007)			Mean	t-test	Median	Wilcoxon sign test
	Mean	Median	Stdev	Mean	Median	Stdev	difference	p-value	difference	p-value
REPURCHASED	0.016	0.004	0.026	0.042	0.031	0.047	0.026***	0.000	0.027***	0.000
GRANTED	0.017	0.015	0.012	0.010	0.008	0.011	-0.007***	0.000	-0.007***	0.000
EXERCISABLE	0.051	0.047	0.028	0.046	0.041	0.029	-0.005***	0.004	-0.006***	0.001
EXERCISED	0.013	0.010	0.012	0.014	0.012	0.01	0.001**	0.028	0.002***	0.000
MTB	3.505	2.992	9.92	3.703	3.218	5.279	0.198	0.659	0.226*	0.069
DEBT	0.202	0.191	0.122	0.180	0.167	0.119	-0.022***	0.001	-0.024***	0.001
CASH	0.091	0.048	0.118	0.103	0.072	0.105	0.012*	0.053	0.024***	0.000
FCF	0.265	0.233	0.429	0.229	0.239	1.261	-0.036	0.500	0.006	0.551
OPINC	0.062	0.061	0.061	0.080	0.078	0.064	0.018***	0.000	0.017***	0.000

***, **, * - denotes significance at 1%, 5%, and 10% level, respectively

Table 3. Correlation Matrix.

Table 3 reports the correlation matrix of share repurchased, stock options and the control variables. $REPURCHASED_t$ is the number of shares repurchased in year t divided by the number of common shares outstanding in the same year, MTB_{t-1} is the ratio of the market value of equity to the book value of equity, $EXERCISED_t$ is the number of stock options exercised in year t divided by the number of common shares outstanding, $EXERCISABLE_t$ is the number of stock options exercisable at the end of the year t divided by the number of common shares outstanding, $DEBT_t$ is the long-term debt divided by total assets, $CASH_{t-1}$ is the amount of cash and short term investments divided by total assets, FCF_t is the free cashflow divided by the book value of equity, $OPINC_t$ is the operating income before extraordinary events divided by total assets, and $GRANTED_t$ is the number of new stock options granted in year t divided by common shares outstanding. All variables have been described in Section 2. Detailed information about each variable appears in the Appendix.

Panel A. Full Sample

	$REPURCHASED_t$	$GRANTED_t$	$EXERCISABLE_t$	$EXERCISED_t$	MTB_{t-1}	$DEBT_t$	$CASH_{t-1}$	FCF_t
$GRANTED_t$	-0.0761							
$EXERCISABLE_t$	0.1340	0.3914						
$EXERCISED_t$	0.2154	0.3359	0.2361					
MTB_{t-1}	0.0309	0.0444	0.0159	0.0522				
$DEBT_t$	0.0031	-0.0564	-0.0811	-0.1142	-0.0564			
$CASH_{t-1}$	0.1128	0.2775	0.3218	0.1888	0.0984	-0.3761		
FCF_t	0.1014	-0.1197	-0.0191	-0.0122	0.1251	-0.0926	0.0289	
$OPINC_t$	0.1551	-0.1635	-0.1193	0.0697	0.1080	-0.1466	0.0848	0.0678

Panel B. Primary Sample

	$REPURCHASED_t$	$GRANTED_t$	$EXERCISABLE_t$	$EXERCISED_t$	MTB_{t-1}	$DEBT_t$	$CASH_{t-1}$	FCF_t
$GRANTED_t$	-0.1436							
$EXERCISABLE_t$	0.3240	0.3463						
$EXERCISED_t$	0.1834	0.4072	0.3521					
MTB_{t-1}	-0.0753	-0.0381	-0.1286	-0.0406				
$DEBT_t$	0.0751	-0.0228	-0.1765	-0.1535	0.0157			
$CASH_{t-1}$	0.1736	0.1422	0.1500	0.1672	0.1146	-0.1449		
FCF_t	0.2715	-0.1097	0.0949	-0.0628	-0.0995	-0.1078	0.0251	
$OPINC_t$	0.1947	-0.1888	-0.0265	0.0030	0.2372	-0.0263	0.1564	0.0517

Panel C. Secondary Sample

	$REPURCHASED_t$	$GRANTED_t$	$EXERCISABLE_t$	$EXERCISED_t$	MTB_{t-1}	$Debt_t$	$Cash_{t-1}$	FCF_t
$GRANTED_t$	-0.0739							
$EXERCISABLE_t$	0.0538	0.3096						
$EXERCISED_t$	0.2233	0.2851	0.1687					
MTB_{t-1}	0.0397	0.0435	0.0023	0.0623				
$DEBT_t$	0.0026	0.0485	0.1112	-0.0742	-0.0476			
$CASH_{t-1}$	0.0714	0.1481	0.0951	0.1782	0.0820	-0.3211		
FCF_t	0.0598	-0.1537	-0.0722	-0.0025	0.1433	-0.0811	0.0036	
$OPINC_t$	0.1666	-0.1329	-0.2197	0.1626	0.1440	-0.3316	0.1350	0.1069

Table 4. Stock repurchases and employee stock options, before and after SFAS no. 123R

Table 4 reports the results of the pooled, time series regressions of share repurchases (measured by the number of shares repurchased by firm in year *t* divided by its total shares outstanding) against employee stock options and control variables, before and after SFAS No. 123R implementation. MTB_{t-1} is the ratio of the market value of equity to the book value of equity, $EXERCISED_t$ is the number of stock options exercised in year *t* divided by the number of common shares outstanding in the same year, $EXERCISABLE_t$ is the number of stock options exercisable at the end of the year *t* divided by the number of common shares outstanding in year *t*, $DEBT_t$ is the long-term debt divided by total assets, $CASH_{t-1}$ is the amount of cash and short term investments divided by total assets, FCF_t is the free cashflow divided by the book value of equity, $OPINC_t$ is the operating income before extraordinary events divided by total assets, and $GRANTED_t$ is the number of new stock options granted in year *t* divided by common shares outstanding in the same year. All variables have been described in Section 2. Detailed information about each variable appears in the Appendix. The t-statistics are calculated using the White (1980) correction for heteroskedasticity. The last two columns report the results of the test for the equality of regression coefficients across the two sample periods. ***, **, * - denotes significance at 1%, 5%, and 10% level, respectively.

Panel A. Full Sample

Variable	Pre SFAS 123R (2002-2004)		Post SFAS 123R (2005-2007)		Coef difference	p-value
	Coef	t-stat	Coef	t-stat		
$GRANTED_t$	-0.101	-1.526	-0.342**	-2.420	-0.241	0.122
$EXERCISABLE_t$	0.058*	1.682	0.307***	5.349	0.249***	0.000
$EXERCISED_t$	0.403***	3.664	0.751***	4.290	0.348	0.092
MTB_{t-1}	-0.000	-0.500	-0.000	-0.241	-0.000	0.887
$DEBT_t$	-0.007	-0.710	0.067***	3.078	0.074***	0.000
$CASH_{t-1}$	0.006	0.788	0.016	1.195	0.010	0.532
FCF_t	0.006*	1.727	0.005**	2.531	-0.001	0.791
$OPINC_t$	0.022*	1.793	0.136***	4.467	0.113****	0.000
Year dummies	YES		YES			
No. Obs.	771		771			
Adj. R^2	0.105		0.152			

Panel B. Primary Sample

Variable	Pre SFAS 123R (2002-2004)		Post SFAS 123R (2005-2007)		Coef difference	p-value
	Coef	t-stat	Coef	t-stat		
MTB_{t-1}	0.000	0.720	-0.004***	-2.596	-0.004***	0.007
$EXERCISED_t$	0.098	0.678	0.582**	2.127	0.484	0.118
$EXERCISABLE_t$	0.062	1.070	0.663***	6.247	0.601***	0.000
$DEBT_t$	-0.046***	-3.039	0.085***	3.038	0.132***	0.000
$CASH_{t-1}$	0.000	0.047	0.044**	2.068	0.043*	0.056
FCF_t	-0.004**	-2.189	0.016***	3.451	0.020***	0.000
$OPINC_t$	0.013**	2.207	0.234***	6.144	0.221***	0.000
$GRANTED_t$	-0.102	-1.354	-0.798***	-2.754	-0.696**	0.020
Year dummies	YES		YES			
No. Obs.	144		144			
Adj. R^2	0.094		0.486			

Panel C. Secondary Sample

Variable	Pre SFAS 123R (2002-2004)		Post SFAS 123R (2005-2007)		Coef difference	p-value
	Coef	t-stat	Coef	t-stat		
MTB_{t-1}	-0.000	-1.136	0.000	0.475	0.000	0.375
$EXERCISED_t$	0.389***	3.092	0.870***	3.995	0.481*	0.056
$EXERCISABLE_t$	0.081*	1.811	0.166***	2.625	0.085	0.274
$DEBT_t$	0.004	0.318	0.054**	2.158	0.051*	0.069
$CASH_{t-1}$	0.018	1.246	0.006	0.290	-0.011	0.661
FCF_t	0.009**	2.099	0.003***	5.224	-0.007	0.131
$OPINC_t$	0.072***	3.022	0.083**	2.413	0.012	0.777
$GRANTED_t$	-0.002	-0.019	-0.252*	-1.762	-0.250	0.156
Year dummies	YES		YES			
No. Obs.	627		627			
Adj. R^2	0.144		0.084			

Table 5. Test for the equality of regression coefficients of the primary and secondary samples, before and after SFAS no. 123R

Table 5 reports the results of the test for the equality of regression coefficients of the primary and secondary samples, obtained in the pooled, time series regressions of share repurchases (measured by the number of shares repurchased by firm in year *t* divided by its total shares outstanding) on employee stock options and control variables, before and after SFAS no. 123R. MTB_{t-1} is the ratio of the market value of equity to the book value of equity, $EXERCISED_t$ is the number of stock options exercised in year *t* divided by the number of common shares outstanding in the same year, $EXERCISABLE_t$ is the number of stock options exercisable at the end of the year *t* divided by the number of common shares outstanding in year *t*, $DEBT_t$ is the long-term debt divided by total assets, $CASH_{t-1}$ is the amount of cash and short term investments divided by total assets, FCF_t is the free cashflow divided by the book value of equity, $OPINC_t$ is the operating income before extraordinary events divided by total assets, and $GRANTED_t$ is the number of new stock options granted in year *t* divided by common shares outstanding in the same year. All variables have been described in Section 2. Detailed information about each variable appears in the Appendix. ***, **, * - denotes significance at 1%, 5%, and 10% level, respectively.

	Pre SFAS 123R (2002-2004)				Post SFAS 123R (2005-2007)			
Variable	Primary Sample Coef	Secondary Sample Coef	Coef difference	p-value	Primary Sample Coef	Secondary Sample Coef	Coef difference	p-value
MTB_{t-1}	<.0001	<-.0001	<.0001	0.320	-0.004	<.0001	0.004***	0.008
$EXERCISED_t$	0.098	0.389	0.291	0.129	0.582	0.870	0.288	0.411
$EXERCISABLE_t$	0.062	0.081	0.019	0.791	0.663	0.166	-0.497***	<.0001
$DEBT_t$	-0.046	0.004	0.050**	0.010	0.085	0.054	-0.031	0.412
$CASH_{t-1}$	<.0001	0.018	0.017	0.292	0.044	0.006	-0.038	0.214
FCF_t	-0.004	0.009	0.013***	0.006	0.016	0.003	-0.014***	0.004
$OPINC_t$	0.013	0.072	0.059**	0.016	0.234	0.083	-0.151***	0.003
$GRANTED_t$	-0.102	-0.002	0.100	0.433	-0.798	-0.252	0.546*	0.091
Year dummies	YES	YES			YES	YES		

Figure 1. Selected statistics