

**The Effect of FASB Statement No. 123R on Stock Repurchases:  
An Empirical Examination of Management Incentives<sup>♦</sup>**

Steve Hegemann

Nebraska Wesleyan University  
Business, Accounting and Economics Department  
5000 St Paul Ave, Lincoln, NE 68504  
United States  
shegeman@nebrwesleyan.edu

Iuliana Ismailescu<sup>\*</sup>

Pace University  
Department of Graduate Economics and Finance  
Lubin School of Business  
One Pace Plaza, New York, NY 10038  
United States  
iismailescu@pace.edu

**Abstract**

This study examines management's response to the change in accounting for stock option-based compensation imposed by SFAS No. 123R, whose 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 negative relation between stock options granted and shares repurchased in the aftermath of SFAS No. 123R, particularly for the S&P 500 firms known for their heavy use of employee stock options. Furthermore, evidence of a contemporaneous increase in repurchases and leverage in the post SFAS 123R period may suggest that some of the buybacks may have been funded with debt. Our findings are robust to the inclusion of traditional determinants of share repurchases.

JEL Classification: G30, G32, G35

Key words: SFAS 123R; share repurchases; employee stock options; management incentives

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<sup>\*</sup> Corresponding author.

## 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 (ESOs) 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 ESOs are granted at the money (when exercise price is equal to the market price), no expense was generally required to be recorded.<sup>1</sup> 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 ESOs.

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.<sup>2</sup> SFAS No. 123R also requires that all unvested ESOs 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.<sup>3</sup>

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.

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<sup>1</sup> 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.

<sup>2</sup> Despite mandated recognition of the ESO expense after SFAS 123R implementation, Barth, Gow and Taylor (2012) find that some firms’ managers and analysts exclude it from pro forma earnings and Street earnings, respectively, either to opportunistically increase earnings, smooth earnings, and meet earnings benchmarks or because ESO expense exclusion increases earnings’ predictive ability for future performance.

<sup>3</sup> See Choudhary, Rajgopal and Venkatachalam (2009) for a discussion of accelerated vesting of ESOs prior to SFAS 123R.

Under SFAS No. 123R, repricing or reissuing outstanding options, which had been common for 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 the issuance of new or repriced options.

The immediate effect of the new rule was that many corporations, especially IT firms, either eliminated or curtailed the use of ESOs as part of their compensation schemes. Brown and Lee (2011) attribute 45% of the ESO cutbacks around the issuance of SFAS 123R to the removal of the favorable accounting benefits available to firms prior to SFAS 123R. 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.

The reduced possibility of new or repriced stock option grants, the acceleration of vesting for many ESOs, and their limited life created a “use-it-or-lose-it” situation for management and employee stock option holders. This “use-it-or-lose-it” situation provided new incentive for management to attempt to influence share prices in order to maximize the value of the declining number of outstanding ESOs prior to their expiration in the post SFAS No. 123R environment.

It is generally accepted that managers repurchase outstanding shares in order to increase the market value of their company’s stock (see Ikenberry, Lakonishok, and Vermaelen, 2000; Chan, Ikenberry, and Lee, 2004; Bradford, 2008; Urs and Theo, 2009). This practice is more likely in firms with large insider 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 ESOs granted by the companies in our sample has declined on average by approximately 28%, while the ESOs vested (proxied by the number of exercisable stock options) has increased on average by nearly 16% and the number of outstanding ESOs has dropped by 4%. Over the same period, the number of 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 ESOs and the previously accelerated vesting of the existing underwater options. Both prompted firms' management to attempt to increase the stock price to maximize the value of these options prior to their expiration, in order to take advantage of the "use-it-or-lose-it" situation. To our knowledge, this is the first paper that explores the impact of 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 unintended 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 and Hypotheses**

One strand of the financial literature our study relates to is stock buybacks. 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 ESOs (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; 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 ESOs and repurchases as a means to counter the dilution effect of exercised ESOs on earnings per share (Lee and Alam, 2004; Bens, Nagar, Skinner, and Wong, 2003; Weisbenner, 2000). The granting and exercise of

ESOs 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. Lie (2002) finds that firms that engage in self-tender offers generally have debt ratios below their predicted levels before the offers, but that their debt ratios typically rise above the predicted levels following the offers. Hovakimian et al. (2001) argue that the deviation between the actual and target debt ratios plays an important role in the repurchase decision, much more than in an issuance decision. McNally (1999) reports that while firms use repurchases to attain their optimal capital structure, firms with low debt ratios prior to a repurchase benefit more (achieve higher returns) because they are more likely to be below their optimal level of leverage. 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. Consistent with this, 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 and 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 ESOs on a firm's cash flows suggests a separate agency problem that may arise from the relation between share repurchases and executive stock options.

Employee stock option grants may have up to a five-year vesting period. Since most ESOs 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 other strand of literature our paper follows is related to option-based compensation and the opportunistic actions by managers to increase the value of their stock options. Evidence that managers influence their pay goes back to Yermack (1997), who finds that the timing of CEO stock option awards coincides with favorable movements in the company stock prices. He shows that stock prices exhibited negative abnormal returns prior to a grant date and positive abnormal returns afterward. Similar results are reported by Narayanan and Seyhun (2005). Lie (2005b) provides evidence that backdating was an important cause of the abnormal stock returns preceding and following grant dates. Collins, Gong, and Li (2005), Heron and Lie (2007), and Narayanan and Seyhun (2006) find that the patterns of pre- and post-grant returns were influenced by the adoption of the Sarbanes-Oxley Act (SOX), which is consistent with the existence of backdating, given that SOX made backdating more difficult. Bebchuk, Grinstein and Peyer (2010) show that not even SOX had the ability to curtail the use of backdating by managers, and that it took a series of articles in the WSJ to expose the practice, which led to numerous probes by regulators, investor groups, and plaintiff lawyers.

Unlike the studies mentioned above, in which managers opportunistically time their stock option grants, Aboody and Kasznik (2000) investigate whether CEOs manage the timing of their voluntary disclosures around option awards. Using a sample of 2,039 CEO option awards by 572 firms with fixed award schedules, they find that CEOs manage investors' expectations around award dates by delaying good news and accelerating the disclosure of bad news in order to maximize their stock option compensation. Likewise, Chauvin and Shenoy (2001) argue that executive stock option grants create the unique opportunity for insiders to profit from information-based price manipulation without engaging in insider trading. They find a



statistically significant abnormal decrease in stock prices during the 10-day period immediately preceding the grant date.

Taken from a different perspective, poorly structured option contracts may create “incentives to artificially inflate reported earnings in order to keep stock prices high and rising” (Alan Greenspan, 2002). Consistent with this line of thought, Gao and Shrieves (2002) show that for managers focused on reported earnings, discretionary accruals become an earnings management tool: for a given amount of cash from operations, positive (negative) accruals increase (decrease) reported income. Given the convexity of the relationship of option values to stock prices, the manager tries to time the higher earnings number to the period when the option component of compensations is relatively large and when sensitivity of option value with respect to stock price is relatively high. In sum, they find that option-based compensations are significantly positively related to earnings management intensity (measured by the absolute value of discretionary accruals scaled by asset size).<sup>4</sup>

Similarly, in a study that investigates the incentives that led to a wave of restated financial statements at the end of the 1990s, Efendi, Srivastava and Swanson (2007) find that CEOs with substantial amounts of in-the-money options are more likely to misstate financial statements, and that the value of in-the-money options differentiates between the likelihood of substantial accounting malfeasance and no irregularities. Additionally CEOs at restating firms benefit more from exercising options than CEOs at control firms.

As the studies above demonstrate, if left to their own devices, managers have been very creative in finding ways to increase the value of their option-based compensations. In light of these findings, we hypothesize that the decline in the use of stock options as a compensation

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<sup>4</sup> Chen, Lee and Chou (2015) show that managers change their risk perceptions for accruals-based earnings management after the enactment of SOX.

incentive following SFAS 123R (see Hayes et al., 2012) prompted companies to increase share repurchases in order to maximize the value of outstanding ESOs. If the implementation of the new accounting rule did impact management's stock repurchase decisions, we should observe a significant change in the relationships between stock repurchases and employee stock options in the period following *SFAS 123R*. Thus, our first hypothesis is:

*H1: Prior to SFAS 123R there is an insignificant or significant positive relation between options granted and stock repurchases, but the two variables become significantly negatively correlated in the period post-SFAS 123R.*

In the 1990s and early 2000s, stock options became the primary component of executive compensation in U.S. public companies, representing on average about 51% of the CEO's pay in the S&P 500 Industrials (Murphy, 2002). The practice was especially pronounced in so-called "new economy" firms (defined as entities with lower sales and fewer employees, but higher market values, higher R&D accounts, and growing more rapidly than their "old economy" counterparts) even after controlling for the economic factors that influence the use of options in all firms (Anderson, Banker and Ravindran, 2000; Ittner, Lambert and Larcker, 2003). Companies with greater use of ESO plans have higher levels of labor productivity, employment growth, and sales growth than otherwise-similar firms (Sesil, Kroumova, Kruse, Blasi, 2007). Granting options to retain key employees and to relax financial constraints increases firm value and results in positive abnormal returns (Kedia and Mozumdar, 2002). Thus, option grant levels are positively related to the current firm performance (Anderson et al., 2000), and lower than expected holdings of options are associated with poorer performance in subsequent years (Ittner et al., 2003; Murphy, 2003).

Collectively, these findings suggest a positive association between a firm's use of option grants and its performance, which lead us to conclude that the curtail of stock option grants following the adoption of SFAS 123R had more severe consequences on firms with bigger ESO programs. Therefore:

*H2: The negative relation between stock options granted and share repurchases post-SFAS 123R is stronger for companies that used employee stock options more extensively.*

As the ability of management to reprice existing stock options or issue new option grants diminishes, they will increasingly engage in stock repurchases to raise the value of the existing options, and more so in "new economy" firms.

### **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 et al. (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 et al. (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 from 20 industries.

Table 1 provides our sample distribution by industry, and summarizes the number of options granted as a percent of common shares outstanding in the three fiscal years preceding the implementation of SFAS 123R. While for most industries option grants represent, on average, one to two percent of their shares outstanding, "new economy" firms (mostly those in the IT sector) have used them more aggressively to hire and retain key employees: option grants represent 2.5% of the shares outstanding in the software and services industry, 3.3% in the technology hardware and equipment industry, and nearly 4% in the semiconductors and semiconductor equipment industry.

< Insert Table 1 here >

In order to test our hypotheses (and assess the impact of SFAS 123R on the relation between options granted and stock repurchase activity), we conduct the analysis on the entire sample, as well as on the top and bottom quartiles by stock options granted in the three years prior to the new accounting rule (64 and 65 firms, respectively). Constrained by a relatively small number of new economy firms in our sample, rather than divide the sample into new vs. old economy firms as done by Anderson et al. (2000) and Murphy (2003), among others, we decided to partition it into quartiles by options granted, and compare the top and bottom ones. Top quartile firms in our sample, comprising primarily IT and pharmaceutical companies, are those whose stock options granted (in the three years) before SFAS 123R represent, on average, more than 2.4% of the common shares outstanding; option grants are lower than 1.1% in the bottom quartile. This methodology allows us to test *H2*, that the reduction in ESO programs following the adoption of SFAS 123R had a bigger impact on the firms that used them on a larger scale.

Fig. 1 illustrates the numbers of shares repurchased, options granted, options exercisable and options exercised over the six-year period bracketing the SFAS No. 123R implementation. The dominance of the top quartile during this period in terms of their ESO and share repurchase programs is quite obvious. On average, the number of options granted by the top quartile firms (scaled by the number of common shares outstanding) declined from 4.15% in 2002 to 1.57% in 2007. For the bottom quartile firms, it went down from 0.83% to 0.44%. As expected, the acceleration of option vesting (proxied by the number of exercisable options) in the top quartile peaked in FY2004 and FY2005, surrounding the implementation of SFAS 123R; no clear pattern emerges in the bottom quartile. Concomitant with the above changes in the stock options, from

2002 until 2007 the number of shares repurchased (as a percent of total common shares outstanding) by the top quartile firms more than quadrupled, from 1.45% to 6.60%, while that of the bottom quartile increased from 0.63% to 4.71%.

< Insert Fig. 1 here >

Table 2 reports the summary statistics of the variables included in our analysis (and described below) for the full sample (Panel A) as well as the top and bottom quartiles (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 work on stock repurchases 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 or the announced number of shares a firm intended to repurchase.<sup>5</sup> These buyback measures were dictated by the available information at the time: until recently firms were not required to report the actual share repurchase numbers, but the dollar amounts paid to repurchase shares were disclosed as part of their financial reporting process, and firms were required to publicly disclose their intention to repurchase shares. Therefore, early studies had no choice but to use these proxies in place of actual share repurchase numbers.

These measures, however, have certain shortcomings. 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. For example, using the dollar value method,

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<sup>5</sup> See Dittmar (2000); Dittmar and Dittmar (2002); Gong, Louis and Sun (2008); Grullon and Michaely (2004); Jagannathan and Stephens (2003); Lie (2005a).

share repurchases of Forest Laboratory Inc., a company in our sample, are estimated to be 3.8% of outstanding shares in 2004. However, using actual share repurchase numbers the company actually repurchased 6.6% of shares outstanding. This variance directly relates to the company's stock price decline of 27% from 2003 (\$61.80) to 2004 (\$44.86) year-end close. The dollar value methodology uses the total dollars spend on share repurchases during the year, divided by the prior year-end close value to estimate repurchases, which does not account for share price fluctuation throughout the year. Likewise, the other repurchase measure, 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.<sup>6</sup>

A change in financial reporting rules that requires companies to report more detailed information about their share repurchases went into effect December 2003. Firms are now required to report the number of shares they repurchase. The use of actual shares repurchased (instead of the dollar value of repurchases or the announced number of shares a firm intends to repurchase) adds a level of precision that was not previously available.

2. *Stock Options Granted (GRANTED)*, is the ratio of stock options granted to the common shares outstanding. Given the numbers reported in Fig. 1, we expect to see a deviation from the historical positive relationship between options granted and share repurchases after the implementation of SFAS No. 123R.
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.

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<sup>6</sup> 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 ESOs.
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.
8. *NUM\_EPS* is the numerator effect of EPS introduced by Bens et al. (2003). It must be accounted for when testing for a repurchase strategy to counteract the dilutive effects of ESOs on reported EPS.

As reported in Table 2, Panel A, during the 2002-2007 period, the average company in our sample repurchased about 3% of its shares outstanding, granted ESOs 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 long-term debt, and had 14% of its assets in cash. In



addition, its exercisable and exercised ESOs were approximately 5.5% and 1.4%, respectively, of its shares outstanding. The profiles of the average companies in the top and bottom quartiles were quite different: exercisable and granted options (as fractions of shares outstanding) were nearly three times as large for the top quartile compared to the bottom quartile; top quartile firms had a higher market to book value, lower leverage and higher cash than companies in the bottom quartile.

<Insert Table 2 here>

In Table 3 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, the number of new options granted has systematically declined in the post SFAS No. 123R in all three samples we use, with the biggest drop experienced by the top quartile. On average, firms that most aggressively used stock options as a compensation incentive have lowered new options granted from 3.5% of total shares outstanding in the pre SFAS No. 123R period to 1.8% in the post period, a statistically and economically significant decline. Although not economically significant, the drop in the number of options granted by bottom quartile firms is also statistically significant. The results of the Wilcoxon rank test are fairly similar. Over the same period, the number of options vested (exercisable) accelerated in the top quartile (albeit not significantly), but declined in the bottom quartile. Furthermore, 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. 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 top quartile.

Other marked changes from the pre- to the post-SFAS 123R period reported in Table 3 are the increase in Operating Income (OPINC) for all sample firms, and the decline in leverage (DEBT) by the bottom quartile.

In sum, the findings reported in Table 3 are consistent with Hayes et al. (2012) in that firms reduced the option grants following SFAS 123R, and provide us with the first hint of the negative relation between the number of options granted and buybacks in the aftermath of the new accounting rule. We formally test this relationship and its significance in the following section.

< Insert Table 3 here >

#### **4. Empirical Results**

The hedging hypothesis advanced by Rogers (2006) assumes a positive relationship between shares repurchased and options granted, which is motivated by managers' desire to hedge the stock price uncertainty at option's expiration. Bens et al. (2003) also argue that the positive relationship arises from the necessity to counteract the dilutive effects of ESOs on reported EPS. Our findings in Fig. 1 and Table 3 tell a different story. Could the historical relation between shares repurchased and options granted have been unintendedly changed by the implementation of the new reporting rule? In order to address this question, we use a pooled, time series regression model as follows:

$$\begin{aligned}
REPURCHASED_{it} = & \alpha_0 + \alpha_1 GRANTED_{it} + \alpha_2 EXERCISABLE_{it} + \alpha_3 EXERCISED_{it} \\
& + \alpha_4 MTB_{it-1} + \alpha_5 DEBT_{it} + \alpha_6 CASH_{it-1} + \alpha_7 FCF_{it} + \alpha_8 OPINC_{it} \\
& + \alpha_9 NUM\_EPS_{it} + \sum_k \alpha_k X_k
\end{aligned} \quad (1)$$

where  $REPURCHASED_{it}$  is the number of shares repurchased by firm  $i$  in year  $t$  divided by its common 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,  $MTB_{it-1}$  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,  $CASH_{it-1}$  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,  $NUM\_EPS_{it}$  is the numerator effect of EPS introduced by Bens et al. (2003), and  $X_k$  are year and industry dummies. In order to allow for correlation of error terms within firms, we cluster standard errors at the firm level.

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

Table 4 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.<sup>7</sup> Noteworthy are those between REPURCHASED and the independent variables, which are positive for all variables except GRANTED. The highest correlations are for GRANTED with EXERCISABLE and EXERCISED (positive) and between CASH and DEBT (negative).

< Insert Table 4 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 5, 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 top and bottom quartiles. Consistent with the trends reported in Fig. 1 and the findings of Table 3, after controlling for other reasons for stock repurchases, we generally find a negative relationship between stock repurchases and options granted throughout the 6-year period bracketing the SFAS 123R implementation for all 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 sample and top quartile. For example, a reduction by one unit in the number of options granted on average by the firms in the top quartile in the post-SFAS 123R results in an increase in the number of shares repurchased by 0.648 units. The drastic alteration of the relation between buybacks and option grants from the pre- to the post-SFAS 123R period is confirmed by the Chi-squared test for equality of the regression coefficients, which is significant for both the full sample and top quartile. For the bottom quartile no marked relation seems to exist between buybacks and option grants either before or after SFAS 123R.

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<sup>7</sup> For brevity, we report only the correlations matrix for the entire sample. Those for the top and bottom quartiles are available upon request.

< Insert Table 5 here >

If stock repurchases were used as a hedging instrument against the 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 the declining number of the outstanding EPOs. Furthermore, it appears that this behavior is prevalent primarily in firms that have made heavy use of ESOs as a performance incentive (top quartile).

The results displayed in Table 5 also show a positive relationship between employee stock options exercisable and stock repurchases, that becomes highly statistically significant after SFAS 123R implementation. On average, 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 by 0.223 units. Consistent with Kahle (2002), this finding suggests that as employee stock option vesting accelerated, more shares were repurchased to fund the exercise of these options (option-funding hypothesis). The Chi-squared test for equality of coefficients shows an increased positive turn in the relationship between shares repurchases and options exercisable from the pre- to the post-SFAS 123R period.

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 flows or higher operating income (Dittmar, 2000), and when their employees exercise more stock options (Fenn and Liang, 2001; Kahle, 2002). Firms with low investment opportunities (proxied

by market-to-book ratio) repurchase a higher percentage of shares (see Stephens and Weisbach, 1998; Rogers, 2006). The explanatory power of most of these variables increases significantly after SFAS 123R implementation.

An additional interesting result in Table 5 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. Based on the significant positive relation between REPURCHASE and DEBT post SFAS 123R (for the full sample and top quartile), it is very likely that managers 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 top quartile, had additional motives to engage in share repurchases than those stated by traditional hypotheses.

Is it possible that in light of SFAS 123R, the employee stock options have been replaced by other compensation incentives that could have driven up the number of shares repurchased? Anecdotal evidence points toward restricted stock (RS), restricted stock units (RSUs) and stock accelerated rights (SARs). RS comes with certain restrictions on its issuance and sale by the employer, but can be issued to any firm employee. It carries the full value of the stock at the time it is granted, which makes it more expensive on a per share basis to companies than stock options. For this reason, companies typically issue far fewer shares of restricted stock compared to stock options.

RSUs represent a promise by the employer to pay the employee an assigned number of shares of the company stock upon completion of a vesting schedule. Although there is not a big difference between RS and RSUs, firms typically benefit more from the use of the latter

because it allows them to defer the issuance of company shares until the vesting schedule is complete, which delays the dilution of the share base.

SARs are compensation plans that grant employees the right to receive an award based on the value of the company's stock. SARs typically provide the employee with a cash or stock payment based on the increase in the value of a stated number of shares over a specific period of time. If a SAR is settled in stock, the accounting is the same as for an option, that is, the company must record the fair value of the award at grant. For a cost-conscious company, this is no improvement over the use of stock option programs.

Although all three forms of compensation mentioned above are gaining ground with employers, there is no clear evidence that any of them has replaced ESOs, and that management has used stock repurchases as a hedging mechanism against stock price increases.<sup>8</sup> Thus, we believe that SFAS 123R has created a mis-incentive for management to use share repurchases in an attempt to maximize the value of outstanding employee stock options prior to their expiration, in order to take advantage of their unique “use-it-or-lose-it” situation post SFAS 123R.

## **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 applies the new rule or the statement

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<sup>8</sup> Brown and Lee (2011) show that “firms were more likely to replace ESOs with restricted stock and long-term incentive plans post-SFAS 123R but the substitution was far less than dollar for dollar.”

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 new employee stock options while accelerating the vesting for certain outstanding options.

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. Companies that extensively made use of stock options as part of their compensation schemes prior to the new reporting rule (top quartile) were compared with those that used them sporadically (bottom quartile).

Our findings demonstrate that both groups of firms 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 quartiles have significantly limited the use of stock option as part of their compensation programs and engaged in repurchase activity post-SFAS 123R implementation. However, when we formally test 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 top quartile. For companies 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, but not before. This finding supports our hypothesis that implementation of SFAS No. 123R provided significant motivation for firms that aggressively used ESOs pre-SFAS 123R to curtail



their use 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 bottom quartile 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 firms 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).

$$\text{REPURCHASED}_t = \text{Actual Number of Shares Repurchased}_t / \text{CSHPRI}_t$$

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).

$$\text{GRANTED}_t = \text{OPTGR}_t / \text{CSHPRI}_t$$

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).

$$\text{EXERCISABLE}_t = \text{OPTEX}_t / \text{CSHPRI}_t$$

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).

$$\text{EXERCISED}_t = \text{OPTEXD}_t / \text{CSHPRI}_t$$

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.

$$\text{MTB}_{t-1} = (\text{PRCC } F_{t-1} * \text{CSHO}_{t-1}) / \text{SEQ}_{t-1}$$

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

$$\text{DEBT}_t = \text{DLTT}_t / \text{AT}_t$$

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.

$$\text{CASH}_{t-1} = \text{CHE}_{t-1} / \text{AT}_{t-1}$$

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

$$\text{FCF}_t = \text{CASHFLOW}_t / \text{SEQ}_t$$

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

$$\text{CASHFLOW}_t = \text{EBITDA}_t - \text{TXPD}_t - \text{XINT}_t - \text{DVC}_t - \text{DVP}_t$$

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).

$$\text{OPINC}_t = \text{IB}_t / \text{AT}_t$$

10. **NUM\_EPS** is the numerator effect of EPS introduced by Bens et al (2003). It is used to account for the diluted effects of ESOs on EPS.

$$\text{NUM\_EPS}_t = S_{t-1} * \{[E_{t-1} * (1 + g) - E_t] / |E_{t-1} * (1 + g)|\} / \text{SHARE}_{t-1}$$

where  $S_{t-1}$  equals the number of diluted shares outstanding (Compustat CSHFD) in the prior year;  $E_{t-1}$  equals income before extraordinary items (Compustat IB) in the prior year;  $g$  equals

the one-year growth rate in diluted EPS (Compustat EPSFI) from year  $t-2$  to  $t-1$ ;  $E_t$  equals income before extraordinary items from the current year, and  $SHARE_{t-1}$  is the total shares outstanding (Compustat CSHO) at the beginning of the year.

$\{[E_{t-1} * (1 + g) - E_t] / |E_{t-1} * (1 + g)|\}$  is restricted to be between  $-1$  and  $+1$ .

## References

- Aboody, D and R Kasznik (2000). CEO stock option awards and the timing of corporate voluntary disclosures. *Journal of Accounting and Economics*, 29, 73-100.
- Anderson, MC, RD Banker and S Ravindran (2000). Executive compensation in the information technology industry. *Management Science*, 46, 530-547.
- Barth, ME, ID Gow and DJ Taylor (2012). Why do pro forma and Street earnings not reflect changes in GAAP? Evidence from SFAS 123R. *Review of Accounting Studies*, 17, 526-562.
- Bebchuk, LA, Y Grinstein and U Peyer (2010). Lucky CEOs and Lucky Directors. *Journal of Finance*, 65, 2363-2401.
- Bens, D, V Nagar, D Skinner and M Wong (2003). Employee stock options, eps dilution, and stock repurchases. *Journal of Accounting and Economics*, 36, 51-90.
- Bradford, BM (2008). Open-market common stock repurchases and subsequent market performance. *Journal of Business and Economic Studies*, 14, 45-61.
- Brav, A, J Graham, C Harvey and R Michaely (2005). Payout policy in the 21st century. *Journal of Financial Economics*, 77, 483-527.
- Brown, LD and Y-J Lee (2011). Changes in Option-Based Compensation Around the Issuance of SFAS 123R. *Journal of Business Finance and Accounting*, 38, 1053-1095.
- Chan, K, D Ikenberry and I Lee (2004). Economic sources of gain in stock repurchases. *Journal of Financial and Quantitative Analysis*, 39, 461-479.
- Chauvin, KW and C Shenoy (2001). Stock price decreases prior to executive stock option grants. *Journal of Corporate Finance*, 7, 53-76.
- Chen, Y-C, C-H Lee and P-I Chou (2015). Stock-Based Compensation and Earnings Management Behaviors. *Review of Pacific Basin Financial Markets and Policies*, 18.
- Choudhary, P, S Rajgopal and M Venkatachalam (2009). Accelerated vesting of employee stock options in anticipation of FAS 123-R. *Journal of Accounting Research*, 47, 105-146.
- Ciccotello, CS, CT Grant and GH Grant (2004). Impact of employee stock options on cash flow. *Financial Analysts Journal*, 60, 39-46.
- Collins, DW, G Gong and H Li (2005). The effect of the Sarbanes-Oxley Act on the timing manipulation of CEO stock option awards. Working paper, University of Iowa.
- Dittmar, A (2000). Why do firms repurchase stock? *Journal of Business*, 73, 331-355.

- Dittmar, A and RF Dittmar (2002). Stock repurchase waves: An explanation of the trends in aggregate corporate payout policy. Working paper.
- Easterbrook, F (1984). Two agency-cost explanations of dividends. *American Economic Review*, 74, 650-659.
- Efendi, J, A Srivastava and EP Swanson (2007). Why do corporate managers misstate financial statements? The role of option compensation and other factors. *Journal of Financial Economics*, 85, 667-708.
- Fenn, GW and N Liang (2001). Corporate payout policy and managerial stock incentives. *Journal of Financial Economics*, 60, 45-72.
- Gao, P and RE Shrieves (2002). Earnings Management and Executive Compensation: a Case of Overdose of Option and Underdose of Salary? Working Paper, University of Tennessee.
- Gong, G, H Louis and AX Sun (2008). Earnings management and firm performance following open-market repurchases. *Journal of Finance*, 63, 947-986.
- Greenspan, A (2002). Testimony before the Committee on Banking, Housing and Urban Affairs, U.S. Senate (July 16).
- Grullon, G and R Michaely (2004). The information content of share repurchase programs. *Journal of Finance*, 59, 651-680.
- Hall, B and K Murphy (2002). Stock options for undiversified executives. *Journal of Accounting and Economics*, 33, 3-42.
- Hayes, RM, M Lemmon and M Qiu (2012). Stock options and managerial incentives for risk-taking: Evidence from FAS 123R. *Journal of Financial Economics*, 105, 174-190.
- Heron, RA and E Lie (2007). Does backdating explain the stock price pattern around executive stock option grants? *Journal of Financial Economics*, 83, 271-295.
- Hovakimian, A, T Opler and S Titman (2001). The debt-equity choice. *Journal of Financial and Quantitative Analysis*, 36, 1-24.
- Hurt, DN, JG Kreuze and SA Langsam (2008). Stock buybacks and their association with stock options exercised in the IT industry. *American Journal of Business*, 23, 13-21.
- Ikenberry, D, J Lakonishok and T Vermaelen (2000). Stock repurchases in Canada: Performance and strategic trading. *Journal of Finance*, 55, 2373-2397.
- Ittner, CD, RA Lambert and DF Larcker (2003). The structure and performance consequences of equity grants to employees of new economy firms. *Journal of Accounting and Economics*, 34, 89-127.

- Jagannathan, M and C Stephens (2003). Motives for multiple open-market repurchase programs. *Financial Management*, 32, 71-91.
- Jagannathan, M, C Stephens and M Weisbach (2000). Financial flexibility and the choice between dividends and stock repurchases. *Journal of Financial Economics*, 57, 355-384.
- Jensen, M (1986). Agency costs of free cash flow, corporate finance, and takeovers. *American Economic Review*, 76, 323-329.
- Kahle, K (2002). When a buyback isn't a buyback: Open market repurchases and employee options. *Journal of Financial Economics*, 63, 235-261.
- Kedia, S and A Mozumdar (2002). Performance impact of employee stock options. Working paper.
- Lee, B and O Meng Rui (2007). Time-series behavior of share repurchases and dividends. *Journal of Financial and Quantitative Analysis*, 42, 119-142.
- Lee, C-H and P Alam (2004). Stock Option Measures and the Stock Repurchase Decision. *Review of Quantitative Finance and Accounting*, 23, 329-352.
- Lehn, K and A Poulsen (1989). Free cash flow and stockholder gains in going private transactions. *Journal of Finance*, 44, 771-787.
- Lie, E (2002). Do firms undertake self-tender offers to optimize capital structure? *Journal of Business*, 75, 609-639.
- Lie, E (2005a). Operating performance following open market share repurchase announcements. *Journal of Accounting and Economics*, 39, 411-436.
- Lie, E (2005b). On the timing of CEO stock option awards. *Management Science*, 51, 802-812.
- Li, K and W McNally (2003). The Decision to Repurchase, Announcement Returns and Insider Holdings: A Conditional Event Study. *Journal of Applied Finance*, 9, 55-70.
- McNally, WJ (1999). Open market stock repurchase signaling. *Financial Management*, 28, 55-67.
- Murphy, KJ (2002). Explaining executive compensation: Managerial power versus the perceived costs of stock options. *University of Chicago Law Review*, 69, 847-869.
- Murphy, KJ (2003). Stock-based pay in new economy firms. *Journal of Accounting and Economics*, 34, 129-147.
- Narayanan, MP and HN Seyhun (2005). Do Managers Influence their Pay? Evidence from stock price reversals around executive option grants. Working paper, University of Michigan.



- Narayanan, MP and HN Seyhun (2006). Effect of Sarbanes-Oxley on the influencing of executive compensation. Working paper, University of Michigan.
- Ofer, A and A Thakor (1987). A theory of stock price responses to alternative corporate cash disbursement methods: Stock repurchases and dividends. *Journal of Finance*, 42, 365-394.
- Paternoster, R, R Brame, P Mazerolle and A Piquero (1998). Using the correct statistical test for the equality of regression coefficients. *Criminology*, 36, 859-866.
- Rogers, DA (2006). Repurchases, employee stock option grants, and hedging. Working paper.
- Sesil, JC, MK Kroumova, DL Kruse and JR Blasi (2007). Broad-based employee stock options in the US: Company performance and characteristics. *Management Revue*, 18, 5-23.
- Skinner, D (2008). The evolving relation between earnings, dividends, and stock repurchases. *Journal of Financial Economics*, 87, 582-609.
- Stephens, C and M Weisbach (1998). Actual share reacquisitions in open-market repurchase programs. *Journal of Finance*, 53, 313-333.
- Urs, P and V Theo (2009). The nature and persistence of buyback anomalies. *Review of Financial Studies*, 22, 1693-1745.
- Vermaelen, T (1981). Common stock repurchases and market signaling: An empirical study. *Journal of Financial Economics*, 9, 139-183.
- Weisbenner, SJ (2000). Corporate Share Repurchases in the 1990s: What Role Do Stock Options Play? The Federal Reserve Board, *Finance and Economics Discussion Series*, Working paper No. 2000-29.
- Yermack, D (1997). Good Timing: CEO Stock Option Awards and Company News Announcements. *Journal of Finance*, 52, 449-4776.

**Table 1. Sample distribution by industry**

This table summarizes the sample distribution by industry. GRANTED represents the number of options granted as a percent of common shares outstanding in the three fiscal years preceding the implementation of SFAS 123R.

SIC Code	Industry name	No. firms	GRANTED (%)
1010	Energy	26	1.04
1510	Materials	22	1.42
2010	Capital Goods	22	1.47
2020	Commercial Services & Supplies	6	1.67
2030	Transportation	8	1.52
2510	Automobiles & Components	1	0.47
2520	Consumer Durables & Apparel	19	2.07
2530	Consumer Services	7	2.09
2540	Media	8	1.75
2550	Retailing	23	1.42
3010	Food & Staples Retailing	5	1.35
3020	Food Beverage & Tobacco	15	1.88
3030	Household & Personal Products	5	1.21
3510	Health Care Equipment & Services	16	2.06
3520	Pharmaceuticals, Biotechnology & Life Sciences	20	1.94
3720	Aircraft and Parts	1	1.74
4510	Software & Services	16	2.52
4520	Technology Hardware & Equipment	19	3.30
4530	Semiconductors & Semiconductor Equipment	14	3.85
5010	Telecommunication Services	4	1.14
	Total	257	

**Table 2. Descriptive statistics. Full sample period (2002-2007).**

The tables below report descriptive statistics for the entire sample period. *REPURCHASED* is the number of shares repurchased divided by the number of common shares outstanding, *GRANTED* is the number of new stock options granted divided by common shares outstanding, *EXERCISABLE* is the number of stock options exercisable divided by the number of common shares outstanding, *EXERCISED* is the number of stock options exercised divided by the number of common shares outstanding, *MTB* is the ratio of the market value of equity to the book value of equity, *DEBT* is the long-term debt divided by total assets, *CASH* is the amount of cash and short term investments divided by total assets, *FCF* is the free cashflow divided by the book value of equity, *OPINC* is the operating income before extraordinary events divided by total assets, and *NUM\_EPS* is the numerator effect of EPS introduced by Bens et al. (2003). All variables have been described in Section 3. Detailed information about each variable appears in the Appendix.

*Panel A. Full sample*

Variable	Mean	Stdev	25 <sup>th</sup> percentile	50 <sup>th</sup> percentile	75 <sup>th</sup> 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
NUM_EPS	-0.0554	0.5268	-0.3486	0.0037	0.2521

*Panel B. Top and bottom quartiles by options granted pre-SFAS 123R*

Variable	Top quartile (N=64)					Bottom quartile (N=65)				
	Mean	Stdev	25 <sup>th</sup> percentile	50 <sup>th</sup> percentile	75 <sup>th</sup> percentile	Mean	Stdev	25 <sup>th</sup> percentile	50 <sup>th</sup> percentile	75 <sup>th</sup> percentile
REPURCHASED	0.0371	0.0464	0	0.0235	0.0552	0.0227	0.0332	0	0.0107	0.0324
GRANTED	0.0268	0.0214	0.0149	0.0242	0.0346	0.0062	0.0055	0.0022	0.0055	0.0090
EXERCISABLE	0.0836	0.0370	0.0575	0.0797	0.1039	0.0312	0.0230	0.0144	0.0250	0.0424
EXERCISED	0.0209	0.0164	0.0099	0.0174	0.0277	0.0084	0.0082	0.0033	0.0060	0.0108
MTB	4.1854	5.1312	2.3234	3.6968	5.4811	3.9008	5.1539	2.0730	2.9048	4.1800
DEBT	0.1358	0.1412	0.0019	0.1136	0.2233	0.1775	0.1013	0.1150	0.1729	0.2375
CASH	0.2533	0.2096	0.0818	0.1940	0.3909	0.0742	0.0692	0.0239	0.0543	0.0996
FCF	0.1792	1.5782	0.1149	0.2114	0.3124	0.3388	0.6747	0.1654	0.2274	0.3114
OPINC	0.0566	0.1103	0.0277	0.0652	0.1111	0.0752	0.0493	0.0455	0.0730	0.1010
NUM_EPS	-0.0921	0.6065	-0.5406	-0.0591	0.2912	-0.0426	0.4897	-0.2431	0.0236	0.2286

**Table 3. Descriptive statistics. Pre- and Post-SFAS 123R periods.**

The tables below report descriptive statistics pre- and post-SFAS 123R. *REPURCHASED* is the number of shares repurchased divided by the number of common shares outstanding, *GRANTED* is the number of new stock options granted divided by common shares outstanding, *EXERCISABLE* is the number of stock options exercisable divided by the number of common shares outstanding, *EXERCISED* is the number of stock options exercised divided by the number of common shares outstanding, *MTB* is the ratio of the market value of equity to the book value of equity, *DEBT* is the long-term debt divided by total assets, *CASH* is the amount of cash and short term investments divided by total assets, *FCF* is the free cashflow divided by the book value of equity, *OPINC* is the operating income before extraordinary events divided by total assets, and *NUM\_EPS* is the numerator effect of EPS introduced by Bens et al. (2003). All variables have been described in Section 3. Detailed information about each variable appears in the Appendix.

*Panel A. Full sample*

Variable	Pre SFAS 124R (2002-2004)			Post SFAS 124R (2005-2007)			Mean difference	t-test p-value	Median difference	Wilcoxon rank sum 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
NUM_EPS	-0.121	-0.062	0.574	0.010	0.064	0.466	0.131***	0.000	0.126***	0.000

*Panel B. Top quartile by options granted*

Variable	Pre SFAS 124R (2002-2004)			Post SFAS 124R (2005-2007)			Mean difference	t-test p-value	Median difference	Wilcoxon rank sum test p-value
	Mean	Median	Stdev	Mean	Median	Stdev				
REPURCHASED	0.020	0.008	0.026	0.054	0.044	0.055	0.034***	<.0001	0.035***	0.000
GRANTED	0.035	0.030	0.024	0.018	0.017	0.014	-0.017***	<.0001	-0.013***	0.000
EXERCISABLE	0.082	0.078	0.038	0.085	0.081	0.036	0.003	0.3885	0.004	0.389
EXERCISED	0.020	0.014	0.019	0.022	0.020	0.014	0.002	0.1543	0.005***	0.002
MTB	4.531	3.723	3.126	3.840	3.674	6.541	-0.691	0.1878	-0.049	0.721
DEBT	0.136	0.120	0.137	0.136	0.105	0.146	-0.000	0.9994	-0.015	0.989
CASH	0.251	0.187	0.216	0.255	0.203	0.204	0.004	0.8451	0.016	0.678
FCF	0.244	0.211	0.268	0.115	0.213	2.217	-0.129	0.4252	0.002	0.719
OPINC	0.044	0.055	0.123	0.069	0.077	0.095	0.024**	0.030	0.021**	0.013
NUM_EPS	-0.237	-0.266	0.643	0.053	0.082	0.531	0.290***	<.0001	0.347***	0.000

*Panel C. Bottom quartile by options granted*

Variable	Pre SFAS 124R (2002-2004)			Post SFAS 124R (2005-2007)			Mean difference	t-test p-value	Median difference	Wilcoxon rank sum test p-value
	Mean	Median	Stdev	Mean	Median	Stdev				
REPURCHASED	0.010	0.000	0.017	0.036	0.026	0.040	0.026***	<.0001	0.026***	0.000
GRANTED	0.007	0.007	0.005	0.006	0.004	0.006	-0.001**	0.0136	-0.002***	0.000
EXERCISABLE	0.034	0.029	0.023	0.028	0.022	0.023	-0.006**	0.0137	-0.008***	0.001
EXERCISED	0.008	0.006	0.010	0.008	0.006	0.006	-0.000	0.9815	0.001**	0.013
MTB	4.090	2.830	6.662	3.711	3.030	2.968	-0.379	0.4689	0.200	0.326
DEBT	0.191	0.190	0.108	0.164	0.163	0.092	-0.027***	0.0091	-0.027***	0.006
CASH	0.064	0.044	0.063	0.085	0.065	0.073	0.021***	0.0024	0.021***	0.001
FCF	0.316	0.220	0.523	0.362	0.236	0.799	0.046	0.4991	0.016**	0.048
OPINC	0.062	0.060	0.044	0.088	0.085	0.051	0.026***	<.0001	0.025***	0.000
NUM_EPS	-0.073	-0.017	0.550	-0.012	0.053	0.421	0.060	0.2245	0.070	0.209

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

**Table 4. Correlation Matrix.**

This table reports the correlation matrix of share repurchased, stock options and the control variables for the entire sample. *REPURCHASED* is the number of shares repurchased divided by the number of common shares outstanding, *GRANTED* is the number of new stock options granted divided by common shares outstanding, *EXERCISABLE* is the number of stock options exercisable divided by the number of common shares outstanding, *EXERCISED* is the number of stock options exercised divided by the number of common shares outstanding, *MTB* is the ratio of the market value of equity to the book value of equity, *DEBT* is the long-term debt divided by total assets, *CASH* is the amount of cash and short term investments divided by total assets, *FCF* is the free cashflow divided by the book value of equity, *OPINC* is the operating income before extraordinary events divided by total assets, and *NUM\_EPS* is the numerator effect of EPS introduced by Bens et al. (2003). All variables have been described in Section 3. Detailed information about each variable appears in the Appendix.

	repurchased <sub>t</sub>	granted <sub>t</sub>	exercisable <sub>t</sub>	exercised <sub>t</sub>	MTB <sub>t-1</sub>	DEBT <sub>t</sub>	CASH <sub>t-1</sub>	FCF <sub>t</sub>	OPINC <sub>t</sub>
granted <sub>t</sub>	-0.0761								
exercisable <sub>t</sub>	0.1340	0.3914							
exercised <sub>t</sub>	0.2154	0.3359	0.2361						
MTB <sub>t-1</sub>	0.0309	0.0444	0.0159	0.0522					
DEBT <sub>t</sub>	0.0031	-0.0564	-0.0811	-0.1142	-0.0564				
CASH <sub>t-1</sub>	0.1128	0.2775	0.3218	0.1888	0.0984	-0.3761			
FCF <sub>t</sub>	0.1014	-0.1197	-0.0191	-0.0122	0.1251	-0.0926	0.0289		
OPINC <sub>t</sub>	0.1551	-0.1635	-0.1193	0.0697	0.1080	-0.1466	0.0848	0.0678	
NUM_EPS <sub>t</sub>	0.1015	-0.0473	-0.0137	-0.1414	0.0208	0.0265	-0.0029	-0.0352	-0.0985

**Table 5. Stock repurchases and employee stock options, before and after SFAS no. 123R**

The tables below report 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.  $GRANTED_t$  is the number of new stock options granted in year  $t$  divided by 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  $t$ ,  $EXERCISED_t$  is the number of stock options exercised 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,  $DEBT_t$  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  $NUM\_EPS_t$  is the numerator effect of EPS introduced by Bens et al. (2003). All variables have been described in Section 3. Detailed information about each variable appears in the Appendix. Standard errors are clustered by firm. 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		
$GRANTED_t$	-0.088	-1.36	-0.431**	-2.56	-0.343*	0.057
$EXERCISABLE_t$	0.058	1.38	0.223***	2.93	0.165*	0.057
$EXERCISED_t$	0.395***	3.20	0.754***	3.83	0.359	0.122
$MTB_{t-1}$	-0.000	-0.52	-0.000	-0.28	-0.000	0.827
$DEBT_t$	-0.001	-0.06	0.080***	3.94	0.081***	0.001
$CASH_{t-1}$	0.005	0.52	-0.004	-0.20	-0.009	0.665
$FCF_t$	0.005	1.06	0.004**	2.33	-0.001	0.833
$OPINC_t$	0.018	1.56	0.179***	5.29	0.161***	0.000
$NUM\_EPS_t$	0.003**	2.57	0.015***	3.58	0.012***	0.007
Year dummies	YES		YES			
Industry dummies	YES		YES			
No. Obs.	771		771			
$R^2$	0.1967		0.2548			



*Panel B. Top quartile by options granted*

Variable	Pre SFAS 123R (2002-2004)		Post SFAS 123R (2005-2007)		Coef difference	p-value
	Coef	t-stat	Coef	t-stat		
GRANTED <sub>t</sub>	-0.094	-1.38	-0.648**	-2.38	-0.554**	0.048
EXERCISABLE <sub>t</sub>	0.076*	1.68	0.251	1.60	0.175	0.284
EXERCISED <sub>t</sub>	0.168	1.50	0.642*	1.94	0.474	0.176
MTB <sub>t-1</sub>	-0.001	-0.79	0.000	0.11	0.001	0.546
DEBT <sub>t</sub>	0.000	0.02	0.087***	2.81	0.087**	0.017
CASH <sub>t-1</sub>	0.003	0.28	-0.030	-0.90	-0.034	0.346
FCF <sub>t</sub>	-0.003	-0.58	0.003**	2.33	0.006	0.216
OPINC <sub>t</sub>	0.037*	1.97	0.205***	3.06	0.168**	0.016
NUM_EPS <sub>t</sub>	0.005**	2.23	0.016**	2.22	0.012	0.128
Year dummies	YES		YES			
Industry dummies	YES		YES			
No. Obs.	192		192			
R <sup>2</sup>	0.2927		0.2829			

*Panel C. Bottom quartile by options granted*

Variable	Pre SFAS 123R (2002-2004)		Post SFAS 123R (2005-2007)		Coef difference	p-value
	Coef	t-stat	Coef	t-stat		
GRANTED <sub>t</sub>	0.020	0.09	-0.487	-1.16	-0.507	0.285
EXERCISABLE <sub>t</sub>	0.113	1.05	0.465*	1.88	0.352	0.192
EXERCISED <sub>t</sub>	0.385	1.37	0.826	1.57	0.441	0.460
MTB <sub>t-1</sub>	-0.0004***	-2.86	-0.002*	-1.98	0.002	0.113
DEBT <sub>t</sub>	0.005	0.31	0.054	1.31	0.048	0.279
CASH <sub>t-1</sub>	0.016	0.71	-0.016	-0.44	-0.032	0.452
FCF <sub>t</sub>	0.000	0.06	0.012***	3.62	0.012**	0.016
OPINC <sub>t</sub>	0.116**	2.62	0.202***	3.05	0.087	0.276
NUM_EPS <sub>t</sub>	0.003	1.53	0.008	0.79	0.004	0.663
Year dummies	YES		YES			
Industry dummies	YES		YES			
No. Obs.	195		195			
R <sup>2</sup>	0.2930		0.4338			

**Figure 1. Selected statistics (as % of common shares outstanding)**

