An examination of executive stock option repricing

Mary Ellen Carter\textsuperscript{a,*}, Luann J. Lynch\textsuperscript{b}

\textsuperscript{a} Columbia University Graduate School of Business, 3022 Broadway, Uris Hall 621, New York, NY 10027, USA
\textsuperscript{b} Darden Graduate School of Business, University of Virginia, Charlottesville, VA 22906, USA

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Abstract

Comparing a sample of firms that reprice executive stock options in 1998 to a control sample of firms with out-of-the-money options in 1998 that do not reprice, we find that the likelihood of repricing increases for young, high technology firms and firms whose options are more out-of-the-money. Further, we find that firms reprice in response to poor firm-specific, not poor industry, performance. However, we find no evidence that repricing is related to agency problems. Our results are consistent with firms repricing options to restore incentive effects and to deter managers in competitive labor markets from going to work for other firms. © 2001 Elsevier Science S.A. All rights reserved.

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\textit{Keywords:} Executive compensation; Stock options; Repricing

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\footnote{Corresponding author. Tel.: +1-212-8549014.}

\footnote{E-mail address: mec75@columbia.edu (M.E. Carter).}

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1. Introduction

In recent years, stock options have become an important component of executive compensation (Hall, 1998). Firms grant stock options to employees as a means of compensation and to provide performance and retention incentives. However, if the firm’s stock price drops below the option’s exercise price, the option is “out-of-the-money,” and its incentive effect is reduced because pay-to-performance sensitivity decreases (Murphy, 1999). Repricing these options by reducing the exercise price is one means to reinstate the incentive.

Repricing stock options is controversial, and recent stock market volatility has raised the importance of understanding this practice (The New York Times, April 19, 2000, p. C1). Institutional investor groups argue that repricing rewards managers for poor performance (The Wall Street Journal, March 10, 1999, p. C2; Business Week, February 15, 1999, p. 38). Some firms have instituted measures to prohibit repricing or to require shareholder approval to reprice stock options. However, in most companies, repricing requires only the approval of the board of directors. Firms that reprice options maintain that they do so to retain valuable employees, to restore performance-based incentives, and to insulate employees from industry-wide or market-wide factors that negatively affect the firm’s stock but that are beyond employees’ control.

Research provides some evidence on the issues surrounding repricing. Several papers find that repricing is related to negative firm performance (Gilson and Vetsuypens, 1993; Chance et al., 2000; Brenner et al., 2000; Chidambaran and Prabhala, 2000). In addition, repricing appears related to conflicts of interest between executives and shareholders (Chance et al., 2000; Brenner et al., 2000).

In this study, we examine factors that explain the repricing decision. Our contribution is threefold. First, we use a more recent sample than in prior research. The Securities and Exchange Commission changed disclosure rules regarding repricing in 1992 so that firms are required to disclose details of executive stock option repricing in their annual proxy statements. This increased disclosure makes repricing and potential conflicts of interest between executives and shareholders more transparent. Although prior studies examining repricings that occurred soon after the new disclosure requirement find a positive relation between executive conflicts of interest and the likelihood of repricing, these conflicts potentially have a smaller impact on the repricing decision in later years due to the long-term effects of the disclosure changes. This possibility suggests that examination of recent repricings can enhance our understanding of this decision.

Second, we use a sample that is more representative of repricings in the general population. Recent research examines repricing by firms included in the
ExecuComp database (Brenner et al., 2000; Chidambaran and Prabhala, 2000). However, ExecuComp firms account for only a small proportion of repricings. For example, of our sample of 1998 repricing firms collected from a search of proxy statements, only 8% (21 of 263) are ExecuComp firms. In addition, repricing firms in the ExecuComp database differ significantly from repricing firms not in the ExecuComp database along dimensions that can characterize the repricing decision. These differences suggest that to better understand stock option repricing, researchers should consider a more representative sample of repricing firms.

Third, we incorporate factors not considered in prior research. Prior research suggests that options are generally out-of-the-money prior to repricing (Brenner et al., 2000). However, prior research either has not attempted to use only control firms with out-of-the-money options (Brenner et al., 2000) or has focused only on poorly performing firms (Chance et al., 2000; Chidambaran and Prabhala, 2000). As a consequence, stock returns in these studies capture the impact on the repricing decision of (1) whether options are out-of-the-money, (2) the extent to which they are out-of-the-money, and/or (3) industry and firm-specific performance. Because each of these factors could explain the repricing decision, we use a research design that disentangles these effects. We focus on firms with out-of-the-money options and include in our analysis a measure of the extent to which options are out-of-the-money as well as measures of industry and firm-specific performance. This approach enables us to provide new insight into firms’ motives for repricing.

We examine a sample of 263 firms, obtained from a Lexis/Nexis search of proxy statements, that repriced stock options during 1998. Using these firms and a control sample of non-repricing firms with out-of-the-money options during the same period, we examine factors that explain firms’ decisions to reprice stock options.

We find that younger firms and firms in high technology industries are more likely to reprice stock options. We also find that the likelihood of repricing increases as stock options become further out-of-the-money. This result is consistent with firms repricing to restore incentives associated with options because the pay-to-performance sensitivity of options decreases as they become further out-of-the-money. In addition, we find that repricing is not driven by poor industry performance, but follows poor firm-specific performance. This result is consistent with claims by repricing opponents that repricing rewards executives who deliver poor performance. However, considering that young, high technology firms are more likely to reprice, it also is consistent with poorly performing firms that operate in competitive labor markets repricing to retain executives who might entertain offers from other firms.

We find no evidence that institutional ownership affects the repricing decision. In addition, we find that insider ownership, executive participation
on the board of directors, and executive participation on the board’s compensation committee are unrelated to the repricing decision. Therefore, unlike prior research, we find no evidence that executive conflicts of interest increase the likelihood of repricing.

The remainder of this paper is organized as follows. Section 2 develops our hypotheses. Section 3 discusses sample selection. Section 4 discusses the research design. Section 5 presents the results, and Section 6 concludes.

2. Hypotheses

We examine factors that explain firms’ decisions to reprice stock options. Because our sample of repricing firms differs from samples used in prior research along dimensions that potentially can explain the repricing decision, we reexamine the impact of variables studied in prior research. In addition, we disentangle previously confounding effects to shed light on firms’ motives for repricing.

Industry: Chidambaran and Prabhala (2000) find that, among ExecuComp firms, those in technology, service, trade, and manufacturing industries reprice more than other firms. However, Chance et al. (2000) and Brenner et al. (2000) find no patterns when examining the incidence of repricing in various industries.

We hypothesize that industries with tight labor markets rely on repricing to retain executives. Statements made by management in proxy statements are consistent with this motivation. For example, management of Ancor Communications says the following in its 1998 proxy statement regarding its decision to reprice stock options:

...after a significant decrease in the price of the Common Stock, the Compensation committee determined that options granted by the Company ... no longer provided a meaningful incentive to employees and directors as initially intended. The Company believes that the market for skilled employees in the high technology field is highly competitive, and believes that stock options with meaningful incentives are an important measure in retaining its employees and directors, which is critical to the Company’s success...

If high technology firms operate in a more competitive labor market, they could experience more turnover and greater difficulty in attracting and retaining top management talent. In fact, a 1998 study by William M. Mercer, Inc. shows that jobs with the highest turnover include technology-related positions (Across the Board, July/August 1998, p. 23). The ability to retain management could rely on the decision to reprice out-of-the-money options.
We predict a positive relation between presence in high technology industries and the likelihood of repricing.

**Extent to which options are out-of-the-money:** Prior research has not investigated the relation between the repricing decision and the extent to which options are out-of-the-money prior to repricing. Because the pay-to-performance sensitivity of options decreases as options become further out-of-the-money (Murphy, 1999), we predict a positive relation between the extent to which options are out-of-the-money and the likelihood of repricing.

**Firm performance:** Prior research suggests that repricing is related to poor firm performance. However, firm performance consists of two components, industry and firm-specific performance, each of which can impact the decision to reprice.

Brenner et al. (2000) consider these two components of performance in a logit regression explaining the repricing decision. After controlling for industry performance, they find that the likelihood of repricing increases as firms’ stock price performance decreases. However, it is difficult to interpret these results as evidence that the source of the stock price decline affects the repricing decision. In their model, stock returns can proxy for factors other than firm-specific performance, given that their control group likely includes firms with in-the-money options and the test group does not. In particular, stock returns can proxy for whether firms’ options are out-of-the-money and/or the degree to which they are out-of-the-money, both of which can affect the likelihood of repricing. Therefore, one cannot determine whether the negative relation between stock price performance and the likelihood of repricing captures (1) that repricing firms have out-of-the-money options, (2) that repricing occurs because the incentive effects of options decrease as they become more out-of-the-money, or (3) that the source of stock price decline (firm-specific or industry) impacts the repricing decision. Our research design allows us to separate these effects. First, since prior research suggests that most repriced options are out-of-the-money prior to repricing (Brenner et al., 2000), we restrict our control sample to firms with out-of-the-money options. In addition, we include a separate measure of the degree to which options are out-of-the-money to capture the reduced incentive effect of these options. As a result, when we include variables representing both firm-specific and industry stock price performance, we isolate the effects of performance on the repricing decision from those confounding factors.

Stock price performance potentially affects the repricing decision for several reasons. First, firms can reprice to protect executives from industry-wide or marketwide factors beyond their control (Saly, 1994), suggesting a negative relation between industry performance and the likelihood of repricing. Second, firms can reprice to retain executives who deliver strong firm-specific performance, suggesting a positive relation between firm-specific performance and the likelihood of repricing. Finally, in competitive labor markets, firms can
reprice to prevent executives from going to work for better-performing firms. Indeed, Coughlan and Schmidt (1985) and Warner et al. (1988) find that CEO turnover is negatively correlated with stock price performance. This would suggest a negative relation between firm-specific performance and the likelihood of repricing.

**Executive conflicts of interest:** The opportunity to influence decisions made by the board of directors can increase the ability of executives to impact decisions related to their compensation. Chance et al. (2000) find that insider participation on the board of directors increases the likelihood of repricing. In addition, Brenner et al. (2000) find that the presence of executives on the compensation committee increases the likelihood of repricing. We use three variables to capture executive conflicts of interest: (1) insider ownership, (2) executive participation on the board of directors, and (3) executive participation on the board’s compensation committee. Consistent with executives influencing decisions related to their compensation in the presence of a conflict of interest, we expect a positive relation between these variables and the likelihood of repricing.

**Institutional holdings:** Institutional investors are among the outspoken opponents of repricing. Prior research shows that large investors serve as a corporate governance mechanism (Shleifer and Vishny, 1997). However, in a univariate analysis, Chidambaran and Prabhala (2000) find no difference in institutional ownership between firms that do and do not reprice. We examine institutional holdings in a multivariate setting. If these investors serve a shareholder governance role in the repricing decision, we expect institutional ownership to reduce the likelihood of repricing.

**Firm age:** Consistent with prior research (Chidambaran and Prabhala, 2000), we expect younger firms to be more likely than more established firms to reprice stock options.

**Firm size:** Prior research finds that smaller firms are more likely than larger firms to reprice (Chance et al., 2000; Brenner et al., 2000; Chidambaran and Prabhala, 2000). Chidambaran and Prabhala suggest three possible explanations for this result. First, a transfer of wealth to managers might be easier in small firms due to differences in governance mechanisms or outside scrutiny. Second, it might be easier to renegotiate compensation contracts in small firms, making it easier to reprice options. Third, small firms might experience more executive turnover and thus reprice to retain talented individuals. Further, key executives in small firms can be more difficult to replace if they are chosen to complement others’ talents. As a result, replacing an executive can be more costly, making repricing a less costly alternative.\(^1\) We expect a negative relation between firm size and the likelihood of repricing.

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\(^1\)We thank an anonymous referee for this interpretation.
3. Sample selection

3.1. Sample of repricing firms

We identify firms repricing executive stock options in 1998 from a search of proxy statements on Lexis/Nexis.\(^2\) Annual proxy statements contain annual compensation data for the CEO and the four most highly paid executives in the company earning more than $100,000. In addition, since 1993, the SEC requires a company to publish a “10-Year Stock Option Repricings” table in its annual proxy statement in any year in which stock options are repriced.

We review these proxy statements to obtain a sample of firms that reprice executive stock options in 1998. We exclude firms, though matching the search string, for the following reasons: (1) the proxy statement contains information about pre-1998 repricings only, (2) the firm reprices pursuant to a transaction such as a merger or stock split,\(^3\) (3) the firm reprices only for non-executive employees or non-employee directors, (4) the repricing date is not available, or (5) the firm makes an explicit statement that it did not reprice stock options. We further restrict our sample to firms with a December fiscal year-end. This restriction enables us to examine firms that are reporting in the proxy all repricing activity during calendar year 1998. We eliminate two firms that increase the exercise price of options. We further restrict the sample to exclude firms repricing from December 4 to December 15, 1998. This restriction is imposed because prior research documents unusual repricing activity during this window in response to the Financial Accounting Standards Board’s announcement regarding a change in accounting for repricings (Carter and Lynch, 2000). As a result, firms repricing during this window likely are repricing for different reasons than those repricing at other times in 1998. While twenty companies repricemore than once during the time period we are studying, each firm is included only once in our analysis. The final sample consists of 263 firms.

3.2. Comparison of repricing firms in ExecuComp and repricing firms not in ExecuComp

Two recent studies related to stock option repricing focus on firms contained in the ExecuComp database (Brenner et al., 2000; Chidambaran and Prabhala,\(^2\)\(^3\))

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\(^2\)The search string used is "option! w/10 repric! and filing-date = 1999 and not form-type (proxy plm)". This search yields 957 citations.

\(^3\)An example of such a transaction is as follows. In accordance with a reverse stock split, Treev repriced its options, as indicated in its proxy statement: “Upon the effectiveness of the Company’s one-for-four reverse stock split, all stock options held by officers, directors and employees were repriced to $1.63.” Repricings of this type are excluded from the analysis.
2000). However, several characteristics differ substantially between repricing firms in ExecuComp and repricing firms not in ExecuComp. Table 1 compares our repricing firms in ExecuComp (21 firms) and our repricing firms not in ExecuComp (242 firms). The ExecuComp firms are larger, with mean (median) total assets of $2,156.9 ($781.6) million compared to $245.0 ($65.8) million for firms not in ExecuComp. In addition, the ExecuComp firms are older, with a mean (median) age of 14.1 (11.5) years versus only 5.4 (3.0) years for the non-ExecuComp firms, where firm age is defined as the number of years the firm has been reported on the Center for Research in Securities Prices (CRSP) database. Only 33.3% of repricing firms in ExecuComp are in high technology industries (based on inclusion in the 1998 CorpTech Directory of Technology Companies), compared to 56.2% of repricing firms not in ExecuComp.

Directors and officers of non-ExecuComp repricing firms own a larger percent of shares, with mean (median) insider ownership for non-ExecuComp repricing firms of 26.3% (20.5%) compared to only 8.5% (7.9%) for ExecuComp repricing firms. A larger percent of board seats are held by executives of non-ExecuComp repricing firms, with a mean (median) of 25.8% (25.0%) of board seats, compared to only 16.5% (14.3%) for ExecuComp repricing firms. However, there is no significant difference between the two groups regarding the presence of an executive on the board’s compensation committee. Finally, ExecuComp repricing firms have significantly higher institutional investor representation, with institutional investors owning an average (median) of 41.0% (41.4%) of shares, compared to only 22.8% (20.2%) of shares of repricing firms not in ExecuComp.

In summary, repricing firms in ExecuComp differ from those not in ExecuComp along dimensions that are central to the examination of repricing activity, including size, age, executive conflicts of interest, and institutional ownership. Consequently, a study that extends beyond ExecuComp is warranted to increase our understanding of the repricing decision.

3.3. Control sample

To examine the repricing decision, we compare firms repricing in 1998 to firms with out-of-the-money options in 1998 that do not reprice those options. Ideally, we would like to obtain a sample of firms whose executive stock options are out-of-the-money. However, since the portfolio of executive options is not available, we use data regarding each firm’s entire stock option portfolio from the stock option footnote in the financial statements to determine whether firms have out-of-the-money options. If a firm has
Table 1
Comparison of 1998 repricing firms not in ExecuComp database to 1998 repricing firms in ExecuComp database

<table>
<thead>
<tr>
<th></th>
<th>Repricing firms not in ExecuComp (242 firms)</th>
<th>Repricing firms in ExecuComp (21 firms)</th>
<th>Test of difference (p-values)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cumulative monthly industry returns for year prior to repricing date(^c)</td>
<td>−10.1% (−12.6%)</td>
<td>−12.7% (−12.7%)</td>
<td>0.63 (0.77)</td>
</tr>
<tr>
<td>Cumulative monthly firm-specific returns for year prior to repricing date(^d)</td>
<td>−30.6% (−34.2%)</td>
<td>−37.7% (−41.0%)</td>
<td>0.44 (0.44)</td>
</tr>
<tr>
<td>Degree to which repriced (^e) options are out-of-the-money</td>
<td>52.4% (54.4%)</td>
<td>54.2% (55.3%)</td>
<td>0.65 (0.57)</td>
</tr>
<tr>
<td>Total assets ($ millions)</td>
<td>$245.0 ($65.8)</td>
<td>$2,156.9 ($781.6)</td>
<td>0.00 (0.00)</td>
</tr>
<tr>
<td>% of shares owned by institutional investors</td>
<td>22.8% (20.2%)</td>
<td>41.0% (41.4%)</td>
<td>0.00 (0.00)</td>
</tr>
<tr>
<td>% of shares owned by directors and officers</td>
<td>26.3% (20.5%)</td>
<td>8.5% (7.9%)</td>
<td>0.00 (0.00)</td>
</tr>
<tr>
<td>% of board seats held by executives</td>
<td>25.8% (25.0%)</td>
<td>16.5% (14.3%)</td>
<td>0.00 (0.00)</td>
</tr>
<tr>
<td>% of firms with executive on compensation committee</td>
<td>7.9% (3.0 yr)</td>
<td>4.8% (11.5 yr)</td>
<td>0.61 (0.00)</td>
</tr>
<tr>
<td>Firm age</td>
<td>5.4 yr (3.0 yr)</td>
<td>14.1 yr (11.5 yr)</td>
<td>0.00 (0.00)</td>
</tr>
<tr>
<td>% of firms in high technology industries(^f)</td>
<td>56.2% (33.3%)</td>
<td></td>
<td>0.04 (0.00)</td>
</tr>
</tbody>
</table>

\(^a\) Means are reported, with medians in parentheses.
\(^b\) Two-tailed t-test of difference in means (Mann–Whitney rank sum test of difference in medians).
\(^c\) Industry returns are based on two-digit SIC code.
\(^d\) Firm-specific returns are derived by subtracting median industry return from raw firm return.
\(^e\) Degree to which options are out-of-the-money = (Weighted average exercise price of options–market price of stock at repricing date)/(Weighted average exercise price of options).
\(^f\) Firms are classified as high technology if they are listed in the 1998 CorpTech Directory of Technology Companies. This process is discussed further in Section 3.2.
out-of-the-money options, we assume that these options are representative of
out-of-the-money options held by executives.

To obtain this control group, we start with all Compustat firms with a
December fiscal year-end, and with asset data, that do not reprice in 1998
(4,316 firms). Then, we randomly select firms from this group and collect data
regarding exercise prices from the stock option footnote in the 1997 financial
statements. For each firm with sufficient data on exercise prices, we compare
the range of exercise prices obtained from the stock option footnote to the
firm’s lowest month-end stock price in 1998 obtained from CRSP. If the
exercise price of any of its stock options is greater than the lowest month-end
stock price in 1998, we consider the firm to have out-of-the-money options. We
continue this process until we have 263 firms with out-of-the-money options in 1998 as our control sample.

4. Research design

4.1. Variable measurement

In this section, we discuss variables used to test the hypotheses presented in
Section 2. Table 2 presents descriptive statistics of these variables for the 526
firms used in our analysis.

*Industry:* We classify a firm as high technology if it is included in the
1998 CorpTech Directory of Technology Companies. To be included in
this directory of public and private firms, a company must develop or
manufacture a high technology product within the scope of the following
industries: factory automation, biotechnology, chemicals, computer
hardware, defense, energy, environmental, manufacturing, advanced
materials, medical pharmaceuticals, photonics, computer software, subassem-
blies and components, test and measurement, telecommunications, and
transportation.4 As reported in Table 2, repricing firms have greater
representation (54.4%) in high technology industries than non-repricing firms
(33.8%).

4To examine the reasonableness of our classification method, we examine whether firms classified
as high technology have higher R&D expense than firms not classified as high technology. Firms
classified as high technology have a mean (median) ratio of R&D to sales of 22.9% (15.5%)
compared to 6.4% (0.3%) for firms not classified as high technology. Since only 61% of the sample
firms have R&D expense reported on Compustat, we also examine the ratio of R&D to sales for
firms’ industries, as represented by three-digit SIC code. Firms classified as high technology are in
industries with a mean (median) ratio of R&D to sales of 25.0% (12.1%) compared to a mean
(median) of 8.2% (0.7%) for firms not classified as high technology. This evidence suggests that our
classification captures the technology nature of the firms in our sample.
<table>
<thead>
<tr>
<th></th>
<th>Repricing firms (263 firms)</th>
<th>Non-repricing firms (263 firms)</th>
<th>Test of difference (p-values)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cumulative monthly industry returns for year prior to repricing date(^c)</td>
<td>−10.3% (−12.7%)</td>
<td>−11.0% (−9.8%)</td>
<td>0.76 (0.96)</td>
</tr>
<tr>
<td>Cumulative monthly firm-specific returns for year prior to repricing date(^d)</td>
<td>−31.2% (−35.4%)</td>
<td>−4.2% (−8.0%)</td>
<td>0.00 (0.00)</td>
</tr>
<tr>
<td>Degree to which repriced options are out-of-the-money(^e)</td>
<td>52.5% (54.6%)</td>
<td>32.3% (26.4%)</td>
<td>0.00 (0.00)</td>
</tr>
<tr>
<td>Total assets ($ millions)</td>
<td>$397.6 ($72.5)</td>
<td>$1,805.2 ($230.1)</td>
<td>0.00 (0.00)</td>
</tr>
<tr>
<td>% of shares owned by institutional investors</td>
<td>24.4% (21.5%)</td>
<td>29.6% (28.8%)</td>
<td>0.01 (0.01)</td>
</tr>
<tr>
<td>% of shares owned by directors and officers</td>
<td>24.9% (19.1%)</td>
<td>21.3% (14.2%)</td>
<td>0.05 (0.00)</td>
</tr>
<tr>
<td>% of board seats held by executives</td>
<td>25.1% (22.2%)</td>
<td>22.6% (20.0%)</td>
<td>0.02 (0.01)</td>
</tr>
<tr>
<td>% of firms with executive on compensation committee</td>
<td>7.6%</td>
<td>8.4%</td>
<td>0.75</td>
</tr>
<tr>
<td>Firm age</td>
<td>6.1 yr (4.0 yr)</td>
<td>10.8 yr (6.0 yr)</td>
<td>0.00 (0.00)</td>
</tr>
<tr>
<td>% of firms in high technology industries(^f)</td>
<td>54.4%</td>
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</table>

\(^a\)Means are reported, with medians in parentheses.
\(^b\)Two-tailed \(t\)-test of difference in means (Mann–Whitney rank sum test of difference in medians).
\(^c\)Industry returns are based on two-digit SIC code.
\(^d\)Firm-specific returns are derived by subtracting median industry return from raw firm return.
\(^e\)Degree to which options are out-of-the-money = (Weighted average exercise price of options–market price of stock at repricing date)/(Weighted average exercise price of options).
\(^f\)Firms are classified as high technology if they are listed in the 1998 CorpTech Directory of Technology Companies. This process is discussed further in Section 3.2.
**Extent to which options are out-of-the-money:** For each firm, we calculate the extent to which repriced options are out-of-the-money (OOM) as follows:

\[
OOM = \frac{(\text{Weighted avg ex price of options} - \text{market price of stock at repricing date})}{\text{Weighted avg ex price of options}}
\]

The repricing date for repricing firms is obtained from the firms’ proxy statement. An equivalent “repricing date” for control firms is assumed to be the month-end date in 1998 on which the firm’s stock price is the lowest.

We estimate the weighted average exercise price of out-of-the-money options for control firms using data regarding each control firm’s entire stock option portfolio from the stock option footnote. We use this estimate as a proxy for the weighted average exercise price of out-of-the-money stock options held by executives of the control firms. In their stock option footnote, firms categorize their option portfolios into several subsets according to exercise price, and then report the range of exercise prices and number of options in each subset. Using these data, we identify the subsets of options that contain out-of-the-money options by comparing the reported exercise prices for each subset to the lowest 1998 month-end stock price. All options in subsets for which all exercise prices are greater than this stock price are considered out-of-the-money, and the weighted average exercise price of the subset is as reported in the footnote. For any subset for which only some of the options are out-of-the-money, we assume that options are equally spread over the range of exercise prices reported for the subset. (Approximately one-half of firms in our control sample require this assumption; for the remaining control firms, each subset is either completely out-of-the-money or completely in-the-money.) Then, we consider to be out-of-the-money all options for which the assumed exercise price is greater than the lowest month-end stock price in 1998, with a weighted average exercise price equal to the average of the highest exercise price in the subset and this stock price. Finally, we compute the weighted average exercise price of all the subsets, and use this overall weighted average in the calculation above. The Appendix presents an example of this calculation. Repriced options of repricing firms are 52.5% out-of-the-money, on average, compared to 32.3% for similar options of non-repricing firms.

**Firm performance:** Separating firm performance into two components, we include measures of industry performance and firm-specific performance for the 12 months prior to the repricing date. Industry performance is measured by the median cumulative monthly stock returns for all firms in the same two-digit SIC code. To obtain a measure of firm-specific performance, we subtract from each firm’s cumulative monthly raw stock returns the median cumulative monthly stock returns for all firms in the same two-digit SIC code. Stock returns are obtained from CRSP. Mean industry returns are negative for both repricing and non-repricing firms at −10.3% (median
of $-12.7\%$ and $-11.0\%$ ($-9.8\%)$, respectively. Mean (median) firm-specific returns for repricing firms are $-31.2\%$ ($-35.4\%)$, compared to $-4.2\%$ ($-8.0\%)$ for non-repricing firms. However, despite the fact that firm-specific returns for non-repricing firms are less negative than for repricing firms, the options for non-repricing firms are still $32.3\%$ out-of-the-money (reported above).

**Executive conflicts of interest:** We use three measures of executive conflicts of interest: (1) percent of shares held by directors and officers, (2) percent of board seats held by the top five executives, and (3) presence of a top-five executive on the board’s compensation committee. These data are obtained from the firms’ 1998 proxy statements. Executive conflicts of interest are more prevalent in repricing firms than in non-repricing firms. Insiders of repricing firms own an average of $24.9\%$ of shares (median of $19.1\%)$, compared to only $21.3\%$ ($14.2\%)$ of shares for non-repricing firms. Executives make up an average (median) of $25.1\%$ ($22.2\%)$ of repricing firms’ boards, compared to $22.6\%$ ($20.0\%)$ for non-repricing firms. However, there is no significant difference between the two groups in the proportion of firms with an executive on the compensation committee.

**Institutional holdings:** To measure institutional holdings, we use the percent of shares owned by institutional investors. While we would like to measure institutional holdings on the repricing date, these data are not readily available. Instead, we use the average of November 1997 and November 1998 institutional holdings reported in the 1998 and 1999 Nelson’s Directories of Investment Research. Non-repricing firms have higher institutional ownership than repricing firms, with a mean (median) institutional ownership of $29.6\%$ ($28.8\%)$ compared to $24.4\%$ ($21.5\%)$.

**Firm age:** Firm age is measured as the number of years the firm has been reported on CRSP. Repricing firms are significantly younger than non-repricing firms, with a mean (median) age of $6.1$ ($4.0$) years, compared to $10.8$ ($6.0$) years.

**Firm size:** Firm size is measured as the natural log of total assets for 1997. These data are obtained from Compustat. Repricing firms are significantly smaller than non-repricing firms. In addition, repricing firms in our study are substantially smaller than repricing firms in recent research. Mean (median) assets of repricing firms in our sample are $397.6$ ($72.5$) million, compared to $617$ ($309$) million in the Chidambaran and Prabhala (2000) study.

### 4.2. Estimation model

To examine the repricing decision, conditional on having out-of-the-money options, we estimate the following logit regression using our sample of
repricing and control firms:

\[ 0, 1_i = \beta_0 + \beta_1 \text{HITECH}_i + \beta_2 \text{OOM}_i + \beta_3 \text{IND.RETS}_i \]
\[ + \beta_4 \text{FIRM.SPEC.RETS}_i + \beta_5 \text{OWN.INSIDE}_i \]
\[ + \beta_6 \text{EXEC.BOD}_i + \beta_7 \text{EXEC.CC}_i \]
\[ + \beta_8 \text{INST}_i + \beta_9 \text{FIRMAGE}_i \]
\[ + \beta_{10} \text{LNASSET}_i + \epsilon_i \] \hspace{1cm} (1)

where

\( 0,1_i \) = one if firm \( i \) repriced during 1998, and zero otherwise.
\( \text{HITECH}_i \) = one if firm \( i \) is classified as high technology, and zero otherwise.
\( \text{OOM}_i \) = extent to which firm \( i \)'s repriced options are out-of-the-money at the repricing date.
\( \text{IND.RETS}_i \) = median stock return for all firms in firm \( i \)'s two-digit SIC code for the 12 months prior to the month of repricing.
\( \text{FIRM.SPEC.RETS}_i \) = stock return for firm \( i \) minus median stock return for all firms in firm \( i \)'s two-digit SIC code for the 12 months prior to the month of repricing.
\( \text{OWN.INSIDE}_i \) = percent of firm \( i \)'s shares held by directors and officers.
\( \text{EXEC.BOD}_i \) = percent of firm \( i \)'s board seats held by top five executives.
\( \text{EXEC.CC}_i \) = one if any of the top five executives serve on the compensation committee of firm \( i \)'s board of directors, and zero otherwise.
\( \text{INST}_i \) = percent of shares owned by firm \( i \)'s institutional investors.
\( \text{FIRMAGE}_i \) = number of years firm \( i \) has been reported on CRSP.
\( \text{LNASSET}_i \) = natural log of assets of firm \( i \).

5. Results

Table 3 presents the results of the regression. The results are robust to alternative specifications, including probit, linear probability, and winsorizing the continuous variables with values below (above) the 1st (99th) percentile. We find that high technology firms are significantly more likely to reprice than low technology firms (\( z \)-statistic = 3.04), and that younger firms are more likely to reprice than older firms (\( z \)-statistic = −2.85). If labor markets are more
Table 3
Logit regression of 1998 repricing decision on variables explaining decision of whether to reprice

\[ 0, 1_i = z_0 + z_1 \text{HITECH}_i + z_2 \text{OOM}_i + z_3 \text{IND_RETS}_i + z_4 \text{FIRM_SPEC_RETS}_i + z_5 \text{OWN_INSIDE}_i + z_6 \text{EXEC_BOD}_i + z_7 \text{EXEC_CC}_i + z_8 \text{INST}_i + z_9 \text{FIRMAGE}_i + z_{10} \text{LNASSET}_i + e_i \]

<table>
<thead>
<tr>
<th>Variable</th>
<th>Predicted sign</th>
<th>Coefficient</th>
<th>z-statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>HITECH</td>
<td>+</td>
<td>0.75</td>
<td>3.04*</td>
</tr>
<tr>
<td>OOM</td>
<td>+</td>
<td>2.72</td>
<td>3.88*</td>
</tr>
<tr>
<td>IND_RETS</td>
<td>–</td>
<td>0.43</td>
<td>0.71</td>
</tr>
<tr>
<td>FIRM_SPEC_RETS</td>
<td>?</td>
<td>–1.20</td>
<td>–2.98*</td>
</tr>
<tr>
<td>OWN_INSIDE</td>
<td>+</td>
<td>–0.39</td>
<td>–0.64</td>
</tr>
<tr>
<td>EXEC_BOD</td>
<td>+</td>
<td>1.19</td>
<td>1.19</td>
</tr>
<tr>
<td>EXEC_CC</td>
<td>–</td>
<td>–0.35</td>
<td>–0.82</td>
</tr>
<tr>
<td>INST</td>
<td></td>
<td>0.54</td>
<td>0.70</td>
</tr>
<tr>
<td>FIRMAGE</td>
<td></td>
<td>–0.04</td>
<td>–2.85*</td>
</tr>
<tr>
<td>LNASSET</td>
<td>–</td>
<td>–0.04</td>
<td>–0.43</td>
</tr>
</tbody>
</table>

\[ \text{Adj. } R^2 \] 19.8%
\[ N \] 434*  

*The number of firms decreases from 526 because of missing data.

*Significant at 1% level, two-tailed test.

**Variable definitions**

0,1

\[ 0, 1_i = \text{zero if firm } i \text{ did not reprice during window and one if firm } i \text{ re-priced during 1998.} \]

HITECH

\[ \text{HITECH}_i = \text{one if firm is classified as high technology, and zero otherwise.} \]

OOM

\[ \text{OOM}_i = \text{extent to which firm } i \text{’s repriced options are out-of-the-money.} \]

IND_RETS

\[ \text{IND_RETS}_i = \text{median cumulative monthly stock return for all firms in firm } i \text{’s two-digit SIC code for 12 months prior to month of repricing.} \]

FIRM_SPEC_RETS

\[ \text{FIRM_SPEC_RETS}_i = \text{cumulative monthly stock return for firm } i \text{ minus median stock return for all firms in firm } i \text{’s two-digit SIC code for 12 months prior to month of repricing.} \]

OWN_INSIDE

\[ \text{OWN_INSIDE}_i = \text{percent of firm } i \text{’s shares held by directors and officers.} \]

EXEC_BOD

\[ \text{EXEC_BOD}_i = \text{percent of firm } i \text{’s board seats held by top five executives.} \]

EXEC_CC

\[ \text{EXEC_CC}_i = \text{one if any of firm } i \text{’s top five executives serve on the compensation committee of the board of directors, and zero otherwise.} \]

INST

\[ \text{INST}_i = \text{percent of firm } i \text{’s shares held by institutional investors.} \]

FIRMAGE

\[ \text{FIRMAGE}_i = \text{number of years firm } i \text{ has been reported on CRSP.} \]

LNASSETS

\[ \text{LNASSETS}_i = \text{natural log of assets of firm } i. \]
competitive in high technology industries, these results are consistent with firms repricing to retain executives.

We find that the extent to which options are out-of-the-money is significantly related to the repricing decision, with firms more likely to reprice as their options become more out-of-the-money ($z$-statistic = 3.88). This result is consistent with firms repricing in response to the decreased pay-to-performance sensitivity that occurs as options become more out-of-the-money.

We find that firm-specific returns are significantly negatively related to the likelihood of repricing ($z$-statistic = –2.98), but find no significant relation between industry returns and the repricing decision. This result suggests that firms are repricing in response to poor firm-specific performance rather than poor industry performance, and is consistent with firms repricing to discourage management from entertaining employment offers from other firms.

Contrary to expectations, we detect no relation between institutional ownership and the repricing decision. We find no relation between the likelihood of repricing and insider ownership, executive participation on the board of directors, or executive participation on the board’s compensation committee. This result suggests that the repricing decision does not result from self-serving behavior by executives and is not consistent with findings in Chance et al. (2000) and Brenner et al. (2000). However, increased disclosure of repricings and the transparency of executive conflicts of interest may have changed the nature of the repricing decision in recent years. As a result, these conflicts may have a different impact on the repricing decision in recent years than in the time periods examined in those studies.

We detect no relation between firm size and the likelihood of repricing. The lack of significance in our multivariate analysis may result from firm size being negatively correlated with presence in a high technology industry. When we estimate our regression without the inclusion of HITECH (results not reported), firm size is marginally negatively related to the likelihood of repricing.

As a sensitivity test, we estimate the regression using market returns, in lieu of industry returns, and firm-specific performance (adjusted for the market). The results (not reported) from separate regressions that include the value-weighted and equal-weighted market index from CRSP confirm the findings presented in Table 3 that repricing occurs in response to poor firm-specific performance. Interestingly, the likelihood of repricing increases significantly as market performance increases. Again, this result is not consistent with firms repricing to insulate managers from uncontrollable market-wide factors, but is consistent with firms repricing to prevent managers from going to work for other firms. Results on other variables are insensitive to this change in specification.

In summary, our results suggest that, contrary to prior studies, it is not firm size or an executive conflict of interest that explains firms’ decisions to reprice
stock options. Rather, it is presence in high technology industries, firm age, the degree to which options are out-of-the-money, and firm-specific performance that explain the decision. Further, since there is no significant relation between industry performance and the repricing decision, firms do not appear to be repricing to insulate executives from uncontrollable factors. In contrast, they are repricing in response to poor firm-specific performance. This result is not consistent with firms repricing to retain executives who deliver strong firm-specific performance. In fact, it is consistent with the claim that repricing rewards poor performance. However, when we combine our results, an alternative explanation is possible. If young, high technology firms operate in tight labor markets, our results are consistent with firms repricing to restore the incentive effects of options and to retain employees in competitive labor markets.

6. Conclusion

In this paper, we examine factors that explain firms’ decisions to reprice stock options. We use a sample of firms that reprice executive stock options in 1998 and a control sample of firms with out-of-the-money options in 1998 that choose not to reprice. Our sample differs from samples used in recent research along dimensions that potentially explain the repricing decision. By using a more representative and more recent sample of repricing firms and by investigating additional characteristics of repricing firms, we increase our understanding of the repricing decision.

We find that younger, high technology firms are more likely to reprice than older firms not in high technology industries. We find that firms are more likely to reprice as their options become more out-of-the-money. This result is consistent with the pay-to-performance sensitivity of options decreasing as options become more out-of-the-money, suggesting that repricing is at least partially explained by firms’ desires to reinstate the incentive associated with stock options.

Finally, we find that repricing is not explained by poor performance within repricing firms’ industries, but follows poor firm-specific performance. This result is not consistent with the claim that firms reprice to insulate management from uncontrollable industry effects. Rather, it is consistent with assertions made by the opponents of repricing that repricing rewards management for poor performance. However, it does not appear that repricing is related to agency problems, since we find no relation between executive conflicts of interest and the likelihood of repricing. Rather, taken together, the results suggest an alternative explanation: to restore incentive effects of options and to discourage management from going to work for other firms, young, high
technology firms operating in competitive labor markets reprice as firm-specific performance deteriorates and options become more out-of-the-money.

Appendix

Example of calculation of weighted average exercise price of out-of-the-money stock options for control firms.

<table>
<thead>
<tr>
<th>Exercise price range</th>
<th>Number of options</th>
<th>Weighted average exercise price</th>
<th>Number of options out-of-the-money</th>
<th>Weighted average exercise price of out-of-the-money options</th>
</tr>
</thead>
<tbody>
<tr>
<td>$18.49–$32.38</td>
<td>677,702</td>
<td>$30.08</td>
<td>0(^a)</td>
<td>na</td>
</tr>
<tr>
<td>$32.68–$38.59</td>
<td>633,494</td>
<td>$35.77</td>
<td>485,304(^b)</td>
<td>$36.33</td>
</tr>
<tr>
<td>$39.50–$45.75</td>
<td>537,549</td>
<td>$45.55</td>
<td>537,549(^c)</td>
<td>$45.55</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1,022,853</td>
<td>$41.17</td>
</tr>
</tbody>
</table>

Lowest month-end stock price in 1998 is $34.0625 (August)

\(^a\) All options are in-the-money because the exercise price of all options in the range is less than the lowest month-end stock price in 1998 of $34.0625.

\(^b\) Number of options that are out-of-the-money:

\[
\left(\frac{38.59 - 34.0625}{38.59 - 32.68}\right) \times 633,494 \text{ options} = 485,304 \text{ options}.
\]

Weighted average exercise price of out-of-the-money options:

\[
\left(\frac{38.59 - 34.0625}{2}\right) + 34.0625 = 36.33.
\]

\(^c\) All options are out-of-the-money because the exercise price of all options in the range is greater than the lowest month-end stock price in 1998 of $34.0625.

References


