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# **Stock Option Repricing and Executive Turnover**

Jon Einar Flåtnes

## 1. Introduction<sup>1</sup>

With the increasing importance of stock options as a component of executive compensation<sup>2</sup>, it is important to understand their effectiveness in aligning executive interests with those of shareholders and their function as a retention device. With the collapse of the tech stock bubble in the past three years, compensation committees of an increasing number of firms have repriced previously granted stock options downward. While many authors argue that downward repricing is essential to incentivize executives and to retain valuable managers, repricing also creates a potential disincentive to performance by granting the executive a potential windfall while the stock price plummets. Previous studies have been focusing on the underlying factors that determine the repricing decision, and less research has been addressing the consequences from this board action<sup>3</sup>. This paper examines the effect of stock option repricing on executive turnover. Do firms that choose to reprice experience a relatively lower turnover rate among its top executives when compared to firms faced with circumstances in which repricing might be chosen, but chose not to? This paper is divided into six sections. Section 2 discusses the theoretical background and the existing literature on the topic. Section 3 outlines the conceptual model and discusses the ideal data. Section 4 describes the actual data, and develops the actual model. Section 5 shows the regression results and discusses the findings, and section 6 concludes.

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<sup>1</sup> The author would like to thank Michael Swendsen for lending me access to the COMPUSTAT database, and Martins Blums for helping me extract the data from COMPUSTAT. Moreover, the author wishes to thank Gary Krueger for being a helpful advisor, and for providing insightful comments. Finally, the author would like to thank Matija Vodopivec, Fernando Furquim and Andrew Korsberg for insightful comments.

<sup>2</sup> Barkema et. al. (1998), p 135

<sup>3</sup> Core, Guay, Larcker, 2003 (p. 41)

## **2. Literature Review**

Granting stock options to managers and employees has two functions: 1) a means of compensation, and 2) to provide performance and retention incentives. However, if the company's stock price falls below the option exercise price, the options become essentially worthless ("out-of-the-money"), and lose much of their incentive effects, because pay-performance sensitivity decreases (Murphy, 1999). In response to this some companies choose to reset to exercise price in order to reinstate the incentive, and to retain good managers. However, although this practice is infrequent<sup>4</sup>, repricing is controversial and has received much criticism from the financial press and from institutional investors for rewarding poor performance<sup>5</sup>.

### **2.1. Theory**

This section outlines the theory behind stock option repricing and discusses previous research related to this topic. Economists have developed theories both for and against stock options repricing, making the issue highly controversial. Although there is a vast amount of empirical research done on the topic, very few theoretical studies have been addressing the issue. What follows is a brief theoretical background on repricing.

#### **2.1.1. Theory I: Ex-post effects of repricing**

Classical agency theory states that if the interests of the shareholders and the managers are misaligned, an alignment of the interests can occur through appropriate incentivization that is a reward/bonus scheme. Incentive models generally assume managers are effort and risk averse (Holmstrom, 1979). Hence, in order to maximize the

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<sup>4</sup> Brenner, Sundaram, and Yermack (2000) find that 1.3% of executives they examine had options repriced between 1992 and 1995

<sup>5</sup> The Wall Street Journal, March 10, 1999, p. C2; Business Week, February 15, 1999, p. 38

net economic value to shareholders, there must exist an efficient compensation contract between the company and the manager (Core, Guay and Larcker, 2003).

An important indicator of the quality of a pay-performance contract is the degree to which the executive's pay changes relative to changes in company performance, referred to as pay-performance sensitivity. Jensen et al. (1990) and John et al. (2003) have examined pay-performance sensitivity finding that stock options have among the highest pay-performance sensitivities making them an efficient incentive structure when the strike price of the options are "in-the-money" (Murphy, 1999). Moreover, the fact that executives typically hold many options that are unvested, make them an important retention device. Since these unvested options are forfeited upon leaving the firm voluntarily, they serve as "golden handcuffs" that encourage executives to stay with their current firm (Scholes (1991) and Mehran and Yermack (1997))

However, the problem arises when the stock prices fall precipitously, considerably reducing the pay-performance sensitivity of stock options as the value of options to purchase a stock at a price way above the market weakens the managerial incentives and the retentive power of the stock options. If the original contract cannot be altered, this will result in "poor continuation outcomes for the principal as well" (Acharya et. al., 2000, p.67). For a senior executive officer who holds many underwater options at a non-repricing firm, the prospect of obtaining a new compensation package from a competing firm may be a compelling reason to depart. Since the costs incurred by losing valuable executives and by hiring new ones are high, the firm might consider it profitable to alter the terms of the original contract through repricing.

### **2.1.2. Theory II: Ex-ante effects of repricing**

From an ex-ante standpoint, however, the anticipation of repricing has a negative impact on incentives present in the original contract (Acharya et. al., 2000, p. 94). Hence, credible initial commitment by the principal not to reset contract terms will enhance the incentive effect of the original contract.

The relative dominance of the re-incentivization and the negative feedback effect is what determines the effectiveness of repricing.

## **2.2. Previous Empirical Research**

The literature on stock option repricing has expanded rapidly as options have become an increasingly common component of executive compensation. The research can be divided into two broad categories: 1) determinants of the repricing decision, and 2) the consequences of repricing.

Most studies on the topic have focused on the determinants of the repricing decision. Some of the first empirical research was done by Gilson et al. (1993) who studied a sample of 77 firms that file for bankruptcy or privately restructure their debt during the years 1981 to 1987. Their results show that repricing firms have under-performed the market for six years prior to the repricing date, and that the typical repricing is a fifty percent reduction in the exercise price.

More recent studies have analyzed the determining factors in greater depth by testing various models (Brenner, et al., 2000; Chance, et. al. 2000, for example; see table 1 below)

*Table 1: Summary of studies where the dependent variable is 1 if repriced, 0 otherwise*

| Study | Sample | Explanatory | Method | Significant var. |
|-------|--------|-------------|--------|------------------|
|-------|--------|-------------|--------|------------------|

|                           |                                                |                                                                                                        |      | variables                                                        |                |                                                      |                                            |  |
|---------------------------|------------------------------------------------|--------------------------------------------------------------------------------------------------------|------|------------------------------------------------------------------|----------------|------------------------------------------------------|--------------------------------------------|--|
| Chen (2004) <sup>6</sup>  |                                                | Cross-sectional, 1994-1998, 108 repricing incidents matched with a similar sample of restricting firms |      | SIZE, NOOP, CEOT, BOSI, STVO, CEOC                               | Cond. logit    | SIZE(+), NOOP(-), CEOC(+)                            |                                            |  |
| Carter et al. (2003)      |                                                | Cross-sectional, 1998, 135 repricing incidents matched with a similar sample of non-repricing firms    |      | INDU, OOMN, STRE, INRE, FIAG, NOOU, EXTO                         | Logit          | OOMN(+), INDU(+), NOOU(+), EXTO(+)                   |                                            |  |
| Chidambaram et al. (2001) |                                                | Cross-sectional, 1992-1997, 127 CEO-repricing incidents and 86 non-CEO repricing incidents             |      | INDU, FIAG, BOSI, SIZE, CEOT, INSO, NOOP                         | 2-stage probit | INDU(+), FIAG(-), BOSI(-)                            |                                            |  |
| Carter et al. (2001)      |                                                | Cross-sectional, 1998, 263 repricing incidents matched with a similar sample of non-repricing firms    |      | OOMN, FIRE, SIZE, BOSE, EXCC, INOW, INSO                         | Logit          | OOMN(+), FIRE(-)                                     |                                            |  |
| Brenner et al. (2000)     |                                                | Panel data, 22,834 executive-year observations                                                         |      | COIN, VOLA, SIZE, STRE, MAPO, EXOW, INRE                         | Logit          | COIN(+), INVO(+), SIZE(-), STRE(-)                   |                                            |  |
| Chance et al. (2000)      |                                                | Cross-sectional, 1998, 52 repricing incidents matched with a similar sample of non-repricing firms     |      | FRCA, OUDI, SIZE, INOW, MABO, STVO                               | Logit          | FRCA(+), OUDI(-), SIZE(-)                            |                                            |  |
| Pollock et al. (2000)     |                                                | Panel data, 799 firm-month observations                                                                |      | OOMN, CEOC, CEOV, CLBO, CEOO, INSO, BACE, SIZE                   | Logit          | OOMN(+), CEOC(+), CEOV(-), CLBO(-), CEOO(-), INSO(-) |                                            |  |
| VAR                       | Variable description                           |                                                                                                        | VAR  | Variable description                                             |                | VAR                                                  | Variable description                       |  |
| BACE                      | Number of board members appointed after CEO    |                                                                                                        | EXCC | Presence of any of five top executives on compensation committee |                | MABO                                                 | Market to book                             |  |
| BOSE                      | % of board seats held by top 5 executives      |                                                                                                        | EXTO | % of executives to leave the firm one year in advance            |                | MAPO                                                 | Managerial position of the executive       |  |
| BOSI                      | Board size                                     |                                                                                                        | EXOW | Executive ownership                                              |                | NOOP                                                 | Number of options held by executive        |  |
| CEOC                      | Dummy for whether the CEO is a chairman        |                                                                                                        | FIAG | Firm age                                                         |                | NOOU                                                 | Number of options outstanding              |  |
| CEOO                      | CEO ownership                                  |                                                                                                        | FIRE | Firm-specific return                                             |                | OOMN                                                 | Degree to which the option is out-of-money |  |
| CEOT                      | CEO tenure                                     |                                                                                                        | FRCA | Free cash flow                                                   |                | OU DI                                                | % outside directors                        |  |
| CEOV                      | CEO Viability                                  |                                                                                                        | INDU | Dummies for industry                                             |                | SIZE                                                 | Size                                       |  |
| CLBO                      | Classified board                               |                                                                                                        | INOW | Inside ownership                                                 |                | STRE                                                 | Stock return                               |  |
| COIN                      | Conflict of interest on compensation committee |                                                                                                        | INRE | Industry return                                                  |                | STVO                                                 | Stock volatility                           |  |
|                           |                                                |                                                                                                        | INSO | Institutional ownership                                          |                | VOLA                                                 | Industry volatility                        |  |

Although they use the same dependent variable (a dummy for whether a company has repriced or not), their independent variables, sample size, sample source and estimation techniques are different, leading to highly conflicting results. Especially, these differences are

<sup>6</sup> Chen (2004) used whether a company restricts repricing or not as the dependent variable

caused by the difficulty in constructing an adequate control sample for non-repricing firms. Chance et al. (2000) used a sample of 37 firms that repriced in the period 1985-1994, and matched each firm with a non-repricing firm according to a set of criteria, such as prior stock market performance, industry and size. A similar approach was taken by Chidambaran et al. (2001) and Carter et al (2001), both of which construct a control sample of non-repricing firms that have experienced a similar history of stock decline. Alternatively, Brenner et al. (2000) and Pollock et al. (2001) included all the data available in the EXECUCOMP database or those in a specific industry, and thus did not create a matched sample. However, this approach has been criticized for omitting several factors that may be important to the repricing decision (Carter et al., 2001), and hence the matching method used by Carter et al. is preferable.

Although the results from the various studies differ widely, some findings are relatively consistent. Repricing firms tend to be new, small, high technology firms with options that are highly out-of-the-money and poor firm-specific stock performance.

The second category of studies examines the consequences of repricing on financial performance, executive wealth, shareholder wealth and executive and employee turnover, which is the study of the current paper.

The effect of repricing on executive turnover has been addressed in several recent studies, none of which have found any evidence that repricing results in lower executive turnover (Chidambaran et al., 2001; Daily, et al., 2001; Carter et al., 2001). The most important studies are summarized in table 2:

*Table 2: Summary of studies where the dependent is 1 if an executive voluntarily leaves the company, 0 otherwise):*

| Study | Sample | Explanatory variables | Method | Results |
|-------|--------|-----------------------|--------|---------|
|-------|--------|-----------------------|--------|---------|

| Chen (2004)               | Cross-sectional, 1994-1998, 108 repricing incidents matched with a similar sample of restricting firms | SIZE, STRE, REST                   | Probit         | SIZE(-), REST(-)                |
|---------------------------|--------------------------------------------------------------------------------------------------------|------------------------------------|----------------|---------------------------------|
| Carter and Lynch (2003)*  | Cross-sectional, 1998, 135 repricing incidents matched with a similar sample of non-repricing firms    | OOMN, REPR, EXTO, STRE, SALE, AGEE | OLS, Heckman   | OOMN(+)                         |
| Chidambaram et al. (2001) | Cross-sectional, 1992-1997, 127 CEO-repricing incidents and 86 non-CEO repricing incidents             | SALE, STRE, INDU, REPR, NOSH       | 2-stage probit | STRE(-), INDU, NOSH(-), REPR(-) |
| VAR                       | Variable description                                                                                   |                                    |                |                                 |
| AGEE                      | Average age of top five executives                                                                     |                                    |                |                                 |
| EXTO                      | % of executives to leave the firm one year in advance                                                  |                                    |                |                                 |
| NOSH                      | Number of shares held by CEO                                                                           |                                    |                |                                 |
| OOMN                      | Degree to which the option is out-of-money                                                             |                                    |                |                                 |
| REPR                      | Repricing dummy                                                                                        |                                    |                |                                 |
| REST                      | 1 if the firm has repricing restrictions                                                               |                                    |                |                                 |
| SALE                      | Total sales                                                                                            |                                    |                |                                 |
| SIZE                      | Total assets                                                                                           |                                    |                |                                 |
| STRE                      | Stock return                                                                                           |                                    |                |                                 |

In fact, some studies have found that CEO turnover is higher for repricing firms relative to a carefully selected control group of non-repricers, and that it stays significantly higher over the two years following the repricing (Daily et al, 2002). Interestingly, however, Carter et al. (2003), find that employee turnover is significantly reduced in the year following the repricing. This is consistent with Oyer and Schaefer (2002), who suggest that options are granted to employees primarily as a retention device, rather than providing performance incentives.

The literature has also addressed the issue of timing of option repricings. A study conducted by Callaghan et al. (2000) investigated the change in stock price around the repricing date, and found that “on the day of the repricing and for about four weeks thereafter, [there is] an increase in stock price that appears permanently impounded in future stock price (...) In addition, repricing dates tend to either precede the release of good news or follow the release of bad news in the quarterly earnings announcements”. These

findings strongly suggest that managers can influence the repricing date, resulting in a significant benefit to themselves and, thus, in an additional cost to shareholders.

Although previous empirical research has provided some very useful insights as to why some firms choose to reprice, and identified some of the consequences of this action, the effect of repricing on firm performance has not been thoroughly investigated. Several studies have provided some descriptive statistics on the topic, but their findings are very inconsistent. Chidambaran et al. (2001) document that repricing firms improve their operating performance relative to the repricing year but do not recover their historical profitability levels. However, they do not formally test for abnormal performance. In small-sample studies, Chance et al. (2000) find no abnormal returns in the 250-day post-repricing period, whereas Callaghan et al. (2000) document significant positive abnormal returns over the 120-day and 250-day post-repricing period, even for the sample period analyzed by Chance et al. (2000).

### **3. Conceptual Model**

Based on the theoretical rationale for repricing as outlined in section 2.1.1, we would expect executive turnover ( $T$ ) in period  $t+1$  to be a function of whether the company repriced its stock options in period  $t$  or not ( $R$ ), in addition to a set of control variables. Hence, we have the following basic conceptual model:

$$(1) \quad T = f(\text{controls}, R_{0,t})$$

Consistent with previous empirical research<sup>7</sup>, executive turnover is determined by four main conceptual measures: company characteristics ( $C$ ), executive characteristics ( $E$ ), pay-performance sensitivity ( $P$ ) and executive labor market characteristics ( $M$ ):

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<sup>7</sup> See for example, Coughlan et al. (1985), Warner et al. (1988), Murphy et al. (1993)

$$(2) \quad T=f(C, E, P, M)$$

First, company characteristics include factors such as size, performance and work environment, all of which are influential in the executive's decision to stay with the company or to resign. Consistent with Warner et al. (1988), we expect a positive relation between firm size and turnover. Performance is expected to be negatively correlated with turnover, because positive performance is indicative of good leadership, and thus an executive is more likely to stay in a position in which he/she does a high-quality job. A stimulating work environment is also predicted to reduce executive turnover.

Second, executive characteristics include among others, age, and the degree to which the company's interests and executive interests are aligned. If executives' being closer to retirement leads to higher turnover, we expect a positive relation between age and turnover. On the other hand, if young executives are more mobile and less loyal to the firm, we expect a negative relation between age and turnover<sup>8</sup>.

An improvement of the pay-performance sensitivity is also expected to provide a greater incentive for executives to stay with the firm, and hence reduce turnover. Since the intention of repricing is to raise the pay-performance sensitivity, this is the mechanism through which repricing is expected to reduce turnover.

Finally, the characteristics of the executive labor market are important determinants of an executive's decision to leave the company. If other companies offer better compensation packages, and a more attractive work environment, executives will be more likely to quit.

As suggested by previous literature, a regression using model (2) could potentially lead to inconsistent estimates. The repricing decision and the resignation by an executive

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<sup>8</sup> Carter et al. (2003)

could happen simultaneously, possibly generating a sample selection bias. The endogeneity can be corrected for by using the two-step procedure as suggested in Heckman (1979). In the first step, we estimate a probit model for the repricing decision. The second stage uses the inverse Mills ratio to estimate a consistent model of executive turnover. Hence, our conceptual model contains the following system of equations:

$$(3) \quad T = f(C, E, P, M, R_{0,1})$$

$$(4) \quad R_{0,1} = f(C, P, M)$$

Model (4) is based on previous empirical literature, discussed in section 2.2. It states that the repricing decision is based on company characteristics, current pay-performance sensitivity, and executive labor market characteristics.

### **3.1. Ideal Data**

Ideally, we would be able to measure voluntary turnover separately from forced resignation. Since we are only interested in the effect repricing has on executives' decision to stay with the company or not, the cases where the executive's contract is being terminated by the company will introduce a bias to our estimates.

Data on company characteristics would ideally include accurate performance data based on a large set of financial measures, and data on the company's work environment, such as the executive's relationship with other employees and the physical setting in which the executive is working. Although these factors are difficult to measure, they could possibly be captured using a company level survey.

Executive characteristics are also hard to quantify. However, ideal data would include measures of the executive's age, family situation, career plans and whether or not his goals are aligned with those of the company.

Ideal data on the pay-performance sensitively would take into account the fact that the performance of a company can be due to exogenous factors or to factors directly attributable to an executive. Hence, ideally we would be able to measure the degree to which the company's performance can be directly related to actions taken by the executive. This would allow us to compute the impact this has on the executive's compensation.

The characteristics of the labor market for executives could ideally be measured as a set of variables capturing the relative attractiveness of job offers in other companies. Data would include details, such as compensation, of all the job offers available to the executive at any point in time.

Finally, in order to best examine the impact of repricing on executive turnover, we would ideally obtain data on when the executive makes the decision to resign as opposed to when his resignation is announced. Moreover, panel data would make it possible to compare a repricing event with another point in time when the same company faced the same economic situation, but chose not to reprice. In addition, we would ideally get data on when the managers knew about the repricing, in contrast to when the repricing actually occurs.

#### **4. Actual Data and Variables**

Unfortunately, our data are far from ideal. However, consistent with previous research, we use overall executive turnover as a proxy for voluntary turnover. Moreover, in order to estimate CEO turnover, we also use a limited dependent variable which takes one if the CEO leaves the company in the year of repricing, and zero otherwise. The data are found by manually scanning through proxy statements for each company over several years in order to determine which executives appeared on the compensation table for a given year, but not for the next year<sup>9</sup>. Proxy statements are available from EdgarOnline<sup>10</sup>.

As a proxy for company characteristics, we use book value of assets to capture size, and past stock performance to approximate company performance. This is consistent with most previous research. Also, as suggested by several empirical studies, industry dummies significantly account for differences in executive turnover, and thus will be included in our model. All these data are available from the COMPUSTAT database.

Data on executive characteristics are not only unavailable, but the measures are often hard to quantify. Hence, merely CEO age will be used, since it is available from proxy statements and is believed to have a significant impact on CEO turnover<sup>11</sup>.

As suggested by previous empirical research, the percentage of common shares held by the executive is a good proxy for pay-performance sensitivity. Although it does not correct for the fact that performance might be attributable to factors over which the executive has had no influence, it should be a good measure of how responsive an

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<sup>9</sup> Each company must submit a proxy statement to the SEC annually. This contains, among others, compensation data for all executives whose salary exceeds \$100,000 a year, in addition to data on executives' ages, and beneficiary ownership (only reported for those who own more than 1% of common stock)

<sup>10</sup> <http://textsearch.edgarexplorer.com/prosearch.asp>

<sup>11</sup> Carter et al. (2003) is the only study using the age variable. However, instead of CEO age, they used the average age for all executives listed in the proxy statement.

executive's compensation is to the general stock performance of the company. Data on common shares held by the largest shareholders are available from proxy statements.

No previous studies have used measures that capture the characteristics of the executive labor market, since data on the details of executive job openings are not publicly available for a large number of companies. Hence, although this certainly is an important determinant of executive turnover, we will not include it in our model due to data unavailability.

Stock option repricing data are available from the EXECUCOMP database. Unfortunately, however, I do not have access to this database, and I therefore obtained my data by performing a search on EdgarOnline and scanning through firms' proxy statements. As noted in section 2.2, a similar technique was employed by Carter et al. (2001), and although it gives accurate data on the repricing date, this method limits the sample size due to very time-consuming data collection process.

Data were compiled by first identifying repricing instances (i.e. company name and repricing date), and then collecting the appropriate data for the year of repricing, the preceding year, and the succeeding year. Consistent with previous research, a control sample was also created, consisting of firms that most closely matched the decline in performance for each company during the six months prior to the repricing incident, but chose not to reprice. Hence, our final dataset contains cross-sectional data for 62 companies and 73 repricing instances.

#### 4.1. Actual Model

Based on the theory outlined in previous sections and the availability of data, we employ the following model (expected signs are in parentheses):

$$\begin{aligned}
 (5) \text{ CEOTURN}_{(0,1)i} = & \beta_0 + \beta_1 \log(\text{SIZE}_{i,t}) + \beta_2 \text{STRET}[-12, -6]_i + \beta_3 \text{STRET}[-6, 0]_i + \\
 & \beta_4 \text{STRET}[0, 6]_i + \beta_5 \text{HITECH}_{(0,1)i} + \beta_6 \text{EXETURN}[-12, 0]_i + \\
 & \beta_7 \text{CEOAGE}_i + \beta_8 \text{CEOSHARES}_i + \beta_9 \text{REPRICE}_{(0,1)i} + \mu
 \end{aligned}$$

(+)
(-)
(-)
  
(-)
(+)
(+)
  
(+/-)
(-)
(-)

where the variables are defined as follows:

$\text{CEOTURN}_{(0,1)} = 1$  if the CEO leaves the company during the year of repricing or during the following year; 0 otherwise

$\text{SIZE}$  = Book value of assets

$\text{STRET}[X, Y]$  = Stock return between month X and Y where X and Y are the months relative to the repricing event.

$\text{HITECH}_{(0,1)} = 1$  if the company is a technology firm (as defined by the SIC code); 0 otherwise

$\text{EXETURN}[-12, 0]$  = Number of top-five executives who leave the company during the one year preceding the repricing event.

$\text{CEOAGE}$  = The age of the CEO at the time of repricing.

$\text{CEOSHARES}$  = The percentage of common stock owned by the CEO.

$\text{REPRICE}_{(0,1)} = 1$  if the stock options were repriced; 0 otherwise

*Each variable is given for firm i.*

The justifications for the expected signs are based on the discussion in section 2 and 3.

Although the sign on SIZE can be ambiguous, it has been argued in the literature that larger firms are expected to have higher executive turnover due to a larger degree of agency problems. Such problems are more pronounced in larger, mature firms which have more diffuse ownership and greater separation between ownership and control<sup>12</sup>. Thus we expect a positive sign on SIZE.

Since higher past and current stock returns are indicative of good leadership, executives are more likely to stay in a successful position, than in one under which performance has declined. Moreover, positive stock returns will increase the value of the stocks and options owned by the executive, and hence he/she has an incentive to stay with the company, since these unvested options are forfeited upon leaving the firm voluntarily. Hence, we expect a negative sign for all the stock return variables.

Technology firms were shown to have higher executive turnover rates by Carter et al. (2001). Since the technology sector is generally more risky, executives would tend to be more mobile than in other sectors. Thus, we expect a positive sign on HITECH<sub>(0,1)</sub>.

Past executive turnover could be an indication that the company has trouble retaining its executives. Hence, we would expect to see higher turnover in companies with a history of frequent executive turnover. Thus, a negative sign is expected for the EXETURN[-12,0] variable.

If executives' being closer to retirement leads to higher turnover, we expect a positive relation between age and turnover. On the other hand, if young executives are more mobile and less loyal to the firm, we expect a negative relation between age and turnover. Thus the predicted sign of CEOAGE is ambivalent.

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<sup>12</sup> Chidambaran et al. (2001), Warner et al. (1988)

The CEOSHARES variable is expected to be negatively correlated with executive turnover, since higher executive ownership of common stock will increase the pay-performance sensitivity. Hence, we predict a negative sign.

Repricing is expected to reduce CEO turnover by reinstating the retentive power of the executive stock options. Thus, we should see a negative sign for  $REPRICE_{(0,1)}$

In order to correct for the potential endogeneity of the REPRICE variable, we also estimate the following simultaneous system of equations using a two-stage Heckman procedure. We also use overall executive turnover as the dependent variable instead of CEO turnover:

$$\begin{aligned}
 (6) \quad EXETURN_i = & \beta_0 + \beta_1 \log(SIZE_i) + \beta_2 STRET[-12, -6]_i + \beta_3 STRET[-6, 0]_i + \\
 & \quad \quad \quad (+) \quad \quad \quad (-) \quad \quad \quad (-) \\
 & \beta_4 STRET[0, 6]_i + \beta_5 HITECH_{(0,1)i} + \beta_6 EXETURN[-12, 0]_i + \\
 & \quad \quad \quad (-) \quad \quad \quad (+) \quad \quad \quad (+) \\
 & \beta_7 REPRICE_{(0,1)i} + \mu \\
 & \quad \quad \quad (-) \\
 (7) \quad REPRICE_{(0,1)i} = & \beta_0 + \beta_1 \log(SIZE_i) + \beta_2 STRET[-12, -6]_i + \beta_3 STRET[-6, 0]_i + \\
 & \quad \quad \quad (+/-) \quad \quad \quad (-) \quad \quad \quad (-) \\
 & \beta_4 STRET[0, 6]_i + \beta_5 HITECH_{(0,1)i} + \beta_6 EXETURN[-12, 0]_i + \\
 & \quad \quad \quad (-) \quad \quad \quad (+) \quad \quad \quad (+) \\
 & \beta_7 CEOSHARES_i + \mu \\
 & \quad \quad \quad (+)
 \end{aligned}$$

## 5. Results

The results obtained by estimating the probit model in (5) are displayed in table 3:

**Table 3:**

*Probit regression of model (5). Dependent variable is 1 if the CEO leaves the company during the year of repricing or the following year, 0 otherwise. Z-statistics are in parenthesis.*

| Variable                        | Predicted Sign | Coeff.               | Marginal Effects (dy/dx) |
|---------------------------------|----------------|----------------------|--------------------------|
| Intercept                       |                | -1.876<br>(-1.54)    |                          |
| Log(Sales)                      | (+)            | -0.280<br>(-2.75)*** | -0.046                   |
| Return [-12,-6]                 | (-)            | 0.525<br>(1.72)*     | 0.086                    |
| Return [-6,0]                   | (-)            | -0.429<br>(-0.8)     | -0.070                   |
| Return [0,6]                    | (-)            | -0.804<br>(-2.08)**  | -0.131                   |
| Technology<br>(Dummy)           | (+)            | -0.045<br>(-0.09)    | -0.007                   |
| Exec. Resign [-12,0]            | (+)            | -0.316<br>(-1.08)    | -0.051                   |
| CEO Age                         | (+/-)          | 0.048<br>(2.06)**    | 0.008                    |
| % Shares held by CEO            | (-)            | -2.140<br>(-0.95)    | -0.349                   |
| CEO Options Repriced<br>(Dummy) | (-)            | -0.934<br>(-1.22)    | -0.229                   |
| N                               |                | 74                   |                          |
| Pseudo R <sup>2</sup>           |                | 0.33                 |                          |
| Log likelihood                  |                | -23.06               |                          |
| $\chi^2$ (p-value)              |                | 22.65 (0.01)         |                          |

\*=Significant on a 10% level; \*\*=Significant on a 5% level; \*\*\*=Significant on a 1% level

As apparent from table 3, the variables  $\log(\text{sales})$ , return  $[-12,-6]$ , return  $[0,6]$  and CEO age are significant in explaining CEO turnover. However, we find no evidence that repricing is associated with lower CEO turnover, as the relation between CEO turnover and the repricing dummy is not significant at conventional levels. Nevertheless, the sign is as predicted, which is a weak indication that turnover is lower in repricing firms.

Surprisingly, on the other hand, we find the coefficient for  $\log(\text{sales})$ , the measure for size, to be negative and significant at a 1% level. This implies that smaller firms have higher CEO turnover, which conflicts with the findings in Carter et al. (2003), Chidambaran et al. (2001), Warner et al. (1988) and most other empirical studies. Hence, either our model is incorrectly specified or since our sample has an overrepresentation of repricing firms, it is possible that among repricing firms, size is negatively correlated with turnover.

Furthermore, we observe that *stock return* for the six months preceding the repricing event and the six months following it is negatively correlated with CEO turnover, as predicted. The marginal effects are -.07 and -.13, respectively, implying that a 100% increase in stock return during the six months leading up to the options being repriced, is associated with a 7% decline in the probability that the CEO leaves the company. The decline is 13% when considering stock return for the six months following the repricing. However, stock return for the next six months preceding the repricing event shows a significant positive correlation with turnover. Although this result is hard to explain, it could be due to a potential negative correlation between stock return for successive intervals, caused by cyclical stock price fluctuations.

The *dummy for technology firms* has a negative coefficient, which conflicts with the theory that these firms have higher CEO turnover. However, since the finding is not significant, no interpretations can be made based on this result.

A similar conclusion can be made for the *executive resignations [-12, 0]* variable. One would expect to observe a higher probability of CEO turnover in those companies with a history of high executive turnover. However, since our findings yield a negative, insignificant coefficient, these results should not be relied upon.

The coefficient on *CEO age*, on the other hand, is highly significant, and its positive sign is consistent with the theory that CEOs who are closer to retirement have a higher probability of resigning. Our results imply that a CEO, whose age is twice that of another CEO, has a 0.008% higher chance of leaving the company.

Moreover, *the percentage of shares held by the CEO* has a negative, but not significant, coefficient. This is consistent with the theory that higher CEO ownership of common stock increases the pay-performance sensitivity, and hence reduces turnover. The marginal effect of 0.35 implies that the impact is relatively large; however, since the coefficient is not significant, this result might be due to randomness.

As outlined in previous sections, the potential endogeneity of the repricing variable could introduce a selection bias, and hence make the estimates in model (5) inconsistent. Therefore, in order to obtain consistent estimators, we run a Heckman two-stage procedure, where the first stage is a probit model where CEO repricing (0,1) is the dependent variable, and the second stage uses the inverse Mills ratio to estimate overall executive turnover<sup>13</sup>. Table 4 displays the results from this regression:

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<sup>13</sup> Executive turnover is used instead of CEO turnover, since the latter variable only includes a few positive cases (i.e. where the value of the dummy is 1)

Table 4:

First column is an OLS regression of model (6). T-statistics are in parenthesis. Third column shows the first stage of a Heckman and is thus a probit regression where CEO repricing (0,1) is the dependent variable. Column two shows the second stage of the Heckman using the inverse Mills ratio generated from the first stage. Z-statistics are in parenthesis.

| Variable                        | Predicted Sign | OLS<br>Executive<br>Turnover | Heckman St. 2<br>Executive<br>Turnover | Heckman St. 1<br>CEO Repriced |
|---------------------------------|----------------|------------------------------|----------------------------------------|-------------------------------|
| Intercept                       |                | -0.546<br>(-1.13)            | 0.355<br>(0.94)                        | 1.648<br>(2.59)***            |
| Log(Sales)                      | (+)            | 0.082<br>(1.32)              | 0.074<br>(0.83)                        | -0.203<br>(-1.63)*            |
| Return [-12,-6]                 | (-)            | -0.502<br>(-2.29)**          | -0.467<br>(-1.87)*                     | 0.820<br>(1.08)               |
| Return [-6,0]                   | (-)            | -0.326<br>(-1.17)            | -0.470<br>(-1.27)                      | -0.448<br>(-1.17)             |
| Return [0,6]                    | (-)            | -0.287<br>(-1.44)            | -0.366<br>(-1.26)                      | -0.563<br>(-1.6)*             |
| Technology<br>(Dummy)           | (+)            | 0.954<br>(3.23)***           | 1.033<br>(3.27)***                     | 0.228<br>(0.42)               |
| Exec. Resign [-12,0]            | (+)            | 0.231<br>(1.3)               | 0.237<br>(1.05)                        | 0.640<br>(1.43)               |
| CEO Age                         |                |                              |                                        |                               |
| % Shares held by CEO            |                |                              |                                        | 0.066<br>(0.05)               |
| CEO Options Repriced<br>(Dummy) | (-)            | 1.027<br>(2.36)**            |                                        |                               |
| Inverse Mills Ratio             |                |                              | 0.412<br>(0.30)                        |                               |
| N                               |                | 74                           | 74                                     | 74                            |
| Adj. R <sup>2</sup>             |                | 0.16                         |                                        |                               |
| F-stat (p-value)                |                | 3.05 (0.01)                  |                                        |                               |
| $\chi^2$ (p-value)              |                |                              |                                        | 22.39 (0.03)                  |

\*=Significant on a 10% level; \*\*=Significant on a 5% level; \*\*\*=Significant on a 1% level

The results in table 4 show that all signs are as expected except for the repricing variable, which in the OLS regression has a positive and significant coefficient. This could be due to the potential endogeneity of repricing, and thus column two will give more consistent estimates. We observe, however, that the other variables remain relatively unchanged<sup>14</sup>.

Two striking differences between the results from model (5) and model (6) is that for model (6), executive turnover is, as expected, positively related to both size and the technology dummy. The fact that such a positive relationship was lacking when using CEO turnover as the dependent variable, could be due to the fact that this variable only contains a few incidents of actual CEO turnover, and hence we would need a larger sample in order to get accurate and significant estimates.

## **6. Conclusion**

Despite the fact that many companies resort to repricing as a method of reinstating the retentive power of stock options that have fallen far below their exercise price, this practice has received strong criticism from the financial press and institutional investors for rewarding managers for poor performance, and some see it as an example of managerial entrenchment. This study examines the hypothesis that repricing results in lower executive turnover. Specifically, we estimate a model of executive turnover as a function of company size, past and current stock returns, industry, past turnover, CEO age, CEO ownership of company shares and a dummy specifying whether executive stock options have been repriced. Our results do not support the hypothesis that repricing reduces neither executive turnover nor CEO turnover. However, we do find evidence that

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<sup>14</sup> A Hausman test between the OLS regression and the Heckman model shows that we can reject the hypothesis that the OLS model is exogenous.

past and current stock return, company size and CEO age are significant in explaining CEO turnover. Moreover, our results indicate that overall executive turnover is significantly higher in technology firms and lower in companies with positive past stock returns. Our findings are robust to controlling for the potential endogeneity of the repricing decision. Overall, our results provide little support for firms' arguments for repricing executive stock options.

Since data are lacking for some important determinants of executive turnover, the results from previous studies, including the current study, might not be valid. Hence, future research would focus on compiling data for a larger set of variables, such as characteristics of the executive labor market. Moreover, if the proposed law is implemented that would require shareholder approval of repricing, this would open up a new set of questions regarding stock option repricing, performance and retention.

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