Is backdating vicious?: an investigation on the rationale of backdating CEO stock options

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Is Backdating Vicious? - An Investigation on the Rationale of Backdating CEO Stock Options

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Abstract

The widespread practice of backdating executive stock options has drawn strong criticism of the public and also serious attention of the regulators. Other than pure luck and insider manipulation, I conjecture some backdating is rational. By using a sample of 126 US companies under investigations related to backdating, I find them larger, younger, having lower cash holding and higher stock volatility. In addition, there is little evidence for managerial entrenchment and underperformance. Lastly, I build up a simple dynamic game of imperfect information, showing that higher performance indeed increases the backdating propensity, which distinguishes backdating from repricing mechanism.

Keywords: Option Backdating, Option Repricing, Corporate Governance, Corporate Finance

JEL Classification: G3

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1 Introduction

Since the 1980s, facing promising prospects but with financial constraints, firms, especially in the high-technology industry, have started to grant stock options[1] to employees. Apart from compensation, option grants aim to provide incentives and further align the interests between ownership and control, which is viewed as an effective way to alleviate the principal-agent problems (Jensen and Meckling, 1976). As time goes by, taking options as an indispensable part of compensation packages becomes a common practice across firms. The 1990s was a period of vast option grants to executives and even middle managers in large US firms.

According to Hall and Murphy (2002), in 1998 the median values of stock and options owned by S&P's industrial and financial CEOs (chief executive officers) are $30 million and $55 million, respectively. Besides, Core and Guay (1999) find that, between 1992 and 1996, stock options contribute approximately one-third to the value of the median CEO's equity portfolio and one-half of total equity incentives, i.e. the sensitivity of portfolio value to stock price.

During the past few years, academic researchers found that firms' stock returns are abnormally low immediately before executive stock option grants, and abnormally high afterwards[2]. Since stock options are generally granted at the money (due to tax considerations[3]), other than pure luck and/or the ability to forecast stock price pattern, insider timing of grants with anticipation of possible stock increases and strategic timing of information releases around grants are the most likely explanations. However, Lie (2005) and Heron and Lie (2007) suggest another possibility which better suits this pattern. That is, by hindsight, insiders reset the grant dates to one with a particular low stock price, the so-called "backdating".

[1] Employee stock options offer workers right to buy company stock at a set price and usually have a vesting period of several years. Options are usually granted by directors and detailed by a compensation committee. In most cases, companies make their grants at the same time each year, avoiding the potential for date manipulation, but in fact no law requires this.

[2] See Yermack (1997), Aboody and Kasznik (2000), Chauvin and Shenoy (2001), among others.

[3] Heron and Lie (2007) provide several explanations.

These findings, followed by press reports[4], brought option grant timing to the attention of US federal prosecutors, and particularly, the Securities and Exchange Commission (SEC). Backdating is regarded as illegal, a violation of security laws amounting to financial frauds, as long as it is not disclosed to shareholders. Under that circumstance, backdating is simply a vicious way to steal money from shareholders. More importantly, by resetting options to a date with a favorable price, executives are actually rewarded for poor performance. In that case, backdating is viewed as an example of managerial rent-seeking. The anticipation of backdating could also reduce managerial incentives. However, defenders argue that it only involves (relatively) small sums and offers an alternative to market-based pay. On top of that, making backdating illegal with criminal charges[5] might hinder innovation (e.g. Apple Inc.).

As a closely related topic, option repricing attempts to "reincentivize" managers by lowering the strike prices of previously granted options that are significantly out of the money. Empirical studies[6] show that the majority of option repricing occurs after stock price declines. Technology, trade and service oriented firms[7], along with small firms[8], conduct option repricing more. In most cases, repricing either directly lowers the original strike price and/or shortens the vesting period. As a result, at first glance, backdating and repricing seem not the same, suggesting different mechanisms and implications.

The main goal of the paper is, by using a sample of 126 US firms currently undergone investigations, to determine possible causes and effects of backdating practice, under the assumption that being investigated is equivalent to conducting backdating. In the causal perspective, I test common beliefs that backdating is associated with poor corporate governance and inferior firm performance. The results might also shed some light whether backdating is just another form of repricing. Besides, if firms want to reward managers, why do they choose backdating, instead of other alternatives? To answer the question,

[4] See Wall Street Journal (2005).

[5] For firms, major damages that follow a backdating charge include the departure of the CEOs, restatement of the financial statements, legal expenses, and stiff tax bills and potential penalties for unpaid income and payroll taxes (for both firms and individuals).

[6] The evidence is so far limited to US capital market only.

[7] See Chidambaran and Prabhala, 2003.

[8] See Chance et al., 2000.

I examine whether backdating firms face severe financial constraint and/or higher stock price volatility. After separate univariate tests, I conduct a regression analysis to determine what might contribute to backdating decision.

On the other hand, I estimate the impact made by the press revealing backdating of firms, which can be regarded as reputation risk. Also, one interesting issue is to see if those firms commit other corporate frauds more. The alternative hypothesis is that firm might not act in bad faith, and it chooses backdating because the benefits actually outweigh the costs. In the end, I investigate possible drivers behind the reputation risk.

In short, what I find is that, no matter when compared with market average or peer group, the sample firms don't have poor corporate governance and inferior performance, either. Consequently, backdating practice doesn't purely result from lucky or greedy executives. Financial constraint seems not a major reason for backdating, but stock volatility does, which might explain why backdating is preferred to other means for compensation. More than that, firm-specific characteristics such as size, age, financial constraint, and profitability have significant influences in backdating decision. In general, backdating firms tend to be large, young, growing, volatile, and under financial constraint and tight labour market. They also have smaller boards, high managerial ownership, but less managerial entrenchment. As a result, compared with Chidambaran and Prabhala (2003), despite sharing common features, backdating and repricing firms still have distinctive properties, and it's fallacious to argue that backdating is de facto another form of repricing. In essence, repricing is to incentivize managers and backdating is to keep them from accepting outside options.

When it comes to the consequences, the news release regarding backdating indeed inflicts a substantial loss on firms. On the whole, there is an abnormal 2% stock price drop on the news release day. Extending the event window to a 61-day period, the drop increases to approximately 7%, and the stock price never resumes. Besides, the sample firms on average face more class action lawsuits than their peer groups. In other words, backdating firms have a higher propensity for corporate frauds. Lastly, the analysis of reputation risk shows that, when looking at the event day, better profitability, promising growth prospects, and poor governance reduce reputation risk. Committing other frauds would aggravate the

risk, which is further mitigated for firms that happen to have poor governance. However, once considering the whole pre-event period, the severity of reputation risk is entirely driven by growth opportunities and fraud level, whose influences enhance in comparison with the previous event-day analysis.

In the last part, following Acharya et al. (2000), I build up a simple dynamic game of imperfect information. It demonstrates that, under certain conditions, backdating is the best response for firms. Moreover, the higher the (high signal of) final cash flow is, the higher the backdating likelihood is. It's consistent with the previous empirical ramifications which distinguish backdating from repricing.

All in all, firms under backdating investigations in the US are not connected to managerial entrenchment, nor underperformance. Tax evasion is the first-order consideration, and then financial constraint and stock volatility lead to backdating decision, in order to reward successful managers. I add to the literature by presenting an alternative mechanism contrary to general conceptions. Additionally, incorporating performance in the model suggests discrepancies between backdating and repricing.

The remainder of the paper proceeds as follows: Section 2 provides, among others, two cases that illustrate how backdating works. Section 3 gives a brief literature review related to backdating. Section 4 contains hypotheses to be tested. Section 5 describes the dataset and the methodology applied. Section 6 shows the estimation and testing results. Section 7 presents the model. Lastly, Section 8 summaries the findings and concludes.

2 Case Studies: ACS and Brocade[9]

2.1 The ACS case

The ACS (Affiliated Computer Services), founded in 1988, is a techonology-outsourcing company in Dallas, Texas. It provides diversified business process and information technology outsourcing solutions to commercial and government clients worldwide. Its former CEO, Jeffrey Rich, helps transform a small technology company into one with more than

[9] Source: Factiva database and Wall Street Journal news archive.

$4.4 billion in annual revenue and around 55,000 employees. Thanks to rises of ACS's stock price, Mr. Rich's wealth increases greatly by his stock-option gains; however, the timing of the grants is so exceptional that soon raises the public's eyebrow. At first glance, it might seem he is just lucky. But according to WSJ analyses, the odds of this happening purely by chance are slim – around one in 300 billion. In comparison, the odds of winning the multistate Powerball lottery with a $1 ticket are one in 146 million. As a matter of fact, if his grants from 1995 through 2002 had dated at the yearly average share price, he'd have gained 15% less.

For illustration, let's take one especially well-timed grant for instance. One grant with 500,000 options with a strike price $11.53 offered to Mr. Rich, adjusted for stock splits, are dated on October 8, 1998, which happens to be the end of a precipitous stumble of its stock price. More specifically, the stock price falls 28% in the 20 trading days prior to October 8, and rises 60% in the following 20 trading days. ACS claims that, the grant is for Mr. Rich's promotion to CEO; nonetheless, in fact, he isn't promoted until February 1999. In response, the company says it has a "six-month transition plan" for him, and the October 8 option grant is "in anticipation" of his promotion. Actually, if his grant had dated on the day of his official promotion announcement, Mr. Rich would have earned far less. The grant isn't reported to the SEC until 10 months after the stated grant date, which doesn't violate any regulation at that time.

Mr. Rich's options are granted by a special board committee, mostly including directors Frank Rossi and Joseph O'Neill. Mr. O'Neill says, "We had ups and downs in our stock price like any publicly traded stock. If there were perceived low points, would we grant options at that point? Yes." Mr. Rich says grants are made on the day the compensation committee authorized them, or within a day or so. In addition, he claims that he or Chairman Darwin Deason makes recommendations to this special board committee concerning option dates.

In September 2005, Mr. Rich resigns abruptly as the CEO, again with favorable timing. In an unusual separation agreement, the company agrees to make a special payment of $18.4 million, which happens to make up the difference between the strike price of 610,000 of his outstanding stock options and the closing ACS stock price on the day of

his resignation. What's intriguing is that, the company doesn't reveal the news of his resignation on that day. Instead, his resignation is announced several days later, which causes the stock falling by 6%. In turns out that Mr. Rich gains an extra $2 million by exercising the options just before the news. Facing this, Mr. Rich says that ACS signs his separation agreement on Friday, using Thursday's price for the options payout. The reason that it postpones the announcement until Monday is that it doesn't want to seem "evasive" by putting the news out late Friday.

On March 7, 2006, ACS announces that the SEC has asked for documents related to its stock-option grants from October 1998 through March 2005 as part of an informal inquiry. On May 10, a preliminary internal probe concludes that the effective dates of executive stock options seem to precede their written approval dates and it plans a charge of nearly $32 million to restate its financial statements due to the grants. Later on November 27, CEO and President Mark A. King, along with CFO Warren D. Edwards sign separation agreements with ACS which allow them to stay in the company during a transition period until June 30, 2007. The noncash compensation costs related to backdating would be as high as $51 million, excluding tax related expenses.

2.2 The Brocade case

The Brocade (Brocade Communications Systems), founded in 1995, is a data storage-networking company in San Jose, California. It provides storage switches that function as virtual traffic officers and allow for interconnection between storage devices. Gregory Reyes, who works as its CEO since mid-1998, resigns in January 2005, at the same time the company announces to restate financial statements from 1999 to 2004 because of improper accounting for previous options granted to new or part-time employees, employees on leaves of absence or in transitory roles with the company. One of its most remarkable restatements is for fiscal 2000. During that year, Brocade actually losses $951.2 million, instead of the originally reported $67.9 million earnings. The $1 billion difference is related to its stock-based compensation and associated with income tax adjustments. After resignation, Mr. Reyes remains as consultant and director within the company for several months.

Similarly, some of Mr. Reyes' options are granted on highly favorable dates. For example, one grant is dated on October 1, 2001, at the time when its stock price reaches to the yearly lowest level; also, two other grants come at monthly stock lows. Even though Mr. Reyes doesn't exercise any options after the company goes public in 1999, he makes a fortune by selling at least $380 million of shares before its IPO. On May 16, 2005, Brocade discloses that the Justice Department and the SEC are investigating its option-granting practices. After two years, on May 31, 2007, Brocade agrees to settle with the SEC and pays $7 million.

Besides, since April 2006, Brocade has been under a class action lawsuit, lead by The Arkansas Public Employee Retirement System who claims a $1.9 million loss, stating that Brocade recruits employees by giving them offer letters with early, mostly inaccurate, starting dates for employment. For example, on January 6, 2000, David Smith receives an offer letter from Mr. Reyes and is employed as a vice president. His compensation consists of a base salary of $240,000 a year and 200,000 options, with the grant date of his first day of employment. However, Mr. Smith states that he doesn't start working full-time in Brocade until April, rather than the supposedly January starting date. Between 2000 and 2001, Mr. Smith pockets $7.4 million from the sale of his share holding.

The suit also alleges that Mr. Reyes has the authority to grant options "as a committee of one" and that he sometimes holds "ad hoc" board meetings with other executives to approve option grants. In the beginning, Mr. Reyes denies any backdating practice under his watch, but now he recognizes its existence. Nevertheless, facing criminal fraud charges and millions of dollars in fines, he still defends himself by stating that its purpose is to retain and recruit talented employees, not to defraud shareholders. The one-person stock option committee is to facilitate the hiring and retaining procedure, and is legal under the law of Delaware, where Brocade is incorporated. What's more, he argues that he doesn't realize its accounting implications, isn't directly involved in awarding backdated options, and investors doesn't consider them material, either.

3 Literature Review

Hall and Murphy (2002) conduct a certainty-equivalent analysis to determine the cost, value, and pay-for-performance sensitivity of vested stock options owned by undiversified and risk-averse managers. They show that firm's cost of option-granting typically exceeds its value to managers. The incentives provided by options are maximized with a strike price at or near the grant-date market price when the grant is an add-on, ceteris paribus. However, if managers receive options to compensate reduced cash income, incentives are maximized with a strike price close to zero. Thus, under this framework, some common practices, such as setting higher performance benchmarks by issuing premium options or refraining from repricing following stock price declines, are not necessarily in the interests of shareholders.

Palmon et al. (2004), by taking effort aversion into account, evaluate the common practice of at-the-money executive stock options. They simulate the firm's decisions and the manager's effort choice under various compensation schemes and identify what are optimal. They find that when abstracting from tax considerations, it is optimal to grant in-the-money options. Otherwise, issuing at-the-money options might be optimal. Both strategies hold regardless of strike price linked to market situation; in addition, issuing options with benchmarked strike prices usually dominates options without.

Bizjak et al. (2007) find that board interlock significantly facilitates the spread of backdating practice across firms. Other factors such as younger CEOs, higher stock volatility, and larger managerial holdings of stock and options all attribute to backdating likelihood. But, little evidence relates backdating to poor corporate governance. Collins el al. (2007) argue weak governance, higher managerial option holding, and board interlock contribute to backdating. Having directors who receive option grants on the same day as the CEO also increases the likelihood. Narayanan et al. (2007) discuss economic impacts of legal, governance, tax, disclosure, and incentive issues thanks to the revelation of backdating. Using a sample of firms already implicated in backdating, they find that the revelation of backdating results in a loss of 8% to shareholders, i.e. around US$500 million per firm. In contrast, the potential gain from backdating (for CEOs) is estimated under US$0.6 million per firm annually.

Sauer and Sautner (2007) examine the relations between option repricing, performance, and corporate governance in the Europe. They find repricing is common for young and fast growing firms that encounter a sharp decline in accounting and stock price performance in the two years before repricing, and cash compensation is not reduced accordingly when repricing occurs. After repricing decision, which is affected by corporate governance structure, performance improves significantly.

4 Hypotheses

One possibility to backdate CEO current options is as follows. The CEO has (unexpected) good performance; however, in the meantime the industry (or some of the competitors) is not doing well. Facing likely talent shortage, outside options might appear and induce her to leave the firm. To keep her, the firm has to provide her with some benefits (like immediate bonus), and backdating her current options is one alternative, among others. On top of that, backdating options without revealing to shareholders is tax-efficient for both parties. As for the CEO, on the other hand, she might also prefer to backdating current options, if given a higher value.

Furthermore, it's also intriguing to see what backdating might bring to the firm. In addition to major damages described in the beginning, there is an "indirect" damage of particular interest, i.e. news announcement. When receiving the news, shareholders express their opinions through the stock market, which, to a lesser extent, could be viewed as public outcry. The following are the null hypotheses for testing,

For precedents:

- H1: Backdating is associated with poor corporate governance.
- H2: Backdating is associated with inferior performance.

For consequences:

- H3: The press revealing the backdating practice has negative impact on firm value.
- H4: The backdating firms also commit more other corporate frauds.

5 Data and Methodology

Until September 2007, there are 126 public firms under (formal or informal) investigations or internal probes, available on the WSJ[10]. Note that in the paper, I assume the probability of backdating equivalent to that of under investigations. Table 1 shows the sample firm characteristics. On the whole, more than one-third of the firms have market value less than 1,000 million dollars, suggesting many sample firms are relatively small[11]. However, there are still roughly 11% of the firms with market value exceeding 10,000 million dollars, suggesting some outliners in the sample size distribution. On the face of it, the argument that backdating firms tend to be small is not valid, despite my sample bears inherited upward bias in size. That is, large firms are more likely to be the investigation targets for regulators. On the other hand, if categorized by industry, almost 60% of the firms are in the IT sector.

To measure corporate governance, I use IRRC (Investor Responsibility Research Center) database. It publishes detailed listings of corporate governance provisions for firms in corporate takeover defenses. Up to 30 distinct provisions for approximately 1,500 firms since 1990 are provided. In my sample, data of 103 firms are available. In addition, IRRC provides information about board members, which allows me to calculate board size. Board size is a measure for its effectiveness, being another proxy for corporate governance[12].

Next, I use both Compustat and CRSP databases to gather sample firm characteristics. Compustat provides annual and quarterly income statement, balance sheet, statement of cash flows, and supplemental data items on publicly held companies. It has a sub-database called ExecuComp which covers more than 80 compensation items on top-5 executives in public companies, starting from 1992. As for CRSP (Center for Research in Security Prices), it maintains a comprehensive collection of security price, return, and volume data for the NYSE, AMEX and NASDAQ stock markets, among others.

[10] Wall Street Journal "Perfect Payday" report (the June 12, 2007 version). (http://online.wsj.com/page/perfectpayday.html)

[11] Using a common definition, i.e. less than US$100 millions, there are 11 small firms in 2001, and only 4 in 2006.

[12] See Yermack (1996).

As for my third test, I conduct an Event Study analysis. As a starting point, I choose stock price as the proxy for firm value. Next, I use both Factiva and WSJ report to identify the earliest press revealing date as the event date. Factiva covers various sources of information including major wire services, US business publications, national and regional newspapers, and trade publications. The estimation window lasts 255 days, ending 46 days before the event date. On the other hand, the event window contains 61 days in total, starting from 30 trading days before and ending 30 trading days after the event. Following the event study approach, I estimate the average abnormal returns for sample firms.

To test the last hypothesis, following Shane et al. (2005), I collect corporate fraud information from the Accounting and Auditing Enforcement Releases (AAERs) published by the SEC. AAERs provide cases in which the SEC believes to have sufficient evidence of accounting or auditing frauds to bring a case against a firm or its executives. Namely, AAERs represent blatant violations of the Generally Accepted Accounting Principles (GAAP) standards of reporting and disclosure. Alternatively, I use the Stanford Securities Class Action Clearinghouse and find securities class action filings (SCAFs) in the US between 1996 and 2007. Dyck et al. (2007) argue that the assumption that value-impacting corporate frauds follows by a security class action lawsuit filled under the 1933 Exchange Act or the 1934 Securities Act is justifiable. Hence, those filings are valid proxies for alleged corporate frauds. However, one possible problem is that using SCAFs might overestimate the actual corporate frauds; that is, some allegations are frivolous. The enactment of the Private Securities Litigation Reform Act of 1995 aims to reduce frivolous lawsuits. Since the data start from 1996, this overestimation problem is much alleviated.

As robustness checks, I form a matched portfolio for each sample firm based on size and industry. In order to reduce the possibility of "mis-matching", i.e. to mistakenly include firms that also conduct backdating but never get caught, I run another test for all matched firms. According to Heron and Lie (2007), the enactment of Sarbanes-Oxley Act of 2002[13] (SOX) makes the abnormal stock return pattern weaker but doesn't eliminate

[13] Among others, the SOX changes the reporting requirements for option grants. Previously, CEOs receiving grants usually report to the SEC on Form 5, not due until 45 days after the company's fiscal year-end, and also to shareholders in proxy statement, not due until the next year's annual meeting. After

it all together. Furthermore, they argue that, after SOX, the fact that firms delay their option reporting implies backdating practice. So, on average, the peer group is expected not to miss the reporting requirement more than its sample firm. If not, unsuitable firms are excluded from the peer group. Following Heron and Lie (2007), I obtain 92 filing information regarding stock option grants to executives of sample firms from Thomson Financial Insider Filing database, which provides insider transactions reported to the SEC. Similarly, I include only observations with a cleanse indicator of R ("data verified through the cleansing process") or H ("cleansed with a very high level of confidence"), occurring after August 29, 2002 (the effective date of SEC's new reporting requirements) and before January 1, 2007.

6 Estimation and Testing Results

6.1 Backdating and Corporate Governance

To test if backdating is associated with corporate governance, firstly I use the GIM Index, its five (revised) sub-indices[14], and the BCF Entrenchment Index[15] to measure shareholder rights in 1990 and 2006. The lower the index is, the stronger rights the shareholders have, which suggests better corporate governance structures. I also use the board size as another proxy for corporate governance. That is, the smaller the board size is, the more efficient the board is, which implies better governance.

In Table 2, the comparison between the sample and the whole market shows that, by using mean test, backdating firms in general have at least as good corporate governance as the market average. In particular, in 2006, except the Delay category of GIM sub-index, backdating firms have significantly stronger shareholder rights. The board size is smaller in the sample firm than its peer group, not statistically significant though. The median test results in an outcome not as robust as what the mean test does, but the same

the SOX, option grants must be reported to the SEC on Form 4, within two business days after the grants.

[14] I add the Notice Requirement to the Delay subindex, the Dual Class to the Voting subindex, the Recapture of Profits to the Other subindex, and take the Antigreenmail Law provision out of State subindex.

[15] See Bebchuk, Cohen, and Ferrell (2004) and Gompers, Ishii, and Metrick (2003) for index construction.

conclusion still holds. Using individual variables, the results (undocumented) are similar but then weaker.

To take a closer look, I compare shareholder rights and board size between the sample firm and its corresponding matched firms. Table 3 shows a similar pattern as previous results, and in general the shareholder rights of the sample is not worse than those of its peer group. More specifically, except the Protection subindex (which flips the sign, not significant though), the difference of other index remains the negative sign. However, if compared with the market level in Table 2, both the magnitude and (some of) its significance of differences vary. The median test, again, has a similar outcome, and the sample firms have significantly better shareholder protection in terms of voting mechanisms, along with measures which alleviate managerial entrenchment. As for the board size, there is no difference between the sample firms and their matched firms. To sum up, based on the testing results, I reject the null hypothesis, and backdating isn't associated with poor corporate governance structures.

6.2 Backdating and Firm Performance

As the first step, I collect data from the WSJ COMPANY RESEARCH, which provides 1-, 2-, and 5-year return data of individual stock, its corresponding industry index, and also the market index, respectively. According to Table 4, the sample firms have beat-the-industry performance in any mean stock return measure. Particularly, during the past 5 years, the stock return of the sample firms is 2.5 times of that of the industry as a whole, which is also statistically significant. However, in general, its corresponding industry performs worse than the whole market which has the proxy of DJ U.S. Total Market Index, except the one-year return measure. On the other hand, the median test results in a similar but weaker outcome.

Table 5 shows the comparison of performance between the sample and the market, and its peer group, respectively, from 1993 to 2005. In general, the estimates of the differences from the mean test are larger than those from the median test, which might be attributed to the outliners. Thus, for the remainder of the paper I emphasize median test results to avoid biased interpretations. Firstly, column Difference(M, SP) represents the annual

excess stock return, with the S&P500 index as the benchmark, of the sample firms. During this period, there are 7 years in which the sample firms have beat-the-market performance, among them 4 are statistically significant, with 2 years of significant underperformance.

As for the rest of the columns, they show the annual excess growth rate, with three proxies[16], of the sample firms, relative to their peer group. Among them, the estimates of sales difference are all positive. In particular, from 1998 to 2000, the sample firms beat their peer group with double-digit growth in percentage. The remaining two proxies have weaker outcomes, but it's never the case that the sample firms significantly underperform their peer group. Therefore, combining the evidence above, I argue that backdating isn't associated with firms having inferior performance.

6.2.1 Backdating and Financial Constraint

The preceding finding that backdating firms outperform the market and their peers indicates likely outside options for successful executives, and hence firms have to provide additional compensation to keep them from leaving (even to avoid the "prospects" that they might leave). In order to understand why firms choose backdating rather than the alternatives, firstly I look at the financial constraint, defined as cash holdings subtracted by interest expenses, facing the sample firms and their peer group from 1993 to 2005. Table 6 shows the results which test whether these two groups have the same financial constraint. Both mean and median tests convey a similar pattern, and in particular, before 2000, backdating firms do have lower cash holding relative to their matched counterparts. Afterwards, the pattern is reversed, and backdating firms hold more cash. One caveat is that, most of the results are not statistically significant. Furthermore, I test the difference between the two groups directly. In Table 7, the median test shows before 2000, backdating firms are under significant financial constraint, relative to their peer group. Afterwards, the pattern is not clear (not significant, either). Having all, I don't have strong evidence to link backdating to financial constraint. However, since most backdating happened before 2002, low cash holdings might still attribute to backdating.

[16] Sales, Operating Income Before Depreciation, and Net Income.

6.2.2 Backdating and Stock Price Volatility

In this session, I probe if stock price volatility, defined as the standard deviation of stock price centered on its mean, of backdating firms is larger than that of the market. If yes, that implies it's easier to take advantage of stock price variation in order to profit from backdating. There are three proxies for the market, the S&P500 Index, and the value- and equally-weighted NYSE/AMEX Index. In Table 8, the excess stock price volatility of the sample firms, relative to that of the market, is positive, mostly statistically significant. The S&P500 index has the most prominent outcome for both tests. Compared with mean test, the median test results display a less pronounced pattern; nevertheless, this excess volatility is statistically significant throughout the entire period, being at least 10% each year. Based on the findings, I argue that stock volatility is one of the necessary conditions for backdating.

6.3 Backdating Firm-specific Characteristics

After several univariate tests, I conduct a regression analysis and examine possible determinants of backdating decision. To that end, I estimate both linear probability and binomial probit models, controlled for firm-specific factors, labour market situation and industry fixed effects. The dependent variable is assigned to 1 for backdating firms and 0 for matched firms. On the other hand, the explanatory variables include ones such as stock return volatility, firm size (logarithm of market capitalization), financial constraint (cash subtracted by interest expenses), R&D propensity (R&D expenses divided by total assets), and growth opportunity by using the market-to-book ratio, i.e. the book value of assets plus the market value of common stock less the sum of book value of common equity and balance sheet deferred taxes.

Also, I control for profitability by using return on assets (a ratio of EBIT, i.e. earnings before interest and tax, to total assets), CEO option holding ratio (the black-scholes option value divided by total compensation), and executive labour market tightness measured by turnover ratio divided by underperformance ratio. If this measurement is low, it suggests a tight labour market. Otherwise, the turnover is supposed to be proportional to underperformance, given the market is loose. Due to the difficulty to determine the

exact timing and also the multiple occurrences of backdating, for each firm the explanatory variables are the mean of those on an annual basis from 1992 to 2005[17]. In Table 9, Panel A reports the correlations between explanatory variables and Panel B summaries the estimation results, in which some models further control for industry effects coded using the first 2-digit NAICS codes.

According to Panel B, both specifications have similar results. In spite of expected signs, due to the lack of statistical significance, governance measures, CEO option holding ratio, stock price volatility, and labour market tightness don't matter on backdating propensity. What matter are firm size, age, financial constraint, and return on assets (ROA). To interpret, at first, contrary to the previous findings, backdating is associated with underperformance, which might attribute to the outliner issue; in addition, without using a "relative" measure for profitability weakens this argument. Next, conforming to repricing, backdating firms tend to be young, growing, and having smaller boards of directors. But, the significant positive relationship between firm size and backdating propensity contradicts repricing mechanisms. It's not surprising since big companies are easy targets for regulators, but this feature again distinguishes backdating from repricing. Finally, the lack of significance of R&D propensity implies that backdating practice is so commonly used across sectors that it isn't restricted to technology-intensive industries only.

To conclude, I argue that repricing and backdating indeed share similar features, but not identical. In particular, performance is the major factor that separates the two. In other words, under a tight labour market, facing underperformance, repricing is needed to incentivize managers; on the other hand, facing superior performance, backdating is one way to keep managers from leaving. Moreover, note that repricing concentrates on some industries, but backdating is widely adopted across sectors.

6.4 Backdating and News Announcement

In this section, I adopt the Event Study methodology to test if the press revealing backdating practice brings negative impacts on firms. To identify the event date, I use three different sources of news release, which are Factiva, WSJ, and one with the earlier date

[17] It can be problematic because of outliners, which can't be alleviated thanks to small sample size.

between the former two. Table 10 summarizes the press announcement dates from these two sources, together with the probe order and rulings announcement dates of individual firms. The event window starts from 30 trading days before through 30 trading days after the event, and the estimation period is 255 days ending 45 days before the event. Using market- and market risk-adjusted return models (with both equally- and value-weighted market index), I calculate the abnormal stock returns as the difference between the realized returns and the ones predicted by model. Generally speaking, it should be more appropriate to use the last source of news release, i.e. the earlier date between Factiva and WSJ, for analysis since people use massive sources of information, which also spreads quickly nowadays. Hence, I take it as my benchmark case for the remainder of this section.

Table 11 reports the analytical results. Firstly, by using equally-weighted market index and market adjusted return model, Panel A provides the day-by-day (cumulative) abnormal stock returns and their corresponding test statistics. On date 0, on average, there is a -2.09% abnormal return and a -7.36% cumulative abnormal return (CAR) for the sample firms. In addition, the whole event window is divided into three sub-periods, i.e. pre-event, event, post-event. Based on different weighting measures for market index, Panel B and C report the estimates for the CAR. To further demonstrate, Fig. 1 and 2 displays the CAR pattern during the event window period. For the market adjusted return model, prior to around 20 days before the announcement, the stock prices move in line with what the theory predicts but start to decrease sharply afterwards. In particular, the CAR from Day -20 to Day -1 is around -5%, or -0.25% a day. On the announcement date, the abnormal return plummets more than 2%, which is statistically significant and making its CAR exceeding -7.5%. Since then, the stock prices gradually resume to the theoretical trend, though they never return to previous levels. In particular, the abnormal return between Day 1 and Day 30 is meagerly 0.4% by equally weighted market index (or -0.16% by value weighted market index), both statistically insignificant. On the other hand, the market return model has similar but slightly weaker results (undocumented).

As a result, the first press revealing backdating practice indeed causes non-trivial damages to firms. One thing interesting is the monotonic and substantial decline since 20 days before the news. To explain it, two forces, among others, might come into play. For

one thing, based on other information (e.g. abnormal stock trading), investors probably anticipate the news approaching; for the other, which is more likely, insiders anticipate that happening as well. Both factors attribute to and further aggravate the pattern during that period. At first glance, I suspect the second effect dominates the first one, since insiders should have better information access. But, since the abnormal return pattern almost disappears soon after the news, both effects are already priced in, and the investor effect is not necessarily dominated by the insider effect.

6.5 Backdating and Other Corporate frauds

The last part of the empirical analyses aims to understand whether firms under investigations might in fact act not in bad faith. Table 12 shows that the number of AAERs of each sample firm ranges from 0 to as high as 10, with an average of 0.19 case per firm, and the number of SCAFs ranges from 0 to 3, with an average of 0.63 case per firm. Since AAERs capture outrageous cases of corporate wrongdoing, it can be viewed as the lower bound of the true corporate fraud level. Similarly, since SCAFs include frivolous cases, it is best viewed as the upper bound. Hence, the "confidence interval" of the true corporate frauds committed by firms should be between these two estimates. Note that I exclude backdating related cases for both AAERs and SCAFs.

To compare, I use SCAFs in order to avoid underestimation (undocumented). For the peer group as a whole, the number ranges between 0 and 1, and the mean is 0.27 (the median is 0.25) case per group. The mean test shows that backdating firms seem to commit significantly more other corporate frauds. Nevertheless, the median test indicates otherwise. So, the sample firms on average face more class action lawsuits than their counterparts, but not so if the influences of outliners are eliminated. Even so, I don't find conclusive evidence to reject the hypothesis that backdating firms commit more other frauds. Note that it's possible that backdating investigations might be initiated by the "track record" of corporate frauds. In other words, not only simply being large, but also having more other fraud suits would make firms easy targets.

As mentioned earlier, one way for investors to express their views on firms is through the stock market. And therefore, to some extent, stock price variation can be regarded

as "public outcry". Intriguingly, I want to see if there is relationship between CAR and corporate frauds. To achieve that, firstly I use the results from the Event Study in the previous session which include individual CAR during the whole event window. Table 11 reports the outcome in three different sub-periods, i.e. CAR(-1,0), CAR(-30,0) and CAR(-30,30). Panel B shows that the correlation between the number of AAERs and any CAR measure is negative, suggesting that the higher the number of AAERs is, the higher the negative cumulative abnormal return is. Since the level of negative cumulative abnormal return represents the severeness of public outcry for firms, it can be viewed as the reputation risk facing firms. As a result, the negative correlation between the two suggests that the higher the severity of public outcry, the more likely that the shareholders, or the blockholders, might file for law suits as long as they find evidence of wrongdoings of their firms.

Taking a step further, I conduct a regression analysis to know what, if any, might explain this public outcry. Because the abnormal stock return almost disappears after the event, Table 13 only shows the estimation results for two dependent variables, CAR(-1,0) and CAR(-30,0). For CAR(-1,0), in general, market-to-book ratio, ROA, and GIM index are positively associated, with different significant levels, with this CAR measure, which is negatively correlated to AAERs. So, having promising growth prospects, better profitability, and/or poor governance reduce the reputation risk, and committing other corporate frauds aggravates it. When the interaction term of GIM index*AAERs is added, the reputation risk is further reduced for firms with poor governance who also commit other corporate frauds at the same time. More, after controlling for industry effects, all the explanatory variables remain the same signs, but ROA and GIM index are not significant anymore.

When considering the whole pre-event period, a similar picture emerges. Nevertheless, now only growth opportunities and other corporate frauds matter for the reputation risk. The significance of profitability and governance disappear. More than that, another major difference is that, the magnitude for every important factor greatly increases. For both cases, replacing AAERs with SCAFs results in similar outcomes, though weaker again (undocumented).

7 A Simple Model

The preceding empirical results provide evidence supporting the conjecture that some backdating practices are rational. Thus, in this section, following the baseline linear model in Acharya et al. (2000), I build up a simple two-period model which demonstrates one situation in which backdating is a rational strategy for the firm.

The firm in this game is owned by an entrepreneur (the "principal") who employs a manager (the "agent") to operate a project lasting for two periods. Without loss of generality, the initial investment is normalized to unity. At the end of the second period (terminal node), there is a one-time cash flow (possibly H^2, HL, and LL, where H>1>L), depending on the actions (effort levels) taken by the manager in each of the two periods, and the outcome of the interim first period can be regarded purely as an informative event signalling the final cash flows, which could be a reference for later renegotiating the terms of the initial contract.

The manager's set of possible action in each period is $A = [0, \bar{a}]$ ($\bar{a}<1$). After taking the action $a \in A$ in the first period, a public signal $s \in \{H, L\}$ is observed signalling the final outcomes. After the signal, the manager chooses her second period action, and I denote the action following the H signal with a_h and one following the L signal with a_l. The prospects of the signals and of the final cash flows depend on the actions taken by the manager. Given the initial period action a, the signal H is observed with probability $p(a) = a$ and the signal L with 1-p(a). Once H realizes, the manager chooses action a_h, and the final cash flow H^2 is realized with probability $p(a_h)$ and cash flow HL with $1\text{-}p(a_h)$. Similarly, after the signal L, the manager chooses action a_l, and the final cash flow L^2 is realized with probability $p(a_h)$ and cash flow LH with $1\text{-}p(a_l)$. Figure 3 illustrates the baseline model in an extensive form.

The actions incur a cost or disutility to the manager, which is denoted by $c(a) = ka$ ($k>0$). In addition, $W=(w_{hh}, w_{hl}, w_{lh}, w_{ll})$ denotes a compensation scheme devised by the principal for the manager. The objective of the manager is to choose an initial action a, and the subsequent action a_h or a_l to maximize the expected (linear) utility of her compensation subtracted by the cost of the actions. Like the baseline model, I also assume a risk-neutral principal who anticipates the manager's response to any initial offer

and chooses a compensation scheme maximizing her own initial expected (linear) utility, subtracted by the manager's compensation. For simplicity, I put discount rates to zero and assume this principal-agent relationship lasts for two periods.

In order to derive the equilibrium, one applys the backward induction approach as follows,

For the manager,

$$\begin{aligned} U_i(a_i, w_{ii}, w_{ij}) &= p(a_i)w_{ii} + (1-p(a_i))w_{ij} - c(a_i), \;\; i = \{h, l\}, \; j \neq i \\ &\Longrightarrow \;\; U(a, U_h, U_l) = p(a)U_h + (1-p(a))U_l - c(a) \end{aligned}$$

For the entrepreneur,

$$\begin{aligned} V_h &= p(a_h)(H^2 - w_{hh}) + (1-p(a_h))(HL - w_{hl}) \\ V_l &= p(a_l)(L^2 - w_{ll}) + (1-p(a_l))(LH - w_{lh}) \\ &\Longrightarrow \;\; V = p(a)V_h + (1-p(a))V_l \end{aligned}$$

Here, it's further assumed that the strike price is normalized to unity, which is valid because in practice executive stock options are usually issued at the money. Given any α, the optimal compensation scheme is the following (note that HL<1 by construction),

$$\begin{aligned} w_{hh} &= \alpha(H^2 - 1)^+ = \alpha(H^2 - 1) \\ w_{hl} &= \alpha(HL - 1)^+ = 0 \\ w_{lh} &= \alpha(LH - 1)^+ = 0 \\ w_{ll} &= \alpha(L^2 - 1)^+ = 0 \end{aligned}$$

Under the usual pre-commitment mechanism, the compensation anticipated by the manager at the terminal nodes is the initial one offered by the principal. Thus, the manager's best response of a*(α) and the equilibrium payoff V(α) are easily determined. Lastly, the principal chooses α to maximizes V(α). Now, the close-form equilibrium come as follows,

For the manager, first,

$$\max_{a \in [0, \bar{a}]} a\alpha(H^2 - 1) + (1-a)0 - ka$$

$$a_h = \left\{ \begin{array}{ll} 0, & if \quad \alpha(H^2-1) < k \\ \bar{a}, & otherwise \end{array} \right\}$$

$$U_h = \left\{ \begin{array}{ll} 0, & if \quad \alpha(H^2-1) < k \\ \bar{a}\alpha(H^2-1) - k\bar{a}, & otherwise \end{array} \right\}$$

$$a_l = U_l = 0$$

Next,

$$\max_{a \in [0,\bar{a}]} aU_h + (1-a)U_l - ka$$

$$a = \left\{ \begin{array}{ll} 0, & if \quad U_h - U_l < k \\ \bar{a}, & otherwise \end{array} \right\}$$

For the entrepreneur,

$$\begin{aligned} \alpha &= \frac{k(1+\bar{a})}{\bar{a}(H^2-1)}, \text{ and} \\ V &= \bar{a}H^2 + \bar{a}(1-\bar{a})HL + (1-\bar{a})L^2 - k\bar{a}(1+\bar{a}) \end{aligned}$$

As a result, in equilibrium, given the initial contract W=(w_{hh}, w_{hl}, w_{lh}, w_{ll}) designed by the entrepreneur, the manager exerts action ā during the first period. Afterwards, when signal H occurs, she will continue with action ā, but with zero effort when signal L realizes.

7.1 Subgame Perfect Bayesian Equilibrium

In this section, I extend the baseline model and assume this principal-agent relationship lasts at least one period only and breaking the initial contract (by either party) doesn't incur any cost or penalty. Notice that the model here can't distinguish between new issues of options and resetting (backdating in my case) of current options. In other words, no new options are issued in this game. Then, my question is that, what happens if after one period, the signal H is realized and the entrepreneur finds that unexpected outside options appear? In that case, there is a risk that, under the initial contract, the manager might leave the firm and it's not possible to find the replacement (in time) to continue the

project, which would fail and incur a loss of the initial investment 1. To keep her, what the entrepreneur can do is to reset, i.e. backdate, the initial contract.

The timeline has the following (revised) structure,[18]

—|————|————————|————————————|————————|————>

T=0 T=1 T=2

Contract Effort(MH) Signal(Renegotiation) Effort (MH) Final Outcome realized

Figure 5 shows the extensive form of the game after the signal H is realized. After the signal H, the entrepreneur, as Player 2, facing the prospects of outside options for the manager, moves first to decide whether to reset the initial contract or not. That is, to change α to $\alpha^{'}$ or not. Then the manager, as Player 1, given the outcome of renegotiation, decides to stay in the firm or accept the (best) outside option and leaves the firm. If she stays, as usual, she chooses the action $a_h$and the final cash flow realizes; on the other hand, if she leaves, she receives the outside option without incurring any disutility from the action[19]. To derive the subgame perfect Bayesian equilibrium in this dynamic game of imperfect information, first Player 2 must have a belief about which node has been reached, which is represented by probability P and 1-P, as shown in Figure 5.[20]

In addition, I assume that $\alpha^{'} > \alpha$, and without loss of generality, the best outside option B $= \bar{a}\alpha(H^2 - 1)$. Similarly, by using the backward induction technique, I find that, for Player 1, after renegotiation there are four subgames, as shown with red thick arrows in Figure 6. Given the payoffs, Player1 has four possible pure strategies as follows,

Strategy 1 (S1) : stay and choose action $\bar{a}$, if $\alpha^{'} - \alpha \geq \dfrac{k}{(H^2 - 1)}$; accept B and leave, otherwise.

Strategy 2 (S2) : accept B and leave the firm.

Strategy 3 (S3) : stay and choose action $\bar{a}$.

Strategy 4 (S4) : stay and choose action $\bar{a}$.

Next, for Player 2, due to the non-singleton information set, there is only one subgame

[18] Refer to Figure 4 for a simple illustration.

[19] Strictly speaking, the best outside option can be defined as any payoff value (slightly) larger than the original wage w_{hh}.

[20] More specifically, Player 2 has a belief that the best outside option appears (exogenously) with probability P, and nothing happens (or no valid outside options) with probability 1-P.

with two cases for consideration[21]. In Case 1, as shown in Figure 7, there exists a pure strategy: backdate (reset α to $\alpha^{'}$), if $P \geq \tilde{P} = \frac{\bar{a}k}{(\bar{a}H^2 - k(1+\bar{a})+1)}$; not to backdate (keep α intact), if $P < \tilde{P}$, where $\alpha^{'} = \alpha + \frac{k}{H^2-1}$ for profit maximization. For further illustration,

To check what might influence this threshold $\tilde{\text{P}}$, I have the following relations,

$$\begin{aligned}
\frac{\partial \tilde{P}}{\partial H} &= \frac{-2\bar{a}^2 kH}{(\bar{a}H^2 - k(1+\bar{a})+1)^2} < 0 \\
\frac{\partial \tilde{P}}{\partial k} &= \frac{\bar{a}(\bar{a}H^2+1)}{(\bar{a}H^2 - k(1+\bar{a})+1)^2} > 0 \\
\frac{\partial \tilde{P}}{\partial \bar{a}} &= \frac{k(1-k)}{(\bar{a}H^2 - k(1+\bar{a})+1)^2} \lesseqgtr 0
\end{aligned}$$

To interpret, first notice that the expected profit for the firm to backdate is $\bar{a}H^2 - k(1+\bar{a}) - \bar{a}k$, in which the first term $\bar{a}H^2$ is expected value of final cash flow given manager's response, the second element $k(1+\bar{a})$ is wage (also the best outside option), and the last element $\bar{a}k$ can be viewed as backdating cost. Then,

1. When H is higher, i.e. a higher (signal of) final cash flow, the firm has more to lose if the manager leaves. Thus, the entrepreneur has a higher propensity to backdate, and the threshold of briefs for outside options reduces.

2. When k is higher, i.e. a higher cost of efforts, the original contract of wage is higher. The outside options need to be more attractive, which is more costly for other firms. Additionally, the backdating cost goes up. So, the entrepreneur has a lower propensity to backdate, and the threshold increases.

3. When $\bar{a}$ is higher, i.e. both a higher (expected) final cash flow, a higher wage, and a higher cost of backdating for the firm, the impact on the expected profit is undetermined.

By the same token, when it comes to Case 2, when $\alpha^{'} - \alpha < \frac{k}{(H^2-1)}$,Player 2 has one pure strategy which is not to backdate no matter what her belief is. However, that means $\alpha^{'} = \alpha$, which contradicts the assumption of $\alpha^{'} > \alpha$. As a result, this case doesn't hold.

[21] Case 1 refers to the situation when $\alpha^{'} - \alpha \geq \frac{k}{(H^2-1)}$; Case 2 refers to when $\alpha^{'} - \alpha < \frac{k}{(H^2-1)}$.

Taken together, after signal H, there exist two subgame-perfect Bayesian Equilibrium,

((stay and choose action $\bar{a}$), (backdate, when $P \geq \tilde{P}$)), and

((stay and choose action $\bar{a}$), (not to backdate, when $P < \tilde{P}$)).

8 Conclusions

10 years ago, Yermack (1997) first identifies the pattern of abnormal stock return around CEO stock option grants, suggesting the possibility of firms timing option grants or firm-related announcements. Later on, Lie (2005) and Heron and Lie (2007) argue that, instead of timing grants and announcements, it's more likely that CEO options are actually backdated. That is, the grant dates of current options are changed to more favorable dates, i.e. with lower striking prices. Moreover, the comprehensive newspaper coverage starting from 2004 reveals this backdating practice to the public and further draws regulators' attention. For them, backdating is simply a vicious way of stealing money from the firm. However, its common use among firms implies that, in addition to lucky or greedy executives, there might be rational considerations.

All told, the central message of the paper is that, backdating isn't solely due to lucky or greedy executives. More specifically, on the whole, backdating firms are neither poor governed, nor bad managed. Apart from tax evasion, one necessary condition contributing to backdating is high stock volatility. Compared with the alternatives, it's easier to take advantage of stock variation, and hence benefiting from backdating. The firm-specific characteristics such as size, age, financial constraint, and profitability are all influential in backdating decision, which is consistent with Bizjak et al. (2007). Also, despite the similarities, backdating and repricing have differences, and it's not valid to view backdating merely as another form of repricing. What distinguishes between the two is that, given a tight labour market, repricing is to incentivize managers and backdating is to keep them. The simple dynamic game presented in the paper illustrates one possible mechanism.

When looking at what news announcement might affect firm value, there is approximately 7% abnormal stock price decline during the 61-day event period. Thus, similar to Narayanan et al. (2007), the backdating news indeed imposes a non-negligible loss on firms. Moreover, backdating firms face more class action lawsuits than their peer group,

suggesting a higher propensity for frauds. So, backdating firms are not vicious, but they are not innocent either! Having better profitability, growth prospects, and poor governance reduces reputation risk for firms. Firms that commit more frauds intensify the risk, which is alleviated for those with poor governance. If taking the whole pre-event period into account, the severity of reputation risk is mainly driven by growth opportunities and fraud levels.

Several issues arise from the analyses. Firstly, by using a sample of firms under investigations, in fact I look at cases in "extreme" scenarios only, and it brings about overestimation. Therefore, the results and implications can be "conservative" to the reality. I've made it clear in the beginning that my goal is not to explain the entire universe, but a subset of it. Besides, using anti-takeover provisions to evaluate corporate governance is debatable. After all, they represent shareholder rights when it comes to corporate control, only part of governance mechanisms. Consequently, until a better proxy emerges, I should argue that backdating is associated with better shareholder anti-takeover rights, instead of corporate governance as a whole. Last but not the least, future work needs to find the accurate timing of backdated options and pin down the causality between backdating decision and firm-specific factors.

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Appendix

Table 1
Sample Firm Characteristics

This table provides a summary of 126 firms under investigations related to backdating CEO stock options in the US. Panel A displays, in 2001 and 2006, the size distribution of sample firms, and the market value data are retrieved from Datastream. Panel B displays their industrial orientations in which the industrial classification is based on Wright Reports, http://wrightreports.ecnext.com/.

Panel A: Size

Market Value (US$ million)	2001		2006	
	Number of Firms	Fraction in %	Number of Firms	Fraction in %
< 1,000	50	40.00	44	34.92
1,000 – 2,000	21	16.80	26	20.63
2,000 – 3,000	8	6.40	7	5.56
3,000 – 4,000	9	7.20	10	7.94
4,000 – 5,000	5	4.00	4	3.17
5,000 – 6,000	5	4.00	5	3.97
6,000 - 7,000	3	2.40	3	2.38
7,000 – 8,000	4	3.20	4	3.17
8,000 – 9,000	3	2.40	3	2.38
9,000 – 10,000	3	2.40	5	3.97
> 10,000	14	11.20	15	11.90
Sample Size	125	100.00	126	100.00

Panel B: Industry

Industry	Number of Firms	Fraction in %
Construction	1	0.79
Defense	1	0.79
Diversified	1	0.79
Chemicals	2	1.59
Financial	2	1.59
Food & Beverages	2	1.59
Recreation	2	1.59
Oil, Gas, Coal & Related Services	3	2.38
Utilities	5	3.97
Retailers	7	5.56
Drugs, Cosmetics & Health Care	11	8.73
Miscellaneous	14	11.11
Electronics	75	59.52
Sample Size	126	100.00

Table 2
Backdating and Corporate Governance (1)

This table shows whether the backdating firms have the same corporate governance level with the market average in 1990 and 2006, respectively. The full sample consists of 21 (in 1990) and 103 (in 2006) firms that are under investigations in the US. The corporate governance index data are retrieved and calculated with data from IRRC. Panel A displays the mean test results, using t-test for equality. Panel B displays the median test results, using Wilcoxon/Mann-Whitney (tie-adjusted) test for equality. The symbols *, **, and *** represent statistical significance at the 0.1, 0.05, 0.01 level, respectively. P-values are reported in the parentheses.

Panel A: Mean Test

		1990			2006		
		Sample (S)	Market (M)	Difference (M,S)	Sample (S)	Market (M)	Difference (M,S)
GIM Index		7.24	8.89	-1.65*** (0.009)	8.05	9.02	-0.97*** (0.000)
GIM Sub-Index	Delay	1.67	1.80	-0.14 (0.601)	3.12	3.26	-0.15 (0.273)
	Protection	2.38	2.38	0.00 (0.999)	1.81	2.04	-0.24** (0.037)
	Voting	0.62	0.65	-0.03 (0.875)	0.49	0.71	-0.23*** (0.005)
	Others	0.48	1.20	-0.72*** (0.002)	0.66	0.97	-0.31*** (0.001)
	State	0.95	1.58	-0.63*** (0.009)	1.20	1.59	-0.38*** (0.000)
BCF Entrenchment Index		1.00	1.93	-0.93*** (0.002)	1.88	2.25	-0.37*** (0.003)
Board Size[1]		8.42	10.30	-1.88*** (0.0067)	8.62	9.12	-0.50 (0.2213)
Sample Size		21	1466		103	1896	

Panel B: Median Test

		1990			2006		
		Sample (S)	Market (M)	Difference (M,S)	Sample (S)	Market (M)	Difference (M,S)
GIM Index		8	9	-1** (0.022)	8	9	-1*** (0.000)
GIM Sub-Index	Delay	1	2	-1 (0.462)	3	3	0 (0.249)
	Protection	2	2	0 (0.943)	2	2	0 (0.028)
	Voting	1	0	1 (0.749)	0	1	-1*** (0.003)
	Others	0	1	-1*** (0.001)	1	1	0 (0.001)
	State	1	1	0 (0.005)	1	1	0 (0.001)
BCF Entrenchment Index		0	2	-2*** (0.001)	2	2	0 (0.003)
Board Size		8	10	-2*** (0.0048)	8	9	-1 (0.2751)
Sample Size		21	1466		103	1896	

[1] Data started from 1996 the earliest.

Table 3
Backdating and Corporate Governance (2)

This table shows whether the backdating firms have the same corporate governance level with their peer group in 2006. The full sample consists of 85 firms that are under investigations in the US. The corporate governance index data are retrieved and computed with data from IRRC. The mean test uses t-test and the median test uses Wilcoxon/Mann-Whitney (tie-adjusted) test for equality. The symbols *, **, and *** represent statistical significance at the 0.1, 0.05, 0.01 level, respectively. P-values are reported in the parentheses.

		Mean Test			Median Test		
		Sample (S)	Peer Group (P)	Difference (P,S)	Sample (S)	Peer Group (P)	Difference (P,S)
GIM Index		8.18	8.62	-0.45 (0.1110)	8.00	8.67	-0.67* (0.0985)
GIM Sub-Index	Delay	3.15	3.46	-0.31* (0.0815)	3.00	3.50	-0.50 (0.1818)
	Protection	1.87	1.81	0.06 (0.6694)	2.00	2.00	0.00 (0.9601)
	Voting	0.51	0.62	-0.12 (0.2793)	0.00	0.50	-0.50** (0.0208)
	Others	0.68	0.90	-0.22** (0.0232)	1.00	1.00	0.00 (0.0266)
	State	1.20	1.24	-0.04 (0.6819)	1.00	1.00	0.00 (0.3629)
BCF Entrenchment Index		1.89	2.35	-0.46*** (0.0025)	2.00	2.33	-0.33*** (0.0028)
Board Size		8.62	8.26	0.36 (0.4590)	8	8	0 (0.3781)
Board Size[2]		7.26	7.27	-0.01 (0.9815)	7	7	0 (0.6231)
Sample Size		85	85		85	85	

[2] Data in 2001, in which have the most observations.

Table 4
Backdating and Performance (1)

This table shows the comparison of stock returns between the sample firms (S) and the industry (I), the industry and the market (M), and the sample firms and the market, respectively. The full sample consists of 111 firms that are under investigations in the US. The stock return data are collected from WSJ Company Research, and the Dow Jones U.S. Total Market Index represents the market benchmark. Panel A displays the mean test results, using t-test for equality. Panel B displays the median test results, using Wilcoxon/Mann-Whitney (tie-adjusted) test for equality. The symbols *, **, and *** represent statistical significance at the 0.1, 0.05, 0.01 level, respectively. P-values are reported in the parentheses.

Panel A: Mean Test

Performance During Past: (from July 16 or 17, 2007)	Difference (I,S)	Difference (M,I)	Difference (M,S)
1 year	0.0309	0.0565***	0.0874*
	(0.5371)	(0.0000)	(0.0765)
2 years	0.0775	-0.0547***	0.0228
	(0.2556)	(0.0010)	(0.7297)
5 years	2.5447**	-0.0404	2.5043**
	(0.0106)	(0.5576)	(0.0117)
Sample Size	111	111	111

Panel B: Median Test

Performance During Past: (from July 16 or 17, 2007)	Difference (I,S)	Difference (M,I)	Difference (M,S)
1 year	-0.1450***	0.0897***	-0.0553**
	(0.0004)	(0.0000)	(0.0139)
2 years	-0.0963**	-0.0677***	-0.1640***
	(0.0309)	(0.0000)	(0.0000)
5 years	0.1328	-0.1991***	-0.0663
	(0.2389)	(0.0000)	(0.2970)
Sample Size	111	111	111

Table 5
Backdating and Performance (2)

This table shows the comparison of performance between the sample firms and the market (M), which has the proxy of S&P500 index, also between the sample firms and their peer group (P). The full sample consists of firms that are under investigations in the US. The stock prices (SP), sales (S), operating income before depreciation (OIBD), net income (NI) data are collected from CRSP and Compustat. Panel A displays the mean test results, using t-test for equality. Panel B displays the median test results, using Wilcoxon/Mann-Whitney (tie-adjusted) test for equality. The symbols *, **, and *** represent statistical significance at the 0.1, 0.05, 0.01 level, respectively. P-values are reported in the parentheses.

Panel A: Mean Test

Performance During:	Difference (M,SP)	Difference (P,S)	Difference (P,OIBD)	Difference (P,NI)
1993	0.3289*	-0.2781	-0.5189**	0.9220
	(0.0577)	(0.1704)	(0.0288)	(0.7148)
1994	0.0491	0.0157	-0.1834	-0.6131
	(0.4951)	(0.7717)	(0.3132)	(0.5381)
1995	0.7406***	0.2831	3.8601	1.7580
	(0.0001)	(0.1510)	(0.3061)	(0.4396)
1996	0.1458*	0.7081	1.9302	4.0710
	(0.0768)	(0.1668)	(0.2742)	(0.4465)
1997	0.3157***	0.0613	-1.4327	0.2905
	(0.0001)	(0.7780)	(0.3651)	(0.4779)
1998	0.2298***	4.7975	0.7674	-0.2326
	(0.0008)	(0.1287)	(0.1850)	(0.7975)
1999	0.9468***	0.5870	0.0344	1.7464
	(0.0000)	(0.1505)	(0.8879)	(0.2238)
2000	-0.1102	0.4335***	1.3056	-14.0949
	(0.1346)	(0.0070)	(0.1907)	(0.3655)
2001	0.1881	0.2013**	0.8329**	-0.1432
	(0.2620)	(0.0442)	(0.0320)	(0.8942)
2002	-0.3431***	0.0079	-0.1145	-0.2206
	(0.0000)	(0.8606)	(0.7058)	(0.7121)
2003	1.0305***	0.0370	0.6648*	-0.0149
	(0.0000)	(0.2635)	(0.0652)	(0.9750)
2004	0.1741***	0.1090***	0.2141	0.1438
	(0.0028)	(0.0055)	(0.2149)	(0.6901)
2005	0.0454	0.0813**	0.3392*	0.4330
	(0.2020)	(0.0224)	(0.0857)	(0.3343)
Sample Size	125	82	82	82

Panel B: Median Test

Performance During:	Difference (M, SP)	Difference (P,S)	Difference (P,OIBD)	Difference (P,NI)
1993	0.0940	0.0589	-0.5189	-0.0899
	(0.1256)	(0.6891)	(0.2087)	(0.3478)
1994	-0.0302	0.0872	-0.1010	-0.1473
	(0.7343)	(0.5355)	(0.2814)	(0.3121)
1995	0.3525***	0.0029	-0.0972	0.1034
	(0.0000)	(0.3209)	(0.5605)	(0.7397)
1996	-0.0300	0.0350	0.0831	0.1887
	(0.5343)	(0.2361)	(0.1248)	(0.4734)
1997	0.1650***	0.0576	0.1335	0.1448**
	(0.0000)	(0.2726)	(0.3219)	(0.0404)
1998	0.0606	0.1101**	0.1962***	0.3994***
	(0.5830)	(0.0434)	(0.0094)	(0.0030)

1999	0.5682***	0.1117**	0.1296*	0.3755***
	(0.0000)	(0.0331)	(0.0786)	(0.0038)
2000	-0.3019***	0.1596**	0.2107*	0.1309
	(0.0000)	(0.0125)	(0.0870)	(0.1639)
2001	-0.1282	0.0708**	0.2234**	0.2058
	(0.1228)	(0.0227)	(0.0447)	(0.1046)
2002	-0.4494***	0.0427	-0.0409	0.0582
	(0.0000)	(0.7261)	(0.2354)	(0.8575)
2003	0.7189***	0.0385*	0.1449*	0.1683
	(0.0000)	(0.0641)	(0.0813)	(0.1302)
2004	0.0431	0.0683***	0.1603**	0.0687
	(0.2410)	(0.0060)	(0.0192)	(0.2423)
2005	-0.0284	0.0448**	0.0443	0.0885
	(0.5596)	(0.0160)	(0.1864)	(0.3407)
Sample Size	125	82	82	82

Table 6
Backdating and Financial Constraint (1)

This table shows whether the backdating firms and their peer group face the same financial constraint between 1993 and 2005. The full sample consists of 104 firms that are under investigations in the US. The financial constraint is defined as cash subtracted by interest expenses. The mean test uses t-test and the median test uses Wilcoxon/Mann-Whitney (tie-adjusted) test for equality. The symbols *, **, and *** represent statistical significance at the 0.1, 0.05, 0.01 level, respectively. P-values are reported in the parentheses.

	Mean Test			Median Test		
	Sample (S)	Peer Group (P)	Difference (P,S)	Sample (S)	Peer Group (P)	Difference (P,S)
1993	45.13	69.60	-24.47 (0.2945)	7.92	24.69	-16.77 (0.1103)
1994	44.86	61.31	-16.45 (0.5611)	6.45	16.77	-10.32* (0.0867)
1995	31.31	49.17	-17.86 (0.2991)	3.73	14.54	-10.81** (0.0474)
1996	47.60	72.61	-25.01 (0.3836)	8.34	15.05	-6.71 (0.2247)
1997	55.47	68.63	-13.15 (0.5190)	16.05	21.90	-5.86 (0.2866)
1998	70.16	75.19	-5.03 (0.8399)	11.34	24.47	-13.14 (0.1433)
1999	92.43	142.22	-49.79 (0.2806)	26.47	33.52	-7.05 (0.5785)
2000	168.52	136.18	32.34 (0.3933)	55.22	52.86	2.36 (0.5107)
2001	226.42	160.30	66.12 (0.1861)	60.47	57.94	2.53 (0.4923)
2002	232.02	177.00	55.03 (0.2916)	83.88	62.12	21.76 (0.6171)
2003	307.02	211.35	95.68 (0.1616)	114.59	95.30	19.29 (0.5370)
2004	311.33	195.11	116.23 (0.1329)	70.26	100.60	-30.34 (0.8112)
2005	337.97	266.17	71.79 (0.5077)	90.75	102.48	-11.72 (0.6244)
Sample Size	104	104		104	104	

Table 7
Backdating and Financial Constraint (2)

This table shows the comparison of financial constraint between the backdating firms and their peer group between 1993 and 2005. The full sample consists of 104 firms that are under investigations in the US. The financial constraint is defined as cash subtracted by interest expenses. The mean test uses t-test and the median test uses Wilcoxon/Mann-Whitney (tie-adjusted) test for equality. The symbols *, **, and *** represent statistical significance at the 0.1, 0.05, 0.01 level, respectively. P-values are reported in the parentheses.

	Difference(P,S)	
	Mean Test	Median Test
1993	-24.47	-8.67**
	(0.2945)	(0.0162)
1994	-16.45	-9.34***
	(0.5008)	(0.0003)
1995	-17.86	-4.85***
	(0.2201)	(0.0016)
1996	-25.01	-3.08
	(0.2664)	(0.2319)
1997	-13.15	-4.33
	(0.3686)	(0.3280)
1998	-5.03	-7.91***
	(0.7048)	(0.0034)
1999	-49.79	-3.97**
	(0.1304)	(0.0491)
2000	32.34	6.85
	(0.2787)	(0.2007)
2001	66.12*	4.60
	(0.0607)	(0.6058)
2002	55.03	-0.59
	(0.1363)	(0.7929)
2003	95.68*	1.32
	(0.0660)	(0.8945)
2004	116.23**	-1.28
	(0.0388)	(0.7843)
2005	71.79	5.90
	(0.4398)	(0.7820)
Sample Size	104	104

Table 8
Backdating and Stock Price Volatility

This table shows the comparison of stock price volatility between the backdating firms and the market from 1993 to 2005. The full sample consists of 121 firms (S) that are under investigations in the US. The proxies for the market are S&P Composite Index (S&P), and value weighted and equally weighted NYSE/AMEX Index (VWNA and EQNA, respectively). The stock price volatility is defined as the standard deviation of monthly stock price, centered on the mean. The median test uses Wilcoxon/Mann-Whitney (tie-adjusted) test for equality. The symbols *, **, and *** represent statistical significance at the 0.1, 0.05, 0.01 level, respectively. P-values are reported in the parentheses.

	Mean Test			Median Test		
	Difference (S&P,S)	Difference (VWNA,S)	Difference (EWNA,S)	Difference (S&P,S)	Difference (VWNA,S)	Difference (EWNA,S)
1993	0.2970***	0.2948***	0.2710***	0.1492***	0.1470***	0.1233***
	(0.0010)	(0.0011)	(0.0026)	(0)	(0)	(0)
1994	0.3121*	0.3119*	0.3052*	0.1466***	0.1464***	0.1397***
	(0.0791)	(0.0793)	(0.0859)	(0)	(0)	(0)
1995	1.3977	1.4036	1.4213	0.1281***	0.1340***	0.1517***
	(0.1907)	(0.1889)	(0.1834)	(0)	(0)	(0)
1996	0.0900	0.0984	0.1091	0.1194***	0.1278***	0.1385***
	(0.2871)	(0.2444)	(0.1972)	(0)	(0)	(0)
1997	0.2865***	0.2875***	0.2930***	0.1208***	0.1218***	0.1273***
	(0.0001)	(0.0001)	(0.0001)	(0)	(0)	(0)
1998	0.1942***	0.1996***	0.1720***	0.1710***	0.1765***	0.1488***
	(0)	(0)	(0)	(0)	(0)	(0)
1999	0.2653***	0.2791***	0.2679***	0.2165***	0.2303***	0.2191***
	(0)	(0)	(0)	(0)	(0)	(0)
2000	0.3124***	0.3207***	0.3261***	0.2740***	0.2823***	0.2877***
	(0)	(0)	(0)	(0)	(0)	(0)
2001	0.2485***	0.2644***	0.2805***	0.1708***	0.1867***	0.2027***
	(0)	(0)	(0)	(0)	(0)	(0)
2002	0.2472***	0.2615***	0.2773***	0.2198***	0.2341***	0.2499***
	(0)	(0)	(0)	(0)	(0)	(0)
2003	0.1886***	0.1867***	0.1355***	0.1433***	0.1414***	0.0902***
	(0)	(0)	(0)	(0)	(0)	(0)
2004	0.1477***	0.1436***	0.1270***	0.1175***	0.1135***	0.0968***
	(0)	(0)	(0)	(0)	(0)	(0)
2005	0.1264***	0.1183***	0.1124***	0.1101***	0.1020***	0.0961***
	(0)	(0)	(0)	(0)	(0)	(0)
Sample Size	121	121	121	121	121	121

Table 9
Regression Analysis of Determinants to Backdating

This table provides linear probability and binomial probit estimations of characteristics of the backdating firms. The dependent variable is assigned to 1 for the backdating firms and 0 for the matched firms. For the explanatory variables, firm size has proxy of log(market value), financial constraint is defined as cash subtracted by interest expenses, R&D ratio is R&D expenses divided by total assets, and growth opportunity is the market-to-book ratio defined as the market value of assets divided by the book value of total assets, i.e. the book value of assets plus the market value of common stock less the sum of book value of common equity and balance sheet deferred taxes. Also, return on assets is a ratio of EBIT (earnings before interest and tax) to total assets, CEO option holding ratio is option value (black-scholes) divided by total compensation, and labour market tightness is measured by turnover ratio divided by underperformance ratio. Panel A reports the correlations between explanatory variables and Panel B summaries the estimation results, in which some models control for industry effects using the first 2-digit NAICS codes. P-values are reported in the parentheses and the symbols *, **, and *** represent statistical significance at the 0.1, 0.05, 0.01 level, respectively.

Panel A: Correlations

	Firm Size	Age	FC	R&D Ratio	MTBR	ROA	Volatility	Board Size	BCF Index	Option Ratio	Labour Market
Firm Size	1										
Age	0.205	1									
FC	0.558	0.143	1								
R&D Ratio	-0.154	0.049	-0.051	1							
MTBR	0.178	-0.250	0.117	-0.158	1						
ROA	0.244	0.207	0.151	0.127	-0.181	1					
Volatility	0.359	-0.216	0.215	-0.189	0.629	-0.145	1				
Board Size	0.228	0.442	0.142	0.042	-0.297	0.209	-0.132	1			
BCF Index	-0.109	-0.006	-0.178	-0.029	-0.102	-0.090	-0.048	0.237	1		
Option Ratio	0.093	-0.078	-0.053	-0.145	0.246	-0.175	0.171	-0.167	-0.001	1	
Labour Market	-0.052	-0.021	-0.031	-0.123	-0.086	-0.114	-0.055	0.003	0.152	-0.039	1

Panel B: Estimation Results

Dependent Variable	Linear Probability Model		Binomial Probit Model	
	(1)	(2)	(1)	(2)
Size - Log(Market Value)	0.301158***	0.293409**	0.829792***	0.824565**
	(0.0026)	(0.0103)	(0.0075)	(0.0147)
Age	-0.005719*	-0.002544	-0.019198*	-0.009648
	(0.0901)	(0.5345)	(0.0758)	(0.4311)
Financial Constraint	-0.020185**	-0.022799**	-0.056056**	-0.064518**
	(0.0164)	(0.0127)	(0.0380)	(0.0205)
R&D Propensity	-1.347212	-1.399009	-4.572896	-5.411744
	(0.7609)	(0.7720)	(0.7106)	(0.6943)
Market to Book Ratio	0.025148	0.025502	0.075958	0.084273
	(0.1145)	(0.1810)	(0.1721)	(0.2056)
Return on Assets	-0.007249**	-0.007338**	-0.02073**	-0.021035*
	(0.0170)	(0.0278)	(0.0323)	(0.0546)
Volatility	0.000642	0.003686	0.006938	0.015333
	(0.9479)	(0.7536)	(0.8405)	(0.7094)
Board Size	-0.005802	-0.011531	-0.010623	-0.029065
	(0.7951)	(0.6707)	(0.8658)	(0.6960)
BCF Index	-0.062072	-0.085963**	-0.18347*	-0.269434**

	(0.1030)	(0.0296)	(0.0946)	(0.0220)
CEO Option holding Ratio	0.100229	0.105699	0.327393	0.380299
	(0.5612)	(0.5852)	(0.5034)	(0.4780)
Labour Market Tightness	-0.057847	-0.046715	-0.170521	-0.133146
	(0.7084)	(0.7650)	(0.7172)	(0.7743)
Industry Effects	No	Yes	No	Yes
R^2	0.202	0.239		
Adjusted R^2	0.143	0.097		
McFadden R^2			0.160	
LR statistic			35.03151	
			(0.0002)	
Schwarz criterion			1.529	1.922
Sample Size	160	160	160	160

Table 10
Summary of the Press Announcement Date

This table summarizes the earliest dates of press announcement revealing backdating practice, informal or formal probes, and rulings of sample firms from two sources, Factiva and WSJ. Companies with bold letters have replaced their CEOs and companies with grey area have their financial statements unchanged.

Company	The earliest news release date (Factiva)	The earliest news release date on WSJ report	The news release date of informal probe order	The news release date of formal probe order (SEC)	The news release date of ruling
Activision	June 19, 2006	July 28, 2006	July 28, 2006	June 7, 2007	
Affiliated Computer Services	Mar. 7, 2006	May 10, 2006	Mar. 7, 2006		
Affymetrix	July 31, 2006	Aug. 1, 2006			
Agile Software	Sep. 12, 2006	Oct. 26, 2006			
Alkermes	May 26, 2006	Aug. 10, 2006	26 May 2006		May 25, 2007 (no enforcement)
Altera	May 9, 2006	June 21, 2006	May 25, 2007		Feb. 20, 2007 (no enforcement)
American Tower	May 20, 2006	May 23, 2006	May 20, 2006		
Amkor Technology	June 12, 2006	Aug. 16, 2006	Sept. 15, 2006		
Analog Devices	Nov. 11, 2005	May 24, 2006	Nov. 11, 2005		Nov. 2005 (settled with SEC), now under US Attorney
Apollo Group	June 10, 2006	June 9, 2006	June 10, 2006		Apr. 24, 2007 (civil charges)
Apple Inc.	June 29, 2006	June 2006	Oct. 4, 2006		
Applied Micro Circuits	May 31, 2006	May 31, 2006	June 12, 2006		
Applied Signal Technology	Jan. 18, 2007	Jan. 16, 2007			
ArthroCare	Aug. 23, 2006	Aug. 23, 2006	Aug. 23, 2006		June 1, 2007 (no enforcement)
Aspen Technology	June 12, 2006	Sept. 6, 2006	June 12, 2006		
Asyst Technologies	June 14, 2006	June 7, 2006	June 7, 2006		Feb. 6, 2007 (no enforcement)
Atmel	July 25, 2006	Aug. 15, 2006	Aug. 15, 2006		
Autodesk	Aug. 18, 2006	Aug. 17, 2006	Sept. 5, 2006		
Barnes & Noble	July 12, 2006	July 12, 2006	July 21, 2006		
BEA Systems	Aug. 4, 2006	Aug. 16, 2006			
Bed, Bath & Beyond	Aug. 4, 2006	Oct. 10, 2006	Oct. 10, 2006		
Black Box	Nov. 17, 2006	Nov. 17, 2006	Nov. 17, 2006		
Blue Coat Systems	July 14, 2006	Aug. 3, 2006	Aug. 3, 2006		
Boston Communications Group	May 22, 2006	July 21, 2006	July 21, 2006		
Broadcom	May 18, 2006	May 18, 2006	June 12, 2006	Dec. 18, 2006	
Brocade Communications Systems	Nov. 11, 2005	Jan. 7, 2005	May 16, 2005		July 20, 2006 (criminal and civil charges); May 31, 2007 (Settled with SEC)
Brooks Automation	Mar. 18, 2006	Late Apr. 2006	May 12, 2006		
CA (Computer Associates)	June 29, 2006	June 29, 2006			
Cablevision	Aug. 8, 2006	Aug. 8, 2006	Aug. 16, 2006		
Caremark Rx.	May 19, 2006	May 18, 2006	May 18, 2006		

CEC Entertainment	Aug. 7, 2006	Aug. 11, 2006	Aug. 11, 2006		
Ceradyne	Aug. 2, 2006	Aug. 4, 2006	Oct. 24, 2006		
Chordiant Software	Aug. 10, 2006	July 24, 2006	July 25, 2006		Feb. 14, 2007 (no enforcement)
Cirrus Logic	Oct. 25, 2006	Oct. 24, 2006	Oct. 30, 2006		
Clorox	Aug. 2, 2006	Aug. 2, 2006			
CNET Networks	May 22, 2006	May 22, 2006	May 24, 2006		
Computer Sciences	May 29, 2006	June 29, 2006	June 29, 2006		
Comverse Technology	Mar. 18, 2006	April 2006	May 4, 2006		Aug. 9, 2006 (criminal charges); Jan. 10, 2007 (settled with SEC)
Corinthian Colleges	July 12, 2006	July 12, 2006	Aug. 18, 2006		
Costco Wholesale	Oct. 13, 2006	Mar. 19, 2007	Mar. 19, 2007		
Crown Castle International	Aug. 4, 2006	Aug. 4, 2006	Aug. 4, 2006		
Cyberonics	June 8, 2006	June 8, 2006	June 9, 2006		
Dean Foods	Aug. 4, 2006	Nov. 1, 2006	Nov. 1, 2006		May 10, 2007 (no enforcement)
Delta Petroleum	May 24, 2006	May 22, 2006	June 19, 2006		
Electronic Arts	July 19, 2006	Sept. 20, 2006	Sept. 20, 2006		
Emcore	Nov. 7, 2006	Nov. 6, 2006			
Endocare	Aug. 24, 2006	Aug. 1, 2006	Aug. 1, 2006		
Engineered Support Systems	May 14, 2006	June 12, 2006	June 12, 2006		Feb. 6, 2007 (civil charges)
EPlus	Aug. 11, 2006	Aug. 11, 2006			
Equinix	June 12, 2006	June 12, 2006	June 12, 2006		Dec. 6, 2006 (termination of SEC probe); Jan. 17, 2007 (withdrawal of grand jury subpoena)
Extreme Networks	Sept. 21, 2006	Sept. 15, 2006	Sept. 15, 2006		
F5 Networks	May 22, 2006	May 22, 2006	May 22, 2006		
Forrester Research	Dec. 20, 2006	Dec. 19, 2006			
Foundry Networks	June 28, 2006	June 27, 2006	June 27, 2006		
Getty Images	Nov. 9, 2006	Nov. 9, 2006	Nov. 9, 2006		
Hansen Natural	Oct. 29, 2006	Oct. 31, 2006	Oct. 31, 2006		
HCC Insurance Holdings	Aug. 11, 2006	Nov. 17, 2006	Nov. 17, 2006		
Home Depot	June 16, 2006	June 16, 2006	June 23, 2006		
IBasis	Sept. 11, 2006	Oct. 20, 2006	Oct. 20, 2006		
Insight Enterprises	Oct. 21, 2006	Oct. 31, 2006	Oct. 31, 2006		
Integrated Silicon Solution	Aug. 4, 2006	Oct. 23, 2006			
Intuit	June 9, 2006	June 9, 2006	June 9, 2006		Oct. 30, 2006 (no enforcement)
J2 Global	Aug. 7, 2006	Aug. 11, 2006			
Jabil Circuit	Mar. 18, 2006	May 3, 2006	May 3, 2006		
Juniper Networks	May 17, 2006	May 22, 2006	May 22, 2006		
KB Home	Aug. 4, 2006	Aug. 23, 2006	Aug. 24, 2006		
Keithley	Aug. 12, 2006	Sept. 14, 2006	Sept. 14, 2006		
King Pharmaceuticals	Nov. 10, 2006	Nov. 10, 2006			
KLA-Tencor	May 22, 2006	May 22, 2006	May 22, 2006	Feb. 9, 2007	
KOS Pharmaceuticals	Aug. 16, 2006	Aug. 8, 2006	July (Aug. 8, 2006)		
Linear Technology	May 22, 2006	May 24, 2006	June 15, 2006		

Macrovision	June 14, 2006	June 13, 2006	June 13, 2006		Nov. 2, 2006 (no enforcement); Feb. 13, 2007 (withdrawal of grand jury subpoena)
Marvell Technology Group	May 22, 2006	July 5. 2006	July 5, 2006		
Maxim Integrated Products	May 22, 2006	June 7, 2006	June 7, 2006		
McAfee Inc.	May 19, 2006	May 25, 2006	May 25, 2006	June 9, 2006	
Meade Instruments	May 22, 2006	May 22, 2006	June 13, 2006		
Medarex	May 24, 2006	May 24, 2006	May 24, 2006		
Mercury Interactive	Nov. 11, 2005	May 15, 2006	Nov. 11, 2005		May 31, 2007 (settled with SEC)
Michaels Stores	June 9, 2006	June 14, 2006	June 15, 2006		Sept. 7, 2006 (withdrawal of one grand jury subpoena, but received another one)
Microtune	Sept. 20, 2006	Sept. 20, 2006			
Mips Technologies	Aug. 31, 2006	Sept. 19, 2006	Sept. 19, 2006		
Molex	Aug. 3, 2006	Aug. 2, 2006	Oct. 5, 2006		
Monster Worldwide	June 12, 2006	June 12, 2006	June 12, 2006		Feb. 15, 2007 (plead guilty to criminal charges)
msystems	June 2, 2006	June 1, 2006	July 3, 2006		
Nabors Industries	Dec. 27, 2006	Dec. 27, 2006	Feb. 7, 2007		May 9, 2007 (no enforcement)
Newpark Resources	July 14, 2006	June 29, 2006			
Nvidia	June 9, 2006	Aug. 10, 2006			
Nyfix	Nov. 11, 2005	May 20, 2006	Nov. 11, 2005		
Openwave Systems	May 22, 2006	May 22, 2006	May 22, 2006		
Pediatrix	Aug. 3, 2006	Dec. 6, 2006	Dec. 6, 2006		
Pixar	Aug. 8, 2006	Nov. 9, 2006	Sept. 17, 2006		
PMC-Sierra	Aug. 14, 2006	Nov. 9, 2006	Nov. 9, 2006		
Power Integrations	Apr. 19, 2006	May 5, 2006	May 24, 2006		
Progress Software	June 21, 2006	June 19, 2006	June 27, 2006		
Quest Software	May 23, 2006	May 22, 2006	June 1, 2006		
QuickLogic	July 27, 2006	Aug. 7, 2006	Aug. 7, 2006		Mar. 23, 2007 (no enforcement)
Rambus	May 24, 2006	May 30, 2006			
Redback Networks	July 1, 2006	June 30, 2006	June 30, 2006		
Renal Care	May 22, 2006	June 2, 2006	June 2, 2006		
Research In Motion	Sept. 29, 2006	Sept. 28, 2006	Oct. 27, 2006		
Restoration Hardware	Nov. 1, 2006	Aug. 28, 2006			
RSA Security	May 20, 2006	June 13, 2006	May 20, 2006		
SafeNet	May 19, 2006	May 19, 2006	May 19, 2006		
Sanmina-SCI	June 10, 2006	June 9, 2006	June 9, 2006		
Sapient	Oct. 17, 2006	Oct. 17, 2006			
Semtech	May 23, 2006	May 22, 2006	May 22, 2006		
Sepracor	May 24, 2006	June 2, 2006	June 2, 2006		
Sharper Image	Sept. 7, 2006	Sept. 7, 2006			
Sigma Designs	July 27, 2006	July 26, 2006	July 26, 2006		
Silicon Image	Oct. 29, 2006	Oct. 31, 2006	Oct. 31, 2006		
Sonus Networks	Nov. 6, 2006	Nov. 6, 2006			
Stolt-Nielsen	June 3, 2006	June 1, 2006	July 6, 2006		

Sunrise Telecom	Sept. 20, 2006	Sept. 20, 2006	Sept. 20, 2006		
Sycamore Networks	May 23, 2006	May 23, 2006		May 23, 2006	
Take-Two Interactive Software	July 10, 2006	July 10, 2006	July 10, 2006		Feb. 14, 2007 (settled with SEC)
The Cheesecake Factory	July 18, 2006	July 19, 2006	Aug. 3, 2006		
THQ	July 18, 2006	Aug. 7, 2006	Aug. 7, 2006		
Trident Microsystems	May 22, 2006	May 26, 2006	2004, June 16, 2006 (Justice)		
UnitedHealth	Mar. 18, 2006	May 11, 2006	May 11, 2006	Dec. 26, 2006	
Valeant Pharmaceuticals	Sept. 11, 2006	Sept. 11, 2006	Sept. 11, 2006		
Verint	Apr. 18, 2006	Apr. 17, 2006	July 20, 2006		
VeriSign	June 27, 2006	June 27, 2006	June 27, 2006		
Vitesse Semiconductor	Mar. 18, 2006	Apr. 19, 2006	May 18, 2006		
Witness Systems	Aug. 9, 2006	Aug. 9, 2006	Oct. 30, 2006		
Xilinx	June 7, 2006	June 23, 2006	June 23, 2006		Nov. 30, 2006 (no enforcement)
Zoran	May 23, 2006	July 3, 2006	July 3, 2006		

Table 11
Event Study Analysis

This table presents the abnormal stock returns around the earliest press release of backdating practice of the sample firms. Abnormal stock returns are estimated by the market adjusted return model, with equally-weighted market index excluding dividends, in which the estimation window lasts 255 days ending 45 days prior to the release. The release information is collected from Factiva and WSJ. Panel A displays the results on the daily basis, and Panel B summaries by dividing the whole event window into three sub-periods. Similar to Panel B, Panel C shows the summary of the sub-period results by using value weighted market index excluding dividends, *ceterīs paribus*. The symbols *,**, and *** denote statistical significance at the 0.05, 0.01 and 0.001 level, respectively, using a 2-tail test.

Panel A: Day-by-Day Basis (equally weighted index)						
Day	Sample Number	Average Abnormal Return (%)	Cumulative Average Abnormal Return (%)	Positive: Negative	Sign	Patell Z
-30	119	0.20	0.20	51:68	(-)	0.581
-29	119	-0.42	-0.22	45:74	(-)	-2.488*
-28	119	0.23	0.01	59:60	(-)	1.321
-27	119	-0.19	-0.18	61:58	(+)	-1.194
-26	119	0.17	-0.01	55:64	(-)	1.148
-25	119	0.06	0.05	62:57	(+)	0.253
-24	119	0.08	0.13	60:59	(+)	0.845
-23	119	0.32	0.45	61:58	(+)	1.34
-22	119	-0.16	0.29	53:66	(-)	-1.33
-21	119	-0.40	-0.11	51:68	(-)	-1.827
-20	119	-0.17	-0.28	61:58	(+)	-0.49
-19	119	-0.72	-1.00	57:62	(-)	-2.986**
-18	119	-0.07	-1.07	52:67	(-)	-0.091
-17	119	-0.42	-1.49	46:73	(-)	-1.794
-16	119	-0.39	-1.88	53:66	(-)	-1.481
-15	119	-0.41	-2.29	57:62	(-)	-1.504
-14	119	-0.05	-2.34	54:65	(-)	-0.225
-13	119	0.06	-2.28	61:58	(+)	0.402
-12	119	-0.38	-2.66	51:68	(-)	-1.642
-11	119	-0.30	-2.96	48:71	(-)	-1.454
-10	119	-0.15	-3.11	52:67	(-)	-0.552
-9	119	-0.32	-3.43	47:72	(-)	-1.161
-8	119	-0.35	-3.78	55:64	(-)	-1.36
-7	119	-0.41	-4.19	48:71	(-)	-2.678**
-6	119	0.03	-4.16	57:62	(-)	0.628
-5	119	-0.21	-4.37	54:65	(-)	-1.005
-4	119	-0.24	-4.61	59:60	(-)	-1.149
-3	119	-0.47	-5.08	51:68	(-)	-2.017*
-2	119	-0.30	-5.38	42:77	(-)	-1.325
-1	119	0.11	-5.27	61:58	(+)	1.018
0	**119**	**-2.09**	**-7.36**	**33:86**	**(-)**	**-9.660*** **
1	119	-0.17	-7.53	61:58	(+)	-0.547
2	119	-0.10	-7.63	57:62	(-)	0.111
3	118	0.43	-7.20	62:56	(+)	2.346*
4	118	0.25	-6.95	65:53	(+)	0.808
5	118	-0.59	-7.54	41:77	(-)	-3.169**
6	118	0.07	-7.47	60:58	(+)	0.383
7	118	0.34	-7.13	61:57	(+)	1.329
8	117	-0.11	-7.24	56:61	(-)	-0.239
9	117	-0.02	-7.26	54:63	(-)	-0.014
10	117	0.01	-7.25	58:59	(-)	-0.107

11	117	0.02	-7.23	51:66	(-)	0.033
12	117	0.01	-7.22	64:53	(+)	0.378
13	117	0.22	-7.00	64:53	(+)	0.756
14	117	-0.58	-7.58	45:72	(-)	-2.622**
15	117	0.32	-7.26	61:56	(+)	1.225
16	117	0.23	-7.03	60:57	(+)	0.769
17	117	0.38	-6.65	65:52	(+)	1.891
18	117	0.16	-6.49	55:62	(-)	0.85
19	117	-0.39	-6.88	49:68	(-)	-2.040*
20	117	0.16	-6.72	59:58	(+)	0.867
21	117	-0.16	-6.88	59:58	(+)	-0.838
22	117	-0.04	-6.92	53:64	(-)	-0.138
23	117	0.05	-6.87	59:58	(+)	0.413
24	117	-0.08	-6.95	56:61	(-)	-0.252
25	117	0.41	-6.54	62:55	(+)	1.524
26	117	0.13	-6.41	60:57	(+)	0.806
27	117	-0.30	-6.71	50:67	(-)	-0.977
28	117	0.03	-6.68	47:70	(-)	-0.762
29	116	0.23	-6.45	63:53	(+)	0.941
30	116	-0.50	-6.95	50:66	(-)	-2.632**

Panel B: Pre- and Post Event Period Basis (equally-weighted index)

Period	Sample Number	Average Abnormal Return (%)	Precision Weighted CAAR (%)	Positive: Negative	Patell Z
(-30,-2)	119	-5.36	-4.80	45:74(-)	-4.314***
(-1,0)	119	-1.98	-1.79	39:80(-)	-6.111***
(+1,+30)	119	0.40	0.23	56:63(-)	0.203

Panel C: Pre- and Post Event Period Basis (value-weighted index)

Period	Sample Number	Average Abnormal Return (%)	Precision Weighted CAAR (%)	Positive: Negative	Patell Z
(-30,-2)	119	-6.10	-5.69	43:76(-)	-5.104***
(-1,0)	119	-2.14	-1.96	36:83(-)	6.685***
(+1,+30)	119	-0.16	-0.37	54:65(-)	-0.326

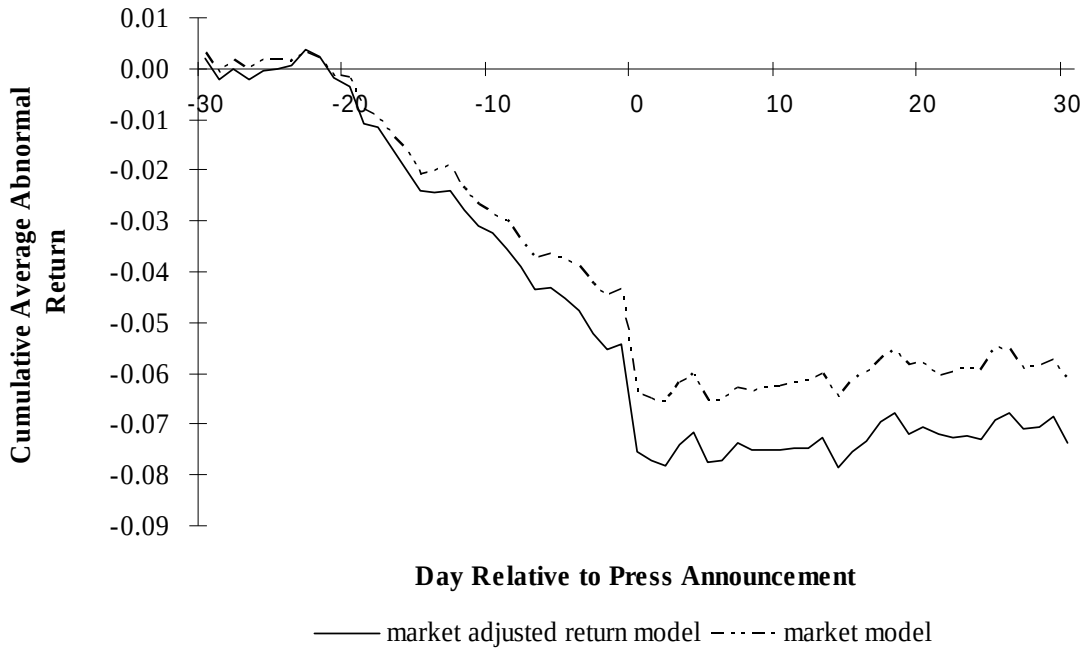

Fig. 1. Cumulative Abnormal Stock Returns Around Press Revealing Backdating Date

Figure 1 displays the cumulative abnormal stock returns from 30 days before through 30 days after the earliest press release of backdating practice of the sample firms. Abnormal stock returns are estimated using the market model and market risk adjusted model, with equally-weighted market index excluding dividends, in which the estimation window lasts 255 days ending 45 days prior to the release. The release information is collected from Factiva and WSJ.

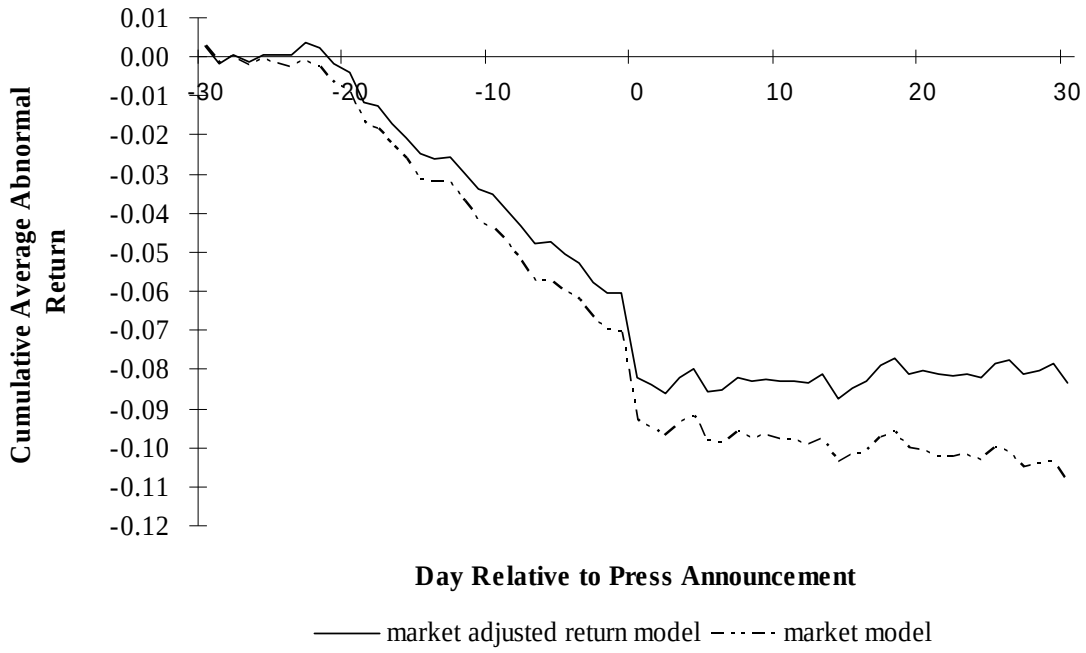

Fig. 2. Cumulative Abnormal Stock Returns Around Press Revealing Backdating Date

Figure 2 displays the cumulative abnormal stock returns from 30 days before through 30 days after the earliest press release of backdating practice of the sample firms. Abnormal stock returns are estimated using the market model and market risk adjusted model, with value-weighted market index excluding dividends, in which the estimation window lasts 255 days ending 45 days prior to the release. The release information is collected from Factiva and WSJ.

Table 12: Corporate Fraud and Reputation Risk

Panel A gives a summary of number of Accounting and Auditing Enforcement Releases (AAERs) issued by the SEC, the number of Securities Class Action Filings (SCAFs) from the Stanford Securities Class Action Clearinghouse (SSCAC), and cumulative abnormal stock return (CAR) of each individual firm in the sample. In particular, for the CAR, three sub-periods are estimated by market adjusted return model with value weighted index excluding dividends. Panel B reports the correlation matrix.

Panel A: Summary					
Company	# of AAERs	# of SCAFs	Cumulative Abnormal Return (%) (-1,0)	(-30, 0)	(-30,30)
Activision	0	1	3.51	-10.79	-15.37
Affiliated Computer Services	0	0	1.07	10.97	-0.94
Affymetrix	0	1	-2.52	-26.46	-31.49
Agile Software	0	1	-0.63	6.16	10.89
Alkermes	0	1	8.27	-1.17	-12.09
Altera	0	0	-3.42	-0.45	-9.65
American Tower	0	0	-13.78	-9.72	53.66
Amkor Technology	0	0	-6.80	-8.95	-14.83
Analog Devices	0	0	2.12	2.69	-1.76
Apollo Group	0	1	-1.71	-23.46	-29.79
Apple Inc.	0	1	-0.01	-6.98	3.10
Applied Micro Circuits	0	1	-4.60	-17.47	-38.69
ArthroCare	0	0	-1.88	5.86	10.00
Aspen Technology	2	2	-3.21	-30.85	-49.24
Asyst Technologies	0	0	-2.65	1.78	-13.43
Atmel	0	3	-11.32	-6.19	23.15
Autodesk	0	1	2.34	2.18	-0.14
Barnes & Noble	0	0	-1.08	-8.22	-5.98
BEA Systems	0	1	1.90	-3.68	2.55
Bed, Bath & Beyond	0	0	3.04	-7.53	-3.21
Black Box	0	1	-1.73	2.40	-1.06
Blue Coat Systems	0	1	-15.32	-6.30	10.62
Boston Communications Group	0	2	7.60	-6.81	-29.90
Broadcom	0	1	3.01	4.14	6.17
Brocade Communications Systems	0	1	-8.77	-6.69	-7.72
Brooks Automation	0	0	-0.06	-6.88	-22.88
CA (Computer Associates)	10	1	-3.07	-7.51	-1.88
Cablevision	0	0	1.93	6.00	4.64
Caremark Rx.	0	0	2.77	-15.02	-32.69
CEC Entertainment	0	0	-0.72	-8.01	-0.20
Ceradyne	0	0	-6.55	0.31	-7.97
Chordiant Software	0	1	2.36	-15.04	-14.83
Cirrus Logic	0	0	-4.91	-7.02	-2.93
Clorox	0	1	-0.51	-4.16	-5.81
CNET Networks	0	0	-2.31	-13.47	-14.68
Computer Sciences	0	0	-0.04	-1.68	-3.78
Comverse Technology	0	1	-2.53	-19.73	-23.30
Corinthian Colleges	0	2	-0.93	1.16	-8.75
Costco Wholesale	0	0	4.97	8.30	7.15
Crown Castle International	0	0	6.72	-0.46	-1.38
Cyberonics	0	1	1.84	8.24	-5.33
Dean Foods	0	0	-0.09	3.01	10.06
Delta Petroleum	0	0	0.41	-2.84	-7.17
Electronic Arts	0	1	-0.32	12.62	19.72
Emcore	0	0	-6.76	-10.18	-7.80
Eplus	0	0	-1.90	5.34	7.51
Equinix	0	1	-7.34	-32.05	-33.22

Extreme Networks	0	1	-2.84	-10.76	-5.18
F5 Networks	0	1	0.00	-35.85	-59.52
Forrester Research	0	0	-1.73	-12.49	-18.32
Foundry Networks	0	2	-3.91	-0.42	-22.07
Getty Images	0	0	-0.79	-16.87	-23.90
Hansen Natural	0	0	-14.38	-5.76	0.30
HCC Insurance Holdings	0	0	-0.33	-21.29	-22.44
Home Depot	0	1	-1.48	-2.70	-10.57
Ibasis	0	1	-0.99	12.06	6.33
Insight Enterprises	0	1	-5.51	9.49	4.54
Integrated Silicon Solution	0	0	-3.63	0.88	1.67
Intuit	0	0	-3.94	-1.35	15.25
J2 Global	0	0	-5.01	-20.34	-19.92
Jabil Circuit	0	0	1.83	-5.07	-4.49
Juniper Networks	0	2	1.69	-8.08	-11.68
KB Home	0	0	-7.20	-16.65	9.27
Keithley	0	1	-1.98	-9.64	-3.03
King Pharmaceuticals	0	1	3.06	-7.57	-11.01
KLA-Tencor	0	0	4.84	-15.52	-17.15
KOS Pharmaceuticals	0	1	1.83	9.82	22.54
Linear Technology	0	0	-5.71	-60.13	-59.06
Macrovision	0	0	-0.11	-4.83	-5.02
Marvell Technology Group	0	1	-11.22	-18.61	-55.16
Maxim Integrated Products	0	0	-1.91	-36.89	-50.41
McAfee Inc.	3	0	-3.63	-0.69	0.10
Meade Instruments	0	0	-1.50	13.64	2.78
Medarex	0	0	-4.18	-5.43	-20.43
Mercury Interactive	0	0	-1.41	-26.59	-23.95
Michaels Stores	0	1	-2.64	6.98	-4.43
Microtune	1	2	-3.27	-1.00	-18.16
Mips Technologies	0	0	-1.97	17.75	17.69
Molex	0	1	2.92	-5.00	9.08
Monster Worldwide	1	0	6.02	-5.37	-1.14
msystems	0	0	-14.19	-3.36	-12.12
Nabors Industries	0	0	-1.75	-7.04	-12.33
Newpark Resources	0	0	-1.57	-1.31	0.21
Nvidia	2	1	0.02	-5.25	-26.33
Openwave Systems	0	2	-14.28	-12.15	-18.94
Pediatrix	0	2	2.57	-3.18	4.92
PMC-Sierra	0	0	-0.78	-45.63	-34.51
Power Integrations	0	0	4.78	0.98	-30.59
Progress Software	0	0	-1.64	-7.52	-4.91
Quest Software	0	2	-4.21	-12.50	-22.99
QuickLogic	0	1	-26.01	-41.44	-58.73
Rambus	0	1	2.66	8.96	19.15
Redback Networks	0	3	3.12	-14.50	-21.79
Research In Motion	0	0	-2.25	10.90	46.95
Restoration Hardware	0	0	0.80	-6.93	28.23
RSA Security	1	0	-6.21	-0.56	7.44
SafeNet	0	0	-23.56	-46.48	-27.04
Sanmina-SCI	0	0	-0.97	6.95	17.93
Sapient	0	0	-11.81	1.31	6.18
Semtech	0	0	3.97	-18.72	-15.67
Sepracor	0	1	5.00	-36.60	-43.64
Sharper Image	0	1	-1.91	-17.60	-7.61
Sigma Designs	0	1	-1.34	-23.73	28.43
Silicon Image	0	3	-5.69	-7.52	2.40
Sonus Networks	0	3	2.54	-6.69	15.26

Stolt-Nielsen	0	0	-0.50	-0.51	-13.88
Sycamore Networks	0	2	3.08	15.21	11.94
Take-Two Interactive Software	3	2	-7.99	-46.02	-16.27
The Cheesecake Factory	0	0	-2.58	-7.80	13.63
THQ	0	1	-2.76	-14.35	-17.20
Trident Microsystems	0	0	-8.70	-13.77	-14.46
UnitedHealth	0	2	3.25	22.26	-31.41
Valeant Pharmaceuticals	0	0	-3.69	-1.50	-12.97
Verint	0	0	-2.43	-7.40	-9.22
VeriSign	0	1	-1.23	-29.37	-27.93
Vitesse Semiconductor	0	0	-5.96	-17.59	-13.99
Witness Systems	0	0	-6.87	-30.84	-8.33
Xilinx	0	0	0.28	-27.75	-23.10
Zoran	0	0	6.39	-3.30	-12.02
Mean	0.19	0.63	-2.14	-8.25	-8.43

Panel B: Correlation Matrix

	# of AAERs	# of SCAFs	CAR(-1,0)	CAR(-30, 0)	CAR(-30,30)
# of AAERs	1				
# of SCAFs	0.098	1			
CAR(-1,0)	-0.039	0.033	1		
CAR(-30, 0)	-0.060	-0.006	0.319	1	
CAR(-30,30)	-0.015	-0.077	0.082	0.637	1

Table 13: Regression Analysis of Reputation Risk

This table provides OLS estimation of reputation risk, measured by the cumulative abnormal stock return during the revelation of backdating. AAERs are the Accounting and Auditing Enforcement Releases issued by the SEC, and SCAFs are the Securities Class Action Filings from the Stanford Securities Class Action Clearinghouse (SSCAC), both a proxy for corporate fraud. The GIM index, a proxy for corporate governance, are retrieved and calculated with data from IRRC. For other explanatory variables, firm size has proxy of log(sales), growth opportunity is the market-to-book ratio defined as the market value of assets divided by the book value of total assets, i.e. the book value of assets plus the market value of common stock less the sum of book value of common equity and balance sheet deferred taxes. More, return on assets is a ratio of EBIT (earnings before interest and tax) to total assets. Panel A reports the correlations between explanatory variables, and Panel B displays the estimation results, in which some models control for industry effects coded using the first 2-digit NAICS codes. P-values are reported in the parentheses and the symbols *, **, and *** represent statistical significance at the 0.1, 0.05, 0.01 level, respectively.

Panel A: Correlations

	Size - log(sales)	Market to Book Ratio	Return on Assets	GIM Index	AAERs	GIM*AAERs	SCAFs	GIM*SCAFs
Size - log(sales)	1							
Market to Book Ratio	-0.145	1						
Return on Assets	0.325	-0.072	1					
GIM Index	0.073	0.048	0.030	1				
AAERs	0.082	-0.023	0.055	0.104	1			
GIM*AAERs	0.082	-0.021	0.049	0.118	0.994	1		
SCAFs	-0.121	0.035	-0.115	0.021	0.079	0.067	1	
GIM*SCAFs	-0.109	0.048	-0.124	0.155	0.098	0.094	0.970	1

Panel B: Estimation Results

Dependent Variable	CAR(-1,0)			CAR(-30,0)		
	(1)	(2)	(3)	(1)	(2)	(3)
Size - log(sales)	0.00485	0.00475	0.01115	0.01397	0.01328	0.01806
	(0.4362)	(0.4468)	(0.2382)	(0.5263)	(0.5480)	(0.5332)
Market to Book Ratio	0.00016**	0.00016**	0.00020**	0.00081***	0.00081***	0.00094***
	(0.0412)	(0.0435)	(0.0205)	(0.0035)	(0.0037)	(0.0019)
Return on Assets	0.00822**	0.00841**	0.00734	0.01095	0.01222	0.01135
	(0.0474)	(0.0443)	(0.1099)	(0.2086)	(0.1532)	(0.2610)
GIM Index	0.00420*	0.00389	0.00336	0.01109	0.00901	0.00649
	(0.0802)	(0.1057)	(0.2616)	(0.1288)	(0.1953)	(0.4517)
AAERs	-0.00504**	-0.04213***	-0.03898***	-0.01337	-0.25987***	-0.26523***
	(0.0204)	(0.0029)	(0.0064)	(0.2804)	(0)	(0.0003)
GIM Index*AAERs		0.00386***	0.00363***		0.02567***	0.02618***
		(0.0057)	(0.0072)		(0)	(0.0003)
Industry Effects	No	No	Yes	No	No	Yes
R^2	0.132	0.142	0.243	0.072	0.119	0.207
Adjusted R^2	0.085	0.086	0.046	0.021	0.061	0.001
Sample Size	98	98	98	98	98	98

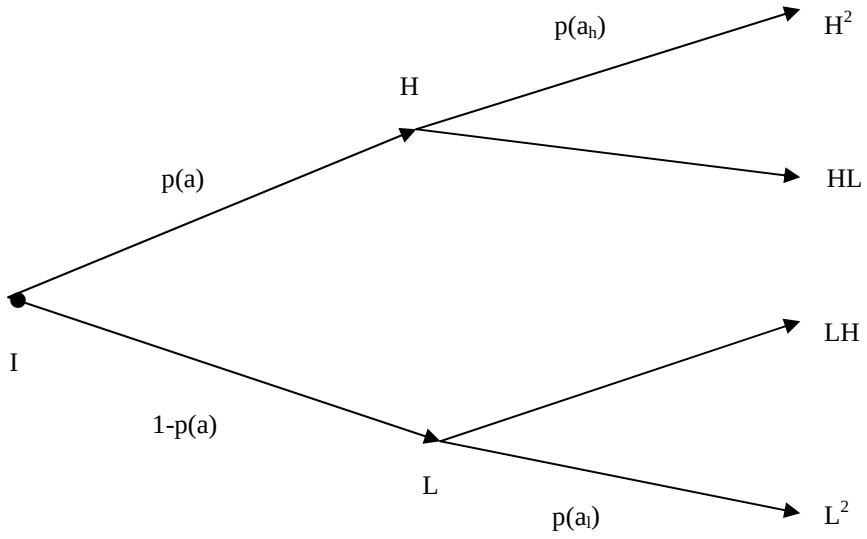

Figure 3: The evolution of information and distribution of final cash flows in the baseline model

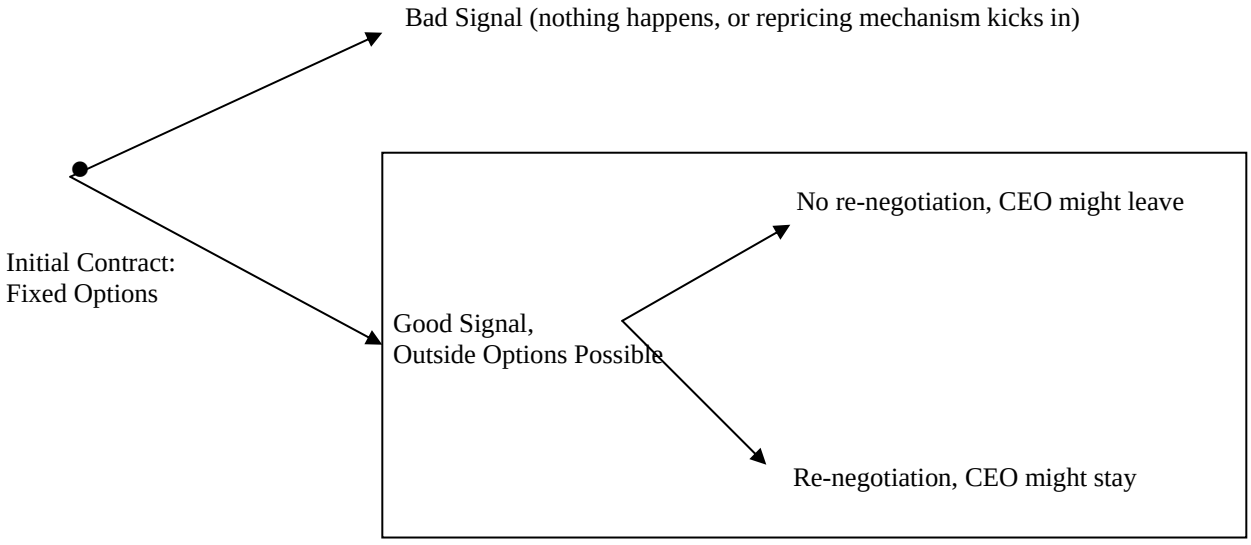

Figure 4: The simple evolution of the game with renegotiation prospects

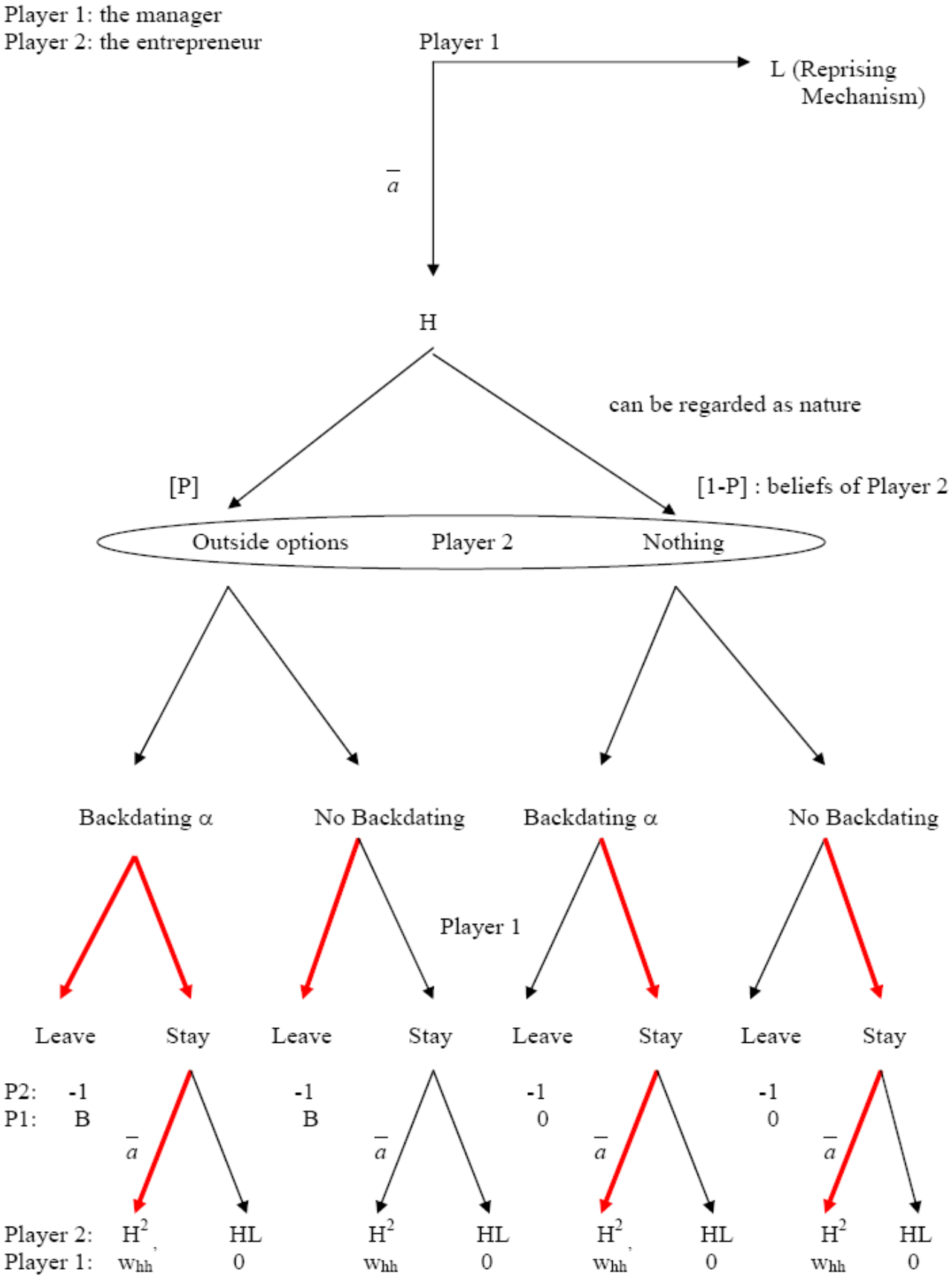

Figure 5: The extensive form of the dynamic game of imperfect information

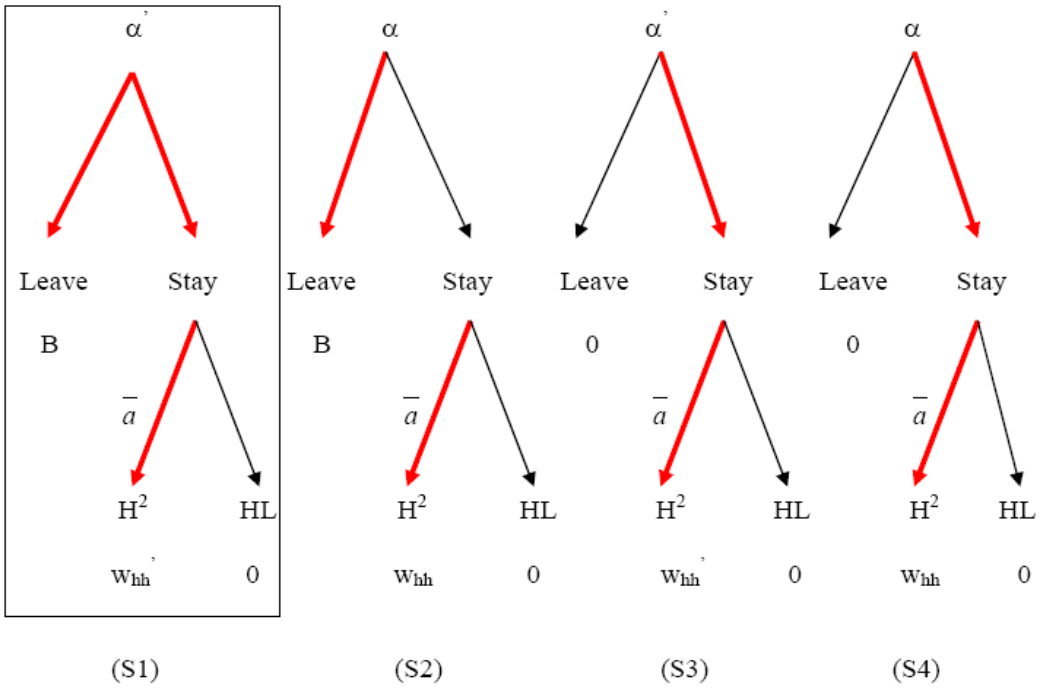

Figure 6: The four subgames for Player 1

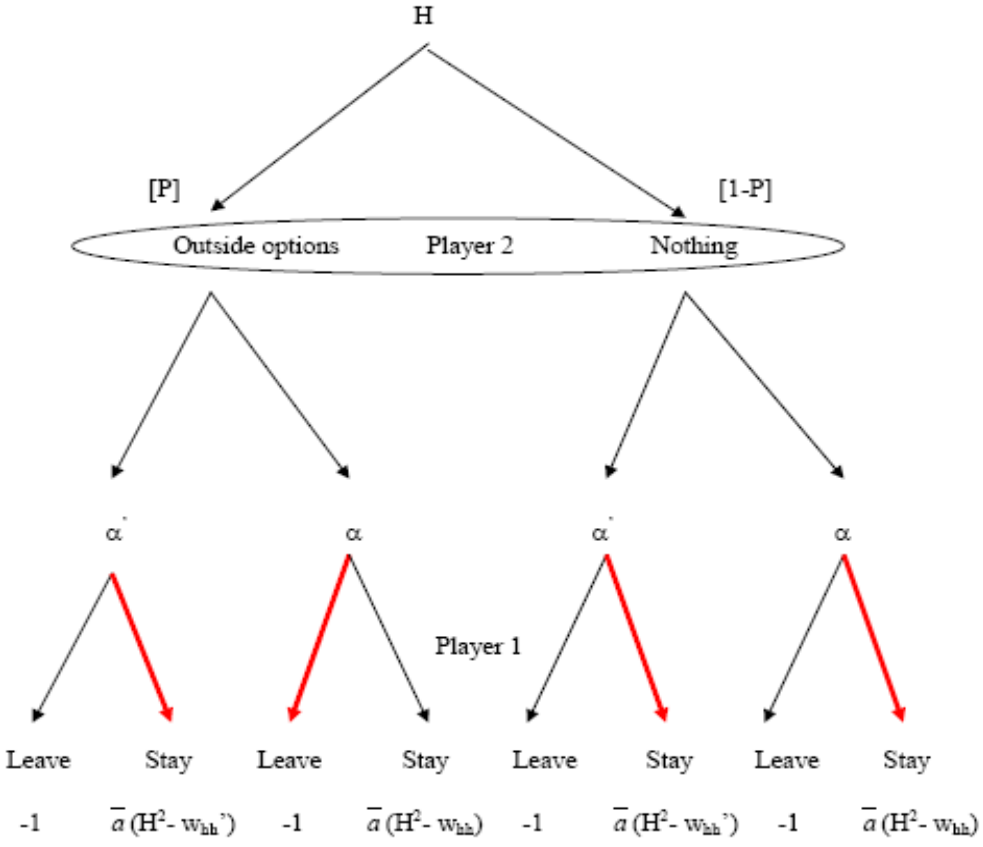

Figure 7: The extensive form of the subgame for Player 2 in Case 1