Legitimized Unethicality:

The Divergence of Norms and Laws in Financial Markets

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Abstract

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Financial markets, where companies are characterized by a separation of ownership from control and interactions are opaque to a large majority of uninformed investors provide a fertile ground for executives to conduct practices that push the ethical boundaries of accepted and expected behavior. Furthermore, some practices such as tunneling of funds in business groups and backdating of executive's stock option grants exhibit remarkable proliferation among many disparate actors, ones who will argue for the merits of these practices even after they are exposed. In this dissertation I examine the antecedents of widely practiced financial frauds, processes that lead to what I call "legitimized unethicality"- unethical behavior that gains credence among perpetrators while remaining clearly illegal to outsiders. In chapter 1 I look at skewed investments of mutual funds in affiliated companies when these go public, highlighting how shared ownership over financial and non financial companies can lead mutual funds to transfer funds from savers who's portfolios they manage to the business group to which they belong. In chapter 2 I examine the diffusion pattern of stock option backdating among executives in the United States, where co-location (both spatial and temporal) creates clusters of bad behavior among clients of audit firms. I isolate a key "agent of diffusion" that gives credence to the practice of stock option backdating- the local office of the companies' auditor and show, using multiple methods, that

this geographical concentration of backdating is the result of heterogeneous acceptance of backdating among local auditors and is dependent on the level of competition among the local offices of these auditors. In the third chapter I turn to look at the social characteristics that promote adoption of stock option backdating and show that this practice is adopted by those executives who experience a gap between their realized compensation and the expected compensation level when comparing to their peers. Backdating is therefore one form of catching up to perceived "fair" levels of compensation. Together these papers demonstrate that some unethical practices can gain legitimacy by perpetrators, and spread widely among them, while remaining clearly unethical to outsiders until exposed.

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Acknowledgements

The following dissertation would not have been possible without the intellectual, moral and practical support and advice from my advisor, Bruce Kogut, the Chair of my committee, Eric Abrahamson and the members of my dissertation committee: David Stark, Ernesto Reuben and Catherine Thomas. I am truly indebted to each and every one of them. Every chapter of this dissertation greatly benefitted from the advice of Dr. Gitit Gur-Gershgorn, Alicja Pluta and Mr. Zubin Jalev who also assisted with several of the matching and data collection procedures in chapters 2 and 3. I would also like to extend my gratitude to Liza Tepper and Rita Yankilovitch from the Israeli Securities Authority for their assistance in collecting the data for chapter 1. The work presented in this dissertation would not have been possible without the help of these brilliant people.

Preface

Illegal practices in financial markets come at a great cost, both directly and indirectly by creating distrust between investors and managers of publically traded companies. Most research in corporate governance treats these cases using the atomistic principle-agent framework focusing primarily at conflicts of interests between managers or large shareholders and small investors (Jensen and Meckling,1976, Morck and Yeung,2003). Although atomistic frameworks describe the incentives of managers to commit fraud, fraudulent practices spread *between* organizations rapidly as is evident from the wide diffusion of stock option backdating in the United States. The diffusion of illegal practices is a *social process* and cannot be explained by agent's atomistic incentives. The social structure in which such practices are introduced support the rate by which they diffuse and the likelihood that they will be adopted through a process that I call "legitimized unethicality".

Studying the diffusion of unethical practices empirically is a causally complex problem. By its nature, most empirical settings of corporate fraud suffer from the selection and identification problems. Researchers can look at ethical violations when they are caught, either by regulators or by stakeholders. This may cause researchers to incorporate variables that determine the selection of "caught" cases into the explanatory side of the model. This type of research is especially vulnerable to mistakenly identify variables as increasing a company's likelihood of committing fraud when those might simply be variables that increase the likelihood of a company being caught. Research in corporate fraud looks at shareholder litigation (Hompson and Sale,2003), manipulation of financial statements identified by regulators such as the SEC (Farber,2005) or explicitly only on cases identified by all mechanisms including auditors, investors, regulators employees and the media to determine which one is most

prominent (Dyck et al.,2010). Determining that certain characteristics of companies lead them to be sued more by their shareholders, investigated more by regulators or scrutinized by the media tells us very little about the underlying characteristics that make companies more likely to engage in those practices in the first place.

The advantage of studying backdating of stock option grants and investment made by mutual funds during IPO road-shows is the clear identification of the persecutors of the unethical practice. By looking at the universe of all stock option grants and deducing the ones that are highly unlikely to be assigned at random, we can observe the complete universe of fraudulent companies. This allows for the isolation of the variables that increase the company's likelihood of committing this form of fraud from those attributes of the company and its executives that contribute to their being more visible for regulators and stakeholders. A similar rational follows for examining investments made by mutual funds; once an anomaly in the participation of funds in IPO's is detected, this practice is tractable for all funds and the available information covers the entire universe of possible and manifested deviance.

This dissertation is comprised of three essays, each underlying a social process or structure that contributes to the acceptance of an unethical practice within the community of potential perpetrators. The first chapter shows how in the concentrated ownership structure in Israel, affiliation of mutual funds with a business group leads fund managers to participate heavily in IPO's, pushing the price up and transferring funds from their savers into the group. This process, which we call "channeling" has clear benefits for the business group, and thus despite being unethical they are "rational" from the standpoint of fund managers and owners. The second chapter looks at a contrasting corporate ownership structure and show how, in the dispersed ownership structure of the United State backdating of stock option grants for

executives diffused rapidly and extensively. The paper exemplifies the role of geography in explaining this diffusion and the creation of geographical clusters where backdating is legitimized. The paper also identifies one mechanism that drove this geographical legitimation: the local offices of external auditors. The third chapter examines how social comparison processes lead executives to adopt backdating as an instrument for bridging the gap between their compensation and the compensation levels they should feel entitled to, thus demonstrating that backdating stock option grants can be framed by managers as cheating in the pursuit of justice. Taken together, these three papers seek to provide grounds for discussing how unethical practices can be legitimized within communities while remaining clearly unethical for outside observers.

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Chapter 1: Channeling Funds into the Group: IPO Pricing and Business Groups

We demonstrate that business groups use financial intermediaries to boost the stock prices of affiliated firms in initial public offerings (IPO). Using a complete sample of all IPOs and all mutual funds in Israel during a four-year period, we find that the participation of mutual funds owned by the business group leads to economically significant overpricing for those IPOs. We show an increased likelihood of participation of mutual funds in the offerings of related firms and a rapid disposal of those stocks in subsequent trade. Our findings expand on the tunneling hypothesis by demonstrating that the transfer of resources can come from sources external to the group, such as assets managed by mutual funds, in a phenomenon we call "channeling."

Introduction

In past decade there has been increasing interest in pyramidal business groups, especially in the ability of group owners to transfer assets from one firm in the pyramid to another. This phenomenon, described by Kogut and Spicer (1998) and later dubbed "tunneling" by Johnson et al. (2000) takes many forms, including transfer pricing, transfer of goods at nonmarket prices, and inflated payments for intangibles. Much of the research has examined, from both theoretical

and empirical perspectives, the internal capital markets in these groups; yet the theoretical possibility of transferring funds from outside sources into the group's internal capital markets, an activity we refer to in this paper as "channeling," has not previously been addressed. This is in part because the existing research has focused on the expropriation of minority shareholders, rather than on the practice of conducting trades via financial intermediaries, which benefits the group at the expense of individual savers.

Channeling funds from sources external to the group is fundamentally different from tunneling from firms within the group. In business groups where ownership is pyramidal the transfer of value in tunneling presents serious governance problems for firms at low tiers in the pyramid, where the divergence is great between cash flow rights and control rights. [See (Almeida and Wolfenzon, 2006a, b; Morck et al., 2005) for a discussion of the relationship between lower-tier firms in a pyramidal group and incentives for tunneling.][1] Unlike trades conducted from firms' own cash flows, trades managed by financial intermediaries such as mutual, trust, and pension funds can exhibit similar agency problems without a large divergence of control rights from cash flow rights, because the major shareholder of the company owns no portion of the funds being transferred. Furthermore, while tunneling negatively affects the value of the tunneling target, channeling from sources external to the group has limited implications for the value of the mutual fund managing companies and the resources accessed are vastly larger[2]. Channeling can therefore be viewed as an extension of the agency problem in mutual

[1] This view of the pyramidal group is a variation on principal agent theory (Jensen, M.C., Meckling, W.H., 1976. Theory of the firm: Managerial behavior, agency costs and ownership structure. Journal of Financial Economics 3, 305-360.,whereby the managers of a firm act to maximize the group owners utility and not the small shareholders utility (Morck, R., Yeung, B., 2003. Agency Problems in Large Family Business Groups. Entrepreneurship Theory and Practice 27, 367-382.)

[2] Clal financim LTD., one of the asset managers controlled by a business group, has close to 20 billion NIS under management, almost twice as much as the entire market value (and four times larger than the "free float" held by minority shareholders) of Celcom LTD, the largest company controlled by the same business group.

funds to business group firms who manage "other people's money", and result in large benefit to the business group at the expense of savers.

We seek to shed light on the perseverance of business groups in developed economies, and to provide insights into the persistent underdevelopment of capital markets in these economies. We also verify assumptions made in previous research (e.g., (Barca and Becht, 2001), Ch. 9; (Leff, 1978) that institutional investors controlled by a business group act as "vehicles of power" for the controlling shareholder. We use mutual fund investment decisions in IPOs in which prices of the transactions and the participation of group managed funds are evident. We point to a disturbing finding: ownership of financial intermediaries gives business groups the ability to go public with firms that are less profitable, yet they benefit from notably high prices on the stocks sold. This price increase is absorbed by institutional investors who participate in IPOs generated from the business groups who own financial intermediaries. In this way the business groups systematically weaken the efficiency of capital allocation in stock-exchange offerings.

Using a unique data set of all IPOs in the Israeli market over a four-year period, we show clear cases in which institutional investors belonging to a business group transfer funds from small investors to the group at high prices and subsequently incur large losses when selling the stocks. Because Israeli companies use the Dutch auction method to go public, increased participation at the bidding stage can support the IPO and drive prices up. Systematic behavior like this can create inefficiencies in the IPO market by allocating excessive resources to firms in business groups with financial intermediaries.

The contribution of this paper is threefold. First, it contributes to the literature on the transfer of value to firms within business groups and to the corporate governance literature by identifying a potentially significant problem arising from business group control over nonbank financial intermediaries. Second, the paper advances the discussion about how business groups can gain a persistent advantage in domestic stock markets. Third, from a welfare point of view it sheds light on how business groups' control over financial intermediaries can result in the misallocation of capital in the economy.

The paper proceeds as follows: Section 1 discusses the theoretical foundation of this study and the main hypothesis; Section 2 describes the data; Section 3 reports the main unconditional findings on institutional investors' IPO investment choices over the period in question; Section 4 reports the main results; and Sections 5 and 6 discuss the findings and offer conclusions.

Theoretical foundations

Financial intermediaries in the business group

Business groups are dominant and common in both developing and developed economies, as has been documented extensively (Barca and Becht, 2001; Claessens et al., 2000; La Porta et al., 1999). Most notably these groups have been observed to predominate in emerging economies where they are argued to mitigate underdeveloped markets, mainly capital allocation markets (Chang and Hong, 2000; Khanna and Rivkin, 2001; Khanna and Yafeh, 2007). Business groups often control mechanisms, like banks, insurance companies, and asset managing companies, through which they can achieve preferential access to capital.

Like all economic organizations, business groups are motivated to create superior access to capital and have been shown to finance affiliated firms in various ways, some of which are assisted by the weaker regulation in these markets (La Porta et al., 1998). The literature finds much evidence for internal dealings within groups: for example, Shin and Park (1999) find that investments made by firms within a business group are less sensitive to their own cash flow (compared to nongroup affiliated firms) but are highly sensitive to the cash flow of other firms in the group. They interpret this finding as evidence that internal capital markets exist within the groups. Chang and Hong (2000) show that, in Korea, various forms of internal transactions exist within groups, including debt guarantees, internal trade, and equity investments. Better access to capital is one of the unique advantages of the business group form of organizational control.

It is important to note that internal capital markets, despite creating better financing opportunities to affiliated firms, can decrease the overall capital allocation efficiency in the economy (Almeida and Wolfenzon, 2006a). Internal dealings such as capital allocation between firms, debt guarantee, and internal trade can work to the benefit of the group or the group owner by diverting funds from firms in which the owner has limited cash flow rights to firms in which its cash flow rights are greater. Almeida and Wolfenzon show that the choice of a pyramid structure for the business group may represent an attempt to maximize the potential cash flow gains of the ultimate owner (Almeida and Wolfenzon, 2006b). Divergence of cash flow rights from control rights has also been tied to agency problems at the firm level for firms controlled by a business group, where the controlling shareholder's interests diverge from minority shareholders as the cash flow rights of the controlling shareholder diminish (Morck et al., 2005).

Conflicts of interests in financial intermediaries

Extensive research has shown that financial intermediaries such as mutual funds, trust funds, insurance companies, and banks can conduct business that benefits the firm at the expense of individual savers. When information about systematic actions harming savers is not easily available, mutual funds vote disproportionally with management, and banks have been shown to underwrite and then buy high-debt firms (Davis and Kim, 2007). Davis and Kim showed that even in a highly regulated and transparent market such as the U.S., a positive association exists between business ties and the propensity of mutual funds to vote with management. Research has shown that firm ties to the underwriter can affect analysts' recommendations, resulting in more optimistic reports on the firm (Michaely and Womack, 1999). Affiliated analysts are slower to downgrade recommendations and faster to upgrade them (Brien et al., 2005) and stocks recommended by affiliated analysts underperform (Michaely and Womack, 1999). These findings suggest a bias that may result from conflicts of interest in the investment banks' roles as underwriter and as a provider of information and forecasts about the firm. [See (Mehran and Stulz, 2007) for a review of the conflicts of interest literature.] Even in the U.S., where markets are comparatively efficient, these biases are only partially discounted. Ulrike Malmendier and Devin Shanthikumar show that only large investors adjust their behavior to the underlying incentives of the analysts, while small investors seem oblivious to the conflicts of interest affiliated analysts face when issuing recommendations--a finding they attribute partially to the cost of obtaining the information (Malmendier and Shanthikumar, 2007). Ber, Yafeh and Yosha find that, in Israel, bank managed funds pay too much for bank underwritten IPOs at the expense of returns to investors (Ber et al., 2001).

The transfer of wealth from mutual fund managing companies to the group is akin to the conflict of interest explored in the universal banking literature where commercial banks can use

valuations as underwriters of companies to substitute debt of the firm to the bank with equity sold on an IPO. [See (Drucker and Puri, 2007) for a survey of the literature.] Again, information plays a critical role in the adjustments of investors. The findings on commercial banks engaging in this transfer of debt to the public have been mixed, divided along the lines of information asymmetry and the cost of obtaining affiliation information on all sides of the transaction (Puri, 1999). Another stream of research we can draw on pertains to related lending, where banks issue loans for firms owned by the bank or the bank's owner at terms that are better than arms-length lending. (La Porta et al., 2003) provide a test of related lending in Mexico.

Insights from the universal banking and related lending literature, and from the research showing agency in financial intermediaries, can also apply to the transfer of capital from funds managed by a business group to the group itself. Business groups that are active in the capital markets can use their control over mutual, trust, and pension funds to boost prices for their own IPOs, thus transferring capital from small outside investors into the group. Group owners can further use their financial intermediaries to reduce any possible threat to their control by holding parts of the control shares with trusted fund managers at no personal cost to the group owner.

Data

The Israeli stock market and IPO auction system

In 2003-2007 Israel was classified as an emerging economy. There were 627 companies listed in the Tel Aviv Stock Exchange (TASE), about 7% of which were companies dually listed in foreign exchanges. The average market cap of shares and convertibles traded in the TASE was USD 156 billion, and the average daily trading volume was USD 300 billion. During these years

there were between 795 and 1,167 mutual funds operating in Israel, managing USD 113 billion in assets.

During this period the Dutch auction system, rather than the book building method, was used for initial public offerings (Hauser et al., 2006; Jagannathan et al., 2009). Similar to systems used in France, Finland, New Zealand, Brazil, Argentina, and Austria, the Israeli auction system consisted of a uniform price offer in which the lowest price that cleared the bid was set for all participants (Jagannathan et al., 2009; Oh, 2008). Under Israeli regulations all IPOs follow a two stage bidding process: first the underwriter can secure orders from institutional investors for up to 80% of the shares; then all investors can participate in bidding on the remaining shares. While the first stage includes maximum prices submitted by the mutual funds, the final price is determined in the second stage. If the underwriter fails to fulfill the 80% commitment in the first stage, it is viewed as a negative signal regarding the quality of the IPO. Conversely, oversubscription in the first stage (exceeding 80% of the number of shares offered) sends a positive signal to investors participating in the second stage. Most IPOs are oversubscribed, which is a positive signal regarding the prices attached to the IPO by institutional investors. Information on all first stage commitments (price and quantity) is accessible for investors in the second stage.

Data sources

We used several sources to gather the data for our analysis. First we started with over 300 IPOs documented in the Tel Aviv stock exchange website, i.e., all offerings listed between January of 2003 and December 2007. From those we excluded all non-firm IPOs (ETF and RIT

offerings). We then sorted the sample to isolate stock-only offerings. This allowed us to trace the amount of wealth transferred by observing the real prices of the stocks as established by the end of the first trading day. Out of the 117 firms in this sample, one firm had an anomalous return, exceeding 400% on the first day of trade. We found that this firm had issued an immediate report on the first day of trade, thereby causing the surge in the stock price. Because this information was not available for the funds in the bidding stage, we excluded this observation from our sample. Our sample includes 56 mutual funds directing a total of 757 unique investments toward 29 firms. Nine of the 29 firms are owned by one of two business groups that own financial intermediaries. The relatively large number of investment decisions directed at a much smaller universe of underlying IPOs may raise concerns about potential estimation bias in our models. We address these concerns in the analysis. Furthermore we replicate the main result showing proffered pricing for IPOs generated from business groups with financial intermediaries in a separate sample of bond IPOs, reported in Appendix 1.

To identify the business groups we followed the existing literature on Israeli groups (Maman, 1999, 2002) and used the widely accepted Dun and Bradstreet guide, published annually by D&B Israel. The guide includes a breakdown of the core fundamentals of the 19 largest business groups in Israel. One possible difficulty with identifying ultimate owners based on heads of families is an incomplete mapping of the holdings of firms whose stocks are held by family members with different last names. To address this, we supplemented the guide by mapping the first-degree family members for each ultimate controlling family using news reports from the five largest newspapers in Israel. We searched a ten-year window, in which we found seven family members who had changed their last names (usually due to marriage).

The third data set we used was the holdings of mutual funds across time. These data are reported to the Security Authority on a monthly basis and include the entire portfolio of each individual fund at the last day of trade of that month. From this data we identified the shares that each fund bought in an IPO and traced when the funds sold those shares.

Lastly, we downloaded from the Israeli Security Exchange website the daily closing price of stocks for all firms in the sample over a three-year period from the day of the IPO. Our goal here was to calculate the buy and hold returns of the funds and the first day access return, to which we refer here as underpricing.

Unconditional findings

Findings at the firm level

Although research done in the 1990s indicated that IPOs in Israel had a 4.5% positive return on the first day of trade (Kandel et al., 1999), we find that during our sample the mean first day return centered close to zero. When parsing the sample to business group and nonbusiness group firms, we find that the nongroup IPOs have a zero mean first day return and business group firms have first day returns that are slightly negative yet not significantly different from zero. In this paper, we define positive first day returns as *underpricing* and negative first day returns as *overpricing*. The average overpricing for business group firms is 4.16% on IPOs of an average magnitude of 340 million NIS (about 85 million dollars), with a standard deviation of 8.81%. On average this translated to a net transfer of $3.5 million from investors in funds to the group or group controlling family, compared to the price of the firm on the first day of trade.

Table 1 reports the main unconditional characteristics of firms issuing stock during the study period, according to the group ownership classification.

--- insert Table 1 about here ---

We find that business groups tend to go public with firms that are larger and older than nongroup firms. Business groups' ability to finance their pre-IPO activity through the banking system might explain this finding. We also find that business group firms go public with higher debt ratios, which is consistent with this explanation. Nongroup firms have a highly skewed distribution of the amount of capital raised, and most issue stock for less than $15 million.

Findings at the investment level

Coding the fund-IPO pairs

Because the purpose of this research is to explore the effects of ownership of business groups on mutual funds, we conduct the analysis at the investment level made by the mutual fund. We classify firms as belonging to a business group (BG), or independent (NBG).

We use the same classification scheme for identifying mutual fund ownership; depending on the ultimate owner, a mutual fund is classified as either BG or NBG. We conduct our analysis on two levels. First we divide the sample between BG and NBG ownership (see Table 1) and look at the issuing firm level. Then we code the BG-BG matrix such that the diagonal, where mutual funds investing in the IPO are owned by the same group, is coded as *same group,* and the off-diagonal, where investments are made by mutual funds in other groups, is coded as *different group* (see Table 2a and 2b). We defined *control* as the owner of the largest portion of voting shares, where no three other shareholders combined hold more voting shares. We established a

25% cutoff, whereby no shareholder with less than 25% of the votes was considered a controlling shareholder.

--- insert Table 2 about here ---

Classifying investments at the pair level allows us to observe the behavior with a fund-specific effect. Specifically the funds that belong to a business group can make investment decisions on all pair categories, whereas funds that don't belong to a business group can only invest in other group or nongroup IPOs.

Unconditional findings at the investment level

We now turn to the unconditional findings at the investment level. We examine the investment decisions of mutual funds within the universe of IPOs available for investment in a given year. We find that the average overpricing per investment is more acute when funds invest in their own group. Same-group investment yields on average a negative first-day return of 6.33%. This cannot be explained by the poor ability of these funds to choose investments, because their investments in similar firms from other business groups yield a loss that is one fifth of that--only 1.42% for the first day of trade, which does not differ significantly from zero. Since several mutual funds invest in the same IPOs, the investment observations are not independent between categories. Given that all mutual funds face the same investment universe, this is informative at the fund's investment level. We confirm the direction of the findings in these models when we control for clustering at the firm level; at that point the size of the negative first-day return drops to 5.16% but remains significant.

--- insert Table 3 about here ---

Overpricing indicates that individual investors bought equity in the firm at a higher price than they would have paid had they bought the shares at the end of the first day of trade. An alternative view is that investors might assess the firm as a good long-term investment and secure the shares at the IPO, disregarding the first day of trade. The data does not support this argument. Same-group investments lose on average 13.99% in the first three months of trade, and 28.39% in the first six months, compared with a 1.52% loss for investments in different business groups for the three-month horizon, and 13.5% for at six months. The share price trajectory for IPOs in which same-group mutual funds invested is distinctly inferior to that of all other categories.

--- Insert Figure 1 about here ---

Overall these findings support the idea that business groups channel funds into the group from outside investors. When mutual funds invest in IPOs from their own group they make poor returns on their investments, in effect transferring funds from small investors in mutual funds to firms in the business group. These findings are consistent with the universal banking research showing that banks underwrite firms that share ownership with them at high prices (Puri, 1999). Our findings also show that the internal capital markets are not limited to financing affiliated firms through bank ownership. Groups can tap directly into the savings managed in mutual funds, with implications for the efficiency of capital allocation by financial intermediaries.

Alternative explanations: asymmetric information and long-term investment strategy

Next we rule out the possibility that these investments are made as a long-term strategy based on superior information by the mutual fund that is owned by the business group. We use the same classification scheme for the fund holding data. If this were a strategic action intended

to support the price of an IPO, we would expect mutual funds that buy in the same-group IPOs to sell the shares sooner than funds that invest as a long-term strategy. We plot the holdings of mutual funds over time for all categories of IPOs.

--- insert Figure 2 about here ---

The findings are striking. The funds that participate in their own groups' IPO quickly dispose of the shares in subsequent trade and sell off more than 80% within the first two periods. Funds that do not participate in their own groups' IPO hold on to those same stocks for much longer. The mutual funds that belong to the business group hold nongroup IPOs much longer. The disposal of different groups' stocks by those funds is swift, but less so than the disposal of stocks bought on their own group's IPO.

When calculating the annualized losses of the funds on these investments we find that same-group investments generated a net loss of 34% by the time the stocks bought at the IPO were completely sold. This constitutes the highest loss of all possible pairs, and the only one that is significantly negative. Indeed, the returns of the firms issued by business groups that control financial intermediaries are negative throughout the period, making it virtually impossible to sell those shares at a profit. Same-group funds do, however, minimize their losses on the same-group IPOs compared to nongroup funds. Although unable to make profits on investments in their own groups, business group funds sold at an average profit of 15.5% when investing in business groups without internal financial intermediaries, and at a 14% profit when investing in nongroup firms. Nongroup fund managers made an average profit of 19% on their investments.

--- insert Table 4 about here ---

Models and analysis

We test whether there is a systematic advantage to business groups when issuing stocks using several models of investment choices by mutual funds. First we collect the pre-IPO financial statements for all firms in our sample to account for any systematic differences among business group firms. We then analyze the activity pattern at the investment decision level of the mutual fund, when holding period and overall return on investment are constant. We then run the same models on the subsample of mutual funds that belong to business groups with IPO activity during our time period. We supplement this analysis by constructing a data set of all mutual funds operating in the IPO market throughout the period and modeling the likelihood of their participation in an IPO using the *different group* and *same group* coding.

4.1. Main results

During the road show, mutual funds are exposed to the company's financial statements as well as information about management, future strategy, markets, and opportunities for the firm. The information available on the companies is summarized in the financial statements just prior to the IPO. We analyze this in a similar way to (Pagano et al., 1998) analysis of initial public offerings in Italy and (Ber et al., 2001) analysis of IPOs in Israel, to see if there is a systematic difference between business group and nonbusiness group firms. We find that business group firms are bigger and remain incorporated for a longer time without raising capital from the stock markets. Firms that belong to business groups that also control financial intermediaries are almost one standard deviation less profitable than the firms in our sample, which is both statistically and

economically significant. The results, controlled for industry and year of IPO, are reported in Table 5.

--- insert Table 5 about here ---

Both long- and short-term unconditional performance of the stocks behave as predicted in the literature. Profitability increases the above-market return, leverage depresses it, and bigger firms have smaller above-market return growth (Fama and French, 1993).

In all models, though business group firms perform better in the short run, IPOs issued by groups owning financial intermediaries that participated in the IPO exhibit poor performance. The results for three, six, and 12-month performance are reported in Table 6, and the stock price trajectory is reported in Table 7. To exclude the first day overpricing effect and the high volatility of the first few days of trade, we measure the stock performance starting five days after the IPO. In the long run there is no significant difference between the performance of firms belonging to business groups and that of business groups with financial intermediaries, and both are below market.

--- insert Table 6 about here ---

In Table 7 we model the underpricing, capturing the amount that was overpaid for the stocks by the institutional investors that bid on the IPO. Each fund sees all IPOs and can choose whether to bid in that offering and at what price. We find that the variables *business group* and *same group* account for negative underpricing (overpricing) of 1.79% and 5.75% at high significance levels ($p<0.001$ for business group IPOs). Note that by definition the variable *same group* only refers to mutual funds that are managed by the same business groups as the firm whose stocks they are buying.

--- insert Table 7 about here ---

Together, these findings suggest that mutual funds invest in firms belonging to their own group at high prices, which are then translated into realized losses. Markets price these firms lower than the IPO price up to one year after the IPO. This prevents the funds from exiting their investments at a profit, and indeed these investments generate a significant loss to the funds at the point of sale both in raw-market-adjusted returns and in risk-adjusted returns.

Likelihood of funds to participate in an IPO

We now examine the likelihood of funds to invest in an IPO. To support the IPO price and facilitate the channeling of funds from the general public to the group, mutual funds need to be substantially more active in IPOs from their own group. Unconditionally, the frequency table reported in Table 8 shows that business group funds are more likely to participate in any business group IPO, and almost twice as likely to participate in IPOs from their own group compared to nongroup IPOs.

--- insert Table 8 about here---

Participating in an IPO sends a signal for the quality of the issuing. Since IPOs are issued through an auction in the stock market, participation also helps fill the demand in the first auction stage, which indicates to the bidders in the second stage the quality of the underlying offer.

We use a data set that includes all mutual funds that were active during each IPO to model the likelihood of participation in an IPO. The results are reported in Table 9 and are consistent with the unconditional frequency table. Same-group ownership increases the

likelihood of participating in an IPO and is the strongest predictor of a fund's odds in participating in a given IPO.

--- insert Table 9 about here ---

The models show that funds are more likely to invest in their own group, and furthermore that the same-group variable is highly significant and has an effect second only to the investment policy of the fund.

Discussion

The question of whether business groups are paragons or parasites is far from being resolved. On that question, the endogeneity of small stock and bond markets in business group economies plays a critical role in researching business groups and their influence on the macroeconomic environment.

Research identifies theoretical arguments for both positive and negative effects of business groups on the way markets operate in countries where they dominate a large portion of the national economy. The main argument on the positive side focuses on how internal capital markets replace inefficient external markets, allowing national economies to develop faster and leapfrog the stages in which external capital allocation through banks and capital markets is inefficient (Khanna and Palepu, 2000; Khanna and Yafeh, 2007; Shin and Park, 1999).

Conversely, the increased power and political influence of second and third generation group owners who may be less talented than the founder, as well as a general entrenchment of business groups, may inhibit the development of markets external to the group and slow economic growth (Khanna and Yafeh, 2007; Morck et al., 1998; Morck et al., 2005). Notably, pyramidal groups create a wedge between control rights and cash flow rights, giving the major

shareholder incentive to stifle resources from lower-tier firms (Johnson et al., 2000). This phenomenon alone can impair the development of efficient external capital markets even if tunneling is priced correctly in subsequent trade.

But what happens when the market for allocation of capital is itself influenced by business groups? The use of financial intermediaries by controlling shareholders to accomplish the transfer of wealth gives rise to concerns, hitherto undocumented, about the level of development of capital markets in business group dominated economies. Control over financial intermediaries allows groups to create access to capital disparate from that available to nongroup firms and distort the efficiency of capital allocation by financial markets. Affiliated players in the local stock markets can also support the controlling shareholder during takeover threats and transfer even more funds during repurchases of shares.

We find that when mapping the investments made by mutual funds in IPOs there is a clear pattern of support of mutual funds owned by the business group in their own group offerings, and possibly cooperation between groups. Mutual funds are much more likely to invest in their own group IPO, despite the fact that prices are on average 6.33% higher than what the market evaluates the firm stock to be; the funds subsequently dispose of those shares quickly and at distinct and consistent losses. This pattern is not conceptually limited to mutual funds. It can come into play when groups manage investment portfolios in pension funds, provident funds, life insurance policies, and any other mechanism in which large sums of money are managed by a group whose interests are not aligned with those of individual savers. The fact that mutual funds in Israel are shown to act strategically to the benefit of the business group at the expense of individual savers does not preclude individual savers also enjoying benefits from investing in a mutual fund that is owned by a business group. For example, when business groups control a

large enough portion of the economy, and when group firms are highly connected through cross holdings, they are often perceived as "too big to fail," creating implicit insurance to the individual savers in those funds. In addition, groups might have superior information on related businesses and enjoy better access to superior management talent. We do not attempt to analyze the net effect of investing in business group managed funds. The findings suggest that even if the savers themselves rationally choose to invest in business group managed funds, the misallocation of capital can result when these funds participate in trades that specifically benefit the group.

Conclusion

This study reveals how business groups can use financial intermediaries such as mutual funds to channel funds into the group during IPOs. We start our investigation by analyzing mutual fund activity according to the classification scheme of different-group and same-group pairs. Using this scheme we show consistent evidence that funds belonging to a business group are more likely to participate in IPOs originating from their own group; that these IPOs are significantly overpriced; and that these investments show below-market performance in the short run and then correct to performance that is not significantly different from that of other business group firms. We further examine the return made on these investments by the same-group funds and find that they generate a negative return on investment that is both statistically and economically significant. These funds dump the shares they bought at the IPO at a staggering speed after the stock has begun to trade.

This evidence shows that business groups' control over financial intermediaries gives them preferential access to external capital markets, enables them to issue stock at high prices, and diverts funds from the general public's savings into the group's internal capital markets. The

unconditional findings hold when controlling for firm and fund characteristics, year-fixed effect, and market conditions.

Research has shown that business groups transfer funds between firms in the group in an internal capital market. Our findings show that these funds originate not only from activities conducted in market conditions, but also by channeling resources external to the group, such as savings in mutual funds.

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Tables and Figures:

Table 1

Characteristics of firms issuing stocks

Firm characteristics are reported for all 115 firms in the sample. Industry classification is according to ISA regulations on 7 major industry sectors. IPO characteristics include quality signals such as: whether the IPO papers included a specific designation for the proceedings (designated proceedings); whether stocks were offered separately or as a bundle with bonds (stock + bond); whether the underwriter committed to buy in the IPO; and the level of institutional commitment in the IPO prior to the closing day bid. General IPO characteristics are the amount of funds raised (proceeds); first day of trade data; and short, medium, and long term stock performance. Market capitalization and IPO proceeds are in millions of NIS. Trading volume is the daily trading volume of the stock in thousands of NIS.

Non business group firms n=87						
Variable	**Percentage of companies**	**Std dev**				
Investment holding companies	5.75%					
Industrial companies	43.68%					
Commerce	24.14%					
Real estate	24.14%					
Banking and insurance	0.00%				.	.
IPO includes bonds	66%					
	Mean	**Std dev**	**Minimum**	**Maximum**	**t Value**	**Pr > |t|**
Firm age	14.20	12.15	2.00	68.00	10.89	<.0001
Underwriter commitment	0.24	0.11	0.02	0.58	21.22	<.0001
Institutional inv commitment	0.74	0.13	0.30	0.90	55.06	<.0001
Institutional in results (PostBid)	0.73	0.14	0.25	0.90	50.31	<.0001
IPO proceeds equity only	65.33	54.38	16.30	360.00	11.2	<.0001
IPO proceeds total	89.91	112.26	0.00	860.00	7.47	<.0001
Market capitalization first day	193.01	211.30	24.00	1,472.06	8.52	<.0001
First day underpricing	0.00	0.31	-0.56	1.94	-0.08	0.9372
First day trade volume	4,119,265.68	8,693,605.60	2,616.00	52,342,434.00	4.42	<.0001
3 month return	-0.05	0.19	-0.43	0.82	-2.29	0.0245
3 month average trade volume	244,494.58	258,236.80	7,883.94	1,143,595.00	8.83	<.0001
6 month return	-0.07	0.30	-0.63	1.50	-2.35	0.0211
6 month average trade volume	228,491.17	299,947.40	14,209.73	1,616,309.29	7.11	<.0001
12 month return	-0.18	0.38	-0.93	1.11	-4.31	<.0001
12 month average trade volume	206,433.46	279,347.11	9,202.74	1,479,886.88	6.89	<.0001

Firms belonging to business groups with no financial intermediaries
n=20

Variable	Percentage of companies	Std dev
Investment holding companies	5.00%	
Industrial companies	20.00%	
Commerce	25.00%	
Real estate	40.00%	
Banking and insurance	10.00%	
IPO includes bonds	50.00%	

	Mean	Std dev	Minimum	Maximum	t Value	Pr > |t|
Firm age	24.70	21.03	2.00	73.00	5.25	<.0001
Underwriter commitment	0.25	0.12	0.07	0.50	9.34	<.0001
Institutional inv commitment	0.72	0.14	0.38	0.80	23.27	<.0001
Institutional in results (PostBid)	0.70	0.14	0.38	0.80	23.09	<.0001
IPO proceeds equity only	145.76	130.06	21.70	408.80	5.01	<.0001
IPO proceeds total	202.98	237.35	21.69	911.25	3.82	0.0011
Market capitalization first day	581.33	631.57	66.72	2,296.49	4.12	0.0006
First day underpricing	-0.04	0.09	-0.19	0.23	-1.82	0.0841
First day trade volume	5,832,271.13	6,397,066.28	17,958.60	20,390,464.84	4.08	0.0006
3 month return	-0.02	0.14	-0.34	0.25	-0.49	0.6271
3 month average trade volume	521,784.37	464,710.22	19,660.93	1,799,590.09	5.02	<.0001
6 month return	-0.07	0.21	-0.56	0.30	-1.58	0.1315
6 month average trade volume	493,220.01	468,627.67	12,564.77	1,748,365.38	4.71	0.0002
12 month return	0.00	0.41	-0.54	0.81	-0.02	0.987
12 month average trade volume	601,992.44	749,652.84	19,311.37	3,175,110.10	3.59	0.0019

Firms belonging to business groups with financial intermediaries
n=8

Variable	Percentage of companies	Std dev
Investment holding companies	12.50%	
Industrial companies	37.50%	
Commerce	37.50%	
Real estate	12.50%	
Banking and insurance	0.00%	
IPO includes bonds	50.00%	

	Mean	Std Dev	Minimum	Maximum	t Value	Pr > |t|
Firm age	30.25	27.66	6.00	87.00	3.09	0.0175
Underwriter commitment	0.26	0.14	0.10	0.50	5.09	0.0014
Institutional inv commitment	0.74	0.14	0.50	0.90	14.65	<.0001
Institutional in results (PostBid)	0.74	0.14	0.50	0.90	14.62	<.0001
IPO proceeds equity only	239.43	272.57	24.10	878.60	2.48	0.0419
IPO proceeds total	474.48	574.80	24.10	1,678.60	2.33	0.0522
Market capitalization first day	1,148.95	1,667.29	69.65	5,071.59	1.95	0.0923
First day underpricing	-0.06	0.07	-0.17	-0.01	-2.53	0.0393
First day trade volume	40,977,238.58	95,746,701.00	168,164.30	276,208,490.00	1.21	0.2654
3 month return	-0.08	0.07	-0.24	0.00	-3.27	0.0138
3 month average trade volume	1,685,770.21	3,200,653.39	128,823.86	9,441,492.27	1.49	0.1799
6 month return	-0.05	0.31	-0.35	0.49	-0.47	0.6512
6 month average trade volume	1,267,250.38	2,182,326.77	77,685.80	6,469,503.71	1.64	0.1445
12 month return	0.16	0.92	-0.67	2.12	0.48	0.6464
12 month average trade volume	1,060,465.27	1,650,369.64	42,398.03	4,953,449.67	1.82	0.112

Table 2a
Coding for pairs of mutual fund – IPO firm combination

		Ownership of firm issuing stock	
		BG	**NBG**
Ownership of mutual fund	**BG**	*BG-BG*	BG-NBG
	NBG	NBG-BG	NBG-NBG

Table 2b
Coding for the BG-BG pair

		Ownership of firm issuing stock	
		BG_i	**BG_j**
Ownership of mutual fund	**BG_i**	same group	different group
	BG_j	different group	same group

Table 3

Characteristics of investments made by mutual funds according to the type of investment (nongroup, different group, same group)

Investment characteristics are reported for all 2124 combinations of IPO-mutual fund. First we report the indicator variables, then the continuous variables, and finally the stock market variables at one day, 3, 6, and 12 months after the IPO. IPO characteristics include quality signals such as: whether the IPO papers included a specific designation for the proceedings (designated proceedings); whether stocks were offered separately or as a bundle with bonds (stock + bond); whether the underwriter committed to buy in the IPO; whether the fund was managed by one of the underwriter of the IPO or the leading underwriter; and the level of institutional commitment in the IPO prior to the closing day bid. General IPO characteristics are the amount of funds raised (proceeds); first day of trade data; and short, medium, and long term stock performance. IPO proceeds and market capitalizations are in millions of NIS. First day return is presented as the total first day return for the IPO, the first day return weighted by the mutual fund's share of the total commitment and the first day return in monetary terms (thousands of NIS).

	Non business group investors				**Business group investors**								
Source	**Investing in NBG firm**		**Investing in BG firm**		**Investing in NBG firm**		**Investing in different BG firm**		**Investing in same BG firm**				
	n=812		n=403		n=831		n=372		n=41		Same BG-different BG difference in means		
	Mean		Mean		Mean		Mean		Mean				
Prospectus includes designation for proceeds	65%		91%		63%		96%		73%				
Include bonds	70%		67%		73%		69%		85%				
Fund linked to lead underwriter	19%		6%		18%		20%		73%				
Fund linked to non lead underwriter	29%		27%		17%		15%		0%				
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	t-statistic	DF	P value
First day underpricing	0.00	0.31	-0.04	0.09	0.00	0.32	-0.02	0.10	-0.06	0.05	-3.99	73	0.00
3 month excess return	-0.03	0.18	-0.02	0.11	-0.02	0.20	-0.02	0.12	-0.08	0.04	-6.93	128	0.00
6 month excess return	-0.04	0.31	-0.13	0.18	-0.05	0.33	-0.11	0.18	-0.19	0.24	-1.98	45	0.05
6 month excess return	-0.11	0.43	-0.11	0.51	-0.15	0.41	-0.12	0.45	-0.23	0.73	-0.96	43	0.34
First day trade volume	8,140,948	13,982,589	43,494,982	83,599,112	7,439,451	12,821,056	34,988,503	76,215,254	35,548,774	57,106,866	0.06	57	0.95
3 months trade volume	330,346	297,210	1,901,012	2,774,989	331,287	294,312	1,594,045	2,534,049	1,785,510	1,958,460	0.58	56	0.57
6 months trade volume	322,584	363,152	1,475,261	1,892,515	295,980	329,905	1,246,162	1,735,749	1,490,834	1,381,676	1.05	55	0.30
12 months trade volume	298,565	360,337	1,297,474	1,468,486	260,325	309,810	1,119,900	1,361,118	1,291,660	1,049,823	0.96	56	0.34

Table 4

Return on investments made on the IPO stocks

Significant sale was defined as a sale of 50% or more of the stocks purchased during the IPO. Return was calculated as the price difference between purchase price at the IPO and average sales price throughout the period divided by the price paid, annualized. Returns that were higher than 100% and lower than 50% were excluded. Any single fund can have multiple investments during the period. *t* tests were conducted for differences in means. Where *F* tests showed difference in distributions we conducted a two sample *t* test.

			Firm					
			NBG	**BG**	**Statistics**			
			Mean	**Mean**	**t Value** NBG-BG	**Pr > |t|**	**F Value** NBG-BG	**Pr > F**
Investor	**NBG**		**9%**	**15%**	-1.76	0.079	1.93	<.0001
	BG		**8%**	**17%**	-1.89	0.06	1.06	0.696
Statistics		**t Value**	0.3	-0.4				
		Pr > |t|	0.7633	0.6912				
		F Value	1.91	1.93				
		Pr > F	<.0001	<.0001				
	Same Group			**-34%**				
Statistics		**t Value** NBG-BG		6.04				
		Pr > |t|		<.0001				
		F Value NBG-BG		1.58				
		Pr > F		0.2484				

Table 5

Conditional effects of business groups on initial public offerings

Accounting measures are reported in the IPO papers submitted to the Tel Aviv stock exchange for the quarter prior to the IPO date and the prior year. Age is the age of the firm since first incorporated; market capitalization is reported in millions of NIS as the first day of trade market capitalization of the firm; quick ratio is the cash + cash equivalent assets divided by current liabilities; liabilities to capital are the firm's total liabilities divided by the capital invested in the firm; gross profit to assets is the firm's sales minus cost of goods sold divided by its assets reported in millions of NIS. We include industry and time variables to control for "hot IPO markets" and industry specific effects.

	Age		**Market cap**		**Quick ratio**		**Financial leverage**		**Gross profit / assets**	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Intercept	13.862**	14.260**	-8.558	115.244	-1.174	-0.931	3.966	14.257	0.155	0.101
	(5.924)	(6.184)	(196.325)	(200.093)	(0.738)	(0.759)	(46.745)	(48.286)	(0.134)	(0.135)
Business group firm	15.638**	15.010**	706.977**	512.039**	0.705	0.339	-66.102*	-81.619**	-0.078	0.001
	(3.735)	(4.593)	(123.769)	(148.615)	(0.527)	(0.596)	(33.372)	(37.910)	(0.098)	(0.105)
Same Group		1.782		553.538**		1.194		50.632		-0.321*
		(7.525)		(243.483)		(0.918)		(58.443)		(0.170)
R-Square	0.1732	0.1737	0.3104	0.3431	0.1725	0.1862	0.1223	0.1288	0.2485	0.279
n	116	116	116	116	116	116	116	116	116	98
Controlling for industry and year fixed effect										

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 6
Returns on investments in IPO

Performance data are the market adjusted returns of the firm's stock at the 63, 125 and 250 trading days interval corrected for first day return (first 5 days of trade excluded). IPO size is the value of stocks and bonds sold at the IPO. Accounting measures are reported in the IPO papers submitted to the Tel Aviv stock exchange for the year prior to the IPO date. Market capitalization is the first day of trade market capitalization of the firm taken from the stock exchange daily trading data reported in millions of NIS; quick ratio is the cash + cash equivalent assets divided by current liabilities; liabilities to capital are the firm's total liabilities divided by the capital invested in the firm; gross profit to assets is the firm's sales minus cost of goods sold divided by its assets. Industry dummies are included according to TASE industry classification. To control for time effects of issuing we included dummy variables for the year of IPO. Standard errors are corrected for clustering.

VARIABLES	(1) Above market return on first 3 trading months	(2) Above market return on first 3 trading months	(3) Above market return on first 3 trading months
Business group firm		2.188**	2.373**
		(1.102)	(1.115)
Same group			-4.455***
			(0.822)
IPO size	0.00649***	0.00526***	0.00540***
	(0.00131)	(0.00152)	(0.00151)
Market cap	-0.00504***	-0.00539***	-0.00541***
	(0.000412)	(0.000431)	(0.000432)
Constant	-5.538***	-5.456***	-5.467***
	(0.932)	(0.929)	(0.930)
Observations	2,174	2,174	2,174
R-squared	0.140	0.142	0.143

VARIABLES	(4) Above market return on first 6 trading months	(5) Above market return on first 6 trading months	(6) Above market return on first 6 trading months
Business group firm		-12.58***	-12.58***
		(1.491)	(1.509)
Same group			0.0338
			(2.486)
IPO size	-0.0101***	-0.00301	-0.00301
	(0.00276)	(0.00273)	(0.00272)
Market cap	-0.00171*	0.000283	0.000283
	(0.000959)	(0.000819)	(0.000818)
Constant	-1.315	-1.785	-1.785
	(1.694)	(1.645)	(1.645)
Observations	2,174	2,174	2,174

R-squared	0.144	0.169	0.169

VARIABLES	(7) Above market return on first 12 trading months	(8) Above market return on first 12 trading months	(9) Above market return on first 12 trading months
bg_firm		-8.630***	-8.781***
		(2.845)	(2.864)
same_bg			4.035
			(5.760)
ipo_size	-0.0656***	-0.0606***	-0.0607***
	(0.00413)	(0.00466)	(0.00466)
market cap	0.0103***	0.0123***	0.0124***
	(0.00138)	(0.00141)	(0.00141)
Constant	3.559*	2.771	2.752
	(2.104)	(2.105)	(2.105)
Observations	1,949	1,949	1,949
R-squared	0.316	0.320	0.320

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 7

First day return on investments by mutual funds

Performance data are the above market returns of the firm's stock at the end of the first day of trade. IPO size is the value of stocks and bonds sold at the IPO. Accounting measures are reported in the IPO papers submitted to the Tel Aviv stock exchange for the quarter prior to the IPO date and the prior year. Market capitalization of the firm (in millions of NIS) taken from the stock exchange daily trading data five days after the initial offer starts getting traded, not reported in the table are: quick ratio measured as the cash + cash equivalent assets divided by current liabilities, liabilities to capital measured as the firm's total liabilities divided by the capital invested in the firm, gross profit to assets which is measured as the firm's sales minus cost of goods sold divided by its assets. Industry dummies are according to TASE industry classification. To control for time effects of issuing we included dummy variables for the year of IPO.

VARIABLES	(1) First day return	(2) First day return	(3) First day return
Same group			-3.364***
			(0.741)
Business group firm		-1.917***	-1.794***
		(0.602)	(0.597)
IPO size	-0.0234***	-0.0226***	-0.0224***
	(0.00121)	(0.00125)	(0.00124)
Market cap	0.0103***	0.0106***	0.0106***
	(0.000459)	(0.000467)	(0.000465)
Observations	2,174	2,174	2,174
R-squared	0.178	0.181	0.182

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 8

Ultimate ownership and participation in an IPO

We measure the frequency of a fund participating in an IPO by constructing a set of all mutual funds that existed on any given IPO date and counting the number of IPOs in which they participated in each of the table cells, then dividing this number by the total IPOs in each cell. NBG is a nongroup owner, BG_i and BG_j are business group ownerships such that when BGj fund invests in BG_j firm we call that pair "same group." When BG_i invests in BG_j's IPO we refer to the observation as "different group."

		Ownership of firm issuing stock	
		NBG	**BG_j**
Ownership of mutual fund	**NBG**	13%	16%
	BG_i	17%	23% ("different group")
	BG_j	17%	31% ("same group")

Table 9

Ultimate ownership and the likelihood of participation in an IPO

Using a sample of all mutual funds that existed throughout the sample period, we model the likelihood of participating in an IPO. We model the likelihood based on financial ratios found to be significant in previous models; the market capitalization of the firm one week after the first trading day (in millions of NIS); the published investment policy of the fund (equity, bonds, or derivatives); the IPO's pre auction commitment success (over commitment takes the value 1 if the IPO had more demand than the appropriated 80% at the first stage, zero otherwise); and the size of the IPO in millions of NIS. We also include dummy variables to the identity of the fund's main owner (BG or non BG) and to the group main owner (BG or non BG). The variable "same" refers to the instances where the fund manager and the issuing firm belong to the same group. The model controls for industry and year fixed effect. Coefficients of the logistic regression are reported, standard errors in parenthesis.

EQUATION	VARIABLES	(1) participating	(2) participating	(3) participating	(4) participating
Participating	Same group				0.595***
					(0.220)
	bg firm			0.423***	0.290*
				(0.129)	(0.151)
	bg investor		-0.0962	-0.0864	-0.127
			(0.218)	(0.220)	(0.220)
	Liabilities to capital	-0.00359*	-0.00361*	-0.00405**	-0.00324*
		(0.00192)	(0.00192)	(0.00187)	(0.00190)
	Market cap	0.000637***	0.000635***	0.000551***	0.000512**
		(0.000230)	(0.000230)	(0.000213)	(0.000218)
	Equity fund	1.642***	1.635***	1.635***	1.638***
		(0.364)	(0.364)	(0.364)	(0.361)
	Bond fund	1.660***	1.655***	1.672***	1.666***
		(0.363)	(0.363)	(0.363)	(0.360)
	IPO size	0.000169	0.000174	-2.74e-06	9.72e-05
		(0.000453)	(0.000453)	(0.000430)	(0.000447)
	Constant	-4.419***	-4.324***	-4.369***	-4.301***
		(0.705)	(0.730)	(0.730)	(0.731)
	Industry controls	yes	yes	yes	yes
	Year controls	yes	yes	yes	yes
	Observations	5,069	5,069	5,069	5,069

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Fig. 1

Weight adjusted excess returns on IPOs

Returns on IPOs according to the three classes of stocks are reported. Returns are raw market adjusted returns, weighted by the market capitalization of the company five days after the IPO. Time is calendar days after the IPO. "Same group" is the return series for companies where mutual funds from the group invested in the IPO during the road show. "Different group" are IPOs originating from business groups with no financial intermediaries and "Non group" are IPOs of firms that do not belong to a business group.

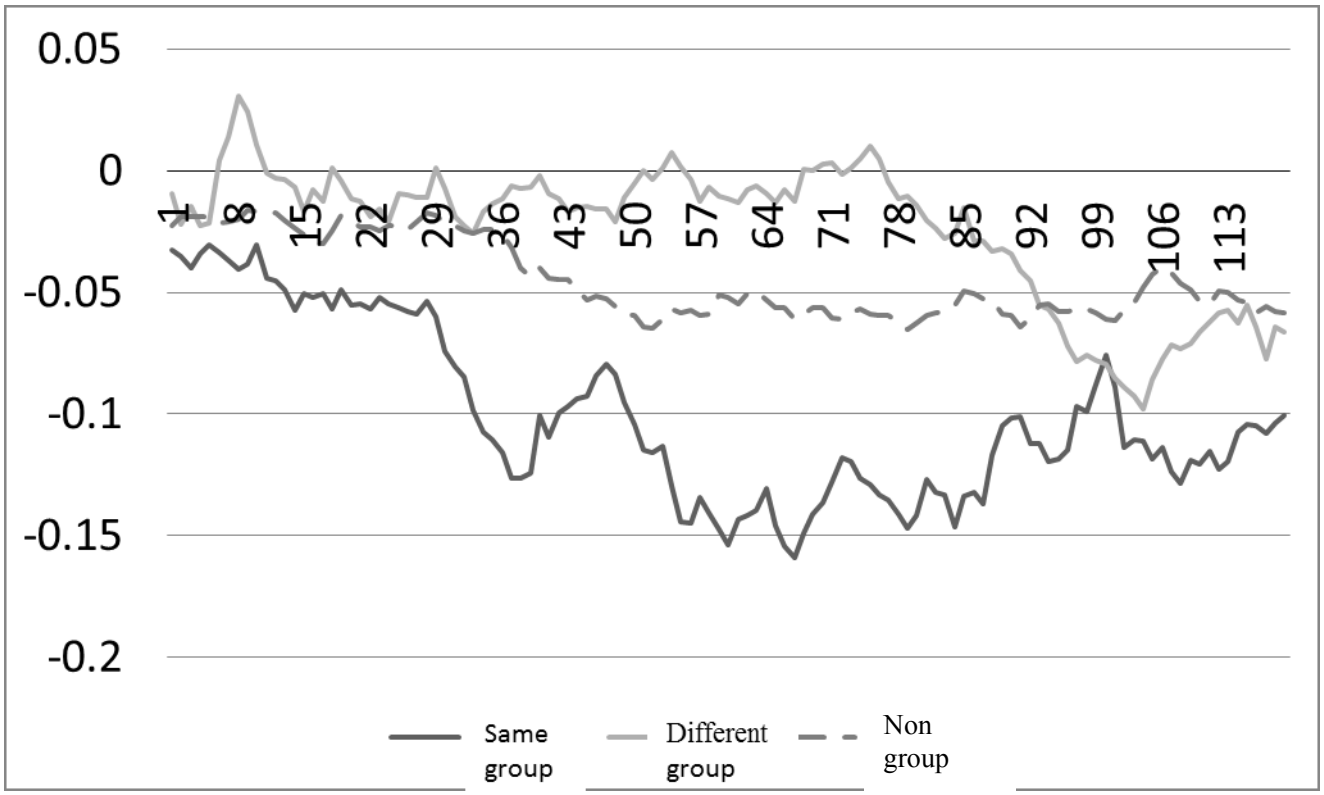
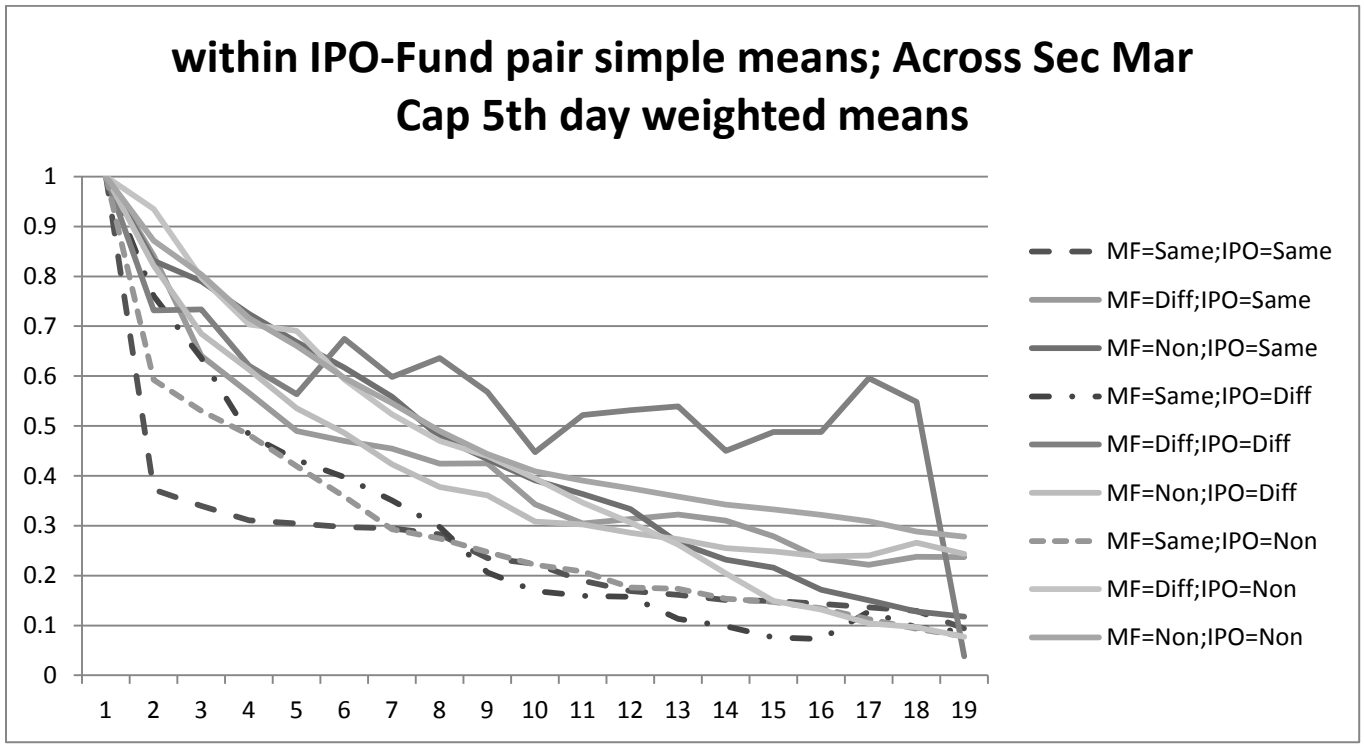


Fig. 2
Percentage Holding of Stocks Bought in an IPO

Holdings of mutual funds are taken from monthly portfolio reports to the Israeli Security Authority. Quantity of shares is tracked over 19 periods until all stocks that were bought in the IPO are sold across most IPO-fund combinations (where 1 is 100% of the shares bought during the auction and 0 means the fund owns no more shares of the firm). Firms are either classified as "same group" for the firms that belong to group with financial intermediaries," different group" for firms that belong to groups with no financial intermediaries, and "nongroup" for firms that don't belong to a business group. Mutual funds are classified in the same way. Days are calendar days. All holdings are weighted for the firm's market capitalization at the end of the first trading day. MF= Mutual fund, IPO= The firm going public.



Chapter 2: The Legitimacy of Corrupt Practices: Geography of Auditors Advice and Backdating of Stock Option Grants

This study looks at how unethical practices spread between organizations and finds that this diffusion depends on local geographical factors that facilitate the creation of clusters of bad behavior. I examine the spread of the use of stock option backdating among executives in the United States and identify one mechanism that drives geographic clustering of backdating through local legitimation of the unethical practice: advice from the local offices of external auditors. The likelihood that a company will start backdating depends on its ties to local offices of external auditors and on the level of exposure the auditor's office had to backdating in the past. The likelihood that a client of a local office of an audit company will adopt backdating increases even more as local competition between auditors increases. These findings shed light on the mechanisms through which the practice of backdating stock option grants became so pervasive in the U.S. economy. Due to the generic nature of backdating stock option grants as an illegal innovation and the central role of auditors in the ties between organizations, these findings are generalizable beyond the backdating case.

Introduction

The spread of ideas easily spans geographical boundaries since ideas have no physical attribute to bind their transport. Ideas that may be described as "unethical" innovations on the other hand, while still lacking material substance to slow-down their transport, must diffuse over non-traceable channels to avoid being caught and impeded. These channels are both spatially and temporally constrained. While we know much about the diffusion of practices and ideas, we know little about the diffusion of those practices that are executed by actors who wish to hide them. In the United States, an innovative illegal practice, the backdating of stock option grants[3] spread to almost one in three companies during the 1990s and early 2000s while remaining hidden from outsiders such as regulators, academics and the press. Illegal practices, despite being viewed as isolated "bad apples", diffuse, and their diffusion is a social process. The social structure in which backdating was introduced supported its rapid diffusion.

Economic sociologists have shown that such extensive diffusion of a practice as we observe in the case of backdating often depends on the legitimation processes for the practice and on the structure of ties between organizations to efficiently transmit the information. Legitimacy and efficiency in transmitting an idea are unlikely to occur for illegal practices since information on executing an illegal practice is unlikely to be shared, and legitimation mechanisms such as isomorphism require organizations to observe other players adopting the practice. It is unlikely that illegal practices diffuse through geography spanning, easily traceable channels. Unlike practices that are normatively acceptable, even when they are contested and diffuse through director ties (Davis 1991b), "broadcasting" (Rogers 1995, Strang and Soule

[3] Backdating of stock-option grants allows the receiver of the grant to avoid paying taxes on the portion of the grant that was awarded below the trading price of the stock. For the company, this portion does not have to be expensed, as the grants are reported to be given "at the money." This will be explained in detail later in the paper.

1998) and trends that result from observing others adopt the practice (Abrahamson 1991), illegal practices are inherently difficult to observe and received little explicit attention from researchers of organizations (Greve et al.,2010). An important clue as to the processes that drive the diffusion of illegal practices is the study of contested versus uncontested anti-takeover measures conducted by Davis (1991b). In this paper the author demonstrates that the diffusion of the more contested practice (golden parachute) is geography dependent, while the less contended practice (poison pill) diffuses through ties that span geographical distance. Geography also plays an important role in the diffusion of business "secrets" on investment targets and precedes social networks that span large geographical distance (Sorenson and Stuart 2001) but importantly, the factors that drive these geographical spillovers of exclusive knowledge, most prominently the mobility of employees (Almeida and Kogut 1999) and joint board appointments (Davis 1991a,b) are unlikely to occur for unethical practices conducted by executives; the market for CEO's of publically traded companies spans geographical distances and executive movements are not frequent enough (Murphy and Zabojnik 2007) to generate rapid diffusion of illegal practices. What drove the rapid and extensive diffusion of backdating? I propose in this paper that even in a highly connected corporate world evil travels by proximity; the same mechanisms that slow down the spread of backdating over geographical distance support the adoption of backdating within the local area, put more generally: the geographical boundaries of the diffusion of illegal practices facilitate the creation of clusters where bad behavior is legitimized.

Since the transfer of information on how to commit ethical violations requires great trust, this process is likely to happen in person, where interactions embody various aspects of personal trust. Local groups that interact with each other frequently can foster local norms (Entwisle et al. 1989, Rogers 1995) that diverge from the global norms that govern the behavior of their distant

peers. Direct personal contact and the creation of a local group's backdating norm may facilitate the emergence of geographic clusters of "bad behavior" in which the adoption of practices such as backdating is accelerated.

The mechanisms that drive organizations to adopt backdating are similar to those that govern the adoption of any practice, the perceived legitimacy of the practice, and its perceived "efficiency" in achieving its goal. Nonetheless, criminality is globally illegal and is unlikely to be perceived as legitimate, rendering many of the insights of the diffusion of innovation literature tangential to the diffusion of illegal innovations. The common approach in organizational sociology to answer questions of diffusion is to look at structural elements, such as the ties that connect the companies (Davis 1991a, O'Neill et al. 1998) and elements that are endogenous to the innovation itself, such as its social acceptance (Rogers 1995). These elements explain the diffusion of (normatively neutral) practices when examined at the global level, independent of geographical proximity (Davis 1991b, Davis and Greve 1997). However, when we seek to explain the diffusion of illegal innovations, we must examine these elements at the level where local norms may depart from deontological professional ethics and foster legitimacy for illegitimate actions. In this paper I look at local offices of audit companies, auditors that are highly connected to the firms that they audit, share geographic proximity with their clients and are trusted by company management with detailed and often sensitive information on company financials. Furthermore, by social construction, auditors provide legitimacy to accounting practices. These factors put the local office of an audit company in the position to provide both the information and know-how [the technology (Kogut and Zander 1992)] and the endorsement [the legitimacy (DiMaggio and Powell,1983)] for practices such as backdating. Therefore, in this paper I propose that the diffusion of backdating follows a geographically clustered pattern, where the mechanism for

diffusion is auditors' local offices in which norms of backdating are established. I show that the likelihood that a local office will allow backdating to proliferate among its clients is highly dependent on the auditor's past experience with backdating and on the level of competitive pressures the office experiences from other auditors. This suggests that gatekeepers such as auditors are vulnerable to competitive pressures that push them to allow their clients to adopt actions that should have been identified as illegal.

The contribution of this paper is threefold: First, the paper shows that geography bounds the diffusion of illegal practices on the one hand, but simultaneously fosters the creation of clusters where misconduct is legitimized. Second, I examine the structural mechanisms that facilitate the diffusion of such practices and point to the dual role of auditors as providers not only of information, but also of legitimacy to questionable accounting practices. Finally, this paper demonstrates that competition between gatekeepers can be a driving force for the diffusion and adoption of illegal practices among organizations.

The backdating of stock option grants

The simplest definition of backdating can be found in the "investorpedia" online knowledgebase, where it is defined as:

> . . . the process of granting an option that is dated prior to the date that the company granted that option. In this way, the exercise price of the granted option can be set at a lower price than that of the company's stock at the granting date. This process makes the granted option in-the-money and of value to the holder (investorpedia.com).

Backdating involves corporate executives manipulating the date of the stock option grant to accommodate a date on which the stock price was more favorable. The Securities and Exchange Commission (SEC) deemed the practice illegal, mainly for tax reasons. If stock option grants are reported as though they were issued, at the money, at a lower price than their price at the date they were actually assigned, then the holder pays taxes only on the realized gains which include a portion that was essentially assigned when the stock price was higher than reported. Shareholders also suffer from this practice since stock option grants that are given at a price lower than the trading price of the stock must be acknowledged as expenses in the company's financial reports. Backdating of stock option grants is also an accounting violation since companies are required to report the "fair value" of the stock options granted in their annual financial reports. In the case of backdating, these options were reported at a fair value of zero where in fact their value was positive ("in the money"), and often large.

Academics indentified irregularities with stock option grants early on but, interestingly, did not attribute them to direct (illegal) manipulation of the date at which the grants were assigned. Yermack (1997) finds abnormal returns following stock option grants to executives. He explains this phenomenon by the ability of managers to time the announcement of good news to immediately follow stock option grants, reaping, in the process, the benefits of being exposed to the information earlier than the markets were. Lie (2005) examines the trend of these "lucky grants" over time and what portion of the abnormally lucky grants were reported to the SEC in a timely manner (within two days of the option grant being given), and, together with Heron (2007), looked at what portion was reported late (Heron and Lie,2007, Lie,2005). Lie and colleagues published several papers on the effectiveness of and the countermeasures to backdating, such as the SOX legislation and market discipline (Carow et al.,2009, Heron et

al.,2007). Lie notes that during the late 1990s and early 2000s, more grants became "lucky grants" over time and, in Heron and Lie (2007), also notes that the majority of these lucky grants were reported to the SEC several days and sometimes several weeks after the grants were given. This led Lie to conclude that "[u]nless executives possess an extraordinary ability to forecast the future marketwide movements that drive these predicted returns, the results suggest that at least some of the awards are timed retroactively" (Lie, 2005 p. 1). In subsequent papers Heron and Lie measure the extent of backdating and asserted that, by 2005, the practice had spread to over one third of the stock-option-granting companies in the U.S. (Heron and Lie,2009).

In one of the few times that an academic paper led to quick subsequent prosecution, shortly after Lie's work was published in the academic journal *Management Science*, two reporters from the *Wall Street Journal* exposed the practices (Forelle and Bandler,2006), which led the SEC to quickly initiate a wide investigation into the practice of stock option backdating. According to the *Wall Street Journal*, as of late 2007, 141 companies had been investigated for backdating, and most of them received punitive actions from the SEC (WSJ online,2007). Jacob (Kobi) Alexander, the CEO and co-founder of Comverse Technology, Inc., an S&P 500 company at the time, fled to Nigeria shortly after being summoned for investigation. He has been sought by the FBI and Interpol since then (Creswell,2006).

Intriguingly, backdating had spread across hundreds and, according to some accounts, thousands of organizations, executives and directors over more than a decade before it was identified by academics who study the structure of executive compensations or by the SEC, Justice Department and shareholders. Backdating practices remained hidden from outsiders while proliferating throughout corporations in the U.S.

The extent of stock option backdating and allegations of auditor involvement

By 2005, the backdating of stock option grants was a widespread phenomenon. Research estimates that by the time the media exposed backdating in early 2006, almost one in every three stock-option-granting public companies in the U.S. had engaged at least once in manipulating the timing of stock option grants (Heron and Lie,2009). Figure 1 shows the number of companies that never backdated and the number of companies that adopted the practice for each year from 1996 to 2005. The fraction of companies that learned how to backdate increased from eight percent to 32 percent within nine years.

---- insert figure 1 about here ---

The media have suggested that auditors took part in promoting backdating schemes early on. As reported in Heron and Lie (2009), several auditors were sued by their clients for advising them inappropriately on backdating and, in some cases, for "signing off" on the practice explicitly. Recently, the U.S. 9th Circuit Court of Appeals in San Francisco reinstated a class-action lawsuit filed against Ernst & Young regarding their involvement in the backdating of stock option grants to executives at Broadcom, Inc. (William,2011). Each of the big four auditors was accused of being involved in backdating, and similar lawsuits were filed against PwC, Deloitte & Touch and KPMG. On October 15, 2007, CFO.com reporter Sarah Johnson reported on the lawsuit against HP's subsidiary Mercury Inc.:

> In their complaint against Mercury, shareholders of the company named those executives, along with three directors and auditor PricewaterhouseCoopers as defendants. They accused Mercury of lacking effective internal controls, filing

> false and misleading financials, and allowing the misdating of stock option grants to occur 54 times.
>
> PwC is accused of knowing about Mercury's "ineffective" controls and knew that misleading information was being shared with investors but did nothing about it.

Reuters followed reports on companies accusing their auditors of knowing about the use of backdating for stock option grants. Tim McLaughlin reported on July 3, 2007:

> A former top executive accused of manipulating stock options at Engineered Support Systems Inc. (ESSI) says outside auditor PricewaterhouseCoopers knew about backdating at the defense contractor, according to court papers filed this week.

Harsher allegations were reported in a June 26, 2006 *Wall Street Journal* article titled "Backdating Woes Beg Question of Auditors' Role." David Reilly reported on explicit allegations against one auditing firm for advising its clients to backdate stock option grants:

> All of the Big Four accounting firms—PricewaterhouseCoopers LLP, Deloitte & Touche LLP, KPMG LLP and Ernst & Young LLP—have had clients implicated. None of these top accounting firms apparently spotted anything wrong at the companies involved. One firm, Deloitte & Touche, has been directly accused of wrongdoing in relation to options backdating. A former client, Micrel Inc., has

> sued the firm in state court in California for its alleged blessing of a variation of backdating. Deloitte is fighting that suit. . . .
>
> . . . "The thing I think that is more problematic is there have been some allegations that auditors knew about this and counseled their clients to do it," said Joseph Carcello, director of research for the corporate-governance center at the University of Tennessee. "If that turns out to be true, they will have problems."

Although early research on backdating does not explicitly control for auditor effects, several recent papers published in Finance addressed the role of auditors in the practice of stock option backdating. Heron and Lie (2009) find that out of the big four auditors (their sample of auditors starts in 2000, so they exclude Arthur Andersen from the analysis), PricewaterhouseCoopers and KPMG are associated with lower incidences of companies having a positive return difference post stock option grants. They also find that smaller auditors are associated with a higher fraction of backdating firms than any of the big five auditors. Bizjak, Lemmon and Whitby (2009) note that auditors have a significant fixed effect beyond director ties in a diffusion setting, where companies are excluded from the sample after the first instance of backdating. These papers treat audit companies as a unified entity, capturing in the process any audit-firm-specific fixed effect. Economic sociology suggests that the adoption of norms that violate ethical guidelines occurs in small cohesive groups rather than in large organizations, a fact that would facilitate the shrouding of the practice from outsiders. I explore this effect directly by allowing for heterogeneous effects for the local offices of each audit company, and comparing the effect to the fixed effect of the audit company. Allowing for heterogeneity

between local offices facilitates the examination of this phenomenon at the local-auditor-office level, where the local norms may diverge from deontological ethics, but auditors still enjoy legitimacy as a reflection of their membership in a large, reputable audit firm. These reputation considerations play a key role in the accounting and economics research in deterring auditors from aiding companies in performing unethical practices. The next section will briefly review how Strategy research on franchising may explain why this assumption does not hold for all local offices.

Auditor independence and auditor reputation

The value of auditing services depends on the assumption of auditor independence. This is characterized in the accounting literature as the fundamental assumption on which auditors can operate as gatekeepers in financial markets (Shockley,1981). Auditors are trusted with enhancing the credibility of financial statements, such that they provide a true and fair view in accordance with the chosen accounting standards. Accounting research has noted that the assumption of independence does not hold and that auditors have relationships of varying strength with their clients. Those relationships depend on factors both intrinsic to the auditing company, such as size, and extrinsic, such as competition between auditing firms, the tenure of the audit and the non-audit services provided to the audited firm (such as management consulting) (Ashbaugh et al.,2003, Johnson et al.,2002, Shockley,1981).

External auditors are motivated to perform their function by contractual agreements, threat of legal liability (Narayanan,1994) and concerns about maintaining their reputation (Firth,1990). Several accounting, finance and management scholars have tested the reputational

costs of deviance for financial firms (Jonsson et al.,2009), and specifically for audit firms in empirical settings. They have found that the cost of a compromised reputation affects not only the auditors, but also, through market reaction, the companies audited by auditors with compromised reputations (Chaney and Philipich,2002, Krishnamurthy et al.,2006).

Research has also tested the costs and benefits of reputation to auditors in experimental settings. In such designs, participants often are assigned to the role of managers or auditors who interact repeatedly through a "market" for auditing services. Auditors can invest a sunk cost into building their reputation as high-quality auditors, which will later determine the likelihood that they would be hired by the company (e.g., (Corona and Randhawa,2010)). Generally, these papers find that, under certain plausible conditions, once the investment in reputation-building is made, it is unlikely that auditors will intentionally not report fraud when it is committed.

While these findings hold in the settings in which they were tested, they do not tell the complete story. Research in Strategy identified that, at the local level, actors may free ride on brand reputation (Brickley et al.,1991, Kidwell et al.,2007). Yet, for auditors, both the empirical literature and the experimental designs do not differentiate between the global reputation of the auditor and the incentives given at the local level. In experiments, when auditors invest in building their reputation, they do so at the individual level. In the empirical settings, when a cost of violating this role is incurred, the cost is measured at the auditing-firm level. Research on reputational costs and benefits has been conducted either at the individual level or at the audit-company level, but has never allowed for divergence of incentives to violate the good reputation (at the local level) from the incentives to maintain it (at the audit-company level). The literature has not accounted for the fact that any one of the hundreds of local offices of the big five

auditors may just as easily have viewed reputation as a collective good, but faced private monetary and social incentives to foster norms that very nearly violate that reputation.

Individual auditors and the managers of publicly-traded organizations spend long periods of time with each other during the preparation of annual reports. Their interaction is extended, repeated and substantive, thus creating the basis for strong social ties to emerge and be nurtured. Accounting research has noted that prolonged interactions may cause auditors to depart from their expected independence, and measures such as rotating auditors every few years to avoid this problem have been discussed over several decades (Gietzmann and Sen,2002, Winters,1976). Yet the length of time that an audit company is engaged with a client ("auditor tenure") is important for efficiency reasons.

I interviewed several auditors who emphasized their social relations with company management. According to one auditor, the relationship of external auditors to company management is substantially different from that of the internal auditors who report to the board of directors and may explain auditors' actions that favor the CEO at the expense of shareholders:

Unlike internal auditors [who are hired by the board], external auditors are hired by the CEO and the CFO. We have a relationship with them. It wouldn't surprise me if some auditors, for example, take a more active role in advising CEOs on how to maximize the value of their option grants. (Interview with a former KPMG auditor, April 18, 2011, NJ)

Another auditor that I interviewed emphasized the importance of personal relationships with clients and the fostering of this relationship by the clients themselves:

I had one major client, a large law firm based in New York. The relationship with them never crossed office boundaries but, regardless, I remember the people there very fondly. During the preparation of the reports, I spent most of my time in their office sitting with their staff on the books. They were great people, even brought cake for me on my birthday. (Interview with a former Ernst and Young auditor, May 25, 2011, NY)

It is important to note that not only do auditors have a relationship with the management of the audited companies, but they also are extensively tied to corporations in the United States. This fact, coupled with their role as providers of legitimacy to accounting practices, fosters potential rapid diffusion of practices that the auditors transmit to company management. Since prima facie organizations are unlikely to knowingly adopt illegal practices that can potentially lead to disastrous outcomes, the legitimizing of a practice is even more important for the diffusion of ethical violations than it is for the diffusion of "neutral" practices.

The role of legitimacy in the diffusion of innovative practices

A core proposition in organizational theory is that, independent of efficiency concerns, the adoption of practices depends on the legitimacy assigned to them by the adopter (Meyer and Rowan,1977, O'Neill et al.,1998). The institutional perspective often emphasizes the role of such social factors as mimetic pressures (Chan and Makino,2007, Haveman,1993, Tolbert and Zucker,1983), coercive pressures and the emergence of common practices over time.

Tolbert and Zucker (1983) show that the diffusion of civil service reforms between U.S. cities in the late 1900s was accelerated when the practice was legitimized by the endorsement of powerful actors. Westphal et al. (1997) show that legitimacy has a dramatic effect on the

adoption of management practices. Using a sample of 2,700 U.S. firms, they show that beyond the network ties, the normative conformity to "Total Quality Management" (TQM) practices pushes organizations to adopt the practice faster and faster, to the point where organizations that adopt TQM suffer losses as a result of implementing the practice. Abrahamson (1991) shows that management practices have the same pattern of adoption identified later in Westphal et al. (1997) This pattern of adoption starts with a few organizations that benefit from the practice, but as the innovation gains legitimacy, more and more organizations start to adopt it. The catalyzing effect of legitimacy is not limited to the realm of management practices or to manufacturing organizations. In Strategy research, Chan and Makino (2007), using legitimacy considerations, explain the adoption of mode of entry of firms to new international markets. O'Neill et al. (1998) generalize the diffusion process to the entire universe of innovative strategies adopted by firms and offer a descriptive account of the pattern of diffusion, whereby adoption is dependent largely on factors related to legitimacy rather than to efficiency concerns.

These extended accounts of diffusion do not intuitively lend themselves to the diffusion of practices that are, by their very nature, shrouded from the environment. To the extent that firms are exposed to unethical practices, we expect those practices to be adopted despite their illegitimate nature, on the basis of their expected "efficiency" in providing benefits to the firm. Although institutional theory would predict a slow adoption of unethical practices, in the adoption of backdating, research have documented quick adoption of stock option backdating across organizations. By the time backdating was unveiled in Heron's (2005) paper and the ensuing media coverage, one in three stock-option-granting firms in the U.S. had issued grants suspected of time manipulations (Bizjak et al.,2009, Heron and Lie,2009). Figure 2 shows the size of the firms assigning highly suspicious stock option grants over time, measured as the

natural logarithm of the firm's assets as reported in the annual financial statements at the time of adopting backdating. As the figure of adoption shows, the trend is similar to the adoption of legitimized innovation, starting with smaller companies and expanding to larger companies where, on average, both the efficiency is reduced (stock volatility and, hence, the gains that can be achieved from backdating) and the cost of being caught increases.

---- insert figure 2 about here ---

Legitimizing processes that were identified in the literature are absent for illegal practices, yet auditors hold both the roles of transmitters of information and agents of legitimization, and, in the absence of observable adopters, they can provide legitimacy to the illegal innovation. Occupying this unique position, auditors do not need to engage in overly explicit action. The information they transfer already embeds approval of the practice and, thus, may have a greater effect on the likelihood of adoption than if this information were provided by an actor with no legitimizing role.

Data and analysis

Methods for identifying backdated stock option grants

Several methods were used to identify backdating following Yermack's 1997 paper and Lie's 2005 paper. The methods were generally adapted to accommodate the variable of interest. For example, Heron and Lie (2009) try to assess what fraction of stock option grants was backdated. For this, they use a method that does not identify individual suspected grants, but, instead, the number of grants that deviate from what would be expected under random grant assignments.

Bebchuk, Grinstein and Peyer (2010) look at directors' involvement and, thus, require a clear identifier of a backdated grant. They use the lowest-price date in a calendar month. Bizjak, Lemmon and Whitby (2009) look at director ties and implement a diffusion model; to accomplish this, they proxy backdating using comparison to random grants. First, they compose a theoretical "standard" return window by simulating random grant days for all option-granting companies; then, they contrast the empirical returns with the simulated ones at three levels and call each grant that is above the 90-, 95- and 99-percent confidence interval of the simulated sample "backdated." Finally, several papers look at a combination of return difference across a given time window (usually +-20 days) and the lowest return decile in a calendar year (Bebchuk et al.,2010, Fleischer,2006, Heron and Lie,2009). Since throughout the period, regulatory constraints prevented managers from looking backward more than a calendar month, I use the method described in Bebchuk et. al (2010) for the analysis. As reported in the robustness test, the results hold for the "return difference" methods.

Data sources and construction of the backdated grant variable

I follow previous research in constructing the sample of companies that have suspicious timing of stock option grants. I gather all stock option grants from January 1996 to December 2001 from Thomson Reuters Insider Trading. The data include the filings of forms 3, 4, 5 and 144 submitted to the SEC by the company. The forms describe, among other things, the number, time and price of stock option grants to executives and directors in the company. In constructing the data, I use a cleansing procedure similar to that used by prior research (Bebchuk, Grinstein and Peyer,2010, Bizjak, Lemmon and Whitby,2009, Heron and Lie,2009). I include only

observations for which Thomson Reuters indicates that the data were "verified through the cleansing process," "cleansed with a very high level of confidence" or "added to nonderivative table in order to correspond with record on the opposing table." I do not include data for which Thomson Reuters had a lower level of confidence in its quality. I also eliminate grants that appear to be scheduled—i.e., grants that are assigned at the same date in two or more consecutive years (Heron and Lie,2007).

I use only at-the-money grants for the analysis. I combine all grants by the same company on the same date and at the same price into one observation. For each stock in the sample, I collect the closing stock price data from CRSP and match the stock grant day to the CRSP stock price date. To verify that the date of the stock option grant is accurate, I follow Heron and Lie (2007) and check that the assigned strike price of the grant is the stock price at the day of the grant. If the price is close to, but not exactly, the price of the grant on that date, I check a +-1 day window, and if the price is closer to the price on one of those days, I assign the grant to that day.

The complete sample includes 92,101 grants given to 32,068 individuals in 6,285 companies over a nine-year period. The vast majority, 57,922 grants, were given to directors; 25,745 were given to CEOs, Chairmen, and Presidents of the board; and 8,434 were given to Chief Financial Officers. I group the CEO, Chairman and President indicators and refer to any of those as the CEO, as in (Bebchuk, Grinstein and Peyer,2010, Heron and Lie,2007, Narayanan and Seyhun,2008). In the majority of cases, the position is occupied by the same person.

I use two methods to identify grant dates that are suspicious for manipulation. First, similar to Bebchuk, Grinstein and Peyer (2010) and to Heron and Lie (2009), I check whether the

grant was given at the lowest stock price date within a given window (a +-20 day window or a calendar month).

--- insert figure 3a about here ---

This method is restrictive. Sophisticated backdaters might be deterred from assigning the grants at the lowest possible price date. To create a continuous variable assigning a likelihood of backdating as the grant date becomes more suspicious, I adapt Bizjak et al. (2009) and Heron and Lie's (2009) main method in the following way: First, I calculate the return difference from the beginning of the event window (20 days prior to the grant) to the grant date and the return from the grant date to the end of the event window. I then subtract the return post-grant from the return prior to the grant (see Figure 3b).

--- insert figure 3b about here ---

The resulting number should be close to zero if grants are assigned randomly. I use a higher cutoff, as in most of the research on backdating (Bizjak, Lemmon and Whitby,2009). I sample 100,000 random grant dates for the companies in the dataset, calculate the 95-percent confidence interval on those dates, and call any grant given at a date that produces a higher return difference a suspicious grant. As the return difference increases, the grant becomes more suspicious.

The geographical clustering of backdating

To model the geographical clustering of backdating, I matched each company's headquarters to longitude and latitude coordinates using the reports on the city and state in which the headquarters are located, and achieve a 92-percent match for all companies in the sample of

grants from 1996 to 2005. I then plotted the locations of the headquarters on a map of the continental U.S. The locations are shown in Figure 5.

--- insert figure 4 about here ---

Blue dots correspond to corporations that did not backdate and red dots represent corporate headquarters that backdated at least once during the period between 1996 and 2005. I then used geographical matching on the 1990 historical county borders map to compose a map on which, for each county, I can plot the average number of companies that backdated. This process allows me to use the "hot spot analysis" method to model any geographic correlation of an event, in this case the rate of backdating in the county. The statistic, expressed as $G_i^* = \frac{\sum_j w_{ij}(d)x_j}{\sum_j x_j}$ requires a weighing matrix w for the extent (weight) by which one company may affect another company given its geographical distance. To create this weighting matrix, I ran a procedure assessing the significance of geographical clustering at intervals of 40km from the focal companies that are represented on the diagonal of the matrix w[4]. This procedure yielded a series of z scores for each interval, which peaked at 120km and 500km. I chose the higher value, 500km to create a zone within which company i has a weight of 1 on company j, beyond that distance, the weight of the company's influence decreases exponentially with the distance from the focal company.

The results of the hot spot analysis are reported in Figure 5. In the areas highlighted in red, there are high frequencies of backdating at a significant geographical clustering ($p<0.01$). Areas in lighter red are significant at the $p<0.05$ level. Yellow areas are not significant and green areas are associated with significantly less backdating in the model.

[4] The choice of 40km as the interval was not arbitrary, the average nearest neighbor to a focal city in the sample was 40km.

--- insert figure 5 about here ---

This geographical clustering can be the result of several aspects that may generate such tightly clustered patterns and be collinear with backdating. One such example would be industry clusters. Companies cluster by industry for reasons that are exogenous to backdating. Since we know that backdating was prominent in specific industries (Heron, Lie and Perry,2007), this, by itself, may lead to geographical clustering. Other factors may also drive the observed "hot spots" of backdaters, such as the sharing of information in channels that correspond with geographical locations such as clubs.

The big five auditing companies have hundreds of offices spread across the U.S. Those offices correspond to specific geographical regions in which the audited companies also reside, largely independent of industry clusters and of other channels of information sharing among executives. In most cases, a company in New York City would be audited by auditors from the NYC office and not by auditors from San Francisco, for example. In the next section, I will model the effect of geographical clustering using the clustering of auditors in the same locations. First, I will look at the effects of the familiarity of the local office with backdating; then assess the effect of competition between auditors in a given region on the likelihood that companies will start backdating; and finally contrast the importance of local offices with the global audit firm effect in explaining the diffusion of backdating.

Modeling the auditor variables

In the following sections, I restrict the sample to the years 1996-2001 to include Arthur Andersen, which was dissolved following the Enron scandal in 2002, and include only companies audited by the big five audit firms. Auditors' main effects are included in the

modeling of backdating (Bizjak, Lemmon and Whitby,2009). Since the sample includes only companies audited by one of the big five audit firms, this could be interpreted as the marginal contribution of the auditor main effect belonging to one of the large auditing firms and not to another. A positive and significant effect would suggest that the audit firms' local offices were more likely to facilitate the spread of the practice compared to other audit firms. No publicly-traded company is unaudited, so it is impossible to include a comparison sample of unaudited companies. I model the auditor's involvement as two distinct effects. First, I include a variable to capture the auditor's main effect, representing the auditing procedures and emphasis on different aspects by different auditors, as well as any global auditor reputation effect. Second, I include a measure of the likelihood that an auditor knows about the backdating practice. This is proxied by the number of backdating companies audited by the auditor in the previous year such that

$$(\text{backdating under auditor}_{\text{t}-1}) = \sum_{t-2}^{t-1} backdating_{izt}$$

for auditor *i* in geographical location (national, state or city level) *z* at time *t*. I modify the geographical parameters to represent the national, the state or the city level. As the number of companies backdating under an auditor in the previous year increases, so does the likelihood that the auditor is aware of the practice. Since not all auditors' local offices have the same number of companies as clients, I run the analysis using the fraction of companies that backdated at t-1 by dividing the number of backdaters in the local office by the number of companies that office is auditing in the year t-1.

$$((fraction\ of\ companies\ backdating) \quad = \frac{\sum_{t-2}^{t-1} backdating_{izt}}{\sum_{t-2}^{t-1} companies_{izt}})$$

The findings are reported at the auditors' local office at the city level and include the full state- and national-level models. The significance of the auditor lag variable increases as the geographical location narrows at the city level.

I test the auditor's role as an enabler in the diffusion of backdating knowledge. To model this role, I exclude a firm from the risk set of companies that can adopt backdating once a company's stock option grant that is assigned at a date that is unlikely to occur at random. Table 1 shows the number of new companies learning to assign grants at extremely opportunistic times, which suggests that these grants timings were manipulated. Grants are identified as manipulated if they were assigned at the lowest price day of a month.

--- insert table 1 about here ---

Random assignment of grants will result in this number being around five percent of the companies (with replacement) since there are, on average, 21 trading days in a month. The realized number of grants assigned at the lowest price date is larger than random, as can be seen in Figure 6. As noted in the previous literature, the majority of grants assigned at highly suspicious times are likely to be backdated (Heron and Lie,2007).

--- insert figure 6 about here ---

Even using the most restrictive method for identifying backdated stock option grants, we still see wide adoption of backdating by executives in U.S. companies. As Table 1 shows, hundreds of organizations adopted backdating every year. Although not intended to tackle the issue directly, Sarbanes Oxley slowed down the adoption of this practice, both by deterring organizations from committing unethical practices and by restricting the ability to report stock option grants more than a few days after they were granted.

To model the adoption of backdating as a diffusion process I first use a linear measure of luckiness adapted from (Heron and Lie,2007) and use a tobit model specification. First, in a way similar to (Heron and Lie,2007), I take all grants given by firm *i* at time *t* and calculate the return difference in a 40 day window around those grants $Return\_diff = (rt_{t-20,t}) - (rt_{t,t+20})$ This method allows me to retain the variance in the "luckiness" of the stock option grant, whereby a grant given at a date that represents a 25-percent positive return difference is not as lucky as a grant given at a more favorable date, yielding a 50-percent return difference. Clearly, executives will not backdate to a date at which the return difference is negative, but it is just as unlikely that executives will backdate to a point in time where the return difference is small. To find a theoretical threshold of unlikely "lucky" return differences, I simulate 100,000 random grant dates for all the companies in the dataset and calculate the return difference on those. I take the 95-percent confidence interval *c* on those returns, such that the dependent variable takes the form

$$y_{i,t} = \begin{cases} y^*_{i,t} \; if \; y^*_{i,t} > c \\ 0 \; if \; y^*_{i,t} \leq c \end{cases}$$

I then model the "luckiness" of the grant timing as a linear measure for any value that exceeds the 95-percent confidence interval on random assignment of grants.[5] Note that the variable representing auditor knowledge is lagged to one year prior to the assignment of the stock option grant. I modulate the variable *z* to represent each of the three geographical areas: national, state or city.

[5] Alternatively, we assign a 1 value to the stock option grant and call it "backdated." The results of this model are qualitatively similar.

The results of the tobit specification[6] are reported in Table 4. I include stock volatility, size, industry and year as the controls for other factors affecting the likelihood of backdating. I also include controls for time varying factors for each audit company by interacting the auditor variable with the year variable. The control variables are significant and absorb much of the variation in the return difference due to factors other than time manipulation.

We report the findings at the city level in such a way that the auditor's lag variable captures the proportion of companies with suspicious grant dates audited by the auditor's local office. To the extent that a single city has more than one office for the same auditing firm, these are collapsed to one observation. In model 1, I do not include the lagged variable measuring the auditor's past experience with backdating; when I include this in models 2 and 3, the observations for 1996 are dropped due to the lack of history of backdating for those auditors. Similarly, observations of companies that did not exist in time t (newly-issued companies, for example) are also dropped for time t. For all the models at the city level I exclude locations where there are less than two companies or less than two auditors as those would over-estimate the significance of the ties to the auditors when these companies start backdating.

--- insert table 2 about here ---

The Tobit model can be interpreted as capturing (a) the effect of being audited by auditor *i* on the "luckiness" of the grant timing; and (b) the effect of the auditor *i*'s knowledge of timing manipulation on the "luckiness" of the grant timing. To the extent that the lagged *"auditor knowledge"* variable captures the likelihood that the auditors in the local office know about backdating, the positive and significant coefficient on the lag variable suggests that auditors were part of the transmission mechanism of the knowledge of backdating to their clients.

[6] We wish to thank Casey Ichniowski for suggesting this model.

Under the tobit specification, at the city level, there is no global significant difference between the big five audit companies in the adoption of backdating. When the excluded category is Deloitte, we can see that companies audited by Ernst & Young's local offices enjoy a 5.93-percent higher return difference when assigning stock option grants, and this finding is marginally significant ($p<0.1$). The auditor knowledge variable reveals a more attenuated effect. If some offices of some auditors were involved in the diffusion of the information on backdating, we should expect to find a correlation between the knowledge an office has of backdating at t-1 and the current luckiness of grant assignments. For companies audited by Arthur Andersen's local offices, I find that when approaching the state where all but one of the auditor's clients backdated in the previous year, the marginal "non-backdater" experiences 8.5-percent better return on its stock option grants in the following year ($p<0.1$). The auditor lagged knowledge variable takes on values from 0 to 1, and the tobit specification truncates the observations at 20-percent positive return difference, representing grants that are up to 8.5-percent luckier than this 95-percent confidence interval (28.5 percent return difference), which are grants that are luckier than 99 percent of the random grants. For PwC, I find a positive local-office effect of 10.8 percent per company that backdated under that local office in the previous year. The knowledge of local offices of Ernst & Young at time t-1 increases the returns of its clients by up to 15 percent ($p<0.01$) ("luckier" than 99.9 percent of the random grants); this value is 9.9 percent for Deloitte ($p<0.1$).

Together, these results suggest that under the specification identified by Heron and Lie's "return difference" method, there is no significant difference between auditing firms at the brand level yet at the local-office level, the more familiar the auditors are with backdating, the more

likely it is that their clients will achieve highly opportunistic timings on their stock option grants. This finding holds for all auditors except KPMG.

Since the return-difference method does not identify the same grants as the "lowest price date" method does, I also test the auditor effect using this identification method (used by Bebchuk, Grinstein & Peyer (2010)). I run a logistic model in which I test the same set of variables for grants identified as backdated if they were granted on the lowest price date of a calendar month.

$$y_{i,t} = \begin{cases} 1 \; if \; y^*_{i,t} = lowest \; day \; in \; the \; calendar \; month \\ 0 \; if \; y^*_{i,t} \neq lowest \; day \; in \; the \; calendar \; month \end{cases}$$

The results of the logistic model are qualitatively similar to the results of the Tobit specification. The likelihood that a company will backdate, given that its auditor's local office was exposed to backdating, goes up for some auditors but remains insignificant for others. I report the results for small auditors' main effect in these models as a robustness test; this adds 2000 observations to the models.

--- insert table 3 about here ---

The models replicate the findings of Heron and Lie (2007) and other scholars who studied backdating (Bebchuk, Grinstein and Peyer,2010, Bizjak, Lemmon and Whitby,2009, Narayanan et al.,2007), showing that a company's stock volatility has a positive effect on the likelihood of adopting backdating, and that the size of the company (measured as the natural log of the companies reported assets) has a negative effect. When I model the auditor knowledge variable as the number of companies that backdated in the previous year (as opposed to the proportion of backdating clients out of all clients) across all auditors' local offices, for every

company that backdated at t-1, the likelihood that companies would start backdating at time t decreases by 5.6 percent ($p<0.01$). Although this is true across auditors, this effect is comprised of some offices that diffuse the information on backdating and some that prevent it. When I include the full specification indicating which audit company the office belongs to, I find that the offices of Arthur Andersen and of PwC are associated with, respectively, a four- and 5.3-percent increase in the likelihood of backdating for every company that backdated at t-1 ($p<0.01$).

I show, using two identification methods and two ways to model auditor knowledge, that an auditor's past experience with backdating is associated with an increased likelihood that its clients will adopt this practice in the immediate future (within one year). This represents a robustness test not only for the method of identification (return-difference compared to the lowest day in a calendar month) and for the sample identified, but also for modeling the auditor-knowledge variable. The robustness of the results across the methods leads to the conclusion that auditors' local offices were more involved with the spread of backdating among their clients than previously suggested.

Competition between local offices of auditors

Auditors experience variying levels of competition across geographical locations. In some areas, the market is nearly equally divided among all of the other audit companies, and few auditors enjoy relative dominance. These competitive pressures may result in incentives to diffuse practices that benefit the executives at the expense of their investors. Similar to the knowledge variable, the intensity of competition variable should be most effective at the local-office level,

where local norms are established and incentives to assist clients overshadow global considerations such as reputation.

To capture the level of comeptition in a geographic region, I use the inverse of the Herfindel-Hirshman index, which is used to represent market concentration. I include all audito companies in the region to calculate the competition variable, small auditors as well as the big 5. The variable "competition," therefore, runs from -0.08 (very competitive) to -1 (very concentrated). In Table 4, I incorporate the level of competition into the Tobit model introduced earlier.

--- insert table 4 about here ---

Competitive pressure is a highly significant variable in the model. Clients of auditors in offices that experience intense competition enjoy higher returns on their stock option grants, significantly over and above the 95-percent confidence interval ($p<0.001$) and significantly over and above their peer companies in areas where there is little competition between auditors. This finding sheds light on one factor that may drive auditors' local offices to heterogeneously promote different practices across geographic locations. Again, this finding holds at the city level but is not significant at the national level.

Local vs. Global effects in the diffusion of backdating

I find that local offices of auditors facilitate the diffusion of backdating. This effect is larger and more significant the closer we the unit of analysis comes to the geographical unit that represents the auditor's local office or team. In this section I model the auditor's role where we calculate the auditor lag variable $\text{auditor lag} = \sum_{t-2}^{t-1} \text{backdating}_{izt}$ such that we aggregate the backdaters in

the previous year at the national level, the state level, and the city level. I report the relative size of the coefficients on each model in figures 6a-6c.

Geography may drive the diffusion of unethical practices in channels other than contact with an auditor who possesses the knowledge of how to backdate. Executives may share positions in local community organizations, nonprofits, and charity associations; their children may attend the same schools; etc. Local channels can drive the diffusion of backdating over and above the local auditing office. I include, for each model, the number of companies that backdated in the same geographical area in the previous year, such that:

$$\text{number of backdaters in area} = \sum_{t-2}^{t-1} \text{backdating}_{zt}$$

where z represents the geographical area (national-, state-, or city-level). This specification includes the variable $[\text{number of companies backdating in area}]_{t-1,z}$, also reported in figure 6b to capture any effect of geography beyond that of local offices of the auditors. This variable takes on a positive, statistically significant sign at the city level. Auditor fixed effect captures global characteristics of auditing companies. These charectaristics have a larger effect at the national level but when measured at the local city level auditor fixed effect becomes economically and statistically insignificant in predicting backdating. The size and significance of the auditor knowledge variables increase as the geographical area becomes smaller, and the global effect of the audit company decreases.

At the national level, we can see that the effect of being audited by a big, reputable company is negative and significant and supersedes any knowledge the company might have of backdating. When I narrow the model down to the local city level, the main effect diminishes

and the knowledge of backdating at the local office level supersedes any auditor fixed effect. At the city level, the auditors' local-office norms, represented by the auditor's lagged knowledge variable, diverge from the deontological ethics that are captured by the auditor fixed effect. This is shown graphically in Figure 6a.

--- insert figure 6a about here ---

In Figure 6b, we can see that locality matters not only due to the auditor's effect. Other channels may help diffuse unethical practices at the geographically narrow level, over and above any audit company's effect. This can be seen through the increase of the effect of the number of backdaters in the previous year on the likelihood that any company will backdate. At the national level, as the number of potential backdaters is exhausted, this effect is marginally negative. At the city level, this effect is larger, positive and significant.

--- insert figure 6b about here ---

Finally, in Figure 6c, we see that for each of the big five auditing companies, the knowledge of backdating has a small, non-significant effect at the national level, but this effect increases as the locality narrows down to the city level.

--- insert figure 6c about here ---

The more the auditors' local offices were exposed to the practice of stock option backdating, the more likely they were to spread the information. The increased likelihood, over and above industry and efficiency effects, points to active transmission of the information from the company's external auditor to the executives who could benefit from the practice. This effect is much less likely to be identified when aggregating across local offices at the auditing-company

level. Spatial heterogeneity and proximity matter, as they allows for the local auditor's incentives to diverge from its global incentives to maintain its reputation and for the norms of backdating to emerge.

Robustness test

Selection of auditors

The results can hold if the causality is reversed and executives share information about auditors who fail to observe backdating. This will result in spuriously identifying the relationship between auditors' past experience with backdating and the future likelihood that their clients will backdate. In this case, the actual causality is reversed: Instead of auditors transmitting the backdating technology to uninformed executives, it is the executives who inform each other and choose to switch to unwary auditors. I address this selection concern by (1) modeling the effect of the total number of backdaters in a geographical region and showing that it does not render the auditor's past experience insignificant; and (2) constructing an eighteen-year history of auditors and CEO tenure with the company and testing whether CEOs choose auditors. Figure 7 describes the histograms of CEO tenure (in black) and auditor tenure (in gray).

--- insert figure 7 about here ---

Auditor tenure exceeds CEO tenure with a company by almost seven years[7], and this difference is highly significant ($p<0.0001$). CEOs are hired by companies that already have a long tenure

[7] We use 18 years due to the limitation on CEO data; the first available comprehensive data on CEO identity start at 1992. Reliable auditor data has existed since the early 1980s. When we use a non-matched sample, we find that the average auditor tenure with a company exceeds 20 years.

with their auditors. Interviews with CEOs and auditors confirm that once an auditor starts auditing a company, the cost of switching to another audit firm is large. Publicly-traded companies are large and complex, and CEOs are reluctant to switch to a different auditor due to the high learning cost the new auditor encounters in the first few years of auditing the company. I also examine the frequency of companies switching auditors in the data. During the period in question, only 51 companies switched auditors, and there is no statistically significant difference in the propensity of those companies to backdate after switching to a new auditor which leads me to conclude that the causal path by which executives choose unwary auditors is not present.

Randomly lucky grants

Even under random assignment, some companies will have lucky assignments of grants. Since there are, on average, 21 trading days in a month, five percent of the grants will randomly be assigned at these days. To address this concern, I use both the method identifying return difference (tobit model) and the method identifying the lowest day in a calendar month (the logit model).

Under the logit model, the grants that are lucky at random should be independent of any variable on the right-hand side of the model. Randomly choosing the date at which a compensation committee meets is independent of the average stock volatility, size and industry of a company. Furthermore, any such assignments are clearly independent of auditors' past experience with backdating and the competition between auditors in those markets. Observations that fall in this random assignment are, thus, noise in the logit model.

The Tobit model uses the return difference from the beginning of the month to the grant day, and from the grant day to the end of the month. This allows me to partially limit the effects of randomly lucky grants by assigning a value to how lucky the grant is. A grant that represents a return difference of 25 percent is lucky, but not as lucky as a grant representing a return difference of 50 percent. The effect that auditors' past experience with backdating and auditor competition has on the luckiness of the grants is, again, independent of random assignments, but this model further quantifies the luckiness "effect." The Tobit model uses a uniform cutoff for the value of y^*, which means that higher-volatility companies will be more likely to fall above this cutoff, independent of their adoption of backdating. Including the monthly volatility on the right- hand side of the model will, therefore, bias the results for auditors' past experience and competition between auditors downward, generating a more conservative estimate of the size of these effects. The fact that the effects of auditors' past experience with backdating and competition between auditors are robust across specifications strengthens the conclusion that auditors played a significant role in the spread of stock option backdating.

Joint selection of auditors and CEO's by companies

One possible explenation for the effect of local offices of auditors on the propensity of firms to backdate is that unobserved firm charectaristics increase the likelihood that they will find both a lenient (or less competent) auditor and a CEO that is more likely to engage in risky and potentially illegal activities, creating a spourious relationship between auditors and backdating. I refer to this process as joint selection of the auditor and the CEO by the company. In this scenario executives learn from each other on how to backdate, but only the auditors that are

lenient, and were selected by the same companies that select the more backdating inclined Chief Executives show an increase in backdating patterns over time.

To test this alternative explenation I utilize the revoking of Arthur Andersen's audit licence as an exogenous event on the side of the backdating (and non backdating) companies who employ one of the Arthur Andersen branches as their auditor. These clients are forced to leave their current audit office and start working with a different auditor providing a semi-exogenous shock (companies are forced to leave but can choose their new auditor). In the alternative scenario whre companies jointly choose auditors and CEO's auditors are "enablers", either due to lack of competance or explicitly overlooking the backdating that is done in the company. This will mean that the stronger predictor of the future backdating behavior of these clients once the moved to the new office will be effected by the level of backdaitng in their new office and independent of the level of backdating under their former auditor. If local offices of auditors are providing their clients with the knowledge of how to backdate than there should be a lingering effect, since these firms know how to backdate and can do so under their new auditor even if the level of backdating under the new office is otherwise low.

In table 5 I report the findings of a logistic model predicting backdating by 476 former Arthur Andersen clients after they move to new auditors in 2003-2005. Since this model predicts changes in behavior within firm over time I include four independent variables in the model: Wheather the firm backdated before moving to the new auditor (Backdate Before), wheather their former (Arthur Andersen) office was associated with at least one standard deviation more backdating clients than other auditors (Past auditor high backdating), wheather their current auditor is associated with higher than one standard deviation more backdating clients (current

ausittor high backdating) and the number of backdating companies within the geographic location (Exposure to other backdaters).

--- insert table 5 about here ---

The results suggest that a firm's backdating patterns after it was forced to switch auditors depend on the extent to which their past auditor was associated with a high proportion of backdating clients, supporting the knowledge transfer argument. The collapse of Arthur Andersen coincides with the passing of the SoX legislation that introduced new, stricter regulation on the reporting of stock option grants. This can explain why companies that came from low backdating auditors and did not backdate prior to the switch show no dignificant change in behavior once moving to a new auditor. Prior backdating and exposure to other backdaters is positively associated with backdating in the period after the switch.

Discussion

The role of any diffuser of information on unethical practices is difficult to assert. Unethical practices are seldom observable to outsiders, leading to difficulties in separating the identification mechanism from the characteristics that promote the adoption of the practice. Most quantitative research on unethical practices suffers from selection and identification problems. Researchers observe ethical violations when they are caught, either by regulators, the media or by stakeholders. This may cause researchers to incorporate variables that determine the selection of "caught" cases into the explanatory side of the model. This type of research is vulnerable to

mistakenly identifying variables as increasing a company's likelihood of committing fraud when, in fact, those might be variables that increase the likelihood of a company being caught.

Corporate-governance research has examined shareholder litigation (Hompson and Sale,2003), manipulation of financial statements identified by regulators such as the SEC (Farber,2005), or, explicitly, only cases identified by all mechanisms—including auditors, investors, regulators, employees and the media—to determine which one is most prominent (Dyck, Morse and Zingales,2010). Determining that certain characteristics of companies lead them to be sued more by their shareholders or investigated more by regulators or the media tells us very little about the underlying characteristics that make companies more likely to engage in those practices to begin with.

By examining stock option backdating, this paper can make more-general claims about the propensity of companies to adopt fraudulent practices. By looking at the universe of all stock option grants and deducing the ones that are highly unlikely to be assigned at random, we can observe—independent of the cases that were investigated by regulators or taken to court by stakeholders—the complete universe of fraudulent companies. This unique approach allows me to isolate the importance of geography and the role of auditors in the spread of backdating from the role of those factors in the search process of regulators and stake holders.

Conventional wisdom treats the perpetrators of ethical violations such as backdating as "bad apples," rogue managers who collude with financial-service providers or insiders to defraud investors for their own benefit. This argument is in line with the commonly used principal-agent framework in economics, which states that incentives to managers are misaligned with the utility of the shareholders. Nonetheless, innovative misconduct diffuses between executives across

companies in a complex social system. In the case of backdating this diffusion follows a clustered geographic pattern with clear "hot spots" of backdating maximized at a roughly 120km and 500km radius, which is aligned with the coverage area of local offices of external auditors.

The diffusion of misconduct comes at a cost that is larger than the direct loss in value to those companies, as financial markets rely on trust to function well. A multitude of control mechanisms are created to ensure that investors are confident that managers of companies in which they invest are not acting contrary to their interests. Auditors play a substantial role in this system of trust and control and are deeply embedded in the structural environment of corporate America. The big four audit firms are involved in the business activities of more than four fifths of the publicly-traded corporations in the United States. The same auditors are connected to tens of thousands of private and public companies across the world. Occupying this exclusive position allows auditors to be uniquely exposed to detailed information and know-how across firms and to possess a broad perspective regarding large portions of the economy. This role includes access to information about practices whose potential publicity may be undesirable for corporations.

The role of auditors in the diffusion of unethical practices is, therefore, of great economic significance. Audit companies are not only gatekeepers to investors in the markets, but are also authoritative, legitimizing actors to their clients. This perception endows auditors' advice with implicit legitimacy, increasing the likelihood that the information they transmit will be adopted. When this information harms investors, the ease with which it diffuses multiplies the economic effect that the innovative practice might have in a counterfactual world, where auditors would not be so highly connected.

Locality matters, especially for the diffusion of unethical practices. Audit companies are comprised of hundreds of local offices, each with its own local incentives to maintain good relations with its clients, ranging from the monetary (audit fees, non-audit services) to the social. These offices are intimately involved with the companies they audit over an extended period of time, which fosters strong social ties with company management. While this is the case for incentives, the countermeasure for deviant behavior by auditors has long been identified as reputation and legal costs, which are incurred at the global-audit-firm level. This structure produces incentives for local offices to free ride on the audit company's reputation and promotes the creation of local clusters of backdating norms. Competition is one such factor that increases the likelihood that norms facilitating client misconduct will be established.

In the case of backdating of stock option grants, when geographical heterogeneity in auditors' local offices is allowed, I find that some local were involved in the spread of backdating among their clients. The likelihood that client will backdate increases, as the local auditing office is more informed about this practice. This finding is true for some local offices, for others, the likelihood of new adopters drops over time. Competition between auditors' local offices affects the likelihood they will adopt this practice. Since backdating is a fairly generic innovation to elicit gains unethically, this finding should be generalizable to other unethical practices.

Conclusion

In this paper, I examine the diffusion of the practice of stock option grants backdating to senior executives. This practice involves manipulating the date on which stock option grants were given to company executives and allows the backdater higher compensations at the expense of

shareholders and the tax authorities. I find that the spread of backdating follows a geographically clustered pattern and that this pattern is supported by the local offices of auditors that have previous experience with backdating companies. While competition between auditors is centris-paribus exogenous to the timing of the stock option grants of their clients, I find that increased competition between auditors leads to a higher rate at which their clients experience abnormally high returns on their option grants.

Backdating had diffused to about one third of the stock-option-granting companies in the U.S. by the mid-2000s. This extensive adoption of an illegal practice, kept hidden from outsiders, is astounding. For practices to be adopted so widely, they need to be transmitted efficiently between organizations and enjoy some form of legitimacy. Auditors are highly connected to companies they audit; they are exposed to sensitive financial data and are likely to know more about this practice than outsiders do. Individual auditors in each office have prolonged social interactions with executives in the companies they audit, as well as monetary incentives to maintain their relationships with the companies. Most importantly, auditors play a dual role in the diffusion of accounting practices; by construction, auditors have a socially endowed role providing legitimacy to accounting practices. When auditors actively diffuse bad practices such as backdating, the fact that they represent an authoritative, legitimacy-providing actor may intensify the effectiveness of the diffusion.

Not all local offices engage in this practice. The geographical analysis shows that there are clear "hot spots" where backdating rates in neighboring cities help explain the rate of backdating in other focal cities in the region. Some local offices develop a "norm of backdating" and are associated with a high rate of backdaters and an increased likelihood of companies backdating over time. In some offices, backdating at time t leads to a lower likelihood of

backdating at time t+1. This divergence of norms between local offices helps explain the creation of geographical clusters of illegal behavior.

Backdating of stock option grants provides researchers with a unique sample on which to test diffusion paths. This practice is identified directly from the data with high confidence and, unlike most unethical practices; the sample of backdaters does not suffer from identification problems generated by selection processes. I can observe the adoption of this practice for every executive in every stock-option-granting company in the United States. Researchers have used several methods for identifying which stock option grants are backdated. I use two methods that lend themselves to identifying individual suspected grants and find that the auditor's local office effect remains statistically and economically significant across specifications. Interviews with auditors supplement the analysis, as several of the auditors I interviewed reported this practice being spread by former colleagues.

I conclude the analysis with the comparison of the auditor and competition variables at three geographical levels: U.S. national level, state level and city level. As the geographical distance of the auditors from the companies becomes smaller, their role in the diffusion of backdating becomes more evident. Geographical proximity is important for the diffusion of unethical practices, as norms deviate from the deontological professional ethics in auditors' local offices. Since most economic activity happens in a complex local social system, this fact can assist in the spread of unethical practices and often keeps them hidden from outsiders for long periods of time.

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Tables and figures:

Figure 1

Number of firms assigning suspicious stock option grants over time

I count each company that assigned a stock option grant at the lowest price day of a calendar month as a potential backdating company. The trend over time is shown in the figure where the number of companies assigning grants at the lowest possible price day in a calendar month increases dramatically over time. The trend slows after the adoption of Sarbanes Oxley legislation in 2002.

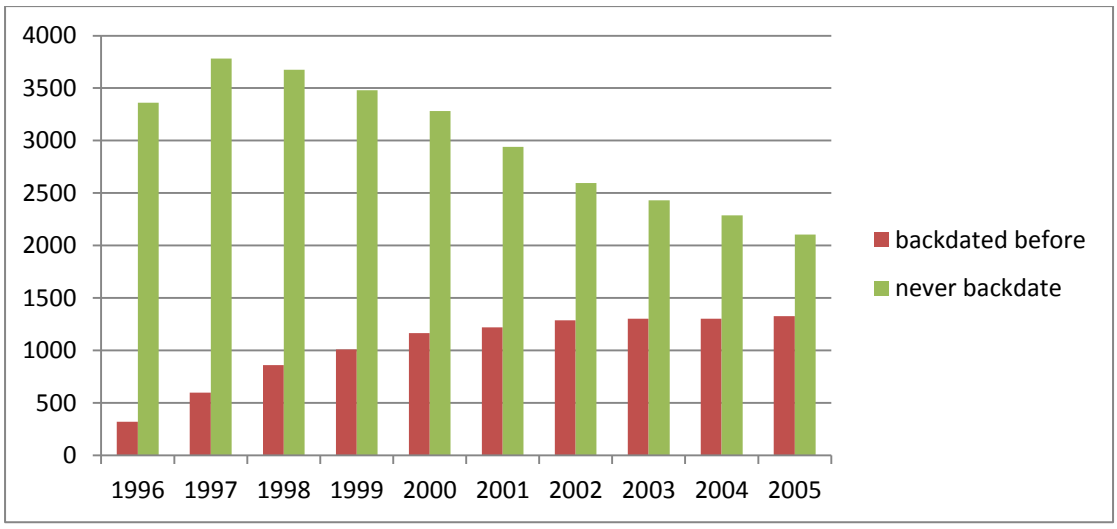

Figure 2

Size of firms assigning suspicious stock option grants over time

I take the natural logarithm of the total assets as reported in the financial statements as the measure of size. Trend line represents the polynomial trend to the order of 3, which represents the data most closely. $R^2 = 0.9119$, we use the simple condition to satisfy $\Delta R^2_{i-i+1} > \Delta R^2_{(i+1)-(i+2)}$

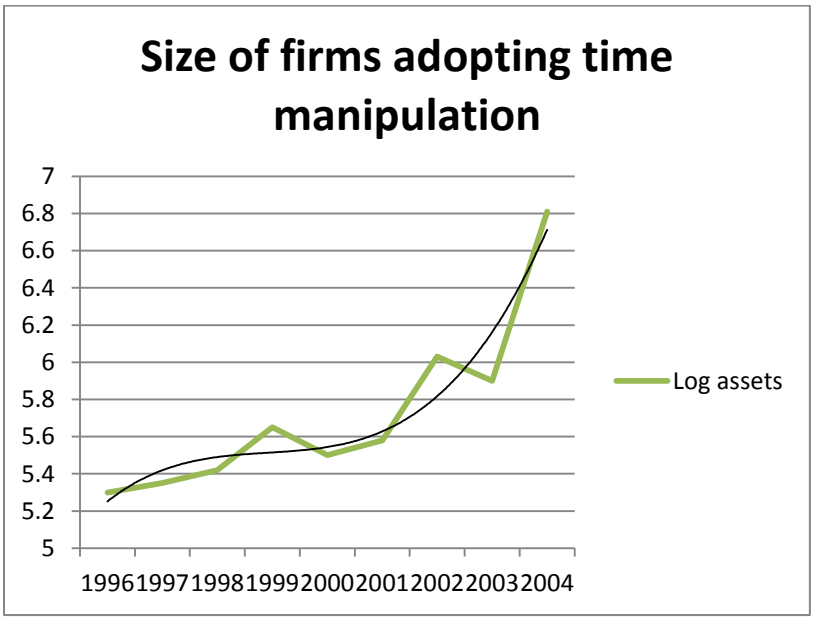

Figure 3a

Broadcom Corp closing stock price and grant date.

To assess whether a stock option grant is suspected of timing manipulation, we use two methods. The first, assigning the lowest stock price date, would call the stock option grant of May 26 a suspected timing manipulation. Any other grant through the window would not be suspected.

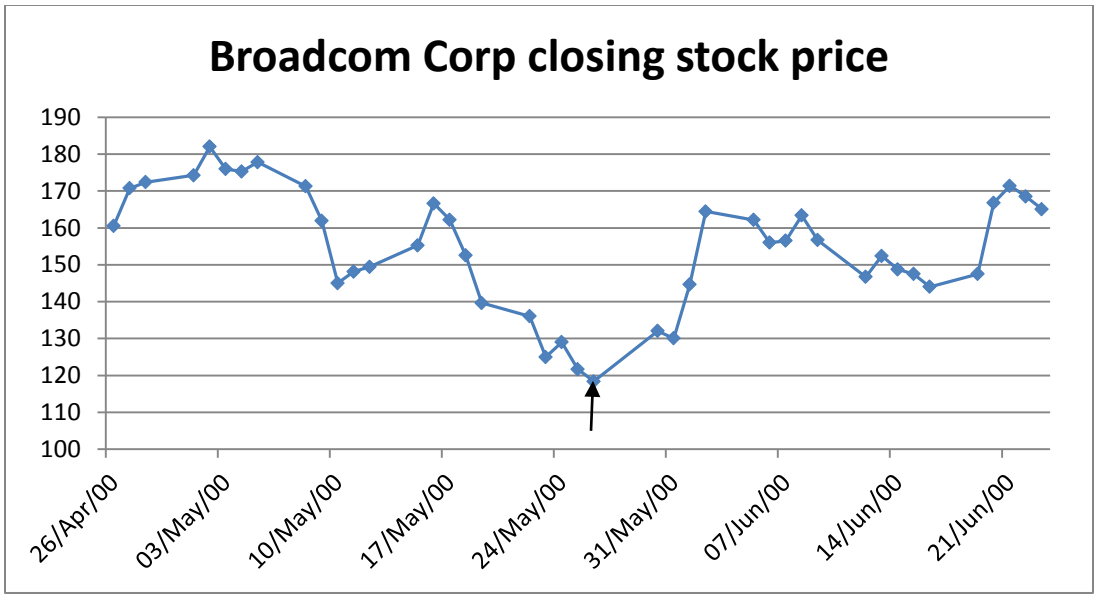

Figure 3b

Apple Inc. closing stock price.

The second method of estimation is to calculate the return difference from the stock option grant date to the end of the window and to subtract it from the return on the stock from the beginning of the window to the grant date. This method would call a grant given on February 4 a suspected grant, while the "lowest price date" method would dismiss it as a nonsuspected grant.

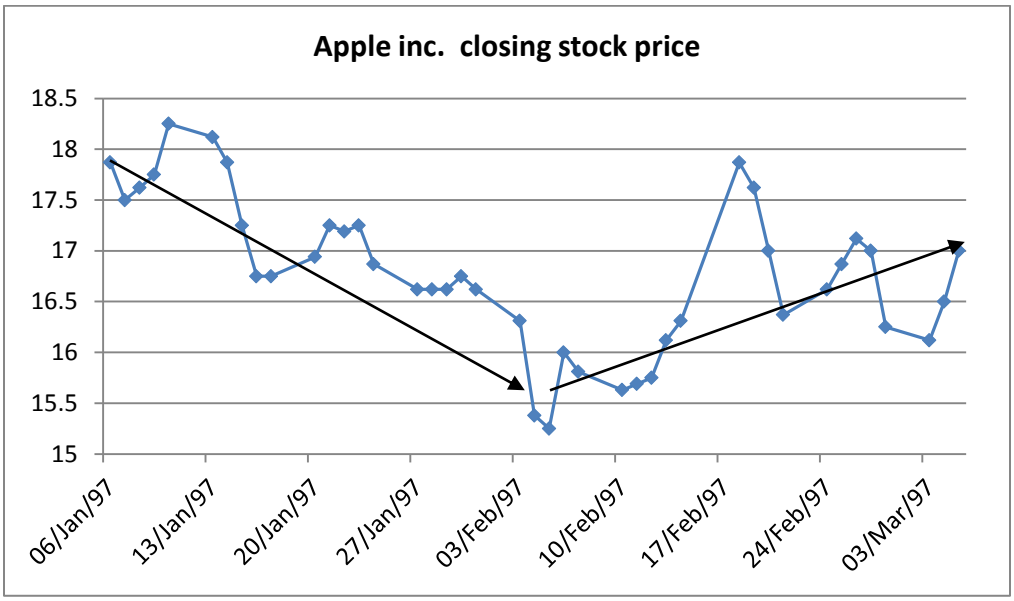

Figure 4

The geographic location of stock option granting companies 1996-2005

I mapped the geographic location of each of the stock option granting companies between 1996 and 2005 using the city-state identifier from its compustat records. I achieved a match on 92% of the sample. Blue dots represent companies that did not backdate during the time period. Red dots are companies that backdated at least once.

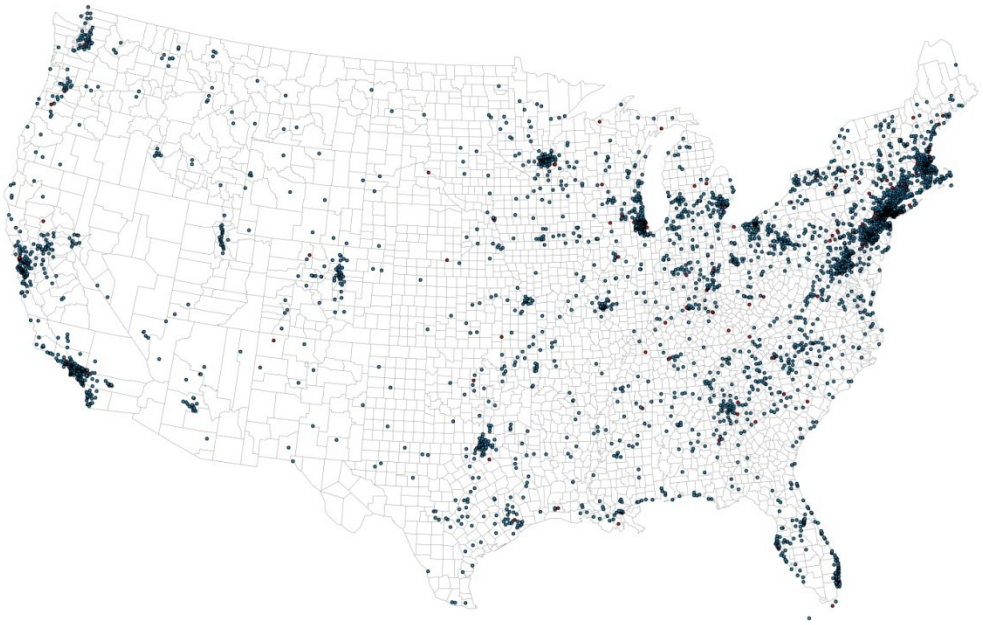

Figure 5

Hot spots of backdating

I mapped the geographic location of each of the stock option granting companies between 1996 and 2005 using the city-state identifier from its compustat records. I used the geographic location to match each company to a county. For each county I calculated the frequency of backdating companies out of all companies in the county. I than ran the Getis-Ord Gi* statistic to asses spatial autocorrelation and map clusters of high backdating. The weight matrix was chosen to maximize the Z score at the 500km level such that every company in the 500km radius from the focal company has a weight of 1 on neighboring companies, beyond that distance the effect diminishes exponentially with distance from the focal company. The results show clusters that are significant at the $p<0.001$ level and above.

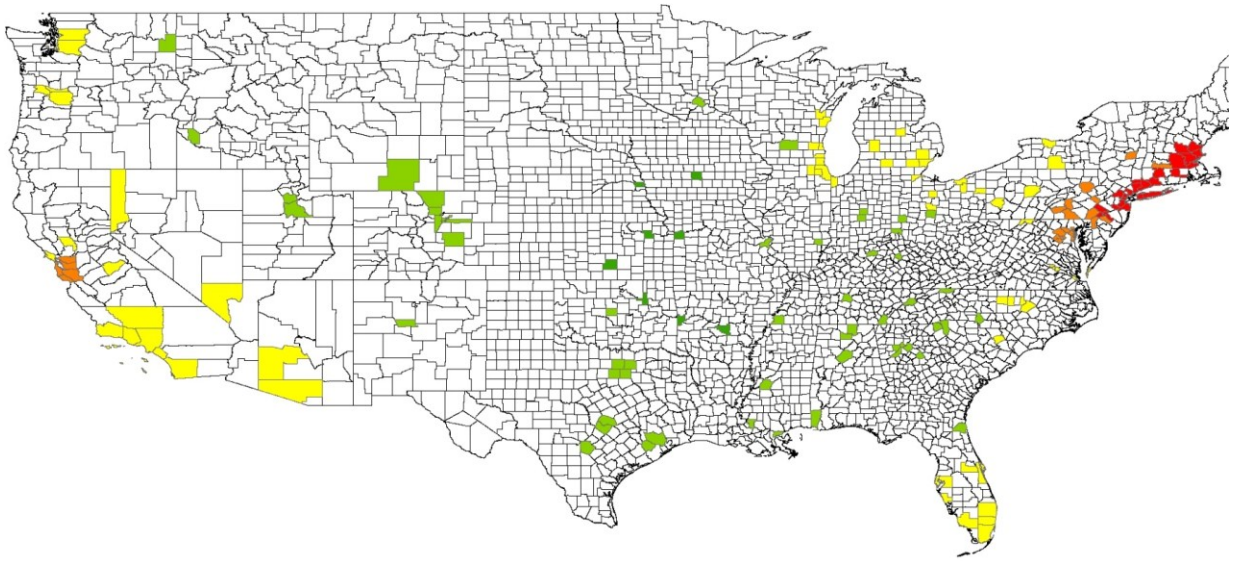

Figure 6

Histogram of grant days

The histogram describes frequency of grants assigned from the lowest price date to the highest within the event window (1 being the lowest possible price within the calendar month and 23 the highest price date).

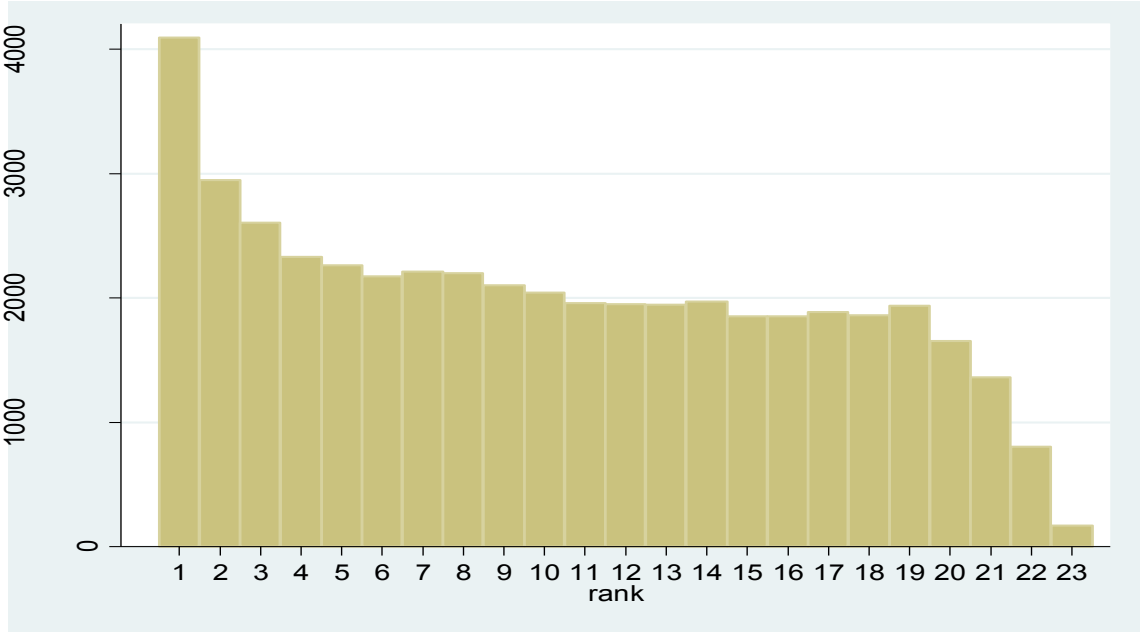

Table 1

Number of new firms backdating by year.

	New adopters of suspicious grant timing	Mean size of adopters (natural log of total assets)
1996	310	5.30
1997	330	5.35
1998	235	5.42
1999	219	5.65
2000	194	5.50
2001	151	5.58
2002	91	6.03
2003	76	5.9
2004	66	6.81

Table 2

Tobit model for time manipulation by companies.

I model the return difference from the beginning of a calendar month to the grant day and from the grant day to the end of the calendar month. Volatility is the standard deviation of the stock price over the trading month. Size is the natural logarithm of the firm's assets. The following five variables refer to a dummy assigned to each of the five big auditing firms. The next five variables are the proportion of companies that were suspected of backdating in the previous years under the same auditor in the same city. Industry affiliation is modeled at the 2 digit SIC code, controls for year effect and an interaction of year and auditor to account for time varying effects in each of the audit companies.

	(Model 1)	(Model 2)
VARIABLES	City	City
monthly_volatility	0.0290***	0.0265***
	(0.00131)	(0.00151)
size	-0.0714***	-0.0748***
	(0.00212)	(0.00263)
Arthur Andersen	-0.0369	0.0413
	(0.0373)	(0.0378)
KPMG		0.0286
		(0.0393)
Ernst&Young	-0.0219	0.0593*
	(0.0359)	(0.0350)
Deloitte	-0.0635	
	(0.0436)	
PwC	0.00295	0.0569
	(0.0423)	(0.0358)
Knowledge- Arthur Andersen $_{t-1}$		0.0850*
		(0.0491)
Knowledge- Ernst&Young $_{t-1}$		0.150***
		(0.0481)
Knowledge- Deloitte $_{t-1}$		0.0990*
		(0.0572)
Knowledge- KPMG $_{t-1}$		0.0666
		(0.0542)
Knowledge- PwC $_{t-1}$		0.108**
		(0.0509)
Industry dummy	yes	yes
Year dummy	yes	yes
Year x Auditor dummy	yes	yes
Constant	-0.00982	0.0824
	(0.113)	(0.174)
Observations	52,236	37,094
Left censored	41,438	29,266
log pseudoliklihood	-23,026	-16,930

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 3

Logistic model for companies learning how to backdate stock option grants.

I model the likelihood that a company will assign stock option grants on the lowest price date of the month, which we call "suspected of time manipulation" or backdating. Monthly volatility is the simple standard deviation of the stock over the trading month. Size is the natural logarithm of the firm's reported assets in the annual financial statements. The following five variables refer to each of the five big auditing firms. The next five variables are the number of companies that were suspected of backdating in the previous years under the same auditor in the same city. Industry controls are included.

VARIABLES	(1) Backdating	(2) Backdating	(3) Backdating
monthly_volatility	0.0416***	0.0419***	0.0364***
	(0.00516)	(0.00517)	(0.00548)
size	-0.0723***	-0.0686***	-0.0684***
	(0.00725)	(0.00735)	(0.00891)
Arthur Andersen		-0.000684	0.0429
		(0.0514)	(0.0693)
Deloitte		-0.0985*	0.0746
		(0.0578)	(0.0791)
Ernst&Young		-0.0736	
		(0.0499)	
PwC		-0.0236	0.0708
		(0.0513)	(0.0698)
KPMG			0.106
			(0.0758)
Knowledge- Arthur Andersen t-1			0.724***
			(0.173)
Knowledge- Ernst&Young t-1			0.537***
			(0.187)
Knowledge- Deloitte t-1			0.0399
			(0.242)
Knowledge- KPMG t-1			0.397*
			(0.212)
Knowledge- PwC t-1			0.325
			(0.211)
Industry dummy	yes	yes	yes
Year dummy	yes	yes	yes
Year x Auditor dummy		yes	yes
Constant	-15.98	-15.99***	-15.65
Observations	58,144	58,144	39,535
Wald	327.39***	335.73***	336.55***
Log pseudolikelihood	-17,227	-17,224	-11,584

Robust Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 4

Effect of competition between auditors on the adoption of backdating

I model the return difference from the beginning of a calendar month to the grant day and from the grant day to the end of the calendar month. Volatility is the standard deviation of the stock price over the trading month. Size is the natural logarithm of the firm's assets. The following five variables refer to a dummy assigned to each of the five big auditing firms. Competitive pressures is the inverse of the Herfindel-Hirschman index of concentration of market shares between auditors in the area. The next five variables are the proportion of companies that were suspected of backdating in the previous years under the same auditor in the same city. The models control for industry affiliation according to the 2 digit SIC code, controls for year effect and an interaction of year and auditor to account for time varying effects in each of the audit companies.

	(1)	(2)	(3)
VARIABLES	city	city	national
monthly volatility	0.0288***	0.0286***	0.0285***
	(0.00139)	(0.00139)	(0.00133)
size	-0.0723***	-0.0720***	-0.0716***
	(0.00233)	(0.00233)	(0.00217)
Arthur Andersen	-0.0287**	-0.0225	-0.0194
	(0.0117)	(0.0143)	(0.0345)
Deloitte	-0.0144	-0.00217	-0.0384
	(0.0134)	(0.0162)	(0.0409)
KPMG	-0.00655	0.0109	0.0288
	(0.0126)	(0.0153)	(0.0358)
PwC	-0.00487	0.00623	0.0182
	(0.0114)	(0.0142)	(0.0391)
competitive pressures	0.0559***	0.0463***	-17.84
	(0.0146)	(0.0147)	(14.15)
Knowledge- Arthur Andersen t-1		0.143***	0.576
		(0.0492)	(0.598)
Knowledge- Deloitte t-1		0.0897	0.941
		(0.0547)	(0.613)
Knowledge- Ernst&Young t-1		0.189***	0.748
		(0.0464)	(0.622)
Knowledge- PwC t-1		0.108**	0.506
		(0.0489)	(0.576)
Knowledge- KPMG t-1		0.0498	0.398
		(0.0531)	(0.582)
Constant	0.0255	0.0133	-3.170
	(0.137)	(0.136)	(2.501)
Observations	42,622	42,622	50,436
left censored	33,755	33,755	39,932
log likelihood	-18727	-18711	-22,427

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Figure 6a
Size of auditor fixed effect across levels of analysis.

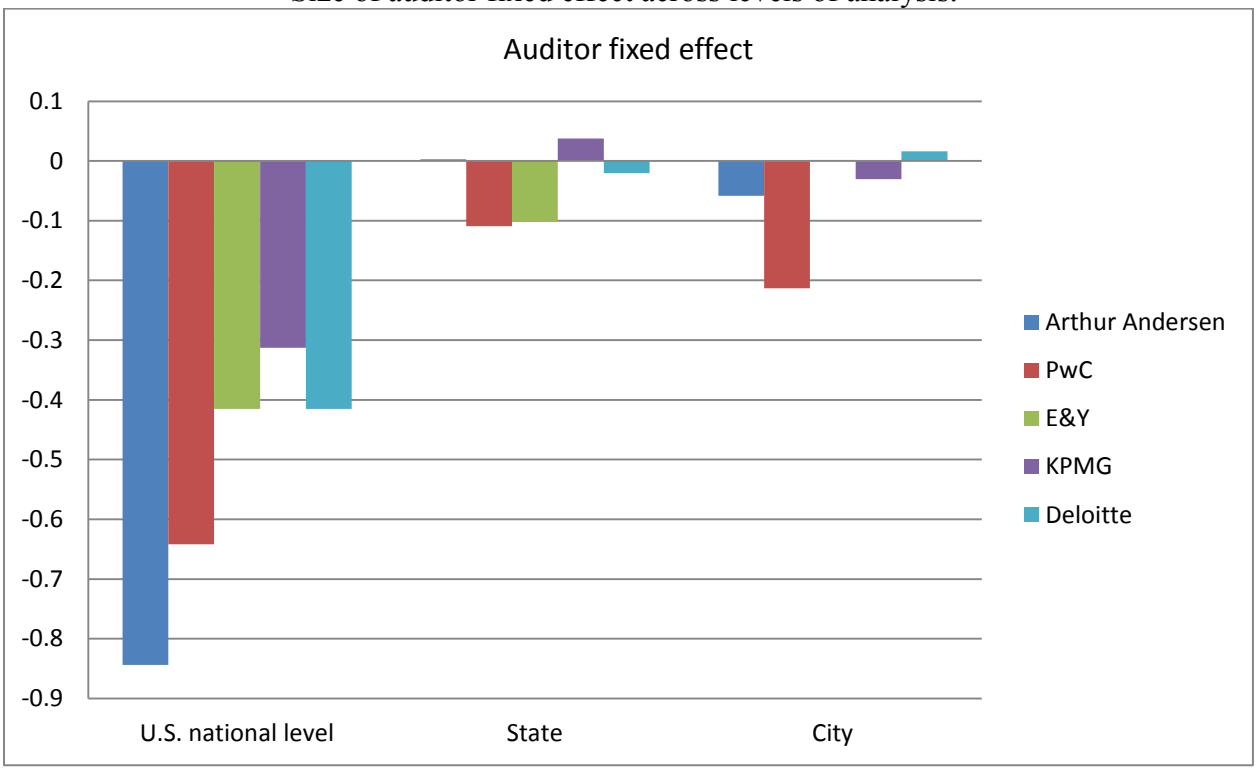

Figure 6b
Number of backdaters in geographical area effect across levels of analysis.

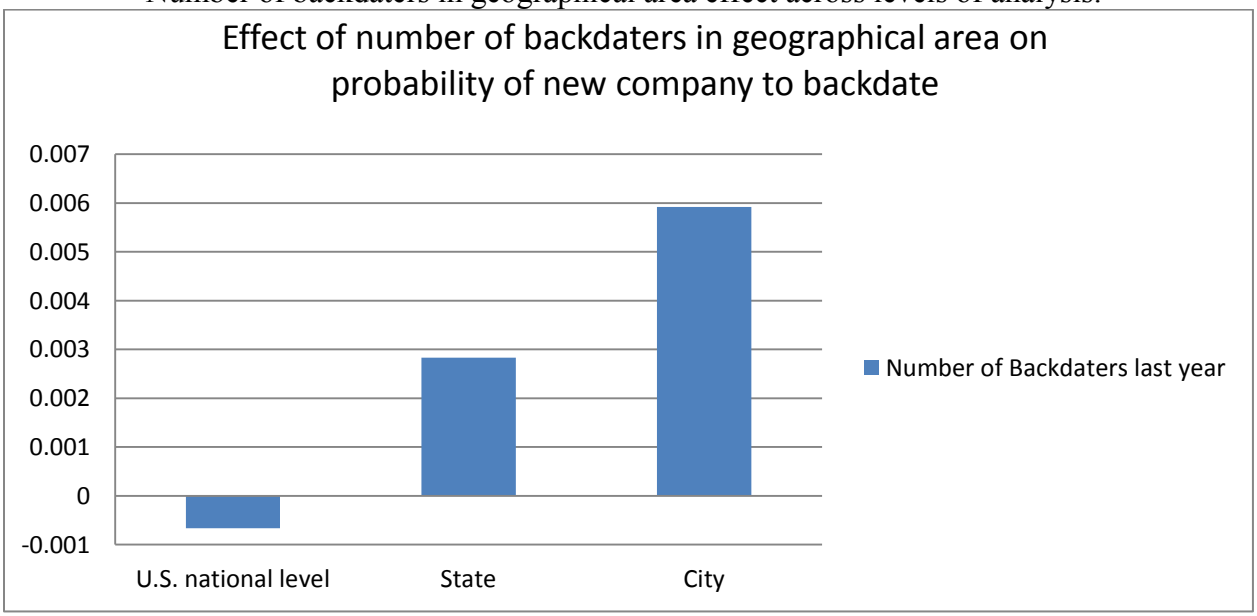

Figure 6c
Number of backdaters under auditor in geographical area across levels of analysis.

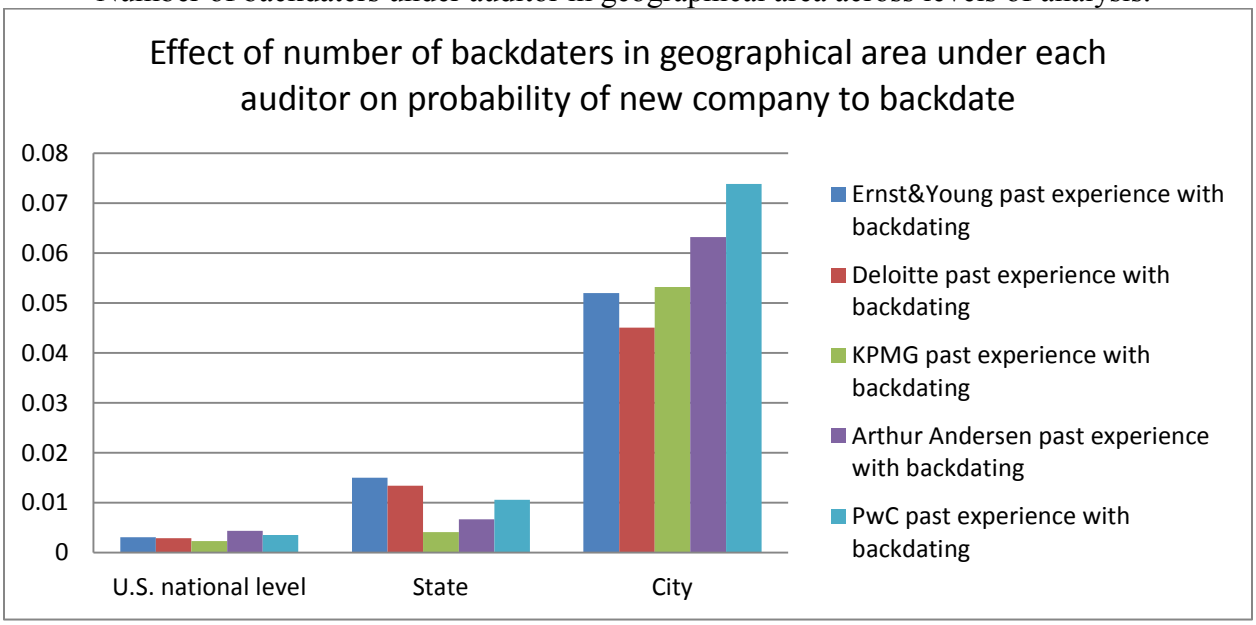

Figure 7
Auditor and CEO tenure at a company
I construct an 18 year history for all companies in the sample and plot the auditor tenure with the company compared with the CEO tenure. The histogram of auditor tenure is in gray and the histogram of CEO tenure is in black. As can be seen in the graph Auditor tenure far exceeds CEO tenure.

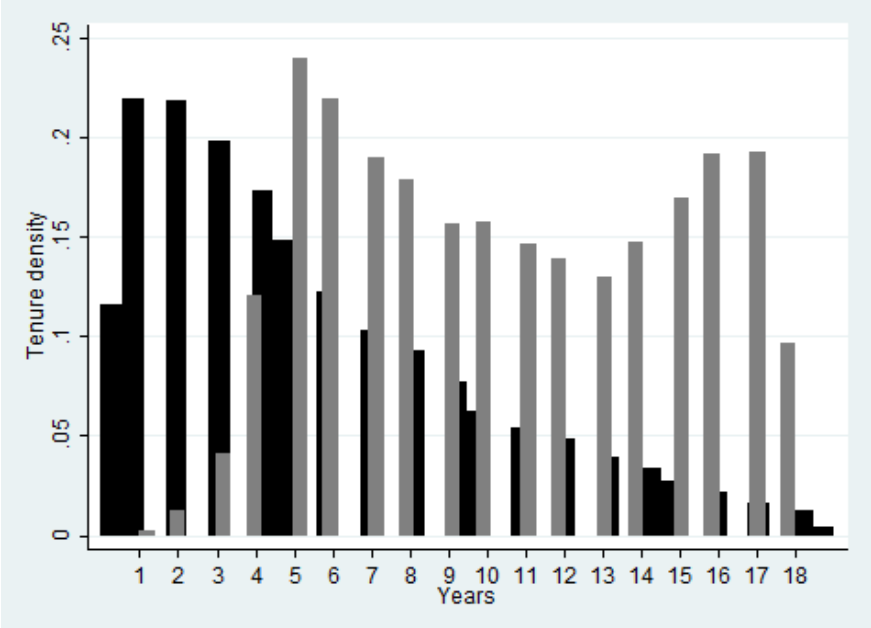

Table 5

Changes in backdating behavior of former Arthur Andersen clients after 2002

This table reports the results of a logistic regression predicting backdating for Arthur Andersen clients after the collapse of the audit firm (post 2002) and their subsequent move to new auditors. Backdate Prior is a dummy variable indicating whether a firm backdated prior to 2002. Past auditor high backdating is a dummy variable taking the value of 1 if the former auditor was associated with at least one standard deviation more clients backdating than other local offices. Current auditor high backdating is a dummy variable taking the value of 1 if the current auditor of the firm is associated with more than one standard deviation more backdating. Exposure to backdaters is a continuous variable counting the density of backdating companies who share the same city as the focal firm.

VARIABLES	Backdate Now
Backdate Prior	0.691**
	(0.280)
Past auditor high backdating	1.465**
	(0.584)
Current auditor high backdating	-0.510
	(0.634)
Exposure to other backdaters	2.446***
	(0.442)
Constant	-2.184***
	(0.190)
Observations	476

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Chapter 3: The Entitled Many: Psychological Entitlement and the Backdating of Stock Option Grants

This chapter considers the effect of psychological entitlement on the pursuit of covert compensation by executives in public companies. Specifically, this paper examines how both stable and time varying elements of psychological entitlement make executives more likely to engage in stock option backdating. Our theory suggests that executives that are underpaid actively try to close the compensation gap by engaging in stealth compensation practices and that this process is mediated by the executives' level of psychological entitlement and by situational cues on the level of "deservingness". We test this theory on the backdating activity of a sample of executives in publically traded companies in the U.S. between the years 1996 and 2004.

"The objective conditions of peoples' lives often bear only minimal relation to their subjective satisfaction with those conditions, or with their subjective well-being in general… beliefs about entitlement are critical determinants of how members of a social group react affectively, evaluative, and behaviorally to their socially distributed outcomes… The disadvantaged often come to believe that they deserve their lesser outcomes, whereas the overprivileged often come to believe that they are entitled to their position of relative advantage." (Major,1994)

Introduction

Sizeable amount of research in social psychology, sociology and economics considers the antecedent of misconduct by individuals within organizations (Greve, Palmer & Ponzer, 2010). In Social Psychology, one of the more comprehensive recent theories in the ethical decision-making field proposes that behavioral decision-making biases render most individuals unaware of pressures to engage in unethical behavior through selective perception, plausible deniability bias. escalating commitment and attribution error (Moore et al., 2006). In Sociology, strain theory (Merton, 1938) contends that strain that is caused by the difference between goals and actual achievements leads to misconduct at all levels of society (Clinard & Yeager, 1980, Voughan, 1999), a theory that was extended to study strain and misconduct of executives of publically traded companies (Agnew et al., 2009). In this paper we integrate the two levels of analysis and explore whether individual level differences interact with situational factors on achievements of socially accepted goals, namely social comparison of compensation levels to peers (Wade at al. 2006), to predict increased unethical behavior among executives. We develop a theory on the interaction of psychological entitlement with social comparison and test its predictions on a sample of executives over a nine year period, during which a large number of them engaged in stock option backdating.

During the 1990's and early 2000's thousands of executives in the United States engaged in the practice of backdating their stock option grants (Bebchuk, Grinstein & Payer, 2009). This practice, deemed illegal by the Securities Exchange Commission in 2005, involves misreporting the dates at which stock options were granted to the executives to reflect a date at which the stock price was more favorable and increase the value of the grant. This finding is striking, are the thousands of executives who backdated their stock option grants crooks? We argue that the

answer to this question is not a clear yes or no but depends on the interaction of social norms in which the executives are embedded, their personality attributes and cues they receive from the environment about fairness. We attempt to isolate a key personality attribute that drives normative executives to engage in such illegal actions as stock option backdating. Much of the popular press and academic research attributes these practices to executive's greed and hubris, and the ensuing pursuit to appropriate, legally or illegally, more and more of the firm's resources to their own pockets. We challenge this view and promote an explanation in which the underlying personality trait that drives much of the adoption of these covert compensation practices is more nuanced derivative of greed, rooted in ever strengthening societal norms of entitlement.

We define entitlement as "the feeling that one deserves, and should receive more than others" (Campbell et al., 2004). A defining characteristic of this definition of entitlement is that it is of a social nature, both as a social norm and in terms of social comparison. Being a socially constructed tool to discern just from unjust results, entitlement is at the heart of societal wealth distribution, between the rich and the poor, natives and immigrants, majority and minority groups and many other parts of society. While today we tend to think in terms of entitlement of various groups in society, entitlement as a concept was rarely discussed or even mentioned in major news outlets until the last 25 years. During the two decades following President John F. Kennedy's inaugural speech in 1961 where he asked his fellow Americans to "ask not what your country can do for you — ask what you can do for your country" there were less than a dozen mentions of the term "sense of entitlement" in the press, one tenth of the number of mentions each year since the early 1980. The number of news articles containing this term soared during the late 1990's and 2000's, reporting a sense of entitlement relating to a wide array of groups,

from school children and college students and university professors, and from individuals claiming social security and social health benefits to executives taking home millions of dollars in annual bonuses. Figure 1 shows the number of mentions of the term "sense of entitlement" in relation to executive pay in major news sources from the early 1980's to 2011. The rise in use of the term "sense of entitlement" was also experienced in literature. Increasingly, during the 1980's and 1990's authors refer to sense of entitlement, coinciding with the decline in the use of terms such as "sense of gratitude" (see figure 2). Indeed, sociologists call the children born in the 1970's, 80's and 1990's "the Y Generation", or "Generation Me", a group of children born into a world where personal heroism was celebrated, in stark contrast to children born in the 1930's and 1940's (Twenge,2006).

> "Generation Me has never known a world that put duty before self, and believes that the needs of the individual should come first. This is not the same thing as being selfish – it is captured, instead, in the phrases we so often hear: "Be yourself," "Believe in yourself," "You must love yourself before you can love someone else." These are some of our culture's most deeply entrenched beliefs, and Generation Me has grown up hearing them whispered in our ears like the subliminally conditioned children in Aldous Huxley's *Brave New World*. (Jean Twenge's blog http://www.generationme.org/aboutbook.html March 22, 2012).

--- Insert figures 1&2 about here ---

This sense of entitlement manifests in birth-cohort differences in self reported measures of academic abilities, drive to achieve, leadership abilities, public speaking abilities etc, self reports that are negatively correlated with actual performance suggesting a rise in the sense of positive self views, independent of actual performance (Twenge et al.,2011). In printed news, a sense of entitlement has often been cited motivating top executives in some of the largest companies in the world to take home astonishing paychecks as compensation for their talents.

This does not seem to be a shift in the way media views executive compensation as these accounts come from within the corporate elite. For example, the New York Times reports on the merger negotiations of Delphi Financials where CEO Robert Rosenkranz demanded 110 million dollars, in addition to his share of the merger payout given his stock ownership in the company:

"…Mr. Rosenkranz demanded in negotiations that he be paid over $110 million more than other shareholders, a number that a special committee of Delphi Financial's board negotiated down by about $50 million. Mr. Rosenkranz has also reportedly tried twice to negotiate side deals with Tokio Marine that would deliver him an additional payout of up to $57 million. When the board committee discovered this, it forced Mr. Rosenkranz and Tokio Marine to repudiate the deals. Despite its statement, Delphi Financial doesn't appear to vigorously defend its chief executive in the litigation. Instead, in a legal filing, Delphi states that one of its directors thought that Mr. Rosenkranz had a "competitive" personality and a "**great sense of entitlement**." (Davidoff,2012)

In the present paper we begin to empirically address this assertion by examining the relationship between covert compensation practices and measures at the executive level that correlate with a sense of psychological entitlement. We contrast the predictions of entitlement with predictions of other explanations such as hubris, greed and narcissism. We find that in many cases the predictions of these alternative explanations for the relationship between covert compensation practices and such variables as executive pay, number of activities executives engage in outside the company and winning awards are diametrically opposed to the predictions based psychological on entitlement. This provides the basis for a strong empirical test to our theory. We test these predictions on a sample of backdating executives in publically traded companies in the United States between 1996 and 2005.

Managerial deviance can have severe implications for firm performance and survivability rendering research into the drivers of managerial deviance essential for the organizational theory and strategic management fields (Greve, Palmer and Pozner,2010). Aside from contributing to the literature on ethics and managerial deviance and the burgeoning literature on behavioral aspects of strategic management, this study also speaks to the literature on social comparison (Festinger,1954) and executive compensation. Research on social comparison between managers focused on the transparent portion of executive compensation (Belliveau et al.,1996, O'Reilly et al.,1988) but did not address the consequences of social comparison processes on the (unethical) pursuit of stealth compensation (Bebchuk and Fried,2003). This study aims to fill this gap by identifying and testing the conditions under which social comparison processes can push executives to pursue unethically acquired income. Lastly this study provides external validity to the effects of psychological entitlement on ethical behavior.

Unobtrusively Inferring Behavioral and Psychological Attributes of Managers

Bourgeoning literature on the behavioral aspects of strategy examine how CEO personality characteristics influence firm actions and outcomes. In this literature actions such as mergers and acquisitions, taking on debt and investing in research and development are tied to CEO personality traits such as hubris (Chatterjee and Hambrick,2007, Hayward and Hambrick,1997), overconfidence (Galasso and Simcoe,2011, Malmendier and Tate,2005) and the achievement of high status (Malmendier and Tate,2009, Wade et al.,2006). In part of this literature, similar explanatory variables have been used to assess whether inferred traits can explain a higher tendency toward unethical practices. Malmendier and Tate (2009) for example,

show evidence that CEO's who achieve high status engage in more earnings manipulation. In this line of research the underpinning of the empirical findings on inferred characteristics are rooted in Social Psychology findings established in lab experiments. This allows for expanding the internally valid lab findings to external contexts. Emerging social psychology research shows that various attributes that are commonly associated with top executives can lead to excess unethical behavior. In a recently published series of seven studies, Piff et. al. (2012) show that higher social class individuals behave more unethically than lower class individuals. They report findings showing that upper class individuals were more likely to break the law when driving (including cutting off pedestrians at crosswalks, an act that is potentially associated with severe cost to the crossing individuals), are prone to making less ethical decisions such as unrightfully taking something from others (including, quite literally, taking candy from children in one of the studies), and outright cheat (over report) when asked to report their experimental earnings. We measure psychological entitlement using various attributes that have been identified as predictors and covariates of psychological entitlement and situational deservingness.

We conceptualize entitlement as a sense that one deserves more and is entitled to more than others, conceptualizing entitlement as both situational and interpersonal. In Social Psychology, entitlement has been shown to be composed of both an underlying stable, cross-situational personality characteristic that is distinctive from other characteristics such as narcissism or sense of power and a "deserviness" component that is derived from situational and social context (Campbell et al.,2004). The former component of entitlement implies some executives would feel entitled to more than others based on who they are (social class, generational differences) and the latter implies that all executives will display a positive relationship between their own perceived performance and their ensuing compensation, in stark

contrast with common explanations such as greed. While greed is situationally independent, entitlement is closely tied to contribution, and while greed is hard pressed to be tied to social class or generational differences, entitlement is rooted in the personal history of one's upbringing. Most importantly, greed encompasses multiple domains, from leisure to power and social capital while entitlement predicts a clear relationship that is dependent on inputs and contribution. Put simply, a greedy executive will cheat when the opportunity arises, while an entitled executive will only cheat to fill a gap between the realized outcomes and the perceived justly deserved ones.

Entitlement in Social Psychology

Entitlement is a component of narcissism (Campbell, Bonacci, Shelton, Exline and Bushman,2004, Major,1994). In the NPI test (Narcissism Personality Test) that is often used in social psychology to measure narcissism, entitlement is featured in eight out of the forty items. The results of the NPI test can be broken down to seven factors: Authority, Self-Sufficiency, Superiority, Exhibitionism, Exploitativeness, Vanity and Entitlement (Raskin and Terry,1988). While the first six factors effect behavior at the core of managerial actions, the seventh-entitlement is directly related to the personality driven need to receive more than others. It is also important to note that while entitlement is a component of narcissism, it alone does not imply a narcissistic personality (Campbell, Bonacci, Shelton, Exline and Bushman,2004). Three elements allow us to differentiate entitlement from the broader narcissism construct. Firstly narcissistic CEOs have been shown in multiple studies to engage in more activities outside of the company, and use firm resources for leisure activities. With regards to appropriating more compensation, entitlement would suggest a reverse relationship- the less non-firm related activities the executives engage in the more likely they are to feel entitled to higher compensation for their

activities. Secondly, similar to greed, narcissism does not imply a positive relationship between effort or success and the resulting compensation. Thirdly there's no compelling evidence that the level of narcissism in the population of U.S. executives changed over the past few decades. In contrast entitlement is been virtually lacking from public discourse until the 1980s, after which we can observe a surge in the use of the term "sense of entitlement" with regards to wages and compensation both in the news and in literature. This surge in the use of the term sense of entitlement coincide with the rise in the income disparity in the US, providing an interesting angle on the rise in income inequality.

In earlier studies, psychologists established the concept of entitlement, mostly in the context of values and social justice (Lerner,1987). Campbell et. al. (2004) differentiated entitlement from other personality dimensions such as narcissism, and a specific personality scale to detect entitlement was developed in 2004. This scale includes 9 items ranked on a 7 point scale such as “I demand the best because I’m worth it”, “I deserve more things in my life” and “Things should go my way”. Entitlement is correlated with gender (man feel entitled to more pay than woman), race, social class and external praises of worth (Major,1989, Major,1994, Major et al.,1984).

Effect of Entitlement on Corporate Fraud

High psychological entitlement implies believing that one should receive more than comparable others. In lab experiments researchers have shown that when given the opportunity to do so, individuals who are high on entitlement appropriate more pay than those who are low on entitlement (Campbell, Bonacci, Shelton, Exline and Bushman,2004). Importantly, early research in psychology established the basic tendency of workers to receive what they feel are

equitable outcomes for work done (Adams,1965). In this line of research ("equity theory"), numerous studies showed that when workers in an organization feel they are under-compensated compared to what other workers receive, they are emotionally burdened by feelings of inequity. These lead employees to try and consciously act to relieve this emotional burden and regain balance in the inputs-to-outcomes ratio they observe in comparable others. In the context of employees, the balance is achieved through adjusting their effort levels to match the perceived "fair" compensation and regain equity (Greenberg,1988). Unlike employees who have very little influence on their compensation, top executives have much higher level of control over their compensation, either through negotiating with the board of directors or through hiding portions of their compensation in illegal actions, and act that was made easier by the increased use of incentive pay (Bebchuk and Fried,2003).

Social comparison (Festinger,1954) provides important information that is used to judge and construct the judgment about both the level of pay (Wade, Porac, Pollock and Graffin,2006) and the "fair" level of personal entitlement. This information includes what types of inputs are expected, and what types of outcomes result from those inputs. Social comparison also provides information about the set of outcomes that are feasible within the societal context (Major,1994). In the context of corporate executives, this comparison will provide information on what is the relationship between effort (or success) and pay. This is a similar process to the way by students infer the relationship between performance in a course and the ensuing grade, or the way in which academics infer the relationship between research and publication and tenure by accessing information derived from comparison to others. Four dimensions of comparison were identified in social psychology literature (three by Levine and Moreland (1987) and the fourth added by Major (1994) directly in the context of entitlement): Self-Self, where outcomes of an individual

are compared to their own historical outcomes, Self-Other where outcomes of an individual are compared to other individuals, Group-Group where the comparison is between one or more social groups and Self-Group in which one is comparing their own relative standing to the group to which they belong (the "generalized others"). Most importantly, proximity and salience, perceived similarity and goals or motivation of the person making the comparison are key in making the social comparison (Major,1994). Given what we know of the perceived self worth of some executives in some industries (Lloyd Blankfein's quote that they are doing "God's work") this raises an interesting question- do the absurdly high levels of pay they command represent what these CEO's feel they are entitled to? (Arlidge and Beresford,2009).

Managers who feel more entitled would resent outcomes that do not conform to what they perceive to be justly earned compensation. This would motivate these executives to appropriate a hidden portion of their compensation. In contrast, research on executive status and hubris shows that high status and hubris manifests itself in high levels of compensation (Graffin et al.,2008) and in more risk taking and indications of unethical behavior (Chatterjee and Hambrick,2007, Malmendier and Tate,2009). Similarly, the underlying premise behind the executive greed argument implies that greedy executives will be paid more than their non-greedy peers and engage in more backdating at the same time. These contradicting predictions provide two diametrically opposed hypotheses on the relationship between executive pay and the likelihood of them engaging in backdating.

H1a (entitlement): Executives that are underpaid compared to their peers will be more likely to backdate.

H2b (hubris, greed): Executives that are overpaid compared to their peers will be more likely to backdate.

Social Class membership and Time Persistent Levels of Psychological Entitlement

Entitlement is comprised of both a time varying element (deservingness) and a persistent personality characteristic (Campbell, Bonacci, Shelton, Exline and Bushman,2004). Belonging to certain social groups endows individuals with a sense of entitlement that is than carried throughout their lives. Some of the more prominently entitled groups in North American society are white, upper-class males. Brenda (1994) provides experimental evidence showing that not only do both male and female individual allocate higher pay to males than to female workers, but that this is also perceived as "right" and creates no emotional burden on neither the receivers of the pay or the allocators. When the allocation is reversed (female workers receive higher pay than male workers) this creates emotional strain. Similar results were reported for racial differences. Social class is also shown to affect the persistent sense of entitlement for simple motivational reasons- social comparison is primarily between an individual and their group or between groups but rarely (if ever) between individual in one social group and different groups.

H2: Upper Class executives will be more likely to backdate than other executives.

Age Differences in Sense of Entitlement

According to simple rationality concerns, the likelihood that executives will engage in behavior that will jeopardize their future income decreases the more future income is at risk. In case of stock option backdating this translates into a negative relationship between the age of the executive and the likelihood that they will backdate. The more potential future earnings they have to lose because of controversial activities they engage in today the more future income is at risk. On the other hand, researchers in social psychology showed that there are clear generational differences in sense of entitlement. Specifically, individuals who were born in the "Me Generation" expect more praise and reward for the same performance than members of earlier generations (Harvey and Martinko,2009, Twenge,2006). These persistent differences predict both increased emotional strain when not attaining the rewards and increased self affirming reports of skills (Twenge, Campbell and Gentile,2011). These findings provide diverging predictions regarding executive's tendencies to backdate.

Assuming no psychological differences between young and older executives, rational agents should take into account the reputational risk of being caught and its impact on potential future earnings. While the reputational cost of defrauding investors and the tax authorities by engaging in stock option backdating rise with the reputation of the executive (senior executives with more tenure will have more "reputation" to lose) the impact of backdating on potential future earnings decreases sharply. The predictions of the rational agent framework will be conditional than on which is larger-reputation cost or net future income loss. Note that rationality concerns assume no generational differences in ethical considerations and that entitlement predicts generational differences, both in baseline levels of backdating and based on compensation difference between the core executive and their perceived peers.

H3a: Executives born after 1970 ("Generation Me") would be more likely to backdate.

H3b (reputation concerns): Younger executives will be more likely to backdate.

H3c (net future income concerns): Older executives will be more likely to backdate.

External Validation and Changes in Sense of Entitlement

Psychological entitlement and sense of deservingness are dependent upon external validation of the executive's talent and contribution. Praises and awards increase the individual's perception of self worth, and provide objective information as to their perceived worth by others. Managers who win awards for being the "CEO of the year", "Most innovative" and "Entrepreneurial" attribute more of the company success to their own actions, leading to increased sense of entitlement. On the other hand such recognition as "Highest paid" indicate both extreme levels of compensation and the external validation of this by others. Research in executive hubris and narcissism suggests that managers who exhibit behavior that will gain them such recognition as "highest paid" are more likely to engage in activities that defy conventions (Chatterjee and Hambrick,2007, Hayward and Hambrick,1997), and engage in unethical activities (Malmendier and Tate,2005, Malmendier and Tate,2009) either due to a sense of invulnerability or because of an extreme sense of self worth (Jean Marie Messier, former CEO of Vivendi Co. is famously quoted in Chatterjee and Hambrick (2007) as signing his emails J5M; Jean Marie Messier Master of the Universe). Furthermore, narcissistic and celebrity CEO's often procure large portions of compensation (Graffin et al.,2008, Wade, Porac, Pollock and Graffin,2006), leading them to be

more likely to be at the top of the pay charts for their respective industries. This line of research would suggest that managers who win recognition for being the highest paid in their field would be more likely to backdate. Similarly, executive greed would suggest simultaneously that executives will be more likely to command very high pay and extract even more rent from the company by backdating. In contrast, entitlement suggests that executives who receive high pay, and especially executives who receive signals from the environment that their pay is high would be less likely to backdate.

H4a (entitlement): Executives who receive external validation of their worth in terms of public awards would be more likely to backdate.

H4b (entitlement): Executives who receive external indications that their pay level is high would be less likely to backdate.

H4c (hubris): Executives who receive any external recognition will be more likely to backdate.

Measurement of entitlement

Entitlement is composed of two constructs: a time varying sense of "deservingness" and an underlying personality characteristic representing a stable sense of entitlement (Campbell, Bonacci, Shelton, Exline and Bushman,2004)[8]. For this study we use unobtrusive indicators of psychological entitlement in a similar fashion to the way Chatterjee and Hambrick (2007) use unobtrusive measures to assess narcissism in CEO's.

[8] These attributes can be measured using the Psychological Entitlement Scale (PSE), which was not available for this study.

Measuring entitlement- Social comparison:

Comparison of Pay to Others

The more prominent source of entitlement is derived from social comparison of one to their perceived peer group (Levine and Moreland,1987, Major,1994). This group can be either other executives who manage similar companies, other executives who share a common training (school peers) or other geographically proximate executives. Kim, Kogut and Yang (Forthcoming) examine the contagion in the level of CEO pay across similar group (director ties, peer groups and educational networks) and find that only peer groups comparison survives the endogeneity test for the contagion effect. To capture the effect of peer groups we use a similar method to Kim, Kogut and Yang (Forthcoming) and take the residuals off a first stage pay regression on each of these three groups (peer groups in similar companies, geographically proximate companies and school cohorts) and use them to predict future backdating behavior.

Upper Class Membership

Gender, Race and a surname indicating upper-class membership (names ending with "Jr." or "II" for example) are used to proxy belonging to a more organically entitled group. Similarly, being included in the Fortune 1000 richest people (or similar lists) indicates belonging to an upper-social-class. A third variable we use is graduating from an Ivy league or other highly prestigious school, as most of the executives within our sample graduated from collage between 1970 and 1990 this correlates strongly with social class membership.

External Validation

Several variables provide useful variation over this dimension: winning a performance related award ("best CEO", "Manager of the Year" etc.) and awards for innovation ("Entrepreneur of the Year", "One of the Top 15 most Influential Women Driving Innovation" etc.). These awards provide an externally validated shock that affirms entitlement to favorable outcomes.

Methodology

Sample

The data for identifying the backdated stock option grants comes from Thomson Reuters Insider Trading, a database comprising of the reported filings of forms 3, 4, 5 and 144 submitted to the SEC each time a stock option grant is granted to insiders. The forms describe, among other things, the number, time and price of stock option grants to executives and directors in the company. In constructing the data, we use a cleansing procedure similar to that used by prior research (Bebchuk, Grinstein and Peyer,2010, Bizjak, Lemmon and Whitby,2009, Heron and Lie,2009). we include only observations for which Thomson Reuters indicates that the data were "verified through the cleansing process," "cleansed with a very high level of confidence" or "added to nonderivative table in order to correspond with record on the opposing table." we do not include data for which Thomson Reuters had a lower level of confidence in its quality. we also eliminate grants that appear to be scheduled—i.e., grants that are assigned at the same date in two or more consecutive years (Heron and Lie,2007).

We use only at-the-money grants for the analysis. we combine all grants by the same company on the same date and at the same price into one observation. For each stock in the sample, we collect the closing stock price data from CRSP and match the stock grant day to the CRSP stock price date. To verify that the date of the stock option grant is accurate, we follow Heron and Lie (2007) and check that the assigned strike price of the grant is the stock price at the day of the grant. If the price is close to, but not exactly, the price of the grant on that date, we check a +-1 day window, and if the price is closer to the price on one of those days, we assign the grant to that day.

These data are supplemented by financial data on the companies obtained from COMPUSTAT and data on executive's history, their past education, awards won and other biographic information was obtained from BOARDEX. To match executives across BOARDEX and Thomson Reuters Insider Trading datasets we used name matching algorithms in a recurring process[i]. Table 1 describes the data in terms of firm-year observations, executive year observations and total number of observations for which we have complete data matched across the datasets. The total number of observations, for CEO, CFO and Chairman of the Board (sometimes referred to as President) over the nine years for which reliable data is available is 21,478. It is comprised of 9,656 firm-year observations over 17,890 executive year observations.

--- Insert table 1 about here ---

To gather the compensation and demographic information for executives we name matched Execucomp dataset with Thomson Reuters Insider Filing data. The merge matched 62.5% of the names (36,723 observations). Execucomp covers the five highest paid individuals in the company (unless the company voluntarily provides information on more position holders

in it's annual proxy filings). The portion of Thomson Reuters Insider Filing that is relevant to this study (table 2, form 144) provides information only on executives that received stock option grants. BoardEx provides information on board members for executives and board members in all companies that were publically traded in 2002. Matching between all three datasets yielded a very small number of observations (only 4,752 observations were matched across all three datasets). To preserve the power and avoid increasing any potential survival bias across the intersection of all three datasets we test our hypotheses independently in the dataset with the most matched observations; for demographic information and executive compensation we use the match between Execucomp and Thomson Reuters (in similar fashion to Bebchuk et. al. (2010)), for awards, upper-class membership and public recognitions we use the match between BoardEx and Thomson Reuters.

Descriptive statistics

Since the sample contains all executives who had the potential to backdate (were granted stock options during the sample period) and all the executives who backdated out of that sample, the descriptive statistics indicate a meaningful correlation, if not causation; executives who graduated from top schools backdate more, executives who win performance awards backdate more and executives who graduate from the top 20 ranked universities backdate more (with the exception of CalTech graduates).

--- Insert figure 3 about here ---

There are also significant differences in the rates of backdating among executives according to the highest degree earned, and the degree type. Figure 4 shows the frequency of backdating according to the highest degree earned by the executive.

--- Insert figure 4 about here ---

Executives with legal degrees have higher than average backdating behavior, as do students of management programs and MBA. Interestingly, executives with education in Finance and Accounting backdate less.

The data includes 7,778 awards that were given to executives who appear in the nine years that comprise of the study period. These awards include such acknowledgements as medals for military service, citizenship and philanthropy awards, community specific awards (most prominently awards from the Black and Latino community to executives) and ethics awards to appearing on the Fortune Magazine "richest people" list or the Forbes "top paid executive" list. In figure 5 the awards are grouped to 15 major categories: Black community awards (for example the National Association for the Advancement of Colored People (NAACP) award), Latino community awards (Latino Leaders Magazine awards), awards from Female organizations (the American National Council for Woman for example), Civic awards (Distinguished Civilian Service Medal for example), Military medals (45 of the executives in our sample were awarded with the Purple Heart Medal), being included in one of the Richest individuals list (Richest individuals, Richest Americans, World Richest Persons list etc.), awards from major publications for business success, superlative awards (variations on "CEO of the year"), awards from business schools, awards from minority organizations, awards from Magazines (that are not included in any of the other catagories), Entrepreneurship awards ("Entrepreneur Of The Year", "Master Entrepreneur Award" etc.), Philanthropy awards and Compensation awards ("25 Highest Paid Banking Executive" for example). Additionally, Ernst & Young auditing company gives awards each year in a variety of local and national locations- from the "Ernst & Young Entrepreneur of the Year award" to "Ernst & Young Entrepreneur of

the Year Southeast Region" and even "Ernst & Youngs San Diego Entrepreneur of the Year". We included these as a different category (Ernst & Young Entrepreneur Awards).

--- Insert figure 5 about here ---

To differentiate sense of entitlement from other explanations such as greed or simple agency theory appropriation of resources we examine the relationship between external activities of the executives and their backdating behavior. Figure 6 shows the frequency of backdating plotted against outside activities for each executive. These activities include golf club memberships, board seats on educational institutions and non for profit organizations, political and foreign affairs organizations (such as the famous "council of foreign affairs" organization) etc. The number of external memberships is a close proxy to the commitment of the executive to the firm; the more external commitments an executive has the less engaged they can be with company management. Similar rationale has been used in previous research for the number of books executives write, their use of corporate jet and their golf club memberships (Malmendier and Tate,2005, Malmendier and Tate,2009, Yermack,2006).

--- Insert figure 6 about here ---

There is a strong negative relationship between the number of external activities top executives engage in and the frequiency of backdating suggesting that the more focused CEO's who spend more time at the company backdate more.

Age data was difficult to match across datasets. There is reliable matching on 1,008 CEO's. As reported in figure 6, both older and very young CEO's backdate less than their mid career peers.

--- Insert figure 7 about here ---

Models and Variables

Previous research argued that stock options that are granted at the lowest price date of a calendar month are likely backdated (Bebchuk, Grinstein and Peyer,2010). Alternative methods for evaluating whether a stock option grant is backdated used the return difference within this window to estimate the luckiness of a grant, these later methods incorporate two important features: firstly, they include grants that display a high return within the window (very lucky) and secondly, they don't impose a demand for the grant to be assigned at the lowest price day. The downside is that these methods suffer from over-identification of backdated grants. In the following models we adapt this method to identify more robustly what grants are likely to be manipulated. We count the number of lucky grants (based on the return difference method) for each executive. If the executive received multiple lucky grants than the likelihood of all of the grants to be randomly lucky is significantly lower than if this "luck" was a onetime event. We designate all lucky grants given to executive who experience multiple "lucky" grants as "robust backdated" grants and estimate in the following models the likelihood of them occurring.

To construct the comparison group we run a regression of the total compensation of executives (tdc1 in Execucomp) on firm characteristics (size, industry) firm performance (stock price performance in the past quarter and year) and individual executive characteristics (last year's pay, tenure at the company, tenure in current position, age and gender). We standardize the resulting residuals (subtract the mean and divide by the standard deviation) to avoid biasing the results for outliers. We take the residuals off the pay regression and use them as independent

variables in the following models. Note that we use tdc1 (total direct compensation) for the estimated pay. This variable includes all salary, bonus, long term incentive payouts in the given year, restricted stock grants and the value of the stock option grants granted in the given year valued using the Black-Scholes method. This represents what the board of directors and the executive thought was the value of the compensation package and is least affected by the executive's choice to backdate or not backdate their grants.

Table 2 reports the main findings of the results of the pay regression on the likelihood of receiving a robust backdated grant.

--- Insert table 2 about here ---

The models vary on the control variables that are included in the estimation. In model 1 only the residuals are included, model 2 includes the stock's monthly volatility (which closely proxies how attractive it would be to backdate a grant given within this month). Model 3 includes also dummy variables indicating whether the grant receiver is among the top paid executives (one or two standard deviations higher than the mean residuals) and industry controls. Model 4 includes role control (CEO, CFO, Chairman, Director and Vice President indicators) and model 5 is the full model with all covariates. In all models the residuals are negative and significant ($p<0.01\%$). The less executives are paid compared to their peers the more likely they are to backdate.

To differentiate entitlement from other explanations such as hubris or greed we model the likelihood of executives to backdate on the number of external activities they engage in. We collect this data from BoardEx, where affiliations such as golf club memberships, executive positions in non-for-profit and educational institutions and other non-firm-related affiliations are

recorded. The results of the logistic regression of backdating on other activities are reported in table 3.

--- Insert table3 about here ---

The results reported in table 3 replicate previous findings that CEO's and CFO's are more likely to receive backdated stock option grants. The results also suggest that, while previous research showed that executives who experience hubris or superstar status increase their activities outside the company (Chatterjee and Hambrick,2007, Malmendier and Tate,2009), when it comes to backdating stock option grants, the more activities an executive has outside the company the less likely they are to engage in such action. The results hold when controlling for industry and stock price volatility.

We include two measures for upper-class membership. The first is based on the executives name. We include names ending with "Jr." "Sr." "II" or "III" as well as names starting with the prefix "Sir" as indicating the executive was born to upper class parents. We include in addition an indicator of whether the executive herself was ever designated as one of the richest people in the world or in one of the regional lists (North America, South America, Europe and Asia). The results of the logistic regression of backdating on these two indicators is reported in table 4.

--- Insert table 4 about here ---

Model 1 shows the main effect of upper-class membership on propensity to backdate. Being among the richest individuals increases the likelihood of backdating almost twice compared to not being included in these lists. This raises an interesting causality question- backdating alone

cannot account for the wealth needed to be included on these lists[9], but could the same personality traits that increase the likelihood of executives backdating assist them in gaining vast wealth throughout their careers?

The second indicator of upper-class membership, the given name of the executive addresses some of these concerns. We interact the upper-class name indicator with the position of the executives in the company and find that the majority of this effect is at the CEO, CFO and Vice President level. CEO's with upper class names backdate more than their peers, even when controlling for industry and stock price volatility. The effect is even stronger for CFO's with upper-class names.

The third test we run is on executive's behavior given that they won external recognition for their performance. To do so we decompose the "awards" field in BoardEx database by the award name and the award granting organization. Compensation awards indicate that the executive is among the highest earners in their category, which according to the entitlement theory would render them less likely to backdate. Awards for exceptional success such as "CEO of the year" or "Most innovative leader" would increase executive's sense of entitlement and therefore increase the likelihood that they will backdate. We count awards forward, including zero awards until the date the awards were granted and the backward count of awards from the date they were won. The results for the logistic regression of backdating on awards won is reported in table 5.

--- Insert table 5 about here ---

[9] Dan Snyder, the owner of the Washington Redskins football team closes the Forbs 400 richest people in North America list with net worth of 1.05 billion dollars. Backdating of stock option grants can increase the option value by only hundreds of thousands of dollars to a few millions and cannot account for the vast wealth needed to be included in these lists.

The results for most awards hold across model specifications. For awards granted by magazines (including such superlatives as "CEO of the year") the positive effect of winning an award becomes insignificant. The coefficient for winning compensation awards is negative and significant. Winning entrepreneurship awards increases the likelihood of backdating by almost 70% but this figure drops when we include industry controls, since a significant portion of these awards are granted to companies in hi-tech industries. The result does not disappear, winning entrepreneurship awards increases the likelihood that executives will backdate by as much as 40%, even when controlling for industry. The coefficient for non for profit organizations is negative and significant across specifications. This result can be interpreted either as good identification of the ethical executives by these organizations.

Lastly we run a model to test generational differences in backdating behavior. We differentiate between the effects of age and generation by interacting age with the generational group "Generation Me" for all executives born after 1970. Table 6 reports the results for the logistic model of age and generation on the observed backdating behavior of executives

--- Insert table 6 about here ---

The results confirm that the age effect is confined to the generation of executives born after 1970. Age is negatively associated with backdating both for the group of executives born after 1970 and for the executives born before that year. Executives who were born in this generation are twice more likely to backdate than their older peers. Despite this strong effect there is no evidence that this generation reacts to lower compensation any differently than older executives.

Sample Robustness

The BOARDEX data covers all directors and senior managers in publically traded companies, provided the executives or the company were still active in 2002. Since our sample starts in 1996 not all of the executives in our sample are covered. Executives that are covered by BOARDEX have a complete history prior to 2002. Table 7 shows the match rate between the stock grant data and BOARDEX executive biographical data. Columns refer to the earliest appearance of an executive in our stock option grants data ("Earliest"), rows refer to the latest appearance of the executive in the stock grant data ("Latest"). The match rate for executives that appear only in 1996 is only 7.8%, the match rate increases as the year of earliest and latest appearance reaching 93.3% for executives that appear throughout the sample.

--- Insert table 7 about here ---

The cumulative name match rate for our complete sample is 59%, caused both for lack of early year coverage by Boardex as well as the fact name matching algorithms had to be used for matching the two datasets. To address possible selection problems causing unproportional representation of backdaters in either the surviving sample or the dropped observations we compare the rate of backdating in the surviving sample to the rate in the complete sample using three methods to identify backdated stock option grants described in appendix 1. The first method, used by Bebchuk, Grinstein and Peyer (2010) designates all grants assigned at the lowest price date of a calendar month as backdated grants. The second method expands on this rational to eliminate randomly lucky grants. In this method (robust backdating table), only executives that receive grants that are assigned at the lowest date of a calendar month at least

twice in the sample years are designated as backdating executives. The last method based on Heron and Lie (2007, 2009) and Bizjak, Lemmon and Whitby (2009) uses the return difference within an event window to determine whether the stock option grant is backdated or not. The results are reported in table 8. There is a slightly higher proportion of backdating among CEO's and CFO's in the survived sample ($p<0.05\%$) for the lowest price date and the return difference method, but no difference across the sample in the proportion of backdaters using the robust backdating identification method.

--- Insert table 8 about here ---

The higher proportion of backdaters in the matched sample can arise either randomly from the name matching procedure or due to higher representation of executives who backdate in the BoardEx dataset. The latter would be a result of higher proportion of executives who backdated and stayed active in publically traded companies (post 2002). The non-significant difference in the robust backdating identification suggests the higher proportion of backdaters in the matched sample is the result of randomly lucky grants, but it does not rule out survival bias of backdating executives from earlier years (1996-2002) to the end of the sample (2005).

Discussion

Overall the findings provide strong support for our theory of managerial entitlement. Using identified backdated stock option grants we provide evidence that multiple variables that correlate strongly with psychological entitlement lead executives to engage in backdating of their stock option grants. The main result; that managers react to negative compensation difference from their peers by increasing likelihood of engaging in stock option backdating holds across the models. Note that for all the models performance of the company is implicitly modeled in the

pay residuals regression: the first stage pay regression includes not only industry and individual covariates but also performance measures which are positively correlated with the chosen level of compensation. The finding that managers seek to bridge compensation differences between them and their peers using backdating is consistent with our prediction and rules out predictions of alternative theories of managerial deviance such as greed and hubris. Managers who engaged in stock option backdating were not solely the highly paid, highly praised executives but rather the ones where there was disparity between praise and performance and actual compensation.

We conceptualize of entitlement as composed of two elements, one reflecting "deservingness" based on performance and effort and the other reflecting psychologically stable sense that one should receive more than others. We provide evidence that managers who are less engaged in company affairs, are members in more organizations such as golf clubs, non for profits, various boards of trustees etc. are less likely to backdate than their peers who are more involved with company affairs. This confirms the relationship between perceived inputs and expected compensation that is the deservingness element predicted in managerial entitlement.

We make a general categorization based on research on psychological entitlement that upper class individuals have a higher baseline sense of entitlement. This can be the result of comparing the self to others within the social group who have a higher baseline of monetary and non monetary rewards in social outcomes(Major,1994, Major et al.,2002). We predict therefore in our theory that additional evidence for entitlement would be an increase in the likelihood of backdating for executives that are members of the high social class. We find that both the ultra rich and individuals who's names indicate that they were born to the privileged classes of society have an increased likelihood of backdating. We do not rule out alternative explanations for increased backdating by higher social class individuals such as lower perceived likelihood or

severity of sanction but we rule out other popular alternative explanations such as greed (Piff, Stancato, Côté, Mendoza-Denton and Keltner,2012).

Additional evidence for psychological entitlement driving managerial backdating comes from generational differences in sense of entitlement (Twenge,2006, Twenge, Campbell and Gentile,2011). We find that managers who were born after 1970 were significantly more likely to backdate compared to their peers, despite the fact that age has an overall negative effect on the likelihood of managers to backdate. The "Generation Me" effect holds when controlling for industry effects, suggesting it is not affected by self selection of young executives to the technology industry that is associated with high backdating.

External praises have a mixed effect. Positive praises on performance and talent increase the likelihood that managers will backdate while public recognition of high pay levels decrease it. Interestingly, minority organizations identify ethical executives well; winning a civic award decreases the likelihood that executives will backdate significantly, both economically and statistically. On the other hand, executives who win awards for entrepreneurship and managerial skills are more likely to backdate than their non-award-winning peers.

There is much discussion in popular press, and some in academic journals on managerial greed as driving unethical practices. Together, the findings presented in this study suggest shifting norms of entitlement provide part of the explanation for the growing levels of managerial (and non managerial) organizational deviance. To paraphrase on Twenge (2006) book title- it's not only today's youth that is more confident, assertive and entitled than ever; it is also today's the managerial class.

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Figures:

Figure 1
"sense of entitlement" in major news publications articles on topics of executive pay
(source: LexisNexis search)

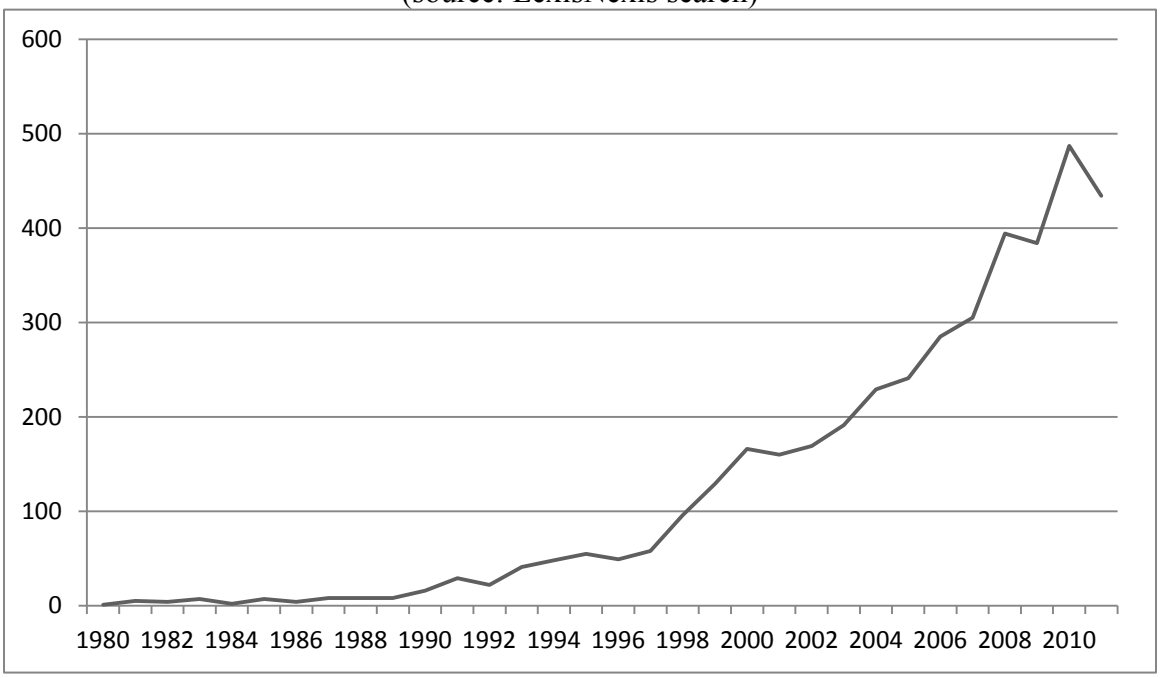

Figure 2
Mentioning of "sense of entitlement" vs. sense of gratitude in literature (source: Google ngram)

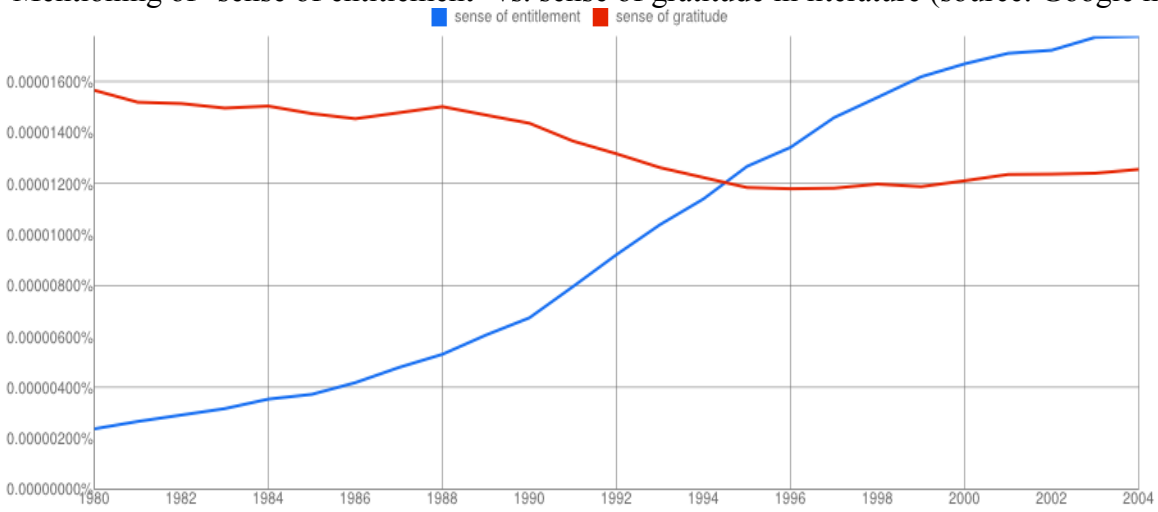

Figure 3
Frequency of backdating among graduates of top 20 universities vs. lower ranked university graduates

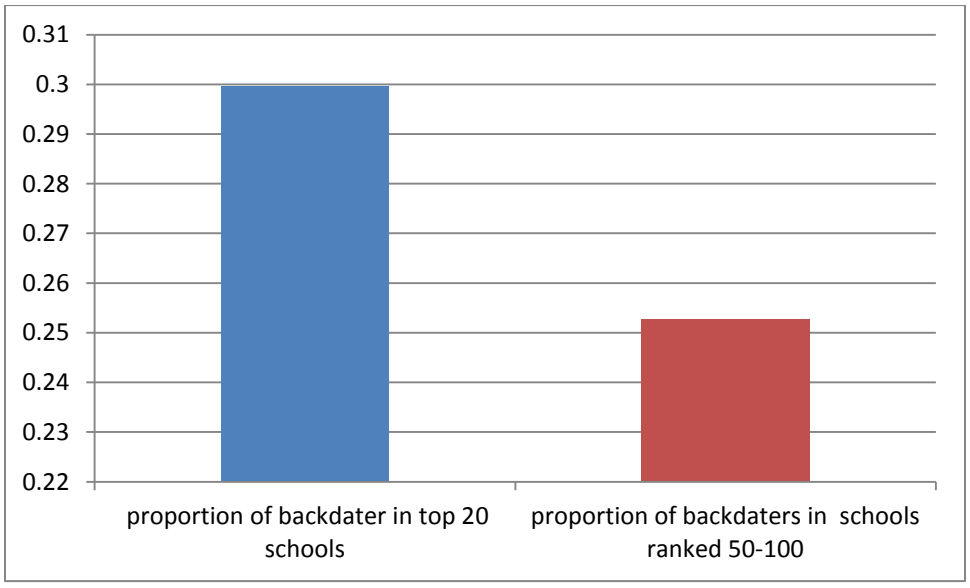

Figure 4
Frequency of backdating according to highest degree earned

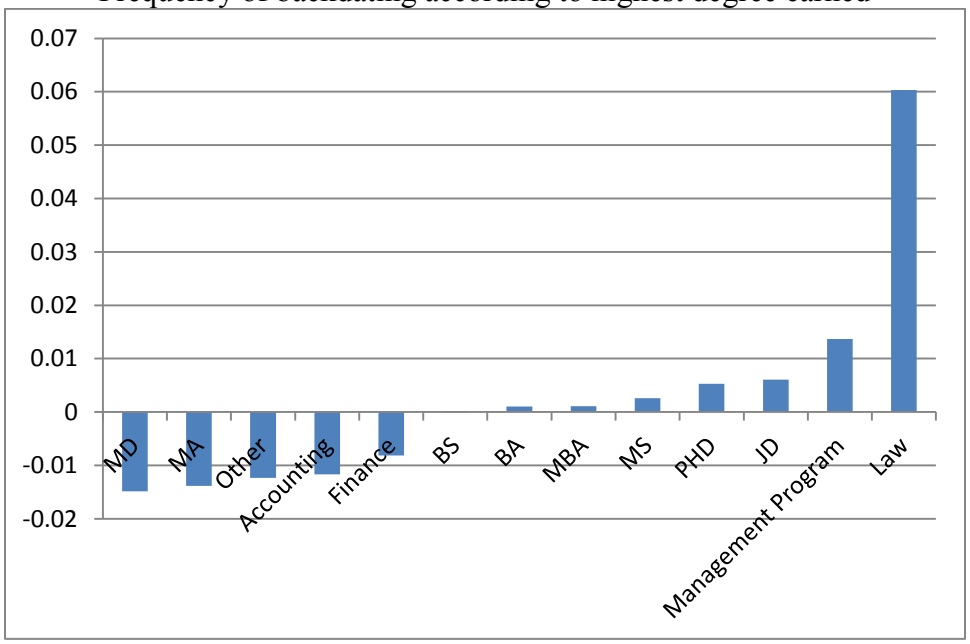

Figure 5
Frequency of backdating according to awards earned

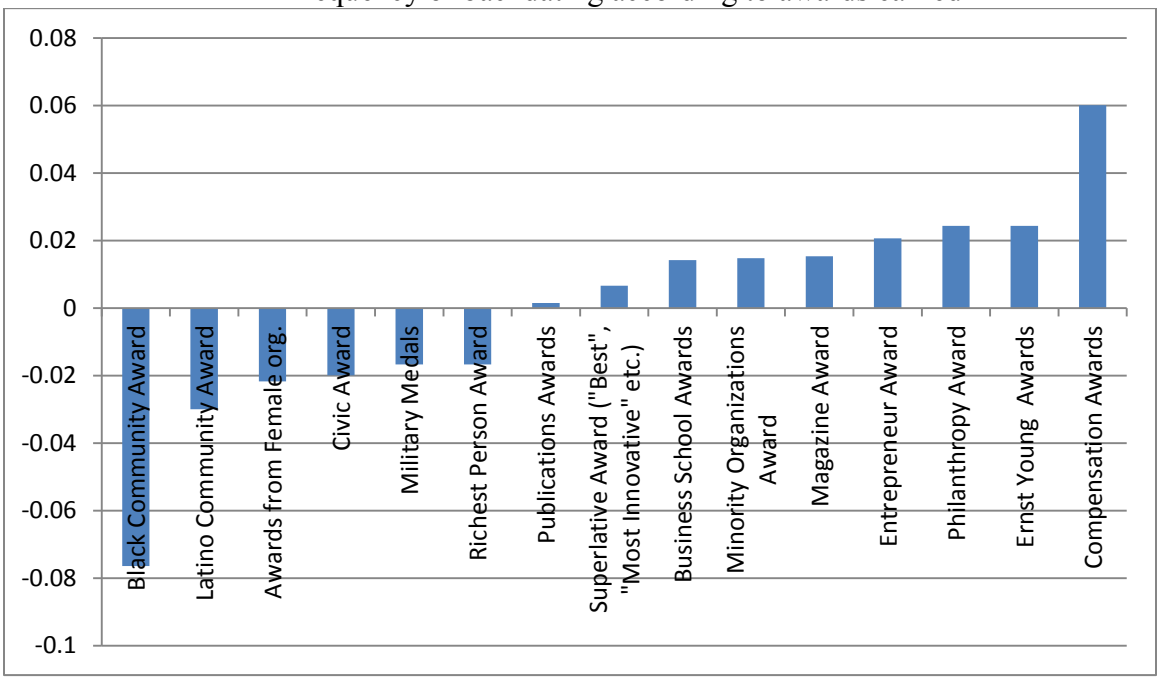

Figure 6
Number of activities outside the company and frequency of backdating

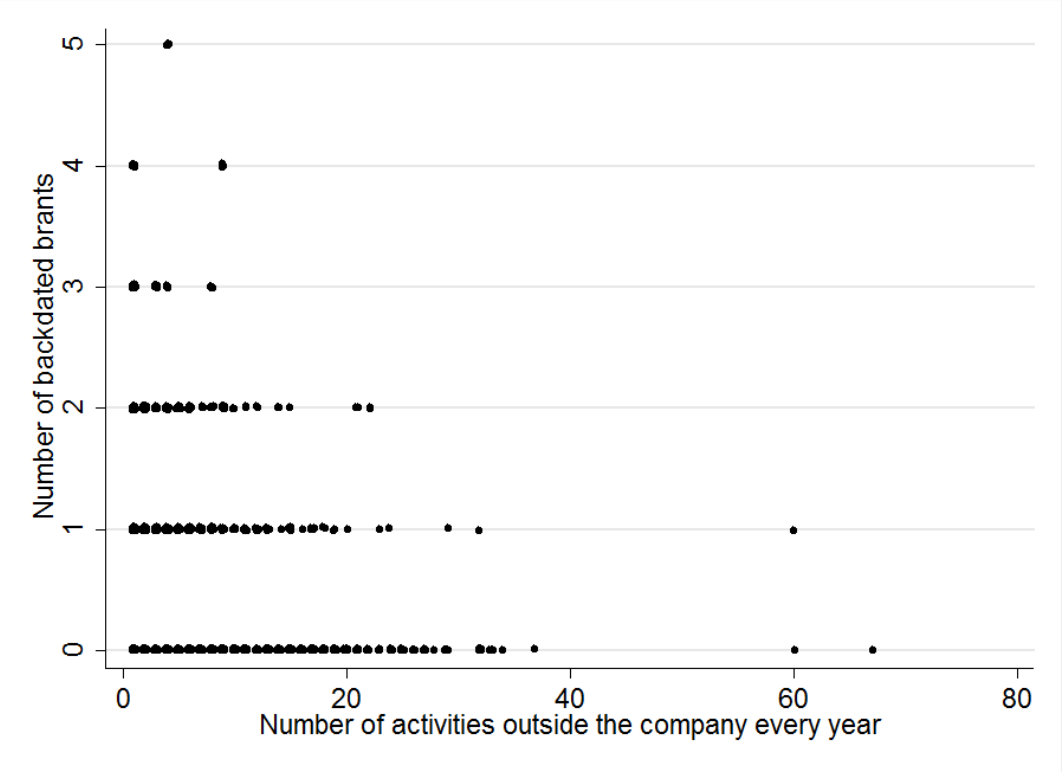

Figure 7
Age and frequency of backdating

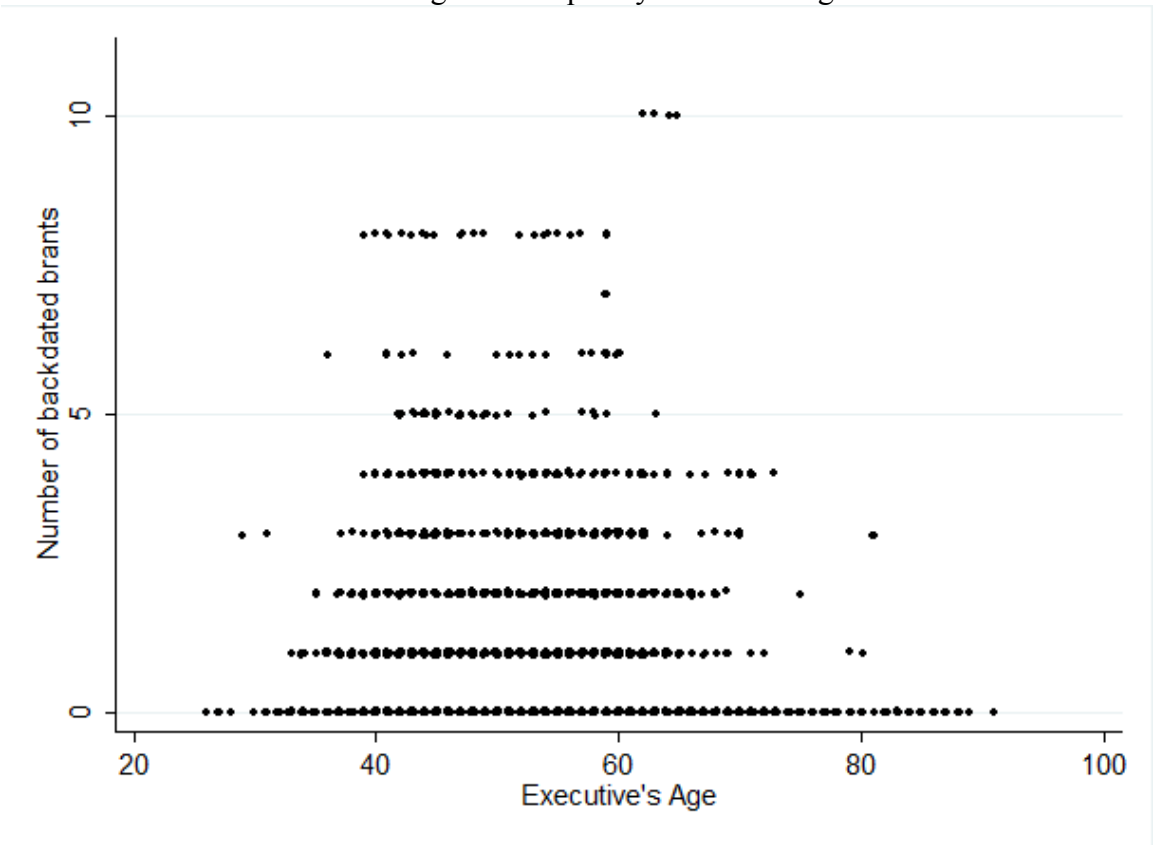

Table 1
Number of observations by year, firm and executives

Year	Firms	Executives	Firm-executive
1996	1,278	2,223	2,596
1997	1,313	2,444	2,938
1998	1,329	2,583	3,079
1999	1,184	2,235	2,595
2000	1,100	2,105	2,552
2001	982	1,808	2,262
2002	875	1,564	1,883
2003	836	1,520	1,961
2004	759	1,408	1,612
	Firm-Year observations	**Executive-year observations**	**Firm-Executive-Year observations**
	9,656	17,890	21,478

Table 2

Peer Group Compensation Level and the Likelihood of Backdating

Logit of likelihood of receiving grants multiple lucky grants on residuals of the pay regression. Residuals are the executive's residuals off the stage 1 pay regression. Volatility is the monthly standard deviation of the stock price. 1 sd higher is an indicator variable taking the value of 1 when the executive's residual is greater than one standard deviation of the residuals. 2 sd higher is an indicator variable taking the value of 1 when the executive's residual is greater than two standard deviation of the residuals. Industry fixed effect is at the 2 digit sic level, role fixed effect is an indicator variable for executive role in the firm (CEO, CFO, VP, Director or Chairman)

VARIABLES	(1) robust_backdate	(2) robust_backdate	(3) robust_backdate	(4) robust_backdate	(5) robust_backdate
residuals	-0.0364**	-0.0551**	-0.0745**	-0.0768**	-0.129**
	(0.00653)	(0.00897)	(0.0101)	(0.0120)	(0.0151)
volatility		0.153**	0.136**	0.159**	0.148**
		(0.0161)	(0.0149)	(0.0167)	(0.0159)
1 sd higher		0.0262	-0.440	-0.381	-0.356
		(0.0728)	(0.965)	(0.893)	(0.950)
2 sd higher			-0.578	-0.387	-0.479
			(0.965)	(0.893)	(0.951)
Industry fixed effect			yes		yes
Role fixed effect				yes	yes
Constant	-1.544***	-1.745***	-14.84***	-1.274	-15.35***
	(0.0298)	(0.0466)	(1.437)	(0.894)	(0.772)
Observations	20,708	20,708	20,671	20,708	20,671

Robust standard errors in parentheses

** p<0.01, * p<0.05, + p<0.1

Table 3

Membership in Non Firm-Related Organizations and the Likelihood of Backdating

Logit of likelihood of receiving multiple lucky grants on number of external activities. Log_other_actv is the log transformation of the number of external activities executives engage in. Volatility is the monthly standard deviation of the stock price. 1 sd higher is an indicator variable taking the value of 1 when the executive's residual is greater than one standard deviation of the residuals. 2 sd higher is an indicator variable taking the value of 1 when the executive's residual is greater than two standard deviation of the residuals. Industry fixed effect is at the 2 digit sic level, role fixed effect is an indicator variable for executive role in the firm (CEO, CFO, VP, Director or Chairman)

VARIABLES	(1) robust backdate	(2) robust backdate	(3) robust backdate	(4) robust backdate	(5) robust backdate
log_other_actv	-0.187**	-0.193**	-0.146**	-0.204**	-0.151**
	(0.0180)	(0.0181)	(0.0186)	(0.0185)	(0.0190)
volatility		0.129**	0.110**	0.133***	0.112**
		(0.00918)	(0.00851)	(0.00926)	(0.00862)
CEO				0.341**	0.279**
				(0.0716)	(0.0731)
CFO				0.221**	0.253**
				(0.0804)	(0.0813)
PorCB				-0.173*	-0.112
				(0.0676)	(0.0697)
VP				-0.288**	-0.185*
				(0.0779)	(0.0805)
Director				-0.000128	0.0223
				(0.0714)	(0.0733)
industry controls			yes		yes
Constant	-1.813***	-1.977***	-1.569***	-1.949***	-1.533***
	(0.0268)	(0.0294)	(0.534)	(0.0756)	(0.543)
Observations	35,765	35,765	35,427	35,765	35,427

Robust standard errors in parentheses

** p<0.01, * p<0.05, + p<0.1

Table 4

Upper Class Membership and the Likelihood of Backdating

Logit of likelihood of receiving multiple lucky grants on upper class membership. UCN is an indicator of whether the executive has an Upper Class Name. Volatility is the monthly standard deviation of the stock price. 1 sd higher is an indicator variable taking the value of 1 when the executive's residual is greater than one standard deviation of the residuals. 2 sd higher is an indicator variable taking the value of 1 when the executive's residual is greater than two standard deviation of the residuals. Industry fixed effect is at the 2 digit sic level, role fixed effect is an indicator variable for executive role in the firm (CEO, CFO, VP, Director or Chairman)

VARIABLES	(1) robust_backdate	(2) robust_backdate	(3) robust_backdate	(4) robust_backdate
Richest person list	0.773**	0.981**	0.812**	1.091**
	(0.249)	(0.268)	(0.248)	(0.268)
UCN	0.175*	0.182*	-0.887	-0.696
	(0.0989)	(0.102)	(0.578)	(0.517)
volatility	0.0601**	0.0564**	0.0586**	0.0545**
	(0.00827)	(0.00777)	(0.00852)	(0.00805)
CEO			-0.0172	-0.0328
			(0.130)	(0.130)
CFO			-0.507^{+}	-0.438
			(0.306)	(0.309)
Chairman			0.410**	0.401**
			(0.122)	(0.124)
VP			0.652**	0.530**
			(0.170)	(0.169)
Director			0.550**	0.435**
			(0.151)	(0.151)
Interactions				
UCNxCEO			1.034**	0.983**
			(0.344)	(0.369)
UCNxChairman			-0.405	-0.215
			(0.331)	(0.357)
UCNxCFO			2.182**	2.241**
			(0.752)	(0.749)
UCNxVP			1.390**	0.997*
			(0.522)	(0.453)
UCNxDirector			0.860	0.681
			(0.567)	(0.505)
industry controls		yes		yes
Constant	-3.373**	-16.86	-3.972**	-15.65**
	(0.0338)		(0.155)	(0.795)
Observations	32,219	30,538	32,219	30,515

Robust standard errors in parentheses

** p<0.01, * p<0.05, $^{+}$ p<0.1

Table 5

Winning Awards and the Likelihood of Backdating

Logit of likelihood of receiving multiple lucky grants on awards won by the executive. UCN is an indicator of whether the executive has an Upper Class Name. Volatility is the monthly standard deviation of the stock price. 1 sd higher is an indicator variable taking the value of 1 when the executive's residual is greater than one standard deviation of the residuals. 2 sd higher is an indicator variable taking the value of 1 when the executive's residual is greater than two standard deviation of the residuals. Industry fixed effect is at the 2 digit sic level, role fixed effect is an indicator variable for executive role in the firm (CEO, CFO, VP, Director or Chairman)

	(1) robust backdate	(2) robust backdate	(3) robust backdate	(4) robust backdate
Awards				
compensation	-0.339^{+}	-0.380^{+}	-0.425*	-0.376^{+}
	(0.205)	(0.212)	(0.206)	(0.212)
entrepreneurship	0.640**	0.393**	0.586**	0.334**
	(0.0754)	(0.0800)	(0.0797)	(0.0833)
philanthropy	0.421	0.518	0.487	0.514
	(0.540)	(0.544)	(0.530)	(0.542)
female org.	-0.523**	-0.423**	-0.497**	-0.419**
	(0.135)	(0.143)	(0.136)	(0.143)
black org.	-0.700*	-0.679*	-0.750*	-0.664^{+}
	(0.388)	(0.403)	(0.412)	(0.404)
latino org.	-0.00559	0.274	0.0424	0.275
	(0.264)	(0.273)	(0.264)	(0.275)
other minority org.	-0.661^{+}	-0.706	-0.733^{+}	-0.703
	(0.389)	(0.432)	(0.395)	(0.430)
Magazine	0.120^{+}	0.0850	0.0740	0.0630
	(0.0692)	(0.0749)	(0.0714)	(0.0753)
volatility		0.130**	0.143**	0.131**
		(0.00989)	(0.0103)	(0.00992)
CEO			0.300**	0.299**
			(0.0791)	(0.0803)
CFO			-0.137	0.0215
			(0.146)	(0.146)
Chairman			-0.220**	-0.192*
			(0.0777)	(0.0805)
VP			-0.0838	-0.124
			(0.103)	(0.107)
Director			-0.0924	-0.0745
			(0.0877)	(0.0910)
Industry controls		yes		yes
Constant	-2.213**	-16.19**	-2.330**	-16.13
	(0.0202)	(0.803)	(0.0907)	
Observations	32,204	31,258	32,204	31,258

Robust standard errors in parentheses

** p<0.01, * p<0.05, $^{+}$ p<0.1

Table 6

Age, Generational Membership and the Likelihood of Backdating

Logit of likelihood of receiving multiple lucky grants on age and generational cohort of executives. GenMe is an indicator variable taking the value 1 when executives were born between 1970 and 1985. Age is the executive's age at the time of backdating as reported in execucomp. Residuals is the executives residual off the stage 1 pay regression. Volatility is the monthly standard deviation of the stock price. Industry fixed effect is at the 2 digit sic level, role fixed effect is an indicator variable for executive role in the firm (CEO, CFO, VP, Director or Chairman)

VARIABLES	(1) robust_backdate	(2) robust_backdate	(3) robust_backdate	(4) robust_backdate
GenMe	3.129**	2.579*	2.671*	-0.284
	(1.097)	(1.150)	(1.167)	(0.186)
age	-0.0514**	-0.0496**	-0.0467**	
	(0.00433)	(0.00438)	(0.00462)	
GenMexAge	-0.0934**	-0.0788**	-0.0814**	
	(0.0288)	(0.0302)	(0.0307)	
residuals				-0.138**
				(0.0252)
GenMexResiduals				0.0449
				(0.0415)
volatility		0.156**	0.156**	0.175**
		(0.0135)	(0.0135)	(0.0177)
CEO			0.141*	0.226*
			(0.0709)	(0.0973)
CFO			-0.0652	-0.150
			(0.0906)	(0.114)
PorCB			-0.146^{+}	0.0793
			(0.0770)	(0.0963)
VP			0.0732	-0.0999
			(0.0860)	(0.112)
Director			-0.154*	-0.0189
			(0.0665)	(0.0803)
Industry controls				yes
Constant	0.654**	0.275	0.233	-15.93
	(0.225)	(0.230)	(0.248)	
Observations	14,686	14,686	14,686	11,609

Robust standard errors in parentheses

** p<0.01, * p<0.05, $^{+}$ p<0.1

Table 7
Match rate between stock option grant data and BOARDEX

HitRate		**Latest**									
		1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
	1996	7.82%	10.47%	14.66%	23.70%	33.45%	49.38%	63.52%	73.64%	83.94%	93.34%
	1997		11.00%	12.32%	16.43%	29.44%	42.69%	59.50%	69.58%	81.11%	91.45%
	1998			14.62%	17.78%	27.52%	40.48%	49.79%	68.94%	80.61%	92.60%
Earliest	1999				20.87%	24.95%	34.70%	48.64%	71.36%	82.64%	90.25%
	2000					24.69%	33.68%	47.61%	67.74%	76.57%	91.53%
	2001						37.39%	43.88%	60.09%	77.44%	89.36%
	2002							52.36%	65.21%	72.96%	88.97%
	2003								64.76%	71.93%	88.99%
	2004									74.55%	87.94%

Table 8
Rate of backdating in complete sample vs. matched sample

	Lowest price day in a calendar month		
	Complete sample	Matched sample	t statistic
CEO	8.90%	9.50%	1.68*
CFO	9%	9.80%	1.88*
Chairman/President	8.84%	9.31%	1.56
	Robust backdating		
	Complete sample	**Matched sample**	**t statistic**
CEO	**4.40%**	**4.30%**	**0.3**
CFO	**3.86%**	**3.78%**	**0.27**
Chairman/President	**4.30%**	**4.02%**	**1.28**
	Return difference within event window		
	Complete sample	Matched sample	t statistic
CEO	15.49%	16.34%	1.81*
CFO	15.79%	16.80%	2.02*
Chairman/President	15.29%	15.56%	0.71

Appendix 1: Pay regression

We predict executive pay using a linear model of total current compensation predicted by last year's compensation, the year, company size (log assets) position within the company, the stock performance over the past 3, 6 and 12 month prior to the pay decision and the industry at the 4 digit sic code level. The results are reported in table 1.

	(1)
VARIABLES	tdc1
size	1,605***
	(41.86)
year	-15.69
	(15.71)
tdc1_last_year	0.00429***
	(0.000426)
Chairman of the Board	1,042***
	(117.7)
dual_position	355.8
	(305.3)
CFO	-201.8***
	(77.67)
CEO	2,456***
	(244.7)
Director	376.8**
	(182.8)
VP	-721.8***
	(115.9)
return_3_months	4.426
	(274.9)
return_6_months	-309.7*
	(159.5)
return_12_months	544.1***
	(111.0)
Industry controls (4 digit sic)	yes
Constant	19,943
	(31,417)
Observations	20,708
R-squared	0.310

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Appendix 2: Entity matching

Names from the BoardEx database were matched to the stock options database using the following method. First, for each name in the stock options dataset, a set of potential candidates in the BoardEx data was chosen through computing a string similarity measure between two names. This measure came from the *difflib* module in the Python programming language and is based on the pattern recognition algorithm developed by Ratcliff and Obershelp which itself is similar in approach to the normalized Levenshtein distance. A value closer to one is returned for strings that are similar to each other and a value closer to zero is returned for dissimilar strings. We chose a value of .5 as the cutoff for the candidate set.

Next, we reduced the candidate set for each name in the stock option set by calculating similarity scores between the company granting the option and the associated companies for each person in the candidate set. Again a value of .5 was used for the cutoff. The similarity scores were computed after a cleaning procedure which de-capitalized all words, removed punctuation, and removed common words in company names such as “Incorporated”, “Holdings”, “Corporation”, etc.

For a random sample of 1,500 candidates, we created a training set by manually noting whether a match existed.

We then measured the difference between the year of the stock option grant and the year in which the candidate worked for the associated company. For example, suppose that a candidate in the BoardEx data was listed as being associated with a company between 2002-2005. (Note: This is a company that scored a similarity score greater than or equal to .5 with the company listed for the person receiving the stock option grant.) If the associated stock option was granted

in 2001, the difference in years would be calculated as the minimum distance between the BoardEx interval and the grant year. If the grant year fell within the interval, then the difference would equal zero.

These three parameters – name similarity score, company similarity score, and difference between grant year and BoardEx years – were used with the manually matched names in order to contrast a logistic regression classifier. The training set was split into two equal parts, the first for training the model and the second for testing the parameters. The true positive rate was 95% while the false hit rate was 4%. We used these parameters on the rest of the data to complete the sample of stock option-BoardEx pairs.