Dual class IPOs: A theoretical analysis

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Abstract

We consider an incumbent who wishes to sell equity to outsiders at an IPO to implement his firm’s project. He may be talented (lower cost of effort, comparative advantage in project-implementation) or untalented. The project may have high (intrinsically more valuable, but showing less signs of success in the near-term) or low near-term uncertainty. Under a single class share structure, the incumbent has a greater chance of losing control to potential rivals if he undertakes the project with high near-term uncertainty, since outsiders may vote for the rival if they believe the project is not progressing well. A dual class share structure allows the incumbent to have enough votes to prevail against any rival, but may be misused by untalented incumbents to dissipate value. Our results help to explain firms’ choices between dual class and single class IPOs and the post-IPO operating performance of dual class versus single class firms.

1. Introduction

When private firms go public, entrepreneurs and other insiders choose the voting structure of their firm’s shares and incorporate it into its corporate charter: while most firms choose a single class share structure (one share, one vote), a substantial minority (about 11% of US IPOs in 2001 and 16.5% in 2002) choose a dual class share voting structure, where one class of shares have superior voting rights (“supervoting” shares from now onward), while another class has inferior voting rights (“ordinary” shares).1 Typically, the supervoting shares are held by the entrepreneurs and other insiders who wish to maintain control of the firm after the IPO; the ordinary shares are sold to outside investors in the IPO. A prominent example of dual class IPOs was that of the internet search firm Google, which has drawn tremendous media attention. Google’s dual class IPO had class A shares (with one vote per share), which were sold to outsiders in the IPO; it also had class B shares (with ten votes per share), which were retained by the founders, Larry Page and Sergey Brin, as well as other insiders.

Dual class share structures confront financial economists with a puzzle. On the one hand, they have been criticized by corporate governance activists and often the media as violating the tenets of shareholder democracy, and for violating the one share-one vote principle (see Grossman and Hart (1988) and Harris and Raviv (1988, 1989), and the large academic literature which has followed them, discussed in Section 2), which states that investors must share a firm’s cash flows and voting power in the same proportion. Thus, Google’s dual class IPO share structure came in for considerable criticism from such activists, with the influential proxy adviser, Institutional Shareholder Services (ISS) ranking Google near the bottom of its corporate governance rankings, below any company in the S&P 500 stock index.2 On the other hand, the empirical evidence is far from clear that dual class share structures necessarily destroy shareholder value. The recent empirical evidence, though inconclusive, indicates that the opposite may, in fact, be true. In a study of dual class IPOs, Bohmer et al. (1996) document that firms going public with a dual class share structure outperform their matched single class counterparts in terms of stock returns as well as accounting performance. Similarly, in a study of firms undergoing dual class share recapitalizations (changing from a single class share structure to a dual class share structure), Dimitrov and Jain (2006) find that such firms exhibit
long-term positive abnormal stock returns over the four years after the recapitalization. They conclude that, on average, dual class recapitalizations are shareholder value-enhancing decisions.

There have, of course, been a few notorious recent examples of entrenched managers destroying shareholder value by consuming excessive perquisites (e.g., Lord Conrad Black, the CEO of Hollinger International, which manages the Chicago Sun-Times and the London Telegraph newspapers). However, some of the best companies, run by highly reputable managers, seem to have adopted a dual class share structure: in addition to Google (which is one of the few companies in the recent past to be profitable at the time of IPO), examples include Berkshire Hathaway (run by Warren Buffett), the New York Times Co. (run by the Sulzberger family), the Washington Post, Inc., and companies like Volkswagon AG in Europe. Further, a substantial fraction of “family owned” firms in the US and abroad have dual class share structures, which does not seem to hurt their performance: in a study of the relationship between founding-family ownership and firm performance, Anderson and Reeb (2003) document that family owned firms in the S&P 500 (about 35% of S&P 500 firms) exhibit significantly better accounting and stock return performance than those that are not family owned. In summary, it is by no means clear that, in practice, dual class share structures destroy shareholder value, despite the arguments of corporate governance activists based on existing theoretical analyses implying that one share-one vote is optimal.

The objective of this paper is to provide a resolution to the above puzzle by developing a fresh theoretical analysis of the equilibrium choice of firms between dual class and single class share structures. The starting point of our analysis is the rationale that many top managers give for adopting a dual class share structure: that it allows them to focus on value maximization without paying attention to temporary fluctuations in share value. However, we recognize that, while talented managers may create considerable shareholder value by focusing on value maximization, the average CEO may not be able to do so, but would instead use this insulation from the disciplining effect of the takeover market to slack off and enjoy the perquisites of control. Further, the equity market may find it difficult to distinguish perfectly between the two kinds of managers. This is therefore the second ingredient driving our analysis. In such a setting, we characterize the incumbent manager’s equilibrium choice between dual class and single class IPO share structures. We also distinguish between situations where the incumbent manager’s choice of a dual class IPO share structure is driven primarily by the incumbent’s desire to maximize his private benefits of control, and those in which a dual class IPO share structure is truly value maximizing (so that firms choosing dual class IPOs can be expected to outperform those choosing single class IPOs in terms of operating performance).

We consider an entrepreneur (the incumbent, from now onward) who currently owns all the equity in his private firm, and who wishes to sell equity to outsiders in an IPO to raise external financing to implement his firm’s project. The incumbent obtains both security benefits (from the equity he owns in the firm) and private benefits of control. The firm can adopt one of two projects: a project with high near-term uncertainty or a project with low near-term uncertainty. The project with high near-term uncertainty is intrinsically more valuable than the project with low near-term uncertainty. However, adopting it may cause the firm’s equity to be temporarily undervalued, since it takes longer time to resolve outsiders’ uncertainty about project success or failure than a project with low near-term uncertainty. Thus, the incumbent has a greater chance of losing control to potential rivals (even those less able than him) if he adopt the project with high near-term uncertainty and outside investors believe that the firm’s project is not progressing well, and therefore vote for the rival in a control contest (if the incumbent does not hold enough voting power on his own account to defeat such a rival). The incumbent may be either talented or untalented: the talented incumbent has a lower cost of exerting effort, and a comparative advantage in implementing projects relative to the untalented incumbent. In particular, the project with high near-term uncertainty yields higher cash flows than the project with low near-term uncertainty only if managed by a talented incumbent. While the incumbent knows his own type, outsiders observe only a prior probability that he is talented (i.e., his “reputation”). In this situation, the incumbent makes a joint decision regarding the IPO share structure (dual class or single class), the kind of project to adopt (the project with high or low near-term uncertainty), and the extent of effort to exert in implementing this project.

The equilibrium in the above situation is driven by the choices made by the talented incumbent (an untalented incumbent would mimic such choices, in order not to reveal his true type to the equity market). The choice of the talented incumbent between a dual class and a single class share structure depends on three effects. First, the insulation from the takeover market provided by a dual class share structure allows the incumbent to create more value by implementing the project with high near-term uncertainty, without the fear of losing control if a rival for control were to appear before the resolution of project uncertainty. Since project type is observable to outsiders, this “value creation” effect would be reflected in the firm’s IPO share price (and allow the incumbent to reduce the dilution in his equity holdings due to the IPO). However, the insulation from the takeover market provided by a dual class share structure also allows untalented incumbents to slack off by not exerting effort, thus dissipating value without any fear of losing control to potential rivals. Since the equity market cannot perfectly distinguish between talented and untalented incumbents, this “loss of discipline” effect is also reflected in the talented incumbent’s firm’s IPO share price if he adopts a dual class share structure. Finally, since, regardless of the kind of project adopted, there is a significantly higher chance that the incumbent loses control to potential rivals under a single class share structure than under a dual class share structure, the expected value of the incumbent’s control benefits is always greater under a dual class share structure. While this third (“control benefits”) effect does not directly affect share value, it nevertheless enters the incumbent’s objective and favors him choosing a dual class share structure. We show that, when the incumbent’s reputation is high and the difference in intrinsic values between the projects with high and low near-term uncertainty is large, the first and third effects together dominate the second, so that a dual class IPO share structure is chosen by the incumbent in equilibrium and the firm implements the project with high near-term uncertainty. On the other hand, when the incumbent’s reputation is low, and the difference in intrinsic values between the projects with high and low near-term uncertainty is small, the second (loss of discipline) effect dominates the first and third effects, so that the firm adopts a single class IPO share structure in equilibrium and implements the project with low near-term uncertainty.

In our basic model, we assume that the voting ratio (ratio of the voting power of supervoting to ordinary shares) chosen by the incumbent under a dual class share structure is large enough to guarantee the incumbent’s control against all rivals. We relax this assumption in an extension to our basic model (Section 4.2), where we allow for potential rivals of two different ability levels relative to the incumbent, and also allow the incumbent to exert two different levels of effort (in addition to no effort). In this section, the voting ratio (under a dual class share structure) is an endogenous variable, and both the share structure and voting power are chosen

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1 The Ford family controls 40% of shareholder voting power with only about 4% of the total equity. Supervoting shares in Berkshire Hathaway have 200 times the voting power of the company’s B shares, with only thirty times the cash flow rights of the B shares.
simultaneously in equilibrium.\textsuperscript{4} We show that, when the control benefits are large, the talented incumbent chooses a high voting ratio (in a dual class IPO equilibrium), since he does not wish to lose control of the firm under any circumstances. On the other hand, when the control benefits are small, the incumbent chooses a low voting ratio in equilibrium. In this case, the risk of losing control to a (high ability) rival exerts a disciplining effect on the untalented incumbent (inducing him to exert at least a low level of effort), which is reflected favorably in the share price of even the talented incumbent’s firm (as discussed earlier). This benefit of a higher share price associated with a low voting ratio dominates the expected value of the control benefits lost by the incumbent, so that he chooses a low voting ratio in equilibrium.\textsuperscript{5}

Our analysis generates several testable predictions, which can be summarized as follows. First, our model predicts that dual class IPOs are more prevalent in three kinds of firms: First, firms operating in industries where a considerable amount of value can be created by ignoring temporary trends (e.g., the newspaper and media industry, where sacrificing editorial integrity in pursuit of transient profits can be disastrous); second, family owned firms and firms run by founder entrepreneurs, who tend to have high reputation in managing the firm; and third, firms characterized by large private benefits of control. Second, our model has predictions regarding the relative post-IPO operating performance of dual class versus single class IPO firms. In particular, it predicts that dual class IPO firms are likely to outperform single class IPO firms if the reputation of the incumbent is high and the firm is operating in an industry where the difference in intrinsic values between the projects with high and low near-term uncertainty is large. On the other hand, single class IPO firms are likely to outperform dual class IPO firms if the incumbent’s reputation is low and the firm is operating in an industry where the difference in intrinsic values between the projects with high and low near-term uncertainty is small. Third, our analysis predicts that imposing a maximum voting ratio between supervoting and ordinary (one vote) shares in dual class firms contributes more toward shareholder value maximization compared to the case where there is no constraint at all on voting ratios in dual class share structures (at one extreme) or the case where dual class share structures are disallowed. Finally, our model also has policy implications for regulators seeking to control management abuses under dual class share structures.

While, for concreteness, we model dual class share structures, our paper can also be thought of as providing a theory of antitakeover provisions in general, since the focus of our paper is on the relationship between the quality and reputation of a firm’s management and their propensity to incorporate antitakeover provisions in their charter at the time of IPO? What is the relationship between the strength (or intensity) of the antitakeover provisions in a firm’s charter and its subsequent operating performance? Our model generates testable predictions related to many of the above questions.

The rest of the paper is organized as follows. Section 2 describes how our paper is related to the existing theoretical and empirical literature. Section 3 describes the essential features of our basic model. Section 4 characterizes various equilibria of our model and develops results. Section 5 describes the testable and policy implications of our analysis. Section 6 concludes. The proofs of all propositions in Section 4.1 and the specific parametric restrictions and threshold values for these propositions to hold are confined to the appendix.\textsuperscript{6}

\section{2. Relationship to the existing literature}

Theoretical analyses on dual class share structures are scarce, and as discussed before, the seminal theoretical analyses of the optimal design of firms’ share structures are by Grossman and Hart (1988) and Harris and Raviv (1988, 1989), who come to the conclusion that the optimal share structure in terms of shareholder wealth maximization involves allocating a firm’s cash flow and voting power in the same proportion (one share, one vote) since it minimizes the chance that a value increasing takeover by a rival would not be consummated (in a setting where incumbent management obtains private benefits of control).\textsuperscript{8} Burkart and Lee (2008) provide a survey on theoretical studies related to security-voting structures, and classify them into four categories: First, the impacts of security-voting structures on tender offers and negotiated control sales (e.g., Burkart et al. (1998), and Zingales (1995)). In particular, Bebchuk and Zingales (2000) argue that dual class share structures exacerbate the distortions associated with excessive use of controlling shareholder structure, since they enable the initial owner to retain a majority of the voting rights in the firm while selling a majority of the cash flow rights to public investors. Second, the influences of security-voting structures on the effectiveness of block ownership as a governance mechanism (e.g., Bolton and von Thadden (1998), and Bennedsen and Nielsen (2006)). Third, the effects of security-voting structures on firms’ financing and ownership decision (e.g., Boot et al. (2006), and Pagano and Roell (1998)). Finally, the effects of lock-in mechanisms (e.g., Bebchuk and Hart (2001) and Stulz and Wasserfallen (1995)).\textsuperscript{9} In contrast to the above studies, we analyze the interaction between the incumbent’s incentive problems and the information asymmetry between the incumbent and outside shareholders, and characterize the situation related to antitakeover provisions: What are the costs and benefits of incorporating various antitakeover provisions in a firm’s charter? Under what conditions are antitakeover provisions value-destroying and under what conditions do they enhance shareholder value? What is the relationship between the quality and reputation of a firm’s management and their propensity to incorporate antitakeover provisions in their charter at the time of IPO? What is the relationship between the strength (or intensity) of the antitakeover provisions in a firm’s charter and its subsequent operating performance? Our model generates testable predictions related to many of the above questions.

\textsuperscript{4} There is some variation in the voting ratio across firms adopting dual class share structures in practice. For example, Google has a 10 to 1 voting ratio, as have many other firms. However, the supervoting shares held by Comcast CEO Brian Roberts have 85 votes against one vote for each ordinary share; the shares held by Frank Stronach, CEO of Magna International, have a 500 to 1 voting ratio; and, finally, the European firm Ericsson’s class B shares have a 1000 to 1 voting ratio.

\textsuperscript{5} In a previous version of this paper, we also develop a dynamic model to characterize the firm’s post-IPO share structure choice, namely, the scenarios in which the firm undergoes a share unification (i.e., switching from a dual class share structure to a single class share structure) or a dual class recapitalization (i.e., switching from a single class share structure to a dual class share structure). These analyses are omitted in the current version due to space limitation, but are available to interested readers upon request.

\textsuperscript{6} In addition to dual class share structures, other commonly observed antitakeover provisions are: anti-greenmail provision, blank check preferred stock, staggered boards, fair price provision, poison pills, stakeholder clause, various shareholder meeting restrictions (e.g., meetings can be called only by directors or executives), various supermajority vote requirements (e.g., supermajority required to approve mergers), and miscellaneous antitakeover provisions (e.g., directors can be removed only for cause). See Field and Karpoff (2002) for a detailed listing.

\textsuperscript{7} The proofs of the two propositions in Section 4.2 are omitted for brevity. They are available in the working paper version of this paper or upon request.

\textsuperscript{8} Grossman and Hart (1988) also suggest, however, that, in the case of competition, departing from one share-one vote can result in higher bid prices for the firm, though in their setting one share-one vote is always socially optimal (unlike in our paper).

\textsuperscript{9} A number of important papers have also made informal arguments regarding the benefits and costs of dual class share structures and other corporate governance arrangements that entrench top management to some degree. These include Alchian and Demsetz (1972), who argue that dual class share structures may deter outside shareholders from incorrectly replacing competent incumbent management, and DeAngelo and DeAngelo (1985), Fischel (1987) and Denis and Denis (1994), who conjecture that effective defenses against change in control can enhance managers’ incentive to make firm-specific investments, thus adding to firm value. See also Partch (1987) and Jarrell and Poulsen (1988) for summaries of alternative arguments.
analyses are summarized in Adams and Ferreira (2008), who come to the conclusion that the existing empirical evidence does not provide a satisfactory answer to the question regarding whether disproportional ownership creates or destroys shareholder value: our theoretical analysis can help to resolve these inconsistencies by suggesting sharper empirical tests and by generating new hypotheses for empirical research.

3. The model

The model has two dates: time 0 and time 1. There are three types of agents: the incumbent, passive outside investors, and the rival. Consider a firm initially set up by a risk-neutral entrepreneur (the incumbent hereafter) as an all-equity firm. The incumbent holds all of the firm's equity at the beginning of the game, and obtains not only the cash flows accruing to his equity ("security benefits"), but also private benefits of control ("control benefits") unobtainable by other equity holders.

At time 0, the incumbent undertakes one of two possible projects: a project with high near-term uncertainty (h) or a project with low near-term uncertainty (l). The project with high near-term uncertainty maximizes firm value, but in the near-term may not show any signs of success, potentially leading to the firm’s equity being undervalued. The project with low near-term uncertainty has a lower NPV but a faster resolution of uncertainty than the project with high near-term uncertainty, thus potentially leading to a higher stock price for the firm in the near-term. The incumbent can implement only one of the two projects. Both projects require an investment amount I to implement at time 0, which the incumbent raises from outside investors through an initial public offering (IPO), since the firm has no internal capital available. When taking his firm to the IPO market, the incumbent can choose either a dual-class (D) or a single-class (S) share structure.

If he chooses a dual-class IPO, the incumbent holds all supervoting shares (with t votes per share), and sells all ordinary shares (with one vote per share) to outside investors. If he chooses a single-class IPO, both he and outside investors hold shares with equal voting rights (one vote per share) and cash flow rights. To begin with, the equity in the firm is assumed to be divided into a large number of shares, all owned by the incumbent. After choosing the IPO share structure, the incumbent sells a certain number of additional shares to outside investors. Both the project and the IPO share structure are publicly observable.

Shortly after the IPO at time 0, outside investors receive a noisy intermediate signal about the potential success or failure of the firm’s project. Meanwhile, a rival arrives with probability φ and tries to take over the firm by buying outside investors’ shares using her own wealth, φ can be thought of as the probability capturing the extent of takeover activity in the industry the firm is operating in and is not contingent on the intermediate signal received by outside investors about project progress. The outcome of the control contest affects the time 1 cash flow of the firm, since it determines the identity of the management team (the incumbent or the rival) in charge of the firm.

At time 1, all cash flows of the firm’s project are realized. We assume that all agents are risk-neutral and normalize the risk-free rate of return to zero. The sequence of events is depicted in Fig. 1.

3.1. Project technology and information structure

The incumbent is of two types: type T ("talented") or type U ("untalented"). The talented incumbent has two advantages over the untalented one: First, he has a lower personal cost of exerting effort than the untalented incumbent. For simplicity, we assume that the cost of exerting effort is 0 for the talented incumbent, while it is $e > 0$ for the untalented incumbent. The incumbent can improve the expected cash flow of the project by exerting effort, while whether he exerts effort or not is not publicly observable. Given that the talented incumbent has an effort cost of 0, he always exerts effort. Whether the untalented incumbent exerts effort or not depends on his trade-off between the monetary and control benefits from the project and his effort cost. Second, the talented incumbent has superior ability in implementing projects compared to the untalented one, and this comparative advantage is especially pronounced when implementing the project with high near-term uncertainty, as we discuss in detail below.

We model the cash flow generated by the firm’s project as follows. Each project generates a high cash flow $C$ with a certain probability and a low cash flow $C'$ with the complementary probability. Given our earlier assumptions, the probability of a high cash flow depends on three variables: (i) whether the incumbent is talented or not; (ii) whether the incumbent exerts effort or not; (iii) whether the project has high or low near-term uncertainty. We denote the probability of a high cash flow for the project with high near-term uncertainty under a talented incumbent exerting effort by $\eta_1$; $\eta_2 = \eta_0$ denotes the corresponding probability under an untalented incumbent (i.e., an untalented incumbent managing a project with high near-term uncertainty, also exerting effort). Similarly, $\eta_1$ and $\eta_2$ denote the high cash flow probabilities when the supervoting shares and ordinary shares have the same cash flow rights.

10 To the extent that a dual class share structure can be thought of as one among many different antitakeover provisions in corporate charters, our paper is also related to the law and economics literature explaining why companies may go public with corporate governance arrangements that are known to be inefficient by both investors and by those taking firms public. A prominent example of this literature is Bebchuk (2002). He shows that, in a setting where firm insiders have private information about the true value of the firm’s projects and the cash flows of the firm are positively correlated with incumbent management’s control benefits, firms may adopt inefficient corporate governance arrangements to signal their true value to outsiders. Unlike the analysis of Bebchuk (2002), where such antitakeover provisions are inefficient, and are adopted only to "burn money" and thus signal credibly to outsiders, in our setting, dual class share structures are often efficient (shareholder value maximizing). Thus, the motivation for adopting dual class share structures is quite different in our setting from that in the above literature.

11 In this context, our paper is also related to the broader theoretical literature on IPOs (see, e.g., Allen and Faulhaber (1989) or Welch (1989)) as well as the large empirical literature on the post-IPO operating and stock return performance of firms (see Ritter and Welch (2002) for a review).
talented and untalented incumbents manage the project with high near-term uncertainty without exerting effort, respectively, and \( \eta'_h > \eta'_b \). The high cash flow probabilities for the project with low near-term uncertainty are \( \eta_l \) and \( \beta_l \) for the talented and untalented incumbent (both exerting effort), and \( \eta_l' \) and \( \beta_l' \) for these two types of the incumbent when not exerting effort. As in the case of the project with high near-term uncertainty, the talented incumbent’s advantage in managing the project with low near-term uncertainty is captured by assuming \( \eta_l > \beta_l \) and \( \eta_l' > \beta_l' \).

It now only remains to specify how the expected cash flows of the projects with high and low near-term uncertainty relate to each other. While the talented incumbent can manage the project with high near-term uncertainty to generate higher cash flows than the project with low near-term uncertainty (\( \eta_l > \eta_l' \)), the project with high near-term uncertainty offers no such advantage managed by an untalented incumbent (\( \beta_l = \beta_l' \)). In summary, we assume: \( \eta_h > \eta_l > \beta_l = \beta_l' > \beta_h = \beta_h' \).

The equity market is characterized by asymmetric information. While the incumbent knows his true type at time 0, outside investors only observe a prior probability distribution on the incumbent’ type: they believe that with a probability \( \psi_l \) the incumbent is of type \( T_l \), and of type \( U \) with the complementary probability. We refer to \( \psi \) as the incumbent’s reputation at time 0.

### 3.2. Intermediate signal about the incumbent’s progress in project implementation

Between time 0 and time 1, outside investors receive an intermediate signal about how successful the firm’s project has been so far. This intermediate signal has two possible realizations: “good” (\( G \)) or “bad” (\( B \)). The probability of the project receiving a good intermediate signal if implemented by the talented incumbent (denoted by \( \delta \) with subscripts indicating project type, and primes indicating the case where the incumbent does not exert effort) is higher than the corresponding probability if implemented by the untalented incumbent (denoted by \( \psi \), with subscripts indicating project type, and primes indicating the case where the incumbent does not exert effort). Thus, we assume, for the project with high near-term uncertainty: \( \delta_h > \psi_h \) and \( \delta_l > \psi_l \); and for the project with low near-term uncertainty: \( \delta_l > \psi_l \) and \( \delta_h > \psi_h \). Similarly, we assume that the probability of getting a good signal is greater when the incumbent exerts effort than when he does not: e.g., \( \delta_h > \delta_h' \) and \( \delta_l > \delta_l' \) (for the talented incumbent); and \( \psi_l > \psi_l' \) and \( \psi_h > \psi_h' \) (for the untalented incumbent). Further, we assume that, while this intermediate signal is informative about project success, it is less informative (i.e., has a greater chance of being erroneous) about the project with high near-term uncertainty than about the project with low near-term uncertainty: i.e., \( \delta_l > \delta_h \) and \( \delta_l' > \delta_h' \) (for the talented incumbent with or without effort, respectively); and \( \psi_l > \psi_h \) and \( \psi_l' > \psi_h' \) (for the untalented incumbent with or without effort, respectively). In summary, we assume: \( \delta_l > \delta_l' > \psi_l > \psi_l' > \psi_h > \psi_h' \).

### 3.3. The rival

Between time 0 and time 1, a rival may arrive and try to take over the firm in a proxy fight. The rival’s objective is to maximize her security benefits. At time 0, the incumbent and outside investors are uncertain about whether or not any rival will arrive: they only observe the probability \( \phi \) that a rival will arrive; no rival will arrive with the complementary probability. If a rival arrives, she purchases the firm’s equity from outside investors with her own wealth (denoted by \( W_{R} \)) prior to the proxy fight. There is no uncertainty about the ability of the rival. If the rival succeeds in taking over the firm, she generates a time 1 cash flow of \( C_R \) with probability 1 (regardless of project type). We assume that the rival, if she arrives, has a higher ability than the untalented incumbent in implementing the project with low near-term uncertainty, and a lower ability than the talented incumbent in implementing the same project: i.e., \( \eta_C + (1 - \eta_l)C > C_h > \beta_C + (1 - \beta_l)C \). Further, we assume that the intermediate signal received by outsiders is precise enough that the expected cash flow of the firm’s project under the incumbent conditional on a good intermediate signal is higher than the expected cash flow under rival management: on the other hand, the expected cash flow under the incumbent conditional on a bad intermediate signal is worse than under rival management:

\[
\text{Prob}(T|G)|\eta_l C + (1 - \eta_l)C| + \text{Prob}(U|G)|\beta_l C + (1 - \beta_l)C| > C_R, \quad (1)
\]

and

\[
\text{Prob}(T|B)|\eta_l C + (1 - \eta_l)C| + \text{Prob}(U|B)|\beta_l C + (1 - \beta_l)C| < C_R. \quad (2)
\]

Furthermore, we assume that if the rival takes over the firm, the incumbent loses his control benefits, \( K \).

### 3.4. Outside investors and the control contest

We now specify the voting behavior of outside investors. Regardless of whether the incumbent chooses a single class or dual class share structure, outside investors’ shares have only one vote per share. We assume that outside investors vote for the party

13 Note that we do not include the high cash flow probabilities when the talented incumbent does not exert effort, \( \eta'_l \) and \( \eta'_h \) in the above summary, since given that his effort cost is zero and that exerting effort creates value, the talented incumbent always exerts effort, so that \( \eta'_l \) and \( \eta'_h \) are unimportant for our analysis from now onward.

14 An equivalent specification is to assume that a good signal is received with a certain probability and no signal is received with the complementary probability.

15 We do not mention \( \delta'_l \) and \( \delta'_h \) in the above summary since the talented incumbent always exerts effort, so that they are unimportant for our further analysis.
which maximizes their share value at the end of the game. Given our earlier assumptions, this means that all outside investors vote for the incumbent if receiving a good intermediate signal, and for the rival if receiving a bad intermediate signal. We assume that the incumbent’s wealth (subsequent to the dilution of his equity holding in the IPO) is small enough that, under a single class share structure he needs outside investors’ votes to maintain control; i.e., he cannot maintain control solely by relying on voting for himself in the control contest against any rival. At the same time, the rival’s wealth $W_R$ is also not large enough to buy up enough equity to ensure success in the control contest by relying only on voting her own shares: in other words, the rival also needs outside investors’ votes to prevail in the control contest. Thus, outside investors’ votes are pivotal in determining who controls the firm subsequent to the control contest.\footnote{The underlying assumption here is that all outsiders vote for the management (the incumbent or the rival) which maximizes the expected value of their equity in the firm (conditional on the information set of outsiders). Our results go through qualitatively even if we assume instead that a majority of outsiders (rather than all outsiders) vote for the management team that outsiders perceive as value-maximizing.}

Outside investors’ votes, however, are not important to the incumbent under a dual class share structure. This is because, under a dual class share structure, the incumbent can always structure the voting ratio between the supervoting and ordinary shares (denoted by $t$) such that he never loses to the rival in a control contest. Regardless of how small his share holding in the firm is, the incumbent can always choose $t$ such that he retains at least 50% control of the firm.\footnote{Note that in the basic model, we assume that the incumbent always chooses $t$ to ensure control against any rival. In Section 4.2, where we solve for the optimal voting ratio in dual class IPOs, we will relax this assumption, and allow the incumbent to choose the optimal level of $t$.}

3.5. The incumbent’s objective

The incumbent obtains both security (cash flow) benefits and control benefits from managing the firm.\footnote{This assumption is standard in the corporate control literature. See, for example, Grossman and Hart (1988) or Harris and Raviv (1988).} The incumbent’s security benefits arise from the cash flow of the project accruing to the share of the firm’s equity held by him. In contrast, control benefits (which are non-contractible) accrue only to the management team in control.

We use $\alpha_i$, $i \in \{D,S\}$, to denote the fraction of equity retained by the incumbent in his firm’s (dual-class or single-class) IPO, and $F_{mn}$, $m \in \{T,U\}$, $i \in \{D,S\}$, to denote the incumbent’s expectation (conditional on his private information about his own talent) of the future cash flow from the firm. Therefore, the security benefits the incumbent gets is $\alpha F_{mi}$. $i \in \{D,S\}$, $m \in \{T,U\}$. Further, we use $\alpha_0 \in \{0,1\}$, $i \in \{D,S\}$, to denote the outcome of the control contest ($\alpha_i = 0$ if the incumbent loses control to a rival, and $\alpha_i = 1$ if the incumbent maintains control). Thus, the expected value of the incumbent’s control benefits is $\alpha_0$. We use $e_{mn}$, $m \in \{T,U\}$ to denote the cost of effort for the two types of the incumbent. As discussed before, we assume that the talented incumbent has an effort cost of zero, and the untalented incumbent has a positive cost of effort (i.e., $e_T = 0$, and $e_U = e > 0$). Whether the incumbent exerts effort or not is unobservable to outsiders and is thus non-contractible, and it is captured by $w \in \{0,1\}$: $w = 1$ if he exerts effort and 0 otherwise.

In summary, the objective of each type of the incumbent is to choose the IPO share structure ($i \in \{D,S\}$), project type ($p \in \{h,l\}$), and whether to exert effort or not ($w \in \{0,1\}$), in order to maximize the expected value of the sum of his time 1 security and control benefits, net of any personal effort costs incurred by him. This is given by:

$$\text{Max}_{p,w} (w \alpha F_{mi} + E(\alpha_i)K - w_m e_m).$$

Note that, in the incumbent’s objective (3) above, $\alpha_i$ is an endogenous variable which depends upon the share structure chosen for the firm (and thus the market value of its equity) and the amount of external financing $I$ that the firm needs to raise in the equity market; similarly, $\alpha_0$ and $w_m$ are also endogenous variables. We discuss the incumbent’s problem in detail in the next section.

4. The equilibrium

4.1. Equilibrium in the basic model

In this section, we characterize the equilibria of our basic model. The equilibrium concept we use is that of Perfect Bayesian Equilibrium.\footnote{See Fudenberg and Tirole (1991) for a detailed description of this equilibrium concept. In Section 5, we also characterize the equilibrium while allowing the incumbent to choose the optimal voting ratio in addition to the share structure. However, the general definition of equilibrium used in this section is the same as the one described here.} An equilibrium consists of (i) a choice of IPO share structure by the incumbent, along with his choices of IPO share price, the fraction of shares to be offered to outside investors, project type, and the level of effort to exert in implementing the firm’s project; (ii) a decision by each outside investor about whether or not to participate in the IPO and a choice of management team to vote for in the event of a control contest; and (iii) a decision by the rival (if she arrives) about whether or not to purchase the firm’s shares from outside investors in an attempt to take over the firm. Each of the above choices must be such that: (a) The choices of each party maximize their objectives, given the equilibrium beliefs and choices of others; (b) The beliefs of all parties are consistent with the equilibrium choices of others; further, along the equilibrium path, these beliefs are formed using Bayes’ rule; (c) Any deviation from the equilibrium strategy by any party is met by beliefs by other parties which yield the deviating party a lower expected payoff compared to that obtained in equilibrium.

In Propositions 1 and 2, we characterize the equilibria in our basic model for different parameters. We discuss the nature of these equilibria at some length, since we build on these basic equilibria in subsequent sections of the paper.\footnote{Throughout the paper, our focus is on pooling equilibria, where the two types of incumbents pool by making similar decisions on IPO share structure, equity pricing, number of shares to offer to outside investors, and project type. We do not focus on equilibria where the actions taken by the two types of incumbents are different in equilibrium, so that the equilibrium is fully separating, and the choice of IPO share structure is a signal of the incumbent’s true type. Two potential separating equilibria are as follows. The first separating equilibrium is the case where the talented incumbent chooses a single class share structure for IPO while the untalented incumbent chooses a dual class share structure. This equilibrium occurs only when the benefits to the talented incumbent of undertaking a project with high versus low near-term uncertainty is small enough (relative to the value benefit of separating from the untalented incumbent), and the incumbent’s control benefits are large enough that the untalented incumbent does not wish to mimic the talented one (while at the same time, not so large that the talented incumbent is better off choosing a dual class share structure due to the reduction in his control benefits under a single class share structure). The second separating equilibrium involves the talented incumbent choosing a dual class share structure while the untalented incumbent separates by choosing a single class share structure. This equilibrium arises only when the increased security benefits to the untalented incumbent of committing to exert effort through his choice of single class share structure is greater than the sum of the benefits of mimicking the talented incumbent and the greater expected value of control benefits under a dual class share structure relative to a single class share structure. Separating equilibria are not interesting in our setting, since the most important issues that we analyze here do not arise in these equilibria. Nevertheless, details of the above separating equilibria are available to interested readers upon request.}
Proposition 1 (Dual class IPO equilibrium). For a given level of takeover activity $\phi$, and control benefits $K$, there exists an equilibrium where the incumbent chooses a dual class IPO if his reputation is high enough and the difference in the intrinsic values between the projects with high and low near-term uncertainty is large enough (the specific parametric conditions are specified in the appendix). Such an equilibrium involves the following:

The talented (T) incumbent: He sells a fraction $(1 - \alpha_0)$ of the firm’s equity (in the form of ordinary voting shares carrying one vote per share) to outsiders at a price $P_0$ ($P_0$ is given by (4) and $\alpha_0$ by (5)). He retains the remaining fraction $\alpha_0$ of equity in the form of supervoting shares carrying a fraction $\frac{\alpha_0}{\alpha_0 + a}$ of the total voting power of the firm’s equity. He implements the project with high near-term uncertainty and exerts effort.

The untalented (U) incumbent: He mimics the talented incumbent by selling a fraction $(1 - \alpha_0)$ of equity at a price $P_0$, retaining a fraction of $\alpha_0$ of equity as supervoting shares. He also implements the project with high near-term uncertainty, but exerts no effort.

Outside investors: They participate in the firm’s IPO, paying $(1 - \alpha_0)P_0$ for a fraction $(1 - \alpha_0)$ of the firm’s shares. If there is a control contest at time 1, they vote for the incumbent if they get a good realization of the intermediate signal, and for the rival if they get a bad realization.

The rival: If she arrives, she invests all of her wealth, $W_R$, in buying shares from outside investors, but is not able to take over the firm.22

The equilibrium is driven by choices made by the talented incumbent, since the untalented incumbent finds it optimal to mimic the talented incumbent. The choice of the talented incumbent between a dual class and a single class share structure depends on three effects. First, the insulation from the takeover market provided by a dual class share structure would allow him to create more value by implementing the project with high rather than low near-term uncertainty, without the fear of losing control. Since project type is observable to outsiders, this “value creation” effect would be reflected in the firm’s IPO share price (and allow the incumbent to reduce the dilution in his equity holdings in IPO). However, the insulation from the takeover market provided by a dual class share structure also allows untalented incumbents to slack off by not exerting effort in implementing the project, thus dissipating value without any fear of losing control to potential rivals. Since the equity market cannot perfectly distinguish between the talented and untalented incumbents, this “loss of discipline” effect is also reflected in the talented incumbent’s firm’s IPO share price (and allows him to adopt a single class share structure instead). Third, since regardless of the kind of project adopted, there is always a chance that the incumbent loses control to potential rivals under a single class share structure (but no such chance under a dual class share structure), the expected value of the incumbent’s control benefits is always greater under a dual class share structure. While this third (“control benefits”) effect does not directly affect share value, it nevertheless enters the incumbent’s objective and favors him choosing a dual class share structure.

When the incumbent’s reputation is high, the cost imposed on the talented incumbent (the loss of discipline effect) is low. On the other hand, when the difference in intrinsic values between the projects with high and low near-term uncertainty is high, the additional value that can be created by undertaking the project with high near-term uncertainty rather than the project with low near-term uncertainty (the value creation effect) is high. Therefore, under these circumstances, the benefit of choosing a dual class IPO exceeds the cost of doing so, and the talented incumbent therefore chooses a dual class IPO in equilibrium, and implements the project with high near-term uncertainty. In this situation, the untalented incumbent is better off mimicking the talented incumbent since doing so not only yields him a higher price for the equity he sells in the IPO, but also insulates him from the takeover market (ensuring that he can consume his benefits of control for sure, regardless of the rival and the intermediate signal outsiders receive), without any significant countervailing disadvantages.

Proposition 2 (Single class IPO equilibrium). For a given level of takeover activity $\phi$, and control benefits $K$, there exists an equilibrium where the incumbent chooses a single class IPO if his reputation is low enough and the difference in intrinsic values between the projects with high and low near-term uncertainty is small enough (i.e., below a threshold value). Such an equilibrium involves the following:

The talented (T) incumbent: He sells a fraction $(1 - \alpha_0)$ of the firm’s equity to outsiders in the form of ordinary shares at a price $P_0$ ($P_0$ is given by (7) and $\alpha_0$ by (8)). He retains the remaining fraction $\alpha_0$ of the total voting power of the firm’s equity. He implements the project with low near-term uncertainty and exerts effort.

The untalented (U) incumbent: He mimics the talented incumbent by selling a fraction $(1 - \alpha_0)$ of equity at a price $P_0$, retaining a fraction of $\alpha_0$ of equity and total voting power. He also implements the project with low near-term uncertainty, and exerts effort.

Outside investors: They participate in the firm’s IPO, paying $(1 - \alpha_0)P_0$ for a fraction $(1 - \alpha_0)$ of the firm’s shares. If there is a control contest at time 1, they vote for the incumbent if they get a good realization of the intermediate signal, and for the rival if they get a bad realization.

The rival: If she arrives, she invests all of her wealth, $W_R$, in buying shares from outside investors. She is not able to take over the firm if the realization of the intermediate signal is good, and is able to take over the firm if the realization of this signal is bad.

When the difference in intrinsic values between the projects with high and low near-term uncertainty is small, the benefits of being insulated from the takeover market (the control benefit effect) and being able to implement the project with high rather than low near-term uncertainty without fear of loss of control if a rival arrives (the value creation effect) are small. At the same time, if the incumbent’s reputation is low, the reduction in equity value due to the untalented incumbent not exerting effort under a dual class share structure and pooling with the untalented incumbent (the loss of discipline effect) imposes significant costs on the talented incumbent (since the market assesses a high probability that the incumbent is of the untalented type, and values the firm’s equity closer to its true value under the untalented incumbent). Thus, the talented incumbent is better off choosing a single class IPO share structure in this situation. Further, given the probability of loss of control under a single class share structure (and the smaller incremental value that can be created by implementing the project with high rather than low near-term uncertainty), the talented incumbent prefers to implement the project with low near-term uncertainty, thus ensuring that the probability of outsiders receiving a good intermediate signal about his implementation of the project and his maintaining control is maximized. The untalented

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21 Throughout the paper, whenever we refer to a fraction of the firm’s “equity,” we refer to the cash flow rights associated with this equity; on the other hand, we specifically refer to the “voting power” of equity when this is the subject of discussion.

22 There are two dimensions in which an incumbent can make an out-of-equilibrium move observable to outsiders in our setting. The first dimension is the incumbent’s choice of share structure: i.e., an incumbent may choose a single class IPO in a dual class IPO equilibrium, or a dual class IPO in a single-class IPO equilibrium. The second dimension is the incumbent’s choice of project type: the incumbent may choose a project with low near-term uncertainty when the equilibrium behavior calls for his choosing a project with high near-term uncertainty (as in Proposition 1) or vice versa. Throughout this paper, the out-of-equilibrium beliefs we specify are such that if outsiders observe the firm taking an out-of-equilibrium action, they believe with probability 1 that the incumbent is untalented, and does not exert effort in implementing the project.
new project. Therefore, the fraction of the firm’s cash flow rights implemented by the type \(T\) at the time 1 cash flow of the project with high near-term uncertainty is given by:

\[
P_0 = \theta[(1 - \delta_1)(1 - \phi)](\eta_h C + (1 - \eta_h) C) + (1 - \delta_1) \phi C_0.
\]

The expression in the first parenthesis of Eq. (4) is the expected value of the time 1 cash flow of the project with low near-term uncertainty implemented by the type \(T\) incumbent (taking into consideration that the firm may be taken over by a rival), and the expression in the second parenthesis is the expected value of the time 1 cash flow of the project with low near-term uncertainty implemented by the type \(U\) incumbent (also taking into consideration that the firm may be taken over by a rival). The market price in the single class IPO equilibrium is thus the average of these two values, weighted by outsiders’ prior probability assessment of the type of the incumbent.

The fraction of the firm’s equity retained by the incumbent in a single class IPO is:

\[
\alpha = \frac{P_0 - I}{P_0}.
\]

The rest of the firm’s equity is sold to outside investors. In a single class IPO, since all the shares have the same voting power, the fraction of voting rights retained by the incumbent is equal to his cash flow rights.

Given other agents’ strategies, if the type \(T\) incumbent chooses to implement the project with low near-term uncertainty, his expected payoff is:

\[
\Pi^T_2 = \alpha_0[(1 - \delta_1)(1 - \phi)](\eta_h C + (1 - \eta_h) C) + (1 - \delta_1) \phi C_0 + (1 - \psi_1)(1 - \phi) \beta_0 C + (1 - \beta_0) C_0.
\]

4.1.2. The Type \(U\) incumbent’s problem

The type \(U\) incumbent, when considering his strategy (given the strategies of the type \(T\) incumbent, outside investors, and the rival), is also faced with the choice between a dual class IPO and a single class IPO. In an equilibrium where the type \(T\) incumbent chooses a dual class IPO, the type \(U\) incumbent also chooses a dual class IPO. In such an equilibrium, given other agents’ strategies, if the type \(T\) incumbent chooses a single class IPO, he sells his IPO shares at the market price of \(P_0\), which is given by:

\[
P_0 = \theta[(1 - \delta_1)(1 - \phi)](\eta_h C + (1 - \eta_h) C) + (1 - \delta_1) \phi C_0
\]

By selling his IPO shares at the market price specified in Eq. (4) (i.e., at the pooling price), the type \(T\) incumbent's expected payoff is given by:

\[
\pi^T_2 = \alpha_0[(1 - \delta_1)(1 - \phi)](\eta_h C + (1 - \eta_h) C) + (1 - \delta_1) \phi C_0 + (1 - \psi_1)(1 - \phi) \beta_0 C + (1 - \beta_0) C_0.
\]

The expression in the first parenthesis of Eq. (7) is the expected value of the time 1 cash flow of the project with low near-term uncertainty implemented by the type \(T\) incumbent (taking into consideration that the firm may be taken over by a rival), and the expression in the second parenthesis is the expected value of the time 1 cash flow of the project with low near-term uncertainty implemented by the type \(U\) incumbent (also taking into consideration that the firm may be taken over by a rival). The market price in the single class IPO equilibrium is thus the average of these two values, weighted by outsiders’ prior probability assessment of the type of the incumbent.

The fraction of the firm’s equity retained by the incumbent in a single class IPO is:

\[
\alpha = \frac{P_0 - I}{P_0}.
\]

The rest of the firm’s equity is sold to outside investors. In a single class IPO, since all the shares have the same voting power, the fraction of voting rights retained by the incumbent is equal to his cash flow rights.

Given other agents’ strategies, if the type \(T\) incumbent chooses to implement the project with low near-term uncertainty, his expected payoff is:

\[
\Pi^T_2 = \alpha_0[(1 - \delta_1)(1 - \phi)](\eta_h C + (1 - \eta_h) C) + (1 - \delta_1) \phi C_0 + (1 - \psi_1)(1 - \phi) \beta_0 C + (1 - \beta_0) C_0.
\]
type as the type $T$ (since the sum of his security and control benefits minuses any effort cost is higher in this scenario).

In the single class IPO equilibrium (Proposition 2), given other agents' strategies, if the type $U$ incumbent chooses a single class IPO, he sells his IPO shares at the market price specified in Eq. (7) (since the equilibrium is pooling). The fraction of the firm's equity (with the same cash flow and voting rights) retained by the incumbent in a single class IPO is specified in Eq. (8). The incumbent sells the rest of his firm's equity to outside investors. Given other agents' strategies, if the type $U$ incumbent chooses to implement the project with low near-term uncertainty, his expected payoff is:

$$
\Pi_U = \frac{z_0}{2} (\psi_U + (1 - \psi_U)(1 - \phi)) \frac{g}{C_0} + (1 - \psi_U)(1 - \phi) \frac{K - e}{C_0}.
$$

(11)

It can be shown that his payoff in this case is higher compared to the situation where he deviates from the equilibrium by either choosing a dual class IPO, or by implementing the project with high near-term uncertainty. In summary, under the conditions specified for the existence of the single class IPO equilibrium (Proposition 2), the type $U$ incumbent is always better off mimicking the type $T$ by choosing the same (single class) IPO share structure and project type as the type $T$ (since the sum of his security and control benefits minuses his effort cost is higher in this scenario).

4.1.3. Outside investors and the control contest

Passive outside investors make their investment decision based on their break-even conditions between investing in the firm’s equity in the IPO and in the risk free asset, whose return is normalized to 0. In the dual class IPO equilibrium (Proposition 2), given other agents' strategies, if the dual class IPO incumbent chooses a single class IPO, he sells his IPO shares at the market price specified in Eq. (7) (since the equilibrium is pooling). The fraction of the firm’s equity (with the same cash flow and voting rights) retained by the incumbent in a single class IPO is specified in Eq. (8). The incumbent sells the rest of his firm’s equity to outside investors. Given other agents' strategies, if the type $U$ incumbent chooses to implement the project with low near-term uncertainty, his expected payoff is:

$$
\Pi_U = z_0 \left(\psi_U + (1 - \psi_U)(1 - \phi)\right) g / C_0 + (1 - \psi_U)(1 - \phi) K - e.
$$

(11)

It can be shown that his payoff in this case is higher compared to the situation where he deviates from the equilibrium by either choosing a dual class IPO, or by implementing the project with high near-term uncertainty. In summary, under the conditions specified for the existence of the single class IPO equilibrium (Proposition 2), the type $U$ incumbent is always better off mimicking the type $T$ by choosing the same (single class) IPO share structure and project type as the type $T$ (since the sum of his security and control benefits minuses his effort cost is higher in this scenario).

4.1.4. The rival’s problem

Similar to outside investors, the rival makes her investment decision based on her break-even conditions between investing in the firm’s equity and in the risk free asset. In both the dual class IPO equilibrium (Proposition 1) and the single class IPO equilibrium (Proposition 2), the rival, if she arrives, always pays a fair price for the equity she buys in the firm.

In the dual class IPO equilibrium, if the realization of the outsiders’ intermediate signal is good, the firm’s share price is updated to

$$
P^D_0 = \frac{a_0}{a_0 + a_1} (\eta_0 C + (1 - \eta_0) C_0) + \frac{a_1}{a_0 + a_1} (\beta_0 C + (1 - \beta_0) C_0).
$$

If the outsiders’ realization of the intermediate signal is bad, the firm’s share price is updated to

$$
P^D_0 = \frac{a_0}{a_0 + a_1} (\eta_0 C + (1 - \eta_0) C_0) + \frac{a_1}{a_0 + a_1} (\beta_0 C + (1 - \beta_0) C_0).
$$

In this equilibrium, even if she buys shares from outside investors at these prices, the rival is not able to take over the firm because of the existence of the dual class share structure.

In the single class IPO equilibrium, the rival buys shares at the prices $P^S_0$ and $P^S_1$ (which are specified in outside investors’ problem). The rival wins the control contest if the realization of the outsiders’ intermediate signal is bad, and the incumbent remains in control if the realization of the outsiders’ intermediate signal is good.

We now derive the comparative statics of the firm’s equilibrium choice between dual class and single class IPOs.

**Proposition 3.** [Comparative Statics on the Incumbent’s Equilibrium Choice Between Dual Class and Single Class IPOs]

(i) As the difference between the expected cash flows from the project with high near-term uncertainty and the project with low near-term uncertainty increases, the equilibrium involves a dual class IPO for lower values of managerial reputation $\theta$.

(ii) As the magnitude of the incumbent’s control benefits, $K$, increases, the equilibrium involves a dual class IPO for lower values of managerial reputation $\theta$.

(iii) As the probability of a rival arriving, $\phi$, increases, the equilibrium involves a dual class IPO for lower values of managerial reputation $\theta$.

The talented incumbent maximizes the sum of his security (cash flow) benefits and control benefits when choosing between a dual class and a single class share structure for his firm’s IPO. There are four factors affecting this objective, two affecting the incumbent’s security benefits and two affecting his control benefits. The advantage of a dual class share structure in terms of cash flow benefits is that it allows the talented incumbent to create more value, by implementing the project with high rather than low near-term uncertainty (the value creation effect): clearly, as the intrinsic value difference between the two projects increases, this advantage becomes bigger. However, the disadvantage of a dual class share structure to the talented incumbent is that it insulates the untalented incumbent from the disciplining effect of the takeover market, thus allowing him to dissipate share value. Since the equity market is unable to distinguish perfectly between the talented and untalented incumbents, this affects the talented incumbent’s firm’s share price as well to some degree, which, in turn, leads to a dilution in his post-IPO equity holding and thereby his long-term cash flow from the firm (the loss of discipline effect). However, the greater is the talented incumbent’s reputation, the smaller is this cost. Part (i) above shows that as the difference in intrinsic values between the projects with high and low near-term uncertainty increases, the cost-benefit trade-off between a dual class and a single class IPO favors a dual class IPO for lower levels of the incumbent’s reputation, making it the equilibrium choice.
However, a dual class share structure also offers the talented incumbent an advantage in terms of control benefits (the control benefits effect). This arises from the fact that under a dual class share structure, he is insulated from the takeover market and does not have any chance of losing control, in contrast to a single class share structure, under which a talented incumbent exerting effort may lose control with some probability (if outsiders get a bad intermediate signal of the incumbent’s progress in project implementation). This advantage (in the expected value of control benefits) of a dual class share structure over a single class share structure is increasing in the level of the incumbent’s control benefits, $K$ (the greater is the level of control benefits, the more the incumbent has to lose if a rival takes over), and the extent of takeover activities in the firm’s industry, $\phi$ (the greater is the probability of a rival arriving, the greater is the chance that the incumbent loses control). Therefore, the higher are the levels of each of these two variables, the lower is the reputation level at which the incumbent chooses a dual class IPO over a single class IPO in equilibrium (as shown in parts (ii) and (iii), respectively, of the above proposition).

We now compare the IPO prices and post-IPO operating performance of firms choosing dual class IPOs relative to those choosing single class IPOs.

**Proposition 4.** [Comparison of Shareholder Value and Post-IPO Operating Performance in Dual Class and Single Class IPOs]

(i) If the reputation of the incumbent is high or the difference in intrinsic values between the projects with high and low near-term uncertainty is large, then a dual class share structure maximizes shareholder value. Further, the post-IPO operating performance of the firm is maximized under a dual class rather than a single class IPO share structure in this case.

(ii) If the reputation of the incumbent is low or the difference in intrinsic values between the projects with high and low near-term uncertainty is small, then a single class share structure maximizes shareholder value. Further, the post-IPO operating performance of the firm is maximized under a single class rather than a dual class IPO share structure in this case.

As discussed under Proposition 3, the talented incumbent (who drives the equilibrium, since the untalented incumbent mimics the talented one) chooses between dual class and single class IPOs with the objective of maximizing the sum of his security (cash flow) and control benefits. However, this means that the talented incumbent’s choice between dual class and single class IPOs need not necessarily be the one which maximizes shareholder value (and subsequent operating performance) since it may also be driven by control benefits considerations (the control benefits effect). When the difference in the expected cash flows between the projects with high and low near-term uncertainty is large, the additional value that can be created by the incumbent implementing the project with high near-term uncertainty (as in a dual class IPO) rather than the project with low near-term uncertainty (as in a single class IPO) is large. At the same time, if the incumbent’s reputation is high, the market assesses a high probability that the incumbent is talented, so that the reduction in share value arising from the talented incumbent having to pool with the untalented one (the loss of discipline effect) is small. In such a situation, if the incumbent chooses a dual class share structure for IPO, it not only maximizes his personal objective, but also maximizes shareholder value and operating performance (as shown in part (i) above).

Conversely, when the incumbent’s reputation is low and the difference in expected cash flows between the projects with high and low near-term uncertainty is small, a single class IPO not only maximizes the talented incumbent’s objective (making it the equilibrium choice), but also maximizes shareholder value and post-IPO operating performance (as shown in part (ii) above). This is because the additional value that can be created by the talented incumbent implementing the project with high near-term uncertainty instead of the project with low near-term uncertainty (using a dual class share structure) is small, and given the incumbent’s low reputation, the advantage of the single class share structure in disciplining the untalented incumbent is large (i.e., the loss of discipline effect under a dual class share structure on shareholder value is large).

**4.2. Equilibrium voting ratio in dual class IPOs**

In our basic model, the voting ratio between the supervoting and ordinary shares is exogenous: we assume that this ratio is large enough such that if the incumbent chooses a dual class share structure, he is guaranteed to maintain control against any rival. In this section, we study an extension to our basic model by endogenizing the voting ratio in a dual class share structure, assuming that the incumbent simultaneously chooses the share structure and the voting ratio at the time of IPO (time 0). This implies that, in some cases, the voting ratio chosen by the incumbent may be such that even with a dual class share structure, the incumbent may lose control to a rival.

We relax three other assumptions in this section. First, we assume that the rival has two possible levels of ability: high ability or low ability. We assume that the high ability rival generates a cash flow of $C_h$ for the firm, while the low ability rival generates a cash flow of $C_l$. The ability levels of both low and high ability rivals are in between those of the talented and untalented incumbents, so that: $\eta_l C_h + (1 - \eta_l) C_l > C_h > C_l > \eta_l C_h + (1 - \eta_l) C_l$. We assume that the probability of a high ability rival arriving is $\phi_h$; that of a low ability rival arriving is $\phi_l$; and that of no rival arriving is $(1 - \phi_h - \phi_l)$. As in the basic model, the ability of the rival is observable by all agents once she arrives. Second, unlike in the basic model, we now allow the incumbent to exert two different levels of effort (in addition to not exerting effort), with the corresponding costs to the untalented incumbent denoted by $e$ and $e^*$, $e < e^*$. As in the basic model, the talented incumbent has a zero cost of effort, so that he always exerts high effort. Third, unlike in the basic model, we now assume that the fraction of outsiders voting for the incumbent in a control contest (denoted by $\nu$) is not only a function of the intermediate signal, but also an increasing function of the ratio between the incumbent’s and the rival’s abilities. This latter assumption implies that for a given intermediate signal received by outside investors, the incumbent receives a larger proportion of outsiders’ votes in a control contest against a low ability rival compared to the proportion of votes that he receives against a high ability rival.

We now characterize the equilibrium in the above setting.

**Proposition 5.** [Equilibrium Choice of Share Structure and Voting Ratio]

(i) If the incumbent’s reputation $\theta$ is high enough and the difference in intrinsic values between the projects with high and low near-term uncertainty is large (i.e., above a threshold value), there exists an equilibrium where the incumbent chooses a dual class IPO at time 0. In this equilibrium:

(a) If the control benefits are high, both talented ($T$) and untalented ($U$) incumbents choose a dual class IPO with a high voting ratio $\nu_T$ and implement the project with high near-term uncertainty. The untalented ($U$) incumbent does not exert effort. The firm is never taken over by any type of rival.
(b) If the control benefits are small, both talented (T) and untalented (U) incumbents choose a dual class IPO with a low voting ratio tL and implement the project with high near-term uncertainty. The untalented (U) incumbent exerts low effort. The firm is taken over by a high ability rival (if she arrives) if the realization of the intermediate signal is bad. It is never taken over by a low ability rival.

(ii) If the incumbent’s reputation is low enough and the difference in intrinsic values between the projects with high and low near-term uncertainty is small (i.e., below a threshold value), there exist an equilibrium where the incumbent chooses a single class IPO at time 0. In this equilibrium, both talented (T) and untalented (U) incumbents choose a single class IPO and implement the project with low near-term uncertainty. The untalented (U) incumbent exerts high effort. The firm is taken over by a high ability rival if she arrives. It is taken over by a low ability rival (if she arrives) if the realization of the intermediate signal is bad.

As in previous propositions, the equilibrium choices here also are driven by those made by the talented incumbent, since the untalented incumbent is better off mimicking the talented incumbent in equilibrium. In the above equilibrium, the trade offs faced by the talented incumbent in choosing between a single class and a dual class share structure are similar to those in the basic model, so that we do not discuss them here. Within a dual class share structure, however, the incumbent’s choice between a high voting ratio and a low voting ratio depends on his trade off between security and control benefits. A high voting ratio dual class share structure has two advantages over a low voting ratio dual class share structure from the point of view of the talented incumbent. The first is that it is able to deter both high ability and the low ability rivals from taking over the firm, thus ensuring that the incumbent can always maintain control (and enjoy his control benefits with probability 1). The second advantage arises from the “value creation effect.” This effect arises from the fact that, even though both types of incumbents implement the project with high rather than low near-term uncertainty under both high and low voting ratio dual class share structures, at time 0, the expected value created is smaller under the low voting ratio case, since the talented incumbent may lose control to a high ability rival in the event of a bad realization of the intermediate signal, thereby reducing firm value (since the talented incumbent implementing the project with high near-term uncertainty can in fact create greater value than a high ability rival). On the other hand, the advantage of a low voting ratio dual class share structure over a high voting ratio share structure is that, the risk of the incumbent losing control (to a high ability rival) exerts a disciplining effect on the untalented incumbent (inducing him to exert a low level of effort, compared to no effort under the high voting ratio dual class share structure). As discussed under the basic model, this disciplining effect has a positive effect on the share price of even the talented incumbent, since the market cannot distinguish perfectly between the two. When the control benefits are large, the advantages of a high voting ratio relative to a low voting ratio (the combination of the control benefits and the value creation effects) dominate its disadvantage (in terms of the reduced IPO price arising from the loss of discipline effect), and the incumbent chooses a dual class share structure with a high voting ratio. On the other hand, when the incumbent’s control benefits are small (but still in the range of values where he chooses a dual class IPO), the disadvantage of a high voting ratio dominates, and he chooses a dual class share structure with a low voting ratio.

**Proposition 6.** [Share Value Improvement with Restriction on Voting Ratio] If the maximum voting ratio between the supervoting shares and ordinary shares is restricted to t (where tL > t ≥ tL), then the share value of the firm is greater than if no such restriction is imposed.

As mentioned in the discussion of the previous proposition, the incumbent chooses a dual class share structure with a high rather than a low voting ratio when the combination of the control benefits and the value creation effects dominates the loss of discipline effect. In many of these situations (when the incumbent’s control benefits are large), the loss of discipline effect dominates the value creation effect, so that the incumbent’s choice of a high voting ratio over a low voting ratio is driven primarily by his desire to maximize control benefits (and not by the value creation considerations). In such situations, putting an upper limit on maximum voting ratio that can be chosen in dual class IPOs forces the incumbent to adopt the low voting ratio, increasing shareholder value.

### 5. Implications and testable hypotheses

1. **The prevalence of dual class IPOs:** Our model has predictions about the kinds of firms that choose to have dual class rather than single class IPOs. First, our model predicts that dual class IPOs are more likely to be prevalent in industries where a considerable amount of value can be created by making investments with high near-term uncertainty. One example of such an industry is the newspaper industry, where editorial independence needs to be protected, and cultivating a particular clientele may be important: e.g., politically liberal readers in the case of the New York Times Co. and politically conservative readers in the case of Dow Jones and Co. (which owns the Wall Street Journal). A second example is the movie industry, where large and expensive investments with high near-term uncertainty need to be made (often in opposition to conventional wisdom). Similar examples can be found in other industries where large amounts need to be invested in research and development (R&D) with slow resolution of investment uncertainty. Second, our model predicts that dual class IPOs are likely to be associated with family-owned firms and other firms run by high reputation managers (e.g., founding entrepreneurs, as in the case of Sergey Brin and Larry Page of Google or Warren Buffett of Berkshire Hathaway). Thus, our model predicts that, the greater is the reputation of firm management, the greater is the likelihood of the firm choosing a dual class share structure. Third, our model predicts (consistent with the argument made by corporate governance activists) that dual class share structures are also prevalent in firms with large private benefits of control. However, in our setting, such control benefits are only one among the many factors which drive firms to adopt a dual class share structure and other antitakeover provisions. Consistent with these predictions, Gompers et al. (2010) find that media companies and companies with a person’s name in the company name are more likely to adopt dual class share structures. Evidence broadly supporting the above predictions is also provided by Arugaslan et al. (2010).

2. **Comparison of share value maximization and operating performance in dual class versus single class IPOs:** First, our model predicts that dual class IPOs maximize shareholder value if the
incumbent management’s reputation is high, and the firm is operating in an industry where the difference between the intrinsic values of projects with high and low near-term uncertainty is large.\textsuperscript{25} Second, single class IPOs maximize shareholder value if the incumbent management’s reputation is low, and the firm is operating in an industry where the difference between the projects with high and low near-term uncertainty is small. These imply that, if we compare the post-IPO operating performance by constructing industry and size-matched samples of firms undertaking dual class and single class IPOs, and split each sample into two based on managerial reputation, the high reputation dual class subsample is expected to outperform the high reputation single class subsample; however, the low reputation dual class IPO subsample is expected to underperform the low reputation single class IPO subsample. Though they do not perform such split-sample comparisons, evidence provided by Bohmer et al. (1996) is broadly consistent with the above prediction: they find that dual class IPO firms outperform their industry and size-matched single class counterparts in terms of post-IPO accounting performance.

3. Implications for antitakeover provisions in corporate charters: Our model generates two testable predictions regarding the relationship between the quality and reputation of a firm’s management and various antitakeover provisions in its charter. The first prediction is that the charters of firms with higher perceived management quality and reputation are likely to be characterized with stronger antitakeover provisions (provided that the control benefits from managing these firms are not too large). Further, within this group, firms with greater growth options (associated with projects with high near-term uncertainty) are likely to have stronger antitakeover provisions in their corporate charters. The second prediction is that if we split a sample of IPO firms along two dimensions: first, based on the perceived management quality and reputation; and second, based on the strength of the antitakeover provisions in their corporate charters, the group simultaneously having the highest management quality and reputation as well as the strongest antitakeover provisions in their charters are likely to outperform the other three groups in terms of post-IPO operating performance. Evidence strongly consistent with both predictions is provided by Chemmanur et al. (2011), who test these predictions among a sample of IPO firms using various proxies for perceived management quality and reputation.\textsuperscript{26}

4. Implication for the regulation of dual class share structures: Our analysis has several implications for the regulation of dual class share structures. First, it implies that dual class share structures are not necessarily value reducing: allowing the listing of firms with dual class share structures may even enhance value.\textsuperscript{27} Further, our analysis in Section 4.2 indicates that weaker restrictions on dual class share structures such as imposing a maximum voting ratio between the supervoting and ordinary (one vote) shares may contribute more toward maximizing shareholder value compared to the case where there is no regulation at all on dual class share structures (at one extreme) or the case where listing of dual class firms is disallowed.\textsuperscript{28} Finally, our analysis suggests that the best way of regulating dual class shares is more direct regulation aimed at managements using the dual class share structures only to entrench themselves and to extract private benefits while sparing managements which use this structure to create long-term shareholder value.\textsuperscript{29} One such direct regulation might involve requiring supervoting shares in firms consistently underperforming their industry peers over a long period (say five or ten years) to lose some of their superiority over ordinary shares in terms of voting power (that is, having the voting ratio shrink in such underperforming firms).

6. Conclusion

This paper analyzes a firm’s choice between dual class and single class share structures at its IPO. We consider an entrepreneur (“incumbent”) who obtains both security benefits and private benefits of control, and who wishes to sell equity to outsiders to raise financing to implement his firm’s project. The incumbent may be either talented (lower cost of effort, comparative advantage in implementing projects) or untalented: the incumbent’s ability is private information, with outsiders observing only a prior probability that he is talented (his “reputation”). The firm’s project may have either high (intrinsically more valuable, but showing less signs of success in the near-term) or low (faster resolution of uncertainty) near-term uncertainty. Under a single class share structure, the incumbent has a greater chance of losing control to potential rivals if he undertakes the project with high near-term uncertainty, since outside equity holders may vote for the rival if they believe that the project is not progressing well. A dual class share structure allows the incumbent to have enough votes to prevail against any rival, but may be misused by untalented incumbents to dissipate value by not exerting effort. In equilibrium, the incumbent simultaneously chooses the IPO share structure (dual class or single class), project type (the project with high or low near-term uncertainty), and how much effort to exert.

Our analysis generates a number of testable predictions: First, our model predicts that dual class IPOs are more prevalent in three kinds of firms: First, firms operating in industries where a considerable amount of value can be created by ignoring temporary trends; second, family owned firms and firms run by founder entrepreneurs, who tend to have high reputation in managing the firm; and third, firms characterized by large private benefits of control. Second, our model predicts that dual class IPO firms are likely to outperform (underperform) single class IPO firms if the reputation of the incumbent is high (low) and the firm is operating in an industry where the difference in intrinsic values

\textsuperscript{25} Our results provide an explanation for the finding of Smart and Zutter (2003) that dual class IPO firms sell at lower valuations (price to earnings and price to sales ratios) than single class IPO firms. In our setting, such a lower valuation for dual class IPO firms relative to single class IPO firms arises due to the loss of discipline effect associated with dual class share structures. Our analysis also explains why firms may choose dual class share structures despite such lower valuations: in our setting, managers choose dual class share structures when the combination of the value creation and the control benefits effects dominates the loss of discipline effect. Thus, while in some cases, managers may choose a dual class share structure purely driven by large control benefits, in other cases, the choice of such a share structure may indeed be driven by considerations of shareholder value maximization.

\textsuperscript{26} See also Baranchuk et al. (2005), who document that firms with greater growth options are associated with stronger antitakeover provisions in their corporate charters.

\textsuperscript{27} Until 1984, the NYSE imposed a one-share one-vote rule. In that year, they imposed a moratorium on its enforcement of this policy, after General Motors announced that it would issue a second class of stock with lower voting rights. Before this moratorium, the NYSE had delisted five firms for violating the one-share one-vote rule.

\textsuperscript{28} Of course, one question that may arise here is regarding the precise value of the maximum voting ratio between the supervoting and ordinary shares that regulations should establish. The AMEX requires that the ratio of voting rights between high-vote and low-vote stocks cannot exceed 10 to 1, and that the low vote shares must have certain rights in selecting the board of directors.

\textsuperscript{29} Several proposals have been put forward by various legal and other experts, both in the US and in Europe, for the regulation of dual class share structures (see Wilson (1993) for a review). One such proposal is the “break-through rule” under which a bidder that has acquired 75% of a company’s cash flow rights should be able to gain control and “break through” any mechanisms and structures that have been established by the company. Under this proposed rule, if the company has established a dual class structure and the bidder has acquired shares with inferior or no voting rights, the bidder is still able to cast votes in proportion to the fraction of capital that it has acquired (see, e.g., Financial Times, May 31, 2002).
between the projects with high and low near-term uncertainty is large (small). Our analysis also has testable predictions for the voting ratio between supervoting and ordinary shares in firms adopting dual class share structures. In addition, our model has policy implications for regulators for controlling management abuses under dual class share structures.

Acknowledgments

For helpful comments and discussions we thank Sanjay Banerji, Erik Berglof, Sudipto Bhattacharya, Doug Cook, Amil Dasgupta, Jerome Detemple, Antoine Faure-Grimaud, Laura Field, Bill Francis, Iftekhar Hasan, Yrjo Koskinen, Jacob Oded, Dimitri Vayanos, David Webb, as well as participants at the 2005 FMA meetings, the 2005 Asian Corporate Governance Conference, the 2005 Conference on Pacific Basin Finance, Economics, and Accounting, the 2006 FIRS conference, and seminar participants at Boston College, Boston University, Durham University, Fordham University, Indiana University at Bloomington, London School of Economics, Rensselaer Polytechnic Institute, University of Alabama, University of Arkansas and York University. We are solely responsible for any remaining errors or omissions.

Appendix A

A.1. Proof of Proposition 1 and 2

Given the equilibrium behavior and beliefs of agents in a dual class IPO equilibrium (DIE from now onward, Proposition 1), the IPO price for a firm in such an equilibrium is \( P_0 = \theta \eta C + (1 - \theta) [\beta C + (1 - \beta')] \). The fraction of equity retained by the incumbent in this equilibrium is:

\[
x_0 = \frac{P_0 - I}{P_0} = \frac{\theta \eta C + (1 - \theta) [\beta C + (1 - \beta')] - I}{\theta \eta C + (1 - \theta) [\beta C + (1 - \beta')] - C}.
\]

(A1)

The rest of the cash flow rights are sold to outside investors. In this equilibrium, the expected payoff for a type \( T \) incumbent is:

\[
\Pi_T^I = x_0 [\eta C + (1 - \eta) C] + K.
\]

(A2)

and the expected payoff for a type \( U \) incumbent is:

\[
\Pi_U^I = x_0 [\beta C + (1 - \beta') C] + K.
\]

(A3)

where \( x_0 \) in both (A2) and (A3) is as specified in (A1).

In the dual class IPO equilibrium, we also need the equilibrium payoffs for each type of incumbent to be greater than the payoffs they can get from any off-equilibrium moves. Given the out of equilibrium beliefs, if any incumbent chooses to have a single class IPO, outside investors infer that the incumbent of this firm is of type \( U \) with probability 1, who chooses to implement a project with high near-term uncertainty and exert no effort in implementing it. Furthermore, if a rival appears, outside investors vote in a way such that the rival always takes over the control of the firm. The market price for such a firm’s IPO shares is \( P = \phi C + (1 - \phi) [\beta C + (1 - \beta') C] \). The first condition required for a DIE to exist is given by:

\[
\phi C + (1 - \phi) [\beta C + (1 - \beta') C] \leq P_0.
\]

(A4)

Given (A4), no type \( T \) incumbent chooses a single class IPO in a dual class IPO equilibrium. If any incumbent chooses to implement a project with low near-term uncertainty (another off-equilibrium move), outside investors again infer that with probability 1 the incumbent of this firm is a type \( U \) incumbent, who exerts no effort in implementing the project. The market price for such a firm is \( P = \beta C + (1 - \beta') C \). The second condition required for a DIE to exist is:

\[
\beta C + (1 - \beta') C \leq P_0.
\]

(A5)

Given (A5), no type \( T \) incumbent chooses to implement a project with low near-term uncertainty in a dual class IPO equilibrium.

Furthermore, we also require (A6)-(A10) to hold for a DIE:

\[
\phi C + (1 - \phi) [\beta C + (1 - \beta') C] - I + (1 - \phi) K \leq \Pi_T^U,
\]

(A6)

\[
\phi C + (1 - \phi) [\beta C + (1 - \beta') C] - I + (1 - \phi) K \leq \Pi_T^U,
\]

(A7)

\[
\phi C + (1 - \phi) [\beta C + (1 - \beta') C] - I + (1 - \phi) K \leq \Pi_T^U,
\]

(A8)

\[
\beta C + (1 - \beta') C - I + K \leq \Pi_U^I.
\]

(A9)

and

\[
\beta C + (1 - \beta') C - I + K \leq \Pi_U^I.
\]

(A10)

Given (A6)-(A10), no type \( U \) incumbent chooses to have a single class IPO or implement a project with low near-term uncertainty in the dual class IPO equilibrium.

For example, for \( \theta = 0.8, \eta = 0.9, \theta = 0.8, \beta_0 = 0.4, \beta' = 0.4, \beta_1 = 0.2, \beta_2 = 0.2, \delta_1 = 0.8, \psi_1 = 0.6, \psi_2 = 0.4, \delta_2 = 0.5, \psi_3 = 0.45, \beta = 3, \theta = 10, C = 100, C = 50, \theta' = 85, I = 50, \phi = 0.5, \) and \( k = 20, \) a DIE exists with \( x_0 = 0.43182, \Pi_T^U = 61.023, \Pi_U^I = 45.909, \) and conditions A4-A10 are satisfied.

Given the equilibrium behavior and beliefs of the agents in the single class IPO equilibrium (SIE from now onward, Proposition 2), the IPO price for a firm in such an equilibrium is:

\[
P_3 = \theta (\delta_1 + (1 - \delta_1)(1 - \phi))(\eta C + (1 - \eta) C) + (1 - \delta_1)(1 - \phi) C + (1 - \delta_1)(1 - \phi) C + (1 - \delta_1)(1 - \phi) K.
\]

(A11)

The fraction of equity (the fraction of cash flow rights) retained by the incumbent in this equilibrium is:

\[
x_3 = \frac{P_3 - I}{P_3},
\]

(A12)

where \( P_3 \) is as specified in (A11), and he sells the rest of the cash flow rights to outside investors. In this equilibrium, the expected payoff for a type \( T \) incumbent is:

\[
\Pi_T^I = x_3 [\delta_1 + (1 - \delta_1)(1 - \phi)](\eta C + (1 - \eta) C) + (1 - \delta_1)(1 - \phi)] C + (1 - \delta_1)(1 - \phi) K.
\]

(A13)

and the expected payoff for a type \( U \) incumbent is:

\[
\Pi_U^I = x_3 [\delta_2 + (1 - \delta_2)(1 - \phi)](\beta C + (1 - \beta') C) + (1 - \delta_2)(1 - \phi) K = e.
\]

(A14)

where \( x_3 \) in both (A13) and (A14) is as specified in (A12).

In an SIE, given the out of equilibrium beliefs, if any incumbent chooses to have a dual class share structure when his firm goes public, outside investors infer with probability 1 that the incumbent of this firm is of type \( U \), he implements a project with high near-term uncertainty, and he exerts no effort in implementing the firm’s project. In this case, the market price for the firm is
to choose a dual class IPO in an SIE, we need (A18)–(A20) to hold:

\[ \beta C + (1 - \beta) C^2 \leq P_s. \]  

(A15)

Given (A15), no type T incumbent chooses to have a dual class IPO in an SIE.

Further, if a firm chooses to implement a project with high near-term uncertainty in an SIE, outside investors infer with probability 1 that the incumbent is of type U, and he exerts no effort in implementing the project. Furthermore, if a rival arrives, in this case, outside investors always vote for the rival in the control contest and the incumbent loses control of his firm. In this case, the market price for the firm is

\[ P = \phi C + (1 - \phi) [\beta C + (1 - \beta) C^2]. \]

We therefore need (A16) and (A17) to hold for an SIE to exist:

\[ \phi C + (1 - \phi) [\beta C + (1 - \beta) C^2] \leq P_s, \]  

(A16)

\[ \phi C + (1 - \phi) [\beta C + (1 - \beta) C^2] - I \phi C + (1 - \phi) (\eta C) + (1 - \phi) K \leq \Pi_T^U. \]  

(A17)

Given (A16) and (A17), no incumbent (either type T or type U) chooses to implement a project with high near-term uncertainty in an SIE.

If a firm chooses a dual class IPO in an SIE, outside investors infer with probability 1 that the incumbent is of type U, and he exerts no effort in implementing the firm’s project (be it a project with high or low near-term uncertainty). For a type U incumbent not to choose a dual class IPO in an SIE, we need (A18)–(A20) to hold:

\[ \frac{\beta C + (1 - \beta) C^2}{\beta C + (1 - \beta) C^2} \leq \beta C + (1 - \beta) C^2 + K \leq \Pi_T^U, \]  

(A18)

\[ \frac{\beta C + (1 - \beta) C^2}{\beta C + (1 - \beta) C^2} \leq \beta C + (1 - \beta) C^2 + K \leq \Pi_T^U, \]  

(A19)

and

\[ \beta C + (1 - \beta) C^2 - I + K \leq \Pi_T^U. \]  

(A20)

In the dual class IPO equilibrium, one sufficient condition for the incumbent to remain in control in the situation where a rival arrives is that the incumbent retains more than 50% of voting rights when his firm goes public, i.e., \( \frac{\eta C}{\eta C + (1 - \eta) C} > \frac{1}{2} \), which is equivalent to:

\[ t > 1 - \frac{\eta}{\eta T}. \]  

(A21)

In the single class IPO equilibrium, between time 0 and 1, the share price of the firm is updated by the investors, after observing their intermediate signals. If a good signal arrives for a firm, its share price is updated to \( P^T_s = \frac{1}{\eta C + (1 - \eta) C} \), and if a bad signal arrives for a firm, its share price is updated to \( P^b_s = \frac{1}{\eta C + (1 - \eta) C} \). For an SIE to exist, we also require:

\[ x_s C_R \leq \Pi_T^U. \]  

(A22)

(22) ensures that an incumbent always votes for himself in any control contest. Given (1) and (2), outsiders vote for the incumbent if they get a good intermediate signal, and they vote for the rival if they get a bad intermediate signal.

For example, for \( \theta = 0.3, \eta = 0.8, \beta = 0.5, \beta = 0.4, \beta = 0.4, \beta = 0.2, \beta = 0.2, \beta = 0.7, \beta = 0.5, \beta = 0.35, \beta = 0.45, \psi = 0.4, \phi = 0.3, \psi = 1, C = 100, C = 50, C = 71.5, I = 50, \phi = 0.4, K = 20, \) and \( \Pi_T^U = 1.381, \Pi_T^U = 38.333, \) and conditions A15–A22 are satisfied.

A2. Proof of Proposition 3

(i) For a fixed set of other parameters in the model, denote \( C_{T^U_{1H}} = \eta C + (1 - \eta) C \), and \( C_{T^U_{2H}} = \eta C + (1 - \eta) C + C_{T^U_{1H}} \). Let \( \theta > 0 \) be the lowest reputation level for the dual class equilibrium with a given \( C_T \) to exist, and it can be shown from Proposition 1 that \( \theta > 0 \) decreases in the equilibrium payoffs to the incumbent. The difference in the equilibrium payoff to the talented incumbent between the above two equilibria is:

\[ \Delta \Pi_T^U = \delta_2^H C_{T^U_{2H}} - \delta_2^H C_{T^U_{1H}} > 0 \]  

because \( \delta_2^H C_{T^U_{2H}} > \delta_2^H C_{T^U_{1H}} \). Similarly, it can be shown that \( \Delta \Pi_T^U > 0 \). Thus, when the difference in value between the projects with high and low near-term uncertainty increases, the equilibrium payoffs to both types of incumbents increase. Hence, \( \delta_2^H < \delta_1^H \). Therefore, when the difference between the projects with high and lower near-term uncertainty increases, the equilibrium involves a dual class IPO rather than a single class IPO for lower values of \( \theta \).

(ii) For a fixed set of other parameters in the model, let \( K_1 < K_2 \). As the magnitude of the private benefits of control \( K \) increases, the payoffs for both types of incumbents increase under both a dual class share structure and a single class share structure, but they increase faster under a dual class share structure because \( \phi > 0 \). Thus, \( \delta_2^H < \delta_1^H \). Therefore, when the magnitude of the private benefits of control increases, the equilibrium involves a dual class IPO rather than a single class IPO for smaller value of \( \theta \). □

A3. Proof of Proposition 4

\[ P_s = \phi C + (1 - \phi) C^2 + (1 - \theta)[\beta C + (1 - \beta) C^2], \]  

and \( P_s \) is specified in (A11). It can be shown with some algebra that if \( \theta > 0 \), then \( \delta_1^H C + (1 - \delta) \phi C _ 0 \phi C _ 0 > \delta_2^H C + (1 - \delta) \phi C _ 0 \phi C _ 0 \). Therefore, \( \delta_1^H C + (1 - \delta) \phi C _ 0 \phi C _ 0 > \delta_2^H C + (1 - \delta) \phi C _ 0 \phi C _ 0 \). Thus, when the difference in value between the projects with high near-term uncertainty is sufficiently greater than that of the project with low near-term uncertainty. □

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