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Abstract

We create a novel dataset to examine the recent rise in dual-class IPOs. We document that dual-class firms have different types of controlling shareholders and wedges between voting and economic rights, and that the increasing popularity of dual-class structures is driven by founder-controlled firms. We find that founders' wedge is greater when founders have stronger bargaining power. The increase in founder control over time is due to greater availability of private capital and technological shocks that reduced firms' needs for external financing. Stronger bargaining power is also associated with a lower likelihood of sunset provisions that terminate dual-class structures.

Keywords: Dual-Class, Initial Public Offerings (IPOs), Entrepreneurship, Corporate Governance, Venture Capital, Private Firms, Raising Capital

JEL Classifications: G34, G28, G24

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1. Introduction

Public markets have undergone dramatic changes in recent years. Most notably, the number of publicly traded firms has been steadily declining, while private capital to fund late-stage startups has become more available (Gao et al., 2013; Doidge et al., 2018). Also changing is the nature of the firms that choose to go public. While publicly traded companies in the classic sense are thought of as widely held firms with dispersed shareholding, many of the firms that have recently elected to go public are tightly controlled by their founders or other entities via a dual-class stock structure. As shown in Figure 1, almost 30 percent of initial public offerings (IPOs) in 2017-2019 had dual-class structures. Well-known examples include IPOs of high-tech firms such as Google in 2004, Facebook in 2012, and more recently, Snap in 2017. Yet, as Adams and Ferreira (2009) state, "few papers tackle the issue of the determinants of dual-class structure... Consequently, we still know very little about this issue." In this paper, we empirically explore the recent rise in dual-class stock IPOs, and present new evidence on the distribution and determinants of voting and economic rights across various stockholder types.

Why do firms adopt dual-class structures at the IPO, and what factors explain their recent popularity? A typical dual-class structure allocates excess voting control to a particular group of shareholders, despite their claim to a much smaller share of cash flow rights. Dual-class structures may entail substantial agency costs, as those shareholders with excess control rights bear only a small proportion of the financial consequences of their decisions, while retaining the ability to forestall takeovers and entrench themselves. Accordingly, from a governance perspective, the increase in dual-class stock IPOs is puzzling. Dual-class structures were historically used infrequently, presumably because the agency costs associated with such structures were high (Goshen and Hamdani, 2015). With institutional shareholders and proxy advisory firms placing growing pressure on corporations to remove provisions that shield managers from shareholder monitoring, such as staggered boards (Cremers, Litov, and Sepe, 2017) and poison pills (Catan, 2019), we might expect dual-class structures to follow a similar declining trend. Moreover, almost half of the IPOs in recent years have been from companies that raised financing from venture capital (VC) firms prior to going public (Ritter, 2020), and many well-known dual-class stock offerings in recent years are of firms belonging to technology sectors, such as software, that are of primary interest to VC investors. VC firms have incentives to design optimal governance systems for their portfolio firms when those firms go public in order to preserve the value of their investment (Baker and Gompers, 2003; Hochberg, 2012).[1] Thus, one might expect VC firms to insist on a one-vote one-share system

[1] VC firms tend to relinquish their controlling stakes at the IPO (Black and Gilson, 1998; Kaplan and Stromberg, 2003; Kaplan, Martel, and Stromberg, 2007), but usually unwind their positions within a year or so following the company's listing (Barry et al., 1990; Field and Hanka, 2001; Iliev and Lowry, 2020).

for their portfolio companies at the IPO. In light of these concerns about agency costs, it is natural to ask why IPO firms appear increasingly to be adopting dual-class structures.

A key challenge in exploring the determinants of dual-class firm structures is that not all dual-class firms are the same. While the academic literature has generally treated dual-class firms as a single monolithic "type," measuring excess control rights for directors and officers, in reality, the nature of controllers in different dual-class firms varies widely. In fact, founders are controllers in just under half of dual-class IPOs. The controllers may be directors or officers who are not the founders, parent or holding companies that issued shares in a subsidiary, an extended family that has controlled the firm for generations, or even private equity (PE) investors that have chosen a structure that allows them to keep control over the firm after the IPO. Furthermore, some dual-class structures are driven by regulatory and tax considerations, rather than by governance considerations.

To break open the dual-class black box, we create a novel database that identifies the shareholders, voting rights and type of controller in each dual-class IPO over the years 1994-2019. To the best of our knowledge, ours is the first comprehensive study of dual-class stock firms to date to classify and differentiate between various types of controllers and control wedges. Using our taxonomy of dual-class firms, we are able to compute the wedge between the voting and economic rights for different types of controllers, as well as for public shareholders, and to examine the determinants of different types of dual-class firm structures. The wedge for the public shareholders conveys the true measure of the potential agency costs of dual-class firms, since it shows (no matter what kind of controller the company has) how much outsider shareholders' voting rights lag behind their economic rights. To date, studies of dual-class firms have only computed the wedge for directors and officers, which may provide a distorted measure of the controllers' power and the agency costs borne by shareholders.

Our categorization of the different types of dual-class firms illustrates a variety of different motivations underlying dual-class structures that have been largely ignored by existing literature. The most common controllers of dual-class IPO firms are founders (4.8 percent of all IPOs, including single-and dual-class), parent and holding companies (2.4 percent), PE firms (0.9 percent), non-founder directors and officers (0.5 percent), and VC firms (0.4 percent). While the classic example of the founder-controlled software firm may be a salient one, there are many other notable examples of dual-class firms that do not fit this model. For example, Chipotle, a food chain that went public in 2006, was not controlled by its founder, but rather by McDonald's. First Data Corporation, a financial services company that went public in 2016, was controlled by KKR, a well-known PE firm. In both companies, the directors' and officers' economic rights exceeded their voting rights, and therefore their wedge was negative (whereas the controller—such as McDonald's or KKR—had a positive wedge) and did not reflect the existence of controllers' true superior voting rights. In contrast, our more detailed

data allows us to accurately capture the structures and potential agency costs of dual-class firms. More specifically, we find that the rise in dual-class IPOs is driven by an increase in the controlling power of firms' founders. For example, in 2017-2019, 19 percent of all IPOs were founder-controlled dual-class firms, a significant increase from 3 percent of all IPOs in 1994-2006. On the other hand, the percentage of dual-class structures with other types of controllers stayed relatively stable over time. Moreover, founders' wedge between economic and voting rights increased considerably, whereas the wedge of other controllers again remained largely the same or even declined over time. Thus, while there is wide variation in the type of controllers, the data suggests that the increase in dual-class IPOs is driven by founders' ability to dictate the governance of IPO firms.

We hypothesize that one potential determinant of dual-class structures is the relative bargaining power of founders versus investors (Goshen and Hamdani, 2015). When founders have stronger bargaining power, they are better able to negotiate for greater control rights at the time of IPO, and thus, the firm is more likely to adopt a dual-class structure. This theory is particularly appropriate for explaining the controlling power of dominant founders in software companies, such as Facebook and Snap. As argued by Goshen and Hamdani (2015), such founders place high value on the ability to pursue their visions. A strong bargaining position allows founders to raise capital without losing control over the firm, despite the potential agency costs associated with such control.

Founders may have greater bargaining power at the IPO stage in two related circumstances. The first is when there is more private capital available to be deployed. The ability to raise financing in the private markets provides founders with alternatives for exits through an IPO. Moreover, when "more money is chasing deals," there is greater competition among investors for deals, and valuations go up. When founders value control over their companies, higher valuations in the private market provide better outside options and make it less advantageous to go public (Ewens and Farre-Mensa, 2020) unless the founders have superior voting rights enshrined in the structure of the public firm.[2] Thus, the greater availability of funding has a direct effect on the bargaining position of the founders at the IPO stage, allowing them to negotiate for greater control rights in a public offering relative to what might be available in a tighter financing environment.

To explore this bargaining power hypothesis, we construct two proxies for the strength of private capital markets. The first is the amount of dry powder in the industry, defined as the amount of funds raised, but not yet invested, by VC firms. This measure is meant to proxy for the amount of private capital available for investment. This may be viewed as the outside option for a company considering a public offering versus

[2] There is ample evidence that VC firms competing to invest in startups have become more deferential to founder-entrepreneurs (Lublin and Ante, 2012; Alden, 2014; Winkler and Farrell, 2018; Kupor, 2012; Alon-Beck, 2019).

raising capital in the private market. The second is the amount of late-stage VC investment at the industry level in the year before the IPO (Goshen and Hamdani, 2015), which we view as an alternative proxy for the strength of private capital markets. Both proxies are based on VC fund flows because these are most likely to serve as an alternative to going public for a broad set of IPO firms. Since 2010, 57 percent of IPOs have been VC-backed, and most other firms in our sample appear to have been potential targets for VC investments even if they reached the IPO stage without such investment.[3] Moreover, VCs invest in a wide range of industries that are representative of the IPO sample.[4] Finally, VC investments are correlated with investments by other private investors, including private equity funds, hedge funds, corporations, and mutual funds (Ewens and Farre-Mensa, 2020; Kwon, Lowry, and Qian, 2020; Chernenko, Lerner, and Zeng, 2021).

Consistent with our hypothesis, we show that our proxies for the availability of private capital are positively correlated with a higher likelihood of founder control and a greater founders' wedge between voting and economic rights. All our specifications include industry fixed effects, such that the estimates of the coefficients on the proxies for industry private capital are derived from changes in the availability of financing across time. In contrast, the proxies are not positively correlated with a higher probability of control by other types of controllers, such as parent companies or PE firms. Unlike founders, these controllers do not normally seek outside equity investment from other private investors, and therefore the availability of external private equity capital does not typically affect these controllers' bargaining power. This further supports the hypothesis that the rise in founder control through dual-class structures is driven by founders' bargaining power.

Our results are robust to a variety of alternative specifications. First, the patterns we document remain substantially the same when we further control for several proxies for industry economic conditions. These include proxies for "hot" public markets at the industry level, such as the average returns or IPO underpricing in the industry, and the intensity of the merger activity to account for industry merger waves.

Second, the results are robust when evaluating subsamples of the data that exclude or include only certain types of IPOs, such as VC-backed IPOs. This suggests that the outside options in the private market may enhance founders' ability to maintain control in the IPO even if they did not previously obtain investments from VC firms prior to the IPO. The results are also qualitatively similar when we exclude firms from industries with a high concentration of software and data management companies. Our findings are thus not limited to

[3] Only about half of the founder-controlled dual-class IPO firms in the sample were not backed by VCs prior to the IPO, yet most of them seem to have been potential targets for VC investments. Obvious examples include technology firms, such as GreenSky, Inc. and Innovalon Holdings, as well as firms in industries such as pharmaceuticals and communications.

[4] Based on the industry classifications in VentureXpert, VCs invest in a wide range of non-high-technology industries, including health services, retail companies, financial services, and even manufacturing and transportation.

software firms such as Facebook and Snap, and they further help explain the decline of dual-class structures in industries such as communications that have experienced a decline in private capital investments.

Third, we provide evidence that dual-class structures tend to be determined at the IPO stage. In particular, in examining the certificates of incorporation of a sample of 56 large startups from the Private Capital Research Institute, we find that dual-class structures were created in the IPO negotiation period in about 80 percent of these firms. In addition, using data from Ewens and Malenko (2020), we find that pre-IPO board control of VC-backed firms does not predict control at the IPO stage. This is further consistent with the notion that the availability of private capital in the year prior to the IPO affects founders' bargaining power for control rights at the IPO.

Founders may have a strong bargaining position not only where the supply of private capital increases, but also when they need relatively less capital to operate their business. When a firm does not require much capital, investors, such as VC firms, may be competing to invest in the firm rather than the firm competing with other firms for investment capital. As documented by Ewens, Nanda, and Rhodes-Kropf (2018), the introduction of cloud computing in 2006 led to a significant reduction in costs of experimentation, business formation and scaling for software and web-based ventures. As a result, such startups became less reliant on funding, thus increasing the relative bargaining power of their founders vis-`a-vis their investors. To take one recent example, Veeva, an online customer relationship and content management company, received only $7 million in VC investment but was valued at $4.4 billion shortly after its IPO in 2013. Perhaps unsurprisingly, Veeva has a dual-class stock structure (Schubarth, 2013). Using a difference-in-differences analysis around the introduction of cloud computing, we show that firms in Cloud industries became more likely to adopt dual-class structures that give greater control to founders following the introduction of cloud computing, particularly for VC-backed IPOs. This finding is consistent with anecdotal evidence that due to technological changes, software companies now have more options for reaching scale and going public without raising significant funding from VC firms.

Our empirical tests also reveal other ancillary yet novel findings. We find no significant relationship in the full sample period between VC backing and the wedge of founders. This suggests that VC firms do not appear, on average, to be averse to founders' voting rights exceeding their economic rights. While founder-controlled dual-class IPOs were initially less likely to be VC-backed firms, they have become increasingly able to attract VC investment in recent years. Our results are consistent with a diminution in the governance role of VC firms over time (Ewens et al., 2018). Finally, we find that foreign firms, primarily those based in China, are much more likely to be controlled by founders and have a larger wedge between founders' voting and economic rights. This finding is consistent with the existence of various regulatory restrictions on companies that have prevented founder-controlled firms from listing on the Hong Kong or Chinese stock exchanges.

While many firms go public with a dual-class structure, these structures do not necessarily persist indefinitely. We document the adoption of "sunset" provisions in IPOs of dual-class firms. Sunset provisions specify the circumstances under which the wedge between voting and economic rights ends, typically through the conversion of the dual-class structure into a single-class one with no superior voting rights for any shares. The recent debate over sunsets has focused on two main types of sunsets: (1) "time sunsets," which stipulate that the conversion into a single-class firm must occur at a pre-determined time, such as five years after the IPO; and (2) "ownership sunsets," which convert dual-class firms into single-class firms when the controllers' economic stake falls below a certain threshold. While some commentators have recommended that dual-class firms adopt time sunsets because agency costs at dual-class firms arguably increase with firm age (Bebchuk and Kastiel, 2017), others have questioned their efficacy (Fisch and Solomon, 2019; Sharfman, 2019), and advocate the use of ownership sunsets because they address the concern that controllers will have too little a stake in the outcome of their decisions. We find that both time and ownership sunsets are more likely to be included in VC-backed IPOs of dual-class firms, and less so in other IPOs. However, despite a growing trend of dual-class firms adopting such provisions, sunsets are less common in founder-controlled firms, further consistent with an increase in founders' bargaining power over time.

Our work makes a number of contributions to the literature. First, our study contributes to the scholarship exploring dual-class stock structures. We provide the first detailed exploration of the nature and incidence of different types of controllers, and propose new measures for examining the wedges between cash flows and control. Unlike prior datasets, our data allows a nuanced analysis that incorporates the underlying economic motivations of different controllers and an accurate measure of the agency costs faced by public shareholders.

In particular, our findings add to the literature's understanding of the determinants of dual-class structures, which remains relatively unexplored (Adams and Ferreira, 2009). A number of theoretical studies discuss the tradeoffs between agency costs, reputational incentives, and the benefit of locking controlling shareholders into the firm's long-term performance and reputation (Grossman and Hart, 1986; Hansmann, 1988; Choi, 2018). Early empirical studies suggested that dual-class structures enable controlling shareholders to retain control without having to bear excessive cash-flow risk (DeAngelo and DeAngelo, 1985). The first comprehensive empirical study of dual-class firms, Gompers et al. (2009), suggests that dual-class structures are more prevalent in the presence of private benefits for corporate insiders. Specifically, Gompers et al. (2009) find that dual-class stocks are more likely in the media industry and in eponymous companies. More recently, Iliev and Lowry (2020) explore the relationship between information asymmetries, proxied by variables such as R&D, and dual-class structure, and find no connections. To the best of our knowledge, our work is the first to demonstrate the potential effect of founder bargaining power on the choice of dual-class structure in IPOs.

This analysis may help explain why some industries, such as software, have experienced a large increase in the percentage of dual-class IPOs, whereas the communications industry, historically a predictor of dual-class structures, experienced a decrease.

Our article is also related to research that studies the effect of dual-class structure on performance. Several studies have found that a higher wedge between director and officer voting rights and cash flow rights is associated with lower firm value (Jarrell and Poulsen, 1988; Claessens et al., 2002; Lemmon and Lins, 2003; Smart et al., 2008; Gompers et al., 2009) and managerial extraction of private benefits (Smart et al., 2008; Masulis et al., 2009). Conversely, other studies find no significant association with shareholder value or even find a positive effect (Partch, 1987; Cornett and Vetsuypens, 1989; Dimitrov and Jain, 2006). Smart and Zutter (2003) find that dual-class IPOs are less likely to be underpriced. Consistent with their finding, recent studies suggest that dual-class stock firms exhibit higher valuations around the time of the IPO, although they also find lower valuations when these firms become mature companies (Cremers, Lauterbach, and Pajuste, 2018; Kim and Michaely, 2019). Although we do not discuss valuations in this paper, our data calls for further examination of earlier findings. For example, an examination of whether the higher valuations of dual-class firms are related to specific controllers, especially founders of high-growth companies, would be useful. Moreover, future analysis of the relationship between firm value and the agency costs associated with dual-class structures would more accurately rely on our proposed measure of the wedge between voting and economic rights of the public shareholders rather than the previously used measure that relies on the wedge for directors and officers, which can be misleading.

Second, we contribute to the recent literature exploring the growth in private capital markets that has resulted in companies staying private longer (Gao et al., 2013; Doidge et al., 2018; Ewens and Farre-Mensa, 2020). As shown by Ewens and Farre-Mensa (2020), regulatory changes that resulted in greater availability of private financing contributed to a decrease in the number of public firms. Our focus is on VC investment, which is the main source of funding for entrepreneurial firms, especially for many of the recent high-tech IPOs, such as Facebook and Snap. Our results are consistent with the increase in availability of late-stage capital leading to increased bargaining power for founders vis-a-vis investors at the IPO, and in turn, to an increase in dual-class stock structures in IPO firms. In this sense, our study is related to Lehn et al. (1990), who explore the substitutability of private ownership in which there is no wedge between voting rights and cash-flow rights and dual-class stock structures that keep control in the hands of insiders. Specifically, we show that an increase in the availability of private capital that gives entrepreneurial firms greater financing options increases the power of entrepreneurial firm founders to maintain their control even after the firm becomes public.

Third, we contribute more broadly to the literature on governance of IPO firms. Much of the literature focuses on adoption of anti-takeover devices. Several studies have highlighted the prevalence of anti-takeover provisions in the governance of IPO firms (Daines and Klausner, 2001; Karpoff and Field, 2002; Iliev and Lowry, 2020). For example, Daines and Klausner (2001) find that anti-takeover devices are used to protect managers when takeovers are more likely, and Karpoff and Field (2002) find that managers tend to deploy defenses when their compensation is high and shareholder oversight is weak. Similarly, Field and Lowry (2017) show that after the IPO, mutual funds tend to vote against directors of dual-class stock firms, but not those of firms with classified boards.[5] With few exceptions (Baker and Gompers, 2003; Hochberg, 2012), however, this literature has not emphasized the impact of founder bargaining power on governance at the IPO stage. Thus, we complement recent studies of controversial IPO governance provisions (Field and Lowry, 2017) by providing a market-based explanation for the rise of dual-class stock.[6]

Finally, our paper adds another dimension to the large body of literature on the governance role of VC firms. VC firms monitor their portfolio companies through board representation (Lerner, 1995) and by acquiring information through staged financing (Gompers, 1995). Kaplan and Stromberg (2003) document that VCs negotiate control rights at the time of their investment and put monitoring and advisory systems in place. Hellmann and Puri (2002) indicate that VCs play a role in the professionalization of startups, including the hiring of outside CEOs (see also Broughman and Fried, 2020). Two studies focus directly on VC firms' impact on IPO firms (Baker and Gompers, 2003; Hochberg, 2012). Both show that VC-backed IPO firms tend to have more independent boards. Hochberg (2012) also shows that VC-backed firms tend to have lower earning management and more positive reactions to the adoption of anti-takeover devices. These findings support the hypothesis that governance is the result of a bargaining process between investors and insiders. Our article extends these studies by focusing on how changes in the relative bargaining power of founders and investors have affected the most extreme entrenchment device, the dual-class stock structure. Moreover, we document the changes in VC firms' attitudes toward governance over time (Ewens et al., 2018; Ewens and Malenko, 2020).

[5] Institutional shareholders have consistently expressed strong opposition to dual-class structures. For example, on October 2, 2012 the Council of Institutional Investors sent letters to the New York Stock Exchange and Nasdaq requesting them to prohibit dual-class stocks in their listing standards. See https://www.cii.org/dualclass_stock.

[6] In this respect, our study is related to other studies that explore market explanations for the prevalence of governance mechanisms, especially in the context of executive compensation (e.g., Cremers and Grinstein, 2013; Peters and Wagner, 2014; Jenter and Kanaan, 2015).

2. A Taxonomy of Dual-Class Firms by Controller

A key contribution of our study is the construction of a novel dataset on dual-class IPOs from 1994-2019. We begin by describing the data construction process and presenting a taxonomy of dual-class firms by controller type. To code the data on dual-class structure, we merge the IPO sample with data on dual-class stock from several existing sources: (1) data on dual-class listings from 1994-2002 from Gompers et al. (2009);[7] (2) data on dual-class IPOs available on Jay Ritter's website; and (3) data collected by the Council of Institutional Investors.[8] We extend this data by using the DirectEdgar software and CapitalIQ to identify candidate firms that may have adopted dual-class stock structures.[9] We manually review the registration statements and the first proxy statements after the IPO of the candidate firms. We classify as single-class firms that went public with multiple classes of common stock but converted all their shares into a single class before filing their first proxy statement. We remove from the sample dual-class IPOs where the dual-class structure is adopted for tax and regulatory reasons.[10] The final sample includes 5,907 IPOs of which 607 are dual-class firms, comprising 10.28 percent of the total sample. As shown in Figure 1, since 2008 there has been a steady increase in the proportion of IPO firms that are dual-class, with a particularly steep uptick beginning in 2016. This trend, however, does not provide the full picture; it treats all dual-class structures as the same irrespective of the type of controller.

To identify controllers in our sample firms, we collect detailed data from firm proxy statements. Whereas previous research treats dual-class IPOs as a binary classification (i.e., an IPO firm either has or does not have a dual-class structure), we demonstrate the existence of a wide range of dual-class structures—some entrenching founders, others giving a holding or parent company or private equity firm control, and so on.

We classify control over dual-class stock firms based on where voting power and operational control of the company are situated. A shareholder or a group of shareholders qualify as controller(s) if (1) they have voting power in excess of fifty percent, (2) they have more than double the voting power of any other shareholder,[11] or (3) if the prospectus's description of the company's business made it clear that they controlled

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[7] See https://faculty.som.yale.edu/andrewmetrick/data/.
[8] See https://www.cii.org/dualclass_stock.
[9] We use various key word expressions to identify candidate firms, such as "class B" and "voting rights" and ("five votes" or "ten votes" or "fifteen votes" or "twenty votes" or "twenty five votes" or "thirty votes" or "5 votes" or "10 votes" or "15 votes" or "20 votes" or "25 votes" or "30 votes").
[10] Tax-driven IPOs include "Up-C" IPOs, which simply exist to allow pre-IPO owners to claim passthrough tax treatment which lowers their tax liability. Regulation-driven dual-class firms include media companies, where the dual-class structure was formed to comply with the regulation by the Federal Communications Commission (FCC) that limits the percentage of voting stock individuals can own across media companies.
[11] An example of this sort of control is LinkedIn's 2011 IPO. Founder Reid Hoffman only had 39.4% voting power. However, he had more than double the votes of the next largest shareholder, Sequoia Capital (17.8%). Therefore, we coded Hoffman as controller. See https://www.sec.gov/Archives/edgar/data/1271024/000119312512191357/d336108ddef14a.htm.

the business.[12] Finally, if none of the above criteria fit any shareholder or group of shareholders, we classify the dual-class firm as having no controller.

The most common class of controllers is the firm founder. Most firms identify their founders by name in their registration or proxy statements. We double-check the histories of each IPO firm using Factiva and internet research to make sure we do not miss any founder who is not identified as such in the SEC filings. Founders, however, are not the only class of controllers, and there are several other important types. First, dual-class stock firms may be controlled by parent or holding corporations. For example, when the fast-food chain Chipotle went public in 2006, it was not controlled by Steve Ells, its founder, but rather by a subsidiary of McDonald's. McDonald's owned most of the super-voting shares and had control of 87 percent of the voting rights, with a 22 percent "wedge" between its voting and economic rights. McDonald's had financially supported Chipotle, leasing out office and restaurant space as well as providing insurance, software and tax assistance.[13] Second, investors in the firm often serve as controllers, and a VC firm or a private equity ("PE") firm may control the firm at the time of IPO, possibly due to a desire to influence the business in the first years in which the firm is public.[14] To make sure we are not identifying a VC investor as PE (or vice versa), we scan the regulatory filings, VentureXpert, SDC, and the news media to determine the role played by the investor. In some cases, control may also be shared between the founder and a VC firm.[15] Control may also be maintained by directors and officers who are not the founders. For example, Skysat Communications Network, which went public in 1994, was controlled by directors and officers who were not founders of the company.[16] Other categories include family control and control by investors that are not VC or PE firms. In a few cases, there is no clear controller.[17]

A primary measure of interest for a dual-class firm is the "wedge" between voting and economic rights for key economic actors within the firm. While prior literature computes the wedge solely for directors and officers, regardless of the actual structure in place, we compute this wedge separately for founders, VC firms, PE firms,

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[12] For instance, we classify Yanhong Li as controller of Baidu because Baidu's prospectus makes clear that the company relied on Li's status as co-founder and CEO. See https://www.sec.gov/Archives/edgar/data/1329099/000119312506133151/d20f.htm

[13] See https://www.sec.gov/Archives/edgar/data/1058090/000104746906005769/a2169737zdef14a.htm

[14] These investors will typically sell their shares after a few years, and the firm then converts into a single-class firm. We do not discuss conversions in this article.

[15] This situation arises when the founder and VC have approximately equal voting rights and operational control, and/or the VC is in charge at the time of the IPO but exits the company soon after, leaving the founder in charge. For example, Edison Schools, a company that went public in 1999, was controlled by a consortium of VC firms. However, by 2002, they had exited the company, and the founder remained in control. We code such companies as controlled by "Founders and VC."

[16] Skysat's directors and officers owned a majority of the supervoting Class B shares and had 42 percent of the total voting power in the company, with a 22 percent wedge.

[17] For example, Waddell & Reed Financial Inc. had widely dispersed ownership with no clear controller. In fact, the largest holder of the supervoting Class B shares was an institutional investor (T. Rowe Price). See https://www.sec.gov/Archives/edgar/data/1052100/0001047469-99-010633.txt.

non-founder directors and officers, and public investors. Note that the wedge for any of these agents can be positive even if they are not the controllers. For example, the founder may have a positive wedge even if a VC controls the firm.[18]

By calculating different wedges for different agents, we allow for a more accurate measure of the motivations for different types of dual-class firms than the prior literature, which follows Gompers et al. (2009), and focuses exclusively on the wedge for directors and officers. Measuring the wedge solely for directors and officers has a number of drawbacks. First, it camouflages the extent to which founders (rather than other insiders) control the organization. For example, in some firms, such as Dropbox, some founders were also directors and officers at the IPO, but the wedge for the other directors was actually negative.[19] Moreover, as stated above, some firms, such as Skysat, may actually be controlled by directors who are not the founders. Second, this measure can be entirely misleading when the controllers are not directors or officers, and dual-class structures exist for reasons other than to entrench management. As an example, consider the case of Weider Nutrition International, which went public in 1997. The parent company, Weider Health and Fitness, owned all the super-voting Class B stock, which gave it ten votes per share. Accordingly, the holding company was the controller, wielding more than 98 percent of the aggregate voting power. The controller wedge for the holding company was 31 percent. If we had defined the wedge only for the directors and officers, however (in accordance with prior literature), we would have computed a negative wedge of -3.4 percent, since the directors do not hold any Class B stock.

Importantly, we also compute the wedge for public shareholders. Note that this wedge is typically negative, because public shareholders' voting rights are usually lower than their economic rights.[20] We define "public" investors as those without prior contractual or business relations with the company. Accordingly, institutional and retail investors are classified as public investors, whereas a party that had a business relationship or personnel interlock with the company is not.[21] This public shareholder wedge ("public wedge") is a direct measure of the firm's agency costs, as it captures the extent to which public shareholders relinquish voting power to other agents.

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[18] For example, Stitch Fix, which went public in 2018, was controlled by the VC firms Baseline Ventures and Benchmark Capital Partners. However, the founder Katrina Lake had a large positive wedge of 8.27 percent. See https://www.sec.gov/Archives/edgar/data/1576942/000157694218000007/a2018proxystatement.htm.

[19] The founders, Andrew Houston and Arash Ferdowsi, had a 24.5 percent wedge, while the non-founder directors and officers had a small negative wedge. See https://www.sec.gov/Archives/edgar/data/1467623/000114036119006800/nc10000579x1_def14a.htm.

[20] However, this is not always the case. For example, Square 1 Financial went public in 2014 with the controllers, a PE consortium, holding all the nonvoting Class B shares. The public only owned Class A shares, which had one vote per share, so their wedge was positive. See https://www.sec.gov/Archives/edgar/data/1329799/000117494714000262/c379557_def14a.htm.

[21] For example, we exclude Urknall Inc. from the definition of "public" for the Canaan, Inc. IPO, because it is controlled by Xiangfu Liu, a cofounder of Canaan who subsequently left the company. See https://www.sec.gov/Archives/edgar/data/1780652/000156459020016788/can-20f_20191231.htm (p. 85-86).

Figure 2 shows the variety in dual-class structures by type of controller. The largest group is founder-controlled dual-class firms (excluding those where control is shared with a VC firm), which constitute 4.3 percent of all IPOs (including single-class firms). The second largest group is dual-class firms controlled by a parent or holding company, at 2.4 percent of all IPOs. All the other dual-class companies controlled by a PE firms, directors and officers (who are not the founders), or a family, each constitute less than 1 percent of total IPOs. In Figure 3, we plot the average wedge between voting and economic rights of each controller. The wedge is substantially larger for founders than it is for other controllers—on average more than 26.1 percent when founders control the firm. The average wedge of the controllers in dual-class firms not controlled by a founder is only 14.1 percent. More specifically, the average wedge for company controllers is about 19 percent, 16 percent for VC controllers, and only 7.6 percent for PE controllers. Finally, the average wedge of the public shareholders in all dual-class firms is -17.5 percent, though it is naturally higher in magnitude when the controllers are founders.

To examine the heterogeneity of dual-class structures across time, we document changes over time by the type of controller. In Figure 4, we split the sample into IPOs that occurred in 2006 or before and those that took place in 2007 to 2019. Much of the increase in dual-class firms is due to the increase in founder control. The likelihood of founder control in IPO firms has more than doubled, despite the fact that VCs rarely held controlling stakes in IPO firms on or prior to 2006. We also observe a sharp increase in the percentage of VC controlled firms, often jointly controlled with the founder, though these are a relatively small number of firms. We emphasize, however, that in virtually all VC-controlled firms (whether or not the control is joint with the founder), the founders' wedge is positive. Thus, in some firms, VCs manage to both obtain control and accommodate the founders' interest. Interestingly, the percentage of other controllers stays relatively stable across time.

In Figure 5, we also evaluate the change over time in control wedges for different types of controllers. As shown in the figure, the wedge of founders increased considerably from 23.3 percent in 1994-2006 to 28.4 percent in 2007-2019 in the dual-class firms they controlled. On the other hand, the wedges of other controllers either stayed stable, or even decreased in the case of VC firms. The average magnitude of public shareholders' negative wedge increased on average by almost 3 percent, mostly due to the increase in founders' wedge. Thus, not only did the percentage of founder-controlled firms increase over our sample period, but also, conditional on founder control, the wedge between founders' voting and economic rights increased considerably.

In summary, the data clearly demonstrates that the general rise in dual-class IPOs is driven by the increase in founders' control over their firms.

3. Conceptual Framework: Founders' Bargaining Power

Given that the rise in dual-class structure is accompanied by a significant increase in founders' control, we focus our analysis on founders' bargaining power. First, we hypothesize that when more private capital is available, founders are less likely to take their firm public without maintaining control. The intuition is that when founders value control over their companies, the option to raise capital in private markets coupled with increasing valuations due to "more money chasing deals" may provide better outside options for founders and make it less advantageous to go public unless the founders maintain control. Second, we argue that when firms have lower capital needs, the founders have stronger bargaining power vis-à-vis investors, and they can thus bargain for greater control rights at the IPO. Specifically, we hypothesize that technological shocks that reduced firms' capital needs in certain industries, such as software, made it more likely that founders would be able to maintain control in the IPO stage.

a. The supply of private capital

We use a simple model to convey the general intuition for the idea that a greater supply of private capital makes it more likely that firms will adopt dual-class structures that give control to firms' founders. We assume that the founder values both private benefits from control and cashflow or economic rights from dividends. Therefore, the value of the firm to the founder is $V_E = \overline{A} + B$, where the first term represents the value of operational control over the company, and the second the sum of economic rights from all the outstanding shares. An investor does not value the founder's control over the company as much as the founder does, so the value of the firm to the investor under founder control is $V_I = \underline{A} + B$, where $\underline{A} < \overline{A}$.

We assume that the firm needs to raise I amount of investment (where I is smaller than the firm valuation, i.e., $I < \underline{A} + B$), and the firm may seek to raise this amount from a private investor or in an IPO. For simplicity, similar to Zingales (1995), we assume that the founder has the ability to stop or delay the IPO. To raise funds in the amount I from a private investor, the founder must relinquish voting power, $\underline{v} = \frac{I}{\underline{A}+B}$. The public shareholders are typically passive, and thus, they place greater value on founder control. Thus, $V_{PUB} = \tilde{A} + B$, where $\tilde{A} \in (\underline{A}, \overline{A}]$. In the IPO, the founder will relinquish voting power, $v = \frac{I}{\tilde{A}+B}$. Because $\underline{A} < \tilde{A}$, the founder relinquishes more voting power to private investors than to public shareholders, and thus $\underline{v} < v$.

So far, we have only considered a single-class IPO. In order to retain control, the founder may own shares with superior voting rights. Let $\mu \geq 1$ represent the number of votes per share owned by the founder. For example, if the founder owns "Class B" super-voting stock that entitles her to five votes per share, $\mu = 5$. Let

$p \in [0,1]$ represent the probability that the IPO is successful in attracting a sufficient number of investors. In this setting, the founder decides to go public rather than raise funds from private investors if:

$$p\left[\frac{\mu(1-v)}{v+\mu(1-v)}\tilde{A}+(1-v)B\right] > (1-\underline{v})\underline{A}+(1-\underline{v})B \quad (1)$$

This expression yields a few simple insights. The firm is more likely to go public if $\underline{v}$ is higher or v is lower, or when the valuation by the public investor ($\tilde{A}$) is higher, and the valuation by the private investor ($\underline{A}$) is lower. Also, a higher μ also makes it more likely that the firm will go public. Thus, if public shareholders are willing to buy shares when the founder has superior voting rights, the founder will be more inclined to go public.

We examine the firm's incentives when there is high competition among private investors, and thus more money chasing deals. This means that the valuations by private investors will tend to be higher, and therefore, $\underline{A}$ will be higher. We assume for expositional clarity that $\underline{A} = \tilde{A}$, and therefore, $v = \underline{v}$. The condition in equation (1) simplifies to the following:

$$\frac{\mu p\underline{A}}{\underline{v}+\mu(1-\underline{v})} > \underline{A}+(1-p)B \quad (2)$$

Suppose that μ = 1. Then, the inequality becomes $p\underline{A} > \underline{A}+B(1-p)$. This means that the firm chooses to remain private because $p \leq 1$. Accordingly, for the firm to do an IPO it must be that $\mu > 1$, as the left-hand side is increasing in μ. That is, the firm will only go public if the founder receives superior voting rights. Using $\underline{v} = \frac{I}{\underline{A}+B}$, we can rewrite equation (2):

$$\frac{(\underline{A}+B)\mu p\underline{A}}{I+\mu(\underline{A}+B-I)} > \underline{A}+(1-p)B. \quad (3)$$

As expected, the benefit from going public (i.e., the left-hand side) is increasing in μ because the founder prefers to maintain control. Moreover, the derivative in μ is increasing in $\underline{A}$. That is, a greater wedge becomes more likely at the IPO stage when valuations in the private market are increasing, presumably due to greater competition among private investors.[22]

[22] We note that higher public market valuations by public investors have a different effect than higher private market valuations. The reason is that if $\tilde{A}$ is higher but $\underline{A}$ stays fixed, then the public investors will demand a smaller share percentage; that is, v will be smaller. Note that as discussed above, higher private valuations are associated–by assumption–with higher valuations by public investors, as otherwise firms are unlikely to go public. The rationale is that an increase in demand by private investors for a stake in a firm serves as a signal to presumably less informed public investors about the quality of the firm and pushes public market valuations higher. Importantly, however, the driver for these increased public market valuations is the increase in private capital caused by greater engagement of private investors, such as VC firms, with entrepreneurial startups, as opposed to (or perhaps in addition to) an independent rise in public market valuation.

PREDICTION I: *The more private capital is available, the more likely firms that go public are to adopt a dual-class structure whereby the founder gets superior voting rights.*

We emphasize that the availability of private capital affects founders' bargaining power even when they do not actually obtain investments from private investors prior to the IPO. The rationale is that the availability of these funds and the competition among investors push valuations up, rather than actual investments in the firm prior to the IPO. Even if the firm has not sought outside investment in the past, it could still do so in lieu of raising capital on the public markets.

Finally, as discussed below, in the empirical analysis we measure the availability of private capital at the industry level. We exploit changes over time in the availability of private capital in each industry to examine whether they are associated with corresponding changes in the likelihood of dual class-structures that allocate control to founders.

b. Technological shocks that reduced demand for capital

Founders' bargaining power is also stronger when they need less capital to operate their businesses, and when investors thus compete to invest in them. We hypothesize that the likelihood of dual-class structures is higher in industries that have become more capital efficient, in the sense that their dependence on external financing is lower. As shown by Ewens et al. (2018), several technological shocks have decreased the costs of starting new businesses of certain types, and thus made it less advantageous for VC firms to invest much effort in monitoring startups' governance in early stages of financing. Ewens et al. (2018) identify the advent of Amazon's Web Services ("AWS") in early 2006 as the defining moment that lowered the initial costs of starting a business in the software-and service-related industries. Cloud computing reduced the need for startups to make large fixed investments in the early stages of the firm, when the probability of success is still low. As a result, VC firms invest smaller amounts in startups and dedicate fewer resources to monitoring their governance. Accordingly, those startups that end up succeeding in the first stage, such as Dropbox and Snap, are widely coveted by many VC firms who seek a bite at the apple. This increases the bargaining power of the founders of successful startups and allows them to maintain their control for the rest of the life of the firm. It is thus perhaps unsurprising that many software firms have chosen to adopt dual-class structures at the IPO.

Moreover, there is evidence that technological shocks not only reduced the costs of doing business at the startup stage, but also at later stages of the lives of entrepreneurial firms. Specifically, startups tend to use cloud computing several years after the initial stages of financing. Most of the large software and service companies, including Dropbox, Snap, and others, have based a significant portion of their business on cloud infrastructure even after the IPO. The reduced costs of doing business may also affect firms' need for capital not only at the

early financing stages, but also in the immediate pre-IPO stage, when the firm chooses its governance structure. When VCs compete to invest in a successful startup, they may have to allow the founder to retain control after the IPO. In fact, startups in the software industry have accomplished IPOs with dual-class stock without even tapping into VC funding (Schubarth, 2013). Accordingly, we expect a higher rate of dual-class structures and founder control in IPOs of firms that benefited from cloud computing, even for IPOs not backed by VCs.

PREDICTION II: *After the introduction of cloud computing in 2006, firms whose operating costs decreased due to cloud computing were more likely to adopt dual-class structures where the founders get superior voting rights.*

In the empirical analysis, we follow Ewens et al. (2018) in classifying firms into those that belong to Cloud industries, such as business services, finance and leisure, that benefited from cloud computing, and those belonging to other industries. We examine whether dual-class structures and founder control proliferated in Cloud industries after 2006.

4. Other Data and Descriptive Statistics

We have already described the data on dual-class structures and the wedge between voting and economic rights for different types of controllers in Section 2. Here, we describe the remaining data used in our study. Data on IPOs is sourced from the SDC Thomson Reuters database and on Jay Ritter's website.[23] The SDC data include general variables representing IPO characteristics such as the IPO offer price, while the data from Jay Ritter includes data on the year each IPO company was founded. We make the corrections to the SDC data offered by Ritter[24] and by Lowry, [25] as well as our own manual checks of missing firms' identifiers and IPO offer prices. We exclude offerings of units, IPOs with an offer price of less than five dollars, closed-end funds and real estate investment trusts. We include only firms listed on major stock exchanges, namely the New York Stock Exchange, Nasdaq, and AMEX, and firms that are included in the CRSP database. We merge this dataset with financial data in Compustat from the end of the fiscal year that preceded each IPO.

We use a number of variables to capture an IPO firm's characteristics and financials. *Age* is the difference between the year of the IPO and the year the company was founded. *Eponymous* is an indicator equal to one if a firm's name at the IPO includes a person's name. The rationale is that if the company bears a founder's name, such naming might reveal a personal stake in the business and thus the desire to maintain control. For

[23] See https://site.warrington.ufl.edu/ritter/ipo-data/.
[24] *Id.*
[25] See https://sites.google.com/site/michelleblowry/ipo-review-chapter.

observations from 1994-2002, we use the variable from Gompers et al. (2009),[26] and for the rest of the sample, we manually review firm names. *IPO Proceeds* is the proceeds in $ millions raised in the IPO. *Assets* is the book value of assets in $ millions. *Leverage* is long-term debt divided by book value of assets. *Cash* is the ratio of cash and short-term investments to total book assets. *ROA* is return on assets calculated as operating income after depreciation divided by book assets in the previous year. *R&D* is the ratio of research and development expenditures over total book assets (normalized to zero if missing), and *CapEx* is the ratio of capital expenditures over total book assets. Because R&D may be a poor measure of firms' innovation, we construct an additional measure, *Patents*, which is the real value of the patents in $ millions filed by an IPO firm in the five-year period prior to the IPO using the data in Kogan, Papanikolaou, Seru, and Stoffman (2017).[27]

We classify IPOs by five variables: (1) *VC-backed* is an indicator variable that equals one if a firm was financed by VC firms prior to the IPO; (2) *Foreign* is an indicator variable that equals one if a firm is based outside the United States; (3) *Media*, which is an indicator variable that equals one if a firm belongs to one of the following SIC industry codes: 2710-11, 2720-21, 2730-31, 2840-2849, 3660-69, 4800-99, 7810, 7812, and 7820;[28] (4) *Spin-off* is an indicator variable that equals one if the IPO is defined as a spinoff in the SDC database; and (5) *Cloud Industry* is an indicator variable that equals one if a firm belongs to a Cloud industry.

As discussed above, Cloud industries are industries that became more capitally efficient as a result of the introduction of cloud computing. To create the *Cloud Industry* variable, we follow a similar procedure to Ewens et al. (2018) by searching for keywords, such as software, service, and web, in the companies' business descriptions for all firms in both the VentureXpert dataset and the full SDC IPO dataset. Each set of keywords is associated with one of the twenty-seven industry classifications as described in Table A1 in Ewens et al. (2018) based on the Venture Source database classification.[29] Cloud industries include Business Support Services, Consumer Information Services, Financial Institutions and Services, Media and Content, Medical Software and Information Services, Retailers, Software, and Travel and Leisure. We then create a mapping from two-digit SIC codes to the twenty-seven industries, based on the largest number of keywords in the

[26] We thank Professor Andrew Metrick for sharing these data with us.
[27] We use five years as the cutoff because this is the average time before a patent application is approved or dismissed.
[28] Note that our definition of media companies is slightly broader than that used in Gompers et al. (2009), which does not include 2840-49, 4800-99, or 3660-69. Our definition includes "communications" companies, which allow businesses and individuals to communicate via audio, radio, video, and other methods. We use this definition because it includes the companies which are subject to the cross-ownership regulations of the Federal Communications Commission (FCC), and at least historically some firms adopted dual-class structures to comply with these regulations.
[29] We thank Professor Ewens for his help with the description of treated industry segments in Venture Source and for sharing relevant data on the methodology for creating a mapping from Venture Source to other industry classifications.

business description of each firm that belongs to each two-digit SIC industry. This allows us to classify each two-digit SIC code as either a "Cloud" industry or a "Non-Cloud" industry.[30]

To proxy for variation in the availability of private capital, we construct two variables at the industry level. The idea is that when more private capital is available for investments in firms in a particular industry, founders of firms in that industry have greater power to bargain for control rights. Our proxies are based on the availability of VC capital because VCs funds are the type of financing most likely to serve as a potential alternative to going public for a broad set of IPO firms. Moreover, research shows that VC investments are correlated with investments from other investors, such as PE firms (Ewens and Farre-Mensa, 2020) and mutual funds (Kwon, Lowry, and Qian, 2020; Chernenko, Lerner, and Zeng, 2021).

We source data on VC funds at the year-industry level from VentureXpert. The first measure, *Ind. Dry Powder*, denotes the total dollar amount (in billions) of capital available for investment by VC funds that invest primarily in each industry. Because VentureXpert does not include the amount of money invested by each fund in each company financing round, we follow Hochberg, Lindsey, and Westerfield (2015) and Barrot (2016), and compute an imputed amount by weighting the total VC round amount by the average amount each VC fund invests in each round. The amount of available capital is the amount of capital raised by each VC fund minus the total amount of capital it invested after the fund was created (in $ billions). To account for outliers, we winsorize these amounts at the 1 percent level, and we adjust them using the Consumer Price Index. We allocate VC funds to two-digit SIC industry codes based on the industries in which they made the largest number of investments in a given year. We then sum across industry-funds to compute the total amount of dry powder for each year-industry. The second measure, *VC Ind. Financing*, denotes the total amount of VC investment (in $ billions) in companies that belong to each industry based on two-digit SIC codes. In calculating the amounts of VC investments, we include only investments classified as "later stage," "expansion," or "buyout/acquisition" in VentureXpert, as the availability of large amounts of early-stage investment or seed capital are unlikely to improve the bargaining power of founders at the pre-IPO stage.

Table 1 presents the summary statistics. In columns 1-4, we show the data for single-class firms; in columns 5-9, the data on founder-controlled dual-class firms (including those where control is shared with a VC firm); and in columns 10-14, the data for other dual-class firms. As shown in Panel A, the age of founder-controlled dual-class firms at the IPO is lower than for single-class firms, but other dual-class firms are much older. The proceeds of all types of dual-class firms are larger, but those not controlled by a founder have substantially more assets. All types of dual-class firms have higher return on assets (ROA). Interestingly, the value of patents

[30] The following two-digit SIC codes are classified as treated: 23, 27, 31, 51, 52, 53, 54, 56, 57, 59, 60, 61, 62, 63, 64, 65, 67, 70, 73, 78, 79, 82, 87, and 93.

for founder-controlled firms is substantially larger than the value for other types of firms (although the number of patents produced by both groups is similar). Arguably, the value of the patents captures the innovative nature of founder-controlled firms. However, dual-class firms also spend less on R&D relative to non-dual-class firms.

In Panel B, we look at IPO type. Founder-controlled firms are not significantly less or more likely to be backed by VCs, but other kinds of dual-class firms are less likely to be VC-backed as compared to single-class firms, in large part because when the controller is a corporation or a PE firm, VCs are not needed for the firm to raise capital. Founder-controlled firms, and to a lesser extent other dual-class firms, are prevalent among foreign-based firms, especially Chinese ones, such as Alibaba and Baidu. Until 2019, firms listing in China could not opt for a dual-class structure. Therefore, for a Chinese founder who values control over her company, US exchanges' openness to dual-class structures is a factor that would weigh in favor of listing in the United States. As expected, dual-class structures are also more frequent among media companies and firms in Cloud industries. Finally, a large percentage of dual-class IPOs where the controller is not a founder involve a spin-off (37 percent). When a corporation lists a subsidiary on a stock exchange, it often seeks to maintain control after the IPO.

In Panel C, we present further data on certain types of wedges (see Figure 5 and Section 2). The average public wedge in the sample is -17.5 percent, but is larger in founder-controlled firms (-23 percent) as compared to other dual-class firms (-12.7 percent). This is in large part because the average founder wedge in founder-controlled IPOs (26.11 percent) is higher than the average wedge of non-founder controllers (14.08).

Finally, in Panel D, we show the descriptive statistics for the proxies for private capital availability (Ind. Dry Powder and VC Ind. Financing). These measures are all substantially larger for founder-controlled firms than for the single-class firms and other dual-class firms, consistent with the hypothesis that higher availability of private capital gives founders the leverage to bargain for control rights at the IPO.

5. Dual-Class Structures and the Supply of Private Capital

The first hypothesis we test is that when the availability of private capital is greater, firms are more likely to have dual-class structures at the IPO (see Section 3.a). In Figure 6, we show the percentage of dual-class firms out of the total number of IPOs in the five industries that experienced the largest increase in the availability of private capital and the largest decrease in the latter part of the sample period (2007-2019). Business services, including data processing, is the industry with the largest increase in private capital. Communications, essentially the traditional media industry, is the industry with the largest decrease in private capital. We observe that in industries where private capital increased, there was a concomitant increase in the

percentage of dual-class firms, particularly those controlled by founders (from 1.5 percent to 11 percent). Likewise, we observe that in industries where private capital decreased, there was a decrease in the percentage of dual-class firms and founder-controlled firms. This is largely driven by the media industry, historically a predictor of dual-class structures Gompers et al. (2009), where the percentage of IPOs that were founder-controlled dual-class firms decreased from 8.1 percent to only 2.2 percent.

More formally, we examine the determinants of different types of controllers that use dual-class structures using the following regression model:

$$Controller_{i,t} = \beta IPC_{j,t-1} + \gamma X_{i,t-1} + \eta_j + \mu_t + \epsilon_i, \quad (4)$$

where $Controller_{i,t}$ is an is an indicator variable that equals one if firm *i* has adopted a particular type of dual-class structure at the IPO in year *t*. We first examine specifications where the dependent variable is *Dual-Class*, which is an indicator variable that equals one if a firm has a dual-class structure at the IPO. We are particularly interested in specific types of dual-class controllers: *Founder Control*, which is an indicator variable that equals one if the controller is the founder; *NF Dual*, which equals one for dual-class firms not controlled by the founder; *PE Control*, which is control by a private equity firm; and *Co. Control*, which is control by a holding or parent company. We do not examine other types of controllers separately because their number is very small.

The key variable of interest for exploring the role of founder bargaining power in determining dual-class structures at the IPO is $IPC_{j,t}$, which proxies for the supply of industry private capital for industry j in year t. We use two alternative proxies for IPC: (a) *Ind. Dry Powder*, which is the total dollar amount (in billions) of capital available for investment by funds that invest primarily in industry j in year $t-1$; and (b) *VC Ind. Financing*, which is the dollar amount of venture capital financing (in billions) provided to companies (excluding early-stage investments) in the industry j to which firm i belongs in year $t-1$, i.e., the year before the IPO.

X_i refers to a set of firm-level controls, which includes financial controls, and indicator variables for different types of IPOs, such as *VC-Backed*. Prior literature argues that VC firms have incentives to design optimal governance systems for their portfolio firms when those firms go public in order to preserve the value of their investments (Baker and Gompers, 2003; Hochberg, 2012). It is thus possible that VC-backed firms might be less likely to adopt dual-class structures at the time of IPO.

Although our main variable of interest is at the industry-year level, we include industry fixed effects based on two-digit SIC codes, η_j. This ensures that the identification of the main coefficient of interest, β, comes from changes in dry powder or VC financing at the industry level over time, and not from general industry

characteristics. We also include μ_t, which are year fixed effects to account for annual trends. Finally, ε_i is a firm-specific error term.

The results from the regression model in Equation (4) are in Table 2. In columns 1-5, the proxy for industry private capital is *Ind. Dry Powder*. An IPO firm is more likely to be dual-class when *Ind. Dry Powder* is larger. As expected, we obtain a similar result when the dependent variable is *Founder Control*. On the other hand, the coefficient on *Ind. Dry Powder* is not significant when the dependent variable is *NF Dual* (column 3), *PE Control* (column 4) or *Co. Control* (column 5). The estimates are economically significant: a one standard deviation increase in *Ind. Dry Powder* (equivalent to $30.4 billion) is associated with about 3.0 percentage points higher probability of founder control, relative to the unconditional mean of 4.8 percent of the firms in the sample that are founder-controlled. We obtain similar findings in columns 6-10, where we use *VC Ind. Financing* as a proxy for industry private capital. A one standard deviation increase in *VC Ind. Financing* (equivalent to $5.5 billion) is associated with about 3.1 percentage points greater probability of founder control. The estimates in both specifications are consistent with the hypothesis that the availability of private capital increases the bargaining power of founders, rather than that of other potential controllers.

Other differences between founder control and control by other agents, such as non-founder directors or parent companies, also emerge from the analysis. The coefficient on *VC-Backed* is not statistically significant when we examine the probability of dual-class structure or founder control, belying the notion that VCs may prevent dual-class structures at the time of IPO. Note, however, that the coefficient on *VC-Backed* is negative when examining dual-class firms where the controller is not the founder, and this association appears to be driven by the inclusion of dual-class firms controlled by a parent or holding company in our sample. This may be because VCs are unlikely to invest in firms which are controlled by a large corporation, rather than because VCs dislike entrenchment via dual-class structures. As expected, we find that dual-class firms controlled by a corporation are more likely to involve spin-offs, which are negatively associated with founder control. Dual-class structures may be used by corporations to maintain control over subsidiaries after the issuance of stocks to the public, possibly for strategic reasons.

The estimates from the models also suggest that the value of patents is higher in founder-controlled firms as compared to single-class firms and other dual-class firms. In contrast, the coefficient on *R&D* is not statistically significant, suggesting that the innovativeness of these firms may not be fully reflected in investment on research and development at the time of the IPO. Moreover, as expected, founder-controlled firms tend to belong to Cloud industries, are more likely to be foreign firms, and tend to be younger.

Next, we evaluate whether the size of the wedge between economic and voting rights is related to the supply of private capital at the time of the IPO. We estimate similar models to those in Table 2, substituting the size of the wedge as the dependent variable:

$$Wedge_{i,t} = \beta IPC_{j,t-1} + \gamma X_{i,t-1} + \eta_j + \mu_t + \epsilon_i \quad (5)$$

where $Wedge_{i,t}$ is the size of the wedge at the IPO in year t. We examine the following wedges: the wedge of the public shareholders (*Public Wedge*), the wedge of the founders (*Founder Wedge*), the wedge of controllers in dual-class firms that are not controlled by their founders, the wedge of PE firms (*PE Wedge*), and finally the wedge of parent or holding companies (*Co. Wedge*).

The results are presented in Table 3. As shown in columns 1 and 6, public shareholders have a lower wedge when dry powder is higher. On the other hand, as expected, the *Founder Wedge* increases when dry powder is larger: a one standard deviation increase in *Dry Powder* is associated with a 1 percentage point lower public wedge for each IPO and a 0.85 percent higher founder wedge. Likewise, a one standard deviation increase in *VC Ind. Financing* is associated with a 0.97 percentage point lower public wedge for each IPO and a 1.08 percentage point higher founder wedge. Given that only about 10 percent of IPO firms in the sample have dual-class structures, this is an economically meaningful result.

Unsurprisingly, we find no evidence of a statistically significant relationship between *NF Wedge*, *PE Wedge* or *Co. Wedge* and *Ind. Dry Powder*; presumably, there is no negotiation for financing between outside investors and controllers, such as PE firms or parent companies. These results are qualitatively similar when we use *VC Ind. Financing* as a proxy for industry private capital.

The coefficients on other variables are generally in line with the findings in Table 2. Importantly, *VC-Backed* is not significantly associated with *Founder Wedge* and is negatively related to *Co. Wedge*; *Spin-off* is positively associated with *Co. Wedge* and is negatively associated with *Founder Wedge*; and the value of patents is positively related to *Founder Wedge*. The results are qualitatively similar when employing univariate specifications that only include *IPC* and fixed effects as shown in Table A.1 and Table A.2. The estimates are also stable when we include some of the controls (rather than all of them) as shown in Table A.3. In Table A.4 and Table A.5, we also run the same specifications as in Tables 2 and 3 but excluding foreign firms. All the results are qualitatively the same. This addresses the concern that the results are driven by firms based outside the US.

A potential concern with our analysis is that our proxies for private capital availability at the industry level do not only proxy for the availability of private capital. Rather, they could proxy for more general industry conditions in which there is a high or low demand for certain stocks. In these circumstances, the demand for

stocks offered at the IPO may be so high that insiders can sell equity with restricted voting rights in the public markets at relatively high prices. To examine this, we run the same regressions, but add three proxies for "hot public markets." These measures are: (1) *Ind. Returns*: the 12-month industry portfolio returns in the month prior to the IPO and winsorized at the 1% level; (2) *Ind. Underpricing*: the average underpricing of all IPOs in each industry in year $t-1$. This is essentially the average first-day returns on all industry IPOs in the year prior to the IPO; and (3) *Ind. Avg. Proceeds*: the average proceeds of all IPOs in each industry in year $t-1$. All variables are based on the Fama-French 48 Industry classification. We also add controls for *Dry Powder* or *VC Financing*, which are the annual total amount of dry powder or VC financing in year $t-1$.

It is also possible that dual-class structures are adopted more frequently in response to industry merger waves. As is well-known, dual-class structures serve as an anti-takeover device because they make it virtually impossible for outsiders to acquire control. To address this possibility, we add two more variables: (1) *Ind. M &A Num.*, which is the natural log of the number of merger transactions completed in the industry in year $t-1$; and (2) *Ind. M &A Value*, which is the natural log of the number of merger transactions completed in the industry in year $t-1$. Both measures are based on two-digit SIC codes.

The results are presented in Table 4. We observe little statistically significant correlation between the public market measures and our measures of dual-class structures, with few exceptions. *Ind. Returns* is positively related to dual-class structure at the 10 percent level, but it does not correlate with founder control or any of the wedges. Interestingly, industry underpricing is negatively associated with dual-class and founder control and founder wedge, and positively related to public wedge. *Ind. Avg. Proceeds* is also correlated with founder control and founder wedge, though only at the 10 percent level. This is consistent with the notion that controllers may tend to undertake IPOs with dual-class structures when market conditions enable issuers to price their stocks at higher valuations. We find no evidence that dual-class structures are adopted as a response to industry merger waves. This result contrasts with earlier studies that find that dual-class structures are adopted as a response to takeover activity (Daines and Klausner, 2001).

Importantly, even when adding these additional controls, the coefficients on *Ind. Dry Powder* and *VC Ind. Financing* are largely the same as those reported in Table 2 and Table 3. These results are consistent with the notion that dual-class structures are not simply the result of high demand for IPO stocks. Rather, they appear to be directly related to the availability of private capital at the firm and industry level. This is consistent with our conceptual model, which suggests that a dual-class structure may be partly a substitute for raising capital in private markets (Lehn et al., 1990).

a. Different types of IPOs

Our analysis up to now has included the full sample of IPO firms. Next, we explore whether our findings are driven by a particular subsample of the data, such as VC-backed IPOs and Cloud industries, that are known to produce many founder-driven businesses. We re-run our main specifications on different subsamples: VC-backed IPO versus IPOs not backed by VCs, firms in Cloud industries versus firms in other industries, and US firms versus foreign-based firms. Table 5 presents the estimates from our models. Panel A includes regressions where the dependent variable is either *Dual-Class* or *Founder-Control*, and Panel B reports results from specifications where the dependent variable is the *Public Wedge* or *Founder Wedge*. Each panel also shows results from regressions where we use either *Ind. Dry Powder* or *VC Ind. Financing* as a proxy for the availability of private capital.

As can be seen from the table, the relationships observed in Table 2 hold more generally across multiple subsamples. In particular, even in dual-class IPOs that are not backed by VCs and in IPOs that are not in Cloud industries, we observe that in most specifications greater supply of private capital is associated with a higher likelihood of dual-class structure and founder control, a more negative public wedge, and a higher founder wedge. This suggests that greater availability of private capital may also increase founders' bargaining power even for firms that did not ultimately obtain investments from VC firms or other private investors.[31] The results also hold when we restrict the sample of firms to a smaller sample of 679 foreign firms.[32] This is generally consistent with evidence that foreign firms, especially from China, have increasingly attracted capital from VC firms in recent years (Aizenman and Kendall, 2012). Thus, overall, the analysis suggests that the patterns uncovered in the full sample do not appear to be driven solely by a particular segment of IPO firms.

b. VC-backed IPOs

To further explore the bargaining hypothesis, we next focus specifically on VC-backed IPOs. Bargaining between founders and insiders and investors over structure at the IPO is likely to be particularly acute in IPO firms with existing VC investors. The underlying assumption is that governance is part of the terms of the investment, and may be determined by the bargaining position of the VC firm and the entrepreneur.

The focus on the sample of VC-backed IPO firms allows us to obtain additional variables for VCs' characteristics that could potentially explain the likelihood of dual-class structures. We merge the sample of VC-backed IPOs with firm-level data from VentureXpert. Because there is no common identifier for the IPO

[31] Note further that VCs invest in a wide range of industries beyond those that we term "Cloud industries." In fact, the correlation between VC-Backed and Cloud Industry in the sample is close to zero and not statistically significant..

[32] The results are not statistically significant when we use *Ind. VC Financing* as a proxy for *IPC*, but this is likely because of the limited variation in the sample of only 679 firms. When we omit the year and industry fixed effects in this specification, the coefficient on *VC Ind. Financing* is positive and significant.

data and VentureXpert, we do the matching based on firm names. This matching process results in a sample of 2,345 VC-backed IPOs (out of 2,677 VC-backed IPOs in the full sample) for which information on the VC firms that invested in the firm pre-IPO can be obtained.

Using the data from VentureXpert, we construct a number of variables that may relate to VC and founder bargaining power and therefore affect dual-class structures. *VC Rounds* is the number of VC financing rounds a firm undergoes prior to the IPO. In each round of financing, VC firms tend to negotiate for control through contractual rights and the appointment of board members (Kaplan and Stromberg, 2001, 2003; Ewens and Malenko, 2020). *VC Firms* is the number of VC firms that provided financing to the firm. When the founder negotiates with multiple VCs, she may be better able to maintain control over the firm as compared to a situation where only one VC is ready to fund the firm. Moreover, coordination problems between VC firms may also lead to better negotiation outcomes for the founder. *VC Firm Age* is the maximum age at the time of the IPO of the VC firms that supported the IPO. The assumption is that more mature VC firms have better reputations (Barrot, 2016), and may as a result have more bargaining power vis-a-vis the founder. *VC Fund Size* is the amount of funds in $ millions raised by the largest VC fund prior to the IPO. Typically, funds that have raised large sums of money do so because they have better past performance and better reputations, and thus may have greater ability to negotiate control terms. Table 6 presents estimates of models similar to those in Equation (4) and Equation (5) for the sample of VC-backed IPOs. As before, all measures of private capital availability are positively related to the probability of dual-class IPOs, founder-controlled IPOs, a larger-magnitude (negative) public wedge and a higher founder wedge. A one standard deviation increase in *Ind. Dry Powder* (equivalent to $34.7 billion) is associated with a 2.06 percentage point and 1.51 percentage point higher probability of dual-class structure and founder control. These figures are economically meaningful given that the percentage of dual-class and founder-controlled firms in this sample are only 7.42 percent and 4.61 percent, respectively.

Additionally, we observe a significant relationship between the number of VC rounds the firm has had pre-IPO and dual-class structure at the IPO. Having one additional round of VC financing prior to the IPO is associated with a -0.49 percentage point probability of founder control. Likewise, a one standard deviation increase in VC rounds (3.21) is associated with about 0.43 percentage point higher public wedge and 0.49 lower founder wedge. The other VC-related variables do not appear to be significantly related to the probability of dual-class structures and founder-control.

c. Bargaining power prior to the IPO

Our study is focused on governance at the IPO stage. It is well-known that firms re-evaluate their governance structures at the IPO. Thus, often, the dual-class structure is determined at the IPO together with

all other governance provisions, including the state of incorporation, board structure, and anti-takeover devices. However, it is also possible that in some cases, a dual-class structure is created earlier, either when the firm is founded or during VC investment rounds when the founders negotiate control rights with the VC investors.

We conduct several qualitative and quantitative analyses to explore this issue. First, we conducted several interviews with partners at law firms that advise entrepreneurial startups. Based on our conversations, it appears rare for dual-class structures to be created before the IPO. Founders' bargaining power may affect VCs' board seats or their contractual rights, but does not typically result in a wedge between the shareholders' economic and voting rights.

Second, we obtain a sample of 56 certificates of incorporation of large VC-backed dual-class firms before the IPO from the Private Capital Research Institute. The selection is random except that it relates to large, high-profile startups that ultimately became public, such as Dropbox, Facebook, Google, Lyft, and Zoom. This is a sample of firms where we might suspect a greater likelihood that a dual-class structure could be created before the IPO stage, as many VC firms competed heavily to invest in these companies; such competition favors founder negotiating power, should the founders wish to maintain their control. In our sample of 56 firms, we find that the dual-class structure was created before the IPO negotiation period in only 13 firms (23.2 percent). On average, the dual-class structure was created 6.3 years prior to the IPO for these 13 firms. In one of these 13 firms, both classes of common stock were entitled to one vote per share before the IPO, and therefore the wedge was zero. Importantly, these 13 firms were established on average 15.5 years before their IPO, indicating that the dual-class structure was adopted only in the last third of their lives as private firms. The remaining 43 firms (76.8 percent) in our sample adopted dual-class forms about nine months before their IPO (i.e., 278.4 days), indicating that most of the sample firms choose dual-class stock structures within the IPO negotiation period. The findings from this sample are consistent with the notion that the vast majority of dual class structures are put in place approaching the IPO, rather than during earlier rounds of bargaining.

Third, we merge our data to data on pre-IPO board structure from Ewens and Malenko (2020), who document the extent to which founders or VC firms control the board in a sample of startups that obtained financing through Regulation D. The merged data include a sample of 243 VC-backed IPOs, 29 of which are dual-class firms. Out of the 29 dual-class firms, 14 are controlled by the founders at the IPO, eight are controlled by VC firms, and seven are jointly controlled by founders and VC firms. Somewhat paradoxically, we find that VC investors controlled the boards of 57 percent of the founder-controlled dual-class firms prior to the IPO compared to 38 percent of VC-controlled dual-class firms, and 43 percent of the VC-backed IPOs of firms with a single class of stocks. This further supports the notion that founder control through dual-class

structures that we observe in our data is not likely to simply result from founders' bargaining power in rounds before the IPO.

Finally, in unreported tests, we examine whether bargaining power when firms receive their first VC financing round is likely to increase the probability of a dual-class structure. We repeat the analysis presented in Table 6, but control for the amount of aggregate VC financing invested in startups located in the state where each firm is headquartered in the year the firm receives its first early-stage VC financing round (or alternatively, the year of the first financing round). We focus on VC financing where the startup is located because when the firm is still in relatively early stages, VC financing at the state level is likely to affect entrepreneurs' bargaining power. We also repeat this analysis, using the value of the assets of state and local pension funds weighted by the fraction of state officials on their board of trustees as in Hochberg and Rauh (2013); Ewens and Farre-Mensa (2020); González-Uribe (2020) as an instrument for the VC financing at the state level. Across all of these analyses, we find no evidence of a relationship between VC financing at the state level and the probability of dual-class structure.

Overall, the above analyses suggest that historical bargaining power in years before the IPO does not appear to predict dual-class structures at the IPO stage in the same manner that proxies for contemporaneous founder bargaining power do.

d. Instrumental variable analysis

The controls for hot public markets discussed above suggest that the proxies for industry private capital are not merely a reflection of broader correlated economic conditions. Nevertheless, as an additional robustness, we employ an instrumental variable analysis. As an instrument for industry VC financing, we construct a measure for supply-shifters in the amount of VC financing at the industry level, using changes to VC investment at the regional level. As discussed in Section B of the Online Appendix, the main results relating to founders' control and wedge are robust when using this approach.

6. Dual-class Structures and the Impact of Technological Shocks

In this section, we examine the extent to which technological shocks that reduced firms' need for capital increased founders' ability to maintain control in the IPO through dual-class structures. As discussed in Section 3.b, we hypothesize that firms in Cloud industries were more likely to adopt dual-class structures that allocate control to founders following the introduction of cloud computing in 2006.

As a first step in the analysis, we show patterns in the adoption of dual-class structures for firms in the Cloud industries and other firms. As shown in Figure 7, the rate of increase in dual-class structures was higher for firms in Cloud industries, and this applies when we consider subsamples of VC-backed IPOs (Panel B) or

only IPO firms not backed by VCs (Panel C). This is again consistent with anecdotal evidence that firms in Cloud industries were able to reach the IPO stage without the need to raise any capital from VC firms.

In Figure 8, we show trends in controller types in firms in Cloud industries versus other firms. As shown in Panel A, the increase in founder control is largely driven by firms in Cloud industries. The percentage of founder-controlled firms (including jointly controlled with a VC firm) increased from 2.9 percent of IPOs in 1994-2006 to 16.1 percent of IPOs in 2007-2019, whereas in non-Cloud industries, the percentage stayed roughly the same at about 3.1 percent. This pattern is particularly strong in VC-backed IPOs in Cloud industries, where founder control increased from 2.0 percent to 23.0 percent (Panel B). There is also an increase in founder control in cloud industry IPOs not backed by VCs, but it is more modest (from 3.6 percent to 8.5 percent).

We explore these patterns more formally using a difference-in-differences regression analysis surrounding the introduction of cloud computing. To the specifications outlined in Equation (4) and Equation (5), we add *Post-2006*, a variable that equals one if the IPO's year is 2007 or later, following the introduction of the cloud, and interaction terms between *Post-2006* and *Cloud Ind*. We also interact *Post-2006* and *VC-backed* in order to account for the possibility that VC firms have become more tolerant of founders' control over the sample period, perhaps given the success of many founder-led firms.

The results are presented in Table 7. As shown in column 1, firms in Cloud industries were 11.9 percent more likely after 2006 to be dual-class than other IPOs. We also observe that whereas prior to 2006, VC-backed IPOs were less likely to be dual-class IPOs, they were 10.1 percent more likely to be dual-class after 2006. In columns 2 and 3, we observe a positive coefficient on the triple interaction on *VC-Backed* with *Cloud Ind* and *Post-2006*, suggesting that some of this post-2006 effect is due to firms in Cloud industries.

In column 4, we observe similar trends for founder control. Firms in Cloud industries were 10.5 percent more likely after 2006 to have founder-controlled dual-class structures than other IPOs. Likewise, we observe that VC-backed IPOs were more likely to be founder-controlled after 2006. Moreover, as can be seen in columns 5 and 6, this trend is mostly due to Cloud industries. VC-backed IPO firms in a Cloud industry are about 12 percentage points more likely to be controlled by founders after 2006. We observe similar estimates when the dependent variable is the public wedge (columns 7-9) or founder wedge (columns 10-12), suggesting that firms in cloud industries have on average about 2.4 percent higher public wedge and 2.9 higher founder wedge after 2006 (based on columns 7 and 10), and this effect is stronger in VC-backed IPOs (columns 8-9 and 11-12). All the results are robust to controlling for the availability of private capital by including *Ind. Dry Powder* in the regressions (see columns 3, 6, 9 and 12).

These results are consistent with the view that investors have increasingly yielded to founders over the years, allowing them to maintain control of their portfolio companies, particularly in the software and services industries. They thus support the hypothesis that the bargaining power of founders vis-a-vis investors has strengthened, particularly in Cloud industries, and that, as a result, we observe more dual-class and founder-controlled firms becoming public in recent years.

We acknowledge that these findings may also be consistent with a different hypothesis. It is possible that following the successful Google IPO in 2004, VC firms changed their attitudes toward dual-class stocks and adopted the view that they are not harmful to shareholder value. This is consistent with recent findings that in the years after the IPO, dual-class firms outperform non-dual-class firms (Cremers et al., 2018; Kim and Michaely, 2019). Because VC firms typically sell or distribute their equity stakes after the lock-up period, the aversion toward dual-class structure may have waned in recent years. We cannot entirely rule out this hypothesis, but it is not mutually exclusive with the bargaining hypothesis that we advance in this study. It may well be that both factors have contributed to the rise in dual-class IPOs.

We find further support for the bargaining power hypothesis by examining whether the introduction of cloud computing led to a decrease in the ongoing costs of doing business for more mature startups approaching the IPO stage. That is, we seek to examine whether the costs of running a business have become lower not only for early-stage startups (as shown by Ewens et al., 2018), but also for firms at the IPO stage. Thus, we construct two variables that capture the costs of doing business: *Costs of Goods* defined as the costs of goods divided by sales in the fiscal year prior to the IPO, and *General Expenses* defined as selling, general and administrative expenses divided by sales in the fiscal year prior to the IPO.[33] We then employ a difference-in-differences analysis to examine whether these costs have decreased in our sample for treated firms after 2006 and the introduction of cloud computing.

The results in Table 8 are consistent with a substantial decrease after 2006 in both cost measures. This decrease is economically meaningful: the mean of the *Costs of Goods* variable is 0.60, while the marginal effect for treated firms post-2006 ranges from -0.07 to -0.09. The mean *General Expenses* is 0.46, and the effect on treated firms after 2006 is between -0.05 and -0.10. The estimates suggest that the ongoing capital needs of treated firms have generally declined since the introduction of cloud computing, and that therefore, their success has likely become less dependent on obtaining funding from private investors.

Overall, taken together, our results suggest that the popularity of dual-class structures is at least in part the result of stronger founders' bargaining position vis-a-vis investors following technological changes that reduced entrepreneurs' need for external financing.

[33] To mitigate the effect of outliers on our analysis, we omit firms with sales that are lower than $5 million.

7. Sunset Provisions

While an IPO firm may have a dual-class structure in place at the time it goes public, such structures need not be permanent, and often have pre-determined end points, or "sunset provisions." Sunsets specify circumstances under which the superior and inferior voting shares convert into a common class of common stock, and the dual-class structure ceases to exist.

There has been a vigorous policy debate over the need for sunsets to prevent insiders in dual-class firms from controlling the companies in perpetuity. Notably, some commentators have argued that dual-class firms should adopt time sunsets that terminate the dual-class structure after a specified period (e.g., ten years). On one hand, such sunsets address the concern that the vision and skills of controllers will dissipate over time (Bebchuk and Kastiel, 2017). On the other hand, it is likely impossible to predict at the time of the IPO when founders' skill and motivation will decline. Other scholars have advocated the use of ownership sunsets that convert the firm into a single class firm when the controller' economic interest falls below a certain threshold (Fisch and Solomon, 2019; Sharfman, 2019). The advantage of ownership sunsets is that they address the risk that controllers will have too little a stake in the outcome of their decisions. The disadvantage of this approach, however, is that it does not guarantee that the controllers' power will be terminated.

In this section, we document the extent to which dual-class firms with different controllers adopt different types of sunset provisions, especially time sunsets and ownership sunsets. In particular, we examine whether founders' bargaining power may affect the adoption of sunset provisions.

a. Data

For each dual-class IPO firm, we examine SEC filings to identify "sunsets," i.e. clauses in the firm's organizational documents that cause the firm's stock to convert into one class, without any differential voting rights, at a prespecified time or event. There are four types of sunset provisions in the sample: time sunsets, ownership sunsets, transfer sunsets, and sunsets triggered by other events. Each firm may have one or more than one type of sunset provision.

Time sunsets cause the elimination of dual-class structure at a pre-specified point in time. For example, when Groupon went public in 2011, its prospectus specified that "no shares of common stock will be issued or outstanding until five years after the completion of this offering, at which time all outstanding shares of Class A common stock and Class B common stock will automatically convert into shares of common stock."[34]

[34] See https://www.sec.gov/Archives/edgar/data/1490281/000104746911008854/a2205238zs-1a.htm.

Ownership sunsets cause super-voting shares to convert into shares with just one vote when the controller owns less than a prespecified percentage of the company's total outstanding shares, or if the number of super-voting shares falls below a prespecified percentage of the total number of outstanding shares. For example, in the 2004 IPO of Texas Roadhouse, all the shares convert into single-class with one vote per share if the shares owned by the founder represent less than 20.0 percent of the total number of both the superior voting shares and the other common shares.[35] The rationale is that the controller loses her superior voting rights if her economic interest is too low.

Transfer sunsets cause any super-voting shares that are sold to entities other than a list of transferees explicitly listed in the registration statement (typically other founders and controllers) to convert into non-super-voting shares. In Google's 2005 IPO, its registration statement provided that any super-voting Class B shares would convert into Class A shares upon sale, except for transfers between Larry Page and Sergey Brin (the company's cofounders), or transfers made for estate planning and tax purposes.[36]

Finally, we code "other" event sunsets. These typically mandate the conversion of super-voting shares upon a founder's death or disability. Workday's 2013 IPO provided for the conversion of super-voting shares nine months after the last of the cofounders had died.[37] We created separate indicator variables for each of these subcategories of event sunsets.

b. Empirical Analysis

Figure 9 presents the percentage of dual-class firms that adopt each type of sunset provision by controller type. As shown in Panel A, time sunsets are relatively rare in founder-controlled firms. On the other hand, when a VC firm controls the firm, by itself or together with the founder, about 47 percent of dual-class firms adopt such sunsets. This is consistent with the idea that adoption of time sunsets is the product of negotiation between founders and VC firms.

As shown in Panel B, ownership sunsets are adopted more frequently across different types of controllers. We observe a substantially similar pattern of adoption, however, in founder and VC-controlled firms. Adoption rates in founder-controlled firms are relatively low, but are higher when control is shared with a VC firm or when the firm is controlled exclusively by a VC firm.

Transfer sunsets, as can be seen in Panel C, are frequent in founder-controlled firms, with more than 67 percent adopting them. Interestingly, in Panel D, we do not observe a high percentage of sunsets that terminate

[35] See https://www.sec.gov/Archives/edgar/data/1289460/000104746904030247/a2137984zs-1a.htm.
[36] See https://www.sec.gov/Archives/edgar/data/1288776/000119312504142742/ds1a.htm.
[37] See https://www.sec.gov/Archives/edgar/data/1327811/000119312512420693/d385110ds1a.htm.

dual-class structures in other events such as the death or disability of the founders. Again, however, the percentage of these sunsets is higher when a VC firm has control of the firm.

In Figure 10, we explore trends over time by comparing dual-class firms exclusively controlled by founders to all other dual-class firms. First, we observe that there is an overall trend towards adopting all types of sunset provisions. The trend is similar in founder-controlled firms and other firms, with one notable exception. The increase in the percentage of time sunsets, and to a lesser extent, ownership sunsets, is smaller in founder-controlled firms than in other firms.

We hypothesize that when a founder's bargaining position is stronger, the firm is less likely to adopt sunsets. As in Section 5, we use a difference-in-differences analysis by exploiting the introduction of cloud computing as a shock to founders' bargaining power. To make the interpretation of the coefficients easier, we interact *Founder-control* with *Post-2006* and *Non-Cloud*, an indicator equal to one if the firm does not belong to a Cloud industry. In this way, the coefficient of interest is the interaction between *Founder-control* and *Post-2006*.

The results are presented in Table 9. As shown in column 1, founder control is associated with a 13.5 percent lower likelihood of time sunsets and a 24.0 percent lower likelihood of ownership sunsets. This suggests that founders' bargaining power permits them to avoid sunsets that curb their control. Overall, our findings regarding sunsets further reinforce our hypothesis that the changing bargaining relationship between founders and VCs affects the prevalence of dual-class structures.

8. Conclusion

Although many studies have evaluated the consequences of dual-class structures for firm performance, few studies have carefully examined the determinants of these structures and the size of the wedge between insiders' voting power and cashflow rights. Understanding the factors that predict different types of dual-class structures is increasingly important in light of the dramatic rise in dual-class IPOs and the general concerns that these structures present agency problems for investors.

Our paper is the first to explore the different types of dual-class firms in a large sample of almost 6,000 IPOs between 1994-2019. Founders control many of them, but others are controlled by corporations, investment firms or families. We demonstrate that the rise of dual-class structures is mainly due to founder-controlled firms in the software and services industries. We show that the major factor that predicts dual-class structures and a greater wedge between voting and economic rights is the amount of available private financing for startups and their need for external financing. The more outside opportunities the founders have and the less money they need to operate their business, the greater their bargaining power when raising capital.

Our study has important implications for understanding the evolving nature of public markets. The literature to date has shown that increases in private financing have led to a decrease in the number of firms in public markets, and therefore more concentrated ownership in the economy as a whole (Ewens and Farre-Mensa, 2020). We further show that greater availability of private financing may also cause public markets themselves to change by allowing founders to retain greater power to pursue their visions, without keeping as large an economic stake in the firm.

Our findings provide critical input for evaluating policy proposals that affect the nature of public and private markets. They suggest that policies to liberalize private markets by loosening the restrictions on selling and trading in private securities (SEC, 2019) may not only make public issuances less desirable, but may also increase the likelihood that the firms that do ultimately go public will be controlled by their founders. While there is evidence that public markets attach higher valuations to dual-class firms as compared to other IPO firms (Cremers et al., 2018), the broader ramifications of a growing number of controlled public firms in a shrinking public market require further analysis.

Finally, the realization that dual-class stock refers to an array of ownership arrangements, ranging from control by a visionary founder to a holding company or a family, should lead to a rethinking of corporate governance research on the effects of dual-class structures on different outcomes, such as valuation and innovation. The type of controller and wedge between economic and voting rights may have an effect on various outcomes.

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Figure 1. The Rise of Dual-Class Stock IPOs.
This figure shows the three-year rolling percentage of companies conducting Initial Public Offerings (IPOs) that went public with multiple classes of shares.

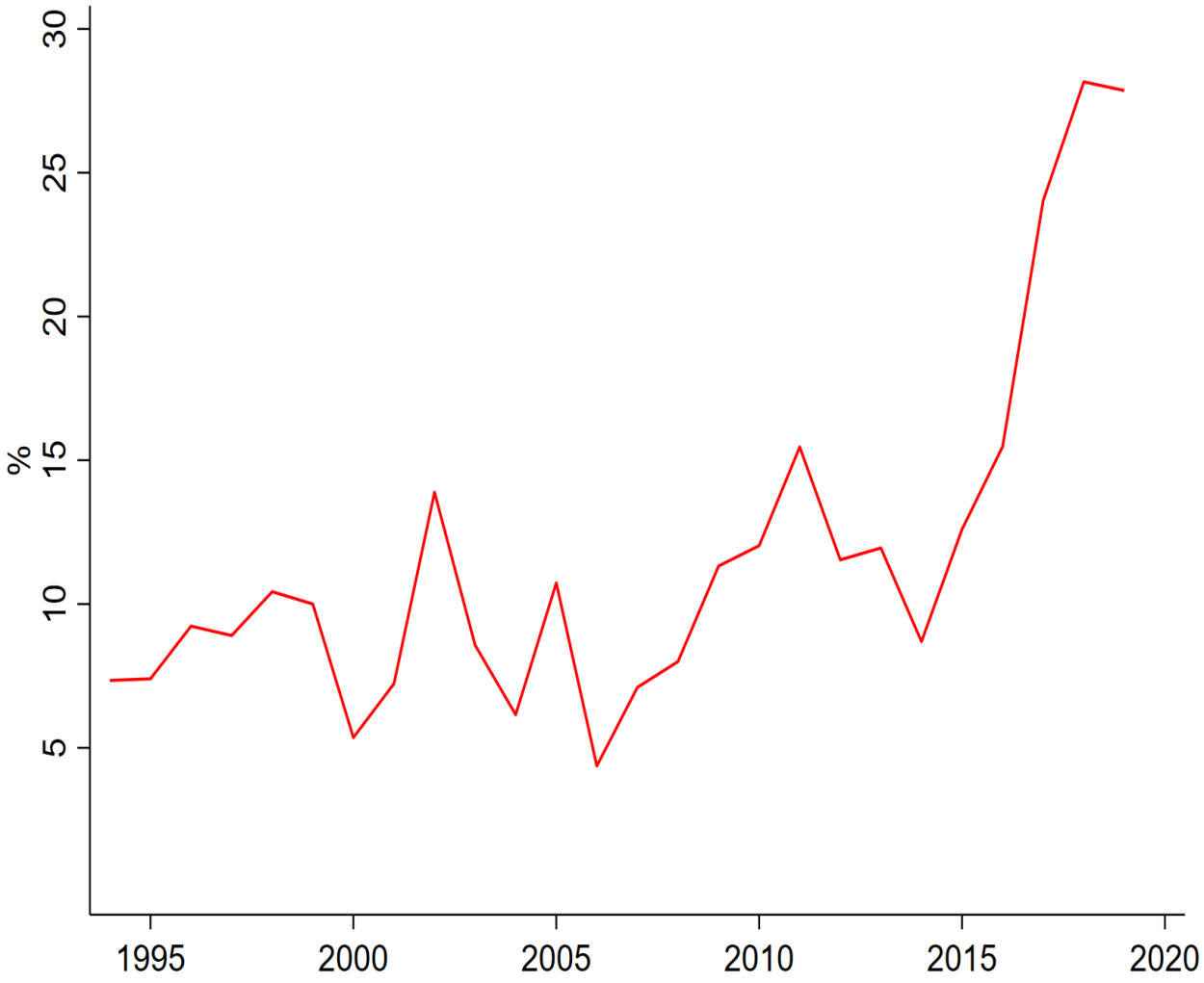


Figure 2. The Percentage of Dual-Class IPOs by Controller.
This figure shows the percentage of dual-class IPOs out of the total number of IPOs (both single and dual-class) from 1994-2019 by the type of controller. Types of controllers include: Founder, Founder and Venture Capital Firm, Venture Capital Firm, Private Equity Firm, Directors & Officers who are not founders, a Company which is a parent or holding company, a Family business, or other type of investors or no controller.

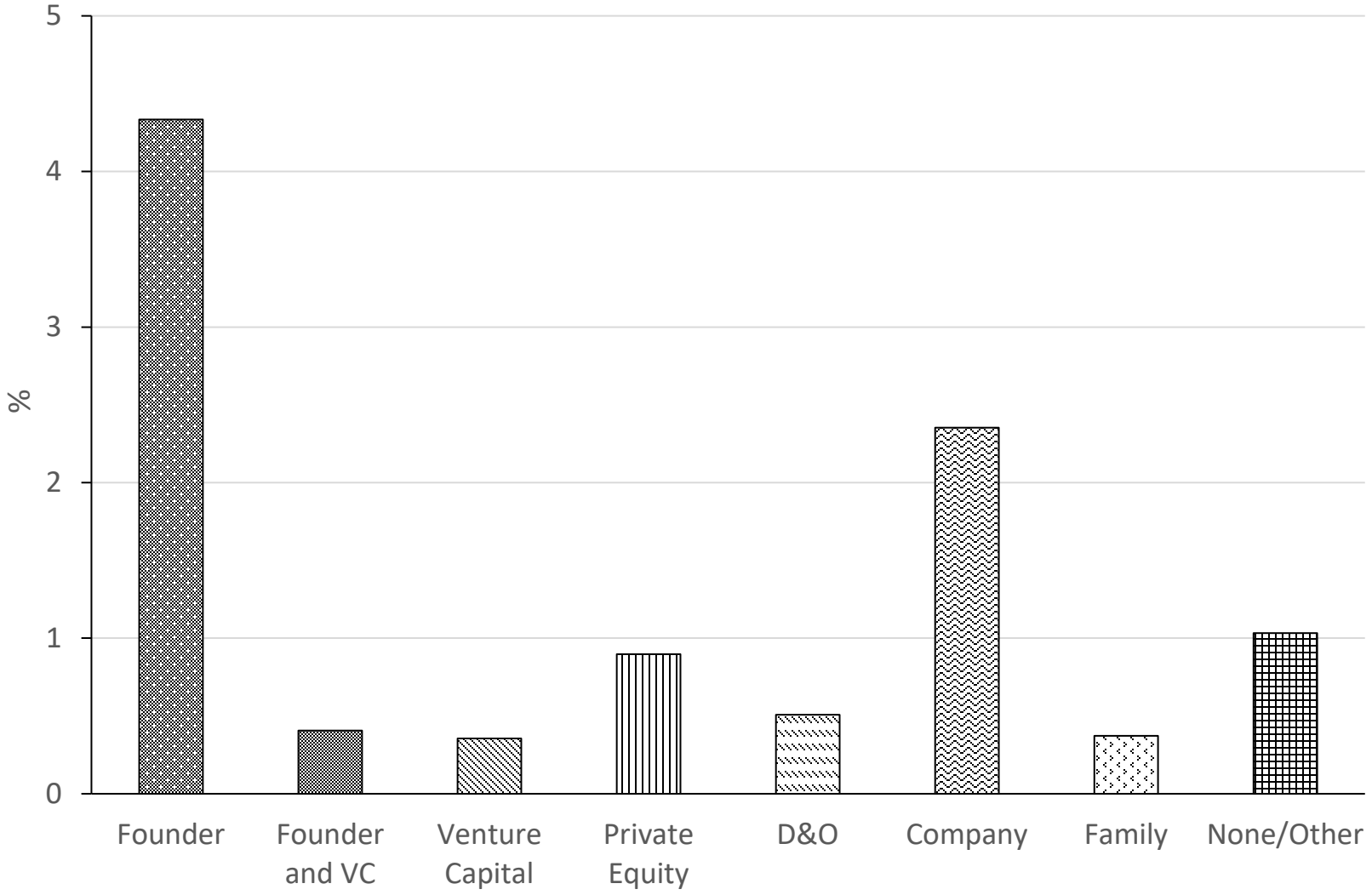


Figure 3. The Average Wedge in Dual-Class IPOs by Controller.
This figure shows the average "wedge" between voting and economic rights in dual-class IPOs, as expressed in percentage points, based on the type of controller. Types of controllers include: Founder, Founder and Venture Capital Firm, Venture Capital Firm, Private Equity Firm, Directors & Officers who are not founders, a Company which is a parent or holding company, a Family business, or other type of investors or no controller. The "public" wedge represents the average wedge for public investors across all dual-class IPOs, multiplied by -1 (since public investors typically have a negative wedge).

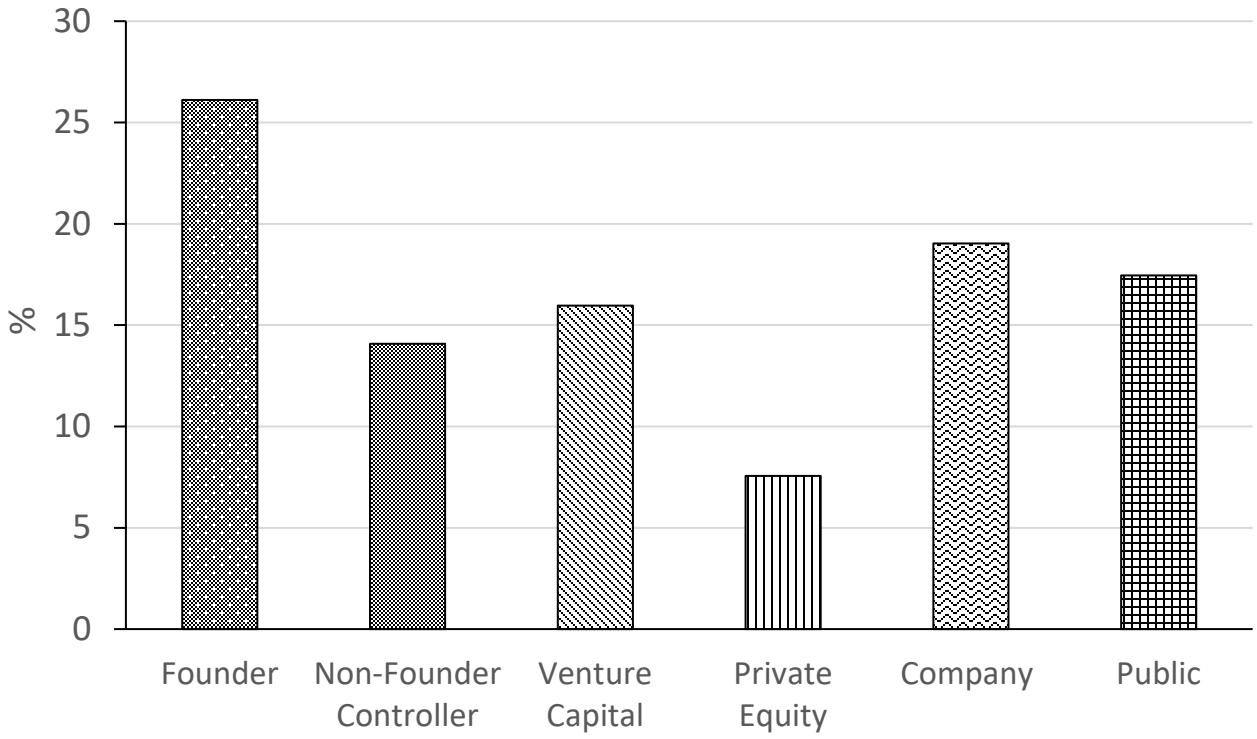


Figure 4. The Percentage of Dual-Class IPOs by Controller.
This figure shows the percentage of dual-class IPOs out of the total number of IPOs (both single and dual-class) from 1994-2019 by the type of controller, before and after the introduction of cloud computing in 2006. Types of controllers include: Founder, Founder and Venture Capital Firm, Venture Capital Firm, Private Equity Firm, Directors & Officers who are not founders, a Company which is a parent or holding company, a Family business, or other type of investors or no controller.

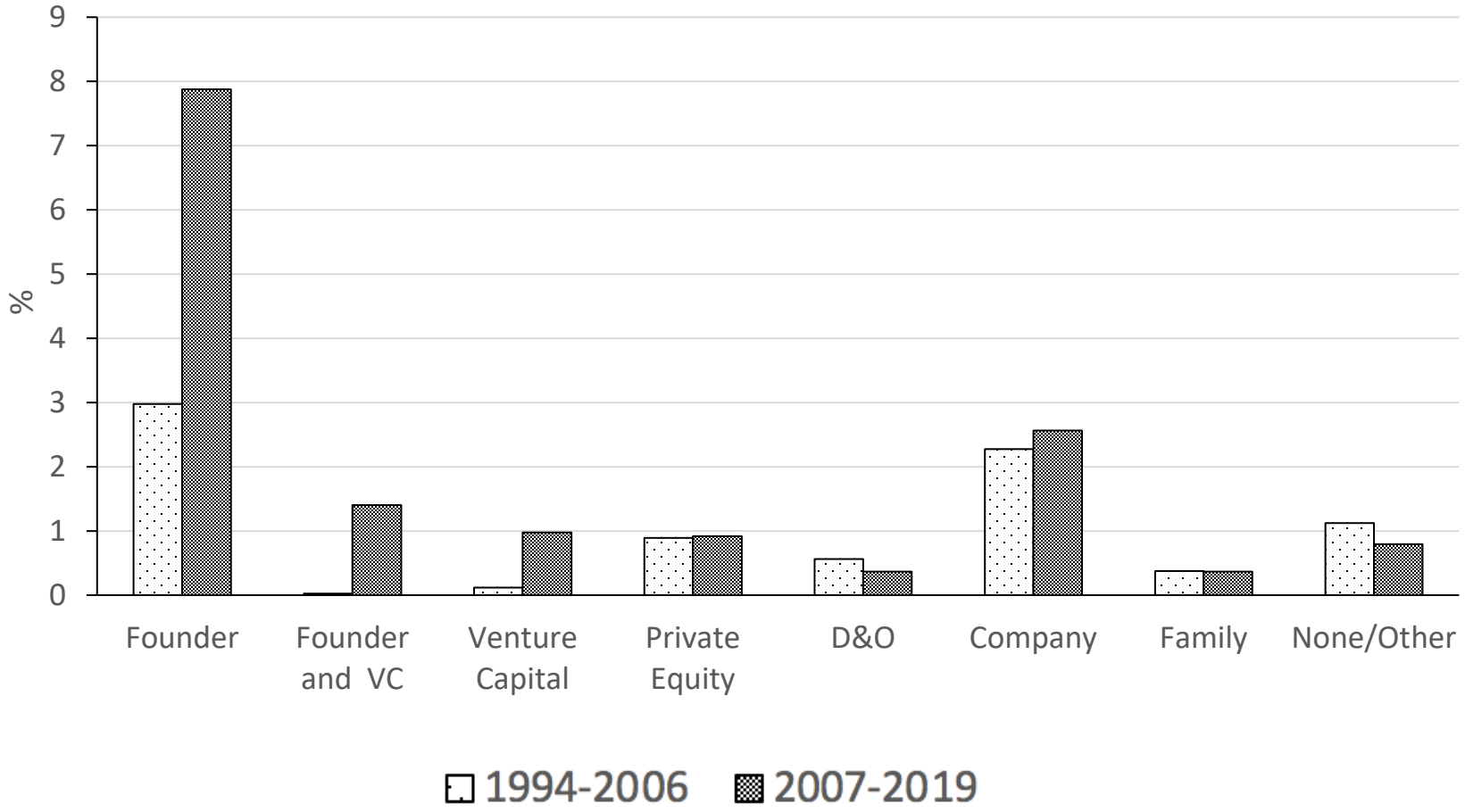


Figure 5. The Average Wedge in Dual-Class IPOs by Controller Over Time.
This figure shows the average "wedge" between voting and economic rights in dual-class IPOs (in percentage points), based on type of controller, before and after the introduction of cloud computing in 2006. Types of controllers include: Founder, Founder and Venture Capital Firm, Venture Capital Firm, Private Equity Firm, Directors & Officers who are not founders, a Company which is a parent or holding company, a Family business, or other type of investors or no controller. The "public" wedge represents the average wedge for public investors across all dual-class IPOs in the corresponding time period, multiplied by -1 (since public investors typically have a negative wedge).

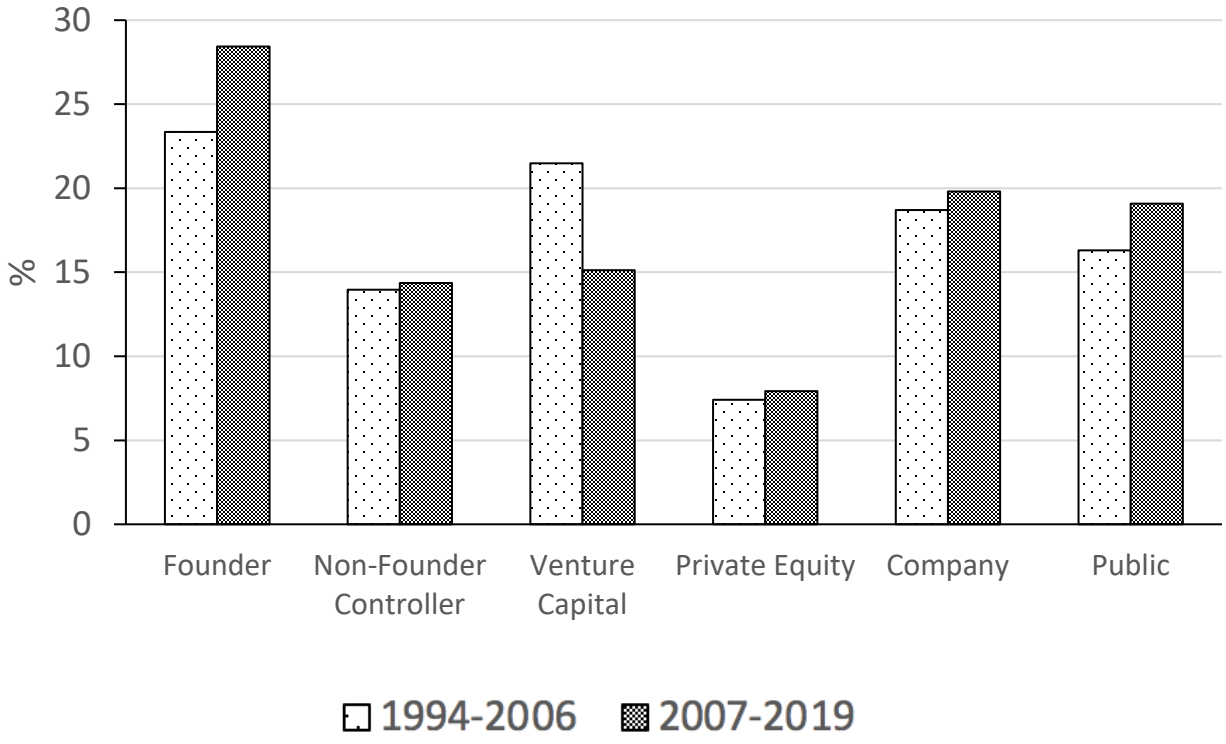
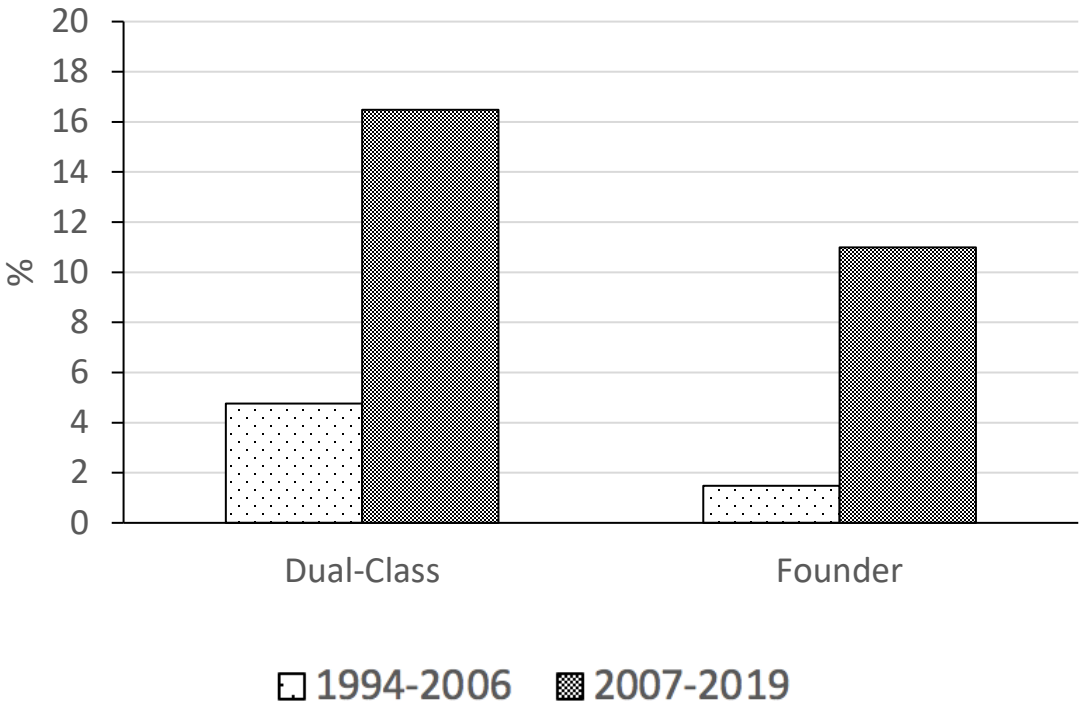


Figure 6. The Percentage of Dual-Class IPOs in Industries with Largest Changes in Private Capital.
This figure shows the percentage of all dual-class IPOs and founder-controlled dual-class IPOs, in the ten industries that experienced the largest increase (Panel A) or decrease (Panel B) in the amount of dry powder after the introduction of cloud computing in 2006.



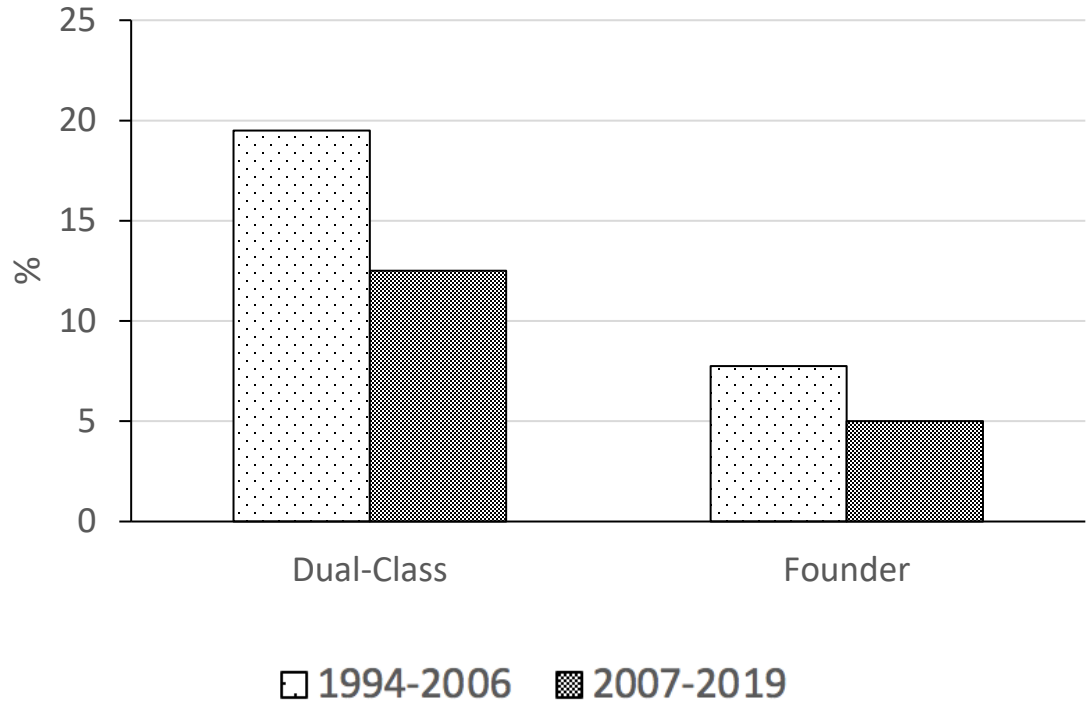


Figure 7. Trends in the Probability of Dual-Class IPOs by Industry.
This figure shows the three-year rolling average percentage of Dual-class IPOs out of the total number of IPOs (Panel A), the total number of VC-Backed IPOs (Panel B) and the total number of Foreign-based IPOs (Panel C). In each panel, we split the sample into IPOs of firms that belong to Cloud industries and IPOs of firms that do not belong to such industries.

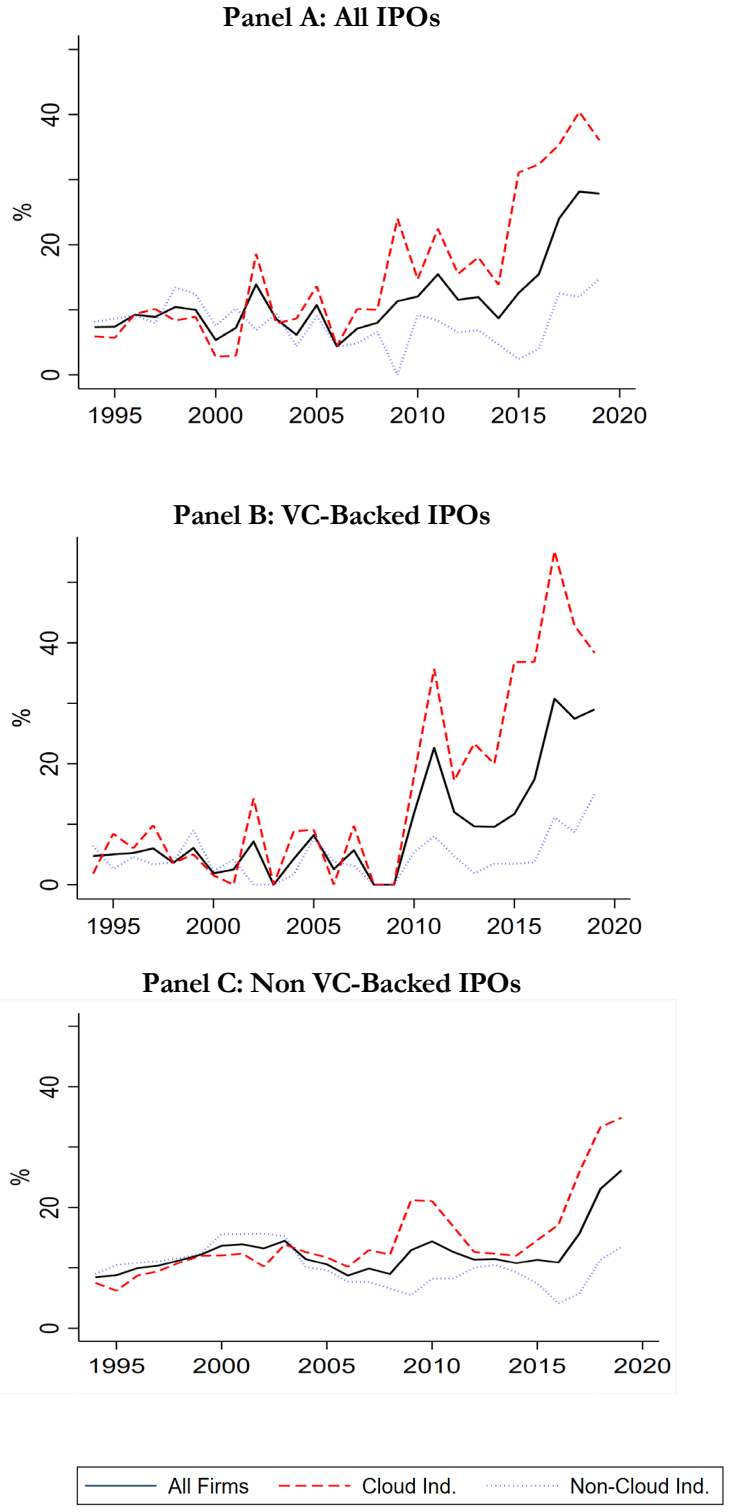


Figure 8. The Percentage of Dual-Class IPOs by Controller.
This figure shows the percentage of dual-class IPOs by the type of controller. Types of controllers include: Founder, Founder and Venture Capital Firm, Venture Capital Firm, Private Equity Firm, Directors & Officers who are not founders, a Company which is a parent or holding company, a Family business, or other type of investors or no controller. Panel A includes all IPOs, Panel B includes IPOs of VC-backed firms, and Panel C includes non-VC-backed firms.

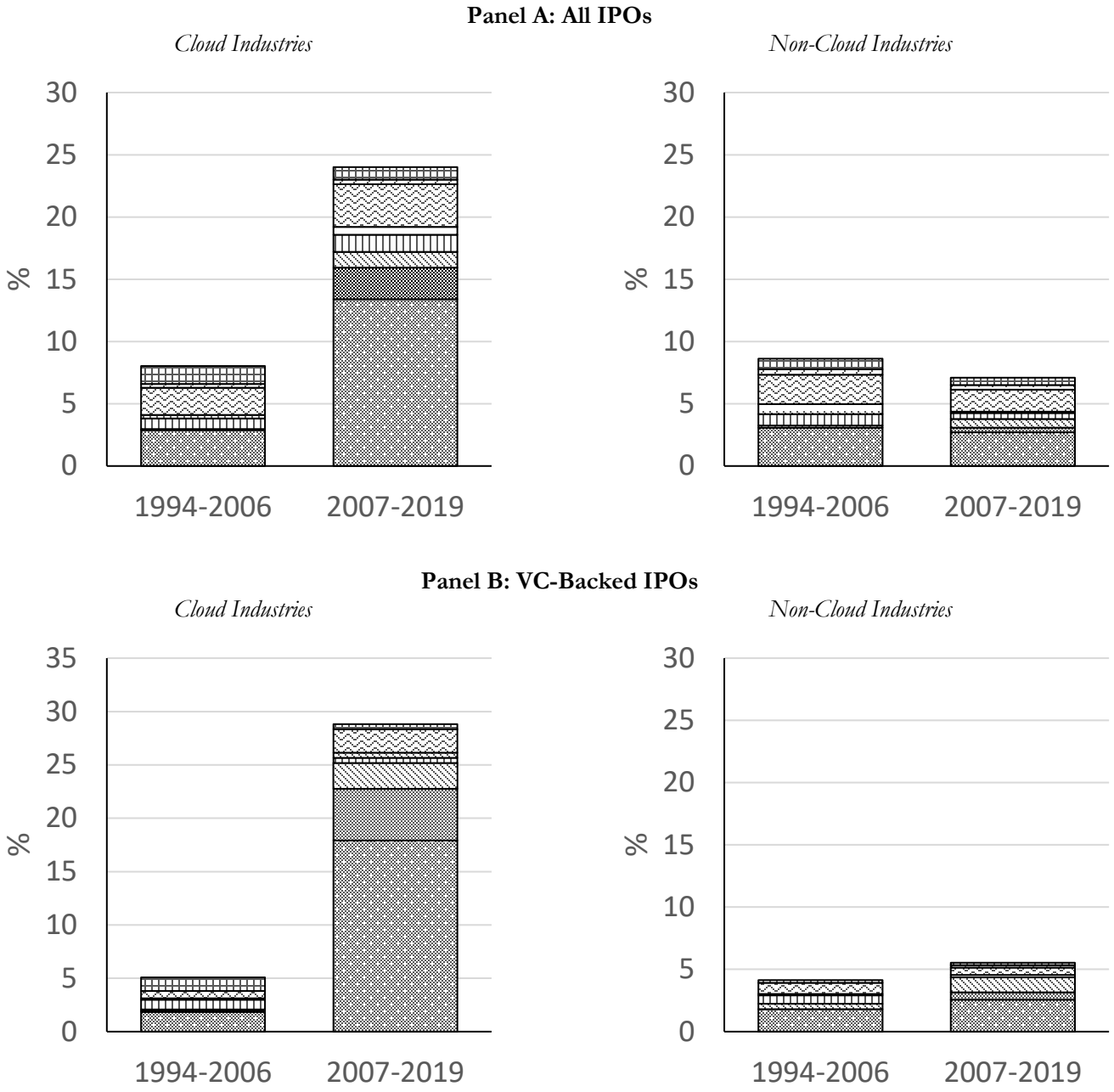


Figure 8. The Percentage of Dual-Class IPOs by Controller *(continued).*

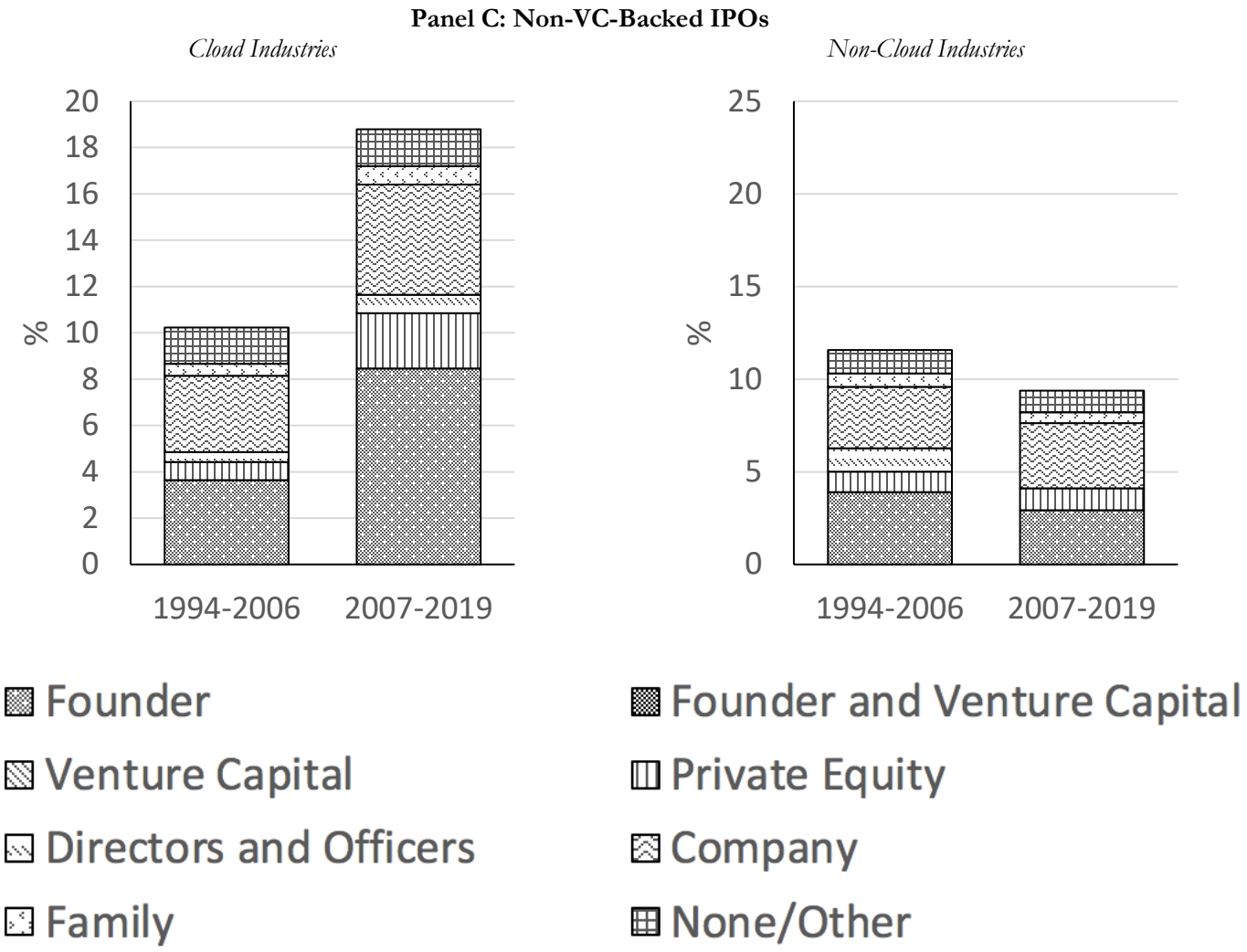


Figure 9. The Percentage of Different Types of Sunsets by Controller.
This figure shows the percentage of dual-class IPOs that have different types of sunsets by the type of controller. Types of sunset provisions include: Time Sunsets (Panel A), Ownership Sunsets (Panel B), Transfer Sunsets (Panel C) and Other Sunsets (Panel D). Types of controllers include: Founder, Founder and Venture Capital Firm, Venture Capital Firm, Private Equity Firm, Directors & Officers who are not founders, a Company which is a parent or holding company, a Family business, or other types of investors or no controller.

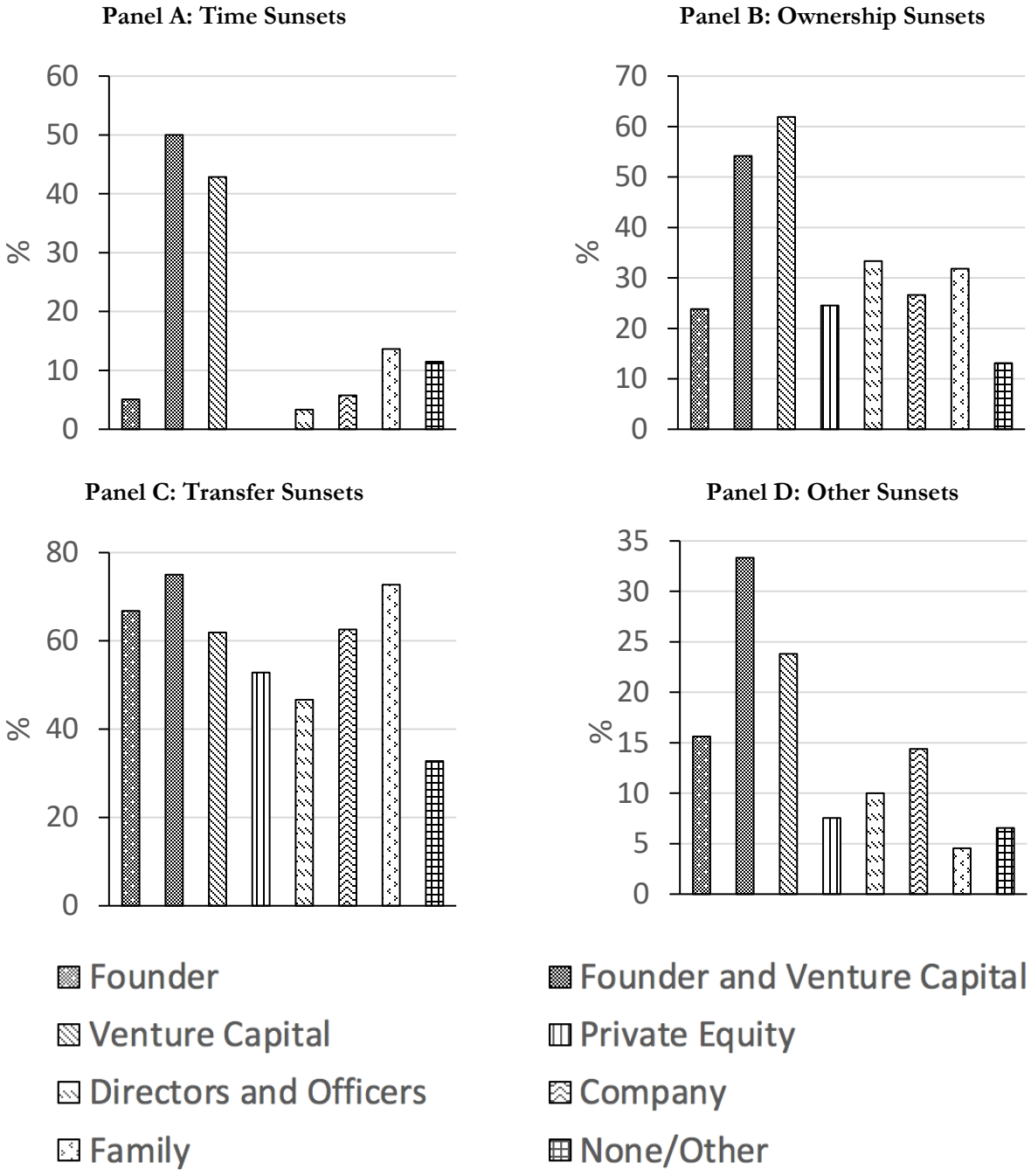


Figure 10. The Percentage of Different Types of Sunsets over Time by Founder Control.
This figure shows the percentage of dual-class IPOs that have different types of sunsets, comparing IPOs in 1994-2006 to IPOs in 2007-2019. Each Panel divides dual-class IPOs into IPOs that are controlled solely by the founders and other dual-class IPOs. Types of sunset provisions include: Time Sunsets (Panel A), Ownership Sunsets (Panel B), Transfer Sunsets (Panel C) and Other Sunsets (Panel D).

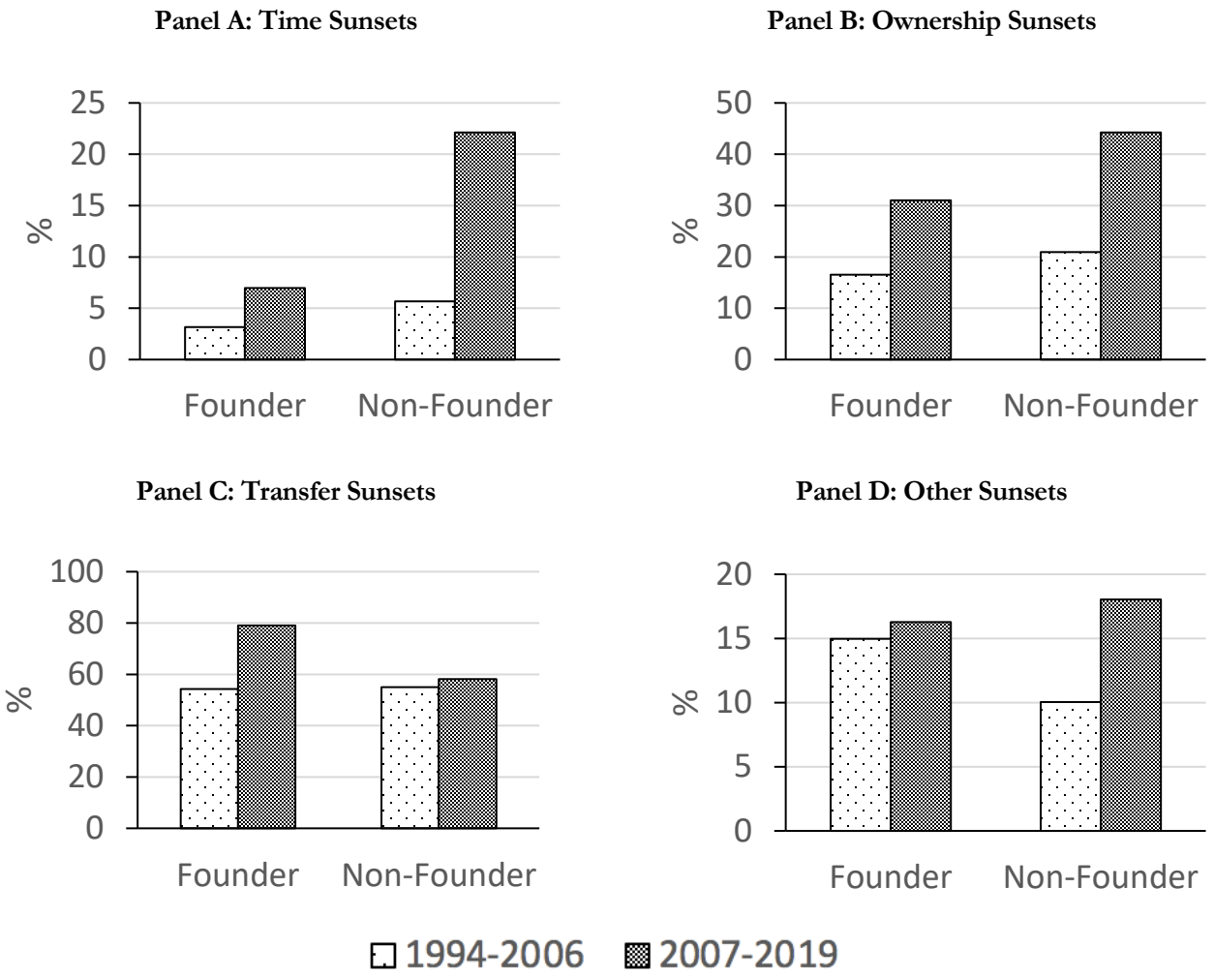


Table 1: Summary Statistics for IPOs, 1994-2019

This table provides descriptive statistics for all IPOs in our sample, from 1994 to 2019. The left panel presents data for single-class firms, the middle panel for dual-class firms controlled by the founder, and the right panel for dual-class firms not controlled by the founder. All firm financials are Winsorized at the 1% level. Variables that are not defined herein are described in the Appendix.

	Single Class IPOs				Founder-Controlled Dual-Class IPOs					Other Dual-Class IPOs				
	Obs.	Mean	Med.	St. Dv.	Obs.	Mean	Med.	St. Dv.	*T-stat*	Obs.	Mean	Med.	St. Dv.	*T-stat*
Variables:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	*(6)-(2)*	(10)	(11)	(12)	(13)	*(11)-(2)*
							Panel A: Firm Characteristics							
Age	5,062	15.43	8.00	21.46	279	11.7	8.00	10.94	-2.881	312	28.97	12.50	35.11	10.33
IPO Proceeds	5,300	137.18	60.70	531.84	281	324.21	115.10	1,165.63	5.264	326	472.2	160.30	1,335.47	9.658
Eponymous	5,300	0.08	0.00	0.27	281	0.12	0.00	0.33	2.568	326	0.12	0.00	0.33	2.442
Assets ($ Mil)	5,243	497.77	36.76	1,924.7	281	389.21	130.63	886.07	-0.940	326	1,880.42	307.87	3,979.23	11.53
ROA	5,145	-0.24	0.02	0.75	279	-0.06	0.05	0.47	3.885	321	-0.10	0.05	0.63	3.236
Leverage	5,229	0.23	0.08	0.33	281	0.19	0.04	0.29	-1.871	323	0.25	0.11	0.30	1.036
Cash	5,239	0.27	0.14	0.29	281	0.30	0.23	0.26	1.390	326	0.17	0.06	0.22	-6.412
R&D	5,300	0.19	0.01	0.38	281	0.09	0.00	0.20	-4.429	326	0.08	0.00	0.24	-5.305
Cap.Ex.	5,025	0.08	0.05	0.10	274	0.08	0.05	0.10	-0.107	314	0.07	0.04	0.10	-1.382
Patents (#)	5,300	5.26	0.00	67.42	281	5.80	0.00	37.24	0.135	326	8.53	0.00	69.03	0.851
Patents ($ Mil)	5,300	41.32	0.00	752.24	281	183.32	0.00	2,333.1	2.576	326	64.77	0.00	400.07	0.558
							Panel B: IPO Type							
VC-backed	5,300	0.46	0.00	0.50	281	0.51	1.00	0.50	1.656	326	0.26	0.00	0.44	-7.116
Foreign-based	5,300	0.13	0.00	0.33	281	0.37	0.00	0.48	11.35	326	0.17	0.00	0.38	2.271
Cloud Industry	5,300	0.46	0.00	0.50	281	0.66	1.00	0.47	6.512	326	0.51	1.00	0.50	1.710
Media Company	5,300	0.07	0.00	0.26	281	0.12	0.00	0.33	3.309	326	0.15	0.00	0.36	5.419
Spin-Off	5,300	0.16	0.00	0.37	281	0.05	0.00	0.22	-4.941	326	0.37	0.00	0.48	9.704
							Panel C: The Size of the Wedge							
Public Wedge	-	-	-	-	281	-22.99	-22.41	16.26	-	326	-12.68	-11.04	17.54	-
Founder Wedge	-	-	-	-	281	26.11	24.10	18.06	-	326	0.61	0.00	5.25	-
Non-Founder Wedge	-	-	-	-	281	0.00	0.00	0.00	-	326	14.08	11.94	18.18	-
Private Equity Wedge	-	-	-	-	281	-0.94	0.00	4.84	-	326	1.13	0.00	11.09	-
Company Wedge	-	-	-	-	281	0.00	0.00	0.00	-	326	8.11	0.00	13.78	-
							Panel D: Venture Capital Financing							
Ind. Dry Powder	5,300	17.86	3.82	29.56	281	31.98	3.22	40.91	7.633	326	16.85	1.41	30.8	-0.597
VC Ind. Financing	5,300	2.68	0.69	5.17	281	6.24	0.87	8.82	10.75	326	3.01	0.37	6.14	1.130

Table 2: The Determinants of Controllers in Dual-Class IPOs

This table presents the results of a linear probability model where the dependent variable is an indicator that equals one if an IPO has dual-class stock in columns (1) and (6), a founder-controlled dual-class structure in (2) and (7), a dual-class structure not controlled by a founder in (3) and (8), a dual-class structure controlled by a private equity investor in (4) and (9), and a dual-class structure controlled by a parent or holding company in (5) and (10). All specifications include year and two-digit SIC industry fixed effects. All variables are described in the Appendix. All standard errors are robust. The ***, **, and * denote significance at the 1%, 5%, and 10% levels. Columns (1)-(5) use *Industry Dry Powder* as VC investments proxy, (6)-(10) use *VC Industry Financing*.

	Ind. Private Capital = Ind. Dry Powder					Ind. Private Capital = VC Ind. Financing				
	Dual-Class	Founder	NF Dual	PE	Co.	Dual-Class	Founder	NF Dual	PE	Co.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Ind. Capital	0.00121***	0.000969***	0.000240	-0.000123	0.000162	0.00691***	0.00562***	0.00129	-0.0000703	0.000112
	(5.25)	(5.81)	(1.38)	(-1.64)	(1.32)	(5.22)	(5.02)	(1.37)	(-0.18)	(0.18)
VC-backed	-0.0133	0.00397	-0.0173**	0.00345	-0.0202***	-0.0126	0.00451	-0.0171**	0.00328	-0.0200***
	(-1.31)	(0.55)	(-2.18)	(0.99)	(-3.91)	(-1.25)	(0.63)	(-2.16)	(0.94)	(-3.87)
Foreign	0.0812***	0.0775***	0.00377	-0.00265	0.00812	0.0818***	0.0779***	0.00392	-0.00291	0.00846
	(5.38)	(6.25)	(0.36)	(-0.64)	(1.10)	(5.42)	(6.28)	(0.38)	(-0.70)	(1.14)
Media	0.0396	0.00257	0.0371	0.000785	0.0212	0.0401	0.00296	0.0372	0.000677	0.0213
	(1.46)	(0.18)	(1.57)	(0.08)	(1.18)	(1.48)	(0.21)	(1.57)	(0.07)	(1.19)
Eponymous	0.0314*	0.0352***	-0.00378	-0.00930*	0.00365	0.0313*	0.0351***	-0.00379	-0.00935*	0.00372
	(1.80)	(2.81)	(-0.29)	(-1.91)	(0.39)	(1.79)	(2.79)	(-0.29)	(-1.93)	(0.40)
Log(Age)	-0.00939*	-0.0116***	0.00217	-0.00479**	-0.00128	-0.00937*	-0.0115***	0.00216	-0.00467**	-0.00143
	(-1.66)	(-3.40)	(0.45)	(-2.19)	(-0.46)	(-1.65)	(-3.38)	(0.45)	(-2.14)	(-0.51)
Log(Assets)	0.0412***	0.0105***	0.0307***	0.00769***	0.0126***	0.0409***	0.0102***	0.0307***	0.00761***	0.0127***
	(11.48)	(4.54)	(10.30)	(5.62)	(5.82)	(11.37)	(4.43)	(10.27)	(5.61)	(5.82)
Patents ($ Mil)	0.00433	0.00541**	-0.00109	-0.00106	-0.00102	0.00434	0.00543**	-0.00108	-0.00105	-0.00104
	(1.26)	(2.29)	(-0.40)	(-1.29)	(-0.54)	(1.26)	(2.29)	(-0.40)	(-1.27)	(-0.55)
ROA	-0.0212**	0.00524	-0.0264***	-0.000439	-0.0105*	-0.0195**	0.00668	-0.0261***	-0.000211	-0.0108*
	(-2.32)	(1.06)	(-3.43)	(-0.20)	(-1.82)	(-2.11)	(1.32)	(-3.39)	(-0.10)	(-1.86)
Leverage	-0.0478***	-0.00936	-0.0385***	0.0142***	-0.0424***	-0.0464***	-0.00820	-0.0382***	0.0142***	-0.0424***
	(-4.03)	(-1.19)	(-4.09)	(3.45)	(-6.67)	(-3.91)	(-1.05)	(-4.06)	(3.45)	(-6.68)
Cash	0.00499	0.0110	-0.00604	-0.0116***	-0.00968	0.00647	0.0122	-0.00572	-0.0119***	-0.00925
	(0.27)	(0.83)	(-0.41)	(-2.71)	(-0.88)	(0.35)	(0.91)	(-0.39)	(-2.79)	(-0.84)
R&D	0.00329	0.00546	-0.00217	0.00811	0.00160	0.00451	0.00651	-0.00201	0.00864*	0.000925
	(0.20)	(0.67)	(-0.15)	(1.56)	(0.16)	(0.27)	(0.79)	(-0.14)	(1.65)	(0.09)
Cap.Ex.	0.0449	0.0459	-0.000946	-0.0294**	-0.00125	0.0475	0.0480	-0.000516	-0.0290**	-0.00174
	(0.94)	(1.31)	(-0.03)	(-2.29)	(-0.05)	(1.00)	(1.37)	(-0.01)	(-2.25)	(-0.07)
Spin-Off	0.00172	-0.0526***	0.0543***	0.00170	0.0541***	0.00335	-0.0512***	0.0546***	0.00181	0.0539***
	(0.14)	(-8.00)	(4.69)	(0.37)	(5.96)	(0.27)	(-7.80)	(4.71)	(0.39)	(5.95)
Adj. R^2	0.132	0.125	0.0787	0.0496	0.0569	0.133	0.128	0.0788	0.0492	0.0566
N	5,384	5,384	5,384	5,384	5,384	5,384	5,384	5,384	5,384	5,384

Table 3: The Determinants of the Wedge between Voting Rights and Economic Rights

This table presents the results of a linear regression model where the dependent variable is the size of the "wedge" between voting and economic rights for various agents within the firm, as expressed in percentage points. The dependent variable is the wedge for public shareholders in columns (1) and (6), founders in columns (2) and (7), all non-founder controllers (if any) in columns (3) and (8), private equity investors in columns (4) and (9), and a parent or holding company in columns (5) and (10). All specifications include year and two-digit SIC industry fixed effects. All variables are described in the Appendix. All standard errors are robust. The ***, **, and * denote significance at the 1%, 5%, and 10% levels. Columns (1)-(6) use *Industry Dry Powder* as a VC investments proxy, while (7)-(12) use *VC Industry Financing*.

	Ind. Private Capital = Ind. Dry Powder					Ind. Private Capital = VC Ind. Financing				
	Public	Founder	NF	PE	Co.	Public	Founder	NF	PE	Co.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Ind. Capital	-0.0329***	0.0279***	0.00589	-0.000349	0.00212	-0.177***	0.197***	0.00758	0.00299	-0.0146
	(-5.23)	(5.16)	(1.40)	(-0.18)	(0.64)	(-4.71)	(4.63)	(0.41)	(0.34)	(-1.00)
VC-backed	0.350	0.232	-0.496***	-0.174*	-0.406***	0.329	0.242	-0.489**	-0.175*	-0.401***
	(1.35)	(0.98)	(-2.59)	(-1.75)	(-3.04)	(1.27)	(1.03)	(-2.56)	(-1.75)	(-3.01)
Foreign	-0.971**	2.859***	-0.0991	-0.407**	0.0849	-0.991***	2.862***	-0.0879	-0.408**	0.0943
	(-2.57)	(6.45)	(-0.39)	(-2.46)	(0.45)	(-2.61)	(6.50)	(-0.34)	(-2.47)	(0.50)
Media	-0.556	-0.261	0.715	-0.111	0.160	-0.570	-0.253	0.719	-0.112	0.163
	(-0.90)	(-0.63)	(1.36)	(-0.51)	(0.48)	(-0.92)	(-0.60)	(1.36)	(-0.51)	(0.49)
Eponymous	-1.067**	0.789*	-0.0480	-0.246*	-0.118	-1.065**	0.784*	-0.0460	-0.247*	-0.116
	(-2.10)	(1.87)	(-0.14)	(-1.66)	(-0.65)	(-2.10)	(1.85)	(-0.13)	(-1.66)	(-0.63)
Log(Age)	0.380**	-0.473***	-0.0198	-0.0209	-0.0879	0.381**	-0.466***	-0.0245	-0.0200	-0.0927
	(2.34)	(-3.65)	(-0.16)	(-0.33)	(-1.36)	(2.36)	(-3.61)	(-0.20)	(-0.32)	(-1.44)
Log(Assets)	-0.634***	0.279***	0.445***	0.0430	0.240***	-0.628***	0.266***	0.448***	0.0422	0.244***
	(-7.49)	(3.70)	(7.26)	(1.23)	(5.38)	(-7.40)	(3.52)	(7.27)	(1.21)	(5.40)
Patents ($ Mil)	-0.121	0.207***	-0.0736	-0.0338	-0.0244	-0.121	0.208***	-0.0741	-0.0337	-0.0250
	(-1.40)	(3.08)	(-1.41)	(-1.08)	(-0.63)	(-1.39)	(3.07)	(-1.42)	(-1.08)	(-0.64)
ROA	0.253	0.0781	-0.549***	-0.0854	-0.306**	0.213	0.142	-0.557***	-0.0828	-0.320**
	(1.16)	(0.52)	(-3.21)	(-1.13)	(-2.07)	(0.97)	(0.93)	(-3.24)	(-1.10)	(-2.16)
Leverage	0.549*	0.109	-0.779***	0.0778	-0.904***	0.513	0.150	-0.778***	0.0784	-0.907***
	(1.73)	(0.42)	(-3.18)	(0.70)	(-5.64)	(1.62)	(0.58)	(-3.17)	(0.71)	(-5.65)
Cash	0.257	-0.332	-0.219	-0.0718	-0.432	0.213	-0.308	-0.204	-0.0736	-0.422
	(0.56)	(-0.71)	(-0.62)	(-0.54)	(-1.59)	(0.46)	(-0.66)	(-0.57)	(-0.55)	(-1.54)
R&D	0.283	-0.000540	-0.488	-0.128	-0.146	0.261	0.0658	-0.509	-0.123	-0.171
	(0.71)	(-0.00)	(-1.57)	(-0.74)	(-0.61)	(0.65)	(0.26)	(-1.63)	(-0.71)	(-0.72)
Cap.Ex.	1.261	-0.506	-1.568	-0.766	-0.315	1.202	-0.408	-1.582	-0.762	-0.338
	(0.96)	(-0.45)	(-1.55)	(-1.01)	(-0.47)	(0.91)	(-0.36)	(-1.57)	(-1.01)	(-0.50)
Spin-Off	0.544*	-1.588***	0.806***	0.0324	0.992***	0.505*	-1.534***	0.802***	0.0341	0.983***
	(1.82)	(-7.97)	(2.97)	(0.29)	(4.88)	(1.69)	(-7.73)	(2.96)	(0.30)	(4.87)
Adj. R^2	0.0892	0.111	0.0540	0.0669	0.0359	0.0903	0.116	0.0537	0.0669	0.0360
N	5,384	5,384	5,384	5,384	5,384	5,384	5,384	5,384	5,384	5,384

Table 4: The Determinants of the Wedge – Controlling for "Hot Markets"

Columns (1)-(2) and (5)-(6) present the results of a linear probability model where the dependent variable is an indicator that equals one if an IPO has: dual-class stock in columns (1) and (5), and a founder-controlled dual-class structure in (2) and (6). Columns (3)-(4) and (7)-(8) present the results of a linear regression model where the dependent variable is the size of the "wedge" between voting and economic rights for various agents within the firm, as expressed in percentage points. The dependent variable is the wedge for public shareholders in columns (3) and (7), and founders in columns (4) and (8). All specifications include year and two-digit SIC industry fixed effects. Additional controls include VC-backed, Cloud, Foreign, Media, Eponymous, Log(Age), Log(Assets), Patents ($ Mil), ROA, Leverage, Cash, R&D, Cap.Ex., and Spin-Off. All variables are described in the Appendix. All standard errors are robust. The ***, **, and * denote significance at the 1%, 5%, and 10% levels. Columns (1)-(4) use *Industry Dry Powder* as a VC investments proxy, while (5)-(8) use *VC Industry Financing*.

	Capital = Industry Dry Powder				Capital = VC Ind. Funding			
Dep. Variable:	Controller		Wedge		Controller		Wedge	
	Dual-Class	Founder	Public	Founder	Dual-Class	Founder	Public	Founder
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Ind. Returns	0.000808*	-0.00000476	-0.0147	-0.00584	0.000804*	-0.00000718	-0.0148	-0.00634
	(1.84)	(-0.01)	(-1.17)	(-0.50)	(1.86)	(-0.02)	(-1.19)	(-0.55)
Ind. Under-pricing	-0.0525*	-0.0445**	1.668**	-1.629***	-0.0672**	-0.0580***	2.082***	-2.139***
	(-1.68)	(-2.38)	(2.15)	(-2.59)	(-2.09)	(-2.97)	(2.60)	(-3.20)
Ind. Avg. Proceeds	0.0000272	0.0000412*	-0.00109*	0.00128*	0.0000284	0.0000424*	-0.00112*	0.00132*
	(1.10)	(1.78)	(-1.81)	(1.69)	(1.13)	(1.80)	(-1.82)	(1.72)
Ind. M&A Num.	0.0316	0.0106	-0.588	0.427	0.0236	0.00391	-0.488	-0.123
	(1.28)	(0.59)	(-0.94)	(0.73)	(1.02)	(0.23)	(-0.83)	(-0.22)
Ind. M&A Value	0.0111	0.00572	0.0347	0.0926	0.0105	0.00515	0.0558	0.0826
	(1.38)	(1.03)	(0.14)	(0.48)	(1.31)	(0.93)	(0.22)	(0.43)
Capital	0.000986	0.00119	-0.0223	0.0395	-0.00170	-0.00183	0.0436	-0.0628
	(0.32)	(0.43)	(-0.23)	(0.34)	(-0.61)	(-0.74)	(0.50)	(-0.60)
Ind. Capital	0.000833***	0.000790***	-0.0266***	0.0223***	0.00580***	0.00537***	-0.163***	0.203***
	(2.76)	(3.69)	(-3.41)	(3.17)	(3.65)	(4.00)	(-3.74)	(3.97)
Additional Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.139	0.133	0.0926	0.120	0.141	0.136	0.0943	0.126
N	4,982	4,982	4,982	4,982	4,982	4,982	4,982	4,982

Table 5: Different Types of IPOs

Panel A presents the results of a linear probability model where the dependent variable is an indicator that equals one if an IPO has dual-class stock in columns (1)-(6), and a founder-controlled dual-class structure in columns (7)-(12). Panel B presents the results of a linear regression model where the dependent variable is the size of the "wedge" between voting and economic rights for various agents within the firm, as expressed in percentage points. The dependent variable is the wedge for public shareholders in columns (1)-(6), and founders in (7)-(12). We analyze the linear probability models separately for VC and Non-VC backed firms (columns (1)-(2) and (7)-(8)), Cloud and Non-Cloud Industry firms (columns (3)-(4) and (9)-(10)), and the U.S. and Foreign firms (columns (5)-(6) and (11)-(12)). The first three rows of each panel use *Industry Dry Powder* as a proxy for the availability of private capital, while the following three rows use *VC Industry Financing*. All specifications in this table include year and two-digit SIC industry fixed effects. Additional controls include VC-backed, Cloud, Foreign, Media, Eponymous, Log(Age), Log(Assets), Patents ($ Mil), ROA, Leverage, Cash, R&D, Cap.Ex., and Spin-Off. All variables are described in the Appendix. All standard errors are robust. The ***, **, and * denote significance at the 1%, 5%, and 10% levels.

Panel A: The Determinants of the Controller												
	Dual Class						Founder Control					
	VC	Non-VC	Cloud	Non-cloud	US	Foreign	VC	Non-VC	Cloud	Non-cloud	US	Foreign
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Ind. Dry Powder	.000807***	.00140***	.000996***	0.00262***	.000859***	.00166**	.000739***	.000831***	.000719***	.00153***	.000746***	.00154***
	(2.78)	(3.47)	(3.10)	(3.18)	(3.66)	(2.01)	(3.34)	(3.10)	(3.11)	(3.15)	(4.47)	(2.59)
Additional Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.207	0.0953	0.178	0.106	0.105	0.312	0.191	0.0897	0.189	0.0651	0.0739	0.271
N	2,597	2,787	2,531	2,853	4,705	679	2,597	2,787	2,531	2,853	4,705	679
VC Ind. Financing	0.00583***	0.00690***	0.00827***	0.0173**	0.00580***	0.00131	0.00520***	0.00386**	0.00576***	0.0110*	0.00523***	-0.000460
	(3.65)	(2.93)	(4.73)	(2.08)	(4.26)	(0.26)	(3.56)	(2.48)	(3.83)	(1.92)	(4.71)	(-0.11)
Additional Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.211	0.0949	0.184	0.105	0.107	0.309	0.196	0.0891	0.193	0.0645	0.0784	0.267
N	2,597	2,787	2,531	2,853	4,705	679	2,597	2,787	2,531	2,853	4,705	679

(continued)

Table 5: Different Types of IPOs (continued)

Panel B: The Determinants of the Wedge												
	Public Wedge						Founder Wedge					
	VC	Non-VC	Cloud	Non-cloud	US	Foreign	VC	Non-VC	Cloud	Non-cloud	US	Foreign
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Ind. Dry Powder	-0.0272***	-0.0271**	-0.0291***	-0.0406*	-0.0270***	-0.0430**	0.0251***	0.0235**	0.0191**	0.0431***	0.0178***	0.0392*
	(-3.60)	(-2.53)	(-3.34)	(-1.88)	(-4.04)	(-2.33)	(3.72)	(2.57)	(2.39)	(3.01)	(3.43)	(1.92)
Additional Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.154	0.0644	0.114	0.0775	0.0702	0.203	0.183	0.0616	0.168	0.0449	0.0472	0.284
N	2,597	2,787	2,531	2,853	4,705	679	2,597	2,787	2,531	2,853	4,705	679
VC Ind. Financing	-0.180***	-0.0939*	-0.203***	0.0291	-0.177***	0.0418	0.184***	0.140**	0.190***	0.351**	0.117***	0.278
	(-3.76)	(-1.80)	(-4.11)	(0.14)	(-4.43)	(0.36)	(3.30)	(2.37)	(3.24)	(2.06)	(3.97)	(1.38)
Additional Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.159	0.0632	0.118	0.0765	0.0730	0.200	0.188	0.0625	0.172	0.0448	0.0495	0.287
N	2,597	2,787	2,531	2,853	4,705	679	2,597	2,787	2,531	2,853	4,705	679

Table 6: VC-Backed IPOs - The Determinants of the Controller and Wedge

This table only analyzes firms that are VC-backed. Columns (1)-(2) and (5)-(6) present the results of a linear probability model where the dependent variable is an indicator that equals one if an IPO has dual-class stock in columns (1) and (5), and a founder-controlled dual-class structure in columns (2) and (6). Columns (3)-(4) and (7)-(8) present the results of a linear regression model where the dependent variable is the size of the "wedge" between voting and economic rights for various agents within the firm, as expressed in percentage points. The dependent variable is the wedge for public shareholders in columns (3) and (7), and founders in (4) and (8). All specifications include year and two-digit SIC industry fixed effects. All variables are described in the Appendix. Columns (1)-(4) use *Industry Dry Powder* as a VC investments proxy, while (5)-(8) use *VC Industry Financing*. Additional controls include Cloud, Foreign, Media, Eponymous, Log(Age), Log(Assets), Patents ($ Mil), ROA, Leverage, Cash, R&D, and Cap.Ex. All standard errors are robust. The ***, **, and * denote significance at the 1%, 5%, and 10% levels.

	Capital = Ind. Dry Powder				Capital = Ind. VC Financing			
	Controller		Wedge		Controller		Wedge	
	Dual-Class	Founder	Public	Founder	Dual-Class	Founder	Public	Founder
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Ind. Capital	0.000593**	0.000435*	-0.0220***	0.0112*	0.00534***	0.00446***	-0.184***	0.101**
	(1.98)	(1.96)	(-2.98)	(1.82)	(3.02)	(2.75)	(-3.45)	(2.15)
VC Rounds	-0.00476**	-0.00489***	0.134**	-0.154***	-0.00466**	-0.00480***	0.131**	-0.152***
	(-2.22)	(-3.13)	(2.40)	(-3.05)	(-2.16)	(-3.07)	(2.33)	(-3.01)
VC Firms (#)	-0.00177	-0.000301	-0.00117	0.000820	-0.00190	-0.000415	0.00308	-0.00163
	(-1.31)	(-0.32)	(-0.03)	(0.03)	(-1.40)	(-0.44)	(0.09)	(-0.06)
VC Firm Age	0.000172	0.00502	0.122	0.0913	-0.000260	0.00467	0.137	0.0832
	(0.01)	(0.53)	(0.39)	(0.37)	(-0.02)	(0.50)	(0.44)	(0.34)
VC Fund Size	0.00217	-0.00493	0.208	-0.156	0.00211	-0.00501	0.210	-0.157
	(0.38)	(-1.06)	(1.49)	(-1.24)	(0.37)	(-1.08)	(1.50)	(-1.25)
Additional Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.172	0.157	0.148	0.132	0.177	0.163	0.156	0.135
N	2,078	2,078	2,078	2,078	2,078	2,078	2,078	2,078

Table 7: Dual-Class Structures and the Impact of Technological Shocks

Columns (1)-(6) present the results of a linear probability model where the dependent variable is an indicator that equals one if an IPO has dual-class stock in columns (1)-(3), and a founder-controlled dual-class structure in (4)-(6). Columns (7)-(12) present the results of a linear regression model where the dependent variable is the size of the "wedge" between voting and economic rights for various agents within the firm, as expressed in percentage points. The dependent variable is the wedge for public shareholders in columns (7)-(9), and founders in (10)-(12). All specifications include year and two-digit SIC industry fixed effects. Additional controls include Foreign, Media, Eponymous, Log(Age), Log(Assets), Patents ($ Mil), ROA, Leverage, Cash, R&D, Cap.Ex., and Spin-Off. All variables are described in the Appendix. All standard errors are robust. The ***, **, and * denote significance at the 1%, 5%, and 10% levels.

	Controller						Wedge					
	Dual-Class			Founder Dual-Class			Public			Founder		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Cloud Ind.* Post-2006	0.119***	0.0681**	0.0575*	0.105***	0.0389*	0.0314	-2.390***	-0.688	-0.324	2.888***	0.925	0.689
	(5.86)	(2.21)	(1.86)	(6.71)	(1.92)	(1.55)	(-4.51)	(-0.91)	(-0.42)	(5.58)	(1.33)	(0.98)
VC-backed	-0.0464***	-0.0355***	-0.0341**	-0.0256***	-0.0114	-0.0104	1.024***	0.658*	0.611*	-0.479*	-0.0569	-0.0262
	(-3.45)	(-2.60)	(-2.49)	(-2.88)	(-1.28)	(-1.17)	(2.90)	(1.81)	(1.67)	(-1.93)	(-0.23)	(-0.11)
VC-backed* Post-2006	0.101***	0.0561**	0.0528**	0.0741***	0.0151	0.0128	-2.329***	-0.815	-0.702	1.822***	0.0759	0.00222
	(4.99)	(2.43)	(2.28)	(4.85)	(0.99)	(0.84)	(-4.46)	(-1.37)	(-1.18)	(3.47)	(0.16)	(0.00)
Cloud Ind.* VC-backed	0.0180	-0.00660	-0.00782	0.0241*	-0.00809	-0.00895	-0.257	0.569	0.611	0.563	-0.390	-0.417
	(0.99)	(-0.35)	(-0.41)	(1.96)	(-0.67)	(-0.74)	(-0.56)	(1.15)	(1.23)	(1.44)	(-1.05)	(-1.12)
Cloud Ind.* VC-backed		0.0940**	0.0886**		0.123***	0.119***		-3.156***	-2.974***		3.640***	3.521***
* Post-2006		(2.34)	(2.20)		(4.06)	(3.92)		(-3.13)	(-2.96)		(3.49)	(3.37)
Ind. Dry Powder			.000613***			.000430**			-0.0210***			0.0136**
			(2.58)			(2.55)			(-3.26)			(2.50)
Additional Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.139	0.140	0.141	0.136	0.140	0.141	0.0923	0.0941	0.0956	0.118	0.121	0.122
N	5,384	5,384	5,384	5,384	5,384	5,384	5,384	5,384	5,384	5,384	5,384	5,384

Table 8: The Costs of Doing Business for IPO firms After 2006

This table presents the results of a linear regression model where the dependent variable is Cost of Goods in columns (1)-(3) and General Expenses in columns (4)-(6). Costs of Goods Sold and General Expenses are Winsorized at the 1% level in each tail. All specifications include year and two-digit SIC industry fixed effects. All variables are described in the Appendix. All standard errors are robust. The ***, **, and * denote significance at the 1%, 5%, and 10% levels.

	Cost of Goods			General Expenses		
	(1)	(2)	(3)	(4)	(5)	(6)
Post-2006	0.0393	0.0417	-0.0928*	0.363***	0.484***	0.0713
	(0.73)	(0.77)	(-1.74)	(5.94)	(8.05)	(1.61)
Cloud Ind.*Post-2006	-0.0874***	-0.0900***	-0.0741***	-0.101***	-0.0715**	-0.0494**
	(-3.56)	(-3.65)	(-3.02)	(-3.24)	(-2.39)	(-2.19)
Eponymous		-0.0140	-0.00826		-0.00687	0.00485
		(-0.98)	(-0.59)		(-0.40)	(0.41)
Log(Age)		-0.0223***	-0.0112**		-0.0599***	-0.00798
		(-3.76)	(-2.03)		(-7.69)	(-1.39)
Log(Assets)		0.00350	0.0164***		-0.0558***	-0.00937**
		(0.99)	(4.15)		(-11.97)	(-1.96)
Patents ($ Mil)			-0.00794*			0.0108**
			(-1.79)			(2.33)
ROA			-0.255***			-0.684***
			(-8.72)			(-13.80)
Leverage			0.0196			0.0150
			(1.10)			(0.73)
Cash			0.170***			0.639***
			(4.31)			(14.53)
R&D			-0.0156			0.275***
			(-0.25)			(2.97)
Cap.Ex.			-0.129			0.401***
			(-1.51)			(3.86)
PPE			-0.0212			-0.146***
			(-0.55)			(-3.54)
Adj. R^2	0.221	0.223	0.279	0.254	0.310	0.635
N	4,545	4,386	4,236	4,012	3,869	3,755

Table 9: The Likelihood of Sunset Provisions in Dual-Class IPOs

This table presents the results of a linear regression model where the dependent variable is one of the four types of sunset provisions: (1) Time Sunset, (2) Ownership Sunset, (3) Transfer Sunset, and (4) Other Sunset. All specifications include year and two-digit SIC industry fixed effects. All variables are described in the Appendix, except that Founder-control is equal to one only if the firm is solely controlled by the founder(s) and control is not shared with VC firms. All standard errors are robust. The ***, **, and * denote significance at the 1%, 5%, and 10% levels.

	Time Sunset	Ownership Sunset	Transfer Sunset	Other Sunset
	(1)	(2)	(3)	(4)
Founder-control Post-2006	-0.135*	-0.240**	0.00242	-0.0517
	(-1.79)	(-2.32)	(0.02)	(-0.59)
Founder-control	-0.0143	0.0286	0.124	0.0742
	(-0.29)	(0.39)	(1.40)	(1.12)
Post-2006	0.219***	0.332***	0.543***	0.110
	(2.61)	(2.71)	(3.66)	(1.05)
Founder-control Non-Cloud	0.0157	-0.0693	-0.169	-0.0224
	(0.26)	(-0.74)	(-1.45)	(-0.26)
Non-Cloud Post-2006	0.131	-0.262**	-0.277**	0.0834
	(1.39)	(-2.09)	(-2.16)	(0.80)
Founder-control Non-Cloud Post-2006	-0.141	0.418**	0.314*	-0.151
	(-1.18)	(2.26)	(1.69)	(-1.04)
VC-backed	0.0457	0.0245	-0.0319	0.0361
	(1.61)	(0.54)	(-0.66)	(1.03)
Log(Age)	0.0164	0.0133	-0.0198	0.0165
	(1.25)	(0.56)	(-0.85)	(1.09)
Adj. R2	0.0479	0.0708	0.0885	0.000889
N	591	591	591	591

Appendix Table: Variable Description

Variable	Definition	Source
Age	The difference between the current year and the year the company was founded	Compustat; Jay Ritter's website
Assets	Book value of assets in $ millions winsorized at the 1% level	Compustat
Cap.Ex.	Ratio of capital expenditures to assets, winsorized at the 1% level	Compustat
Cash	The ratio of cash and short-term investments to total book assets winsorized at the 1% level	Compustat
Cloud Ind.	An indicator equal to 1 if a firm belongs to one of the following two-digit SIC codes: 23, 27, 31, 51, 52, 53, 54, 56, 57, 59, 60, 61, 62, 63, 64, 65, 67, 70, 73, 78, 79, 82, 87, and 93	Ewens et al. (2018); Compustat
Co. Control	An indicator equal to one if a parent or holding company controls the firm and has the most voting power	Manual checks
Co. Wedge	The difference between parent or holding company's voting rights and economic rights	Manual checks
Cost of Goods	Cost of goods divided by sales winsorized at the 1% level	Compustat
D&O Wedge	The difference between directors and officers' voting rights and economic rights	Manual checks
Dual-class	An indicator equal to 1 if a firm has dual-class stock at the time of its IPO	Manual checks; Jay Ritter's website; Gompers et al. (2009)
Eponymous	An indicator equal to 1 if a firm's name at IPO includes a person's name	Manual checks; Gompers et al. (2009)
Founder Control	An indicator equal to 1 if the founder controls the firm and has the most voting power	Manual checks
Founder Wedge	The difference between founders' voting rights and economic rights	Manual checks
Foreign	An indicator equal to 1 if the company is headquartered outside the United States	SDC IPO
General Expenses	Selling, general and administrative expenses divided by sales winsorized at the 1% level	Compustat
Ind. Dry Powder	The amount of funds in U.S. dollar billions raised by VC firms, but not invested in any company allocated to each two-digit SIC industry code based on the number of the fund's investments in each industry in the relevant year	SDC VentureXpert
Ind. M&A Num.	The natural log of the number of industry mergers and acquisitions in the year before the firm's IPO based on two-digit industry codes	SDC M&A
Ind. M&A Value	The natural log of the value of industry mergers and acquisitions in the year before the firm's IPO based on two-digit industry codes	SDC M&A
Ind. Returns	The annual returns to the industry portfolio in the year before the firm's IPO based on the Fama-French 48 industry classification	Ken French website
Ind. Under-pricing	The average underpricing of IPOs in the industry in the year prior to the firm's IPO based on the Fama-French 48 industry classification. Under-pricing is the price of the share at the close of the first day of trading minus the offer price at the IPO divided by the offer price at the IPO	CRSP; SDC IPO

Ind. Avg. Proceeds	The average proceeds of IPOs in the industry in the year before the firm's IPO based on the Fama-French 48 industry classification	SDC IPO
IPO Proceeds	The amount of the IPO proceeds in $ million.	SDC IPO
Leverage	The ratio of long-term debt to total book assets winsorized at the 1% level	Compustat
Media	An indicator equal to 1 if the issuer's SIC code is 2710-11, 2720-21, 2730-31, 2840-2849, 3660-69, 4800-99, 7810, 7812, and 7820	Manual checks
NF Dual	An indicator equal to 1 if the firm is a dual-class firm and the controller is not the founder	Manual checks
Non-Founder Wedge	The difference between voting and economic rights of the controllers in dual-class firms not controlled by their founders.	Manual checks
Non-Founder Wedge	The difference between voting and economic rights for controllers who are not founders.	Manual checks
Non-Cloud	An indicator equal to 1 if a firm does not belong to a Cloud Industry	Compustat
Other Sunset	Sunset provisions other than Ownership Sunsets, Time Sunsets, or Transfer Sunsets that cause supervoting shares to convert into shares with just one vote on the occurrence of a specified event, such as the controller's death or disability	Manual checks
Ownership Sunset	Sunset provisions that cause supervoting shares to convert into shares with just one vote when the controller owns less than a pre-specified percentage of the company's shares	Manual Checks
Patents (#)	The number of patents filed by an IPO firm within the five years before the IPO date. The filing date is the synthetic filing date obtained from the issue date minus 1,017 days	Kogan et. al (2017)
Patents ($ mil)	The sum of the real economic value of innovation measured as the value of all patents filed by an IPO firm within the five years before the IPO date. The filing date is the synthetic filing date obtained from the issue date minus 1,017 days	Kogan et. al (2017)
PE Wedge	The difference between a private equity (PE) investor's voting rights and economic rights	Manual checks
Post-2006	An indicator equal to 1 if the year of the IPO is 2007	
PPE	Net property, plant and equipment divided by total book assets winsorized at the 1% level	Compustat
Proceeds	Proceeds in U.S. dollar millions raised in the IPO of the firm	SDC IPO
Public Wedge	The difference between outside public shareholders' voting rights and economic rights	Manual checks
R&D	The ratio of research and development expenditures over total book assets	Compustat
ROA	Return on assets calculated as operating income after depreciation divided by book assets in the previous year winsorized at the 1% level	Compustat
Spin-off	An indicator equal to 1 if the IPO involves a spin-off of a subsidiary corporation	SDC IPO
Time Sunset	Sunset provisions that cause the elimination of dual-class at a pre-specified point in time	Manual Checks
Transfer Sunset	Sunset provisions that cause any supervoting shares that are sold to entities other than a list of transferees explicitly listed in the registration statement to convert to shares with one vote	Manual Checks
VC-backed	An indicator equal to 1 if a firm was funded by a Venture Capital firm prior to the IPO	SDC VentureXpert

VC Firm Age	The age of the oldest VC firm that provided financing to the firm prior to the IPO	SDC VentureXpert
VC Fund Size	The total amount of funds raised by the largest VC fund (in U.S. dollar millions) that provided financing to the firm prior to the IPO. Funds that belong to the same VC firm are treated as one fund.	SDC VentureXpert
VC Firms	The number of VC firms that provided financing to the firm prior to the IPO.	SDC VentureXpert
VC Ind. Financing	The total amount of late-stage venture capital financing provided to firms in the industry in the relevant year based on two-digit SIC codes	SDC VentureXpert
VC Rounds	The number of rounds of financing by VC firms prior to the IPO	SDC VentureXpert

Online Appendix to "The Rise of Dual-Class Stock IPOs"

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A. Appendix Tables

Table A.1: The Determinants of Controllers in Dual-Class IPOs - Univariate Specifications

This table presents the results of a linear probability model where the dependent variable is an indicator that equals one if an IPO has dual-class stock in columns (1) and (6), a founder-controlled dual-class structure in columns (2) and (7), a dual-class structure controlled by a non-founder (if any) in columns (3) and (8), a dual-class structure controlled by a private equity investor in columns (4) and (9), and a dual-class structure controlled by a parent or holding company in columns (5) and (10). Columns (1)-(5) use *Industry Dry Powder* as a VC investments proxy, while (6)-(10) use *VC Industry Financing*. All specifications include year and two-digit SIC industry fixed effects. All variables are described in the Appendix. All standard errors are robust. The ***, **, and * denote significance at the 1%, 5%, and 10% levels.

	Ind. Private Capital = Ind. Dry Powder					Ind. Private Capital = VC Ind. Financing				
	Dual-Class	Founder	NF Dual	PE	Co.	Dual-Class	Founder	NF Dual	PE	Co.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Ind. Capital	0.00134***	0.00109***	0.000250	-0.000130*	0.000156	0.00767***	0.00611***	0.00157*	-0.000114	0.000164
	(5.78)	(6.63)	(1.44)	(-1.85)	(1.26)	(5.73)	(5.57)	(1.65)	(-0.30)	(0.26)
Adj. R^2	0.0801	0.0940	0.0229	0.0328	0.0121	0.0821	0.0963	0.0231	0.0323	0.0119
N	5,907	5,907	5,907	5,907	5,907	5,907	5,907	5,907	5,907	5,907

Table A.2: The Determinants of the Wedge between Voting Rights and Economic Rights - Univariate Specifications

This table presents the results of a linear regression model where the dependent variable is the size of the "wedge" between voting and economic rights for various agents within the firm, as expressed in percentage points. The dependent variable is the wedge for public shareholders in columns (1) and (6), founders in (2) and (7), non-founder controller (if any) in (3) and (8), private equity in (4) and (9), and a parent or holding company in (5) and (10). Columns (1)-(5) use *Industry Dry Powder* as a VC investments proxy, while (6)-(10) use *VC Industry Financing*. All specifications include year and two-digit SIC industry fixed effects. All variables are described in the Appendix. All standard errors are robust. The ***, **, and * denote significance at the 1%, 5%, and 10% levels.

	Ind. Private Capital = Ind. Dry Powder					Ind. Private Capital = VC Ind. Financing				
	Public	Founder	NF	PE	Co.	Public	Founder	NF	PE	Co.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Ind. Capital	-0.0337***	0.0315***	0.00601	-0.000687	0.00176	-0.185***	0.210***	0.0144	0.00135	-0.0120
	(-5.51)	(5.79)	(1.48)	(-0.38)	(0.53)	(-5.07)	(4.91)	(0.80)	(0.16)	(-0.83)
Adj. R^2	0.0661	0.0815	0.0265	0.0644	0.00477	0.0675	0.0864	0.0262	0.0644	0.00483
N	5,907	5,907	5,907	5,907	5,907	5,907	5,907	5,907	5,907	5,907

Table A.3: The Determinants of Controllers in Dual-Class IPOs

This table presents the results of a linear probability model where the dependent variable is an indicator that equals one if an IPO has dual-class stock in columns (1)-(4) and the "wedge" between voting and economic rights for public shareholders, as expressed in percentage points, in (5)-(8). All specifications include year and two-digit SIC industry fixed effects. All variables are described in the Appendix. All standard errors are robust. The ***, **, and * denote significance at the 1%, 5%, and 10% levels.

	Dual-Class				Public Wedge			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Ind. Dry Powder	0.00134***	0.00131***	0.00123***	0.00121***	-0.0337***	-0.0337***	-0.0326***	-0.0329***
	(5.78)	(5.70)	(5.42)	(5.25)	(-5.51)	(-5.51)	(-5.23)	(-5.23)
VC-Backed		-0.0214**	-0.00744	-0.0133		0.360	0.223	0.350
		(-2.39)	(-0.81)	(-1.31)		(1.63)	(0.94)	(1.35)
Foreign		0.0633***	0.0761***	0.0812***		-0.477	-0.841**	-0.971**
		(4.73)	(5.14)	(5.38)		(-1.44)	(-2.25)	(-2.57)
Media		0.0388	0.0446*	0.0396		-0.650	-0.617	-0.556
		(1.41)	(1.66)	(1.46)		(-1.07)	(-1.01)	(-0.90)
Eponymous		0.0382**	0.0239	0.0314*		-1.036**	-0.892*	-1.067**
		(2.34)	(1.41)	(1.80)		(-2.28)	(-1.80)	(-2.10)
Log(Age)			-0.0122**	-0.00939*			0.353**	0.380**
			(-2.33)	(-1.66)			(2.42)	(2.34)
Log(Assets)			0.0364***	0.0412***			-0.603***	-0.634***
			(11.77)	(11.48)			(-7.93)	(-7.49)
Patents ($ Mil)				0.00433				-0.121
				(1.26)				(-1.40)
ROA				-0.0212**				0.253
				(-2.32)				(1.16)
Leverage				-0.0478***				0.549*
				(-4.03)				(1.73)
Cash				0.00499				0.257
				(0.27)				(0.56)
R&D				0.00329				0.283
				(0.20)				(0.71)
Cap.Ex.				0.0449				1.261
				(0.94)				(0.96)
Spin-Off				0.00172				0.544*
				(0.14)				(1.82)
Adj. R^2	0.0801	0.0871	0.125	0.132	0.0661	0.0680	0.0852	0.0892
N	5,907	5,907	5,606	5,384	5,907	5,907	5,606	5,384

Table A.4: The Determinants of Controllers in Dual-Class IPOs – Excluding Foreign Firms

This table presents the results of a linear probability model where the dependent variable is an indicator that equals one if an IPO has dual-class stock in columns (1) and (6), a founder-controlled dual-class structure in (2) and (7), a dual-class structure controlled by a non-founder (if any) in (3) and (8), a dual-class structure controlled by a private equity investor in (4) and (9), and a dual-class structure controlled by a parent or holding company in (5) and (10). All specifications include year and two-digit SIC industry fixed effects and exclude foreign firms. All variables are described in the Appendix. All standard errors are robust. The ***, **, and * denote significance at the 1%, 5%, and 10% levels. Columns (1)-(5) use *Industry Dry Powder* as VC investments proxy, (6)-(10) use *VC Industry Financing*.

	Ind. Private Capital = Ind. Dry Powder					Ind. Private Capital = VC Ind. Financing				
	Dual-Class	Founder	NF Dual	PE	Co.	Dual-Class	Founder	NF Dual	PE	Co.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Ind. Capital	-0.0270***	0.0178***	0.00104	-0.000799	-0.00102	-0.177***	0.117***	-0.00575	0.00598	-0.0193
	(-4.04)	(3.43)	(0.25)	(-0.40)	(-0.32)	(-4.43)	(3.97)	(-0.31)	(0.80)	(-1.37)
VC-backed	0.505*	0.0324	-0.596***	-0.127	-0.469***	0.502*	0.0343	-0.593***	-0.130	-0.466***
	(1.88)	(0.17)	(-2.94)	(-1.22)	(-3.49)	(1.87)	(0.18)	(-2.92)	(-1.25)	(-3.48)
Media	-0.622	-0.348	0.760	0.100	-0.0437	-0.630	-0.344	0.761	0.0994	-0.0433
	(-0.98)	(-0.85)	(1.41)	(0.67)	(-0.12)	(-0.99)	(-0.84)	(1.41)	(0.66)	(-0.12)
Eponymous	-0.932*	0.543	-0.0411	-0.186	-0.211	-0.930*	0.542	-0.0404	-0.187	-0.210
	(-1.75)	(1.40)	(-0.11)	(-1.30)	(-1.20)	(-1.75)	(1.39)	(-0.11)	(-1.30)	(-1.19)
Log(Age)	0.243	-0.294**	0.0157	-0.0833	-0.0201	0.239	-0.292**	0.0135	-0.0813	-0.0226
	(1.40)	(-2.31)	(0.12)	(-1.35)	(-0.32)	(1.38)	(-2.30)	(0.10)	(-1.33)	(-0.36)
Log(Assets)	-0.617***	0.221***	0.427***	0.0634*	0.213***	-0.603***	0.211***	0.428***	0.0619*	0.216***
	(-6.91)	(3.40)	(6.43)	(1.82)	(4.54)	(-6.77)	(3.28)	(6.45)	(1.78)	(4.59)
Patents ($ Mil)	-0.109	0.157**	-0.0652	-0.0421	-0.0000168	-0.115	0.161**	-0.0654	-0.0418	-0.000734
	(-1.21)	(2.39)	(-1.19)	(-1.52)	(-0.00)	(-1.28)	(2.44)	(-1.20)	(-1.51)	(-0.02)
ROA	0.197	0.192	-0.506***	-0.0759	-0.299*	0.150	0.223*	-0.511***	-0.0709	-0.308**
	(0.90)	(1.48)	(-2.89)	(-1.11)	(-1.95)	(0.68)	(1.70)	(-2.92)	(-1.03)	(-2.00)
Leverage	0.388	0.280	-0.763***	0.0144	-0.884***	0.358	0.299	-0.765***	0.0163	-0.888***
	(1.17)	(1.13)	(-2.90)	(0.13)	(-5.27)	(1.07)	(1.21)	(-2.90)	(0.14)	(-5.27)
Cash	0.366	-0.480	-0.325	-0.157	-0.517**	0.377	-0.488	-0.323	-0.159	-0.514**
	(0.79)	(-1.44)	(-0.91)	(-1.23)	(-2.08)	(0.82)	(-1.47)	(-0.91)	(-1.24)	(-2.07)
R&D	0.0891	0.302	-0.435	-0.110	-0.168	0.0501	0.328	-0.444	-0.102	-0.181
	(0.22)	(1.50)	(-1.34)	(-0.61)	(-0.67)	(0.12)	(1.60)	(-1.36)	(-0.56)	(-0.72)
Cap.Ex.	0.0360	0.630	-0.934	-0.839	0.416	-0.0291	0.672	-0.942	-0.832	0.403
	(0.03)	(0.55)	(-0.85)	(-0.98)	(0.60)	(-0.02)	(0.59)	(-0.86)	(-0.97)	(0.58)
Spin-Off	0.541*	-1.272***	0.627**	-0.0224	0.854***	0.496	-1.242***	0.622**	-0.0181	0.846***
	(1.71)	(-6.80)	(2.22)	(-0.20)	(4.14)	(1.57)	(-6.67)	(2.21)	(-0.16)	(4.13)
Adj. R^2	0.0702	0.0472	0.0570	0.0839	0.0383	0.0730	0.0495	0.0570	0.0839	0.0386
N	4,705	4,705	4,705	4,705	4,705	4,705	4,705	4,705	4,705	4,705

Table A.5: The Determinants of the Wedge between Voting Rights and Economic Rights – Excluding Foreign Firms

This table presents the results of a linear regression model where the dependent variable is the size of the "wedge" between voting and economic rights for various agents within the firm, as expressed in percentage points. The dependent variable is the wedge for public shareholders in columns (1) and (6), founders in columns (2) and (7), non-founder controller (if any) in columns (3) and (8), private equity investors in columns (4) and (9), and a parent or holding company in columns (5) and (10). All specifications include year and two-digit SIC industry fixed effects and exclude foreign firms. All variables are described in the Appendix. All standard errors are robust. The ***, **, and * denote significance at the 1%, 5%, and 10% levels. Columns (1)-(6) use *Industry Dry Powder* as VC investments proxy, while (7)-(12) use *VC Industry Financing.*

	Ind. Private Capital = Ind. Dry Powder					Ind. Private Capital = VC Ind. Financing				
	Public	Founder	NF	PE	Co.	Public	Founder	NF	PE	Co.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Ind. Capital	-0.0256***	0.0170***	0.00106	-0.000783	-0.00106	-0.176***	0.122***	-0.00634	0.00605	-0.0196
	(-3.77)	(3.15)	(0.25)	(-0.40)	(-0.33)	(-4.40)	(4.03)	(-0.34)	(0.82)	(-1.40)
VC-backed	0.537**	-0.0208	-0.596***	-0.127	-0.469***	0.536**	-0.0214	-0.592***	-0.129	-0.466***
	(1.99)	(-0.11)	(-2.94)	(-1.22)	(-3.50)	(1.99)	(-0.11)	(-2.92)	(-1.25)	(-3.48)
Media	-0.620	-0.349	0.765	0.0998	-0.0427	-0.626	-0.345	0.766	0.0990	-0.0424
	(-0.97)	(-0.85)	(1.42)	(0.67)	(-0.12)	(-0.98)	(-0.84)	(1.42)	(0.66)	(-0.12)
Eponymous	-0.891	0.515	-0.0571	-0.183	-0.212	-0.888	0.512	-0.0563	-0.184	-0.211
	(-1.63)	(1.26)	(-0.15)	(-1.28)	(-1.21)	(-1.63)	(1.26)	(-0.15)	(-1.29)	(-1.21)
Log(Age)	0.234	-0.292**	0.0202	-0.0836	-0.0164	0.229	-0.288**	0.0179	-0.0817	-0.0189
	(1.35)	(-2.28)	(0.15)	(-1.36)	(-0.26)	(1.32)	(-2.26)	(0.14)	(-1.33)	(-0.30)
Log(Assets)	-0.635***	0.254***	0.420***	0.0638*	0.212***	-0.620***	0.243***	0.422***	0.0623*	0.215***
	(-6.23)	(3.08)	(6.35)	(1.84)	(4.54)	(-6.11)	(2.97)	(6.37)	(1.81)	(4.59)
Patents ($ Mil)	-0.101	0.145**	-0.0626	-0.0423	0.000591	-0.108	0.150**	-0.0628	-0.0420	-0.000160
	(-1.12)	(2.19)	(-1.15)	(-1.53)	(0.01)	(-1.18)	(2.25)	(-1.15)	(-1.52)	(-0.00)
ROA	0.197	0.188	-0.500***	-0.0763	-0.299*	0.148	0.224	-0.506***	-0.0712	-0.308**
	(0.87)	(1.32)	(-2.87)	(-1.12)	(-1.95)	(0.64)	(1.55)	(-2.89)	(-1.04)	(-2.00)
Leverage	0.254	0.384	-0.738***	0.0108	-0.883***	0.224	0.405	-0.740***	0.0127	-0.887***
	(0.67)	(1.27)	(-2.84)	(0.10)	(-5.32)	(0.59)	(1.34)	(-2.84)	(0.11)	(-5.32)
Cash	0.311	-0.449	-0.317	-0.159	-0.517**	0.325	-0.459	-0.315	-0.160	-0.514**
	(0.66)	(-1.30)	(-0.89)	(-1.24)	(-2.08)	(0.69)	(-1.33)	(-0.88)	(-1.26)	(-2.07)
R&D	0.0579	0.336*	-0.438	-0.110	-0.169	0.0141	0.369*	-0.447	-0.102	-0.182
	(0.14)	(1.65)	(-1.35)	(-0.61)	(-0.68)	(0.03)	(1.78)	(-1.38)	(-0.56)	(-0.73)
Cap.Ex.	0.0360	0.914	-0.955	-0.836	0.405	-0.0277	0.960	-0.963	-0.829	0.393
	(0.03)	(0.77)	(-0.87)	(-0.98)	(0.58)	(-0.02)	(0.81)	(-0.88)	(-0.97)	(0.57)
Spin-Off	0.575*	-1.347***	0.645**	-0.0249	0.850***	0.528*	-1.313***	0.641**	-0.0206	0.842***
	(1.80)	(-6.97)	(2.28)	(-0.22)	(4.12)	(1.66)	(-6.83)	(2.27)	(-0.18)	(4.12)
Adj. R^2	0.0707	0.0501	0.0570	0.0840	0.0383	0.0737	0.0528	0.0570	0.0840	0.0386
N	4,713	4,713	4,713	4,713	4,713	4,713	4,713	4,713	4,713	4,713

B. Instrumental Variable Analysis

The controls for hot public markets discussed above suggest that the measures of venture capital financing are not merely a reflection of broader correlated economic conditions. Nevertheless, we further address the concern that our proxies for the strength of private capital markets are driven by overall economic conditions by employing an instrumental variable analysis. As an instrument for industry VC financing, we construct a measure for supply-shifters in the amount of VC financing at the industry level, using changes to VC investment at the regional level. The rationale for the instrument is that historical shocks to the regional supply of VC investment could increase investment flows to specific industries but are unlikely to be correlated with firms' governance structures at the IPO level. This instrument is in the spirit of shift-share IVs, which have been used in many studies in various fields of economics.

Our instrument (denoted $IV_{j,t}$) is based on local shifts in the amounts of VC financing weighted by the share of a given industry in local activity. Accordingly,

$$IV_{j,t} = \sum_{r=1}^{R} z_{j,r,t-5} g_{r,t} \quad \text{(B.1)}$$

where $z_{j,r,t-5}$ is the industry j share of VC financing provided to companies located in region *r* in period $t-5$, and $g_{r,t}$ is the change in VC financing in region *r* from period $t-5$ to t. To compute $g_{r,t}$, we measure VC financing in region r on a three-year rolling basis. The classification into regions is based on the location of each firm that receives VC financing in the VentureXpert database. We divide the US into nine regions based on the US Census region classification: New England, the Middle Atlantic, the South Atlantic, East South Central, West South Central, East North Central, West North Central, the Mountain region, and West Pacific. We measure financing at the regional level rather than state level (a) to mitigate the potential concerns that the industry shifts are driven predominantly by one state, primarily California, and (b) to account for shocks that affect neighboring states.

The results are depicted in Table B.1. Consistent with the main results, the coefficient on *VC Ind. Financing* is significantly positive in the full sample (columns 1-4). The F-statistic is large in all specifications, and thus the instrument strongly predicts the endogenous variable. We note that the magnitudes in the instrumental variable analysis are very similar to the equivalent coefficients in Table 2 and Table 3.

To further address the concern that the results are driven by shocks to financing in entrepreneurial states, we run the same regressions but omit all firms located in California, Massachusetts, and New York. The results are in columns 5-8. Interestingly, the founder control and wedge results are even stronger than in the specifications that include all IPOs.

Table B.1: The Determinants of the Controller and Wedge – Instrumental Variable

Columns (1)-(2) and (5)-(6) present the results of an instrumental variables analysis where the dependent variable is an indicator that equals one if an IPO has dual-class stock in columns (1) and (5), and a founder-controlled dual-class structure in columns (2) and (6). Columns (3)-(4) and (7)-(8) presents the results of an instrumental variable analysis where the dependent variable is the size of the "wedge" between voting and economic rights for various agents within the firm, as expressed in percentage points. The dependent variable is the wedge for public shareholders in columns (3) and (7), and founders in columns (4) and (8). F-stat (first stage) is the Kleibergen-Paap rk Wald F statistic of the first stage regression of VC Ind. Financing on the excluded instrument and all other variables. All specifications include year and two-digit SIC industry fixed effects. All variables are described in the Appendix. Columns (1)-(4) examine all IPO firms between 1994 to 2019, while (5)-(8) exclude firms headquartered in California, New York, and Massachusetts. All standard errors are robust. The ***, **, and * denote significance at the 1%, 5%, and 10% levels.

	All IPOs				Excl. CA, NY, and MA			
	Controller		*Wedge*		*Controller*		*Wedge*	
	Dual-Class	Founder	Public	Founder	Dual-Class	Founder	Public	Founder
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VC Ind. Financing	0.0101***	0.00815***	-0.231**	0.350***	0.0160***	0.00937*	-0.237	0.586***
	(2.94)	(2.97)	(-2.39)	(3.41)	(2.97)	(1.94)	(-1.58)	(3.01)
VC-Backed	-0.0131	0.00415	0.337	0.220	-0.00848	0.00467	0.435	0.342
	(-1.30)	(0.58)	(1.30)	(0.94)	(-0.68)	(0.51)	(1.39)	(1.05)
Cloud Ind.	0.658***	-0.206	10.65***	-3.471	0.873***	0.0445	6.224***	0.550
	(3.28)	(-1.09)	(2.67)	(-1.08)	(11.68)	(0.98)	(4.45)	(0.46)
Foreign	0.0808***	0.0771***	-0.974***	2.814***	0.0623***	0.0624***	-0.813**	1.887***
	(5.42)	(6.25)	(-2.60)	(6.50)	(4.08)	(5.24)	(-2.16)	(4.84)
Media	0.0398	0.00273	-0.565	-0.267	0.0478	0.0000351	-0.411	-0.631
	(1.49)	(0.19)	(-0.92)	(-0.64)	(1.22)	(0.00)	(-0.42)	(-1.10)
Eponymous	0.0310*	0.0349***	-1.060**	0.769*	0.0390*	0.0318**	-1.164*	0.932
	(1.80)	(2.80)	(-2.11)	(1.82)	(1.77)	(2.02)	(-1.79)	(1.51)
Log(Age)	-0.00878	-0.0111***	0.371**	-0.438***	-0.00958	-0.0126***	0.240	-0.484***
	(-1.56)	(-3.23)	(2.32)	(-3.39)	(-1.38)	(-3.03)	(1.21)	(-2.82)
Log(Assets)	0.0404***	0.00978***	-0.618***	0.238***	0.0396***	0.00906***	-0.536***	0.194*
	(11.14)	(4.18)	(-7.30)	(3.13)	(9.14)	(3.16)	(-5.56)	(1.96)
Patents ($Mil)	0.00441	0.00548**	-0.122	0.211***	-0.000127	0.00383	-0.0433	0.204**
	(1.30)	(2.33)	(-1.42)	(3.12)	(-0.03)	(1.29)	(-0.42)	(2.05)

(continued)

Table B.1: The Determinants of the Controller and Wedge – Instrumental Variable (continued)

	All IPOs				Excl. CA, NY, and MA			
	Controller		*Wedge*		*Controller*		*Wedge*	
	Dual-Class	Founder	Public	Founder	Dual-Class	Founder	Public	Founder
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ROA	-0.0174*	0.00828	0.179	0.239	-0.00102	0.0114	-0.0883	0.332
	(-1.85)	(1.57)	(0.79)	(1.48)	(-0.10)	(1.56)	(-0.37)	(1.27)
Leverage	-0.0457***	-0.00764	0.501	0.184	-0.0607***	-0.0118	0.553	0.0672
	(-3.89)	(-0.99)	(1.59)	(0.72)	(-4.24)	(-1.27)	(1.37)	(0.20)
Cash	0.00558	0.0115	0.228	-0.351	0.0337	0.0337*	-0.164	-0.0513
	(0.30)	(0.87)	(0.50)	(-0.76)	(1.29)	(1.67)	(-0.26)	(-0.07)
R&D	0.00779	0.00912	0.206	0.224	0.0299	0.00646	-0.115	0.364
	(0.46)	(1.06)	(0.50)	(0.84)	(1.51)	(0.49)	(-0.26)	(0.79)
Cap.Ex.	0.0508	0.0506	1.146	-0.249	0.0515	0.0710	1.429	0.171
	(1.07)	(1.45)	(0.87)	(-0.22)	(0.88)	(1.50)	(0.93)	(0.11)
Spin-Off	0.00475	-0.0501***	0.481	-1.467***	0.00821	-0.0525***	0.579	-1.576***
	(0.38)	(-7.73)	(1.64)	(-7.41)	(0.51)	(-5.97)	(1.54)	(-5.54)
F-stat (first stage)	129.2	129.2	129.2	129.2	61.45	61.45	61.45	61.45
Adj. R^2	0.132	0.126	0.0898	0.111	0.149	0.148	0.0978	0.137
N	5,384	5,384	5,384	5,384	3,357	3,357	3,357	3,357

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