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Abstract

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The past decade saw the rise of both "founder-friendly" venture financings and non-traditional investors, frequently with liquidity constraints. Using detailed contract data, we study open-end mutual funds investing in private venture-backed firms. We posit an interaction between the classic agency problem between entrepreneurs and investors and the one between early-stage venture investors and liquidity-constrained later-stage ones. We find that mutual funds with more stable funding are more likely to invest in private firms, and that financing rounds with mutual fund participation have stronger redemption and IPO-related rights and less board representation, findings consistent with our conceptual framework.

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1 Introduction

A central focus of financial economists studying venture capitalists has been on these investors' governance of portfolio firms. Academics have interpreted staged financing (Gompers, 1995; Neher, 1999), securities that have state-contingent cash flow and control rights (Hellmann, 1998; Cornelli and Yosha, 2003; Kaplan and Stromberg, 2003, 2004), and active board involvement (Lerner, 1995; Bernstein, Giroud, and Townsend, 2016; Gompers et al., 2020) as necessary responses to the information asymmetries and moral hazard that characterize new ventures (Jensen, 1993). The rise of "founder-friendly" financings in the past decade, with the attendant de-emphasis on governance, thus raises important questions about this financing model and optimal corporate governance more generally. Underscoring these academic concerns are the real-world debacles at WeWork and Theranos, where management incompetence or malfeasance went unchecked by boards for extended periods.

A second major change over the past decade has been the emergence of less traditional financiers of venture capital (VC)-backed firms. Firms in venture portfolios are staying private longer, raising much more capital while private, and relying increasingly on institutions other than venture capitalists for such financing. For instance, Ewens and Farre-Mensa (2019) estimate that over three-quarters of the equity raised in recent years by seasoned venture-backed firms that are still privately held has been from organizations such as hedge funds, pensions, mutual funds, and other non-VC investors. Many of these investors care far more intensely about liquidity than VC funds, which typically have secure capital commitments for ten-to-twelve-year periods. For instance, hedge funds are typically subject to quarterly redemption requests; SoftBank—a huge new hybrid investor—raised nearly half of the capital in its first fund in the form of interest-bearing debt, and mutual funds are subject to potentially large daily redemptions.

This paper argues that these two patterns are related. The new investors' concerns about liquidity can create a wedge between their incentives and those of earlier-stage venture investors. We argue that this wedge can affect the governance of entrepreneurial firms. The increasingly important agency problems *between later- and earlier-stage investors* have implications for the contracts that address the classic agency problem *between entrepreneurs and investors*.

We focus on the class of investors with the tightest liquidity constraints: mutual funds. Mutual funds face liquidity constraints on both sides of the balance sheet, leading to differences between their investment incentives and those of venture investors. Because mutual fund skills center on trading securities (Jensen, 1968), it is most efficient for them to trade in relatively liquid asset markets with low transaction costs, notably, public markets. The open-end nature of mutual funds further requires them to carefully manage liquidity to meet daily redemptions (Chen, Goldstein, and Jiang, 2010; Goldstein, Jiang, and Ng, 2017; Chernenko and Sunderam, 2017). Funds may even be vulnerable to "runs" if investors become concerned about the nature or valuation of their illiquid holdings (Zeng, 2017). Beyond the economic significance of their liquidity constraints, mutual funds are also required to disclose publicly their portfolio holdings, which enables our empirical analysis. This transparency is in contrast to many other new investors, such as hedge funds, whose investments are consistent with our framework but whose detailed portfolio data is exceedingly difficult to access.

With mutual funds' liquidity concerns in mind, we provide a conceptual framework in Section 3, highlighting the new agency problem between later- and earlier-stage investors. First, we hypothesize that mutual funds will be more likely to invest in later rounds, which helps with asset-side liquidity due to the proximity to a potential initial public offering (IPO) event. Funds with less volatile flows, that is, those who enjoy greater funding stability should be more likely

to invest. The framework then predicts that these liquidity concerns push mutual funds to request contractual provisions centered on redemption and IPO-related rights,[1] with less emphasis on the monitoring rights valued by venture capitalists. The framework finally predicts that, in exchange for these rights centered on liquidity, mutual funds may rationally underweight other cash flow and control rights that are commonly seen in contracts between entrepreneurs and VC investors. Jointly, these predictions suggest that the agency problem between later- and earlier-stage investors may weaken direct governance typically provided through more standard cash-flow and control rights, but may potentially introduce indirect governance through relatively stronger redemption rights and IPO-related rights.

We bring this conceptual framework to the data in Section 4, focusing on mutual fund investments in a sample of "unicorn" and "near unicorn" startups, that is, private venture-backed firms with a valuation of at least $500 million at some point. (We call both sets of firms "unicorns" for brevity.) We use novel contract-level data from the certificates of incorporation (COIs) to examine the contractual terms between entrepreneurial firms and their investors, including mutual funds. We show that the structure of contracts in investment rounds involving mutual funds is indeed consistent with the interaction of the two agency problems highlighted above. Thus, our paper contributes to the entrepreneurial finance literature pioneered by Kaplan and Stromberg (2003), who document that the structure of contracts between venture funds and their portfolio firms is consistent with the presence of agency problems between venture capitalists and entrepreneurs.

Guided by the conceptual framework, we first analyze which mutual funds are more likely to invest in which firms. Consistent with the anecdotal evidence and our conceptual framework, our findings reveal a significant upward trend in mutual fund investment in unicorns

[1] We discuss the various contractual provisions in Section 2.3.

in their later financing rounds. Compared to venture investors, mutual funds are more likely to invest in late rounds, hot sectors, and larger firms. We also find that larger mutual funds and those with less volatile fund flows are more likely to invest in unicorns, consistent with liquidity concerns.

Turning to the focus of the paper, the analysis of contractual provisions, we relate the provisions in a given investment round to measures of mutual fund participation in the round. In the main text, we use a dummy variable for mutual fund participation; in the Appendix, we report robustness results using a continuous measure of the share of the round's funding that is provided by mutual funds. The former measure provides a straightforward look into how mutual fund involvement is associated with the contractual provisions of a round, while the latter measure may more accurately reflect the economic importance of mutual funds in shaping the contractual provisions of a given round. Both measures deliver similar results.

On the one hand, we find that rounds with mutual fund participation, which we refer to as mutual fund rounds, are associated with stronger investor rights across two dimensions centered on liquidity provision to investors.

The first dimension is provisions that give investors the right to ask the firm to redeem their stake. While redemption rights are relatively under-explored in the VC literature, perhaps because they are less related to the classic agency problem between entrepreneurs and investors, they are among the most powerful weapons for investors. (We summarize in Appendix B several legal cases and structured interviews with investors regarding these rights.) These provisions help ease mutual funds' liquidity concerns and render the underlying private securities relatively more liquid even before an IPO. One unique aspect of our empirical analysis is that we look not only at whether investors have redemption rights but also at the strength of these rights.

We show that conditional on a round having redemption rights, rounds with mutual fund participation are associated with stronger redemption rights.

The second dimension is IPO-related rights. Following Gornall and Strebulaev (2018), we focus on two major IPO-related rights: IPO ratchets that promise investors a certain return in an IPO, and veto rights on IPOs with lower valuations that the current financing round (which we refer to as down-IPOs). Our evidence suggests that mutual fund rounds are more likely to have one or both of these IPO-related rights. These IPO-related rights are again less explored in the existing VC literature because they are less related to the agency problem between entrepreneurs and investors.

On the other hand, we find that mutual fund rounds are associated with fewer direct control rights. Controlling for round number, rounds with mutual fund participation are significantly less likely to include representation on the board of directors. Mutual funds and other non-traditional investors are thus less likely to monitor portfolio firms through board representation or voting on important corporate actions. Less representation on the board of directors is also consistent with mutual funds prioritizing liquidity since board representation can make the underlying securities even less liquid due to insider trading and adverse selection concerns. A similar (though statistically weaker) finding is that mutual fund rounds are associated with fewer standard cash flow rights. Both results are consistent with our hypothesis that mutual and venture funds prioritize different contractual provisions.

Overall, our results reflect the interaction between the agency problem between earlier- and later-stage investors (i.e., venture and mutual funds in our context) and the classic agency problem between entrepreneurs and investors. Efforts to address the former new agency problem are likely to result in deviations from the classic contract designs meant to address the agency

problem between entrepreneurs and venture capitalists. Thus, the divergence in priorities between venture and non-venture investors is likely to have governance implications for today's entrepreneurial firms.

Although our specifications with a round's mutual fund share suggest that mutual funds play an active role in negotiating or selecting certain contractual provisions, our data do not allow us to fully identify the causal effect of mutual fund participation on contractual provisions. In other words, the following two interpretations of our results are not completely distinguishable: 1) contractual provisions are a direct outcome of negotiations between mutual funds and private firms, or alternatively, 2) mutual funds choose to invest in firm-rounds with certain contractual provisions that these investors find appealing, and to invest more when such provisions are stronger. The economic magnitude of our results falls when we include firm fixed effects, suggesting that the selection effect plays a role but does not explain the full picture. However, both interpretations are consistent with mutual funds preferring or requesting certain ex-ante contractual provisions consistent with the wedge between the two agency problems. Furthermore, our theoretical framework suggests that anticipation of the need to attract non-traditional investors, including mutual funds, in later rounds may affect the terms negotiated in earlier rounds. To help further rule out that mutual funds are naively following venture capitalists or are investing in rounds that may not need strong governance, we also conduct a matching analysis between rounds with and without mutual fund participation (Section 4.5). We include additional controls, such as the number of existing class directors representing existing preferred shareholders (Table A2 in the Appendix).

By focusing on the corporate governance implications of mutual fund investments and highlighting the interactions between the agency problems between earlier- and later-stage

investors and between entrepreneurs and investors, our paper contributes to the literature on contracting in entrepreneurial finance (e.g., Kaplan and Stromberg, 2003).[2] The most closely related papers in the literature are the contemporaneous research by Gornall and Strebulaev (2018) and Kwon, Lowry, and Qian (2018), which have different focuses. Gornall and Strebulaev (2018) use an asset-pricing model to show that the reported post-money valuations significantly overstate the actual value of most unicorns, once one accounts for differences in the cash flow and other rights across different series of preferred and common stock. Kwon, Lowry, and Qian (2018) examine the trend of mutual fund investments in private firms using a larger sample of private firms going back to 1990 but a smaller sample of mutual funds. They find that mutual fund investments enable firms to stay private one-to-two years longer.

Similar to our focus on detailed contractual provisions, Bengtsson and Sensoy (2011) used coded contractual data from VC Experts to explore the relationship between the experience of venture capitalists and the contractual terms that they use. Among the relatively few papers to focus on agency problems between early and late VC investors are those who focus on syndication of these transactions (e.g., Admati and Pfleiderer, 1994; Lerner, 1994).

To keep our paper focused, we leave a number of questions for future research. These include how non-VC investors may affect the long-run performance of the private firms and whether mutual funds are a substitute for or a complement to venture capitalists. More generally, there are interesting open questions as to the optimal matching between different types of investors and firms. In addition, the sample size of unicorns is still relatively small at the time of

[2] We focus on mutual fund investments in entrepreneurial private firms, a recent phenomenon under-explored in the literature. For public firms, institutional investors have been documented to provide effective corporate governance through activism and other means (see Brav, Jiang, and Kim, 2010 and Edmans and Holderness, 2016 for reviews). The effects are present over time and across the world (McCahery, Sautner, and Starks, 2016). The concentration of holdings and institutional investors' portfolio shares, which are often associated with large-block purchases in firms, are important factors determining the provision of monitoring (Chen, Harford, and Li, 2007; Fich, Harford and Tran, 2015). Recent studies show that even index mutual funds, which might be seen as the most passive of investors, provide significant corporate governance to public firms (Appel, Gormley, and Keim, 2016).

this study: unicorns are, by definition, relatively large private firms. We hope to extend this research as more unicorns emerge and exit (potentially via IPOs) in the future.

2 Data and institutional background

One of the major challenges in studying investments in entrepreneurial private firms has been the absence of large, comprehensive datasets that include all investors (particularly those other than venture capitalists), governance provisions, and financial performance (see Kaplan and Lerner, 2017, for a discussion). We combine novel data on the corporate governance provisions in the funding rounds of private firms with information on the mutual fund holdings in these firms. Our data on investment rounds and the associated corporate governance provisions come from the certificates of incorporation (COIs), which are amended and filed every time a firm raises a new round of financing. Our data on mutual fund holdings of private firms come from the CRSP Mutual Fund database and SEC forms N-CSR(S) and N-Q.

2.1 Identifying the sample of unicorns and investment rounds

2.1.1 Unicorns and "near-unicorns"

We start with the sample of U.S.-based private venture-backed firms that at some point between January 2012 and December 2016 had at least one investment round with a nominal valuation of at least one billion U.S. dollars, that is, the so-called "unicorns." Data on these high-profile firms is much more comprehensive: in particular, our main data source, VC Experts, has made a concerted effort to gather these firms' regulatory filings, including the COIs that we use to identify corporate governance provisions.

We first identify unicorns based on the "WSJ Billion Dollar Startup Club" database compiled by Dow Jones.[3] Since its inception in January 2012, the database includes private firms that have raised VC financing and achieved a nominal valuation of over one billion U.S. dollars. It also includes firms that exited unicorn status during the time period, whether by acquisition, going public, or by being refinanced at a lower nominal valuation. The database excludes firms that achieved a billion-dollar valuation in an IPO or acquisition. There are 106 unicorns with financing round data and associated COIs in VC Experts.

An important caveat to using a single valuation cutoff is that, as documented by Metrick and Yasuda (2011) and Gornall and Strebulaev (2018), inferring accurate valuations of private venture-backed firms can be challenging. In particular, Dow Jones and most other practitioners would classify a firm as a unicorn if an investor paid $100 million to purchase a block of preferred shares convertible into common stock that would represent 10% of the firm on a fully converted basis (that is, if all other preferred shareholders converted their holdings as well). However, these preferred shares may have rights (e.g., mandated dividends and liquidation preferences) that allow them to receive, for example, 40% of the firm's expected cash flows. In this case, the "true" implied valuation may be $250 million. For these reasons, we use the post-money valuations estimated by VC Experts as a control only and interpret valuation results with caution.

In addition, in light of such complexities and potential disagreements about unicorn valuations, we expand the unicorn sample to include U.S.-based private venture-backed firms that at some point during the 2012-2016 period had at least one investment round with a nominal post-money valuation of at least $500 million. This increases our sample size by 50 firms to 156

[3] The data are available at http://graphics.wsj.com/billion-dollar-club/. The database is maintained by the same team of analysts as the one that compiles Dow Jones's VentureSource (formerly VentureOne) database, which has been extensively used in academic research (Kaplan and Lerner, 2017).

private firms. Although our main results are robust to whether we include these "near-unicorn" firms, including them helps increase the sample size and thus the statistical power of our analysis. For simplicity, we refer to all firms in our sample as "unicorns."

We obtain firm-level characteristics, such as geographic and industry information, from Capital IQ and VC Experts.

2.1.2 Investment rounds

We gather investment-round-level information from the COIs available through VC Experts for our sample firms going back to 2010. COIs are public documents filed by a firm with the Secretary of State of the state in which the firm is incorporated. In states such as California, Delaware, and many others, all firms are required to restate and file their COI when there are any changes in the authorized number of equity shares outstanding, including preferred shares issued to institutional investors such as venture and mutual funds. In particular, there are separate COIs filed for each investment round of private firms, as long as the given round leads to an increase in the total authorized number of equity shares. As a result, our analysis is unlikely to be subject to reporting biases.

Each COI sets forth the rights, preferences, and restrictions of each class and series of common and preferred shares. All investors in a given round typically share the same COI.[4] COIs thus allow us to document and analyze the contractual terms between the unicorns and their investors in the different investment rounds. For the same reason, we compare mutual and venture funds across financing rounds, not within a single round. We discuss the definition of each of these contractual terms and the coding procedure in Section 2.4.

[4] In rare cases, certain investors may enjoy different rights from other investors even within a single round. For example, as documented in Pinterest's COI filed on March 16, 2015, Ben Silbermann, the firm's President and a key investor, is entitled to three votes in his capacity as a member of the Board of Directors (the "Special Director Vote"), but such right is not applicable to matters relating to his compensation. However, such cases are generally rare and difficult to code systematically.

For each investment round, the COIs also document the number of authorized shares of common and convertible preferred shares, as well as their conversion price. Although the conversion price allows us to infer the direction of changes in valuations, we are generally not able to estimate valuations from the COIs directly. The number of shares actually outstanding is often ambiguous (often not all authorized shares are issued), and some of the variables we would need to do a "true" valuation along the lines of Metrick and Yasuda (2011) are missing. For this reason, we use the valuations estimated by VC Experts when available and as a control only, interpreting the results with caution.[5]

Overall, our sample consists of 742 financing rounds for which we were able to get COIs from VC Experts as of December 2016.[6] Note that, although our sample selection criterion for firms is whether the firm had an investment round with a nominal valuation of at least $500 million during the 2012 to 2016 period, our sample of financing rounds covers the 2010 to 2016 period to better uncover the time trend of mutual fund investments in unicorns.

Finally, we note that it is generally challenging to get operating and financial data for private firms. We were able to estimate monthly employment numbers using the information on employee profiles on LinkedIn. While a noisy proxy for the actual number of employees, we validate this measure by showing that it is strongly correlated with the number of participants in the firm's employee benefit plans as reported on Form 5500.[7]

[5] VC Experts uses its own proprietary model to estimate the valuations of some investment rounds.
[6] Although the COIs are publicly accessible in principle, they are very difficult and costly to get otherwise. For example, in Delaware, the Department of State's Division of Records, maintains COI filings. However, the COIs are neither downloadable nor searchable. According to their staff, all requests for copies must be made in person, using the computers in their office to look up companies.
[7] The Form 5500, Annual Return/Report of Employee Benefit Plan, is the publicly available form used to file an employee benefit plan's annual information return with the U.S. Department of Labor.

2.2 Mutual funds and their investments in unicorns

In recent years, open-end mutual funds have been increasingly investing in the convertible preferred securities issued by private firms, both indirectly through secondary markets and by directly participating in funding rounds. In a mutual fund-involved investment round, mutual funds may either join a syndicate under a lead venture firm or negotiate directly with the firm. Mutual funds may even lead an investment round, as when Fidelity led the D round of Uber (see Table 1).

Our sample of mutual funds consists of all actively managed U.S. domestic equity funds. We obtain fund characteristics such as size, family size, institutional share, management fees, and fund flow volatility from the CRSP Mutual Fund Database. Definitions of all explanatory variables are in Appendix Table A1. Table 2 reports summary statistics for the mutual funds.

[Table 2 about here]

We identify mutual funds' quarterly portfolio holdings and their direct investments in unicorns. Since preferred stocks of private firms do not have CUSIPs, we first obtain quarterly portfolio holdings of unicorns from the CRSP Mutual Fund Holdings database by searching for the names of the unicorns in our data. One challenge is that firms may use different trading names in different investment rounds, and these trading names may be different from the registered names in the COIs. We hand-collect all trading and alternative names for our sample unicorns (from their company websites and press releases) and use these alternative names to identify transactions involving each firm in our sample.[8]

In the Online Appendix Table OA1, we confirm that CRSP offers comprehensive coverage of unicorn holdings by comparing aggregate mutual fund holdings of each unicorn with

[8] Section 1of the Online Appendix reports the SAS code used to extract holdings of unicorns from the CRSP Mutual Fund Holdings database. We examine the output to eliminate any false positives.

the information reported in the 2016 Morningstar report on mutual fund investment in private firms.

It is even more challenging to distinguish between direct investments and secondary market transactions. To identify mutual fund direct investments in unicorns round by round, we further use SEC forms N-CSR and N-Q and apply the following two-step process.

First, we identify cases where (a) the security name in the CRSP Mutual Fund Holdings database indicates the series of preferred stock and (b) a fund initiates a position in the specific series within a 60-day window of the corresponding round's closing date. In principle, it is impossible to distinguish fully between direct investments and secondary market transactions. The process described above may inevitably include some secondary market transactions of the corresponding series of preferred stock. However, given the proximity to the closing date, we consider such secondary market transactions comparable to direct investments. The choice of the 60-day window was motivated by the occasional disagreements between the closing dates reported in VC Experts and in other databases such as Crunchbase.

In many cases, however, the title of the security in the CRSP Mutual Fund Holdings database does not state the series of preferred stock. Therefore, in the second step, we identify cases where at least one mutual fund increased its holdings of a unicorn within a 60-day window of a round's closing date. We then use N-CSR and N-Q filings to confirm whether the fund did invest in the series of preferred stock in question.

Once we confirm that at least one fund bought the preferred stock within a 60-day window of the round's closing date, we set the *MFs* dummy to one, indicating that this round is a *mutual fund round*.[9] In our sample of 156 firms, 56 firms have at least one financing round with

[9] We do not include investments that are done through private equity funds, even if they are owned by mutual funds, such as Wellington Management's Hadley Harbor fund, which closed on around $1 billion in 2014.

mutual fund participation. Table 3 reports summary statistics for financing rounds with and without mutual fund participation. For each mutual fund round, we also calculate the share of the round's funding that is provided by mutual funds, which we refer to as the round's *mutual fund share (MF share)*.

[Table 3 about here]

2.3 Contractual provisions

Following Kaplan and Stromberg (2003), we focus on the major contractual provisions set forth in the COIs. These provisions specify the ex-ante allocation of cash flow and control rights between firms and their investors. We describe these provisions, their governance and incentive implications, and our coding procedure in detail below. Table 4 reports summary statistics on these contractual provisions.

[Table 4 about here]

2.3.1 Standard cash-flow rights

Liquidation rights. Liquidation rights determine how the proceeds are shared among different groups of investors in a deemed liquidation event, which is usually defined as a sale of the firm or of the majority of the firm's assets. We consider three dimensions of liquidation rights.

First, *senior liquidation preference* specifies whether in a liquidation event, a given class or family of classes of convertible preferred stocks is senior (senior liquidation preference = 1), or *pari passu* or junior (senior liquidation preference = 0) to the other classes. Note that senior liquidation preference is not defined for the firm's first round (seed or series A).

Second, *liquidation multiple* specifies how many times the original purchase price (plus any declared but unpaid dividends) the investor will be entitled to receive in preference to other

shareholders. These provisions are likely to be important in cases where the investment is moderately successful. In large exits, the optimal strategy is to convert the preferred stock into common stock, in which case the liquidation multiple will be irrelevant. Conversely, if the firm goes bankrupt or is sold for a small amount, this contractually stipulated amount is unlikely to be received. To help with the interpretation, we code whether the liquidation multiple is greater than one as a dummy variable, that is, *liquidation multiple > 1*.

The third dimension of liquidation rights is *participation rights*. There are three possible types of participation rights associated with preferred shares. Participating provisions allow holders of convertible preferred stock to "double dip": if a liquidation event is triggered, investors receive the stipulated amount—the liquidation multiple times the original purchase price—back first and can then convert the convertible preferred stock into common stock and share in the remaining upside. We divide agreements into those with no participation or capped participation (participation rights = 0)[10] and with full participation (participation rights = 1). Intuitively, participation rights allow investors to receive both upside and downside protection. Overall, more senior liquidation preferences, higher liquidation multiples, and stronger participation rights are suggestive of stronger investor cash flow rights.

Cumulative dividends. Dividends provide a time-based guaranteed upside to investors. We consider whether dividends are cumulative. Cumulative dividends (cumulative dividends = 1) are guaranteed; they accumulate over time and effectively increase the investors' return in the event of a liquidation. In contrast, if dividends are not cumulative (cumulative dividends = 0), dividends are paid only if declared at the discretion of the firm's board of directors and thus are not guaranteed ex-ante. Overall, cumulative dividends are suggestive of stronger cash flow rights.

[10] Capped participation means that the holders of a convertible preferred stock receive the liquidation multiple times the original purchase price back first and then share ratably with the holders of common stock up to a total liquidation amount per share equal to some multiple of the original purchase price.

Full ratchet anti-dilution protections. Anti-dilution protections aim to protect the preferred investors in the event a firm issues new equity at a lower valuation than in the previous financing rounds. Anti-dilution protections can be full ratchet (full ratchet anti-dilution protections = 1; the conversion price of the existing convertible preferred shares is adjusted downwards to the price at which the new shares are issued, regardless of the number of new shares issued), or weighted average (conversion price of the existing convertible preferred shares is adjusted downwards according to a weighted average of the original and new financing sizes) or absent entirely (full ratchet anti-dilution provisions = 0 in both cases). The use of anti-dilution protection, and in particular full ratchet anti-dilution protection, is suggestive of stronger investor cash flow rights.

2.3.2 Redemption rights

We classify redemption rights and the detailed underlying provisions as a separate category of contractual provisions. We argue in the conceptual framework in Section 3 that redemption rights are a dimension that mutual funds may care about more than venture capitalists do.

Redemption rights. Redemption rights specify whether a class or series of convertible preferred stocks is redeemable (redemption rights = 1) at its holders' discretion. We call this the *extensive margin* of redemption rights. In the event of redemption, a multiple of the original purchase price or the estimated fair market value of the corresponding convertible preferred stock is paid back to the redeeming investor, provided the firm has enough funds available.[11]

[11] Whether investors receive some multiple of the original purchase price or the estimated fair market value is specified ex-ante in the COI. Because it is impossible to know the market value ex-ante, we did not code cases where the redemption is at fair market value as instances of redemption rights being present.

To our knowledge, there does not exist any data documenting how frequently redemption rights are exercised, or how much the redeeming preferred shareholders actually get in the event of a redemption. However, we present suggestive evidence that redemption rights are indeed important to investors. In Appendix B, we first describe three recent legal cases in which redemption rights were exercised, followed by a discussion of the recent effort by the National Venture Capital Association to change the Model Form Certificate of Incorporation to strengthen redemption rights. We then present the results of structured interviews with leading VC lawyers, which show that shareholders value redemption rights because they 1) are one of the strongest forms of downside protection, 2) provide strong incentives for the underlying firm to go public, and 3) help with liquidity management.

Moreover, thanks to the rich structure of COIs, we are able to document and code several more granular dimensions of redemption rights. We call these the *intensive margin* of redemption rights. These dimensions help us better illustrate to what extent redemption rights may be important to investors.

In what follows, we highlight the institutional details regarding redemption rights, as well as their economic implications. We stress that although these different dimensions may suggest relatively stronger or weaker redemption rights, the more important question is whether an investment round has redemption rights at all.

Months until first redemption. When a preferred stock is redeemable, investors can ask for redemption only after a certain date. We count the number of months from the round closing until the expiration of the "lock-in" period. A shorter lock-in period indicates stronger redemption rights.

Delay after redemption notice. The delay after redemption notice is the maximum number of days from the time investors submit a redemption notice, referred to as the notice or receipt date, to the time of the first redemption payment, referred to as the redemption date. In some cases, the COIs indicate that a delay is possible but do not specify the maximum number of days allowed. In such cases, we use two specifications: one treats these cases as missing values, while the other sets these missing values to 365, which is the longest delay observed in our data.

Voting requirements. In some cases, a redemption notice from any shareholder is sufficient for redemption to take place (No vote necessary = 1), while in other cases a vote by other shareholders is required (No vote necessary = 0). If voting is required, it may take place at either the specific class level (Class vote = 1) or the entire preferred stock level (Class vote = 0). In either case, the firm will send a vote notice to other shareholders in the relevant pool.[12] From the perspective of investors who want to redeem, no voting indicates strongest redemption rights, while class voting is preferable to voting by all preferred shares.

Number of annual installments. Firms may delay redeeming shares by spreading out redemption payments over time. We count the maximum number of annual installments allowed by the COI. If immediate payment is required, the number of annual installments is set to zero.

Stronger redemption rights, along both the extensive and intensive margins, imply that investors enjoy a higher level of asset liquidity. Stronger investor liquidity rights also imply stronger indirect corporate governance, given that these provisions can affect the bargaining between investors and entrepreneurs.

2.3.3 IPO-related rights

[12] Technically, all the shares in the required voting pool will be redeemed by default, but shareholders who do not initiate the redemption request may choose to be excluded from redemptions. No matter whether they choose to be included or excluded from redemptions, they may choose to vote.

Following Gornall and Strebulaev (2018), we consider two important IPO-related rights. These IPO-related rights are likely to be particularly salient for mutual funds that target IPO candidate firms for investments.

IPO ratchets. IPO ratchets (IPO ratchets = 1) promise investors a pre-negotiated minimum return in an IPO, frequently expressed as a multiple of the price per share in the financing. If the IPO price is below the product of the original purchase price and the multiple, investors receive extra shares to ensure they obtain the pre-negotiated return on their investment. Economically, IPO ratchets are analogous to anti-dilution rights, where investors are effectively given extra shares (by lowering the conversion price) in the event of a future "down round" (i.e., one with a lower nominal valuation than the financing).

Down-IPO veto rights. Typically, the automatic conversion provisions force all holders of preferred stock to convert their shares into common stock in an IPO event. Down-IPO veto rights exempt certain series of preferred stock from automatic conversion: investors can keep their preferred stock unconverted and thus senior to common stock. Thus, having down-IPO veto rights helps protect the investors from a potentially sudden markdown of the underlying securities.

Generally, these IPO-related rights give investors more protection in low-valuation IPOs and are suggestive of stronger investor rights and governance provisions.

2.3.4 Control rights

Voting rights to elect directors. Investors in a class of preferred shares may have the right to elect a certain number of directors, who represent that particular class or series. To capture such control rights, we consider the number of directors that holders of a class or series of convertible preferred stocks are able to elect as a separate voting class. We call such directors

class directors and code the stipulated number. More and stronger voting rights to elect class directors are suggestive of stronger corporate governance provisions.

Protective provisions. Protective provisions are analogous to veto rights: they give the investors of a class or series of convertible preferred stock the right to veto certain actions by the firm or other equity holders. There are many more possible types of protective provisions than one can reasonably code, and it is generally difficult to weigh their relative importance.[13] As a result, we simply count the number of protective provisions for any given class or series of convertible preferred stocks. A larger number of protective provisions is generally suggestive of stronger corporate governance provisions.

Note that we code all the provisions for each unicorn-round at the time of the financing. In other words, we focus on the ex-ante contractual and incentive provisions at the time the investors and the firm negotiate the investment round. Provisions associated with a specific class or series of convertible preferred stocks may be revised in subsequent investment rounds (see Broughman and Fried, 2010). However, such revisions would be a much less clear indicator of the strength of ex-ante corporate governance provisions by the specific class of investors.

3 Conceptual framework

To unify our analysis, we follow the spirit of Kaplan and Stromberg (2003) and provide a conceptual framework to understand better mutual funds' concerns when investing in private firms. We argue that mutual funds' distinctive concerns about liquidity push them to prioritize certain contractual provisions and create a potential agency conflict between them (and perhaps

[13] A non-exclusive list of corporate actions that are subject to protective provisions include: 1) to liquidate, dissolve, or wind-up the corporation to effect any merger or consolidation, 2) to amend, alter, or repeal any provision of the COI or bylaws of the corporation in a manner that adversely affects the powers, preferences, or rights of the given series, 3) to create any additional class or series of capital stock, 4) to reclassify or alter any existing security of the corporation that is *pari passu* with the given series, and 5) to increase or decrease the authorized number of directors.

other nontraditional investors) on one hand and venture capitalists on the other hand.[14] We posit that the agency conflict between these late- and early-stage investors, which has intensified in recent years and been under-explored in the literature,[15] is likely to affect optimal contract design in addressing the classic agency problem between entrepreneurs and investors.

We start by describing the regulatory environment in which mutual funds operate. We then highlight three defining features of mutual funds that lead to their distinctive concerns about liquidity. We use these features to develop our conceptual framework.

Open-end mutual funds are regulated under the Investment Company Act of 1940. The act imposes registration and disclosure requirements, regulates transactions with affiliates, and limits funds' leverage. Most importantly, the Act requires funds to calculate daily net asset value (NAV) at which investors can redeem their shares and to settle such redemption requests within seven business days. In addition, open-end funds traded through a broker-dealer must be settled within three business days (Rule 15c6-1 under the Securities Exchange Act of 1933). In practice, open-end mutual funds settle redemption request within one business day. To help address the potential liquidity mismatch between the fund's assets and liabilities, the Act limits funds' investments in illiquid assets to 15% of the fund's net assets. The Act, however, leaves it up to the fund's board of directors to determine which assets are considered illiquid.

In October 2016, the SEC adopted new rules that are meant to further strengthen funds' liquidity management.[16] Rule 22e-4 requires funds to establish a formal liquidity risk

[14] Note that we do not attempt to answer the question as to why mutual funds invest in private firms at all. We instead develop our hypotheses based on the observed fact that mutual funds do invest in private firms. Given that both venture and mutual funds invest in private firms, we explore the differences in their investments.

[15] One notable exception is Admati and Pfleiderer (1994) who theoretically consider a multi-stage financing setting between venture investors and an entrepreneur. They show that initial venture capitalists as insiders have no conflict in revealing information truthfully and setting valuations fairly only if their percentage ownership remains constant before and after the new financing. They do not consider the impact of different types of investors.

[16] U.S. Securities and Exchange Commission, "Investment Company Liquidity Risk Management Programs," January 17, 2017, https://www.sec.gov/rules/final/2016/33-10233.pdf,

management program. The new rules also introduce Form N-PORT that requires funds to classify securities into four classes—highly liquid, moderately liquid, less liquid, and illiquid—and to report these classifications on a confidential basis to the SEC monthly.

We now summarize the three defining features of mutual funds that can create a wedge between their incentives and those of earlier investors in venture-backed private firms. The first of these follows from the above discussion:

Feature 1. Due to their open-end structure, mutual funds are subject to daily flows.

Daily flows, outflows in particular, may negatively influence performance, by forcing funds to deviate from their ideal portfolio holdings or even liquidate assets at fire-sale prices (Chordia, 1996; Edelen, 1999; Coval and Stafford, 2007). Thus, mutual funds must carefully manage their liquidity and trade off the costs of carrying a cash buffer against the costs of inefficient liquidation of portfolio securities to handle daily flows. This is in contrast to venture funds, who enjoy stable long-term funding from their limited partners (LPs) and who typically do not worry about the liquidity of their portfolios.

Feature 2. Mutual fund flows are sensitive to short-term performance.

Not only may mutual fund flows hurt fund performances, but fund flows are, in turn, sensitive to short-term fund performance (Ippolito, 1992; Sirri and Tufano, 1998). In particular, Chen, Goldstein, and Jiang (2010) and Goldstein, Jiang, and Ng (2017) argue that the illiquidity of portfolio holdings can create a first-mover advantage in withdrawing from poorly performing funds and thus lead to a concave flow-to-performance relationship in the region of negative excess returns. Such a concave flow-to-performance relationship may lead to fire-sale spirals, where initial underperformance causes funds to sell some of their assets, exerting negative price pressure, and thereby leading to further underperformance and even greater outflows. In contrast,

there is no generally available measure of venture funds' short-term performance at the daily or weekly horizon. Because of this fact and the relatively longer capital commitments, inflows to individual venture funds are not sensitive to their short-term performance.

Feature 3. Mutual fund performance is driven by their skill in trading securities.

The ability of a mutual fund to profitably trade has been a central focus of research into these institutions for more than half a century since the seminal work of Jensen (1968). Mutual funds seek to generate excess returns by identifying undervalued securities, selling them at optimal times, and executing trades in an efficient manner (Wermers, 2000). In contrast, venture capitalists create much of their outperformance by advising and monitoring their portfolio firms (Lerner, 1995; Bernstein, Giroud, and Townsend, 2016) by staging their investment (Gompers, 1995), and facilitating relationships with other firms and institutions (Lindsey, 2008).

Taken together, Features 1 through 3 highlight the relatively greater importance of liquidity to mutual funds than to venture capitalists. These implications directly lead to:

Hypothesis 1: Mutual funds are more likely to invest in later rounds and in private firms that are closer to exit through an IPO.

At the same time, Features 1 through 3 do not suggest that mutual funds should completely avoid investing in illiquid securities. Indeed, because private markets, with their information problems and extensive uncertainty, may deliver higher expected returns, venture investments may help boost mutual fund performance. Not all funds are equally positioned, however, to take advantage of the higher expected returns associated with illiquid securities. Funds with less volatile fund flows, i.e., more stable funding, should be more likely to invest in private firms. Similarly, larger funds may have a more diversified (and hence stable) investor base, even controlling for the past volatility of fund flows. Since skilled managers are likely to

attract more capital (Berk and Green, 2004), larger funds also may invest more in private firms compared to smaller funds due to their greater sophistication. Finally, larger funds may be more likely to invest in private firms because of fixed due diligence costs. These implications are summarized in:

Hypothesis 2: Larger funds and funds with lower fund flow volatility are more likely to invest in private firms.

Features 1 through 3 also guide our analysis of the contractual aspects of mutual fund investment in private firms, that is, their potential conflicts with venture funds and the resulting differences in the priority assigned to different contractual provisions. First, mutual funds are more likely to invest in firms whose investors already have redemption rights or to request redemption rights in the current round. Redemption rights, as we describe in Section 2.3.2, provide a strong incentive for private firms to go public sooner. These provisions help ensure that the private firms in mutual funds' portfolios do not stay private and illiquid for too long. Second, by shortening the time until IPO, redemption rights make the underlying convertible preferred stock more liquid even before the IPO.

Hypothesis 3: Mutual funds are more likely to invest in private firms that already give their investors strong redemption rights or to request redemption rights in the firm-rounds in which they participate.

Although mutual funds prefer the companies that they invest in to go public in a timely manner, they may worry about the deleterious consequences of a down-IPO. Such an offering will require the mutual fund to mark down its investment, potentially generating short-term underperformance and negative publicity (given the high profile of many IPOs). They are likely to fear, as Feature 2 highlights, subsequent fund outflows, which can have further negative

effects on fund performance (Edelen, 1999). Mutual funds will, therefore, prefer strong IPO-related rights, including IPO ratchets and down-IPO veto rights, which will protect them in low-valuation IPOs:

Hypothesis 4: Mutual funds are more likely than venture capitalists to request stronger IPO-related rights.

Moreover, mutual funds' concerns with liquidity may also have implications for their representation on the board of directors. Being represented on the board makes the underlying securities less liquid, due to insider trading restrictions and adverse selection concerns (Roe, 1990; Bhide 1993). Thus, mutual funds may rationally choose not to be represented on the board of directors for liquidity reasons. Mutual funds may also be less skilled at or lack the capacity to monitor and advise firms, directly leading to their under-representation on the board.

Hypothesis 5: Mutual funds will be less likely to be represented on the board of directors.

Finally, given (a) the potential agency conflicts between mutual and venture funds and (b) mutual funds' emphasis on redemption and IPO-related rights, we may expect mutual funds to put somewhat less emphasis on the strong cash flow rights that are traditionally demanded by venture capitalists.

4 Empirical results

4.1 Time trend in mutual fund investment in unicorns

We start by documenting in Figure 1 the increased propensity for mutual funds to invest in unicorns. Panel (a) of Figure 1 shows that over the 2010-2016 period, the number of distinct mutual funds directly investing in unicorns has increased from less than 10 to more than 140. Panel (b) of Figure 1 illustrates the increase over time in mutual funds' aggregate holdings of unicorns. The dollar value of aggregate holdings has also increased by an order of magnitude,

from less than $1 billion to more than $8 billion. These results paint a consistent picture of unicorn investments becoming a more important part of the portfolios of open-end mutual funds.

[Figure 1 about here]

From another perspective, Panel (c) of Figure 1 shows that the fraction of unicorn financing rounds with one or more mutual funds participating directly has also increased significantly over our sample period. In 2010-2011, less than 5% of financing rounds involved mutual funds as investors; by 2015-2016, this fraction had climbed to 40%. We note that the quarterly volatility of mutual fund direct investment in unicorns was high across the four quarters of 2016, possibly consistent with the general difficulty of private firms getting new funding that year.[17] Overall, the results in Figure 1 suggest that mutual funds are an increasingly important source of capital for entrepreneurial firms, consistent with the findings in Kwon, Lowry, and Qian (2018).

4.2 Determinants of mutual fund investment in unicorns

We next explore the cross section of mutual fund investments in unicorns, asking two main questions. First, in which firms and rounds are mutual funds more likely to invest? Second, which funds are more likely to invest in unicorns?

4.2.1 In which firms and rounds are mutual funds more likely to invest?

Figure 2 reports the probability of mutual funds investing in different types of unicorns. Panel (a) shows that mutual funds are much more likely to participate in late than in early financing rounds, consistent with Hypothesis 1. In our data, mutual funds did not participate in any seed round. On the other hand, more than 36% of Series F, 50% of Series G, and more than

[17] For example, see Jay Yarow, "Blood in the Water: 90% of the Billion-Dollar Unicorn Startups Are in Trouble," *Business Insider*, January 21, 2016, https://www.businessinsider.com/blood-in-the-water-90-of-the-billion-dollar-unicorn-startups-are-in-trouble-2016-1.

47% of H or later rounds involve mutual fund participation. This pattern is consistent with the anecdotal evidence that mutual funds hope to boost their portfolio performance by investing in companies that are close to going public or being acquired.[18]

[Figure 2 about here]

Panel (b) shows that Healthcare and Information Technology (IT) are the two industries that are most likely to see mutual fund investments. This result is also consistent with the anecdotal evidence suggesting that mutual funds invest in unicorns in "hot" industries.

Panel (c) shows that unicorns in Massachusetts are most likely to attract mutual fund direct investments, followed by unicorns in California, Washington, New York, and other states. Since Fidelity, with its headquarters in Boston, is the largest fund family that has been consistently investing in unicorns, this pattern suggests a potential home bias in mutual fund investments in unicorns. This pattern might also be driven by savings in due diligence costs.

Table 5 reports more formal statistical evidence on which firms and rounds mutual funds are more likely to invest in. We estimate linear probability model regressions of mutual fund participation on firm size (proxied for by employment), age, and the experience of the existing VC investors (in the spirit of Gompers et al., 2010). We control for year and round fixed effects. To capture the idea of potential conflicts between early- and late-stage investors, we include two variables that measure contractual provisions in previous rounds. The first one is a dummy variable for a given provision being included in the previous round. The second one captures variation in a given provision between early- and late-stage rounds. Specifically, we calculate the absolute value of the difference between the average value of a given provision in series C

[18] For example, see Robin Wigglesworth, "T Rowe Price $17bn Fund Reveals Details of Private Investments," *Financial Times*, February 28, 2017, https://www.ft.com/content/eca4bc44-fbd9-11e6-96f8-3700c5664d30.

through $k-1$ and the average value of this provision in the seed, series A and B rounds.[19] Our analysis in Table 5 is limited to rounds C and above and excludes earlier rounds that are very unlikely to see mutual fund participation.

[Table 5 about here]

Consistent with Hypothesis 2, firm size, as proxied by employment, is consistently positively correlated with mutual fund investment. Large firms with more employees may be closer to a potential IPO, need more capital, and be more visible. Economically, a doubling in firm size is associated with about a 4-5% higher probability of mutual fund participation. Firm age is also positively correlated with mutual fund investment, although the association is not statistically significant.

Mutual funds are also more likely to invest in firms backed by more experienced VC funds. More experienced venture capitalists may provide several advantages: more credible certification (Megginson and Weiss, 1991; Puri, 1996), better monitoring, and matching with better firms (Sorensen, 2007). More experienced venture capitalists may also have a greater reputation or social capital, which may facilitate the resolution of any potential conflicts with other investors.

Table 5 also shows the association between contractual provisions in previous rounds and mutual fund participation, which is suggestive of potential conflicts (as well as synergies) between mutual funds and earlier-stage VC investors. In particular, we find:

[19]As an example: consider round F where the existence of redemption rights in the previous five rounds is captured by {0,0,1,0,1}. Then the average in series C through E is (1+0+1)/3=0.67, and the average in Series A through B is 0. We use the absolute value of this difference to capture the potential conflict of interests between investors in early and late rounds.

- Mutual funds are more likely to invest in firms that already promise redemption rights to their existing investors. Because existing redemption rights create a strong incentive for the firm to go public, they may benefit current-round mutual fund investors.
- At the same time, large variation in redemption rights across early- and late-stage rounds may create conflicts of interest that may deter mutual funds from investing. Consistent with this suggestion, mutual funds are less likely to invest in firms with greater variation in participation rights and with more class directors in the previous round. Because existing class directors represent the existing investors, both of these variables are likely to be associated with stronger conflicts of interest between early- and late-stage investors, which mutual funds may try to avoid.

4.2.2 Which funds are more likely to invest in unicorns?

We next ask which funds are more likely to invest in unicorns. In keeping with Hypothesis 2, we focus on the effects of fund size and fund flow volatility. We also control for the fund's management fees and institutional share (a) to check whether mutual funds are investing in unicorns to cater to any specific clientele of investors, and (b) to disentangle the effects of institutional share versus flow volatility, since the two variables could be highly correlated with each other (see, e.g., Chen, Goldstein, and Jiang, 2010). Table 6 reports the results.

[Table 6 about here]

We estimate a linear probability model to handle the large number of fixed effects.[20] We include year fixed effects (column 2), both year fixed effects and the Lipper objective fixed effects (column 3), and fixed effects for the Lipper objective interacted with the year (column 4).

[20] Logit and probit models, as well as a Tobit model of the share of the portfolio invested in unicorns, generate similar results.

These fixed effects control for the aggregate time trends documented in Figure 1, as well as any unobserved differences in objectives. All explanatory variables are standardized so that their coefficients represent the effect on a one standard deviation change.

We find that larger mutual funds are significantly more likely to invest in unicorns. The economic magnitude is large: a one standard deviation increase in fund size is associated with about 1.59-1.76% increase in the probability of unicorn investments. This shift is considerable relative to the 2.60% unconditional probability of investing in any unicorn. These results are consistent with Hypothesis 2 and more generally with the presence of economies of scale: larger funds may have more resources and thus may be in a better position to invest in unicorns. We also find evidence of economies of scale at the fund family level: funds of larger fund families are significantly more likely to invest in unicorns.

Also consistent with Hypothesis 2, funds with more volatile fund flows are significantly less likely to invest in unicorns. A one standard deviation increase in flow volatility is associated with a 0.22% to 0.27% decrease in the probability of investing in unicorns.

Finally, we find no significant effect of management fees or institutional share on the probability of investing, suggesting that the effects of fund size and flow volatility are unlikely to be driven by any clientele effects.

4.3 Contractual provisions in unicorn investments

As a benchmark, Figure 3 presents the prevalence of contractual provisions across rounds and contrasts it to mutual fund participation by financing round. It shows that the prevalence of

the various contractual provisions in our sample is comparable to that in earlier studies focusing on venture-backed firms (Kaplan and Stromberg, 2003; Bengtsson and Sensoy, 2011).[21]

[Figure 3 about here]

A few patterns are worth noting. First, as already mentioned, mutual funds are more likely to participate in later rounds. Second, cumulative dividends are much more likely in earlier rounds. The probability of redemption rights is fairly constant across rounds, consistent with the strong persistence in redemption rights across rounds. IPO ratchets are more likely in later rounds, but interestingly there is much less of an increase in the prevalence of down-IPO veto rights.

To answer the key question as to how contractual provisions vary with mutual fund participation, Table 7 reports the results of our baseline regressions of the key contractual provisions, including redemption rights, IPO-related rights, control rights, and standard cash flow rights, on mutual fund participation. We use this specific order of different rights (different from that in which we first introduced them) to better illustrate the underlying economic channels as we discussed in Section 3. Throughout the various specifications, we include round fixed effects and year fixed effects to control for systematic differences across vintages and across early- versus late-stage rounds. In even-numbered specifications, we further include firm fixed effects to control for unobserved firm-level characteristics. Although we do not aim for a formal identification of the casual effects of mutual fund investment on contractual provisions, the differences between specifications with and without firm fixed effects are informative about mutual funds selecting versus negotiating various rights. We also control for employment as a

[21] For example, Kaplan and Stromberg (2003) document that 38% of financial rounds have participation rights and that the use of this term declines in later rounds, roughly consistent with Figure 3.

proxy for firm size and post the post-money valuation as a proxy for unobserved firm characteristics at the time of the financing round.

[Table 7 about here]

4.3.1 Redemption rights and IPO-related rights

In columns 1 through 6 of Panel A of Table 7, the dependent variables are the redemption rights, IPO ratchets, and down-IPO veto rights. We find strong evidence that mutual fund rounds are likely to include stronger redemption and IPO-related rights.

First, mutual fund participation is significantly correlated with stronger redemption rights at the extensive margin, consistent with Hypothesis 3. The difference in redemption rights between rounds with and without mutual fund participation is particularly large economically. According to column 1, convertible preferred stock issued in rounds with mutual fund participation is 18.9% more likely to have redemption rights when controlling for round fixed effects, time fixed effects, and firm characteristics. After further controlling for firm fixed effects, the association becomes weaker (column 2), but is still statistically significant at the 10% level. The pattern suggests that the association between mutual fund participation and stronger redemption rights is partly driven by mutual funds selecting certain firms (and in particular, selecting firms with redemption rights in previous rounds, as Table 5 shows). Selection does not fully explain funds' preference for redemption rights in the current round, however, suggesting that mutual funds may indeed actively request redemption rights for the rounds that they participate in.

Similarly, mutual fund rounds are 17.2% more likely to have down-IPO veto rights when controlling for round and time fixed effects and post-money valuation (column 5), consistent with Hypothesis 4. This association becomes weaker but remains statistically significant at the 5%

level when firm fixed effects are added (column 6), again suggesting that mutual funds both select certain firms and request down-IPO veto rights. We also find some evidence that mutual fund rounds are more likely to include IPO ratchets, although this result is not statistically significant (column 3). This result becomes statistically significant at the 10% level when we use the mutual fund share of the financing round as the explanatory variable in Table A3.

4.3.2 Control and voting rights

We next turn our attention to the control rights and look at 1) the right to elect directors and 2) protective provisions. We start with the regressions of the right to elect the board of directors, since the board of directors plays an important role in corporate governance and monitoring (Adams, Hermalin, and Weisbach, 2010) and since outside directors can be particularly effective (Lerner, 1995; Duchin, Matsusaka, and Ozbas, 2010). At the same time, as we discussed in Section 3, higher board representation also renders the underlying securities less liquid due to adverse selection and insider trading concerns.

In columns 7 and 8 of Panel A, the dependent variable is the number of directors that holders of the preferred series can elect exclusively. Column 7 shows that rounds with mutual fund participation are associated with weaker broad representation (and thus higher liquidity), consistent with Hypothesis 5. The effect is both economically and statistically significant. Specifically, mutual funds participation is associated with 0.39 fewer class directors, controlling for round and year fixed effects and firm characteristics. After further controlling for firm fixed effects, the result becomes statistically insignificant but still positive (column 8). However, the

effect is still statistically significant at the 1% level when we consider the mutual fund share of the financing round as the explanatory variable in Table A3.[22]

We next turn to the protective provisions. In columns 9 and 10, we look at the number of protective provisions. Mutual fund participation is generally associated with more protective provisions, suggesting that lack of representation on the board of directors may be partially compensated for by more veto rights. This is also consistent with our earlier result that mutual fund rounds are more likely to have down-IPO veto rights.

While it is difficult to systematically code the various protective provisions, in many cases, they are meant to ensure that the rights of a given series of preferred stock are not adversely affected in subsequent rounds. Generic protective provisions require preferred stockholders to approve any changes to the COI that would change the number of authorized shares or change the rights of a given series of preferred stock. More specific provisions protect the special redemption, IPO-related, and cash flow rights.[23]

One concern is that mutual funds' lack of board representation may be driven by funds being more interested in later rounds when boards are already having many directors. Although this is unlikely because we include round fixed effects in all specifications, we formally address

[22] Beyond the liquidity concerns articulated in Hypothesis 5, our results are also broadly consistent with the existing evidence that mutual funds are not very active in voting on director elections in public firms (Choi, Fisch, and Kahan, 2013; Iliev and Lowry, 2015).

[23] For example, Series C-1, C-2, and C-3 of Uber have an IPO ratchet provision with a 1.25 multiple. While Series C-1 IPO ratchet provision itself is described in Article IV, Section (B)4(b)(i), the protective provisions in Article IV, Section (B)6(d)(v) require a majority of Series C-1 shareholders to "amend, alter or repeal Article IV, Section (B)4(b)(i) … of the Restated Certificate of Incorporation so as to affect the holders of Series C-1 Preferred Stock adversely." As another example, Series F of Box was guaranteed a return of at least the initial conversion price of $20, increasing at $3 per year. These rights are codified in Section 4 of the COI. The protective provisions of Section 6(j)(v) require two-thirds of Series F shareholders to approve any action that "waives, or results in a waiver of, an adjustment of the Series F Conversion Price or any other Series F Preferred conversion rights pursuant to any provision of Section 4 hereof." The protective provisions also require two-thirds of Series F shareholders to waive "the treatment of any event as a Deemed Liquidation or Qualified IPO, or amend the definition of a Deemed Liquidation or Qualified IPO in the Certificate of Incorporation to exclude a transaction that would otherwise qualify as such." Finally, to ensure that the protective provisions themselves are not weakened later on, Section 6(j)(vii) requires two-thirds of Series F shareholders to approve any action that "waives, amends, alters or repeals this Section 6(j)."

this concern by directly controlling for the number of existing directors representing the preferred investors. To do this, we calculate the number of existing directors at the time of a given round by summing up the number of directors that the preferred shareholders in all the previous rounds are eligible to elect, under the assumption that all existing shareholders have elected directors to represent them.

Table A2 in the Appendix reports the results. In particular, columns 7 and 8 of Panel A in Table A2 show that the negative association between mutual fund participation and the number of directors remains strong after controlling for the number of existing directors. In addition, mutual fund participation is still significantly and positively associated with redemption and down-IPO veto rights. These findings suggest that our results are unlikely to be driven by later rounds already having many existing directors.

4.3.3 Standard cash flow rights

Panel B of Table 7 looks at the standard cash flow rights. These are (a) participation rights (columns 1-2), (b) senior liquidation preference (columns 3-4), (c) whether the liquidation multiple is greater than one (columns 5-6), (d) cumulative dividends (columns 7-8), and (e) the "cash flow index" that is the sum of the four dummies (columns 9-10).[24] For all of these provisions, a negative regression coefficient suggests a negative association between mutual fund participation and these provisions. Overall, after controlling for all the fixed effects and time-varying firm characteristics, we find a weakly negative association between mutual fund participation and these standard cash flow rights, although they are not statistically significant. These findings are generally consistent with Hypotheses 3 and 4 that mutual funds pay more

[24] To make the tables concise, we chose not to include the results on full ratchet anti-dilution protections, as these have very few non-zero observations (see Table 4). The regression coefficients are negative but statistically insignificant.

attention to redemption and IPO-related rights but less attention to other standard cash flow rights.

4.4 Intensive margin of redemption rights

To understand better along which dimensions mutual fund rounds are likely to be associated with stronger redemption rights, we examine the intensive margin of redemption rights. The results are reported in Table 8, where Panel A is the baseline OLS regression, Panel B includes year and round fixed effects, and Panel C further includes firm fixed effects.

[Table 8 about here]

Conditional on a round having redemption rights, mutual fund rounds are associated with stronger redemption rights along almost all of the detailed dimensions that we consider, with the effects of delay after notice (columns 2 and 3) and annual installments (column 6) being statistically significant in the baseline regression and also when year and round fixed effects are included. First, mutual fund participation is associated with significantly shorter delays between the notice/receipt date and actual redemption date. As suggested in column 2, mutual fund participation is associated with a delay that is 26.6 days shorter (18.0 days when round and year fixed effects are included). Some COIs indicate that a delay is possible but do not specify the maximum days allowed. If we set the delay in these cases to 365 days (the longest delay observed in our data), instead of treating them as missing values, column 3 suggests that mutual fund participation is associated with a reduced delay of 82.6 days (96.3 days when round and year fixed effects are included). Column 6 indicates that in mutual fund rounds, actual cash distributions are spread out across fewer annual installments, that is, paid more promptly. In terms of the magnitude, mutual fund participation is associated with a reduced delay of about 0.58-0.78 of a year. In particular, the effect on annual installments is still statistically significant

at the 1% level when controlling for the firm fixed effects, suggesting that mutual funds selecting certain firms is unlikely to drive the effect. Finally, although less statistically significant, we find suggestive evidence that mutual fund rounds may be associated with an about four months shorter delay until investors can initiate a redemption request.

4.5 Matching analysis

As a robustness check that our results are not driven by rounds with and without mutual fund participation being fundamentally different, we conduct a matching analysis. We examine the presence of various contractual provisions across rounds with and without mutual fund participation. Table 9 reports the average treatment effect (ATE), where rounds with mutual fund participation are considered to be treated. Odd-numbered columns match rounds with and without mutual fund participation based on the year and financing round (capped at Series E and above). Even-numbered columns further match on log employment and log valuation, using Mahalanobis distance to help control for time-varying firm-level characteristics.

[Table 9 about here]

Table 9 shows that for redemption rights, down-IPO veto rights, and control rights, the estimated ATEs are still statistically significant and similar to the estimated coefficients on the mutual fund participation dummy in Table 7. The estimated ATEs for participation rights and liquidation rights even become statistically significant and negative compared to Table 7, suggesting that mutual funds trade off rights that are more related to liquidity against some standard cash-flow rights, consistent with Hypotheses 3 and 4.

4.6 Correlation in contractual provisions

To provide another perspective on mutual funds' distinctive contractual preferences, Table 10 examines the correlation across different contractual provisions. We compare rounds

without mutual fund participation (Panel A) to those without mutual fund participation (Panel B) in a formal regression framework, controlling for year and round fixed effects.

[Table 10 about here]

We focus in particular on the interaction between 1) redemption and IPO-related rights and 2) standard cash flow rights. As Gornall and Strebulaev (2018) suggest, down-IPO veto rights are generally more valuable if the investors also obtain senior liquidation preferences or a liquidation multiple greater than one, since those enable the investors to receive a disproportionately large share of the exit proceeds in case of an exit through an acquisition. Panel B shows that in rounds without mutual fund participation (thus, presumably dominated by venture capitalists), the presence of a senior liquidation preference is associated with a 15.5% increase in the likelihood of having down-IPO veto rights. The effect is statistically significant at the 1% level. In Panel A, which restricts the analysis to rounds with mutual fund participation, this effect is smaller and insignificant.

Given our earlier results that mutual fund investments are associated with stronger down-IPO veto rights and weaker standard cash flow rights, this comparison suggests that mutual funds do disproportionately value stronger IPO veto rights, despite the lack of complementary strong cash flow rights. Thus, this comparison provides another way to illustrate mutual funds' contractual preferences, consistent with Hypothesis 4.

Similarly, for rounds without mutual fund participation, the presence of a liquidation multiple greater than one is associated with a 17.4% increase in the likelihood of having IPO ratchets. Again, this effect becomes insignificant and negligible for those rounds with mutual fund participation.

4.7 Relationship between fund characteristics and contractual provisions

To shed additional light on the economic mechanisms linking mutual fund participation with the contractual provisions, we explore in Table 11 the association between the characteristics of mutual funds investing in a given round and the round's contractual provisions. The sample consists of 100 rounds with mutual fund participation. For each round, we either calculate the value-weighted average of the characteristics of all participating mutual funds (Panel A) or take the characteristics of the fund purchasing the largest stake (Panel B). We refer to such funds as lead funds. We include year and round fixed effects in all regressions.

[Table 11 about here]

Given the relatively small sample size, regressions in Table 11 have limited statistical power. However, several results stand out and are consistent with Hypothesis 3.[25] As shown in columns 1 and 3, flow volatility of the participating funds is strongly associated with a higher probability of the round having redemption and down-IPO veto rights. The economic magnitudes are also quite large: a one standard deviation increase in the flow volatility of the participating funds is associated with an 11.8% higher probability of having redemption rights and an 11.3% higher probability of having down-IPO veto rights. These findings are consistent with Hypotheses 3 and 4. Mutual funds' capital structure and risk management concerns—in particular, their need to handle daily inflows and outflows and marking-to-market—push them to request stronger redemption and IPO-related rights.

[25] Given the relatively small sample size and the strong correlation (0.57) between fund size and family size in our sample, we control for only one measure of size at a time. Our benchmark specifications in Table 11 use family size, because the contractual terms with portfolio unicorns are often negotiated by the fund families rather than by individual funds. We obtain similar, though slightly weaker, results when using fund size.

4.8 Mutual fund share of the investment round

If mutual funds are indeed negotiating and selecting rounds with redemption and IPO-related rights, then our results concerning the contractual provisions should be driven by rounds where mutual funds account for a large fraction of the financing provided. To test this hypothesis, we re-estimate the regressions of Table 7 using *MF share*, which is defined as the share of the round's funding that is provided by mutual funds. Table A3 in the Appendix reports the results.

[Table A3 about here]

Columns 1 through 6 show that investment rounds with a higher *MF share* are more likely to have redemption rights, IPO ratchets, and down-IPO veto rights. The economic magnitudes are again quite large: with year and round fixed effects and controlling for valuation, a 10% increase in mutual fund share is significantly associated with a 3.4% increase in redemption rights, a 2.2% increase in IPO ratchets, and a 2.1% increase in down-IPO veto rights. The results become weaker after controlling for firm fixed effects but are still statistically significant at the 10% level for IPO ratchets. These results again suggest that our results are not completely driven by mutual funds simply selecting certain firms, but instead reflect their contractual preferences. We also find that a higher *MF share* is significantly associated with fewer directors and more protective provisions, consistent with Table 7.

4.9 IPO ratchets: a case study

Given mutual funds' preferences for different contractual provisions, as revealed by our results, a natural question is whether the rights requested by mutual funds do indeed benefit them ex-post. Answering this question is challenging due to the limited sample period and data availability: we are not aware of any reliable and systematic data documenting the ex-post exercise of redemption or down-IPO veto rights. Moreover, the interviews summarized in

Appendix B suggest much of the power of these rights lies in their use as a threat point in negotiations.

To address concerns about the efficacy of the provisions, we provide evidence regarding the use of IPO ratchets. Within our sample, we found three unicorns where the convertible preferred stocks had IPO ratchets, and down-IPOs ensued. In each case, investors indeed received extra shares to reach the stipulated return threshold, suggesting that such provisions may have real consequences:

- The first one is Box Inc., which went public at $14 per share. The firm's series F preferred stock had an initial purchase price of $20 per share with an IPO ratchet with a multiple of 1.11. Its series E preferred stock had an initial purchase price of $18 per share with an IPO ratchet with a multiple of 1.
- The second case is Chegg Inc., which went public at $12.50 per share. Its series E preferred stock had an initial purchase price of $9.85 per share with an IPO ratchet with a multiple of 1.5.
- Finally, Square Inc. went public at $9 per share, while its series E preferred stock had an initial purchase price of $15.46 per share with an IPO ratchet with a multiple of 1.2.

In all of these cases, investors in rounds with IPO ratchets received extra shares at IPO to guarantee their promised returns.[26] For example, Box Inc. raised $150 million in its round F from two investors, Coatue Management and TPG Capital. Under the IPO ratchet as described above,

[26] For detailed documentation of these three cases, see for Box, Randall Smith, "Protections for Late Investors Can Inflate Start-Up Valuations," June 8, 2015, https://www.nytimes.com/2015/06/08/business/dealbook/protections-for-late-investors-can-inflate-start-up-valuations.html/; for Chegg, Douglas MacMillan, "Valuation-Hungry Startups Should Heed Chegg's Disastrous IPO 'Ratchet,'" October 21, 2015, https://blogs.wsj.com/digits/2015/10/21/valuation-hungry-startups-should-heed-cheggs-disastrous-ipo-ratchet/; and for Square, Scott Austin and Rolfe Winkler. "Square Pays $93 Million Penalty to Some Investors in IPO," November 18, 2015, https://blogs.wsj.com/digits/2015/11/18/square-pays-93-million-penalty-to-some-investors-in-ipo/.

Coatue and TPG were entitled to receive additional shares. Specifically, Box's lower IPO price at $14 a share effectively dropped Coatue and TPG's purchase price to $12.60 a share (= $14 / 1.11) and thus increased the number of shares they received by 58.7% (= $20 / $12.6 - 1). The potential impact of an IPO ratchet provision also figured prominently in potential investors' concerns about the proposed (and ultimately withdrawn) WeWork IPO.[27]

5 Conclusion

We propose a conceptual framework that highlights the interaction between the classic agency problem between entrepreneurs and investors and that between earlier- and later-stage investors, the latter of whom may face liquidity constraints. Using novel contract-level data, we illustrate this framework by studying open-end mutual funds investing in venture-backed firms and the contractual consequences of these investments. We find that mutual funds with more stable funding are more likely to invest. Rounds with mutual fund participation have stronger redemption and IPO-related rights and less board representation, all of which improve the liquidity of the underlying securities, consistent with our conceptual framework. We believe our analysis and conceptual framework may inform future theoretical and empirical work on the rapidly evolving dynamics of investment in private firms.

[27] John C. Coffee, "Toxic Unicorns: What has been Missed about WeWork's Fiasco," November 9, 2019, https://clsbluesky.law.columbia.edu/2019/11/06/toxic-unicorns-what-has-been-missed-about-weworks-fiasco/,.

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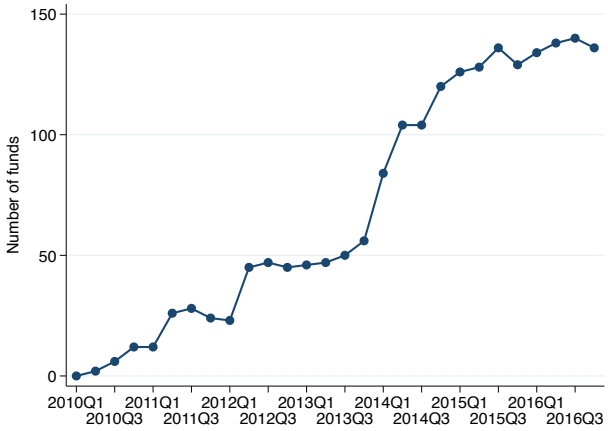
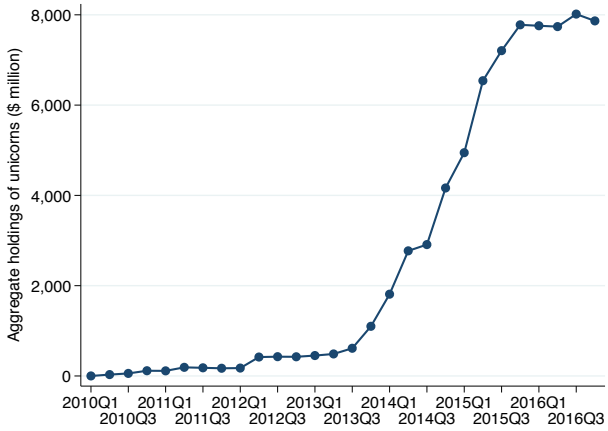
Figure 1
Time Trend in Mutual Fund Investment in Unicorns

This figure shows (a) the number of open-end mutual funds investing in unicorns, (b) aggregate mutual fund holdings of unicorns, and (c) the fraction of unicorn financing rounds with mutual fund participation. The sample of unicorns consists of 156 U.S.-based venture-backed private firms that at some point during the 2012–2016 period raised at least one financing round with a nominal post-money valuation of at least $500 million. Data on mutual fund investment in unicorns is from CRSP Mutual Fund Database and SEC forms N-CSR(S) and N-Q.

(a) Number of funds investing in unicorns



(b) Aggregate mutual fund holdings of unicorns



(c) Probability of mutual fund participation

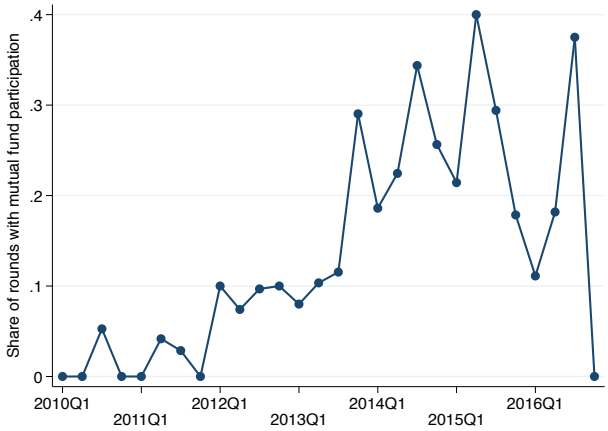
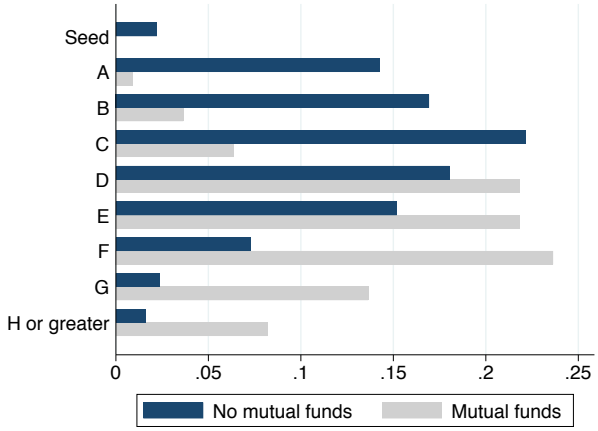


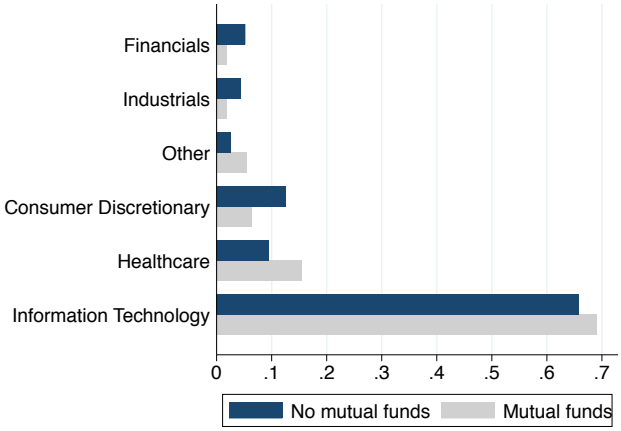
Figure 2
Distribution of Financing Rounds with and without Mutual Fund Participation

This figure reports the conditional distribution of financing rounds with and without mutual fund participation over (a) rounds, (b) sectors, and (c) states of headquarters. The sample of unicorns consists of 156 U.S.-based venture-backed private firms that at some point during the 2012–2016 period raised at least one financing round with a nominal post-money valuation of at least $500 million. Data on mutual fund investment in unicorns is from CRSP Mutual Fund Database and SEC forms N-CSR(S) and N-Q.

(a) Round



(b) Sector



(c) State of Headquarters

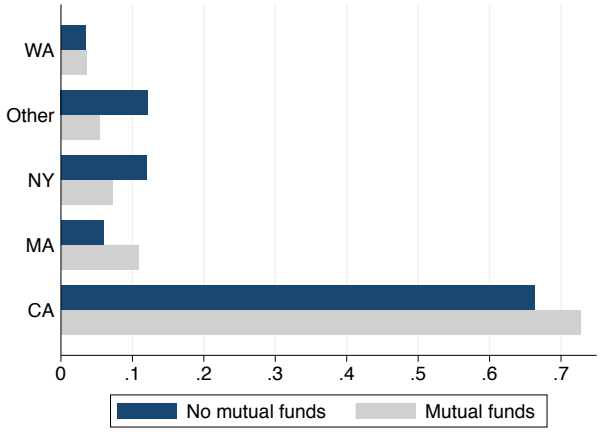
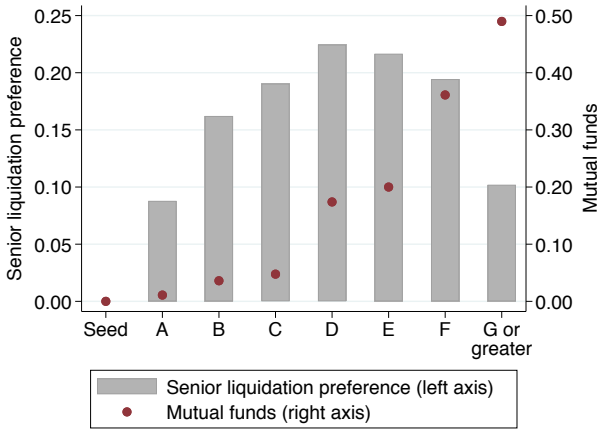


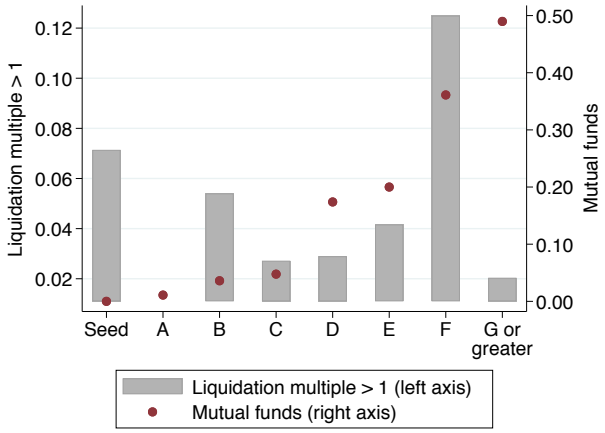
Figure 3
Prevalence of Contractual Provisions and Mutual Fund Participation by Financing Round

This figure shows the prevalence of different contractual provisions and mutual fund participation by financing round.

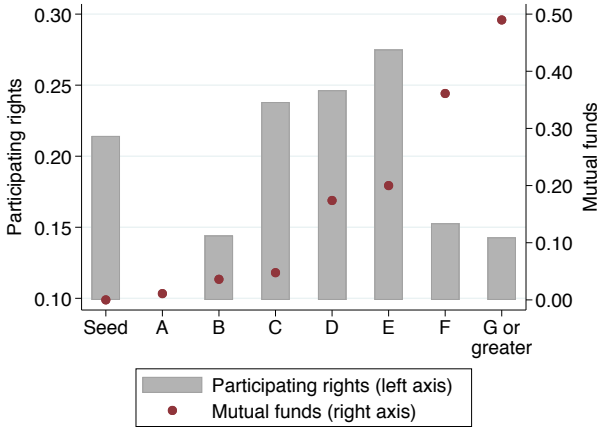
(a) Senior Liquidation Preference



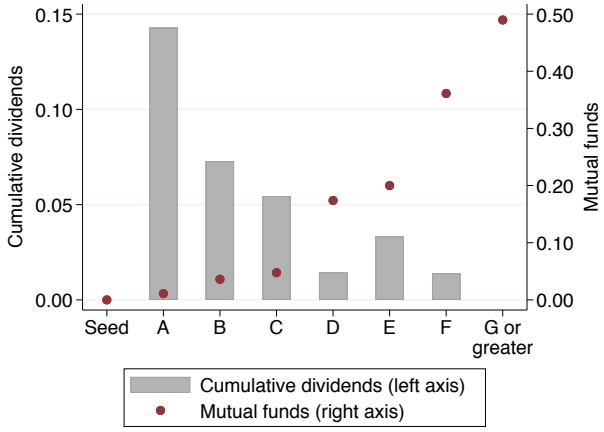
(b) Liquidation Multiple > 1



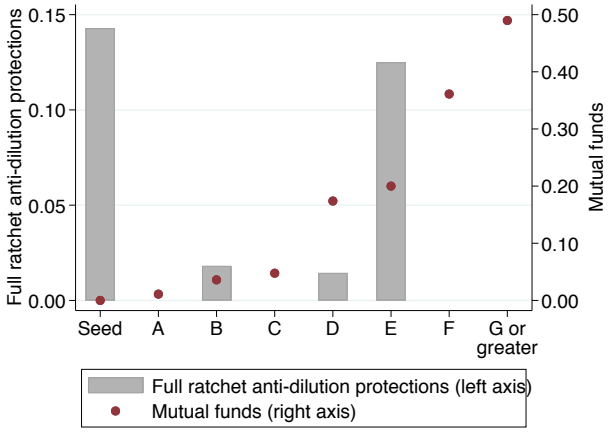
(c) Participation Rights



(d) Cumulative Dividends



(e) Full Ratchet Anti-Dilution Protections



(f) Redemption Rights

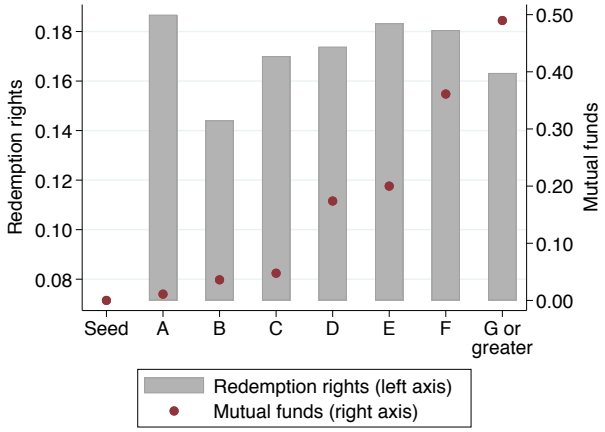
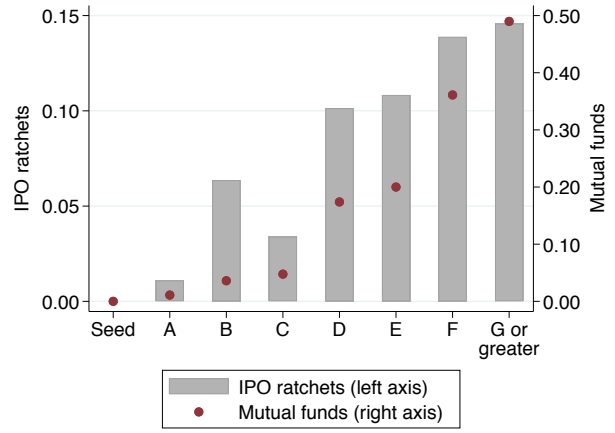


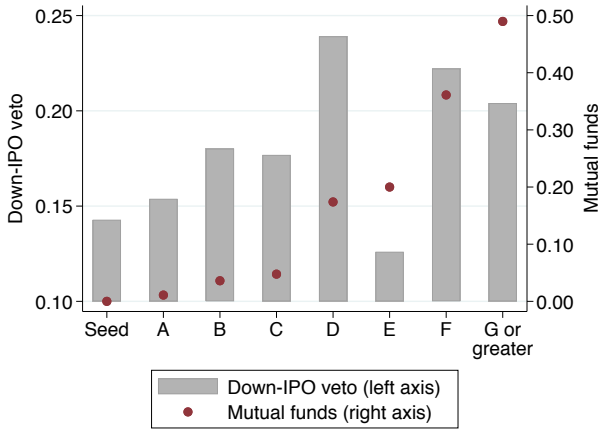
Figure 3 (continued)
Prevalence of Contractual Provisions and Mutual Fund Participation by Financing Round

This figure shows the prevalence of different contractual provisions and mutual fund participation by financing round.

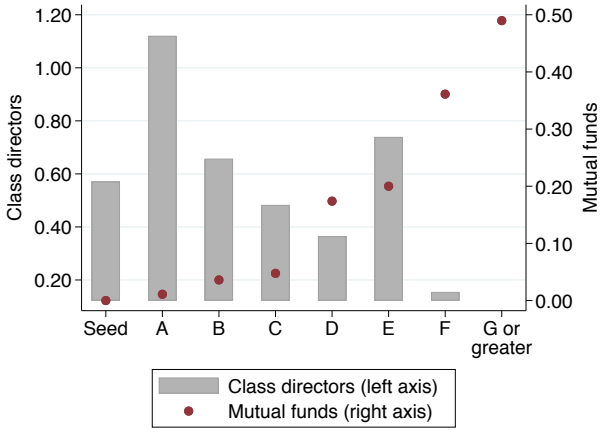
(g) IPO Ratchet



(h) Down-IPO Veto



(i) Class Directors



(j) Class Protective Provisions

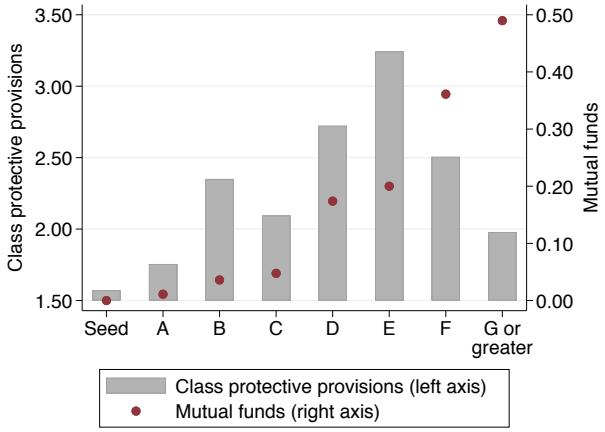


Table 1
The Investors of Uber

This table, compiled from Crunchbase, reports the list of investors of Uber by round and investment type as of December 2017.

Round/Type	Disclosed Investors
Seed	Garrett Camp, Travis Kalanick
Angel	First Round (lead), Adam Leber, AFSquare, A-Grade Investments, Alfred Lin, Babak Nivi, Bechtel Ventures, Bobby Yazdani, Cyan Banister, Data Collective, David Sacks, Dror Berman, Founder Collective, Gary Vaynerchuk, Jason Calacanis, Jason Port, Jeremy Stoppelman, Josh Spear, Kapor Capital, Kevin Hartz, Khaled Helioui, Lowercase Capital, Mike Walsh, Naval Ravikant, Oren Michels, Scott Banister, Scott Belsky, Shawn Fanning, Techstars Ventures
Series A	Benchmark (lead), Alfred Lin, First Round, Innovation Endeavors, Lowercase Capital, Scott Banister
Series B	Menlo Ventures (lead), Benchmark, CrunchFund, Data Collective, Goldman Sachs, Jeff Bezos, Jeff Kearl, Nihal Mehta, Signatures Capital, Summit Action, Troy Carter, Tusk Ventures
Series C	GV (lead), Benchmark, TPG Growth
Series D	Fidelity (lead), BlackRock, General Atlantic, GV, Kleiner Perkins Caufield & Byers, Menlo Ventures, Sherpa Capital, Summit Partners, Wellington Management
Series E	Glade Brook Capital Partners (lead), Brand Capital, Dinesh Moorjani, Foundation Capital, HDS Capital, Jack Abraham, Light Street Capital Management, Lone Pine Capital, New Enterprise Associates, Qatar Investment Authority, Razmig Hovaghimian, Sherpa Capital, Square Peg Capital, Sway Ventures (formerly AITV), Times Internet, Valiant Capital Partners,
Series F	AppWorks Ventures, Bennett Coleman and Co Ltd, Microsoft, Microsoft Corporation - Strategic Investments, MSA
Late Debt	Goldman Sachs (co-lead), Morgan Stanley (co-lead), Barclays PLC, Citigroup
Late PE	Saudi Arabia's Public Investment Fund, Tata Capital, Letterone Holdings SA
Series G	Saudi Arabia's Public Investment Fund (lead), FortRoss Ventures
Late Debt	Morgan Stanley (lead), Goldman Sachs, Barclays PLC, Citigroup
Late Venture	Axel Springer (lead), G Squared
Late Venture	SoftBank Vision Fund (lead)

Table 2
Summary Statistics: Funds

This table reports summary statistics for mutual funds in the sample. The sample consists of actively managed domestic equity funds with total net assets (TNA) of at least $10 million. *Fund size* is the natural log of the fund TNA. *Family size* is the natural log of the aggregate TNA of all funds within the fund family. *Institutional share* is the fraction of fund TNA in institutional share classes. *Flow volatility* is the standard deviation of monthly fund flows over the preceding twelve months. Fund flows are calculated as $\frac{TNA_t - (1+R_t) \times TNA_{t-1}}{TNA_{t-1}}$. *Management fee* is the dollar value of management fees paid during the year divided by the average net assets during the year. The sample period is 2010Q1–2016Q4, with each fund-quarter as an observation.

				Percentile		
	N	Mean	SD	25	50	75
Fund size	55,879	5.80	1.75	4.45	5.75	7.06
Family size	55,879	9.83	2.77	8.11	10.32	11.84
Institutional share (%)	55,879	38.03	38.92	0.00	23.23	77.77
Management fee (%)	55,879	0.76	0.28	0.60	0.75	0.90
Flow volatility (%)	55,879	4.29	33.35	0.92	1.83	3.81
Unicorn portfolio share (%)	55,879	0.02	0.20	0.00	0.00	0.00

Table 3
Summary Statistics: Rounds

This table reports summary statistics for unicorn financing rounds with and without mutual fund participation. *Firm age* is from Capital IQ. *Number of employees* is estimated based on the number of LinkedIn employee profiles. *MF share* is the share of the financing round that is funded by mutual funds. *Post-money valuation* is from VC Experts.

	With mutual fund participation						Without mutual fund participation					
				Percentile						Percentile		
	N	Mean	SD	25	50	75	*N*	Mean	SD	25	50	75
Firm age	109	8.24	3.82	5.00	7.00	10.00	633	5.85	4.00	3.00	5.00	8.00
Number of employees	108	223.96	156.12	105.50	187.50	270.00	625	114.38	144.40	19.00	61.00	153.00
Round number	109	7.37	2.68	5.00	7.00	9.00	633	4.63	2.96	3.00	4.00	6.00
Post-money valuation ($ million)	92	5375.42	11664.94	873.55	1560.53	3595.09	433	1080.13	2640.93	164.64	495.74	1000.00
Amount raised ($ million)	106	249.29	482.21	55.50	101.00	225.00	613	54.60	80.23	12.12	30.00	65.00
Mutual fund share	109	0.32	0.26	0.11	0.26	0.47	633	0.00	0.02	0.00	0.00	0.00

Table 4
Summary Statistics: Contractual Provisions

This table describes the contractual provisions studied in the paper and presents basic summary statistics on their frequency. Firm-level statistics are based on the maximum across each firm's financing rounds, in other words, the presence of a certain contractual feature in at least one round.

Senior liquidation preference specifies whether in a liquidation event, a given class or family of classes of convertible preferred stock is senior to the previous class or classes.

	Yes (1)	**No (0)**	**N/A**
Financing rounds	130	538	74
Firms	63	92	1

Liquidation multiple > 1: holders of convertible preferred stock first receive the liquidation multiple times the original purchase price back and then share ratably with the holders of common stock up to a total liquidation amount per share equal to some multiple of the original purchase price.

	Yes (1)	**No (0)**	**N/A**
Financing rounds	31	711	0
Firms	22	134	0

Participation rights allow holders of preferred stock to "double dip": if liquidation preference is triggered, investors first receive the stipulated amount (the liquidation multiple times the original purchase price) back and can then convert the convertible preferred stock into common stock and share the upside. We divide agreements into those with no participation or capped participation (participation rights = 0) and with full participation (participation rights = 1).

	Yes (1)	**No (0)**	**N/A**
Financing rounds	148	594	0
Firms	46	110	0

Cumulative dividends mean that dividends accumulate over time and effectively increase the investors' return in the event of liquidation.

	Yes (1)	**No (0)**	**N/A**
Financing rounds	36	705	1
Firms	17	139	0

Full ratchet anti-dilution protection means that in the event a firm issues new equity at a lower valuation than in previous financing rounds, the conversion price of the existing convertible preferred shares is adjusted downwards to the price at which the new shares are issued, regardless of the number of new shares issued.

	Yes (1)	**No (0)**	**N/A**
Financing rounds	21	720	1
Firms	4	151	1

Table 4 (continued)
Summary Statistics: Contractual Provisions in Unicorn Financing Rounds

Redemption rights give investors the right to demand redemption of their stake in the firm.

	Yes (1)	**No (0)**	**N/A**
Financing rounds	126	616	0
Firms	36	120	0

IPO ratchets give investors additional shares in IPOs in which the offer price is below a specific threshold.

	Yes (1)	**No (0)**	**N/A**
Financing rounds	57	683	2
Firms	29	126	1

Down-IPO veto exempts investors from automatic conversion in IPOs with offer price below a specified fraction of the round price.

	Yes (1)	**No (0)**	**N/A**
Financing rounds	136	605	1
Firms	41	115	0

Class directors indicate the number of directors that a series can vote as a separate class.

	0	**1**	**2+**	**N/A**
Financing rounds	432	244	63	3
Firms	43	78	35	0

Protective provisions indicate the number of protective provisions that a series can vote as a separate class.

	0	**1**	**2–4**	**5–9**	**10+**	**N/A**
Financing rounds	272	96	227	125	19	3
Firms	22	13	60	50	11	0

Table 5
Which Unicorns Do Mutual Funds Invest In?

This table reports the results of the linear probability model regressions of whether at least one mutual fund participates in the financing round on unicorn characteristics and contractual provisions in previous rounds. $Provision_{k-1}$ denotes the existence of a contractual provision in the previous round. Variation in contractual provisions between early and late rounds, denoted $|\Delta Provision|_{k-1}$, is defined as the absolute value of the difference between the average value of a given provision in series C through $k-1$ and the average value of the same provision in the Seed, A, and B rounds. The sample of rounds consists of series C and later rounds. Robust standard errors are reported. *, **, and *** indicate statistical significance at 10%, 5%, and 1%.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Ln(Employees)	0.039**	0.043**	0.045**	0.052***	0.049**	0.043**	0.046**	0.042**	0.052***	0.053***
	(0.018)	(0.019)	(0.019)	(0.019)	(0.020)	(0.019)	(0.019)	(0.019)	(0.020)	(0.020)
Ln(Age)	0.032	0.028	0.016	0.060	0.024	0.018	0.024	0.034	0.038	0.052
	(0.062)	(0.065)	(0.067)	(0.064)	(0.065)	(0.065)	(0.066)	(0.065)	(0.064)	(0.066)
VC experience	0.051**	0.043*	0.046**	0.042*	0.049**	0.042*	0.046**	0.047**	0.052**	0.049**
	(0.023)	(0.023)	(0.023)	(0.024)	(0.022)	(0.023)	(0.023)	(0.023)	(0.023)	(0.025)
Redemption rights$_{k-1}$	0.226***									0.271***
	(0.062)									(0.060)
$\|\Delta$Redemption rights$\|_{k-1}$	−0.261**									−0.357***
	(0.118)									(0.111)
IPO ratchet$_{k-1}$		0.104								0.141
		(0.129)								(0.152)
$\|\Delta$IPO ratchet$\|_{k-1}$		−0.051								−0.181
		(0.261)								(0.296)
Down-IPO veto$_{k-1}$			0.040							−0.004
			(0.071)							(0.074)
$\|\Delta$Down-IPO veto$\|_{k-1}$			0.041							0.122
			(0.114)							(0.129)
Participation rights$_{k-1}$				−0.066						−0.076
				(0.044)						(0.048)
$\|\Delta$Participation rights$\|_{k-1}$				−0.221***						−0.295***
				(0.083)						(0.088)
Senior liquidation preference$_{k-1}$					0.019					0.001
					(0.078)					(0.091)
$\|\Delta$Senior liquidation preference$\|_{k-1}$					0.067					0.112
					(0.108)					(0.112)
Liquidation multiple \$>\$ 1$_{k-1}$						0.104				0.034
						(0.163)				(0.168)
$\|\Delta$Liquidation multiple$\|\$ > \$1_{k-1}$						0.187				0.394*
						(0.203)				(0.205)
Cumulative dividends$_{k-1}$							−0.022			0.065
							(0.175)			(0.136)
$\|\Delta$Cumulative dividends$\|_{k-1}$							0.062			−0.014
							(0.165)			(0.150)
Class directors$_{k-1}$								−0.070*		−0.105**
								(0.039)		(0.040)
$\|\Delta$Class directors$\|_{k-1}$								−0.062		−0.038
								(0.050)		(0.049)
Protective provisions$_{k-1}$									−0.003	0.003
									(0.011)	(0.011)
$\|\Delta$Protective provisions$\|_{k-1}$									−0.018	−0.014
									(0.012)	(0.013)
N	364	364	364	364	364	364	364	364	364	364
R^2	0.158	0.120	0.120	0.134	0.120	0.129	0.118	0.126	0.125	0.228
Year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Round FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Table 6
Which Mutual Funds Are More Likely To Invest?

This table reports the results of linear probability model regressions of whether a fund invests in unicorns:

$$y_{f,t}\% = \alpha + \beta' \mathbf{X}_{f,t} + \varepsilon_{f,t}$$

where $y\%$ is the conditional probability of investing in any unicorn, expressed in percentage form, f indexes funds and t indexes quarter dates. All explanatory variables are standardized so that the coefficients represent the effect of a one standard deviation change in each explanatory variable. *Fund size* is the natural log of the fund TNA. *Family size* is the natural log of the aggregate TNA of all funds within the fund family. *Flow volatility* is the standard deviation of monthly fund flows over the preceding twelve months. Fund flows are calculated as $\frac{TNA_t - (1+R_t)\times TNA_{t-1}}{TNA_{t-1}}$. *Management fee* is the dollar value of management fees paid during the year divided by the average net assets during the year. *Institutional share* is the fraction of fund TNA in institutional share classes. The sample period is 2010Q1–2016Q4, with each fund-quarter as an observation. Standard errors are adjusted for clustering by fund. *, **, and *** indicate statistical significance at 10%, 5%, and 1%.

	Probability of investing in unicorns (%) $\mu = 2.60\%$			
	(1)	(2)	(3)	(4)
Fund size	1.689***	1.592***	1.757***	1.685***
	(0.348)	(0.344)	(0.356)	(0.357)
Family size	1.307***	1.350***	1.047***	1.081***
	(0.241)	(0.242)	(0.259)	(0.260)
Flow volatility	−0.264***	−0.270***	−0.252**	−0.223**
	(0.090)	(0.090)	(0.108)	(0.106)
Management fee	0.168	0.147	−0.147	−0.140
	(0.143)	(0.143)	(0.161)	(0.159)
Institutional share	−0.100	−0.271	−0.056	−0.052
	(0.265)	(0.268)	(0.273)	(0.273)
N	55,879	55,879	55,879	55,879
Adjusted R^2	0.033	0.043	0.068	0.087
Year FE		✓	✓	
Lipper objective FE			✓	
Objective-Year FE				✓

Table 7
Contractual Provisions and Mutual Fund Participation in Financing Round

This table reports the results of regressions of contractual provisions on mutual fund participation in the financing round:

$$Provision_{i,k} = \alpha + \beta_0 \cdot MFs_{i,k} + \beta_1 \cdot Ln(Employees)_{i,k} + \beta_2 \cdot Ln(Valuation)_{i,k} + \varepsilon_{i,k}$$

where i indexes firms and k indexes financing rounds. *MFs* is a dummy variable equal to one for rounds with mutual fund participation. Contractual provisions are defined in Section 2.4 and summarized in Table A1 in the Appendix. Robust standard errors are reported. *, **, and *** indicate statistical significance at 10%, 5%, and 1%.

Panel A: Redemption, IPO, & Control Rights										
	Redemption & IPO						Control			
	Redemption rights		IPO ratchet		Down-IPO veto		Class directors		Protective provisions	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
MFs	0.189***	0.068*	0.023	−0.001	0.172***	0.081**	−0.391***	−0.068	0.821*	1.086***
	(0.052)	(0.040)	(0.043)	(0.039)	(0.053)	(0.039)	(0.074)	(0.076)	(0.452)	(0.261)
Ln(Employees)	0.080***	0.035	0.047***	−0.043	0.065***	−0.061*	0.181***	−0.037	0.248	−0.341
	(0.016)	(0.029)	(0.012)	(0.029)	(0.015)	(0.032)	(0.035)	(0.101)	(0.159)	(0.352)
Ln(Valuation)	−0.067***	0.010	−0.020*	0.015	−0.080***	0.009	−0.029	0.066	0.096	0.223
	(0.016)	(0.018)	(0.012)	(0.024)	(0.016)	(0.024)	(0.031)	(0.066)	(0.124)	(0.280)
N	519	519	517	517	518	518	516	516	517	517
Adjusted R^2	0.062	0.827	0.028	0.508	0.050	0.816	0.158	0.682	0.027	0.604
Panel B: Cash Flow Rights										
	Participation rights		Liquidation preference		Liquidation multiple > 1		Cumulative diviends		Cash flow index	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
MFs	−0.071	−0.020	−0.023	0.023	−0.028	−0.068	−0.009	−0.065*	−0.155	−0.107
	(0.044)	(0.041)	(0.050)	(0.055)	(0.027)	(0.042)	(0.021)	(0.034)	(0.118)	(0.136)
Ln(Employees)	0.049**	0.047	−0.005	0.040	0.013*	0.006	−0.001	0.030	0.053	0.162
	(0.022)	(0.030)	(0.020)	(0.045)	(0.007)	(0.021)	(0.008)	(0.024)	(0.043)	(0.104)
Ln(Valuation)	−0.096***	−0.111***	−0.034*	−0.041	−0.010	−0.010	−0.021**	−0.005	−0.195***	−0.209**
	(0.018)	(0.031)	(0.018)	(0.044)	(0.009)	(0.019)	(0.011)	(0.029)	(0.048)	(0.103)
N	519	519	519	519	519	519	518	518	518	518
Adjusted R^2	0.103	0.748	0.010	0.530	0.009	0.220	0.025	0.462	0.052	0.562
Round FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Unicorn FE		✓		✓		✓		✓		✓

Table 8
Redemption Rights

This table reports the results of regressions of various aspects of investor redemption rights on mutual fund participation in the financing round:

$$Redemption_{i,k} = \alpha + \beta_0 \cdot MFs_{i,k} + \varepsilon_{i,k}$$

where i indexes firms and k indexes financing rounds. *MFs* is a dummy variable equal to one for rounds with mutual fund participation. *Months until redemption* is the number of months until the first date investors can ask for their shares to be redeemed. *Delay after notice* is the maximum number of days from the time investors submit redemption notice to the first redemption payment. In cases of no stated maximum, *Delay after notice 1* sets such observations to missing, while *Delay after notice 2* sets them to 365 days, the maximum value observed in the data. Maximum delay is set ex-ante in the COIs. *No vote necessary* is a dummy variable equal to one if redemption notice is sufficient and if no vote by other investors is necessary for redemption to take place. *Class vote* is a dummy variable equal to one is redemption vote takes place at the class level. The omitted case is voting by all prefered shareholders. *Annual installments* is the number of annual installments. Robust standard errors are reported. Because robust standard errors are not defined in the class vote regressions with unicorn fixed effects in column 5 of Panel C, these results are omitted. *, **, and *** indicate statistical significance at 10%, 5%, and 1%.

	Months until redemption	Delay after notice 1	Delay after notice 2	No vote necessary	Class vote	Annual installments
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: OLS						
MFs	−3.663	−26.581***	−82.620***	0.046	0.037	−0.575**
	(5.112)	(7.135)	(13.402)	(0.048)	(0.061)	(0.284)
N	126	104	122	126	126	128
Adjusted R^2	−0.002	0.055	0.091	0.004	−0.004	0.027
Panel B: Year and Round FEs						
MFs	−3.803	−18.003***	−96.303***	0.037	0.046	−0.781**
	(5.726)	(6.113)	(21.397)	(0.051)	(0.078)	(0.326)
N	126	104	122	126	126	128
Adjusted R^2	−0.029	0.089	0.093	0.031	0.062	−0.006
Round FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
Panel C: Unicorn FEs						
MFs	−4.280	−1.900	−1.900	0.032		−0.683***
	(4.318)	(1.596)	(1.571)	(0.037)		(0.237)
N	126	104	122	126		128
Adjusted R^2	0.769	0.984	0.964	0.762		0.870
Unicorn FE	✓	✓	✓	✓		✓

Table 9
Contractual Provisions and Mutual Fund Participation in Financing Round: Matching Analysis

This table reports estimates of the average treatment effect (ATE) using nearest-neighbor matching with Mahalanobis distance. Positive ATE indicates that rounds with mutual fund participation are more likely to have a given contractual provision. Financing rounds with and without mutual fund participation are matched exactly on year and series (capped at Series E). Even-numbered columns also match on log employment and log valuation using Mahalanobis distance. Abadie-Imbens robust standard errors are reported. *, **, and *** indicate statistical significance at 10%, 5%, and 1%.

Panel A: Redemption, IPO, & Control Rights										
	Redemption & IPO						Control			
	Redemption rights		IPO ratchet		Down-IPO veto		Class directors		Protective provisions	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
ATE	0.120***	0.106*	0.083	0.065	0.108*	0.127*	−0.310***	−0.266***	1.007**	0.771*
	(0.047)	(0.058)	(0.054)	(0.065)	(0.057)	(0.072)	(0.051)	(0.059)	(0.460)	(0.457)
N	315	246	314	245	314	245	313	244	314	245
Panel B: Cash Flow Rights										
	Participation rights		Liquidation preference		Liquidation multiple > 1		Cumulative diviends		Cash flow index	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
ATE	−0.107***	−0.110**	−0.084*	−0.195***	−0.014	0.004	0.003	0.012	−0.286***	−0.484***
	(0.039)	(0.046)	(0.046)	(0.060)	(0.040)	(0.046)	(0.036)	(0.043)	(0.107)	(0.137)
N	315	246	315	246	315	246	315	246	315	246

Table 10
Correlation in Contractual Provisions

This table reports the results of the regression analysis of the correlation among contractual provisions in rounds with versus without mutual fund participation. The table regresses each provision on the other provisions, along with round and year fixed effects. Robust standard errors are reported. *, **, and *** indicate statistical significance at 10%, 5%, and 1%.

	Redeem rights	IPO ratchet	Down-IPO veto	Particip rights	Senior liq pref	Liq multiple > 1	Cum. divs	Class directors	Protect provs
Panel A: Rounds with Mutual Fund Participation									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Redemption rights		−0.119*	0.275***	0.193**	−0.032	−0.024	−0.058	−0.114*	−0.231
		(0.062)	(0.084)	(0.084)	(0.129)	(0.022)	(0.043)	(0.066)	(0.614)
IPO ratchet	−0.254*		0.649***	−0.127	0.060	0.066	−0.022	−0.274**	−0.213
	(0.134)		(0.121)	(0.080)	(0.166)	(0.053)	(0.077)	(0.117)	(0.898)
Down-IPO veto	0.452***	0.500***		0.012	0.061	0.069	0.121	0.401***	−1.191
	(0.123)	(0.101)		(0.068)	(0.171)	(0.047)	(0.104)	(0.117)	(0.938)
Participation rights	0.415**	−0.128*	0.016		−0.220**	−0.005	0.030	0.165	3.237***
	(0.174)	(0.072)	(0.089)		(0.110)	(0.027)	(0.031)	(0.117)	(1.201)
Senior liq pref	−0.034	0.031	0.040	−0.111**		−0.044	0.020	0.049	2.010**
	(0.140)	(0.084)	(0.115)	(0.051)		(0.034)	(0.077)	(0.071)	(0.987)
Cumulative dividends	−0.227	0.289**	0.393**	−0.024	−0.382**		−0.169	−0.335**	3.195
	(0.144)	(0.127)	(0.155)	(0.114)	(0.190)		(0.179)	(0.149)	(2.304)
Liq multiple > 1	−0.322*	−0.058	0.409	0.077	0.103	−0.100		−0.291**	−0.671
	(0.168)	(0.196)	(0.294)	(0.064)	(0.375)	(0.117)		(0.144)	(1.212)
Class directors	−0.238*	−0.269**	0.511***	0.160	0.096	−0.075	−0.110		0.923
	(0.129)	(0.103)	(0.109)	(0.119)	(0.146)	(0.051)	(0.073)		(1.237)
Class protect provisions	−0.004	−0.002	−0.011	0.023*	0.029*	0.005	−0.002	0.007	
	(0.010)	(0.006)	(0.008)	(0.013)	(0.015)	(0.006)	(0.004)	(0.009)	
N	109	109	109	109	109	109	109	109	109
Adjusted R^2	0.222	0.399	0.526	0.221	0.024	0.095	−0.026	0.199	0.117
Panel B: Rounds without Mutual Fund Participation									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Redemption rights		0.046	0.088*	0.074	−0.095***	0.090***	0.016	0.089	0.132
		(0.036)	(0.049)	(0.050)	(0.036)	(0.034)	(0.025)	(0.081)	(0.310)
IPO ratchet	0.106		0.464***	−0.041	0.009	0.030	0.124**	−0.205*	0.581
	(0.082)		(0.082)	(0.073)	(0.076)	(0.044)	(0.062)	(0.123)	(0.433)
Down-IPO veto	0.090*	0.203***		0.057	0.158***	−0.028	0.012	0.127	−0.336
	(0.050)	(0.044)		(0.048)	(0.048)	(0.026)	(0.031)	(0.089)	(0.347)
Participation rights	0.059	−0.014	0.045		−0.032	−0.008	0.017	0.362***	0.595**
	(0.040)	(0.025)	(0.038)		(0.038)	(0.019)	(0.023)	(0.088)	(0.273)
Senior liq preference	−0.095***	0.004	0.155***	−0.040		0.103***	0.097***	0.323***	0.487
	(0.036)	(0.033)	(0.047)	(0.047)		(0.035)	(0.032)	(0.105)	(0.373)
Cumulative dividends	0.233***	0.033	−0.071	−0.025	0.267***		−0.005	−0.095	−0.035
	(0.085)	(0.048)	(0.067)	(0.063)	(0.079)		(0.043)	(0.159)	(0.556)
Liq multiple > 1	0.054	0.174**	0.038	0.068	0.318***	−0.007		0.406*	−0.690
	(0.082)	(0.084)	(0.100)	(0.092)	(0.092)	(0.054)		(0.215)	(0.621)
Class directors	0.018	−0.018*	0.026	0.094***	0.067***	−0.008	0.026*		0.732***
	(0.017)	(0.011)	(0.018)	(0.019)	(0.021)	(0.013)	(0.014)		(0.151)
Class protect provisions	0.002	0.004	−0.005	0.012**	0.008	−0.000	−0.003	0.058***	
	(0.005)	(0.003)	(0.006)	(0.006)	(0.006)	(0.004)	(0.003)	(0.014)	
N	625	625	625	625	625	625	625	625	625
Adjusted R^2	0.036	0.147	0.128	0.085	0.126	0.062	0.079	0.190	0.066
Year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Round FE	✓	✓	✓	✓	✓	✓	✓	✓	✓

Table 11
Contractual Provisions and Fund Characteristics

This table reports the results of the regressions of contractual provisions on the characteristics of mutual funds participating in the round:

$$Provision_{i,k} = \alpha + \gamma' \mathbf{X}_{i,k} + \varepsilon_{i,k}$$

where i indexes firms and k indexes financing rounds. The sample is limited to rounds with mutual fund participation. In Panel A, fund characteristics are value-weighted averages across all mutual funds participating in the round; in Panel B fund characteristics refer to the lead mutual fund, i.e., the fund acquiring the largest number of shares across all mutual funds participating in the round. Round and year fixed effects are included in all specifications. Robust standard errors are reported. *, **, and *** indicate statistical significance at 10%, 5%, and 1%.

	Redeem rights	IPO ratchet	Down-IPO veto	Class directors	Protect provs	Particip rights	Senior liq pref	Liq mult > 1	Cum. divs	Cash flow index
					Panel A: Value-Weighted					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Family size	0.035	0.031	−0.035	−0.019	−0.314	−0.017	0.077*	−0.024	0.006	0.119
	(0.046)	(0.036)	(0.060)	(0.046)	(0.357)	(0.028)	(0.045)	(0.024)	(0.013)	(0.092)
Flow volatility	0.118**	0.063	0.113**	0.030	−0.700*	−0.011	0.054	−0.000	0.019	0.115
	(0.050)	(0.042)	(0.049)	(0.042)	(0.386)	(0.033)	(0.042)	(0.012)	(0.025)	(0.082)
Management fee	−0.001	0.043	0.063	−0.069**	0.085	0.029	0.030	0.009	0.031	0.129*
	(0.047)	(0.033)	(0.040)	(0.034)	(0.390)	(0.049)	(0.030)	(0.009)	(0.035)	(0.068)
N	100	100	100	100	100	100	100	100	100	100
Adjusted R^2	0.088	0.078	0.097	0.031	0.025	−0.024	0.023	−0.037	0.045	0.051
					Panel B: Lead Fund					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Family size	0.063	0.016	−0.016	0.017	−0.209	0.028	0.078**	−0.021	0.015	0.179**
	(0.046)	(0.041)	(0.050)	(0.032)	(0.377)	(0.023)	(0.036)	(0.021)	(0.013)	(0.076)
Flow volatility	0.131**	0.062	0.115**	0.039	−0.701*	0.002	0.062	−0.002	0.023	0.147*
	(0.053)	(0.044)	(0.051)	(0.045)	(0.392)	(0.036)	(0.044)	(0.013)	(0.026)	(0.085)
Management fee	0.007	0.037	0.069*	−0.058**	0.123	0.043	0.029	0.010	0.033	0.145**
	(0.049)	(0.034)	(0.040)	(0.029)	(0.415)	(0.052)	(0.032)	(0.010)	(0.037)	(0.068)
N	100	100	100	100	100	100	100	100	100	100
Adjusted R^2	0.098	0.075	0.094	0.030	0.022	−0.018	0.028	−0.040	0.052	0.076
Year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Round FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Appendix A

Table A1
Variable Definitions

This table provides the definitions of the variables in the paper. For round-level variables that are explained in detail in the main text, this table provides a summary for brevity.

Variable	Definition
	Fund-Level Variables
Fund size	Log of the fund's total net assets (TNA), expressed in millions of current dollars.
Family size	Log of the aggregate fund TNA, expressed in millions of current dollars, across all CRSP mutual funds within the same fund family.
Flow volatility	Standard deviation of monthly fund flows over the preceding twelve months. Fund flows are calculated as $\frac{TNA_t-(1+R_t)\times TNA_{t-1}}{TNA_{t-1}}$.
Management fee	Fund management fee as a percent of fund TNA from CRSP.
Institutional share	Following Chen, Goldstein and Jiang (2010), a share class is institutional if a) CRSP's institutional dummy is equal to Y and retail dummy is equal to N, or b) fund name includes the word institutional or its abbreviation, or c) class name includes one of the following suffixes: I, X, Y, or Z. Share classes with the word retirement in their name or suffixes J, K, and R are retail.
Unicorns portfolio share	Fund holdings of unicorns in the sample divided by fund TNA.
	Round/Series-Level Variables
Valuation	Post-money valuation, in millions of current dollars, as calculated by VC Experts.
Liquidation preference	Whether a series is senior to its closest previous series.
Liquidation multiple > 1	Whether the liquidation multiple of a given series is greater than one.
Participation rights	Whether a series has full participation rights.
Cumulative dividends	Whether the dividends of a series are cumulative.
Full ratchet	Whether a series has full-ratchet anti-dilution provisions.
Redemption rights	Whether a series has redemption rights.
Months until redemption	Number of months until investors can redeem shares.
Delay after notice	Maximum number of days from the time investors submit redemption notice to the first redemption payment.
No vote necessary	Whether no vote by other investors is necessary for redemptions.
Class vote	Whether the redemption vote is at the class level.
Annual installments	Number of delayed annual installments allowed for redemption payments.
IPO ratchet	Whether a series has IPO ratchet.
Down-IPO veto rights	Whether a series has down-IPO veto rights.
Class directors	The number of directors that a series can vote as a separate class.
Total directors	The weight-adjusted total number of directors that a series can vote.
Class protective provisions	The number of protective provisions that a series can vote as a separate class.
Total protective provisions	The weight-adjusted number of total protective provisions that a series can vote
MFs	Binary variable equal to one for rounds with at least one mutual fund investing.
MF share	The share of the financing round that is funded by mutual funds.
VC experience	Gompers et al (2010) measure of VC firm experience: the difference between the log of one plus the number of investments made by VC firm f prior to year t and the average in year t of the log of one plus the number of investments made by all other VC firms prior to year t. Information on VC firm investments is from Capital IQ. For each startup-VC pair, we take the date of the first investment by the VC firm into the startup. The sample of VC firms consists of firms whose description in Capital IQ mentions the phrase "venture capital."

Table A2
Controlling for Existing Directors

This table reports the results of the regressions in Table 7 while controlling for the total number of existing directors. Robust standard errors are reported. *, **, and *** indicate statistical significance at 10%, 5%, and 1%.

Panel A: Redemption, IPO, & Control Rights										
	Redemption & IPO						Control			
	Redemption rights		IPO ratchet		Down-IPO veto		Class directors		Protective provisions	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
MFs	0.189***	0.071*	0.022	0.004	0.172***	0.082**	−0.391***	−0.102	0.818*	0.997***
	(0.052)	(0.040)	(0.042)	(0.039)	(0.052)	(0.040)	(0.075)	(0.070)	(0.447)	(0.258)
Ln(Employees)	0.078***	0.035	0.043***	−0.043	0.061***	−0.061*	0.176***	−0.041	0.233	−0.352
	(0.016)	(0.029)	(0.012)	(0.028)	(0.015)	(0.032)	(0.035)	(0.091)	(0.163)	(0.340)
Ln(Valuation)	−0.063***	0.007	−0.013	0.011	−0.072***	0.009	−0.018	0.093	0.125	0.293
	(0.016)	(0.019)	(0.011)	(0.024)	(0.016)	(0.024)	(0.032)	(0.062)	(0.132)	(0.269)
Num. existing directors	0.015	0.017	0.028***	0.028*	0.036***	0.004	0.043**	−0.197***	0.118	−0.513**
	(0.010)	(0.012)	(0.010)	(0.015)	(0.012)	(0.016)	(0.018)	(0.051)	(0.087)	(0.198)
N	519	519	517	517	518	518	516	516	517	517
Adjusted R^2	0.064	0.828	0.048	0.511	0.068	0.815	0.164	0.711	0.029	0.620
Panel B: Cash Flow Rights										
	Participation rights		Liquidation Preference		Liquidation multiple > 1		Cumulative diviends		Cash flow index	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
MFs	−0.071	−0.024	−0.023	0.022	−0.028	−0.063	−0.009	−0.067*	−0.156	−0.110
	(0.044)	(0.042)	(0.051)	(0.054)	(0.026)	(0.042)	(0.021)	(0.035)	(0.118)	(0.136)
Ln(Employees)	0.046**	0.047	−0.004	0.040	0.011	0.006	−0.001	0.030	0.050	0.163
	(0.022)	(0.030)	(0.020)	(0.045)	(0.007)	(0.021)	(0.008)	(0.024)	(0.043)	(0.104)
Ln(Valuation)	−0.089***	−0.108***	−0.035**	−0.040	−0.008	−0.014	−0.022**	−0.004	−0.190***	−0.207**
	(0.019)	(0.030)	(0.018)	(0.043)	(0.009)	(0.019)	(0.011)	(0.029)	(0.048)	(0.102)
Num. existing directors	0.025**	−0.020	−0.006	−0.008	0.010	0.032	−0.003	−0.012	0.020	−0.016
	(0.012)	(0.013)	(0.011)	(0.026)	(0.007)	(0.019)	(0.006)	(0.021)	(0.029)	(0.063)
N	519	519	519	519	519	519	518	518	518	518
Adjusted R^2	0.111	0.749	0.009	0.529	0.013	0.231	0.023	0.462	0.051	0.561
Round FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Unicorn FE		✓		✓		✓		✓		✓

Table A3
Contractual Provisions and Mutual Funds Share of the Financing Round

This table reports the results of regressions of contractual provisions on the mutual funds share of the financing round:

$$Provision_{i,k} = \alpha + \beta_0 \cdot MF\ share_{i,k} + \beta_1 \cdot Ln(Employees)_{i,k} + \beta_2 \cdot Ln(Valuation)_{i,k} + \varepsilon_{i,k}$$

where i indexes firms and k indexes financing rounds. *MF share* is the share of the financing round that is funded by mutual funds. Contractual provisions are defined in Section 2.4 and summarized in Table A1 in the Appendix. Robust standard errors are reported. *, **, and *** indicate statistical significance at 10%, 5%, and 1%.

Panel A: Redemption, IPO, & Control Rights										
	Redemption & IPO						Control			
	Redemption rights		IPO ratchet		Down-IPO veto		Class directors		Protective provisions	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
MF share	0.335***	0.057	0.223*	0.184*	0.210*	0.038	−0.767***	−0.377***	1.963***	1.921***
	(0.114)	(0.073)	(0.116)	(0.104)	(0.112)	(0.094)	(0.118)	(0.135)	(0.721)	(0.509)
Ln(Employees)	0.078***	0.039	0.046***	−0.050*	0.064***	−0.054*	0.185***	−0.029	0.239	−0.313
	(0.016)	(0.030)	(0.012)	(0.028)	(0.015)	(0.032)	(0.035)	(0.100)	(0.161)	(0.357)
Ln(Valuation)	−0.059***	0.015	−0.023**	0.013	−0.071***	0.015	−0.043	0.063	0.118	0.297
	(0.016)	(0.019)	(0.011)	(0.024)	(0.016)	(0.025)	(0.030)	(0.066)	(0.128)	(0.278)
N	519	519	517	517	518	518	516	516	517	517
Adjusted R^2	0.054	0.825	0.043	0.516	0.035	0.813	0.155	0.686	0.030	0.601
Panel B: Cash Flow Rights										
	Participation rights		Liquidation Preference		Liquidation multiple > 1		Cumulative diviends		Cash flow index	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
MF share	−0.085	−0.030	−0.033	−0.021	−0.059	−0.158**	0.008	−0.086	−0.203	−0.316
	(0.102)	(0.061)	(0.112)	(0.106)	(0.045)	(0.075)	(0.052)	(0.055)	(0.236)	(0.254)
Ln(Employees)	0.050**	0.046	−0.004	0.043	0.013*	0.006	−0.001	0.027	0.054	0.165
	(0.022)	(0.029)	(0.020)	(0.045)	(0.007)	(0.021)	(0.008)	(0.024)	(0.043)	(0.102)
Ln(Valuation)	−0.099***	−0.112***	−0.035**	−0.039	−0.011	−0.014	−0.022**	−0.010	−0.203***	−0.215**
	(0.018)	(0.031)	(0.017)	(0.044)	(0.008)	(0.018)	(0.010)	(0.028)	(0.047)	(0.100)
N	519	519	519	519	519	519	518	518	518	518
Adjusted R^2	0.101	0.748	0.010	0.530	0.009	0.223	0.024	0.457	0.051	0.563
Round FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Unicorn FE		✓		✓		✓		✓		✓

Appendix B

In this Appendix, we discuss the concern that redemption right provisions might be "boilerplate" that have few legal or economic ramifications. To address this concern and to show the importance of redemption rights, we summarize:

- three cases where investors exercised their redemption rights, and these moves led to extensive and protracted litigation;
- the National Venture Capital Association's effort to strengthen redemption rights in response to the judicial rulings in the above-mentioned cases; and
- structured interviews with lawyers representing some of the largest VCs and mutual funds with investments in private firms regarding their use of redemption rights.

B.1 Cases that illustrate the exercise of redemption rights

We begin with a discussion of three legal cases revolving around the use of the redemption right provisions. Not only do these cases illustrate that these rights are exercised in practice, but also that firms are willing to engage in protracted and costly litigation to define the breadth of these provisions.

The ThoughtWorks Case.[1] ThoughtWorks, Inc. is a Delaware corporation providing software design. In April 2000, SV Investment Partners, LLC (collectively, "SVIP") purchased over 94% of ThoughtWorks Series A Preferred Stock for $26.6 million. According to the COI dated April 5, 2000, SVIP was granted redemption rights "for cash out of any funds legally available therefor" beginning five years after issuance. At the time of the investments, all parties

[1] See SV INVESTMENT PARTNERS, LLC, Schroder Ventures U.S. Fund L.P. 1, Schroder Ventures U.S. Fund L.P. 2, Sitco Nominees, Ltd. VC 04001, and SV (Nominees) Limited, Plaintiffs, v. THOUGHTWORKS, INC., Defendants. C.A. No. 2724-VCL. Court of Chancery of Delaware.

anticipated a rapid IPO, but the precipitous decline in the valuation of young technology stocks precluded that possibility.

Between 2003 and early 2005, ThoughtWorks and SVIP explored ways to redeem SVIP's preferred stock. After no avenue to raise the needed amount of financing presented itself, ThoughtWorks formally offered to redeem all of SVIB's outstanding Preferred Stock for $12.8 million. SVIP rejected the offer and in May 2005 exercised its redemption rights. The Board highlighted its limited working capital and concluded that "funds required to fund the working capital requirements of the Company [were] an amount in excess of available cash." Because of the resulting lack of usable cash, the Board declined to redeem SVIP's shares of Preferred Stock. In the quarters that followed, ThoughtWorks made only small redemptions of preferred shares (about $4 million, or less than 10% of the total amount of principal plus dividends outstanding).

In 2007, SVIP sued ThoughtWorks. In a 2010 decision, the Court of Chancery rejected SVIP's contention that "funds legally available" meant the firm's accounting surplus. Rather, it held that "funds legally available" meant "cash funds on hand that can be legally disbursed for redemption without violating 8 Del. C. § 160 [which prohibit issuers from redeeming preferred stock under certain conditions, such as where the redemption would impair the capital of the issuer] or any other statutory or common law." The Delaware Supreme Court upheld this decision in 2011. Legal commentators highlighted that the decision suggested that investors needed to refine the language in preferred stock agreements: in particular, most redemption and dividend rights are contractually limited to "funds legally available." Given that the courts interpreted the phrase narrowly and provided broad discretion to the boards of companies to determine the amounts to distribute, the decisions suggested the needed for strengthening these provisions.

The TradingScreen Case.[2] TradingScreen is a Delaware corporation providing electronic trading solutions. In 2007, TCV VI, L.P. and TCV Member Fund L.P. (collectively, "TCV") bought 4.34 million shares of TradingScreen's Series D Preferred Stock for a total purchase price of almost $66 million. TCV's investment represented 60.43% of TradingScreen's preferred stock.

On September 12, 2007, TradingScreen filed an amended and restated Certificate of Incorporation granting TCV (and other holders of the preferred stock) redemption rights. The COI stated that three months before the fifth anniversary of the preferred stock issuance, the holders of a majority of preferred stock could ask TradingScreen for assistance in selling their shares. If after nine months, these preferred stockholders were unable to sell their shares on acceptable terms, they could require TradingScreen to purchase their shares.

The COI also described how the redemption price would be determined. TradingScreen and majority holders of the preferred stock had to first negotiate in good faith to determine the preferred stock's fair market value. If they could not reach an agreement within twenty days, then the redemption price would be determined by an independent financial adviser that was acceptable to both parties. TradingScreen must then redeem tendered shares in three equal installments on the six-month, twelve-month, and eighteen-month anniversaries of the "Redemption Date." If TradingScreen fails to make these payments, the unpaid amount will accrue a 13% interest rate.

On June 12, 2012, TCV exercised its right to ask TradingScreen for assistance in selling TCV's shares. After no buyer could be found, on March 14, 2013, TCV demanded that TradingScreen redeem TCV's shares. Because TCV and TradingScreen could not reach an

[2] See TCV VI, L.P., TCV MEMBER FUND, L.P., and CONTINENTAL INVESTORS FUND LLC, Plaintiffs, v. TRADINGSCREEN INC., PHILIPPE BUHANNIC, PIERO GRANDI, PIERRE SCHROEDER, and PATRICK BUHANNIC, Defendants. C.A. No. 10164-VCL. Court of Chancery of Delaware.

agreement on the fair market value of the preferred stock, the determination was made by an independent financial adviser. TradingScreen then formed a special committee of the board of directors that determined that TradingScreen had only $7.2 million legally available for the redemption of Series D Preferred Stock. TCV sued, asking the Court of Chancery of Delaware to force TradingScreen to redeem all of the tendered shares and to pay a 13% interest rate on any unpaid amounts due.

In its complaint, TCV argued that 8 Del. C. § 160 of the Delaware General Corporation Law provided the only limitation on TradingScreen's obligation to redeem preferred stock. Vice Chancellor John W. Noble disagreed ruling that "In addition to the strictures of Section 160, the undoubted weight of authority teaches that a corporation cannot purchase its own shares of stock when the purchase diminishes the ability of the company to pay its debts or lessens the security of its creditors."

The ODN Holding Corporation Case.[3] In 2008, funds sponsored by Oak Hill Capital Partners (Oak Hill) invested $150 million into Oversee.net, setting up the ODN Holding Corporation (ODN) as the holding company. In exchange for its investment, Oak Hill received shares of Series A Preferred Stock.

In 2009, Oak Hill became ODN's controlling shareholder by purchasing $24 million of common stock from one of the existing shareholders. Two years later, ODN switched into liquidation mode: it stopped making acquisitions and sold two out of its four businesses. When

[3] See THE FREDERICK HSU LIVING TRUST, Plaintiff, v. ODN HOLDING CORPORATION, OAK HILL CAPITAL PARTNERS III, L.P., OAK HILL CAPITAL MANAGEMENT PARTNERS III, L.P., OHCP GENPAR III, L.P., OHCP MGP PARTNERS III, L.P., OHCP MGP III, LTD., ROBERT MORSE, WILLIAM PADE, DAVID SCOTT, DEBRA DOMEYER, JEFFREY KUPIETZKY, ALLEN MORGAN, LAWRENCE NG, SCOTT JARUS, KAMRAN POURZANJANI, ELIZABETH MURRAY, TOOD H. GREENE, and SCOTT MORROW, Defendants. C.A. No. 12108-VCL. Court of Chancery of Delaware.

Oak Hill exercised its redemption rights in 2013, ODN used as much of its cash as possible, including cash generated from the previous asset sales, to redeem Oak Hill's preferred stock.

The founder and common shareholders sued Oak Hill as the controlling shareholder for breach of fiduciary duty. The case is still ongoing, but the proceedings in the *ODN* case to date highlight the potential tension between liquidity/redemption rights and control rights. The court noted, for instance, that most of the directors were conflicted due to their relationships with Oak Hill and that the act of exercising redemption rights set up a conflict of interest between holders of the preferred stock with redemption rights and the shareholders at large.

Overall, these three cases clearly demonstrate that redemption rights are exercised ex-post and are of real economic importance, so much so that firms and investors are willing to engage in costly and protracted litigation over them. According to our structured interviews with lawyers representing some of the largest VCs and mutual funds with investments in private firms, there exist numerous other cases in which holders of preferred stock with redemption rights exercised their rights, but where the decisions were not litigated, or elsewhere the cases settled before a judicial decision was issued.

B.2 NVCA's proposal to strengthen redemption rights

The National Venture Capital Association (NVCA) is the main organization of U.S.-based VCs, corporate venture investors, and individuals dedicated to professionally investing private capital in new companies. Among other activities, it provides model forms for various contracts, including COIs, between entrepreneurial firms and their investors. The emphasis that this group has placed on refining redemption rights in light of the decisions above also highlights the importance of these provisions.

More specifically, in 2018, the NVCA modified the Model Form COI to provide for the accrual of a high rate of interest on the redemption price payable with respect to shares of stock that are subject to a redemption request that has been unfulfilled by the company. According to the NVCA, the proposed language was added in light of the rulings of the Delaware Court of Chancery in cases such as *Trading Screen*, *ThoughtWorks*, and *ODN Holding Corporation*.[4]

In particular, the proposed provision was seen as a way to provide an economic inducement for firms to redeem preferred shares, regardless of the reason for the failure to redeem. (This refinement was designed to render irrelevant disputes as to whether failure to redeem shares constitutes technical default). Moreover, the NVCA believed that by making the failure to redeem shares very costly, it would be hard for a board to justify not redeeming preferred shares, even in a company under financial stress. As the NVCA noted, "absent an increasing redemption obligation, the holders of redeemable stock are in a relatively weak contractual position to cause the corporation to redeem their shares and that the board of directors may have an obligation to leverage such weak position for the benefit of the corporation and its residual claimants..."[5]

According to the NVCA, the proposed changes in the guidance of redemption rights was the culmination of a large group undertaking that included participation from many law firms and in-house venture capital lawyers from across the US. The substantial investment in this process clearly suggests that shareholders value redemption rights and acted jointly to improve the exercisability of redemption rights.

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[4] See Morse, Barnes-Brown & Pendleton, PC, "The Continued Evolution of the NVCA Documents: A Summary of Major Changes," December 18, 2018, https://blogmbbp.wordpress.com/2018/12/18/the-continued-evolution-of-the-nvca-documents/.

[5] National Venture Capital Association, "Amended and Restated Certificate of Incorporation," January 2018, http://nvca.org/wp-content/uploads/2019/06/NVCA-Model-Document-Certificate-of-Incorporation.docx, footnote 75.

B.3 Structured interviews on the importance of redemption rights

The two subsections above provide evidence that redemption rights are indeed important in the real would. To understand better why investors in privately held firms view redemption rights to be important, we conducted structured interviews with lawyers representing some of the largest VCs and mutual funds with investments in private firms, asking specific questions about redemption rights.

Because our focus here is on better understanding the economic rationale underlying a single contractual provision, we chose to conduct structured interviews instead of standardized surveys. Surveying VCs and mutual fund investors in general is challenging because these investors are time-constrained and reluctant to share proprietary details about their operations. Moreover, the understanding of a specific highly technical contractual provision is likely to be highly confined to key legal personnel. We felt that one-on-one structured interviews with lawyers specializing in such investments with pre-provided open-ended questions on the usefulness and economic importance of redemption rights would yield the most insights.

To increase the participation rate, we focused the participating interview population to alumni from Harvard University and those who have had a working relationship with the University. We contacted nine lawyers (including those at venture firms, mutual fund companies, and in private practice) and conducted interviews with seven of them. As is typically the case with structured interviews, our sample may not be perfectly representative of the universe of institutional investors investing in private firms. However, we see no reason to believe the sample of responding interviewees should bias our results toward redemption rights being either useful or not, particularly given the open-ended nature of the structured questions.

We summarize the interviews below with de-identified quotes when they are helpful. Overall, all interviewees agreed that while redemption rights are exercised infrequently, they are considered to be important for three main reasons.

First, redemption rights are viewed as one of the strongest forms, if not the strongest one, of downside protection to investors. In contrast to other major cash flow-based downside protections that can be only triggered by a deemed liquidation event, redemption rights can be triggered directly by the shareholders themselves (subject to the limitations in the preferred stock agreement) when they believe the firm is not going in the right direction. One interviewee highlighted the power of these protections: "[W]hen there is a meltdown, redemption rights play a key role. These are especially important when filing companies have good technology that can be sold. Redemption rights become important in the mid-to-end stage." In light of the recent legal decisions regarding the exercise of redemption rights, another interviewee pointed that

> [R]edemption rights do indeed have some "bite." The *ThoughtWorks* case made clear that there were limits here: in particular, that preferred stock is treated as equity and not debt. Thus, the VCs have to consider the interests of the firm (the fiduciary duty of the equity holders) and cannot force the firm into bankruptcy when exercising their redemption rights, or even put the firm in such a weakened condition that it will be unable to be able to pursue opportunities. Thus, these rights are most useful not when there is a sudden collapse of a firm (such as WeWork) but rather [when there is] a stasis or a long slow decline. In these cases, the VCs can exercise their redemption rights and get out without destroying the firm.

Second, redemption rights serve as a strong threat point to incentivize private firms to change their behavior. First, they implicitly push firms to focus on going public. Shareholders automatically lose the redemption rights when the underlying firms go public (due to the automatic conversion of preferred stock to common shares in IPOs that meet certain pre-specified criteria). Thus, entrepreneurs can eliminate this threat by going public faster.

By the same token, as long as the firm remains private, shareholders with redemption rights can use these rights as a threat point. One interviewee mentioned that "[T]he threat to redeem more frequently is sufficient to bring management to the table and achieve the VC's desired ends." Another interviewee mentioned that

> [T]he real purpose of redemption rights is to push a company into an IPO or an acquisition. The threat of a demand to repurchase shares may be to force the management of a company into a deal that they would otherwise be unwilling to do. It allows (albeit indirectly) the investors to achieve liquidity of shares. It is certainly not a founder-friendly term.

Third, redemption rights can help investors with liquidity management. The interviewees noted that the emphasis on liquidity issues had historically varied across the venture community. One interviewee, for instance, mentioned: "[T]raditionally, there were two cultures: West Coast VCs swung for the fences and eschewed the use of redemption rights, while the East Coast firms were most risk-adverse and focused on protecting downside through provisions such as redemption rights and accruing dividends."

The interviewee went on to note that these differences had eased, and that "now the disparity is more between the VCs and the more financially oriented investors, who are much more likely to push for the provisions." Numerous other interviewees noted that later-stage non-VC investors were likely to be especially sensitive to liquidity concerns. Both lawyers working with VCs and mutual funds noted that these considerations were most important for non-VC investors, who were often more subject to short-term financial objectives and constraints. Even in cases where initial investments in start-up firms were a very modest share of the mutual fund's overall portfolio, they suggested, if the investments (or a subset of them) appreciated sharply in value, concerns about liquidity often emerged.

One respondent also highlighted non-VC shareholders' differing objective functions, stating

> Folks who are not VCs who do VC deals--private equity, hedge funds, etc.—are much more likely to be focused on downside options. There is an economic rationale: from [a mutual fund company's] perspective, getting one's money back is important because they will have fewer home runs. For [a top-tier VC firm], this is much less a big deal, given the distribution of their returns. Many financial investors also have a stigma associated with an investment that yields zero, while traditional Series A VCs expect a .200 batting average.

Other observers also highlighted the inability of many financial investors to provide effective governance, arguing that most know little about the processes of starting up and scaling. As a result, their negotiation priorities are unlikely to focus on governance, but instead on provisions for liquidity.

These concerns also have a strong cyclical element, a number of interviewees asserted. One respondent highlighted that "[W]hile issues with redemption rights have not been terribly frequent in the past five years, they may get considerably more prominence with the seeming collapse of so many unicorns and the painful negotiations that have ensured. Moreover, many LPs are starving for liquidity and pressuring GPs for exits."

Online Appendix for

Mutual Funds as Venture Capitalists? Evidence from Unicorns

This Online Appendix

1. reports the SAS code that we use to extract holdings of unicorns in our sample,
2. compares CRSP's coverage of mutual fund holdings of unicorns with the 2016 Morningstar report to confirm that CRSP Mutual Fund Database offers comprehensive coverage of unicorns in our sample;
3. shows that the results in Table 7 on the association between mutual fund participation in a financing round and contractual provisions is robust to controlling for
   - presence of VCs who invested in the previous round (Table OA2),
   - round direction (Table OA3),
   - industry fixed effects (Table OA4);
4. shows that that the results in Table 11 on the association between the characteristics of mutual funds participating in a financing round and contractual provisions is robust to controlling for the share of the funds' portfolios invested in restricted securities (Table OA5).

1 SAS code to extract holdings of unicorns from the CRSP Mutual Fund database

```
* SAS code to extract holdings of unicorns from the CRSP Mutual Fund database;
*
* 1. For each unicorn construct a regular expression to get holdings of that unicorn;
* 2. Append individual unicorn data sets together to create one unicorns dataset;
*
* Exclude observations with valid CUSIP, PERMNO, or maturity_dt as these are publicly traded or debt issues

%let wrds = wrds.wharton.upenn.edu 4016;
options comamid = TCP remote = WRDS;
signon username = _prompt_;

* local directory in which to save the resulting data set
%let unicorns = ;

rsubmit;

data unicorns;
 length unicorn $ 80;
 unicorn = "";
run;

%macro getUnicorn(prx=, filename=, unicorn=);
data unicorn;
 length unicorn $ 80;
     set crsp.holdings;
     where prxmatch(&prx, security_name)
     and missing(cusip)
   and missing(permno)
   and missing(maturity_dt);
 unicorn = &unicorn;
 drop cusip permno permco ticker maturity_dt;
run;
data unicorns;
 set unicorns unicorn;
run;
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endrsubmit;

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2 CRSP Database Coverage of Unicorn Holdings

To confirm that CRSP Mutual Fund Database offers comprehensive coverage of unicorns in our sample, we compared aggregated holdings of unicorns in CRSP with the 2016 Morningstar report on mutual fund holdings of unicorns. Morningstar used the holdings data that mutual funds report to Morningstar to tabulate the number of funds holding each of 163 private companies, as well as the value of their holdings. There are 55 companies in common between Morningstar's list and our sample of unicorns. There are two reasons why the overlap is less than perfect. First, some of the unicorns in our sample had been acquired, gone public, or gone out of business by 2016Q2. Second, Morningstar's list includes firms that would not qualify for our list because they are incorporated abroad or have not reached $500 million valuation.

Table OA1 compares holdings of unicorns according to CRSP versus Morningstar data.

Table OA1
Mutual Fund Holdings of Unicorns According to CRSP versus 2016 Morningstar Report

This table compares CRSP's coverage of mutual fund holdings of unicorns with the 2016 Morningstar report.

	Num funds invested		Aggregate holdings ($ mil)	
Firm	Morningstar	CRSP	Morningstar	CRSP
1Life Healthcare	12	12	24	25
23andMe	7	7	41	41
Airbnb	26	44	525	600
ANI Technologies	1	2	51	57
AppNexus	8	9	62	65
Apptio	12	13	45	45
Blue Apron	11	12	140	140
Cloudera	33	44	293	300
Coupang	0	0	0	0
Coupa Software	3	3	34	34
CureVac	1	2	30	33
Deem	1	1	0	0
Delivery Hero	12	19	52	54
DocuSign	17	25	114	123
Domo	9	11	173	114
DraftKings	13	23	74	76
Dropbox	40	66	390	351
Eventbrite	1	1	55	55
Evernote	2	2	13	13
Flipkart	25	33	315	233
ForeScout	5	6	19	19
Funding Circle	0	0	0	0
HelloFresh	1	2	50	55
Honest Company	16	30	77	126
Houzz	2	2	28	28
Intarcia	18	4	150	132
Jawbone	0	2	0	7
Jet.com	5	5	92	92
Klarna	4	1	9	0
Lookout	12	15	87	59
Lyft	2	2	3	3
Magic Leap	11	20	148	157
MarkLogic	10	16	31	36
Meituan-Dianping	0	0	0	0
Mode Media	8	7	1	0
Moderna	5	5	86	85
MongoDB	11	14	32	35
Mozido	0	0	0	0
Nutanix	34	40	119	122
Palantir	15	25	204	156
Pinterest	15	21	857	863

Table OA1(continued)
Mutual Fund Holdings of Unicorns According to CRSP versus 2016 Morningstar Report

	Num funds invested		Aggregate holdings ($ mil)	
Firm	Morningstar	CRSP	Morningstar	CRSP
Snapchat	23	30	326	332
Snapdeal	0	0	0	0
Sprinklr	0	0	0	0
Social Finance	2	3	21	23
SpaceX	11	11	232	232
Spotify	2	1	85	26
Stemcentrx	4	4	12	12
Tanium	5	7	36	38
Trion Worlds	4	4	0	2
Uber	52	73	2,556	2,491
WeWork	20	36	661	866
Xiaomi	0	0	0	0
YourPeople/Zenefits	5	5	45	45
Zuora	11	19	35	43

Table OA2
Controlling for Presence of VCs from Previous Round

This table reports the results of the contractual provisions regressions in Table 7, while controlling for whether any VC who participated in the previous round also invested in the current round. Robust standard errors are reported. *, **, and *** indicate statistical significance at 10%, 5%, and 1%.

Panel A: Redemption, IPO, & Control Rights

	Redemption & IPO						Control			
	Redemption rights		IPO ratchet		Down-IPO veto		Class directors		Protective provisions	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
MFs	0.200***	0.060*	0.037	0.001	0.177***	0.075*	−0.397***	−0.074	0.912*	1.168***
	(0.055)	(0.036)	(0.045)	(0.043)	(0.056)	(0.043)	(0.078)	(0.084)	(0.467)	(0.303)
Ln(Employees)	0.086***	0.050	0.047***	−0.042	0.063***	−0.060*	0.210***	−0.039	0.200	−0.342
	(0.018)	(0.035)	(0.014)	(0.031)	(0.018)	(0.032)	(0.038)	(0.112)	(0.185)	(0.440)
Ln(Valuation)	−0.074***	−0.001	−0.020	0.021	−0.080***	0.004	−0.028	0.081	0.084	0.118
	(0.017)	(0.021)	(0.012)	(0.026)	(0.017)	(0.024)	(0.034)	(0.073)	(0.136)	(0.331)
Same VC	−0.003	0.010	−0.018	−0.007	0.019	0.029	0.095	−0.036	0.072	−0.344
	(0.040)	(0.027)	(0.031)	(0.033)	(0.041)	(0.024)	(0.076)	(0.075)	(0.305)	(0.276)
N	481	481	479	479	480	480	479	479	479	479
Adjusted R^2	0.066	0.844	0.030	0.527	0.048	0.817	0.166	0.688	0.020	0.600

Panel B: Cash Flow Rights

	Participation rights		Liquidation Preference		Liquidation multiple > 1		Cumulative diviends		Cash flow index	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
MFs	−0.058	0.014	−0.003	0.053	−0.016	−0.034	−0.008	−0.041	−0.085	−0.008
	(0.046)	(0.043)	(0.053)	(0.055)	(0.028)	(0.047)	(0.021)	(0.032)	(0.079)	(0.095)
Ln(Employees)	0.040	0.046	0.035*	−0.026	0.014	0.039	0.002	0.048*	0.089***	0.108
	(0.026)	(0.032)	(0.019)	(0.051)	(0.009)	(0.032)	(0.008)	(0.026)	(0.034)	(0.077)
Ln(Valuation)	−0.094***	−0.110***	−0.049***	−0.041	−0.016	−0.021	−0.025**	−0.024	−0.185***	−0.194***
	(0.020)	(0.033)	(0.017)	(0.046)	(0.011)	(0.024)	(0.011)	(0.029)	(0.033)	(0.075)
Same VC	0.039	0.011	−0.155***	−0.053	0.013	0.042	−0.082***	−0.027	−0.185**	−0.027
	(0.040)	(0.036)	(0.046)	(0.043)	(0.020)	(0.029)	(0.027)	(0.023)	(0.074)	(0.066)
N	481	481	481	481	481	481	481	481	481	481
Adjusted R^2	0.105	0.750	0.098	0.555	0.001	0.267	0.046	0.483	0.089	0.596
Round FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Unicorn FE		✓		✓		✓		✓		✓

Table OA3
Controlling for Round Direction

This table reports the results of the contractual provisions regressions in Table 7 while controlling for the round direction. *Down* rounds are closed at a lower price than the last financing round. *Flat* rounds are closed at the same price as the last financing round. Robust standard errors are reported. *, **, and *** indicate statistical significance at 10%, 5%, and 1%.

Panel A: Redemption, IPO, & Control Rights										
	Redemption & IPO						Control			
	Redemption rights		IPO ratchet		Down-IPO veto		Class directors		Protective provisions	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
MFs	0.187***	0.075*	0.024	−0.010	0.175***	0.081*	−0.398***	−0.067	0.860*	1.024***
	(0.052)	(0.042)	(0.044)	(0.041)	(0.054)	(0.042)	(0.075)	(0.075)	(0.461)	(0.260)
Ln(Employees)	0.087***	0.035	0.046***	−0.040	0.068***	−0.043	0.182***	−0.030	0.289*	−0.123
	(0.016)	(0.036)	(0.012)	(0.034)	(0.015)	(0.033)	(0.036)	(0.103)	(0.163)	(0.370)
Ln(Valuation)	−0.075***	0.011	−0.020	0.022	−0.082***	−0.009	−0.025	0.072	0.042	0.030
	(0.017)	(0.026)	(0.012)	(0.032)	(0.017)	(0.027)	(0.032)	(0.068)	(0.126)	(0.305)
Down	−0.122	−0.046	0.024	0.007	0.025	−0.040	0.094	−0.036	0.194	0.420
	(0.074)	(0.047)	(0.072)	(0.091)	(0.096)	(0.085)	(0.155)	(0.263)	(0.705)	(0.918)
Flat	−0.249***	−0.056	−0.060	−0.073	−0.064	−0.000	0.047	0.398	−0.752	0.019
	(0.044)	(0.072)	(0.085)	(0.084)	(0.100)	(0.123)	(0.266)	(0.252)	(0.809)	(0.941)
N	490	490	488	488	489	489	487	487	488	488
Adjusted R^2	0.074	0.816	0.021	0.526	0.051	0.828	0.138	0.713	0.027	0.677
Panel B: Cash Flow Rights										
	Participation rights		Liquidation Preference		Liquidation multiple > 1		Cumulative diviends		Cash flow index	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
MFs	−0.075	−0.025	−0.045	0.004	−0.031	−0.072*	−0.008	−0.045	−0.204*	−0.133
	(0.046)	(0.044)	(0.050)	(0.055)	(0.027)	(0.042)	(0.021)	(0.033)	(0.117)	(0.138)
Ln(Employees)	0.049**	0.052	−0.013	0.008	0.013*	−0.015	−0.007	0.017	0.030	0.072
	(0.023)	(0.036)	(0.022)	(0.046)	(0.008)	(0.023)	(0.006)	(0.026)	(0.047)	(0.112)
Ln(Valuation)	−0.092***	−0.116***	−0.026	−0.046	−0.009	−0.004	−0.016	0.003	−0.169***	−0.207*
	(0.020)	(0.037)	(0.018)	(0.051)	(0.010)	(0.024)	(0.010)	(0.027)	(0.049)	(0.117)
Down	0.211**	−0.034	0.311***	0.161	0.047	0.036	0.003	0.029	0.886***	0.352
	(0.099)	(0.088)	(0.107)	(0.150)	(0.065)	(0.099)	(0.044)	(0.077)	(0.265)	(0.422)
Flat	0.112	0.111	0.094	−0.103	−0.052**	−0.137	0.260*	0.198	0.512	−0.036
	(0.126)	(0.071)	(0.126)	(0.160)	(0.021)	(0.105)	(0.133)	(0.150)	(0.365)	(0.472)
N	490	490	490	490	490	490	489	489	489	489
Adjusted R^2	0.107	0.747	0.026	0.569	0.006	0.239	0.049	0.531	0.077	0.591
Round FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Unicorn FE		✓		✓		✓		✓		✓

Table OA4
Controlling for Industry Fixed Effects

This table reports the results of the contractual provisions regressions in Table 7 while controlling for industry fixed effects. Industry definitions are from Capital IQ. There are 31 unique industries in the sample. Robust standard errors are reported. *, **, and *** indicate statistical significance at 10%, 5%, and 1%.

Panel A: Redemption, IPO, & Control Rights										
	Redemption & IPO						Control			
	Redemption rights		IPO ratchet		Down-IPO veto		Class directors		Protective provisions	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
MFs	0.126**	0.068*	−0.010	−0.001	0.112**	0.081**	−0.158**	−0.068	1.216***	1.086***
	(0.054)	(0.040)	(0.042)	(0.039)	(0.050)	(0.039)	(0.061)	(0.076)	(0.377)	(0.261)
Ln(Employees)	0.101***	0.035	0.044***	−0.043	0.066***	−0.061*	0.049	−0.037	0.117	−0.341
	(0.020)	(0.029)	(0.013)	(0.029)	(0.016)	(0.032)	(0.033)	(0.101)	(0.157)	(0.352)
Ln(Valuation)	−0.058***	0.010	−0.026*	0.015	−0.103***	0.009	−0.084***	0.066	0.114	0.223
	(0.019)	(0.018)	(0.013)	(0.024)	(0.017)	(0.024)	(0.029)	(0.066)	(0.137)	(0.280)
N	519	519	517	517	518	518	516	516	517	517
Adjusted R^2	0.115	0.827	0.177	0.508	0.312	0.816	0.523	0.682	0.149	0.604
Panel B: Cash Flow Rights										
	Participation rights		Liquidation Preference		Liquidation multiple > 1		Cumulative diviends		Cash flow index	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
MFs	0.014	−0.020	−0.001	0.023	−0.044	−0.068	−0.047**	−0.065*	−0.079	−0.107
	(0.045)	(0.041)	(0.052)	(0.055)	(0.028)	(0.042)	(0.023)	(0.034)	(0.121)	(0.136)
Ln(Employees)	0.033	0.047	−0.010	0.040	0.012	0.006	0.004	0.030	0.029	0.162
	(0.021)	(0.030)	(0.025)	(0.045)	(0.010)	(0.021)	(0.007)	(0.024)	(0.054)	(0.104)
Ln(Valuation)	−0.108***	−0.111***	−0.034*	−0.041	−0.010	−0.010	−0.007	−0.005	−0.194***	−0.209**
	(0.018)	(0.031)	(0.018)	(0.044)	(0.010)	(0.019)	(0.010)	(0.029)	(0.047)	(0.103)
N	519	519	519	519	519	519	518	518	518	518
Adjusted R^2	0.218	0.748	0.115	0.530	0.021	0.220	0.217	0.462	0.161	0.562
Round FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Industry FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Unicorn FE		✓		✓		✓		✓		✓

Table OA5
Contractual Provisions and Mutual Fund Characteristics: Controlling for Restricted Securities Portfolio Share

This table reports the results of the regressions of contractual provisions on the characteristics of mutual funds participating in the round while controlling for the restricted securities portfolio share. The sample is limited to rounds with mutual fund participation. In Panel A, fund characteristics are value-weighted averages across all mutual funds participating in the round; in Panel B fund characteristics refer to the lead mutual fund, i.e., the fund acquiring the largest number of shares across all funds participating in the round. All explanatory variables are standardized so that the coefficients represent the effect of a one standard deviation change in each explanatory variable. *, **, and *** indicate statistical significance at 10%, 5%, and 1%.

	Redem. rights	IPO ratchet	Down-IPO veto	Class directors	Protect. provisions	Particip. right	Senior liq. pref.	Liq. mult. > 1	Cum. divs	Cash flow index
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A: Value-Weighted										
Family size	0.047	0.029	−0.024	−0.034	−0.358	−0.026	0.087**	−0.015	−0.002	0.130
	(0.049)	(0.038)	(0.064)	(0.052)	(0.406)	(0.031)	(0.040)	(0.018)	(0.018)	(0.085)
Flow volatility	0.124**	0.062	0.119**	0.022	−0.724*	−0.016	0.059	0.004	0.015	0.121
	(0.049)	(0.043)	(0.051)	(0.043)	(0.403)	(0.034)	(0.042)	(0.011)	(0.028)	(0.081)
Management fee	−0.018	0.046	0.048	−0.048	0.148	0.042	0.016	−0.003	0.042	0.112
	(0.050)	(0.039)	(0.045)	(0.033)	(0.458)	(0.056)	(0.039)	(0.006)	(0.043)	(0.087)
Restricted securities share	0.047	−0.008	0.041	−0.058	−0.175	−0.038	0.042	0.034	−0.032	0.047
	(0.059)	(0.043)	(0.060)	(0.037)	(0.484)	(0.046)	(0.061)	(0.026)	(0.033)	(0.119)
N	100	100	100	100	100	100	100	100	100	100
Adjusted R^2	0.084	0.068	0.092	0.051	0.015	−0.022	0.021	−0.009	0.069	0.042
Panel B: Lead Fund										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Family size	0.063	0.016	−0.017	0.017	−0.210	0.029	0.078**	−0.021	0.015	0.178**
	(0.046)	(0.041)	(0.050)	(0.032)	(0.376)	(0.023)	(0.037)	(0.021)	(0.013)	(0.077)
Flow volatility	0.134**	0.058	0.122**	0.034	−0.669	−0.003	0.072	−0.002	0.020	0.160*
	(0.053)	(0.044)	(0.050)	(0.046)	(0.432)	(0.037)	(0.046)	(0.013)	(0.028)	(0.087)
Management fee	−0.002	0.046	0.051	−0.045	0.042	0.054	0.005	0.010	0.039	0.114
	(0.053)	(0.038)	(0.045)	(0.029)	(0.488)	(0.055)	(0.036)	(0.010)	(0.044)	(0.080)
Restricted securities share	0.022	−0.022	0.045	−0.032	0.207	−0.028	0.061	0.000	−0.014	0.080
	(0.054)	(0.035)	(0.045)	(0.026)	(0.530)	(0.035)	(0.057)	(0.008)	(0.021)	(0.110)
N	100	100	100	100	100	100	100	100	100	100
Adjusted R^2	0.089	0.067	0.092	0.030	0.014	−0.022	0.041	−0.052	0.049	0.075

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