Dispersion in Fair Valuations of Non-Traded Financial Assets: Evidence from the Mutual Fund Industry

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First Draft: November 25, 2019

Very, Very Preliminary – Comments Welcome

I. Introduction

Implementing fair value accounting for a financial asset traded on an active public market is a relatively straight-forward exercise because the closing market price on the balance sheet date generally reflects a consensus fair value measurement. As a consequence, the fair values of those assets can be easily determined and will likely be identical across different firms' balance sheets. In contrast, establishing the fair value of assets that are not publicly traded is a much more challenging exercise requiring information gathering and subjective expert judgement. The challenging nature of fair value assessments gives rise to two financial reporting concerns. First, the subjectivity of fair value assessments allows them to be exploited to manage reported performance metrics. Second, because fair valuations require subjective information gathering and processing, the same assets might have different valuations on firms' financial statements, which would make those statements less comparable. In this study, we exploit detailed disclosures of investments by regulated mutual funds to provide insights relevant to the understanding of these two concerns. In particular, we provide evidence as to whether discretion in valuations is significantly exploited to meet performance targets and identify associations between dispersion in valuations and characteristics of the information environment, with the latter providing some initial insight as to when comparability will be more compromised by subjective fair value reporting.

Our setting relies upon detailed disclosures of equity security investments by regulated mutual funds. While the securities held by mutual funds are primarily highly liquid publicly traded securities, which ensures that funds can satisfy redemptions in an orderly manner, up to 15% of fund holdings can be allocated to illiquid securities that are not traded in public markets, which we refer to as private securities.[1] We identify private equity securities held by multiple funds, which allows

[1] Kown, Lowry, and Qian (2019) document that mutual fund participation in private markets has increased significantly over the past 20 years, which is a trend that has made the collection of our sample possible. With that said, the presence of a significant trend might also predict that our setting may evolve significantly (e.g., funds may institute more systematic valuation processes for these types of investments), which might make our findings period specific.

us to construct a sample of 328 securities for which there are multiple valuations assigned by different parties on a given date, yielding 6,157 security valuation dates for our analysis.

Regarding the first issue, our analysis uncovers some evidence that funds use the valuation discretion associated with private equity securities to chase performance. More specifically, we find some evidence consistent with funds exploiting valuations to be a top performing fund, but no evidence consistent with funds exploiting valuations to beat their benchmark. Our findings are quite consistent with those in Carhart, Kaniel, Musto, and Reed (2002), which analyzes managers' incentives to inflate quarter-end prices of publicly traded securities through trading activities.[2] Although prior literature has found evidence of mutual fund opportunism, it is still somewhat surprising for the case of private equity security valuations because they are typically subject to independent, rigorous, systematic valuation processes, and audits of those processes.

Regarding the second issue, which is that the discretion offered by fair value accounting will result in comparability problems due to differences in subjective valuations across valuators, we document that the average range of values for a security (i.e., the maximum less minimum value) as a percentage of the consensus (i.e., average) value for that security is about 3.21% and that the average absolute value of the deviation of a fund's value for a security less the consensus value as a percentage of the consensus value is about 1.10%. While somewhat smaller than we expected a priori, there is still sufficient cross-sectional variation in valuations to provide insight into information environment characteristics associated with greater dispersion in valuations. In particular, we find that dispersion in valuations has a significant negative association with firms that have a longer history of performance, more news coverage, and no investors with a geographic advantage (i.e., no investor is close to the firm while others are far from the firm). Somewhat

[2] Brown, Harlow, and Starks (1996) and Chvalier and Ellison (1997) discuss the incentives of mutual fund managers to increase risk in order to improve their relative performance to attract investors, and Carhart, Kaniel, Musto, and Reed (2002) discuss the incentives of mutual fund managers to boost the prices of their holdings before filings in order to be top performers in their peer group (i.e., "leaning for the tape) and to "just-beat" their benchmark.

surprisingly, we find that there is more dispersion in valuations after recent rounds of financing, which should provide clearer signals of value.

In the case of mutual funds, whose valuations of individual equity securities at any date t are in the public domain prior to valuations at date t +1, one attribute of the information environment is the ability to infer or update based upon the prior valuations of others. In essence, updating on the valuations of others serves as a delayed substitute for updating on prices in an active market. While valuation differentials are sticker than predicted by a pure model of information asymmetry, investor beliefs appear to be influenced to some extent by the beliefs of others or the receipt of information underlying those beliefs. As a consequence, there is some movement, on average, towards a consensus.

One unexpected observation that did emerge from our study is that the valuations of private equity investments are remarkably sticky. For example, on average, funds maintain the initial purchase price as the value for almost six months. In addition, if the price at the end of quarter t is not the initial price, that probability that the next quarter price will be identical is 68%. Given the variation in the market prices of public securities, this degree of price stickiness is surprising and seems, on its face, somewhat at odds with textbook implementation of fair value accounting guidance. We intend to pursue exploring this puzzle further in subsequent iterations of this study.

Our study contributes to the literature on fair value accounting. Accounting standards regarding fair value estimates mandate that fair value measurements and disclosures rely upon a three-level hierarchy of inputs, Level 1, Level 2, and Level 3. Level 1 inputs to fair value measures are "quoted prices (unadjusted) in active markets for identical assets," Level 2 inputs are observable inputs such as quoted prices for similar assets in active markets, or identical or similar assets in markets that are not active, interest rates, or implied volatilities. Finally, Level 3 inputs are unobservable and might include estimates of future cash flows or assessments of measurement and fundamental risks. For disclosure purposes, firms must classify an investment based upon the lowest level of significant

input, with Level 1 being the highest and Level 3 being the lowest. Initial research has suggested that users are more skeptical about the efficacy of Level 3 asset fair values (e.g., Barth, 1994 and Eccher, Ramesh, and Thiagarajan, 1996), which may be attributable to strategic reporting.

Four antecedent studies considering strategic asset value reporting adopt a research approach similar to ours: Cici, Gibson, and Merric (2011), Hodder and Sheneman (2017), Hanley, Jagolinzer, and Nikolova (2018), and Agarwal, Barber, Cheng, Hameed, and Yasuda (2019). In particular, like our study, all of these studies identify securities held by multiple entities that disclose fair values in order to gain insight into the determinants of reported valuations.[3] Cici, Gibson, and Merric (2011) consider mutual fund holdings of identical bonds and find that dispersion in values is higher for less liquid bonds (i.e., those with lower credit quality, longer maturities, and small issues), which is consistent with a lack of activity in these bonds' markets leading to wider quoted spreads and, as a consequence, more subjectivity in valuations. They also provide evidence consistent with valuation discretion being employed to smooth returns around a target. Unlike their analysis, we assess valuations of private equity holdings as opposed to thinly traded bonds, which still have public arms-length transaction data (e.g., via Bloomberg terminals), and focus on aspects of the information environment associated with the variation in those valuations.

Hoder and Sheneman (2019) and Hanley, Jagolinzer, and Nikolova (2018) both exploit mandatory insurance company filings with the National Association of Insurance Commissioners to gain insight into impairment and recognition decisions (Hoder et al., 2019) and accounting level classifications and valuation inflation (Hanley et al., 2018). Like Cici et al. (2011), the investments considered are generally thinly traded fixed income securities, but the nature of the reporting strategy space and reporting incentives are presumed different for insurers as opposed to fund

[3] Other studies have employed other research approaches to gain insight into strategic exploitation of valuation discretion. See, for example, Chandar and Bricker (2002), who rely on the relation between returns from unrestricted and restricted investments at closed end funds, or Getmansky, Lo, and Makarov (2004) who rely on an econometric model of return smoothing.

managers. In particular, the reporting strategy space involves recognition and classification discretion in addition to the discretion offered by fair value estimation, and the incentives are more regulatory in nature. Hoder et al. (2018) provide evidence suggesting that the discretion offered by fair value measurement, as opposed to investment categorization (e.g., available for sale vs. held to maturity) plays a limited role in loss avoidance, and Hanley et al. (2018) find that the classification of securities (Level 1, 2, or 3) and source of valuation (self-estimated vs. pricing service, broker/custodian, exchange, NAIC (SVO)), both of which involve discretion, are associated with higher relative valuations. Like these studies, we consider the incentives and opportunities for discretionary valuation, albeit in a substantially different environment. In addition, we focus on attributes of the overall information environment to gain insight into how that environment is associated with dispersions in valuations.

Finally, Argarwal et al. (2019) exploits the same setting as we do, holdings of private securities by mutual funds, and addresses or raises some questions similar to ours. Specifically, they document the stickiness of reported values and that those values move predictably after new rounds of financing occur, which suggests predictable returns to investing in funds. Furthermore, they present some evidence suggesting that funds manage their reported valuations strategically to achieve performance targets. In particular, they observe that, on average, top performing funds in a given year increase their valuation of a private firm investment more significantly in response to a year-end round of financing funding by that firm. Our study takes a somewhat different tack because we are less focused on mutual fund behavior in particular, but instead, exploit the mutual fund setting to gain insight into the fair value reporting more generally. Our analysis finds evidence in line with their study, that valuation discretion is potentially exploited in some settings to achieve performance targets. But our analysis also considers associations between attributes of the information environment and the dispersion in reported values, which provides some insight into when fair value reporting might be more incline to reduce financial performance comparability.

II. Sample

We endeavor to construct of sample of distinct valuations of the same privately traded equity securities held by multiple mutual funds at the same date to gain insight into whether valuation discretion for these types of securities is exploited to manage reported performance, and to gain some insight into characteristics associated with dispersion in valuations. As we discuss below, the endeavor is somewhat challenging for a number of reasons (e.g., some funds that hold a security are in the same fund family and some of those funds appear to always use the same valuation for such securities), which we attempt to rectify in part through our sample selection process as well as in some of our subsequent analysis.

Our sample of mutual fund holdings originates from the January, 2019 quarterly release of the CRSP Mutual Fund Holdings database.[4] We focus on the CRSP Mutual Fund Holdings database, as opposed to Thomson Reuters S12 Files or Morningstar Direct, because CRSP is the only database of the three that both collects information from SEC filings on restricted equity securities (often not the case with Thomson Reuters) and assigns each security a unique identifier that can be tracked over time (often not the case with Morningstar). This release of the CRSP Mutual Fund database covers the universe of holdings for publicly traded open-end mutual funds from January, 2001 to December, 2018. Since open-end mutual fund holdings of privately traded equity securities were minimal prior to 2010, we begin our sample in 2010.

The first filter we employ to isolate U.S. privately traded equity securities is to limit the sample to securities with missing PERMNO and missing CUSIP. While characteristic of privately traded equity securities, missing PERMNO and CUSIP security identifiers also describes a number of other types of securities typically held in mutual funds, e.g., money market securities, foreign securities, and other over-the-counter or bank-originated products. The next filter we employ is to match fund

[4] The particular update of the CRSP Mutual Fund Holdings database is relevant because we have noted numerous cases where securities and their identifiers have changed from one issue to the next.

characteristics from the CRSP Fund Summary file to each portfolio in the holdings database in order to screen out a) non-equity focused funds (using the Lipper asset code "EQ"), b) variable-annuity funds, c) Index Funds, and d) ETFs. Next, we drop all securities with items in their name that clearly distinguish them as non-U.S. or non-equity (e.g., "CASH", "SA", "DEPOSIT", "PLC", "WARRANT", etc.). We next require securities to be held by at least two mutual funds, for at least two filing dates, which allows us to compare valuations across funds for the same security. This reduces the sample to 1,558 securities and 97,854 holdings observations.

The filters thus far (for the most part) limit the sample to non-traded equity-linked securities that do not contain obvious foreign or structured-product abbreviations in their name. The sample contains many of the securities we are interested in (e.g., Dropbox, Airbnb, Docusign, etc.), but the sample also contains a number of non-traded securities of U.S. publicly traded firms (e.g., securities of General Motors, and Bank of America that are not listed on public exchanges), and several securities still linked to foreign firms. At this point, we inspect the remaining list by hand and drop securities issued by firms that we confirm – mainly using the internet – were listed on U.S. exchanges before 2010 (or were a subsidiary of a publicly traded firm before 2010) or have foreign roots. This reduces the sample to 370 securities and 38,547 observations. This corresponds to the first row shown in Table 1.

After manually checking the securities, we are confident the remaining securities in our sample are independent, privately-owned U.S. equity securities. A problem remains with the integrity of the holdings data, though. In a non-trivial amount of cases, either the information about the security in the quarterly mutual filings (e.g., N-CSR or N-Q) is ambiguous about which class of security is held by a fund, or, CRSP incorrectly records the information in the filings. An example of this latter issue can be seen in Figure 1. In this case, CRSP reports a price for a "Cloudera" security held by the Hartford Capital Appreciation HLS Fund that does not match the price assigned to this security in Hartford's filing for that period. In Panel A, we show that CRSP reports a market value of $26,274. In Panel B,

we show that Hartford's filing reports a market value of $928,775. Importantly, in this same filing, Hartford reports a market value of $26,274 for a different equity security issued by "One Kings Lane." It appears CRSP pulled the information for a different security. Such labelling issues can lead to apparent valuation dispersion when it does exist, which will undermine our analysis. Accordingly, we apply two additional filters to help identify and remove security holdings that are potentially mislabeled.

Through intensive manual inspection we identify two signals of security mislabeling. The first signal arises when initial investment dates are not aligned. For example, when a fund begins holding a security for the first time after that security had been held by other funds for multiple filing periods, that fund is likely holding a different security issue (e.g., Class C vs. Class A). To eliminate such cases, we create a new security identifier for the fund with the later start date whenever there exists at least three quarters between the initial investment date of a fund and the initial investment date of other funds holding (supposedly) the same security.[5] We also drop any fund holdings if there does not exist at least one other fund with an initial investment date that is within three months before or after the initial investment date of that fund. This removes 1,699 holdings observations from the sample, which is shown in the second row of Table 1.

The second signal arises when a fund reports a large decrease in the number of shares invested in a security. In some cases, it appears CRSP separates a security into several securities that should have been booked separately from the start (i.e., the securities are distinct).[6] When these cases arise, we observe a sharp decline in the number of shares held by a fund for a given security. To remove the influence of these holdings that are likely misclassified, we drop *all* holdings observations for a fund-security pair if the fund reports a share count decline of at least 25% at any point in the sample period. Lastly, with over 15 different securities issued by "Dropbox Inc." showing up across the

[5] We do not attempt to match this security to another security.
[6] Note that the error in booking is not necessarily the fault of CRSP. Some funds do not clearly describe the securities held.

holdings of various funds throughout our sample period, we found it exceedingly difficult to ensure we are comparing apples to apples for any holdings of Dropbox securities. For this reason, we drop all holdings observations associated with "Dropbox Inc." After these two filters, we are left with 32,412 holdings observations, and 7,824 security-filing dates.

Given that the goal of our paper is to understand valuation decisions when fair valuation principles are being used, we change the sample to obtain sample of *distinct* valuations of the same security. Because some fund families employ a common valuator for securities held by multiple funds within the family, the same value could show up multiple times even though that value comes from a single valuation exercise. To reduce the likelihood that the sample includes the same valuation multiple times, we drop all security filing dates where a) there is only one fund family holding the security, and b) that fund family agrees 100% of the time across its funds on the valuation of a given security.[7] We drop 297 security-filing dates for this reason. Furthermore, due to residual concerns about common valuations within fund families, we also limit our sample in some analyses to a single fund within each fund family. We do so because there appears to be a common valuation for many, although not all, investments at each security-filing date within most fund families.[8]

Lastly, to our surprise a priori, there is pervasive persistence at the initial valuation (i.e., the purchase price), with the persistence being more than two years after the initial investment date in some cases. The stickiness of such values is puzzling in light of the fact that funds are required to update NAVs daily to reflect changes in portfolio value and are required to have balance sheet date fair values reflected in their filings. From our perspective, such persistent initial valuations mechanically induce valuation consensus. Thus, we drop 1,370 security-filing dates where a) all funds agree on the valuation of a security holding, and b) all funds continue to hold the initial

[7] 34 of the 44 fund families, which make up 13% of our sample, satisfy the two conditions.
[8] To choose a single fund within each fund family, we prioritize the fund with the largest allocation to private equity securities or we, in the performance chasing analysis, we prioritize funds who are in our performance-chasing treatment group, since the treatment group is a small percentage of our sample.

valuation. We are left with a final sample of 26,592 holdings observations, 6,157 security-filing dates, and 328 unique private securities. Table 2 provides additional detail about this sample.

From Panel A, the 328 private securities in our sample are issued by 145 unique private firms and are held by 220 unique open-end equity mutual funds, which are managed by 44 different fund management companies. The frequency distribution of holdings observations across fund management companies is described in Figure 2. It's clear that Fidelity, Harford, John Hancock, Morgan Stanley, Putnam, and T. Rowe Price dominate the space.

From Panel B of Table 1, funds in the sample holding private equity securities for about three years, with a wide variation around that mean, and hold about 14 private securities in our sample throughout the sample period for an average of three total years. There are about seven funds holding a security at each filing date, but only about two management companies on average. And although each private equity holding does not make up a significant portion of the portfolio, on average funds have about 2% allocation across all of their private holdings – or about $67 million using average fund size. Additionally, the 90th percentile of portfolio allocation to private securities exceeds 5%, in which case moving the valuation of each security just 10%, assuming equal weights, would boost the return of the portfolio by 50 basis points.[9]

From Panel C of Table 1, the funds in our sample, and the managers managing those funds, are fairly seasoned, with the existing manager running the fund for over eight years, and funds existing for another nine years. Also, funds in our sample are often managed by three or more portfolio managers.[10] Comparing the rest of the fund characteristics of our sample to Huang, Sialm, and Zhang (2011), who study open-end equity mutual funds between 1980 and 2009, reveals our sample of funds are considerably bigger, but are otherwise very similar. Huang et al. (2011) report an average

[9] It is important to note that our estimates of portfolio allocations to private equity securities are a lower bound. As explained above, we drop several securities due to data issues. Furthermore, we believe there exist several additional securities that are either not recorded by CRSP or are missed by our filters.

[10] To compute our measure of manager tenure, we use the tenure of the longest-tenured portfolio manager.

fund size of $1.36B, expense ratio of 1.28%, and median turnover ratio of 0.66. Our sample of funds are about 2.5 times larger (though it is not clear what base year the authors use for dollar asset value) and have expense and turnover ratios of 0.98% and 0.66.

From Panel D, our sample of private firms are about 10 years old, with between 4000 and 4500 employees, both of which are collected from Crunchbase. And these firms have fairly intense news coverage, with over 160 news articles published about them on a rolling 90-day basis (from RavenPack). Additionally, many of our sample firms have a large group publicly traded industry peers, according to Bloomberg, with the average peer group equal to 40 firms. However, several of our sample firms also have very few industry peers, which is shown by a much smaller median value of 14 industry peers.[11]

In Panel B and Panel F, we describe our main dependent variables – *Simple Optimism*, *Optimism, Boldness*, and *Valuation Dispersion* – and in Panel E, we describe our main independent variables for our analysis of performance incentives – *Top 10* and *Just Above Bin*. *Simple Optimism* is computed as the price assigned to a security *j* by fund *i* at a given filing date *t*, minus the average price assigned by all funds holding the security at that date, scaled by this same average:

$$Simple\ Optimism_{ijt} = \frac{Price_{ijt} - \overline{Price_{jt}}}{\overline{Price_{jt}}}$$

Optimism is computed in the same way as *Simple Optimism*, except the average price is constructed by averaging the price assigned by all funds holding the security at the filing date that are not a member of the same fund family as fund *i*. *Boldness* is computed as the same way as *Simple Optimism*, but is the unsigned difference between price and average price, as opposed to signed difference:

$$Boldness_{ijt} = \frac{\left|Price_{ijt} - \overline{Price_{jt}}\right|}{\overline{Price_{jt}}}$$

[11] We also match securities in our sample to private equity (PE) and venture capital (VC) deals in Thomson One Banker's VentureXpert database. Using fuzzy name matching, we match 150 (88%) of our sample firms to at least one funding round. Conditional on having a funding round, firms conduct about ten funding rounds.

And *Valuation Dispersion* is computed as the average *Boldness* across funds holding a security at a given filing date. As can be seen in Column 4 of Table 1, 20.68% of our final sample has valuation dispersion greater than 10 basis points. Valuation Dispersion, however, is often quite small, with an average dispersion of just over 105 basis points. This is function of boldness often being quite small, with an of 1.39% for each fund-security-filing date.

To analyze the role that performance incentives play in determining fair value estimates, we use two measures: 1) whether funds end the year in the top 10 of all funds sharing the same fund-objective style (*Top 10*), and 2) whether funds 'just-meet-or-beat' their benchmark, i.e., earn annual adjusted returns between 0 and 1%. Across our sample of fund-security-filings, 4.5% make it into the top 10 in their respective peer group, and 8.4% just meet or beat their benchmark.

Importantly, our focus is on understanding valuation discretion, so it is important to verify that there exits substantial variation in values across funds for common securities and common dates. We confirm that the likelihood of dispersion of at least 10 basis points across fund families when multiple fund families hold a security increases to 60% of the security-filing dates. Additionally, 86 of our securities experience valuation dispersion of at least 5%. Lastly, we compute a ballpark estimate, using beginning-of-the-year valuations and holding weights, that about 25% of the sample of funds that ended up in the top 10 within their peer group would not have been in the top 10 if they had valued their private securities at the consensus value.

III. Incentives

We consider the possibility that two sources of valuation incentives identified in antecedent literature, reported performance chasing incentives and labor market (i.e., career concern) incentives, could contribute to dispersion in valuations for the same security. The former set of incentives, performance incentives, have been documented in the mutual fund industry, and the latter set of incentives have been documented in the related financial analyst industry.

A. Performance Chasing Incentives

The mutual fund industry offers limited mechanisms for managing reported performance due to the simplicity of the entities' businesses (e.g., they have almost no accruals and their asset base consists almost exclusively of publicly traded financial investments) coupled with substantive regulatory oversight. Nonetheless, antecedent literature suggests that some funds do exploit their limited set of performance management mechanisms to meet performance benchmarks or to be labeled a top performing fund. For example, Chevalier and Ellison (1997) suggest that funds dynamically alter their risk profiles because of convexities in the relation between annual fund performance and fund inflows from investors.[12] Furthermore, Carhart et al. (2002) provide evidence that some funds strive to improve reported performance by making incremental purchases of securities held at year-end in order to push up the year-end valuations for those securities. Most related to our study, a number of studies identify patterns in the data suggesting that some fund managers exploit valuation discretion associated with illiquid holdings (i.e., thinly traded bonds) to meet performance targets (Chander and Bricker, 2002; Bollen and Pool, 2009; Cici, Gibson, and Merrick Jr., 2011).[2]

While antecedent literature provides evidence of performance manipulation, the ability of funds to manage performance in any measurable sense through private equity fair valuations is limited by

[12] Relatedly, Goetzmann et al. (2007) discuss three strategies by which closed end fund can alter return distributions in an effort to manipulate conventional performance measures, all of which rely on the use of dynamic strategies involving derivatives that cannot be employed by open-end mutual funds.

their limited presence in the portfolio, as well as the fact that mutual funds generally employ independent valuators whose valuations are subject to external audits. In particular, given that the private holdings comprise a relatively small subset of a fund's portfolio, altering values in a manner that alters portfolio returns in any significant manner would necessitate quite substantial deviations in values from appropriate fair value. For example, if private security holdings comprise 10% of a fund's portfolio, which would be quite large relative to an average fund, that fund would have to overvalue that holdings by 10% to move the portfolio return by 1%. Such a deviation would be more likely to not attain the approval of an external valuation agent and/or the fund's external auditor.

To assess whether funds appear to alter valuations of private equity holdings to meet performance targets, we identify funds who just meet or exceed a performance target and compare their valuations of private equity securities with the valuations for those securities disclosed by funds who are below or substantially above the performance target. If funds exploit valuation discretion for private equity holdings to meet a target, and the range of valuations is a reasonable proxy for the range of values a fund could justify, we expect those funds who just meet the target will have higher valuations for a given security that those who fall below the target.

We consider two performance targets considered in antecedent literature in these tests, the fund's self-identified performance benchmark (e.g., S&P 500) and being in the top 10 of all funds sharing the same CRSP objective code. To measure the extent of valuation optimism, we consider three measures. For each security holding for a fund, we first compute a measure of relative value, *Simple Optimism*, which is the difference between that fund's price for that security and the average price of all funds holding that security. We then run regressions of the simple optimism on one of two indicators, with one delineating whether the firm is a top 10 fund and the other delineating whether the fund has a return that is weakly above its benchmark by no more than 100 basis points. The first two columns of Panel A of Table 3 offer some significant evidence of an association between funds who are in the top 10 and their or who just meet their benchmark and *Simple Optimism*. It might

be the case that some funds adopt a strategy of sandbagging when they cannot use a bump in returns and exploiting their lower valuations to bump up returns when needed. Pooling across all funds would provide a lower power test for identifying such behavior. Hence, in the third and fourth columns we include fund fixed effects, which allows us to consider how a funds' optimism varies with whether the fund is a top 10 fund or in the just above bin. Here, we find some evidence consistent with some funds using valuation discretion to be in the top 10, which is consistent with the leaning for the tape behavior identified in Carhart et al. (2002). We find no evidence consistent with funds using their valuation discretion to just meet or beat their performance benchmark.

Because the simple measure includes all funds including the fund in question as well as any fund in the same family holding the security, the simple optimism measure as a measure of relative optimism is muted. In particular, the fund itself is in the benchmark and other funds in the same family, which likely have the same valuation, are in the benchmark. Hence, we compute a starker measure of relative optimism, *Optimism*, in which the benchmark value is the average value for the holding by funds who are not in the same family as the fund in question. Columns 5 to 8 replicate the results in Columns 1 to 4 using the starker measure of optimism. The starker measure not surprisingly leads to larger magnitudes for the coefficients, although it does not generate more statistically significant associations.

In Panel's B and C we go a bit deeper by exploring whether the returns recorded by a fund for a given holding align with the results obtained with levels. For each holding, we compute *Abnormal Return*, which is the fund's calendar year return for the holding and the calendar year return for that holding recorded over the same year by all other funds that are not in the same fund family in question. This measure requirement significantly reduces the sample size but, perhaps, increases the detection power by focusing on the primary statistic of interest to fund management, the calendar year return, which is a more widely disseminated statistic. In Panel B, note first that the *Optimism* measure results continue to be sustained within this smaller sample, although the magnitudes are

larger, which might be attributed to funds being more focused on the implications of calendar year end valuations. Furthermore, the abnormal return is higher by about 578 basis points for funds in the top 10 and that the abnormal return effect is magnified to 950 basis points when we control for fund fixed effects, where the latter finding is consistent with some funds adopting a sandbagging strategy – low valuations when the performance target is not achieved and high valuations when the target is achieved. Qualitatively similar results are observed when we consider the change in optimism measure instead of the abnormal return measure. No similar effect is observed in Panel C for funds that just meet or beat their performance benchmark.

Finally, in Panels D and E we further refine the analysis from Panels B and C to only include one fund per family. For Panel D the fund selected is the top 10 fund within the family for which the private equity holdings are the largest percentage of the portfolio and, if there is no top 10 fund, is the fund within the family for which the private equity holdings are the largest percentage of the portfolio. For Panel E the fund selected the fund in the Just Above Bin within the family for which the private equity holdings are the largest percentage of the portfolio and, if there is no fund in the Just Above Bin, is the fund within the family for which the private equity holdings are the largest percentage of the portfolio. This further refinement yields largely similar results.

In summary, the evidence in Table 3 is consistent with some funds using valuation discretion to aid them in becoming a top performer in some periods. We should emphasize, however, that such performance management behavior is far from the sole source of valuation dispersion. In particular, the variation in the relative optimism measures are hardly explained by the incentive to be a top performer in some periods.

Given the evidence consistent with some funds using valuation discretion to be a top performer in some periods, we consider one potential moderator in that behavior. In particular, we conjecture that a fund's influence over the valuation for a particular holding will be more limited if there are many other funds in the same family that also have that holding. This conjecture is motivated by the

observation that funds often rely on the same valuator who will be less incline to favor a particular fund's standing if other client funds will be affected. In Table 4 we test this conjecture for Top 10 funds and provide evidence consistent with that conjecture. That is, the optimism measure is higher for funds in the top 10 when there are only one or two funds in the family that hold the relevant security. Furthermore, the results in Table 4 suggest that more conservative valuations are employed when many funds rely on the valuation agent.

B. Labor Market (Career Concern) Incentives

Within the analyst forecast literature, Hong, Kubik, and Solomon (2000) have found that sell side analysts with more experience or a stronger reputation are more incline to offer bolder forecasts (i.e., forecasts that deviate farther from the consensus). One reason offered for these findings is that more experienced or higher reputation analysts have a track record that makes them less susceptible to a significant revaluation of their labor market value for one missed call, which makes them more willing to deviate from the herd. Within the mutual fund industry, we might expect similar labor market incentives to be at play and find that funds managed by more managers with a longer tenure are more incline to value their holdings in a bolder manner. Such boldness, in turn, would lead to more dispersion in values.

To assess whether boldness in valuations is related to the fund manager's experience, we define boldness as the absolute value of the difference between a fund's valuation of that security and the average value for that security across all funds, scaled by the latter value. We then regress boldness on the manager's tenure, which proxies for experience. We control for the number of funds who hold the security because the expectation for the measure of boldness is likely driven by the number of draws from the valuation distribution.[13]

[13] For example, if the underlying distribution of valuation realizations is normal, the expectation of the boldness measure will necessarily be increasing in the number of draws from that distribution.

The results of those regressions are reported in Table 5. The pooled regression results in Panel A Column 1 suggest that longer tenured managers are more incline to issue bolder forecasts. Once we consider only one fund per family, with that fund being the fund for which the private equity holdings are the largest percentage of the portfolio, the significance of that finding disappears. Furthermore, once we control for the security itself, the finding flips, which suggests that more experienced managers invest in different private equity securities than less experienced managers and that, conditional on the security, more experienced managers are actually less bold. This observation stands in contrast to the analogous findings for sell side analysts.

IV. The Information Environment

Our previous analysis suggests that, within the setting we consider, incentive differentials are unlikely to be the dominant determinant of valuation differentials. Another logical determinant of valuation differences can be attributed to characteristics of the overall information environment, which affects the extent of information asymmetries across investors as well as the extent of disagreement (i.e., agreeing to disagree) among those investors. Antecedent research suggests that information asymmetries can be alleviated by the dissemination of information in a manner that is accessible by the relevant investor community. Furthermore, if disagreement (agreeing to disagree) underlies valuation differences, public information can reduce disagreement by providing resolution of disputed outcomes or by fostering consensus regarding the model, narrative, or lens for processing information pertaining to the firm.[14] Given that most fund managers and analysts are arguably expert investors with similar training (e.g., they are all familiar with, say, a discounted cash flow framework), we expect that public information should be equally accessible to them and that they will be likely to process that information similarly. Hence, we anticipate that valuation differentials will be smaller when there has been more public information available.

[14] If disagreement pertains to the processing of public information, however, it is conceivable that some public signals could exacerbate dispersions in valuations. See, for example, Bloomfield and Fischer (2010).

To test whether more consensus building public information is associated with less valuation dispersion, we identify a number of events or proxies for consensus building public information and assess whether those characteristics are associated with less dispersion in valuations. First, if a private firm has had a recent round of financing, which is arguably a public event providing a common signal of value, there should be less dispersion in reported values for that firm's equity securities. Second, if a private firm has a longer track record of performance, that track record can help alleviate information asymmetries or disagreement regarding drivers of performance, which would reduce valuation differences. Third, when a private firm has a close public peer, we expect that there will be less disagreement in valuations because the peers' filings and market prices are a common relevant source of public information. Fourth, if a firm has garnered more news coverage, that coverage will be a common source of information and may also provide a common narrative for processing that information, which would reduce valuation dispersion. Finally, if one investor is in close proximity to firm management, employees, and operations, they may be able to access soft information that other investors cannot access. Hence, we expect information asymmetries will be mitigated if all investors are in close geographic proximity to the firm's headquarters or are all not in close proximity to the firm's headquarters.

To test these conjectured relations, we run regressions with the following form

$$\text{Dispersion} = \beta_0 + \beta_1 \text{AGE} + \beta_2 \text{FIN} + \beta_3 \text{PEER} + \beta_4 \text{NEWS} + \beta_5 \text{GEO} + \varepsilon$$

where AGE is the number of years the private firm has been in existence; FIN is one if the firm had a round of financing within the last 3 months and 0 otherwise; PEER is the number of publicly trade peers listed in Bloomberg's industry classification match, which captures the likelihood that the firm has a close public peer; NEWS is the average daily number of articles highlighting the private firm with a relevance score of at least 100 over the prior 90 days as determined by Ravenpack; and GEO is 0 if the funds invested in the firm are all within the same state as the investee firm's headquarters or none are in the same state as the investee firm's headquarters. Based upon the reasoning in the

prior paragraph, all of the coefficients are expected to be negative, except for the coefficient on GEO which is expected to be positive, if the conjectures in the previous paragraph are true.

The results of the regression in a pooled form are reported in Panel A of Table 6. We include the natural log of the number of finds in the regression because the expectation for the measure of dispersion is likely driven by the number of draws from the valuation distribution. The multivariate regression results summarized in Column 6 are consistent with our conjectures for AGE, GEO, and NEWS, and no significant results are found for the PEER proxy, which could be due to that proxy failing to reflect the presence of a close public peer. Somewhat surprisingly, recent new rounds of financing, FIN, seems to be associated with greater dispersion, which suggests that those events are interpreted in a different manner by different valuation agents. When we include security fixed effects, which makes it impossible to include PEER or AGE in the regression, just the GEO variable loads significantly.

One feature about the information environment for mutual funds is that their valuations for private holdings must be disclosed in the fund's semiannual and annual reports, which must be filed within 60 days of their fiscal year end as well as their fiscal mid-year. These disclosures, in effect, make the valuations public and allow us to assess whether funds learn from the valuations provided by other funds, either directly by accessing the disclosures themselves, or indirectly by dissemination of the underlying information through other channels. We provide two tests related to this learning activity.

Our first test pertains to the following question: Are valuation differences attributable solely to information asymmetry? If valuation differences arise solely from differences in private information, that private information should not drive differences in valuations after the valuations are publicly disclosed via the fund filings. It follows from this logic that any difference between valuations made at the end of quarter t+1, which occurs after the quarter t valuations are in the public domain, should be attributable to new private information obtained since the valuations at the end of quarter t. As a

consequence, the rank of a fund's valuation within the set of all valuations on date t should be uncorrelated with the rank of the fund's valuation within the set of all valuations at date t+1. Hence, conditional upon their being some valuation dispersion at date t-1, we assess whether the valuation rank at date t is independent of the rank at date t-1, where the date t-1 and date t ranks are either twelve months or three months apart.

We consider two ranking schemes, with the first being a raw ranking (highest, next highest, and so forth). The second ranking we consider is coarser, above or below the median, because some securities are held my many funds and others by few funds. We then assess whether the probability that a fund's valuation is in one of those categories at date t is independent on whether it is in that category at date t-1. For the assessment to make sense, we restrict attention solely to cases where there is some disagreement at date t-1. Again, we control for the number of funds, Ln(Number of funds), because of the possibility that a security that is held by many funds will naturally have more disagreement.

Panel A of Table 7 provides the results for quarterly valuation ranks and Panel B provides results for annual valuation ranks. The quarterly ranks are definitely sticky, but we fail to reject the pure information asymmetry hypothesis using the annual ranks. Hence, these results suggest, at most, that valuation agents learn from others, or learn the information obtained by others, slowly.

While the aforementioned test is a test of whether information asymmetry can explain the entire differential, it does not imply that valuators do not learn from other valuatons and/or the information impounded into those valuations. To assess whether some learning takes place, we examine how the change in valuator i's valuation from t to t+1 can be explained by the deviation of valuator i's valuation from the consensus valuation of other valuators at t. In particular, we run a regression of the form

$$(v_{it} - v_{it-1}) = \beta(v_{it-1} - c_{it-1}) + \gamma_t,$$

where v_{it} is fund i's valuation at date t, c_{it} is the consensus valuation at date t, and γ_t is the error term, which reflects the new private information i obtains after t – 1. If there is no learning, we would expect $\beta = 0$. If there is some learning, we expect β to be negative. The results of this regression are reflected in Table 8. The quarterly and annual results are consistent with valuators learning from the valuations of others or obtaining the information previously held by others.

V. Conclusion

We are not prepared to conclude much at this stage of the project so this section is a to-do.

References

To Do

Figure 1: Data Issues

The figure presents two snapshots of supposedly the same holding by Hartford's Capital Appreciation HLS Fund in the third quarter of 2017. The first snapshot shows the holding reported by CRSP, with a market value of $26,274.15. The second snapshot shows the holding reported by the N-Q filing of the Hartford Series Fund (CIK= 0001053425), filed on November 29, 2017.

Panel A: CRSP Holdings

report_dt	percent_tna	nbr_shares	market_val	security_name	price	crsp_fundno	fund_name
20170930	0.00	127917	26274.15	CLOUDERA INC SERIES F	0.2053999859	014659	HARTFORD CAPITAL APPRECIATION HLS FUND IA SHA

Panel B: N-Q from SEC Edgar

	Consumer Durables & Apparel - 0.0%	
127,917	One Kings Lane, Inc. 01/2014, *(1)(2)(3)(4)	$ 26,274
	Consumer Services - 0.1%	
16,619	Airbnb, Inc. Series E 06/2015, *(1)(2)(3)(4)	1,744,995
514,432	DraftKings, Inc. *(1)(2)(3)(4)	797,370
		2,542,365
	Diversified Financials - 0.0%	
85,350	Social Finance, Inc. 09/2015, *(1)(2)(3)(4)	1,428,759
	Software & Services - 1.0%	
56,702	Cloudera, Inc. PIPE 02/2014, *(1)(2)(3)(4)	928,775
29,504	Magic Leap, Inc. Series C *(1)(2)(3)(4)	716,947
50,200	Nanigans, Inc. 03/2015, *(1)(2)(3)(4)	306,722
793,410	Pinterest, Inc. Series G 03/2015, *(1)(2)(3)(4)	5,695,963
20,891	Sharecare 03/2015, *(1)(2)(3)(4)	6,267,300
815,160	Uber Technologies, Inc. 06/2014, *(1)(2)(3)(4)	33,796,534
293,655	Zuora, Inc. Series F 01/2015, *(1)(2)(3)(4)	1,559,308

Figure 2: Distribution of Management Companies

The figure plots the percent of the final sample of 26,592 holdings observations that are represented by each of the 44 fund management companies in the final sample. Only holdings of non-traded, independently-owned U.S. based equity securities are included in the sample.

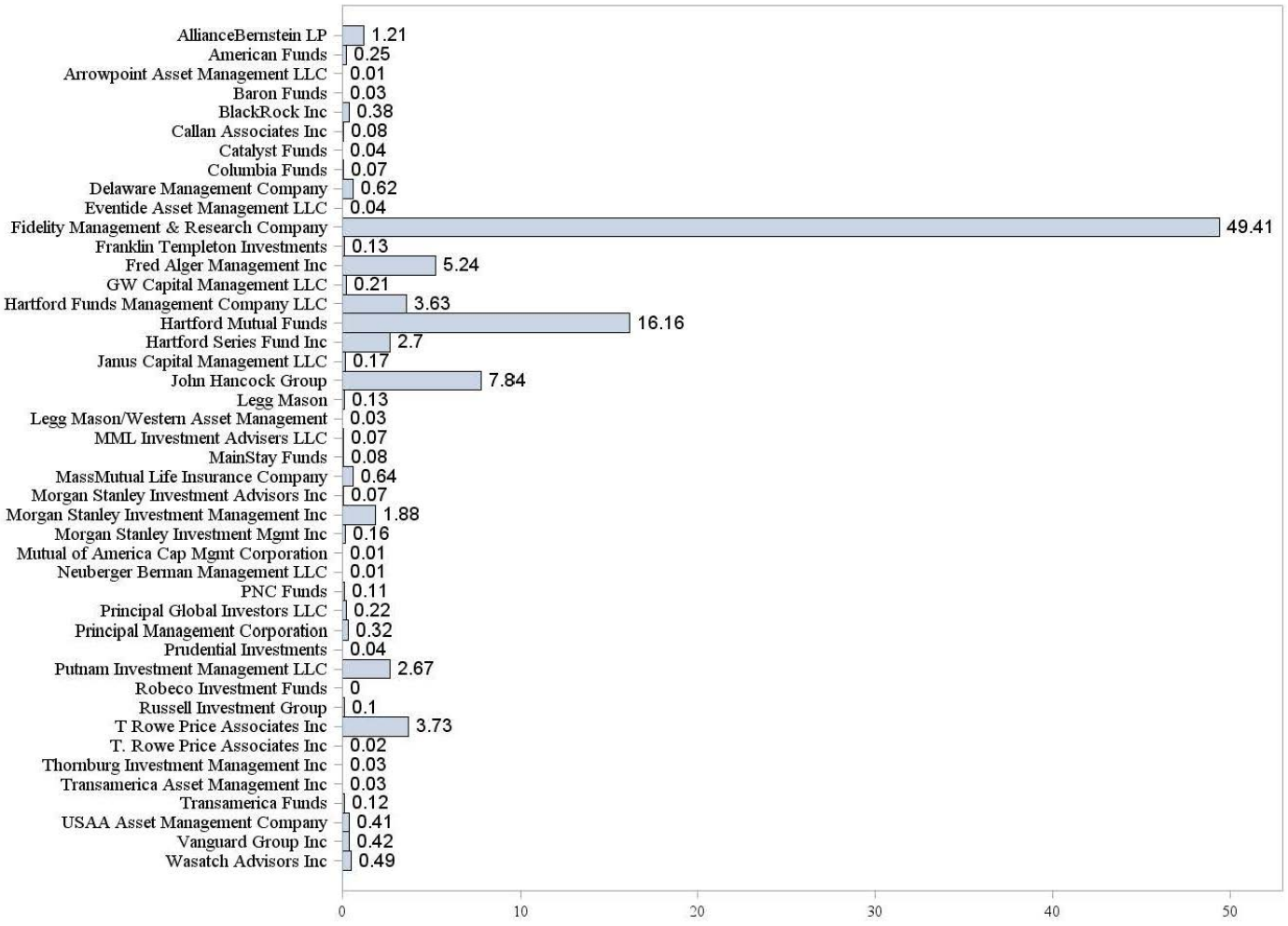

Table 1: Summary Construction

This table presents our sample filters, various sample size statistics, and descriptive statistics for our measure of valuation dispersion. *Dispersion* is computed as the average boldness at the security-filing date level, where boldness is computed as the absolute deviation between a fund's valuation for a security at a particular filing date, minus the average valuation for the security across all funds holding the security that period, scaled by the average valuation. *Dispersion Percent* is the percent of the security-filing dates in Column 3 with *Dispersion* greater than 0.1%.

	Holdings Observations	Security-Filing Dates	Dispersion Percent
Full sample of holdings, after requiring at least two filing periods without at least two investors	38,547	8,955	21.19%
Require at least one other fund with start date within three months of start date (create separate security if at least two funds have start date > nine months later)	36,848	8,954	17.65%
Drop Dropbox	34,962	8,419	16.34%
Drop share count declines greater than 25%	32,412	7,824	16.27%
Drop security filing dates where there is complete agreement at the initial valuation	26,837	6,334	20.10%
Drop security filing dates where there is only one fund family holding the security, and the fund family is always in agreement	26,592	6,157	20.68%
Require at each filing date that more than one fund holds the security	25,772	5,337	24.85%
End-of-year holdings	2,365	498	31.12%

Table 2: Summary Statistics

This table presents mean, median, and standard deviation statistics for mutual fund, portfolio holding, and private security characteristics, in addition to our valuation dispersion and performance incentive measures. The sample in this table corresponds to the sample shown in the third-to-last row of Table 1.

Panel A: Sample Size Statistics

	N
Number of Funds	220
Number of Management Companies	44
Number of Private Firms	145
Number of Illiquid Securities	328
Total Number of Mutual Fund Holdings	26,592

Panel B: Holdings Characteristics

	Mean	Median	Std	N
Number of Private Securities Held by Fund	14.343	14.000	10.324	26592
Number of Funds	6.894	6.000	4.850	26592
Number of Fund Families	1.890	1.000	1.294	26592
Total Holding Period (Months)	36.573	39.600	15.231	26592
Time Invested (Months)	20.701	18.000	13.554	26592
Amount of Time Between Price Updates	2.410	0.000	4.518	26592
Fund Total Investment Weight at Filing	1.959	1.470	2.032	26592
Optimism	0.000	0.000	0.025	26592
Boldness	1.372	0.000	3.160	26592

Panel C: Fund Characteristics

	Mean	Median	Std	N
Fund age	17.048	15.336	13.533	6249
Tenure of Longest-Tenured manager	8.385	7.332	5.545	6249
Age of Longest-Tenured Manager	49.984	52.000	8.969	2401
Expense Ratio	0.980	1.000	0.325	5625
Turnover Ratio	0.664	0.490	0.565	5625
Total Net Assets ($B)	3.373	0.618	9.314	6151
Number of Portfolio Managers	2.986	2.000	3.963	6249

Panel D: Firm Characteristics

	Mean	Median	Std	N
Private Firm Age	9.867	9.000	6.102	5848
Number of Employees (Estimate)	2781.749	750.000	5558.039	6157
News Articles Last 90 Days	111.945	0.000	380.499	6157
Number of Publicly Traded Industry Peers	41.894	20.000	53.752	6055

Panel E: Valuation and Returns

	Mean	Median	Std	N
Annual Fund Return	12.648	9.957	13.990	636
Annual Abnormal Fund Return	-0.145	-0.345	7.316	613
Top 10 Fund	0.046	0.000	0.209	636
Just Above Bin	0.085	0.000	0.279	613

Panel F: Dispersion

	Mean	Median	Std	N
Valuation Dispersion (Avg. Boldness)	1.057	0.000	2.646	6157
Std Valuation Dispersion (Std Price/Avg Price)	1.571	0.000	3.626	5337

Table 3: Main Results for Performance Chasing

This table presents fund-security-year OLS regressions estimating the relation between relative valuation optimism of private security holdings, and fund excess performance. Specifically, the regressions test whether funds that just meet their benchmark, or funds that perform among the best in their peer group, value their private holdings higher than other funds holding the securities the same period. *Simple Opt* is computed as the price assigned by a fund to a private security holding at a given filing date, minus the average price assigned by all funds holding the security at that filing date (including the fund in question), scaled by the average price assigned by these funds at the filing date. *Optimism* is computed the same as *Simple Opt*, except that the average price of the security at the filing date is computed using only funds managed by fund families that differ from the fund in question. *Optimism Change* is computed as the difference between the fund's *Optimism* measure in the current period for a given security, minus the fund's *Optimism* measure at the beginning of the year (at least nine months prior. *Abn Return* is computed as the percent change in a fund's valuation for a private security throughout the year ending December (with the beginning value being at least nine months prior), minus the average percent change in valuation for the private security held by other funds that a) had the same investment horizon, and b) were managed a fund family that differs from the fund in question. *Top-10 (CRSP Objective Code)* is an indicator variable for whether the fund's annual performance (as of December) is ranked in the top ten of all funds in the CRSP Mutual Fund database sharing the same CRSP objective code. *Just Above Bin* is an indicator variable for whether fund's end-of-year return is less than 100 basis points above the benchmark that is listed in the fund's prospectus (from Morningstar Direct). Panel A is restricted to December fund-security-filing dates where there is at least two fund families holding the security. Panels B and C are restricted to December fund-security-filing dates where there is a matching fund from a different fund family that has the identical investment horizon (of at least nine months) that year. Panels D and E restrict the sample in the same way as Panels B and C, but also limit the sample to a single fund from each fund family at each security-filing date. The fund that is selected in Panel D is the fund that is in the *Top 10* group, or the fund with the largest allocation to private equity securities that period if no fund is ranked in the top ten. The fund that is selected in Panel E is the fund in the *Just Above* group, or the fund with the largest allocation to private equity securities that period if no fund is in the *Just Above* group. Standard errors are clustered at the fund level. ***, **, * reflect significance at the 1%, 5%, and 10% levels.

Panel A: Unconditional Comparisons

	(1) Simple Opt	(2) Simple Opt	(3) Simple Opt	(4) Simple Opt	(5) Optimism	(6) Optimism	(7) Optimism	(8) Optimism
Top 10 Fund	0.736		1.231**		1.184		1.978*	
	(1.47)		(2.29)		(1.12)		(1.67)	
Just Above Bin		-0.109		0.523		-0.371		0.605
		(-0.32)		(1.21)		(-0.61)		(0.87)
Fund Fixed Effects	No	No	Yes	Yes	No	No	Yes	Yes
Adj. R-squared	0.001	-0.001	0.071	0.069	0.001	-0.000	0.137	0.132
Observations	1,211	1,184	1,211	1,184	1,211	1,184	1,211	1,184

Panel B: Top 10 - Comparisons across Fund Families, All Funds in Fund Family

	(1) Optimism	(2) Optimism Change	(3) Abn Return	(4) Optimism	(5) Optimism Change	(6) Abn Return
Top 10 Fund	2.111**	2.455**	5.777***	2.417	4.752**	9.501**
	(2.29)	(2.00)	(2.65)	(1.61)	(2.24)	(2.63)
Fund Fixed Effects	No	No	No	Yes	Yes	Yes
Adj. R-squared	0.003	0.002	0.004	0.190	0.015	0.010
Observations	733	733	733	733	733	733

Panel C: Comparisons across Fund Families, All Funds in Fund Family

	(1)	(2)	(3)	(4)	(5)	(6)
	Optimism	Optimism Change	Abn Return	Optimism	Optimism Change	Abn Return
Just Above Bin	-0.852	-0.424	0.174	-0.971**	-1.659	-1.403
	(-1.10)	(-0.50)	(0.10)	(-2.24)	(-1.65)	(-0.65)
Fund Fixed Effects	No	No	No	Yes	Yes	Yes
Adj. R-squared	0.001	-0.001	-0.001	0.191	0.014	0.004
Observations	719	719	719	719	719	719

Panel D: Top 10 - Comparisons across Fund Families, Single Fund per Fund Family

	(1)	(2)	(3)	(4)	(5)	(6)
	Optimism	Optimism Change	Abn Return	Optimism	Optimism Change	Abn Return
Top 10 Fund	2.396**	2.501**	5.562**	2.070	4.084**	8.785**
	(2.31)	(1.98)	(2.48)	(1.52)	(2.25)	(2.55)
Fund Fixed Effects	No	No	No	Yes	Yes	Yes
Adj. R-squared	0.005	0.002	0.004	0.243	0.036	0.038
Observations	389	389	389	389	389	389

Panel E: Meet or Beat - Comparisons across Fund Families, Single Fund per Fund Family

	(1)	(2)	(3)	(4)	(5)	(6)
	Optimism	Optimism Change	Abn Return	Optimism	Optimism Change	Abn Return
Just Above Bin	-0.818	-0.421	0.040	-1.196**	-2.057	-2.063
	(-0.85)	(-0.38)	(0.02)	(-2.17)	(-1.51)	(-0.80)
Fund Fixed Effects	No	No	No	Yes	Yes	Yes
Adj. R-squared	0.000	-0.002	-0.003	0.238	0.031	0.036
Observations	392	392	392	392	392	392

Table 4: The Moderating Effect of Discretion Opportunity

This table presents fund-security-filing date OLS regressions testing whether the number funds in a fund family holding a common security affects level of discretion a fund has in deviating its valuation from consensus. In particular, the regressions test whether having move than two funds in the family mutes the relation between performance incentives and optimistic valuations.*Optimism* is computed as the price assigned by a fund to a private holding at a given filing date, minus the average price assigned by other funds holding the security at that filing date, scaled by the average price assigned by these funds at the filing date. The average price of the security at each filing date is computed using only funds managed by fund families that differ from the fund in question. *Optimism Change* is computed as the difference between the fund's *Optimism* measure in the current period for a given security, minus the fund's *Optimism* measure at the beginning of the year (at least nine months prior. *Abn Return* is computed as the percent change in a fund's valuation for a private security throughout the year ending December (with the beginning value being at least nine months prior), minus the average percent change in valuation for the private security held by other funds that a) had the same investment horizon, and b) were managed by a fund family that differs from the fund in question. The sample in each Column is restricted to December fund-security-filing dates where there is a matching fund from a different fund family that has the identical investment horizon that year. The sample is additionally restricted to a single fund from each fund family at each security-filing date. The fund that is selected is the fund that is in the *Top 10* group, or the fund with the largest allocation to private equity securities that period if no fund is ranked in the top ten. Standard errors are clustered at the fund level. ***, **, * reflect significance at the 1%, 5%, and 10% levels.

	(1)	(2)	(3)	(4)	(5)	(6)
	Optimism	Optimism Change	Abn Return	Optimism	Optimism Change	Abn Return
Top 10 (2 Fund in Family)	2.463**	2.558*	5.849**	2.465	4.348**	9.261**
	(2.16)	(1.85)	(2.32)	(1.67)	(2.17)	(2.44)
Top 10 (> 2 Fund in Family)	1.701***	1.901***	2.538***	-8.325***	-2.865***	-3.753*
	(2.83)	(3.98)	(2.84)	(-11.26)	(-2.86)	(-1.98)
Fund Fixed Effects	No	No	No	Yes	Yes	Yes
Adj. R-squared	0.002	-0.000	0.001	0.248	0.035	0.037
Observations	389	389	389	389	389	389
P-Val: Diff of Coef Test	0.44	0.62	0.17	0.00	0.00	0.00

Table 5: Fund Manager Career Concern Incentives

This table presents fund-security-filing date OLS regressions estimating the relation between fund manager career concerns and valuation boldness. Specifically, the regressions examine whether funds managed by portfolio managers that are more tenured with the fund report values for private securities that deviate more (or less) from consensus than peer funds. The dependent variable in each column, *Boldness*, is computed as the absolute value of the difference between the price assigned by a fund to a private security at a given filing date and the average price assigned by all funds holding the security at that filing date, scaled by the average price assigned by all funds at the filing date. *Manager Tenure* is the log of one plus the number of years the longest tenured manager with the fund has been managing the fund. *Number of funds* is the number of unique funds holding the security that period. The sample is Columns 2 and 4 is restricted to a single fund from each fund family at each security-filing date. The fund that is selected is the fund with the largest allocation to private equity securities that period. Standard errors are clustered at the fund level. ***, **, * reflect significance at the 1%, 5%, and 10% levels.

	(1) Boldness	(2) Boldness	(3) Boldness	(4) Boldness
Ln(Fund Manager Tenure)	0.321*	0.076	-0.205**	-0.739***
	(1.67)	(0.16)	(-2.32)	(-3.20)
Ln(Number of funds)	0.356**	1.264***	3.738***	3.571***
	(2.02)	(2.90)	(12.82)	(9.04)
Security Fixed Effects	No	No	Yes	Yes
Sample	All Funds	Single Fund	All Funds	Single Fund
Adj. R-squared	0.008	0.023	0.434	0.406
Observations	25,772	9,006	25,772	9,006

Table 6: Information Environment Characteristics

This table presents security-filing date level OLS regressions examining the extent to which the quality of the information environment for private firms explains the dispersion in valuations for the private securities issued by these firms. The dependent variable in each column – measuring the dispersion in valuations for a private security at each filing date – is computed as the average of each fund's *Boldness* across all funds holding the security that period. *Boldness* is computed as the absolute value of the difference between the price assigned by a fund to the private security at the filing date and the average price assigned by all funds holding the security at that filing date, scaled by the average price assigned by all funds at the filing date. *Funding Round Last 3 months* is an indicator for whether the private firm had a new round of financing in the previous 3 months. *News Articles Last 3 Months* is the average daily number of articles published over the last 3 months that highlight the private firm (from Ravenpack), with a relevance score of 100. *Number of Publicly Traded Peers* is the number of firms in the private firm's industry peer group as defined by Bloomberg, conditional on the peer firms being publicly traded on a U.S. exchange and having non-missing revenue information. *Dispersion in Geographic Proximity* is an indicator for whether the private firm is held by at least one fund that is located in the same state, and at least one fund that is located in a different state. *Firm Age* is the current year minus the private firm's year of founding (from Venture Xpert). *Number of funds* is the number of unique funds holding the security that period. The reason the sample size in Columns 1, 2, and 4 of Panel A differs from the second to last row of Table 1 is because singletons are dropped from the sample when fixed effects are introduced in Panel B. Standard errors are clustered at the private security level. ***, **, * reflect significance at the 1%, 5%, and 10% levels.

Panel A: Pooled Regressions

	(1) Dispersion	(2) Dispersion	(3) Dispersion	(4) Dispersion	(5) Dispersion	(6) Dispersion
Funding Round Last 3 Months	0.386**					0.203
	(2.53)					(1.61)
Ln(News Articles Last 3 Months)		-0.074*				-0.069*
		(-1.71)				(-1.66)
Ln(Number Publicly Traded Peers)			-0.090			-0.115
			(-1.20)			(-1.56)
Dispersion in Geographic Proximity				1.682***		1.687***
				(4.46)		(5.11)
Ln(Firm age)					-0.510*	-0.750***
					(-1.75)	(-3.01)
Ln(Number of funds)	0.726**	0.759**	0.953***	0.706**	0.728**	0.940***
	(2.18)	(2.38)	(3.24)	(2.13)	(2.19)	(3.40)
Security Fixed Effects	No	No	No	No	No	No
Filing Date Fixed Effects	No	No	No	No	No	No
Adj. R-squared	0.017	0.018	0.033	0.020	0.023	0.065
Observations	5,315	5,315	5,240	5,315	5,071	4,974

Panel B: Security Fixed Effects

	(1) Dispersion	(2) Dispersion	(3) Dispersion	(4) Dispersion
Funding Round Last 3 Months	-0.063			-0.061
	(-0.61)			(-0.60)
Ln(News Articles Last 3 Months)		-0.071*		-0.066
		(-1.66)		(-1.57)
Dispersion in Geographic Proximity			2.018***	2.005***
			(6.52)	(6.50)
Ln(Number of funds)	3.023***	2.988***	2.897***	2.866***
	(5.90)	(5.84)	(5.56)	(5.49)
Security Fixed Effects	Yes	Yes	Yes	Yes
Filing Date Fixed Effects	Yes	Yes	Yes	Yes
Adj. R-squared	0.521	0.521	0.525	0.525
Observations	5,315	5,315	5,315	5,315

Table 7: Tests of Information Asymmetry

This table presents quarterly (Panel A) and annual (Panel B) fund-security level OLS regressions testing whether pure learning can explain fund private-security valuations. More specifically, the regressions estimate the predictability of a fund's current period relative valuation for a private security, using the fund's prior period relative valuation for that private security. The dependent variable in Columns 1 and 3 of each panel is the rank of a fund's valuation (high rank = optimistic valuation) for a given private security among all funds holding the private security that filing date. The dependent variable in Columns 2 and 4 is an indicator for whether the fund values the private security at or above the median value assigned by all funds holding the security that period. *Prior Quarter Valuation Rank* is the optimism rank of a fund's valuation for the private security in the prior quarter (or year) *t-1*, among all funds holding the private security during that prior quarter or year. *Above Median Value (Prior Qtr (Yr))* is an indicator variable for whether the fund's valuation for the private security in the prior quarter (or year) was at or above the median value assigned by all funds holding the security that period. Each column restricts the sample to filing dates where the prior quarter (or year) had a dispersion in valuations of at least 0.1%. Dispersion in valuations is computed as the average valuation boldness of each fund holding the security that period, where boldness is computed as the absolute value of the difference between the price assigned by a fund to the private security at the filing date and the average price assigned by all funds holding the security at that filing date, scaled by the average price assigned by all funds at the filing date. Panel B is estimated using only holdings reported at the end of each calendar year; Panel A is estimated using holdings reported at the end of March, June, September and December. Standard errors are clustered at the fund level. ***, **, * reflect significance at the 1%, 5%, and 10% levels.

Panel A: Quarterly

	(1) Valuation Rank	(2) Above Median Valuation
Prior Quarter Valuation Rank	0.478***	
	(18.24)	
Above Median Value (Prior Qtr)		0.485***
		(24.27)
Ln(Number of funds)	1.276***	-0.037*
	(10.81)	(-1.66)
Adj. R-squared	0.360	0.237
Observations	1,954	1,954

Panel B: Annual

	(1) Valuation Rank	(2) Above Median Valuation
Prior Year Valuation Rank	-0.032	
	(-0.65)	
Above Median Value (Prior Yr)		-0.020
		(-0.40)
Ln(Number of funds)	1.220***	-0.098*
	(7.87)	(-1.90)
Adj. R-squared	0.069	0.003
Observations	473	473

Table 8: Convergence in Beliefs

This table presents fund-security-filing date level OLS regressions examining the extent to which quarterly (or annual) valuations of private securities move in the direction of convergence. More specifically, the regressions test whether the valuation change for a given security held by a fund in quarter (or year) *t* is negatively related to the relative ranking of the fund's valuation for the same security in quarter (or year) *t-1*, compared to other funds holding the security in that quarter (or year). The main explanatory variable, *Lagged Valuation Rank* is the rank of a fund's valuation (high rank = optimistic valuation) in quarter (or year) *t-1*. Each column conditions the sample on having a dispersion in valuations of at least 0.1% in quarter (or year) *t-1*. Dispersion in valuations is computed as the average valuation boldness of each fund holding the security that period, where boldness is computed as the absolute value of the difference between the price assigned by a fund to the private security at the filing date and the average price assigned by all funds holding the security at that filing date, scaled by the average price assigned by all funds at the filing date. Panel B is estimated using only holdings reported at the end of each calendar year; Panel A is estimated using holdings reported at the end of March, June, September and December. Standard errors clustered at the fund level. ***, **, * reflect significance at the 1%, 5%, and 10% levels.

Panel A: Quarterly

	(1) Price Change	(2) Price Change
Prior Quarter Valuation Rank	-0.007**	
	(-2.45)	
Above Median Value (Prior Qtr)		-0.032***
		(-2.65)
Ln(Number of funds)	0.010	0.003
	(0.69)	(0.19)
Adj. R-squared	0.003	0.004
Observations	8,597	8,597

Panel B: Annual

	(1) Price Change	(2) Price Change
Prior Year Valuation Rank	-0.030***	
	(-3.38)	
Above Median Value (Prior Yr)		-0.123***
		(-3.13)
Ln(Number of funds)	-0.182***	-0.242***
	(-3.51)	(-4.55)
Adj. R-squared	0.048	0.048
Observations	473	473