

# The Certification Role of Insider Participation in Private Placements

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**Abstract:** In this paper we provide new insight into the motives underlying insider participation in Private Investments in Public Equity (PIPEs) after explicitly taking into account the nature of the contractual terms involved. This analysis extends the prior literature, especially given the changes in the use of contractual terms and the increased liquidity in the PIPEs market in the intervening period. We find evidence supporting the certification motive. In particular, the certification value of insider participation manifests itself in lower discounts to PIPE investors, who also frequently negotiate control-related terms when insiders participate. Announcement wealth effects are higher when insiders participate than when they are absent both for single and repeated PIPE transactions. Further, this certification effect is validated by improvements in future firm operating performance only when insiders participate.

*Keywords:* Private investment in public equity, PIPEs, private placement, investor identity, contract terms, financial contracting, certification and monitoring.

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## 1. Introduction

Private investments in public equity (PIPEs) have become very popular in recent times, exceeding \$120 billion in 2008, which was more than 50% of the size of the public secondary offerings market at that time.<sup>1</sup> A noteworthy aspect of PIPE transactions is that corporate insiders frequently participate in them. The literature offers self-dealing (Wu 2004) and certification or signaling (Leland and Pyle 1977; Grinblatt and Hwang 1989) as the primary reasons for insider participation in equity issues. However, equity transactions, in general, and PIPE transactions, in particular, occur in an environment of informational asymmetry between insiders and outsiders which can potentially be mitigated or exacerbated by *both* the contractual terms involved and the level of insider participation. In this context, prior evidence indicates that insider participation in equity transactions is associated with pricing (Masulis and Korwar 1986), and that contractual terms granted to investors are associated with the extent of insider participation (Wruck and Wu 2009, Karpoff, Lee and Masulis 2013).<sup>2</sup>

Our purpose in this paper is to provide new insight into the motives underlying insider participation in PIPEs after explicitly taking into account the nature of the contractual terms involved. We focus our analysis on PIPE transactions executed between 2001-2010, which is a more recent period than those analyzed in prior studies on PIPEs. During this time period, there were major changes in the regulatory environment relating to the private placement market, potentially affecting the structure of PIPE transactions in a significant way, and, more importantly, why insiders would participate in them. We analyze how (i) insider participation in PIPEs is associated with the pricing of these transactions, (ii) the nature of the contractual terms offered to investors, and the relationship among contractual terms, insider participation and pricing, (iii) the announcement-period wealth effects associated with insider

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<sup>1</sup> We use the PrivateRaise database for our PIPE statistics.

<sup>2</sup> Masulis and Korwar (1986) show that decreases in management holdings in combined (primary and secondary) offerings exhibit significantly larger negative announcement effects. As evidence of the relationship between contractual arrangements and insider ownership, Karpoff, Lee and Masulis (2013) document that insider holdings are negatively related to the duration of ex-post lock-up agreements in SEOs. Also, Wruck and Wu (2009) document that more board seats are likely to be granted to outside investors when the incumbent CEOs have high shareholdings

participation, in particular, when such PIPE transactions are executed repeatedly, and (iv) any changes in operating performance in the years surrounding a PIPE transaction closing year to investigate if they are congruent with insider participation-related wealth effects. We also address endogeneity issues that arise due to the contemporaneous nature of contractual terms, pricing and the insiders' decision to participate in PIPE transactions.

A PIPE transaction constitutes a non-traditional means of raising equity and is likely to be the preferred means of financing for firms that are unable to raise capital through public offerings (as documented in Brophy, Ouimet and Sialm 2009). Indeed, most PIPE issuing firms are loss firms, under pressure to secure immediate financing for their operations (Dai 2007; Chaplinsky and Haushalter 2009). The private placement market provides them with a forum to induce selected investors to provide the needed capital through a combination of attractive contractual terms and potential certification through insider participation. The literature analyzes two potential motives for insider participation in PIPE transactions that are not mutually exclusive. First, *self-dealing*, and associated entrenchment, is a compelling motive because informed managers have a natural incentive to opportunistically benefit from subsequent stock-price run ups. However, evidence on self-dealing and entrenchment is mixed. On the one hand, Wu (2004) uses a sample of pre-1999 private placements by high-technology post-IPO firms to find that insiders invest in these transactions at substantial discounts, and interprets this evidence as consistent with self-dealing. Barclay, Holderness and Sheehan (2007) also document similar evidence and argue that self-dealing in private placements is associated with entrenchment incentives.<sup>3</sup> On the other hand, Hertzell and Smith (1993) do not find evidence of discounts associated with insider participation. Huson, Malatesta and Parrino (2010) report that insider participation is not necessarily associated with large discounts. They interpret their finding as either managers investing in higher quality issues or as investors requiring smaller discounts when managers invest alongside them.

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<sup>3</sup> Wruck (1989) posits that discounts offered in private placements are a compensation for the resale restrictions imposed for private placements during her sample period (1979-1985). As we discuss later, these restrictions do not generally apply for our sample of PIPEs (2001-2010). She also finds that for middle ranges of managerial ownership (5%-25%), announcement wealth effects are negative for private placements, suggesting managerial entrenchment.

Second, *certification* is also a plausible motive because when insiders participate in these transactions, they lend assurance regarding the quality of their firms' prospects to outside investors by subjecting themselves to the same firm-specific risks (Leland and Pyle 1977; Grinblatt and Hwang 1989). Thus, unlike self-dealing, certification would mitigate the incentive conflicts between insiders and outsiders, especially for distressed firms characterized by high levels of information asymmetry.

Besides participating in PIPE transactions, issuers have other mechanisms available for mitigating potential incentive conflicts, including granting outside investors increased control rights such as board seats or additional voting rights. They could also offer higher liquidity by issuing preregistered stock, price resets and soft/hard floors, permitting investors to bail out if their expectations regarding the PIPE issuers' prospects or managers' motives are not met. While obviously costly to issuers, control and liquidity provisions would serve to mitigate the impact of potential managerial entrenchment, thus permitting a greater role for certification in insider participation. Two interesting questions emerge. First, are control and cash flow rights granted to investors equally likely to be associated with insider participation in PIPE transactions? Second, does the granting of control and/or cash flow rights as well as discounts to outside investors affect the motive behind insider participation?

Contractual terms involving control rights and cash flow rights take on added significance given some fundamental changes that have occurred in the market for private placements since 2000. First, PIPE issuers began issuing Registered Directs (preregistered stock that is freely publicly resalable) post-2003, enhancing liquidity in the private equity market.<sup>4</sup> Further, there were dramatic changes in the contractual structures associated with PIPEs following numerous SEC enforcement actions during 2002-2005, including an increase in investor protection measures and fewer issuer rights (Bengtsson, Dai and Henson 2014). Beginning in February 2008, the SEC also shortened the required Rule 144 holding period and eliminated some of the previous Rule 144 requirements for non-affiliated investors. Approximately

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<sup>4</sup> As indicated by the PrivateRaise database, Registered Directs have since accounted for 21.6% of the entire PIPEs sample. Wruck and Wu (2009) argue that PIPEs are different from Regulation D offerings as PIPEs eliminate resale restrictions by requiring that the shares issued be registered with the Securities and Exchange Commission (SEC) within 30 days of closing, which leads to higher liquidity.

27% of PIPEs in our sample belong to the post-2008 period. The net effect of all these events is that the private equity market has become considerably more liquid post-2000. Enhanced liquidity makes private equity markets potentially attractive to outside investors as they can always pull out of their investments if sufficient returns are not forthcoming. Consequently, PIPE issuers potentially face more pressure to offer assurances and/or attractive contractual terms in order to attract capital during our sample period, raising the possibility that the motive behind insider participation could have fundamentally changed as well.

Our purpose therefore is to reexamine the role of insider participation in PIPE transactions after controlling for the effects of these contractual terms. In earlier work, Wu (2004), Wruck and Wu (2009), Krishnamurthy, Spindt, Subramaniam and Woidtke (2005) and Barclay, Holderness and Sheehan (2007) also deal with managerial incentives in private placements of equity. These studies analyze earlier samples (before calendar year 1999). Wruck and Wu (2009) analyze the effects of placement agreements on the forging of new relationships, governance and monitoring. More importantly, Wu (2004) finds evidence of self-dealing associated with insider participation in private placements. However, to our knowledge, we are not aware of papers that explicitly examine the motives for insider participation after accounting for contractual terms.

We find that PIPEs involving insider participation (IP firms) are smaller in size, exhibit faster cash burn rates, have lower market valuations, lower profitability, and lower liquidity, relative to PIPEs with no inside participation (NIP firms). Thus, IP firms are entities in need of cash whose growth options are not highly valued in public equity markets. Contrary to the self-dealing motive, we find that the average pricing discount negotiated by leading investor types for IP PIPEs is significantly lower than that for NIP PIPEs. Interestingly, IP PIPEs are also associated with the granting of more control rights (board seats and voting rights) but fewer cash flow rights (preregistered stock, price resets, soft and hard floors), relative to NIP PIPEs.

Our market analysis provides additional support for these results. The three-day announcement Cumulative Abnormal Returns (CARs) for IP PIPEs are significantly more positive relative to the corresponding CARs for NIP PIPEs. These results establish that the market views insider participation in

PIPE transactions favorably. Further, they indicate that insider participation, when combined with the granting of control rights to outside investors, is consistent with certification, not self-dealing, being the primary motive for the average firm in our sample.

To add further credence to these findings, we investigate firms engaging in a sequence of PIPEs over time. This multiple PIPEs analysis allows us to study the effect of insider participation with the firm as its own control. If certification is indeed the motive driving insider participation, we would expect the market to react positively when PIPE issuers switch from NIP to IP PIPEs, but, more importantly we would expect the market to react adversely when PIPE issuers switch from IP to NIP PIPEs (because of absence of certification). Our findings strongly support these predictions. We also find that when PIPE issuers conduct repeated IP PIPEs, wealth effects are positive and of similar magnitudes across transactions.

We also examine changes in the future operating performance of IP and NIP PIPEs by comparing selected performance measures the year before vs. the year after the PIPE completion year. We find that size, profitability and growth measures significantly increase *only* for IP PIPEs. We conclude that the improvement in the operating performance of IP PIPEs validates the assurance that insider participation provides to outside investors.

The importance of PIPE transactions is reflected in the growth of academic literature that has examined many aspects of these transactions, including how the market reacts to PIPE announcements, and the motives driving various types of investors to participate in these transactions (Dai 2007; Brophy, Ouimet and Sialm 2009; Billett, Elkamhi and Floros 2014).

The literature has also analyzed the nature and the role of contractual terms in PIPEs. Barclay, Holderness and Sheehan (1997) examine instances where investors are allowed participation on the board. Wruck and Wu (1999) show that increased monitoring and governance through placement agreements create value. Chaplinsky and Haushalter (2010) show wealth effects associated with the presence of contingent claims (warrants and price resets) in private placements, Billett, Elkamhi and Floros (2014)

show the wealth effects associated with strategic and arms-length investors having access to control and cash flow terms, respectively.

While these studies focus on the performance and wealth effects of contractual terms in PIPE transactions, we contribute to the literature by providing a rigorous analysis of the motive behind insider participation in these transactions post-2000, a period in which the private placement market was fundamentally transformed by a series of liquidity-enhancing regulations. We show how the changing structure of PIPE contractual terms and exogenous regulatory changes affect PIPE transactions post 2000. Our data on contractual terms in PIPE contracts enables us to provide some insight into cross-sectional variations in the granting of control rights. More importantly, our findings also add to the broad evidence on the relationship between insider participation, contractual terms and announcement effects in equity transactions.

The paper proceeds as follows. In Section 2, we describe our data and how we identify IP and NIP PIPE subsamples. In Section 3, we present our main results. In Section 4, we conduct several tests to shed additional insight on motives underlying insider participation in PIPEs as a function of contractual terms.<sup>5</sup> We also examine whether our main results hold after we control for any potential endogeneity in our analysis. We provide a conclusion in Section 5.

## **2. Data and sample selection**

We obtain our sample of PIPE transactions from the PrivateRaise database offered by *The Deal Pipeline* with the PIPE closing dates ranging from 1/1/2001 to 12/31/2010. The master file of all completed, unregistered and registered PIPEs conducted in the U.S. (Registered Directs) by both domestic and foreign issuers comprises 14,873 observations. Of these, 1,040 completed PIPE transactions involve

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<sup>5</sup> The ten contractual terms we use for the construction of two contractual term-related dummy variables (control terms dummy and liquidity terms dummy), are the following: board seats, voting rights, price resets, soft floors, hard floors, preregistered stock (Registered Directs), investor call option, liquidation rights, investor redemption rights, and investor purchase rights. For a detailed overview of each dummy variable, please refer to Billett, Elkamhi and Floros (2014), who also offer pairwise correlation coefficients and associated conditional probabilities for the same set of PIPE contractual terms.

participation from insiders including officers, directors, and their family members (IP PIPEs).<sup>6</sup> We designate the remaining 13,833 PIPEs as non-insider participating PIPEs (NIP PIPEs). We allow for all security types to be included in our master file. In multi-period analyses, we allow for IP (and NIP) PIPE issuers to switch, i.e., engage in subsequent NIP PIPE (IP PIPE) transactions; hence, any PIPE issuer need not always be an IP (NIP) PIPE issuer.

For these IP and NIP samples, we are able to access information from *PrivateRaise* on transaction details, investor types, and contractual terms<sup>7</sup>; *PrivateRaise* offers complete information for 49.92% of all completed PIPEs in three separate modules. Because the database offers investor-type information only from 2007-2010, we also access investor-type information for the period 2001-2006 from the *PlacementTacker* database offered by *Sagient Research Systems*. Also, we compute the median values of the gross proceeds amount expressed as a percentage of the market capitalization as of the date of the PIPE closing. We find that the adjusted gross proceeds percentage is significantly higher for IP PIPEs than NIP PIPEs. We also verify whether prior insiders' holdings significantly explain announcement wealth effects. We collect insiders' ownership information from FactSet as of the quarter prior to the PIPE consummation quarter and are able to collect quarterly insider ownership information for 315 out of the 523 IP PIPE transactions (60.04%). We do not find significant announcement wealth effects attributed to prior insider holdings.

Overall, PIPEs outnumbered common stock seasoned offerings conducted in the U.S. by non-regulated issuers during the period from 2001 to 2010 (14,873 vs. 1,758 transactions), with higher gross proceeds (\$411 billion vs. \$346 billion). The median value of a PIPE transaction involving insider participation during this period was \$ 3.8 million, with \$ 2.1 million coming from insiders. Insiders participate along with other outsiders/investor types in IP PIPEs. We are able to collect investor type

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<sup>6</sup> We find that in roughly 73% of all 1,040 insider-participating PIPEs, managers are the insider participants, while directors or affiliated companies as the insider participants comprise the remainder.

<sup>7</sup> PrivateRaise calculates the premium/discount as the percentage price difference between the PIPE offered price and the stock price on the date prior to: a) the definitive agreement/pricing, b) the first offering public announcement, and c) the date of closing, depending on which date comes first.



information for 315 PIPEs of our IP PIPE sample. In this sample the median (average) purchased amount by insiders as a percentage of the total PIPE gross proceeds amount is 13.7% (33.2%). The total dollar amount contributed solely by insiders for all PIPE transactions during this period amounts to \$ 2.65 billion. Both unregistered and registered private equity offerings have consistently increased since 2001. Insiders purchased stakes in roughly 7% of all closed PIPE transactions (1,040 out of a total of 14,873 closed PIPEs) from 2001 to 2010, raising approximately \$ 12 billion.

It is worthwhile noting that the SEC has no regulation in place stipulating that insiders pay a different price (i.e., at least par value) compared to other investors who may purchase the securities at a discount (such a regulation would institutionally preclude self-dealing by insiders; such insider discounts are prohibited in some countries like India. Using hand-collected data we find only 36 observations involving differential pricing, of which none involves IP PIPEs in our sample. Thus, there is no potential bias in our analysis arising from differential pricing.<sup>8</sup>

Table 1<sup>9</sup> provides details on the availability of relevant data for our IP and NIP samples.

(Insert Table 1 here)

For the IP (NIP) sample, we are able to retrieve CRSP pricing information for 523 (6,097) out of 1,040 (13,833) transactions. Next, data on discount/premium and contractual terms are available for 502 (5,800) of the IP (NIP) PIPEs. Availability of relevant financial data from Compustat reduces the sample size to 301 (3,653) IP (NIP) PIPEs. In order to gauge whether insiders constitute the leading investor type we need information on the other investor types, which is not available for all PIPE transactions. Requiring investor type information, limits our sample sizes to 206 (out of 301) IP PIPEs and 1,854 (out of 3,653) NIP PIPEs, respectively.

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<sup>8</sup> For robustness, we perform our analysis with and without the 36 observations; the results are similar.

<sup>9</sup> All variables are defined in Appendix A

### 3. Empirical findings

We begin our analysis by presenting univariate statistics on key financials, pricing and contractual terms for all investor types and classifications.

#### 3.1 *IP versus NIP PIPEs: Comparing issuer profiles and transaction specifics*

(Insert Table 2 here)

Table 2 presents the financial profiles of IP and NIP PIPEs. We report median and mean values. It is clear that many of the variables exhibit skewness. Following the literature, we winsorize all the variables at the 1% and 99% levels (Brophy, Ouimet and Sialm 2009; Chaplinsky and Haushalter 2010). Relative to NIP PIPE issuers, IP PIPE issuers are significantly smaller (referring to the median values), exhibit lower equity valuations, are less liquid, less profitable and have higher cash-burn rates.

(Insert Table 3 here)

In Panel A of Table 3, we compare median (mean) prices for IP and NIP PIPEs. These values are significantly different for the two samples, with IP PIPEs exhibiting significantly lower discounts than NIP PIPEs (2.6% vs. 7.1%). The mean values reveal that IP PIPEs are associated, on average, with premia whereas NIP PIPEs investors request a discount, on average, of 3.5%, which highlights the extent of skewness. In untabulated results, we are able to construct a propensity score-matched sample of 277 pairs of IP and NIP PIPEs. In order to build the propensity score-matched sample, we consider the following variables: size, cash ratio, ROA, cash burn rate and market-to-book ratio of equity. As reported in Table 2, these are the dimensions along which IP and NIP PIPEs exhibit significantly different median values. After employing the propensity score matching approach for identifying IP and NIP PIPEs with similar financial profiles, we find that the median discount values are significantly lower for IP PIPEs, namely 0.7% vs 7.85% (different at the 1% significance level). We recognize that the exclusion of any warrants included in the security types offered in IP and NIP PIPEs could potentially leave out a substantial part of the value of the PIPE shares. Therefore, in untabulated results, we re-compute

discounts for the IP PIPEs and NIP PIPEs that do not have any warrants embedded, namely the common stock, convertible debt and convertible preferred stock offering transactions. We find that the median discounts are significantly lower for IP PIPEs when compared to NIP PIPEs (0.9% vs 7.8%), and this difference is significant at the 1% level. The majority of the IP PIPEs (94.46%) and the NIP PIPEs (90.57%) do not include any warrants.

Panel A also provides statistics on the contractual terms involved in our sample of PIPE transactions. We are able to identify 10 contractual terms that are used in our sample. Only a few of them can unambiguously be viewed as dealing with control rights or with liquidity enhancements. Obvious control rights provisions include board seats and voting rights. Clear-cut liquidity provisions include preregistered stock (providing instant liquidity), price resets, hard floors and soft floors (providing adjustments to the minimum purchase/conversion price in floating-priced placements), and investor purchases (providing the opportunity to the investor to purchase up to a proportionate share of the total number of issuer's securities being offered).

To analyze these contractual terms in a parsimonious way, we construct a control terms dummy that takes the value of 1 when board seats or voting rights are offered and 0 otherwise. We also construct a liquidity-enhancing terms dummy that takes the value of 1 when any of the following contractual terms are present: preregistered stock, investor redemption rights, investor rights of first refusal, price resets, soft floor or hard floor requests, investor call options, investor liquidation rights, and 0 otherwise.

Our analysis indicates that 21.1% (13.4%) of IP (NIP) PIPEs offer investors control terms. Thus, issuers of IP PIPEs appear to cede control rights more frequently than the issuers of NIP PIPEs, suggesting that insider participation and contractual arrangements are associated. Turning to the liquidity-enhancing dummy, 44.9% of all IP PIPEs involve liquidity-enhancing terms compared with 57.1% of NIP PIPE transactions. This finding is consistent with outside investors demanding greater liquidity, but lower control rights in the absence of insider participation. In particular, the granting of board seats is rarely accompanied by offers of preregistered stock in a PIPE transaction. Overall, these results suggest that

insider participation is more likely to be associated with outside investors acquiring additional control to preclude potential managerial entrenchment or self-dealing. In Table 3 (Panel B), we compare the median (mean) alphas---estimated using the calendar-time methodology--- across IP PIPEs and NIP PIPEs for one trading year and three trading month windows preceding the first public announcement of the PIPE transaction. We find that IP PIPEs exhibit significantly lower stock performance for these two trading windows than the NIP PIPEs, preceding the first PIPE public announcement.

(Insert Figure 1 here)

Figure 1 shows the stock price performance for both IP PIPEs and NIP PIPEs over the [-252, 30] day window, with day 0 being the PIPE announcement date. This figure is striking in a number of ways. First, the IP PIPE sample significantly underperforms the NIP PIPEs in the pre-announcement period. Second, returns for the IP PIPE sample are negative beginning from day -218. In contrast, returns are positive and increasing for the NIP PIPE sample. Third, prices start drifting around day -4 and become positive around day 11 for the IP PIPE sample. In contrast, we do not detect any such upward drift around PIPE announcements for the NIP PIPE sample.

Taken together, Figure 1 and Panel B of Table 3 lend credence to the certification hypothesis. In particular, negative price performance appears to be an important determinant of insider participation. Moreover, insider participation seems to arrest the negative price trend and revise market perceptions significantly upward. We investigate the announcement period effects in greater detail later in this section.

### *3.2 Explaining insider participation and discount levels*

(Insert Table 4 here)

Next, in Table 4, we perform a multivariate analysis to explain the insiders' decision to participate in PIPE transactions. We model insider participation using a binomial variable, which takes the value of 1 when insiders invest, and zero otherwise. We estimate four separate models. A detailed

description of the dependent and explanatory variables is presented in Appendix A. In models (1), (2), and (3), we estimate the determinants of PIPE insider participation and in model (4) we estimate the determinants of PIPE discounts. We include the relevant financial variables, shown in Table 2, as of the fiscal year prior to the PIPE transaction closing date/year as independent variables. Specifically, our financial variables account for issuer's size, expenditures (R&D ratio and CAPEX ratio), liquidity and dependency on cash reserves (Cash ratio and cash burn rate), growth options (sales ratio and market-to-book equity ratio), debt levels (total leverage ratio) and profitability (ROA). In addition, we control for any association of the two term dummies and the prior stock performance with insider participation and discounts. Finally, we explore the influence of discount levels on insider participation in PIPEs.<sup>10</sup> Given the apparent role of prior stock price performance in determining insider participation, as evidenced by Figure 1, we also include the three-month pre-announcement abnormal return as an additional control variable. In model (1), we only include financial variables and the three-month run-up performance as regressors in the analysis of insider participation in PIPE transactions. In model (2), we also include contractual terms, and in model (3), we add the discount dummy to the list of regressors. In addition to the results reported in Table 4, we conduct endogeneity tests and using a 2SLS framework, we determine whether the discount dummy and the contractual terms are determined simultaneously along with the decision of insiders to participate in the PIPE transactions (Panel A of Appendix C). Also, we present endogeneity test results based on Rivers and Vuong (1988), testing the simultaneity of the control terms, cash flow terms or the levels of discount, respectively, with the insider participation dummy variable and present our findings in Panel B of Appendix C (we present the second stage of the three simultaneous regressions). The Rho test results indicate that the discount dummy and the contractual terms are not endogenously determined along with insider participation. Because our results in Appendix C indicate that pricing determines the contractual terms and not the other way around, we do not include contractual terms as explanatory variables in model (4) of Table 4.

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<sup>10</sup> In order to make sure that our Table 6 multivariate analysis estimates still hold after accommodating any possible industry clustering, we employ industry fixed effects and find that our estimates are robust.

In model (1) we find insiders participate in PIPE issues that are smaller, have lower capital expenditures, and are less liquid. Prior stock price performance exhibits a negative and significant coefficient suggesting that insider participation is associated with lower stock performance leading up to the PIPE event (consistent with Figure 1). In model (2), we incorporate the two contractual term dummies not included in model (1). The negative coefficient estimate for the liquidity-enhancing terms dummy indicates that insider participation is associated with fewer cash flow rights (e.g., preregistered stock). The positive coefficient estimate for the control term dummy indicates that insider participation is associated with the granting of more control rights. Overall, capital providers appear to use their negotiating power to demand a measure of control even as they agree to lower discounts when insiders participate. In model (3), we also incorporate the discount dummy. We find that IP PIPEs are less frequently associated with discounts. Across all three models, we note that the coefficients of the ROA and R&D ratio variables are not statistically significant, perhaps because accounting performance is subsumed in the pre-announcement stock price performance.

In model (4) of Table 4, we analyze discount levels negotiated in IP vs. NIP PIPE transactions. We eliminate any PIPE transaction in which equity was sold at par to PIPE investors (i.e., no premium or discount) and incorporate the insider participation dummy variable and its interaction with the 3-month prior stock performance as explanatory variables. Consistent with the univariate results presented in Table 3, the results in model (4) indicate that there is a lower likelihood of PIPE issuers providing discounts when insiders are present, even after controlling for their financial characteristics. The findings also suggest that the likelihood of a discount is positively associated with the three-month prior stock performance and negatively associated with size, equity valuations and the interaction of the three-month run-up performance with the insider participation dummy variable. We interpret this latter finding as being contrary to the self-dealing hypothesis, as insiders do not appear to benefit from the three-month run-up performance by negotiating higher discounts for themselves.

There could be a potential concern that our estimates are driven by the fact that we use a binomial dummy variable to measure pricing discounts and do not consider any potential impact of the magnitude of discount. Therefore, in untabulated findings, we re-estimate the same specification model, while incorporating the continuous form of the discount variable. We find that the insider-participating PIPEs dummy variable, which is our main variable of interest, is still significantly negatively associated with the discount level.

### 3.3 *Wealth effects*

(Insert Table 5 here)

We next analyze the announcement period market reaction for PIPE transactions with insider participation. PrivateRaise provides us with both announcement dates and closing dates after 1/1/2003. We consider the earlier of the two dates as our event date. Whenever announcement dates are unavailable, we only consider closing dates to compute our market reactions. We note that only 34.78% of the PIPE transactions that closed after 1/1/2003 exhibit an announcement date that preceded the closing date. We report the market reaction results in Table 5. Specifically, we estimate the CARs over the symmetric three-trading day window around the first public announcement using the market model and the CRSP equally weighted dummy. Panel A shows the announcement period CARs for IP PIPEs and NIP PIPEs. The average CARs for all IP PIPEs is 4.08% (significant at 1% level), which is significantly higher than the average CAR for all NIP PIPEs of 0.84%. Thus, the market appears to respond positively to insider participation, which is consistent with certification, and not self-dealing. In order to make sure that our announcement returns are robust after adjusting for any potential dilution effects, we also compute announcement effects that are dilution-adjusted, following the Hertz and Smith (1993) discount-adjusted abnormal returns measure for the [-1,+1] event window. IP PIPEs exhibit significantly higher discount-adjusted, three-trading day abnormal returns than NIP PIPEs, namely 2.76% vs -0.52% (significantly higher at the 1% level).

### 3.3.1 *Wealth effects of multiple PIPEs*

In Panels B and C, we continue our analysis of the announcement period market reaction to PIPEs by examining samples of consecutive PIPE transactions in which the same issuer switches from an IP PIPE to an NIP PIPE and vice versa. This multi-period analysis allows us to study the effect of insider participation with the firm as its own control. To construct these samples, we use the universe of PIPE transactions that we are able to build from *PlacementTracker* (deals between 1995 and 2000) and *PrivateRaise* (deals between 2001 and 2010). By using both databases, we make sure we capture *all* PIPEs per issuer by chronologically sequencing them (i.e., first, second, third and fourth). We also avoid overlapping observations in the calculation of CARs across Columns [2], [3] and [4]. The average (median) calendar day difference across all consecutive PIPE transactions amounts to around 543 (381) days. To retain the power of our tests, we consider up to four PIPEs issued by the same firm.

In Panel B (Column [1]), we present the difference in mean CARs for all pairs of PIPE transactions in which the *first* PIPE is an *IP* PIPE and the *second* PIPE is an *NIP* PIPE. In columns [2], [3] and [4], we report the difference in mean CARs for the following pairs of PIPE transactions conducted by the same issuer: Column [2] corresponds to the first and second PIPE transactions, Column [3] corresponds to the second and third PIPE transactions, and Column [4] corresponds to the third and fourth PIPE transactions, respectively. We find that in each case, the IP PIPEs are greeted significantly more positively by the market than the NIP PIPEs, and specifically, the difference in mean CARs between the IP and NIP PIPEs across all pairs is 2.88%, which is statistically significant at the 1% level.<sup>11</sup>

In Panel C, we follow the same structure in presenting our findings. The difference is that Panel C presents the differences in mean CARs for PIPE transactions pairs in which the *first* PIPE transaction is

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<sup>11</sup> We trace all 130 issuers forward in time and collect Forms 4 and 5 submitted by them to the SEC within the time period between the first and the second PIPE transaction. We find that 68 out of all 130 issuers do not submit Forms 4 and 5, hence do not experience any change in insider ownership from the first to the second PIPE transaction. We re-estimate the three-trading day CARs for these 68 observations and find an average wealth effect of 1.73% for the preceding IP PIPEs, which is significantly higher. We conclude that our reported findings appearing in Table 5 (Panel B) are not likely to have been muddied by insiders exiting the issuer's ownership roster before the consummation of the second NIP PIPE transaction.



an *NIP* PIPE, which is always *followed* by an *IP* PIPE. Our results indicate that across all pairs, the *IP* PIPEs, which follow the *NIP* PIPEs, are greeted more positively by the market than the preceding *NIP* PIPEs, and the difference is significant. Specifically, the difference in mean CARs is -1.40%, which is significant at the 10% level.<sup>12</sup> These results further confirm that the market's positive response to insider participation sustains itself in repeated PIPE transactions regardless of the order of *IP* and *NIP* PIPEs.<sup>13</sup>

In Panel D, we construct two PIPE samples such that in one sample an initial *IP* PIPE is followed by another *IP* PIPE transaction, and in the other sample an initial *IP* PIPE is followed by an *NIP* PIPE transaction. We restrict our analysis to the first and the second PIPE transactions conducted by a single PIPE issuer. Similar to Panels B and C, we present the differences in mean CARs for such pairs. We find that when the second PIPE transaction is an *IP* PIPE, the wealth effects generated are positive and similar in magnitude whereas when the second PIPE transaction is an *NIP* PIPE, wealth effects significantly decline. Further, when we compare the first *IP* PIPE transaction across the two aforementioned samples, wealth effects are positive and of similar magnitude, whereas when we compare the second PIPE transactions, wealth effects are significantly higher for the *IP* PIPEs. We conclude therefore that the market greets the presence of insiders positively regardless of whether this is the first or the second PIPE transaction, i.e., the impact of certification does not “fade” when moving to later PIPE issues.

To ensure that these findings are not driven by major differences in the estimated betas, we confirm our results by using the CRSP equally-weighted market adjusted returns. These results are available in the Internet Appendix iTable 8. In addition, we make sure that our findings are not restricted

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<sup>12</sup> We make sure there is no overlap between the issuers appearing in Panels B and C. Hence, it cannot be the case that one issuer conducts an *IP* PIPE that is followed by a *NIP* PIPE and thereafter by an *IP* PIPE (and the reverse order). Also, we test for statistical significance in the difference of the financial profiles of the PIPE issuers that switch from being *IP*-PIPEs to *NIP*-PIPEs and vice versa and find no differences. This finding is expected as these PIPEs take place, on average, within the same fiscal year and are characterized by the same reported financials.

<sup>13</sup> Following Park (2013), we look into the *IP* and the *NIP* PIPEs that make up more than 20% of existing shares and find that our results are not driven by the incentive to circumvent the shareholder approval rule. For both *IP* and *NIP* PIPEs, announcement returns are not significantly different when the new shares issued amount to more vs. less than 20% of existing shares. Approximately 36.7% of *IP* PIPEs trigger the shareholder approval rule, whereas the corresponding percentage for *NIP* PIPEs is 24.9%, which is not significantly different. Overall, we conclude that insiders do not participate in PIPEs with the intention to bypass the shareholders' approval.

to three-trading day CARs. To check, we widen the event window of the dependent variable to five-trading day CARs and confirm that our findings (both economic and statistical significance) still hold (untabulated).

### 3.4 Explaining PIPE announcement returns

(Insert Table 6 here)

Next, we conduct a regression analysis of the three-trading day announcement period CARs, using all PIPE transactions. We report these results in Table 6. We include all the financial variables from our logistic regressions in Table 4 as controls.<sup>14</sup> Earlier empirical studies also explain announcement CARs using financial variables (Hertzel and Smith 1993; Dai 2007; Brophy, Ouimet and Sialm 2009).<sup>15</sup> These studies mainly control for size, market valuation, growth options and leverage. Model 1 in Table 6 shows that the coefficient of the insider participation dummy is positive and significant. This result corroborates the univariate results we present in Table 5 in which IP PIPEs exhibit positive and significantly higher three-trading day CARs relative to NIP PIPEs. Also, the results from model (1) suggest that the lower the research and development expense ratio, cash burn rate and ROA and the higher the capital expenditures, the higher are the three-trading day CARs. The result that higher discretionary R&D expenditures are negatively greeted by the market is interesting, and perhaps not surprising, because it suggests that the market is skeptical about the undertaking of R&D activities by PIPE firms, which are predominantly cash poor, underperforming loss firms.

In model (2) we add the control terms dummy and the liquidity-enhancing dummy variables. The coefficient of the insider participation dummy variable remains positive and significant. Interestingly, the coefficient of the control terms dummy is positive and significant as well. Because control terms

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<sup>14</sup> The difference in the number of utilized observations between Table 6 and Table 4 (Model 1) arises from the fact that we are not able to estimate announcement CARs for all IP and NIP PIPEs for which we have available pricing, financials and contractual terms information.

<sup>15</sup> As in prior studies, we also include the total gross proceeds amount adjusted by the closing market capitalization as an additional control variable, and find that its coefficient is not statistically significant.

involving granting board seats or additional voting rights to outsiders act as monitoring mechanisms, this result is consistent with the market responding positively to outside investors having additional control.<sup>16</sup> The coefficient of the control terms dummy is positive and that of the liquidity-enhancing dummy is negative. These estimates indicate that the market response is more positive for PIPEs in which outside participants are granted more control contract terms and fewer liquidity contract terms. That is, the market appears to value monitoring and longer term investment by outside PIPE investors. The estimates for the other control variables remain qualitatively unaffected.

For both models, we widen the event window of the dependent variable to five-trading day CARs and our findings (both economic and statistical significance) remain robust.

Our estimates are robust to one-dimension clustering (years). In untabulated results, we also get qualitatively similar results when we include a dummy variable taking the value of 1 when referring to the post-2008 period, and 0 otherwise. Specifically, we re-estimate models (1) and (2) after including a post-2008 dummy variable and an interaction variable for the insider dummy variable and the post-2008 dummy variable (untabulated results). Neither of these variables is statistically significant, whereas the other independent variable estimates remain the same (i.e., the insider dummy variable is positive and significant, the control terms-related dummy variable is positive and significant and the liquidity-related dummy variable is negative and significant). We re-estimate our two regression models after introducing time-period fixed effects that would absorb all possible within-year clustering in IP and NIP PIPEs and our results remain qualitatively the same. Finally, we note that we re-estimate model (2) by using PIPE transactions that involve the granting of board seats, but no voting rights to the leading PIPE investors and find that our estimate of the control terms dummy is still positive and significant. We conclude that our findings on the control terms dummy are mainly driven by the granting of board seat(s).

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<sup>16</sup> For robustness, we re-estimated model (2) incorporating the interaction effects between insider participation and the control terms dummy, and the liquidity terms dummy, respectively. We find that the positive and significant coefficient of the insider participation dummy still holds.

Finally, we verify whether prior insiders' holdings significantly explain announcement wealth effects. We collect insiders' ownership information from FactSet as of the quarter prior to the PIPE consummation quarter. We are able to collect quarterly insider ownership information for 314 out of the 523 (or 60.04%) IP PIPE transactions. The missing observations are a result of either the PIPE issuer's trading symbols being missing from the FactSet, or the insiders' names not being explicitly reported in the documents accompanying the PIPE transactions' consummation. We find that prior insider holdings do not seem to significantly explain announcement wealth effects.

#### **4. Additional analysis**

In this section, we present a set of additional tests to examine the sensitivity of our results to endogeneity and simultaneity issues. Further, we analyze the performance of IP and NIP PIPEs during the year prior to and the year following the PIPE closing year to investigate the basis for the certification role of insider participation to outside investors.

##### *4.1 Certification motive and performance*

(Insert Table 7 here)

Our market and insider participation analyses hinge upon the certification role of insiders when they participate in PIPE transactions. Certification is associated with assurance offered to public investors as, presumably, insiders know more than outside investors about the company's forthcoming projects and future prospects. Insiders deliver this assurance by announcing their participation in their own company when raising capital. One way to validate the certification motive is by examining whether PIPE issuers that provide this assurance via insider participation deliver better operational performance subsequently relative to other PIPEs in which insiders do not participate. In Table 7, we follow the structure of Table 2 and compare median (mean) annual financial characteristics for the year before vs the year after the PIPE completion for IP and NIP PIPEs, respectively. We note that we compare financial characteristics only for the last IP and NIP PIPE transaction per PIPE issuer and as such, we do not have any other PIPE

transactions possibly confounding our comparison of financial characteristics before and after the PIPE transaction. As has already been pointed out in the data and sample selection section, IP and NIP samples do not include PIPE issuers that interchangeably appear in each other's samples, if PIPE markets are repeatedly tapped. We also make sure that the likelihood of remaining active in CRSP (not delisting) five years after the PIPE closing year, is similar for IP PIPEs and NIP PIPEs. Specifically, we find that 80.46% of NIP PIPEs and 78.02% of IP PIPEs, respectively, remain active five years after closing their PIPE transactions according to the CRSP classification system (delisting code: 100). In no single year from 2001 to 2010 do the aforementioned delisting codes vary by more than 10%.

We find that the median and mean values of total assets, ROA, sales ratio and market-to-book value of equity valuation significantly *increase* in the year following the IP PIPE transactions. In contrast, we find that the corresponding differences for the median and mean values of total assets, the sales ratio, ROA and market-to-book value of equity are not significantly different for NIP PIPE transactions. These findings should be viewed in the context of the pre-PIPE performance of IP and NIP PIPEs as shown in figure 1. The findings appear to validate the claim that insiders have private information about the potential future performance of their firms, and they are able to credibly signal this to specific investors, through participating in the equity transaction, who then are willing to invest in these firms when they are also granted some control rights. Thus, the control rights granted to outside investors serve to limit managerial entrenchment, permitting managers to provide a credible signal of future performance through insider participation. Leverage ratio, cash ratio and CAPEX ratio are not significantly different in either sample, whereas the cash burn rate becomes smaller in both samples (significantly so only for the IP PIPEs). We also compare median and mean values of the EBITDA ratio for the IP and the NIP PIPEs, (untabulated), and find that in IP PIPEs the EBITDA ratio significantly increases whereas in NIP PIPEs it

significantly decreases in the year following the PIPE completion year, confirming the other findings.<sup>17</sup>

Overall, these results validate the certification role of insiders in PIPE transactions.

#### *4.2 Controlling for endogeneity*

We acknowledge that our results are subject to endogeneity concerns because insider participation and contractual terms are choice variables. To address these concerns, we use the two-stage Heckman approach. Specifically, as presented in Appendix B, we employ two distinct two-stage Heckman regressions, whereby in the first stage we explain (a) the decision of the insiders to participate in PIPEs or (b) the choice to request a premium/discount. In the second stage we also explain the announcement CARs for the sample of IP PIPEs. In both cases we find that the IMR ( $\lambda$ ) correction for self-selection is insignificant in the second stage, which suggests that self-selection is not a problem in our OLS models explaining announcement PIPE CARs. Keeping space considerations in mind, we do not tabulate our results explaining the choice to request a premium/discount in the first stage.

Next, we analyze whether any simultaneity exists in the choice of control terms/liquidity terms and the levels of pricing. In model (4) of Table 4 we do not include control/liquidity-enhancing terms in the list of explanatory variables. However, we know that the participating investor type, pricing levels and choice of terms are concurrently revealed to public investors through the related SEC documents. To account for this simultaneity, in Appendix C, we use a 2SLS approach to examine the direction of influence between the control/liquidity terms (a binomial variable) and the premium/discount (a continuous variable). In the first stage of the 2SLS, we regress control and liquidity-enhancing terms on a set of exogenous variables (we use the same set of explanatory variables explaining the discount dummy

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<sup>17</sup> Also, we make sure that the observed changes in size are not solely an artifact of the major capital infusion (PIPE transaction) taking place in the event year. We find that the median value of gross proceeds (gross proceeds amount adjusted by total assets as of the year before the PIPE transaction) amount to \$ 6.99 million (31%) for IP PIPEs and \$ 12.5 million (44%) for NIP PIPEs, respectively. These untabulated findings together with the high cash burn rates for both samples shown in Table 2, lead us to the conclusion that the changes in size, valuation and profitability cannot be solely driven by the PIPE capital infusion, but also by new projects pursued prior to the end of the year following the PIPE transaction.

variable in Table 4 i.e., insider participation dummy variable, size, total leverage ratio, R&D ratio, market-to-book value of equity ratio, cash ratio, ROA, cash burn rate, CAPEX ratio and sales ratio). In the second stage, we use the fitted value from this regression as an additional independent variable in the pricing levels regression. We also estimate the equations in reverse order by first estimating the pricing levels equation and then using the fitted values from this equation as an additional explanatory variable in the control / liquidity dummy equation.

We ensure the system is identified by not incorporating the same set of exogenous variables in the two stages. In particular, the insider participation dummy variable, the cash ratio and the cash burn rate ratio, are not incorporated in the first stage regression explaining the contract terms variable (either the control terms dummy or liquidity terms dummy).<sup>18</sup> Overall, our second stage regression estimates suggest that only pricing levels significantly explain the choice of either the control terms dummy or the liquidity-enhancing dummy (and not vice versa). We conjecture that investors in PIPE transactions have a certain pricing level in mind when engaging in PIPE transactions and in negotiating the contractual terms. In conclusion, our specification of logit regressions in Table 4 (Models 1,2,3) is not subject to simultaneity issues when we include contractual terms as explanatory variables.

#### *4.3 Block purchases by outside investors*

Private placements permit a few select investors to exercise closer control over managers, thereby inhibiting them from engaging in opportunistic behavior. In particular, we find that insider participation is associated with the granting of control rights to outside investors. In turn, managers benefit because they can raise capital at more attractive rates by submitting to monitoring (Jensen and Meckling 1976). However, given that outside investors are granted control rights, it is an empirical question whether blockholdings as additional vehicles for monitoring are valued by the market. To test this premise, we augment our analysis of the determinants of announcement-period CARs in Table 6 by including the

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<sup>18</sup> Because the regression determining the choice of the terms dummy variable is a qualitative choice model, care must be taken in estimating the standard errors (Maddala 1983). Our estimation uses the Stata statistical package as described in Keshk (2003).

amount invested by lead investors in PIPEs (excluding the cases in which insiders themselves are the lead investors) as a percentage of the gross PIPE amounts as an additional independent variable. Data availability with respect to this variable restricts our sample size to 1,952 observations compared with the 3,578 observations that are utilized in Table 6. Untabulated results indicate that its coefficient is positive and significant, which is consistent with the notion that increased monitoring generates a positive market response (the larger the amount invested by lead investors, the stronger the monitoring effect). The coefficient of insider participation continues to be positive and significant, implying that insider participation retains its certification effect even after taking the additional monitoring aspect of lead investor ownership into account<sup>19</sup>. However, interestingly, we find in untabulated analysis that when we interact this variable with control rights, the coefficient is negative and significant, while the main effects of lead investor ownership and control rights continue to be positive and significant. This suggests that granting greater control to the lead outside investors, when they have higher levels of stock ownership is not viewed positively by the market potentially suggesting that there are diminishing returns to the lead outside investors' control.

## **5. Conclusions**

The motives underlying insider participation in equity transactions and the role played by contractual terms offered to investors do not appear to be well resolved. Given the informational asymmetry between insiders and outsiders, both insider participation and contractual terms could serve to mitigate or exacerbate incentive conflicts in equity transactions. PIPE transactions, which have grown in popularity in recent times, offer a unique opportunity to investigate these issues both because of the informational asymmetry between insiders and outsiders and also the availability of data on insider participation, pricing and contractual terms. The academic literature on PIPEs has focused on addressing many important questions such as why some firms would seek this mode of financing, why investors

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<sup>19</sup> We do not find differential wealth effects between insider participating and insider leading PIPEs. Wruck and Wu (2009) find that new blockownerships created as part of the private placement transaction are associated with positive wealth effects.



would choose to participate in this market, how public markets react to the PIPE announcements, how PIPE issuers structure contract terms in order to raise funds at more favorable rates, and whether insider participation is associated with self-dealing. However, in our paper we present new evidence on the determinants of insider participation in these transactions, the effect of insider participation and contractual terms on pricing and their wealth effects, and also how the market reacts to insider participation in repeated PIPE transactions. We also add to the literature on the role of insider investment by investigating whether certification or self-dealing motives drive insider participation.

A typical PIPE issuer is a loss firm that presumably is under pressure to secure immediate financing in order to make investments and finance operations. The private placement market is attractive to these firms because it provides them with a forum to induce selected investors to provide the needed capital. As this market has grown in size over time with more firms seeking financing through private placements, the competition for capital has increased. The market has also become more liquid in part due to many regulatory measures and SEC enforcement actions in the period 2001-2010. One implication of this increased competition and liquidity is that PIPE issuers have to make investments in their firms more attractive to capital providers. Given the extent of information asymmetry surrounding PIPE issuers, they also need to find ways in which to credibly convey private information about their firms' prospects to attract investors. Using a unique sample of PIPEs from the period 2001-2010 for which we are able to secure data on contractual terms, we provide strong evidence that insider participation in PIPE transactions, when combined with the contractual terms granted to outside investors, is attributable to a certification motive and not to self-dealing.

In particular, we show that the average pricing discount negotiated by leading investor types for IP PIPEs is significantly lower than that for NIP PIPEs, indicating that insider participation allows PIPE issuers to get better terms. Moreover, our evidence indicates that IP PIPEs are associated with the granting of more control rights (board seats) and fewer cash flow rights (preregistered stock), relative to NIP PIPEs. This suggests that the certification aspect of insider participation and the monitoring effect of

outsider representation on the board are associated. Further, insider participation is also associated with the PIPE issuer not having to provide high levels of liquidity enhancement (e.g., by issuing preregistered stock). Finally, the market response to the announcement of PIPE transactions is significantly more positive for IP PIPEs relative to NIP PIPEs.

We also examine the wealth effects associated with the issuance of multiple PIPEs over time. This multiple PIPEs analysis allows us to study the effect of insider participation with the firm as its own control. We find that the market reacts positively when PIPE issuers switch from NIP to IP PIPEs, and adversely when they switch from IP to NIP PIPEs, adding further credence to the certification hypothesis. Moreover, the wealth effects of repeated IP PIPEs are positive and are of similar magnitudes across transactions.

Overall, our paper adds to the evidence on the role of insider participation in equity issues and its relation to the use of contractual terms. In particular, we extend the literature on PIPEs by showing that the changing structure of the PIPE market conditions, exogenous regulatory changes and the consequent impact on contractual terms have resulted in insider participation primarily playing a certification role in these transactions.

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## **Appendix A**

### **List of explanatory and dependent variables**

**Insider participation dummy:** Takes the value of 1 when insiders participate and 0 when insiders are absent

**Discount/premium:** Computed only for closed placements. Indicates the percentage of the stock price calculated/reported on the date prior to the best available of: a) date of definitive agreement/pricing, b) date of offering announcement and c) date of closing. Discount (premium) values are presented with a positive (negative) sign. (in percentages)

**CARS:** Abnormal returns computed over the three-day event window [-1, +1] according to a one-factor market model using the CRSP equally-weighted dummy as the market proxy. We use the time window of [-252,-2] as our model's estimation window.

**Gross proceeds adjusted:** Total gross proceeds amount raised over PIPE issuer's market capitalization two days before the PIPE closing

**Control terms dummy:** Takes the value of 1 when board seat(s) or additional voting rights are contractually granted, and 0 otherwise.

**Liquidity terms dummy:** Takes the value of 1 when the preregistered stock or price resets, or soft floor/hard floor, or investor call options, or investor redemption rights, or the investor right of first refusal or investor liquidation rights are granted, and 0 otherwise.

**Size:** Natural logarithm of total book value of assets

**Cash ratio:** Cash and cash equivalents over total assets (in decimals)

**Total leverage ratio:** Total debt (both short-term and long-term) over total assets (in decimals)

**Sales ratio:** Total revenues over total assets (in decimals)

**CAPEX ratio:** Capital expenditures over total assets (in decimals)

**R&D ratio:** Research and development expenditures over total assets (we apply zeroes to all PIPE issuers with missing research and development expenditures values) (in decimals)

**ROA:** Net income over total assets (in decimals)

**Market-to-book value of equity:** Product of the total number of outstanding common shares and the year closing price over the book value of shareholders' equity (in decimals)

**Cash burn rate:** The absolute value of operating income before depreciation divided by the sum of cash and cash equivalents. When the income number is positive, the cash burn rate is set equal to zero. Always expressed as a fraction of a calendar year.

**Three-month run-up performance:** Intercept of the three-factor Fama French model, estimating abnormal returns following the calendar time approach (in percentages)

**Three-month run-up performance interaction:** Interaction variable of the insider participation dummy with the three-month run-up performance.

**Table 1****Constructing the insider-participating and non-insider-participating PIPEs samples**

Table 1 reports the number of observations available for the insider-participating PIPE and the non-insider-participating PIPE samples during the period 1/1/2001-12/31/2010. We present the number of observations after employing each of the documented filtering criteria. There is a difference in the reported number of observations in columns [2] and [3], as we require the availability of leading investor type information only in column [2].

	Number of Observations [2]	Number of Observations (Without Requiring Leading Investor Type Information) [3]	Database Vendor [4]
All insider-participating PIPEs	1,040	1,040	PrivateRaise
Availability of daily pricing information	523	523	CRSP
<i>Insider-leading PIPEs</i>	88		PlacementTracker 1/1/2001-12/31/2006 & PrivateRaise 1/1/2007-12/31/2010
<i>Insider-participating PIPEs with all other investor types leading</i>	227		PlacementTracker 1/1/2001-12/31/2006 & PrivateRaise 1/1/2007-12/31/2010
Availability of investor types information	315		PlacementTracker 1/1/2001-12/31/2006 & PrivateRaise 1/1/2007-12/31/2010
Availability of discount/premium and contractual terms	303	502	PrivateRaise
Availability of annual financials	206	301	Compustat
All non-insider-participating PIPEs	13,833	13,833	PrivateRaise
Availability of daily pricing information	6,097	6,097	CRSP
Availability of investor types information	2,990		PlacementTracker 1/1/2001-12/31/2006 & PrivateRaise 1/1/2007-12/31/2010
Availability of discount/premium and contractual terms	2,873	5,800	PrivateRaise
Availability of annual financials	1,854	3,653	Compustat

## Table 2

### Comparing annual financial characteristics

Table 2 compares the median (mean) annual financials as of the fiscal year prior to the PIPE closing year for all insider-participating vs. non-insider-participating PIPEs. For a detailed description of the dependent and explanatory variables, please refer to Appendix A. The median (mean) financial values are based on 3,954 observations for all non-insider-participating PIPEs with financial information available, without conditioning on the availability of the leading investor identity, and 307 observations for all insider-participating PIPEs with financial information available, also without conditioning on the availability of the leading investor identity. Median financial values are presented first with the last column reporting Wilcoxon z-statistics and their associated p-values in parentheses as well as the Satterthwaite t-statistics of unequal variances with their associated p-values in parentheses. Mean values appear in parentheses right below median values for each of the two subsamples. All variables are winsorized at 1% and 99%. All information is retrieved from Compustat. \*\*\*, \*\*, \* indicate statistical significance at the 1, 5, 10% level, respectively.



Financials' measure	Median (Mean) Financials of Insider-Participating PIPEs	Median (Mean) Financials of Non-Insider-Participating PIPEs	Wilcoxon rank sums z-statistic (p-values) / Satterthwaite z-statistic (p-values)
Total Assets	45.40 (399.81)	58.79 (352.42)	-2.94 (0.00) <sup>***</sup> / 0.99 (0.32)
Total leverage ratio	0.12 (0.20)	0.11 (0.20)	0.08 (0.93) / 0.53 (0.59)
R&D ratio	0.12 (0.31)	0.08 (0.24)	0.96 (0.34) / 1.25 (0.21)
Market-to-book value of equity	1.86 (3.18)	2.43 (3.69)	-3.17 (0.00) <sup>***</sup> / -1.68 (0.09) <sup>*</sup>
Cash ratio	0.15 (0.29)	0.23 (0.33)	-2.60 (0.00) <sup>***</sup> / -2.38 (0.02) <sup>**</sup>
Sales ratio	0.41 (0.64)	0.36 (0.56)	0.97 (0.33) / 1.87 (0.06) <sup>*</sup>
ROA	-0.28 (-0.50)	-0.27 (-0.44)	-1.80 (0.07) <sup>*</sup> / -1.68 (0.09) <sup>*</sup>
Cash burn rate	0.61 (1.35)	0.47 (1.12)	2.16 (0.03) <sup>**</sup> / 1.96 (0.05) <sup>**</sup>
CAPEX ratio	0.02 (0.05)	0.03 (0.05)	-1.07 (0.29) / -1.23 (0.22)

**Table 3**

**Comparing pricing, contractual terms, and returns prior to PIPE announcement**

Panel A compares the median (mean) pricing values, gross proceeds amount over the PIPE issuer's market capitalization as well as the frequency of the dummy variables for the two contractual terms (controls terms dummy and liquidity terms dummy) for all insider-participating vs. all non-insider-participating PIPEs. Panel B compares the median (mean) values of calendar-time portfolio pre-PIPE announcement returns. Securities are formed into portfolios by the PIPE event day. A single regression is run in which the dependent variable is the time series of calendar portfolio excess returns. The explanatory variables, using the Fama-French three-factor model, are the returns of the excess market factor, the small-minus-big capitalization factor, and the high-minus-low book-to-market factor. The intercepts are reported and they represent the mean daily abnormal returns in the event period. In both Panels, median (mean) pricing, leading investor types' adjusted purchase amounts and returns prior to the PIPE announcement are presented first with the last column reporting Wilcoxon z-statistics with p-values in parentheses as well as the Satterthwaite t-statistics of unequal variances with their associated p-values in parentheses. All information is retrieved from PrivateRaise and CRSP. \*\*\*, \*\*, \* indicate statistical significance at the 1, 5, 10% level, respectively.

**Panel A: Comparing median (mean) pricing values and frequency of contractual terms**

Variable	Insider-participating PIPEs	Non-insider- participating PIPEs	Wilcoxon Rank Sums Z- Statistic (P-Values)
Discount/Premium	2.6 (-14.4)	7.1 (3.5)	3.60 <sup>***</sup> (0.00) / -5.64 <sup>***</sup> (0.00)
Gross proceeds adjusted (%)	16.4 (39.2)	11.9 (30.5)	7.12 <sup>***</sup> (0.00) / 1.36 (0.17)
Control terms dummy (%)	21.1	13.4	3.65 <sup>***</sup> (0.00)
Liquidity terms dummy (%)	44.9	57.1	-4.06 <sup>***</sup> (0.00)

**Panel B: Comparing median (mean) values for calendar-time alphas of insider-participating vs. non-insider-participating PIPEs**

[-252,-60]	-5.95 <sup>***</sup> (-5.08 <sup>***</sup> )	5.90 <sup>**</sup> (2.65 <sup>***</sup> )	-2.41 <sup>**</sup> (0.02) / -2.07 <sup>**</sup> (0.02)
[-90,-3]	3.33 <sup>***</sup> (3.50 <sup>***</sup> )	10.90 <sup>***</sup> (7.99 <sup>***</sup> )	-2.35 <sup>**</sup> (0.02) / -2.19 <sup>**</sup> (0.03)

**Table 4**

**Explaining insiders' incentives and PIPE pricing**

Models 1, 2, and 3 present the logistic regression estimates for the insiders' decision to participate in PIPE transactions (dependent variable is the insider participation dummy variable, taking the value of 1 when insiders participate and 0 when insiders are absent). In Model 1 we only use the financial variables and the three-month run-up performance to explain the insiders' participation dummy variable, whereas in Model 2 we add the control terms and liquidity terms dummy variables and in Model 3 we also add the discount dummy. Model 4 presents the logistic regression estimates explaining the PIPE pricing (dependent variable is the discount dummy variable, taking the value of 1 when a discount is negotiated and 0 when a premium is negotiated). For a detailed description of the dependent and explanatory variables, please refer to Appendix A. All annual financial variables are winsorized at 1% and 99%. The estimates are reported in log-odds form. Wald Chi-Square-stats are reported in parentheses. \*\*\*, \*\*, \* indicate statistical significance at the 1, 5, 10% level, respectively.

Explanatory variables	Model 1	Model 2	Model 3	Model 4
	Insider Participation Dummy Variable	Insider Participation Dummy Variable	Insider Participation Dummy Variable	Discount Dummy Variable
Intercept	-1.82 <sup>***</sup> (45.76)	-1.62 <sup>***</sup> (34.23)	-1.27 <sup>***</sup> (17.91)	1.38 <sup>***</sup> (60.20)
Insider participation dummy				-0.52 <sup>***</sup> (13.33)
Assets	-0.07 <sup>*</sup> (2.88)	-0.10 <sup>***</sup> (5.22)	-0.10 <sup>***</sup> (5.48)	-0.07 <sup>***</sup> (7.80)
Total leverage ratio	0.01 (0.01)	-0.00 (0.00)	-0.00 (0.00)	-0.04 (0.32)
R&D ratio	0.14 (0.48)	0.19 (0.82)	0.20 (0.90)	0.02 <sup>**</sup> (0.02)
Market-to-book value of equity	-0.00 (1.91)	-0.00 (1.95)	-0.00 (1.68)	-0.00 <sup>***</sup> (6.97)
Cash ratio	-1.13 <sup>***</sup> (13.88)	-0.99 <sup>***</sup> (10.49)	-1.02 <sup>***</sup> (10.97)	-0.00 (0.11)
Sales ratio	0.11 (1.78)	0.11 (1.70)	0.10 (1.49)	-0.07 (1.49)
ROA	-0.04 (0.18)	-0.03 (0.10)	-0.03 (0.11)	-0.01 (0.01)
Cash burn rate	-0.00 (0.27)	-0.00 (0.45)	-0.00 (0.43)	-0.01 (1.75)
CAPEX ratio	-2.05 <sup>**</sup> (4.17)	-1.87 <sup>*</sup> (3.44)	-1.95 <sup>**</sup> (3.72)	-0.55 (1.25)
Discount dummy			-0.45 <sup>**</sup> (9.46)	
Control terms dummy		0.82 <sup>***</sup> (22.89)	0.73 <sup>***</sup> (17.64)	
Liquidity terms dummy		-0.56 <sup>***</sup> (15.30)	-0.57 <sup>***</sup> (15.92)	
Three-month run-up performance	-0.25 <sup>**</sup> (4.87)	-0.26 <sup>**</sup> (5.11)	-0.25 <sup>**</sup> (4.56)	0.16 <sup>***</sup> (5.44)
Three-month run-up performance interaction				-0.05 <sup>***</sup> (6.13)
Num obs used	3,018	3,018	3,018	3,018
Adjusted R-Square	0.028	0.022	0.025	0.020

**Table 5**

**Wealth effects around PIPE announcements**

Panel A reports the mean Cumulative Abnormal Returns (CARs) for PIPE issuing firms surrounding the PIPE announcement, ordered by whether insiders participate in the PIPE transactions. The two “Differences” rows present (from left to right): The Satterthwaite significance of the mean CAR difference for all insider-participating vs all non-insider-participating PIPEs. Patell t-stats appear in parenthesis in the lower row. Panel B (C) reports the difference of the CARs of PIPE issuing firms surrounding the PIPE announcement, ordered by the sequence of the PIPE transactions and whether insiders participate or not. We use the first four available PIPE transactions per PIPE issuer and include a PIPE sequence. Depending on whether the insider-participating PIPE transaction precedes (Panel B) or does not precede (Panel C) the non-insider-participating PIPE transaction, we construct Panel B and Panel C, respectively. There is no overlap between Panels B and C in the PIPE issuers showing up in Columns [2], [3] and [4]. In Panel D, we construct two samples of PIPE issuers: One that consists of IP PIPEs involving insider participation both in the first and the second PIPE transaction and a second one in which insider participation occurs only in the first PIPE transaction and not in the second one. Statistical significance is based on the Patell t-test. The same column numbering holds across all three panels. Columns [2], [3] and [4] in Panels B and C present the difference in CARs between consecutive PIPE transactions whereas Column [1] presents the weighted average CARs shown in Columns [2], [3] and [4]. The number of observations is presented in the last row. For a detailed description of CARs, please refer to Appendix A. \*\*\*, \*\*, \* indicate statistical significance at the 1, 5, and 10% levels, respectively.

**Panel A:** Wealth effects around PIPE announcements  
(not adjusted for the presence of repeated PIPE transactions)

	All insider- participating PIPEs [1]	All non-insider- participating PIPEs [2]
CAR[-1,+1]	4.08% <sup>**</sup>	0.84% <sup>***</sup>
t-stat	(8.89)	(5.96)
N	489	5,819
	Difference	3.24% <sup>***</sup>

**Panel B:** Difference in wealth effects around repeated PIPE announcements  
(Insiders participate only in the earlier PIPE)

	All [1]	Number of PIPE transactions 1-2 [2]	Number of PIPE transactions 2-3 [3]	Number of PIPE transactions 3-4 [4]
CAR[-1,+1]	2.88%	2.17% <sup>**</sup>	2.75% <sup>***</sup>	4.34% <sup>**</sup>
t-stat		(2.78)	(2.90)	(2.05)
N	298	130	97	71

**Panel C:** Difference in wealth effects around repeated PIPE announcements  
(Insiders participate only in the later PIPE)

	All [1]	Number of PIPE transactions 1-2 [2]	Number of PIPE transactions 2-3 [3]	Number of PIPE transactions 3-4 [4]
CAR[-1,+1]	-1.40%	-0.71% <sup>***</sup>	-1.99% <sup>***</sup>	-2.50%
t-stat		(-2.32)	(-2.53)	(0.96)
N	333	176	100	57

**Panel D:** Difference in wealth effects around repeated PIPE announcements (Repeated insiders vs non-repeated insiders)

	Both Transactions are IP PIPEs 1-2 [1]	First Transaction is an IP PIPE and the second is an NIP PIPE 1-2 [2]	First IP PIPE Transaction When the Second is an IP PIPE-First IP PIPE Transaction When the Second is an NIP PIPE [3]	Second IP PIPE Transaction When the First is an IP PIPE- Second NIP PIPE Transaction When the First is an IP PIPE [4]
CAR[-1,+1]	0.98%	1.96% <sup>***</sup>	2.12%	3.10% <sup>**</sup>
t-stat	(0.41)	(2.81)	(0.89)	(1.96)
N	158	300	229	222

**Table 6**  
**Explaining wealth effects around PIPE announcements**

Table 6 explains the mean three-trading day CARs and incorporates all insider-participating and all non-insider-participating PIPE transactions. For a detailed description of the dependent and explanatory variables, please refer to Appendix A. All annual financial variables are as of the year prior to the PIPE announcement closing year and are winsorized at 1% and 99%. OLS coefficient estimates are reported on the top row with the t-statistic values in the lower one. \*\*\*, \*\*, \* indicate statistical significance at the 1, 5, and 10% levels, respectively. There are 3,426 observations used in each of the two regression models.

Explanatory Variables	Model 1	Model 2
Intercept	-0.01 (-1.01)	-0.01 (-1.05)
Insider-participation dummy	0.03*** (3.46)	0.03*** (3.39)
Assets	0.00 (0.95)	0.00 (1.03)
Control terms dummy		0.01** (1.91)
Liquidity terms dummy		-0.02** (-1.75)
Total leverage ratio	-0.02** (-2.54)	-0.02** (-1.88)
R&D ratio	-0.02*** (-2.95)	-0.02*** (-2.92)
Market to book equity ratio	-0.00 (-0.46)	-0.00 (-0.43)
Cash ratio	0.001 (0.26)	0.00 (0.39)
Sales ratio	0.01*** (2.64)	0.01*** (2.64)
ROA	-0.02*** (-3.60)	-0.02*** (-3.60)
Cash burn rate	-0.00 (-0.01)	-0.00 (-0.01)
CAPEX ratio	0.07** (2.02)	0.03** (2.06)
Num obs used	3, 646	3,646
CAPEX ratio	0.0151	0.0190



**Table 7**

**Comparing financial performance around PIPE investments**

Panel A compares the median (mean) annual financials for the year before to the year after the completion of the last PIPE per PIPE issuer for all insider-participating PIPEs. Panel B mirrors the analysis of Panel A for non-insider-participating PIPEs. For a detailed description of the dependent and explanatory variables, please refer to Appendix A. The median (mean) financial values are based on 1,238 observations for all non-insider-participating PIPEs and 115 observations for all insider-participating PIPEs that are identified as the last PIPE per PIPE issuer with available financial information, also without conditioning on the availability of the leading investor identity. All annual financial variable values are as of the fiscal year prior to the PIPE announcement closing year and are winsorized at 1% and 99% levels. Median (mean) financial values are presented first with the last column reporting Wilcoxon z-statistics with their associated p-values in parentheses as well as the Satterthwaite t-statistics of unequal variances with their associated p-values in parentheses. All information is retrieved from Compustat.

**Panel A:** Comparing financials within insider-participating PIPEs before and after the PIPE closing year

Financial measures	Year Before - Median (Mean) Financials of Insider-Participating PIPEs	Year After - Median (Mean) Financials of Insider-Participating PIPEs	Wilcoxon rank sums z-statistic (p-values)
Total Assets	72.59 (887.09)	121.48 (1122.72)	1.92 (0.08) <sup>*</sup> / 2.79 (0.01) <sup>***</sup>
Total leverage ratio	0.45 (0.50)	0.44 (0.61)	-1.30 (0.19)/ 1.06 (0.29)
R&D ratio	0.00 (0.15)	0.00 (0.14)	-0.13 (0.90)/ -0.27 (0.78)
Market-to-book value of equity	1.14 (2.53)	1.24 (3.12)	1.99 (0.04) <sup>**</sup> / 3.12 (0.01) <sup>***</sup>
Cash ratio	0.10 (0.23)	0.11 (0.25)	0.87 (0.39)/ 0.51 (0.61)
Sales ratio	0.37 (0.75)	0.46 (0.92)	2.12 (0.02) <sup>**</sup> / 2.93 (0.01) <sup>***</sup>
ROA	-0.13 (-0.41)	-0.03 (-0.23)	1.98 (0.04) <sup>**</sup> / 2.22 (0.03) <sup>**</sup>
Cash burn rate	0.20 (0.79)	0.00 (0.57)	-1.22 (0.23)/ -1.73 (0.09) <sup>*</sup>
CAPEX ratio	0.01 (0.05)	0.01 (0.03)	-2.77 (0.01) <sup>***</sup> / -2.13 (0.03) <sup>**</sup>

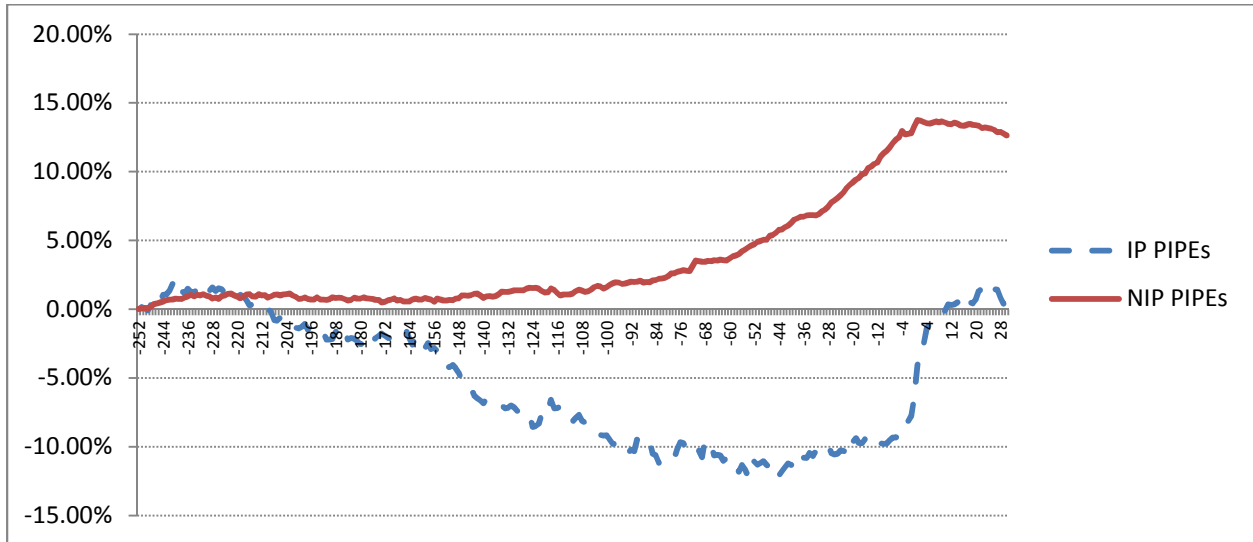
**Panel B:** Comparing financials within non-insider-participating PIPEs before and after the PIPE closing year

Financial measures	Year Before - Median (Mean) Financials of Non-Insider- Participating PIPEs	Year After - Median (Mean) Financials of Non-Insider- Participating PIPEs	Wilcoxon rank sums z-statistic (p-values)
Total Assets	120.51 (13346.54)	169.85 (11662.82)	0.92 (0.39)/ -0.31 (0.76)
Total leverage ratio	0.41 (0.49)	0.37 (0.70)	-1.04 (0.30)/ 1.39 (0.20)
R&D ratio	0 (0.15)	0.01 (0.21)	0.79 (0.43)/ 0.76 (0.45)
Market-to-book value of equity	2.00 (4.97)	1.84 (2.98)	-1.15 (0.25) -1.02 (0.31)
Cash ratio	0.15 (0.27)	0.17 (0.28)	3.09 (0.00)***/ 1.20 (0.23)
Sales ratio	0.52 (0.87)	0.53 (0.73)	0.91 (0.36)/ -1.28 (0.19)
ROA	-0.08 (-0.31)	-0.02 (-0.47)	0.78 (0.44)/ -0.75 (0.45)
Cash burn rate	0.03 (0.60)	0 (0.96)	-1.04 (0.30)/ 1.07(0.28)
CAPEX ratio	0.02 (0.06)	0.01 (0.04)	-4.62 (0.00)***/ -3.28 (0.00)***

**Figure 1**

**Daily abnormal returns (AR) trends for IP and NIP PIPEs**

Figure 1 Panel A (Panel B) presents the daily ARs for the IP PIPEs (and the NIP PIPEs), respectively. ARs are estimated using the market model and an estimation window that spans the time period of [-504,-253]. We consider trading day 0 to be the first public announcement day for the PIPE transaction. The respective cumulative ARs are reported in Table 3 (Panel B).



## Internet appendix

### iTable 8

#### Wealth effects around PIPE announcements (Using market adjusted returns)

Panel A reports the mean Cumulative Abnormal Returns (CARs) for PIPE issuing firms surrounding the PIPE announcement, ordered by whether insiders participate in the PIPE transactions. The two “Differences” rows present (from left to right): The Satterthwaite significance of the mean CAR difference for all insider-participating vs all non-insider-participating PIPEs. Patell t-stats appear in parenthesis in the lower row. Panel B (C) reports the difference of the CARs of PIPE issuing firms surrounding the PIPE announcement, ordered by the sequence of the PIPE transactions and whether insiders participate. We use the four first available PIPE transactions per PIPE issuer and include a PIPE sequence. Depending on whether the insider-participating PIPE transaction precedes (Panel B) or does not precede (Panel C) the non-insider-participating PIPE transaction, we construct Panel B and Panel C, respectively. There is no overlap between Panels B and C in the PIPE issuers showing up in Columns [2], [3] and [4]. In Panel D, we construct two samples of PIPE issuers: One that consists of IP PIPEs that involve insider participation in both the first and the second PIPE transaction and a second one in which insider participation occurs only in the first PIPE transaction and not in the second one. Statistical significance is based on the Patell t-test. The same column numbering holds across all three panels. Columns [2], [3] and [4] in Panels B and C present the difference in CARs between consecutive PIPE transactions whereas Column [1] presents the weighted average CARs shown in Columns [2], [3] and [4]. The number of observations is presented on the last row. For a detailed CARs description, please refer to Appendix A. \*\*\*, \*\*, \* indicate statistical significance at the 1, 5, and 10% levels, respectively.

**Panel A:** Wealth effects around PIPE announcements

(not adjusted for the presence of repeated PIPE transactions)

	All insider- participating PIPEs [1]	All non-insider- participating PIPEs [2]
CAR[-1,+1]	3.87%***	0.99%***
t-stat	(8.15)	(6.47)
N	489	5,819
	Differences	2.88%***

**Panel B:** Difference in wealth effects around repeated PIPE announcements  
(Insiders participate only in the earlier PIPE)

	All [1]	Number of PIPE transactions 1-2 [2]	Number of PIPE transactions 2-3 [3]	Number of PIPE transactions 3-4 [4]
CAR[-1,+1]	2.41%	1.81%**	2.68%***	3.13%**
t-stat		(2.23)	(2.81)	(2.31)
N	298	130	97	71

**Panel C:** Difference in wealth effects around repeated PIPE announcements  
(Insiders participate only in the later PIPE)

	All	[1]	Number of PIPE transactions 1-2	Number of PIPE transactions 2-3	Number of PIPE transactions 3-4
			[2]	[3]	[4]
CAR[-1,+1]	-1.34%		-0.73%***	-1.64%***	-2.68%
t-stat			(-2.41)	(-2.72)	(1.13)
N	333		176	100	57

**Panel D:** Difference in wealth effects around repeated PIPE announcements (Repeated insiders vs non-repeated insiders)

	Both Transactions are IP PIPEs 1-2	First Transaction is an IP PIPE and the second one an NIP PIPEs 1-2	First IP PIPE Transaction When the Second is an IP PIPE-First IP PIPE Transaction When the Second is an NIP PIPE	Second IP PIPE Transaction When the First is an IP PIPE-Second NIP PIPE Transaction When the First is an IP PIPE
	[1]	[2]	[3]	[4]
CAR[-1,+1]	1.11%	1.54%***	2.31%	3.01%***
t-stat	(0.79)	(2.49)	(1.03)	(2.36)
N	158	300	229	222

## Appendix B

### Private information and the choice of discount when pricing a PIPE transaction

Appendix B presents the coefficients from a Heckman baseline two-stage self-selection analysis testing for the existence of private information before going public. In the first stage, we estimate a Probit equation using maximum likelihood in which the dependent variable is a dummy variable that takes on a value of 0 if insiders participate in PIPE transactions. The first stage regression is used to calculate the Inverse Mills Ratio (IMR). In the second stage, we estimate an ordinary least squares regression of the announcement CARs [-1,+1]. For a detailed dependent and explanatory variables' description, please refer to Appendix A. The values in parentheses reflect associated Chi-Square-stats and T-stats.

Explanatory variables	Model 1 Insider Participation Dummy Variable	Model 2 CARs [-1,+1]
Intercept	-1.23 <sup>***</sup> (-70.42)	0.21 (1.02)
Assets	-0.00 (-0.00)	-0.01 (-1.14)
Total leverage ratio	-0.23 <sup>**</sup> (-3.57)	-0.02 (-0.44)
R&D ratio	0.14 <sup>*</sup> (3.47)	-0.005 (-0.30)
Market-to-book value of equity	-0.00 (-0.09)	0.00 (0.82)
Cash ratio	-0.50 <sup>***</sup> (-12.28)	0.05 (0.95)
Sales ratio	0.05 (1.32)	
ROA	-0.08 (-2.17)	0.03 <sup>**</sup> (2.01)
Cash burn rate	0.00 (0.00)	
CAPEX ratio	-0.95 <sup>**</sup> (-5.38)	
Inverse mills ratio		-0.08 (-0.67)
Log likelihood		-972.03
Adjusted R-square		0.0061



## Appendix C

### **Simultaneity of insiders' participation, contractual terms and levels of discounts in PIPEs**

Appendix C reports the coefficients from 2SLS Probit least squares simultaneous equations analysis testing for the existence of an endogenous relation between the choice of PIPE contractual terms and the levels of PIPE discounts. In Panel A, we model the decision choice variable in the first stage (a dummy variable that takes on a value of 0 if PIPE issuers choose a liquidity term); in the second stage we estimate an OLS equation with the levels of discount and the predicted value of the decision choice variable (liquidity terms dummy) as independent variables. In Panel B we replicate Panel A, but using the control terms dummy instead of the liquidity terms dummy. Panel C reports three models explaining the control terms dummy, the liquidity terms dummy and the discount dummy, respectively. We follow the Probit instrumental variables approach and present the second stage of three separate simultaneous regression models whereby in the first stage the insider participation dummy variable is estimated. On the last row, we present the Rho test of the endogeneity of instrumental variables. If the Chi-Square values are significant, we reject the null hypothesis of no endogeneity. For a detailed dependent and explanatory variables' description, please refer to Appendix A. All annual financial variables are drawn from the fiscal year prior to the PIPE announcement closing year and are winsorized at 1% and 99%. The values in parentheses reveal associated Chi-Square-stats or T-stats.

Explanatory Variables	Panel A		Panel B	
	Probit Liquidity Terms Dummy	OLS Discount Levels	Probit Control Terms Dummy	OLS Discount Levels
Intercept	2.14*** (3.76)	0.90*** (25.00)	-3.61*** (-6.21)	0.89*** (10.54)
Decision Choice*		-0.01 (-0.15)		-0.01 (-0.15)
Discount levels*	-2.29*** (-3.67)		2.21*** (3.49)	
Insider- participation		0.17*** (3.79)		0.18*** (4.88)
Assets	0.06*** (2.89)	0.02*** (2.95)	0.09*** (4.15)	0.02*** (2.37)
Total leverage ratio	-0.06 (-1.29)	0.01 (0.51)	-0.04 (-0.49)	0.01 (0.54)
R&D ratio	0.13 (1.27)	-0.02 (-0.68)	-0.16 (-1.51)	-0.02* (-0.83)
Cash ratio		-0.01 (-0.26)		-0.02 (-0.44)
Market-to-book value of equity	-0.00 (-0.09)	0.00 (0.65)	-0.00 (0.74)	0.00 (0.69)
ROA	-0.11** (-2.31)	-0.02 (-1.15)	-0.10** (-1.96)	-0.02*** (-2.45)
Cash burn rate		0.00 (0.36)		-0.00 (-0.13)
CAPEX ratio	-1.14*** (-3.60)		-1.81*** (-4.37)	
Sales ratio	-0.01 (-0.43)	-0.01 (-0.57)	0.02 (0.63)	-0.01 (-0.56)
Adjusted R-square		0.018		0.048

**Panel C:** Analyzing endogeneity of contractual terms and pricing with insiders' participation in PIPE transactions

Explanatory variables	Model 1	Model 2	Model 3
	Control Terms Dummy Variable	Liquidity Dummy Variable	Discount Dummy Variable
Intercept	-1.37*** (-3.92)	0.04 (0.32)	0.88*** (6.39)
Insider participation dummy	0.25 (0.15)	-0.69 (-0.83)	-0.93 (-0.73)
Assets	0.11*** (5.62)	0.02 (1.42)	-0.05*** (-3.29)
Total leverage ratio	-0.07 (-0.92)	0.14** (1.91)	-0.02 (-0.56)
R&D ratio	-0.08 (-0.60)	0.20*** (2.52)	0.05 (0.63)
Market-to-book value of equity	-0.04 (-0.08)	-0.00 (-0.84)	0.00 (0.55)
Cash ratio	-0.57*** (-2.72)	0.15 (1.39)	-0.11 (-0.91)
Sales ratio	0.04 (1.14)	0.03 (0.97)	-0.01 (-0.34)
ROA	-0.14*** (-3.40)	-0.06 (-1.60)	0.00 (0.11)
Cash burn rate	-0.01 (-1.37)	-0.00 (-0.45)	0.00 (1.33)
CAPEX ratio	-2.04*** (-4.65)	-1.18*** (-4.84)	-0.40 (-1.47)
Rho=0 (Chi-square/p-value)	0.09 (0.93)	0.18 (0.66)	0.42 (0.67)