The Economics of PIPEs

Jongha Lim
California State University at Fullerton

Michael W. Schwert
Ohio State University

and

Michael S. Weisbach
Ohio State University and NBER

October 18, 2017

Abstract

This paper considers a sample of 3,001 private investments in public equities (PIPEs). Issuing firms tend to be small and poorly performing, so have limited access to traditional sources of finance. To attract capital, they offer shares in a PIPE at a substantial discount to the market price, along with warrants and a collection of other rights. Because of the discount at issuance, PIPE returns decline with the holding period, which itself is a function of registration status and liquidity of the shares issued in the PIPE. Assuming that the PIPE investor sells 10% of volume each day following the issuance, the average PIPE investor holds the stock for 384 days and earns an abnormal return of 21.2%. More risky firms tend to raise capital from relatively risk tolerant investors such as hedge funds and private equity funds. PIPEs issued to more constrained firms have higher holding period adjusted returns but these returns are more volatile. The abnormal holding period adjusted returns earned by PIPE investors appear to be compensation for providing capital to otherwise constrained firms.

JEL classification: G23, G32, G12

Keywords: PIPE, private placement, alternative investment, hedge fund, private equity fund, warrant.

1. Introduction

An important source of financing for many public corporations are private placements of equity, commonly referred to as "PIPEs". According to *PrivateRaise*, a leading database on PIPE transactions, between 2001 and 2015, there were 11,296 private placements of common stock by U.S. listed firms that raised $243.9 billion. Firms raising funds through PIPEs tend to be small, with 93% of common stock PIPE issuers having market capitalization below $1 billion. As a point of comparison, U.S. firms with market capitalization below $1 billion raised $240.3 billion in SEOs over the same period (see Figure 1). PIPE investments appear to be an important source of corporate finance, especially for small public firms.

Why do so many firms turn to PIPEs for financing? Conventional wisdom is that it is relatively expensive source, or as Brophy et al. (2009) put it, a "last resort" form of financing. But how expensive is it? To calculate the cost to issuers, it is important to consider a number of attributes of the package purchased by PIPE investors. In addition to common stock, issuers often offer investors warrants and other securities. In most transactions, the common stock is unregistered and cannot be immediately sold by investors. The cost of capital for the issuing firms is a function of the expected return and risk of these securities. Since the equity in PIPEs tends to be discounted, the expected return to holding them varies inversely with the expected holding period, which depends on the time it takes to register the securities as well as the thinness of the secondary market for trading these securities after they are registered. Therefore, to calculate the cost of financing through PIPEs, one must control for the time it takes to register the securities and to sell them.

This paper evaluates the cost to issuers and the benefits to investors from PIPE financing. We rely on a comprehensive sample of 3,001 common stock PIPE transactions by U.S. firms listed on NYSE or NASDAQ between 2001 and 2015. In this sample, the median investment is $10 million, which equals 9.1% of the market value of the median issuing firm's equity. In 80.9% of the transactions, the firm issues unregistered equity, meaning that investors cannot sell their positions until the issuing firm registers the equity, on average 100 days following the closing date of the offering. PIPE investors purchase shares at an average discount of 6.3% to the market price. In addition, investors receive warrants in 39% of the

1

transactions in our sample. If one values the warrants using standard techniques, these warrants are worth an average of 17.5% of the value of the equity purchased. Including the value of the warrants, PIPE investors receive an effective average discount of 11.2% relative to the value of the package of securities they acquire.

Because of these discounts and warrants, PIPE investors earn substantially higher returns than investors who buy and sell stocks of issuing firms' or comparable firms at market prices. Over the year following the issuance, PIPE investors average a 12.1% buy-and-hold abnormal return, compared to - 5.2% for investors who buy and sell the issuers' stocks at market prices. These returns are highly skewed, with the median PIPE investor earning an abnormal return of only 1.7% over the year after issuance. The large difference between mean and median returns occur because the returns of the issuing firms' stocks are skewed and in addition the warrants amplify the right tail of the return distribution while having no effect on the losing deals. This highly skewed return distribution suggests that PIPE investing is like venture capital investing in that the key drivers of returns are the "home run" investments.

It is, however, not clear if PIPE investors in practice could achieve the above mentioned buy-and-hold returns. An important factor affecting investors' returns is the time they hold the investments. The returns PIPE investors receive decline with the time they hold the investment. This pattern occurs because the offering discount accrues to investors immediately when the transaction closes. After that point, the long-run performance of issuing firms tends to be poor, consistent with results in the prior literature (e.g. Hertzel et al. (2002); Brophy, Ouimet, and Sialm (2009)). Therefore, PIPE investors have an incentive to exit their stock positions as quickly as possible to capture the discount and mitigate exposure to the issuer's downside risk.[1]

There are two factors that limit the ability of PIPE investors to exit their positions quickly. First, most PIPE shares are unregistered at issuance and cannot be sold to the public until they are registered with the SEC. Second, the shares of PIPE issuers tend to be illiquid, so they cannot be sold immediately

---

[1] Although sometimes short-selling is possible, conversations with practitioners indicate that it is often prohibitively expensive to short sell the stock of PIPE issuers to lock in the discount and hedge against downside risk.

after registration without putting substantial downward pressure on the stock price. At the time of registration, the typical deal exhibits an increase in trading volume and a decrease in the stock price, suggesting that PIPE investors begin to exit their positions as soon as the securities can be sold. However, considering both the size of the investments (18% of the pre-offering shares outstanding, on average) and the limited trading volume in the issuers' shares, we estimate that investors in unregistered PIPEs retain stock exposure for at least one year after registration. In contrast, investors in registered PIPEs are exposed to the issuer's stock for at least six months.

We estimate the returns to PIPE investors controlling both for registration status and the limited ability of investors to exit their positions given the thinness of trading in the underlying stocks. To calculate these "holding period adjusted" returns, we assume that investors sell a constant fraction of the daily volume each trading day from the day the stock is registered until they liquidate their portfolio. The returns from this strategy, which presumably could be executed with a minimal effect of the PIPE investors' trading on price pressure, leads to returns that are nonetheless still noticeably higher than investments in comparable firms at market prices. Assuming that investors sell 10% of the daily trading volume after registration, PIPE investors average a 21.2% return, compared to 4.9% for market investors, over an average holding period of 384 days.

Why do public firms raise capital under such costly terms? Examining the characteristics of PIPE issuers, it appears that their options are limited. Even though these firms are publicly traded, they are relatively small, with median book assets of $51 million. Their operating performance in the year prior to the PIPE issuance tends to be very poor, with a median ratio of EBITDA to Book Assets of -22%. They likely do not have access to public debt markets and appear to have limited access to bank loans, as the median firm has a leverage ratio of only 7.2%. Finally, as has been argued previously (e.g. Hertzel and Smith (1993)), these are firms for which information asymmetry is likely severe, suggesting that the issuance cost of an SEO would be substantial.

We examine the hypothesis that the abnormal returns earned by PIPE investors represents compensation for the risk associated with providing capital to such poorly performing firms. Consistent

with this view, when issuing firms appear to be more risky, the capital in the PIPE is more likely to be provided by relatively risk tolerant investors such as hedge funds and private equity funds, as opposed to the insiders and strategic partners who tend to supply capital to the other PIPEs in our sample. In addition, the returns from the PIPEs issued by riskier firms are higher and more volatile. The PIPE market appears to be one in which PIPE investors provide financing to companies that cannot obtain financing from alternative sources.

One other result is worth noting. A classic question in the capital raising literature is that stock prices generally fall when firms issue additional equity (see for example Smith (1986)). The two potential explanations are that that the issuance could signal the firm's quality, or that there could be price pressure coming from a lack of supply in the market. In our sample, stock prices actually rise when firms issue an unregistered PIPE but fall when they issue a registered one. This pattern suggests that price pressure is an important factor affecting the stock price reaction, since there is no selling pressure for unregistered PIPEs immediately after closing but there is for registered ones. In addition, at the time when the unregistered PIPES are registered and can be traded publicly, these stocks decline in value, which is also consistent with the price pressure hypothesis.

The paper most closely related to ours is Brophy, Ouimet, and Sialm (2009), who analyze a large sample of PIPEs between 1995 and 2002. These authors study the underperformance of firms issuing PIPEs to hedge funds, showing that issuers of "structured" PIPEs, with variable conversion rates to protect investors from downside risk, have particularly poor post-issuance performance. They argue that hedge funds are investors of last resort who provide capital to poor quality firms. We build on Brophy, Ouimet, and Sialm's (2009) analysis in a number of ways. First, we calculate deal level returns for PIPE investments, measuring the returns to PIPE investors and the issuer's cost of capital, whereas they restrict attention to the performance of the underlying stock. Second, we show that the distribution of returns to PIPE issuers is highly skewed and that warrants amplify this skewness, leading to a returns distribution for PIPE investors that relies on "home run" deals to provide acceptable returns. Third, we examine the extent to which the time to registration and the illiquidity of the issuer's stock limits the ability of

4

investors to exit their positions, which is important in light of the underperformance in the issuer's stock and the investors' desire to capture the offering discount.

In addition, the paper is related to Chaplinsky and Haushalter (2010), who also compute returns to individual PIPEs in an earlier, non-overlapping sample from ours. However, these authors do not control for registration status or trading volume considerations that can substantially affect holding periods and hence returns. In addition, they do not discuss the risk or skewness of these returns, nor relate them to the operating condition of the issuing firms, nor the identity of the investors.

Our work is also related to the literature on private placements.[2] This literature began with Wruck (1989), who argues that the resulting increase in shareholder concentration creates value by aligning the interests of managers and shareholders. Subsequent research on private placements has focused on the finding that issuers' post-issuance long-run returns are extremely poor (Hertzel et al. (2002)), which stands in puzzling contrast to the positive returns around private placement announcements. Our paper adds to the private placement literature in several ways. We are the first to estimate the returns to the package of securities offered to investors, which provides an estimate of private placement issuers' cost of capital. We show that the returns to PIPE investors depend heavily on their holding periods and that abnormal returns become statistically insignificant as the holding period extends beyond one year. We also document significantly negative abnormal returns to unregistered PIPE issuers when the registration statement becomes effective, offsetting the positive announcement return an average of three months after the transaction closes. These findings indicate that PIPE investors are short-term shareholders who are unlikely to play a role in improving corporate governance.

2. Privately-Negotiated Investments in Public Firms

2.1. Motivation/Magnitude of Investment

---

[2] See Hertzel and Smith (1993), Hertzel et al. (2002), Wu (2004), Cronqvist and Nilsson (2005), Krishnamurthy et al. (2005), Wu, Wang, and Yao (2005), Barclay, Holderness, and Sheehan (2007), Wruck and Wu (2009), Chaplinsky and Haushalter (2010), Gomes and Phillips (2012),and Chakraborty and Gantchev (2013) for contributions to the literature on private placements.

Public firms often raise capital through privately negotiated transactions rather than through the public market. Table 1 characterizes such investments during the period from 2001 to 2015. Common stock investments are most common, with 11,296 issues totaling $243.9 billion. In addition, syndicates of investors purchased 5,077 convertible or preferred debt issues ($183.0 billion), provided 1,132 equity lines ($19.2 billion), and 1,747 other types of securities ($176.9 billion).[3] In total, PIPE investments provided $623 billion in capital to public firms from 2001 to 2015. Since we are interested in analyzing the returns earned by investors, we focus on the common stock investments, because returns for these investments are straightforward to calculate. However, we emphasize there are also a substantial number of private investments in public companies that include securities other than common stock.

2.2. A Typical Investment

Even "common stock" PIPE investments involve more than just common stock. To illustrate the way these investments are structured, in Table 2 we provide details about a typical investment, the December 2006 investment of $6.5 million in the equity of a medical device company called United American Health Corporation (UAHC). We choose this particular investment because it is close to the median investment size in our sample and has a number of features common to other PIPE deals.

In this investment, a syndicate of investors led by a private equity firm called Heights Capital Management purchased exactly one million shares of UAHC for $6.50 per share. Heights Capital put in 20% of the capital ($1.3 million) and the remaining 80% was split between a group of investors made up of five hedge funds, one private equity fund, and a collection of other individuals and institutional investors. This purchase occurred at a 21% discount to the market price of $8.20, which is larger than average discount for this period (see Table 4 below). In addition to the equity, investors also received 100,000 warrants on UAHC's equity, equal to one warrant for every 10 shares of common equity they

---

[3] Note that in the run-up to the 2008 Financial Crisis, there were large convertible preferred offerings totaling over $69 billion by financial institutions including Barclays, Citigroup, Merrill Lynch, and Washington Mutual.

purchased. The warrants had a strike price of $8.50 per share and a term of 5 years, so applying the Black-Scholes model adjusted for dilution, each warrant is worth $3.92.

Another way of viewing the warrants is that they effectively increase the discount investors receive. For every share with a market value of $8.20, investors receive one tenth of a warrant, increasing the total value to $8.59. Relative to this value, the price of $6.50 per share represents a discount of 24.4%.

One reason for the discount is that the shares were unregistered, so they could not be sold to the public until the firm registered them with the SEC. Unregistered PIPEs generally contain a provision requiring the firm to register the securities within a specified period of time. In this case, the provision stated that UAHC had to file a registration statement within 30 days and that the registration would become effective by the 90th day, or the 120th day if there was an SEC review. In the UAHC PIPE, the registration statement was filed on January 11, 2007 and was declared effective on January 26, 2007, 44 days after the transaction closed.

Figure 2 shows that after this day when the shares were registered, there was a large increase in trading volume in UAHC: during the 5 trading days prior to the registration becoming effective, a total of 297,422 shares were traded, while in the 5 trading days subsequent to the effective registration date, more than three times as many shares, 983,504, were traded. If the additional trading volume represents selling by PIPE investors, then the difference of 686,082 shares represents more than two thirds of the 1 million shares issued in the PIPE. Consistent with PIPE investors putting downward pressure on the stock price by selling their shares immediately after they became registered, the return on UAHC stock over the 5 trading days after registration was -16.3%.

In addition to the equity and warrants, investors in the PIPE received a number of other rights. The warrants had anti-dilution protection, which means that if there was another equity issue at a lower price, the strike price of the warrants would be adjusted downwards. The issuing firm was prohibited from issuing other securities for 60 days, and the investors had the right of first refusal for 40% of any other equity or equity-linked securities that UAHC issued during the subsequent year. It is difficult to put a

monetary value on these rights, but they clearly offer some value, suggesting that the 24% discount is understated relative to the true value that investors received.

While the investors in the PIPE received a number of rights that ordinary investors do not have, it is notable that they do *not* have any "control rights". In venture capital deals, it is common for investors to have rights that allow them to influence the firm's operations, such as board representation, the right to approve compensation arrangements, etc.[4] In contrast, in PIPE deals, these features rarely occur. In our sample, there are control related provisions in less than 10% of PIPEs. These are usually cases in which the investors' provision of capital is contingent on a management change, either the CEO or the board of directors. However, even in these cases, the provisions do not give explicit control rights to the investors. The fact that control rights are not typically negotiated suggests that unlike most private equity investments, PIPEs appear to be passive investments in which the investors do not play an active role in the management of the issuing company.[5]

3. Sample

3.1. Selection Process

The starting point for our sample is the universe of 21,227 distinct PIPE transactions covered in *PrivateRaise*, a leading provider of data on PIPE transactions. *PrivateRaise* began collecting data in 2001, so our sample covers the period 2001 to 2015. We exclude 1,352 Rule 144A issuances and 623 confidentially marketed public offerings (CMPOs), which are included in the *PrivateRaise* database but are not truly PIPE transactions. Most of the Rule 144A offerings in the *PrivateRaise* database are convertible bonds issued by large firms (e.g. Verizon Communications) to hedge funds. A CMPO is a

---

[4] See Kaplan and Stromberg (2003) for a detailed description of the provisions in contracts between venture capitalists and their portfolio firms.

[5] In contrast, some of the prior literature on equity private placements, beginning with Wruck (1989), have focused on the corporate governance benefits of increasing ownership concentration. See Edmans and Holderness (2017) for a survey of the literature on blockholders and corporate governance.

hybrid between a PIPE and an SEO, in which registered stock is first marketed to institutional investors, then a prospectus is filed and the offering is opened to the public.[6]

PIPE transactions involve a variety of security types, many of which are difficult to value. To ease the calculation of returns, we restrict our focus to common equity investments without price reset features. We do include PIPEs with attached warrants so long as there is only one warrant with a fixed strike price. These restrictions exclude 7,956 investments for which the primary security is not common stock, 127 transactions with contingent adjustments to the purchase price, 443 transactions with multiple warrants, and 251 transactions for which the attached warrant did not have a fixed strike price. We exclude eight large transactions that are strategic partnerships, asset purchases with stock as currency, or transactions contingent on the completion of an IPO or a merger. Finally, we require information on investor types, which excludes 3,611 transactions. After applying these exclusion criteria, the sample includes 6,856 PIPE transactions.

To evaluate the subsequent performance of PIPE issuers, we merge the *PrivateRaise* sample with stock price data from *CRSP*. Doing so restricts our sample to firms on NYSE or NASDAQ for analyses that use stock return data. To ensure quality of the stock return data, we exclude transactions for which the pre-closing price in *CRSP* is different than the pre-closing price in *PrivateRaise*, reducing our sample to 3,001 observations.

3.2. Sample Description

There are two types of transactions in our sample, Unregistered PIPEs and Registered Direct Offerings (RDOs). These two transaction types are alike in that they are privately negotiated with a small set of accredited investors, but they differ in the ability of investors to sell their shares in a timely manner.

---

[6] Specifically, a typical CMPO involves an underwriter confidentially marketing a takedown of an effective S-3 shelf registration statement to a small number of investors. Before the underwriter discloses the name of the issuer, the investor must indicate interest in receiving confidential information and agree not to trade the issuer's stock until the offer is either completed or canceled. After the investors confirm interest, the issuer, underwriter, and investors negotiate terms including the offering amount, discount, and warrant coverage. Then the offering is made public and a prospectus is filed with the SEC, allowing outside investors to participate in the transaction. Typically, these documents are filed after the market close and the offering closes before the subsequent market open.

Unregistered PIPEs involve the issuance of unregistered shares under Regulation D of the Securities Act of 1933. In these transactions, the firm promises to file a registration statement with the SEC in a contractually specified timeframe (32 days for the median deal). Investors in unregistered PIPEs can sell their shares after the registration becomes effective, but they cannot trade their shares on public markets before that time.

RDOs involve the issuance of shares previously registered under a shelf registration statement, so investors can sell the shares immediately after purchasing them in the offering, if they wish. The warrants attached to RDOs are sometimes unregistered, with terms of registration specified as in an unregistered PIPE. Over our sample period, the proportion of registered PIPEs in our sample jumped up from 10.9% in 2001 to 28.4% in 2015 (see Table 4 below). This change in the composition of PIPE offerings followed an SEC amendment to Form S-3, referred to by practitioners as the "baby shelf" rule, which allowed listed companies below $75 million in public float to file shelf registration statements.

Table 3 provides summary statistics on the sample of issuing firms and the PIPE transactions.[7] A large number of PIPEs involve hedge funds and private equity funds as investors; we refer to these PIPEs as HF/PE PIPEs. Since the HF/PE PIPEs are potentially different from other PIPEs (non-HF/PE PIPEs), we present statistics for them separately from other PIPEs.

The firms raising capital through PIPEs are much smaller than typical *Compustat* firms, with median book assets of $51.2 million and market capitalization of $109.3 million. At the time of the PIPE, issuing firms are not performing well, with both mean and median EBITDA-to-Assets ratios being negative (mean = -38.5, median = -22.0). Consequently, it seems unlikely that most of our sample firms could access the public debt market, or even borrow much from banks. Perhaps for this reason, the sample firms are not highly leveraged, with the mean (median) market leverage ratio equal to 18.3% (7.2%). Firms issuing a HF/PE PIPE are even smaller and perform poorer than those issuing non-HF/PE PIPEs,

---

[7] These statistics are for the issuing firms who have data available in *CRSP* and *Compustat* and are thus traded on NYSE or NASDAQ. The firms with stocks trading over-the-counter are likely to be even smaller and less leveraged than the ones described in Table 3.

which is consistent with the notion that the firms raising capital from hedge funds and private equity funds are riskier than firms who are able to attract other investors to their PIPEs.

The PIPE offerings have a mean size of $35.3 million and a median size of $10.0 million. The most notable difference between unregistered and registered PIPEs is the liquidity of the issuing firms. The shares issued in the average unregistered PIPE equal 79 times the average daily volume for the issuer's stock over the three months prior to issuance, whereas the typical registered PIPE issues shares equivalent to 24 days of average volume. For unregistered offerings, there are pre-specified dates by which the firm must file a registration statement and by which the registration must become effective. In general, HF/PE PIPEs have shorter registration periods than other PIPEs; the mean (median) effective time to registration was 90 (60) days for unregistered HF/PE PIPEs and 150 (80) days for other PIPEs. HF/PE PIPEs are more likely to have warrants than other deals as well, with about 48% of HF/PE deals having warrants compared to about 22% of other deals.

PIPEs are usually syndicated, with a number of different investors contributing capital in each transaction. In Panel B of Table 3, we present statistics on the investor composition of each PIPE. Hedge funds and private equity funds play a prominent role, participating in roughly two thirds of the PIPEs in our sample (1,991 out of 3,001 PIPEs). In these PIPEs, hedge funds and private equity funds provide an average of 72% of the capital. There appears to be a dichotomy in which hedge funds and private equity funds either provide the bulk of the capital or none at all. Therefore, we present separate results for HF/PE and non-HF/PE PIPEs throughout the paper to explore how differences in investor composition are associated with other transaction characteristics and outcomes.

4. Returns to PIPE Investors

As illustrated by the example of United American Health Corporation, PIPEs are generally sold at a price that differs from the current market price. In this section, we describe how we value the package of securities offered in a PIPE transaction, summarize the discounts for our sample of PIPEs, and compute buy-and-hold abnormal returns to PIPE investors over various horizons.

4.1. Measuring PIPE Discounts

The discount on a PIPE investment reflects the price paid relative to the true value of the package of securities the investor receives. Since 39% of the PIPEs in our sample have attached warrants, it is important to include the value of the warrants in the calculation of PIPE discounts. For this reason, we add the value of any warrants associated with a PIPE to the market price of the equity when estimating the value of the securities the investor receives. Then, we measure the discount as one minus the price paid per share, divided by the sum of the market price of the stock and the estimated value of any attached warrants.

We value each warrant using the Black-Scholes warrant pricing formula that adjusts for the dilution that occurs when the firm issues new shares upon exercise of the warrants:

$$\frac{N}{N + M} C(S_t, K, T, \sigma_t, r_t)$$

where N is the number of shares outstanding, M is the number of warrants outstanding, the function C is the Black-Scholes call option pricing model, S_t is the stock price, K is the strike price, T is the time to expiration, σ_t is the stock volatility, and r_t is the risk-free rate for maturity T. We estimate the conditional volatility σ_t using the annualized standard deviation of daily returns for the three months prior to the valuation date. The risk-free rate r_t is measured with the interpolated maturity-matched swap rate.

One potential concern is that if one measures the volatility at the time of the PIPE issuance, it could be higher than expected future volatility, since PIPEs tend to be issued at times when there is unusually high uncertainty. Overstating volatility for this reason would lead the Black-Scholes formula to overstate the value of the warrants and hence the discounts and returns to the PIPE investors. For this reason, we set a ceiling of 50% for the volatility input, which reduces the estimated value of the warrants and the PIPE discounts.

4.2. Estimates of PIPE Discounts

Panel A of Table 4 summarizes the estimated discounts for the PIPEs in our sample. Table 4 presents mean discounts for our sample of PIPEs, with the sample broken down in a number of ways. We present the discounts by year of issuance, as well as for all years pooled.

The mean discount for all PIPEs is 11.2% and the median is 11.1%.[8] Discounts vary over time, and tend to be higher in the earlier portion of the sample. The discount is much higher for PIPEs with warrants than without, with an average 20.1% discount for PIPEs with warrants and 5.7% for PIPEs without warrants.[9, 10] HF/PE PIPEs have noticeably higher discounts than other PIPEs, with a mean discount of 14.5% for HF/PE PIPEs compared to a discount of 4.6% for other PIPEs. Some of this larger discount comes from the fact that HF/PE PIPEs are more likely to have attached warrants than other PIPEs.

Panel B of Table 4 examines the extent to which discounts vary across PIPEs with different issuing firm and transaction characteristics. The first panel suggests that percentage discounts are larger for smaller PIPE offerings. The average discount is 13.9% for investments of under $5 million and 7.2% for investments over $50 million. Discounts also decline with issuer size. The average PIPE issued by a firm with market capitalization under $50 million has a discount of 14.1%, while the average PIPE issued by a firm with market capitalization over $500 million has a discount of 7.3%. These patterns are consistent with the view that the discounts represent compensation for information gathering costs, some of which are fixed. Smaller investments have a higher per share fixed cost of information gathering and hence a larger discount. Likewise, obtaining information on smaller firms are usually more difficult, increasing the information gathering cost and the size of discounts.

Although discounts decline with the absolute size of offerings, they increase with the relative size of offerings, measured by the ratio of issued shares to outstanding shares. The average discount is 5.5%

---

[8] Median discounts are close to the mean discounts for all subsamples reported in Table 4. To avoid making the table unnecessarily cluttered, we do not report medians in this table but they are available from the authors on request.

[9] This difference mainly comes from the warrant value. The average price discount on stock is not statistically different between the transactions without warrants (5.7%) and those with warrants (7.2%).

[10] Recall that the warrant valuation sets a conservative ceiling on volatility at 50%, otherwise the discounts for PIPEs with warrants would be even larger.

for offerings accounting for less than 5% of outstanding shares and 16.1% for offerings over 25% of existing shares. This pattern suggests that PIPE investors can negotiate a larger discount when their investments matter more to the issuing firm and therefore give bigger bargaining power to the PIPE investors.

Discounts are positively related to the issuer's recent stock performance. Firms that have performed poorly have slightly smaller discounts than the average firm. PIPEs by firms whose equity returned less than -50% in the prior year have an average discount of 8.4%. In contrast, firms that have performed very well have relatively large discounts. PIPEs by firms whose equity returned more than 100% in the prior year offer an average discount of 16.7%. This pattern potentially comes from the timing of the discounts. Usually the price is set at the time the investors and the firm reach an agreement, but the discount is measured at the time the transaction closes. If the price has gone up during this period, the discount increases, and if it has gone down, the discount decreases.

Illiquidity is an important feature of PIPE transactions that is likely to affect the offering price. Consistent with this notion, the average discount of 11.6% for unregistered PIPEs is 22% larger than the average discount of 9.5% for registered PIPEs. This difference is statistically significant at the 1% level and likely reflects compensation for the inability of unregistered PIPE investors to sell their shares until the issuer's registration statement becomes effective, which can take months. Interestingly, the effect of liquidity is less obvious when measured with pre-deal trading activity in the issuer's stock. While there are slightly smaller discounts for the most liquid deals, there is no correlation between discounts and the amount of shares issued as a fraction of daily trading volume.

Not all PIPEs are sold at a discount. In 17.3% of the transactions in the sample, shares are sold at a premium to the prevailing market price. Investors could in principle be willing to pay a premium to be able to gather a large stake in a company they expect to do well over time. One such case occurred when a group of investors led by Apollo and Blackstone made an equity investment in Sirius XM. When these parties reached an agreement on October 17, 2002, the investors agreed to pay a 23% premium to the market price. Presumably, Apollo and Blackstone had private information about Sirius' prospects, since

they were secured debtholders and Sirius had recently defaulted on its debt, and the PIPE was part of the workout by which Sirius avoided going into Chapter 11. By the time the deal closed on March 7, 2003, Sirius XM's stock price had declined sufficiently that the premium had increased to 112%. However, Apollo and Blackstone were rewarded for their investment; over the subsequent two years, Sirius' stock price went up by more than a factor of 10, providing Apollo and Blackstone with a sizable profit despite the premium they paid for the PIPE investment. Non-HF/PE transactions are even more likely to be priced at a premium than HF/PE PIPEs (30% vs. 10%), seemingly because these transactions often times involve corporate insiders and strategic buyers who likely receive private information. [See Table 3, Panel B]

4.3. Buy-and-Hold Returns Earned by Ordinary Investors and PIPE Investors

The return a PIPE investor receives over a particular holding period is equal to the change in the value of the equity investment plus the change in the value of any attached warrants over that period. The equity portion of this investment is affected by the discount negotiated by the investor and the return on the stock over the holding period. If the PIPE contains warrants, the change in warrant valuation will be affected by the change in the stock price and underlying parameters of the Black-Scholes valuation, including the strike price, time to expiration, and the stock volatility.[11] In this section, we compute buy-and-hold abnormal returns to PIPE investors over various horizons.

We summarize the buy-and-hold returns to ordinary and PIPE investors in Table 5. Panel A contains the returns for full sample and Panel B by registration status. To measure abnormal returns, we compare the returns of an issuing firm to those from a matched firm. These matched firms are assigned by considering all firms in the same 2-digit SIC industry that did not previously issue a PIPE during the sample period, then selecting the firm with the minimum sum of the absolute differences between the standardized equity book-to-market ratio, the standardized log market capitalization, and the standardized

---

[11] It is possible that investors cannot realize the Black-Scholes value of the warrants if they wish to exit and there is not a liquid market for the warrants. For this reason, we report PIPE investor returns both with and without warrants throughout the paper.

Amihud (2002) illiquidity measure. We follow Lyon, Barber, and Tsai (1999) and use bootstrapped skewness-adjusted *t*-statistic to draw statistical inferences.

In each panel, we first present the returns to an ordinary investor who buys shares at the market price on the PIPE closing date and holds them for a fixed horizon. These returns tend to be low relative to those of the matched firms. In the full sample, the average abnormal return for the PIPE issuer over the three months after closing is -0.5%, for six months is -4.2%, for one year is -5.2%, and for two years is -8.0%. The returns for the six months, one year and two years are all statistically significantly different from zero. These negative returns are driven by the unregistered PIPEs for which the average return for the PIPE issuer minus the matched firm over the three months after closing is -1.1%, for six months is -5.4%, for one year is -6.5%, and for two years is -12.2%. As with the full sample, the differences for the six months, one year and two years are all statistically significantly different from zero. For registered PIPEs, the average abnormal returns are neither statistically nor economically different from zero for any horizon.

This pattern of underperformance subsequent to PIPE issuance suggests that the Sirius XM example discussed above is atypical and that most firms issuing PIPEs tend to perform poorly afterwards.[12] If the issuing firms in our sample did not offer discounts and warrants, they would likely have trouble finding investors willing to hold long positions in a large quantity of newly issued equity.[13]

The effect of the discounts and warrants on the return to PIPE investors is illustrated in the second and third portion of each panel, in which we report the PIPE investor's return relative to that of a matched firm's equity, both excluding and including the effect of the warrants. In contrast to ordinary investors, PIPE investors' returns are substantially higher than the returns earned on matched firms,

---

[12] Abnormal returns in our sample are somewhat higher than reported in prior literature. Hertzel et al. (2002) find average abnormal returns of -30% over the three years after private placements in a sample covering 1980 to 1996. Brophy et al. (2009) find average abnormal returns of -11% in the year after traditional PIPE offerings to hedge fund investors in a sample covering 1995 to 2002. These differences could arise from differences in the sample period, the holding period used in return calculations, or the type of transactions considered.

[13] Conversations with practitioners indicate that because PIPE issuers tend to be small and not actively traded, it is difficult to short sell their shares to hedge the discount and the warrants. However, in some circumstances, PIPE investors can hedge their investments and still profit from the discounts and warrants included with the PIPE (see Brophy et al. (2009)).

although the magnitude and statistical significance of their returns decrease with the holding period. If we only consider the stock portion of the PIPE (setting the value of warrants to zero), PIPE investors receive an average abnormal return of 10.2% ($t = 7.8$) over the three months following the PIPE's closing, 6.3% ($t = 4.3$) over six months, 4.6% ($t = 2.2$) over the first year, and 1.9% ($t = 0.5$) over the first two years. Adding the value of the warrants increase the returns to 17.4% over 3 months, 13.2% over 6 months, 12.1 over 1 year and 10.1 over two years.

The pattern of returns comes from the discounts PIPE investors receive, combined with the subsequent underperformance of issuing firms' equities. Since a large portion of the return they receive occurs immediately from the discount, PIPE investors have an incentive to exit their positions as soon as possible, especially given the poor subsequent performance of the issuing firms' equities. However, it is not clear whether investors would be able to exit their positions soon enough to realize these gains, given the unregistered status of the equity they receive and the illiquidity of the positions. Therefore, some of these returns, especially for the three-month horizon, are likely to be unattainable by investors who have to sell their positions on public markets to realize the gains.

4.4. Warrants and Skewness in the Return Distribution

An important characteristic of the returns is their skewness, since mean returns are always substantially higher than median returns. This pattern occurs because of both the skewness of the underlying stock returns and also because of the attached warrants. When the issuer performs poorly, the warrants have little value and expire worthless. However, when the issuer performs well, the firm's stock price will exceed the exercise price and the warrants will be valuable. Warrants will therefore magnify the stock's upside but not affect its downside, which increases the skewness of the PIPE return distribution.

This skewness of returns is illustrated in Figure 3, which reports distribution of the one year buy-and-hold abnormal returns to market investors (slanted line pattern bar), the equity portion of PIPE investors' return (dotted bar), and PIPE investors' return using the Black-Scholes valuation of the attached warrants (solid blue bar). The peak of the distribution is negative for all distributions of returns,

which occurs because of the negative median returns earned by both market and PIPE investors. However, PIPE returns are more likely to be positive than ordinary investor returns because of effects of the discount and warrants. The gap between the PIPE investor return and the PIPE investor return excluding warrants is largest for the highest return levels, which reflects the amplification of positive returns by the warrants. This figure is similar to Figure 1 of Chaplinsky and Haushalter (2010), who illustrate return skewness in an earlier sample of PIPEs. Skewness in PIPE returns is not unique to our sample.

The high skewness of PIPE returns suggests that investing in PIPEs is somewhat like venture capital investing, in that positive average returns are driven by a small number of "home runs" in the portfolio. Investing in PIPEs can be profitable because shares are purchased at a discount and the attached warrants amplify the returns of good investments. As a result, winning investments become sufficiently profitable to drive average abnormal returns to 12.1% for a one year holding period in our sample of PIPEs.

5. Registration and Holding Period Adjusted Returns

5.1. Announcement Returns

Much of the literature on private placements has focused on the initial stock price reactions to their announcement. The consensus finding of this literature is that the market reaction is positive. Potential explanations for this finding are that uncertainty about the firm's ability to obtain financing is resolved, that investors provide certification of the firm's quality (Hertzel and Smith (1993); Krishnamurthy et al. (2005)), and that the subsequent increase in ownership concentration potentially leads to improved monitoring (Wruck (1989)).

Table 6 summarizes the abnormal returns from four trading days before to five trading days after the announcement date of the PIPEs in our sample.[14] Similar to other studies, we find a positive and statistically significant average abnormal return of 4.0% (t = 8.2). However, the median abnormal announcement return is 0.5%, suggesting that the large average return is driven by some observations for which returns are particularly high.

There is, however, a substantial difference in the abnormal announcement returns between registered and unregistered PIPEs. The abnormal announcement return for unregistered PIPEs is 5.3% (t = 10.0), in contrast to an average abnormal announcement return for RDOs of -1.3% (t = -1.3). To understand the reason for this difference, it is important to consider two offsetting factors that could lead the announcement of a PIPE to affect stock prices. First, there is likely to be resolution of uncertainty about the firms' capital raising and investment decisions. Since issuing firms are generally small and poorly performing, the market will often not be sure about whether the issuing firms can raise capital and continue their investment policies. The announcement of a PIPE can provide positive news that the firm is able to raise capital, presumably from informed investors in the PIPE syndicate. Second, there is likely to be price pressure following an equity offering, since some investors will attempt to sell their shares immediately. This price pressure would lead to a decline in stock prices at the time of a PIPE announcement.

The difference in abnormal announcement returns between registered and unregistered PIPEs can be understood in the context of these two effects. Shares offered in a registered PIPE are similar to those sold in an SEO in that they can be sold immediately. Therefore, the announcement return for registered PIPEs reflects both effects, with the second effect appearing to dominate in this sample since the average stock price reaction is negative. This negative announcement effect for registered PIPEs is similar to that observed in seasoned equity offerings, which tend to have negative announcement day returns (see for example Asquith and Mullins (1986)).

---

[14] Some of the PIPEs have missing data on the announcement date, in which case we use the closing date. The median difference between announcement and closing is two days, so stock price changes around closing dates are likely to capture the announcement day stock price reaction.

In contrast, an unregistered PIPE has only the first effect, the resolution of uncertainty about the firm's financing and investment opportunities. It does not have the price pressure effect since the issued shares cannot be sold immediately. Therefore, the announcement of unregistered PIPEs provides a way to isolate the impact of information about financing without leading to an immediate increase in selling pressure on the stock. The fact that, in contrast to registered PIPEs or SEOs, the announcement of unregistered PIPEs is strongly positive suggests that the resolution of uncertainty about the ability to raise financing is good news for these firms.[15]

5.2. Abnormal Volume and Return Around Closing and Registration Dates

The difference in the announcement day returns between registered and unregistered PIPEs suggest that at least some PIPE investors appear to have strong incentives to sell their shares as soon as possible, placing downward pressure on the issuer's stock price. We evaluate the extent to which the phenomenon of selling as soon as possible is a general pattern in our sample of PIPE investments. To do so, we examine abnormal trading volume and price movements in issuing firms' stocks immediately following the closing date and the effective registration date for various subsamples split by the investor type and the registration status. For registered PIPEs, shares are tradable as soon as the transaction's closing and therefore, the two dates are the same, while for unregistered PIPEs, the registration date averages 100 days subsequent to the closing date (see Table 3).

We present statistics on trading volume in Table 7, with the full sample of PIPEs presented in Panel A, HF/PE PIPEs in Panel B and non-HF/PE PIPEs in Panel C. In each panel, registered PIPEs average substantially higher trading volume after closing (and registration) relative to the quarter prior to this date. The equities of firms issuing registered PIPEs have an average daily trading volume that is 49.1% higher ($t = 7.2$) in the week following closing, 41.2% ($t = 6.8$) in the two weeks following closing, and

---

[15] Consistent with the results in Krishnamurthy et al. (2005), we find that the announcement return to HF/PE PIPEs is significantly smaller than the announcement return to non-HF/PE PIPEs. Krishnamurthy et al. (2005) attribute this difference to a certification effect from insiders investing in the firm. Our results in Table 7 suggest that this difference can be also explained by a HF/PE investors' stronger incentive to exit quickly, which leads to greater price pressure.

38.0% ($t = 5.9$) higher in the month following closing. However, these large average jumps in trading volume appear to be driven by large increases for a minority of firms, since the median abnormal volume around the time of the PIPE is close to zero for all windows around the closing date.

The trading volume in a registered PIPE issuer's stock is likely to contain both selling by PIPE investors who are trying to liquidate some of their positions and buying by outside investors who react to the positive news of successful securing of capital. These two factors should have offsetting effects on the issuing firm's price. It is impossible to know what fraction of the abnormal volume following PIPE offerings represents selling by PIPE investors, or how long these investors actually hold the shares they acquire. However, the returns around the closing of registered PIPEs provide some insight. The abnormal return to registered PIPEs around the closing is -2.5% ($t = -2.3$) suggesting that the price pressure effect seems to dominate.

Unregistered PIPEs provide a setting that makes it possible to identify the price pressure effect separately from the information effect, since the provision of capital to issuing firms and the selling by PIPE investors happen at different times. Following the closing of unregistered PIPEs, trading volumes significantly increase for the full sample as well as the two subsamples. This increase in trading volume, unlike in registered PIPEs, does not include selling by PIPE investors since their shares are not registered at this time. The statistically significantly positive 4.1% abnormal return around closing indicates that a successful offering of PIPE provides positive news regarding the resolution of uncertainty about the firm's capital raising and investment.

The information effect of capital raising is reflected in the trading volume and return at the time the transaction was closed. Therefore, subsequent increase of trading volume and price movements around the registration of unregistered PIPE securities should reflect selling by PIPE investors rather than information about the issuing firm's prospects. Table 7 indicates that on the registration of originally unregistered PIPEs, we find a spike in trading volume, with about a 30% abnormal volume. This increase in volume is accompanied by significantly negative abnormal returns, with a mean of -3.2% ($t = -6.6$).

This pattern is consistent with selling by PIPE investors driving down the price of issuers' stocks at the time when they can begin selling their positions.

Splitting the sample by investor types in Panels B and C reveals that the price pressure effect is mainly driven by HF/PE investors. For the firms issuing a PIPE to non-HF/PE investors, the average abnormal return around the effective registration date is not statistically different from zero for both unregistered and registered PIPEs. This pattern suggests that HF/PE investors particularly have stronger incentives than other types of investors to sell their shares as soon as they can.

5.3. Trading Volume and the Time Required to Exit a PIPE Investment

An important issue facing PIPE investors is that the stocks they purchase are relatively illiquid, since they were issued by small companies with poor operating performance. Therefore, if a PIPE investor wishes to exit his position by selling shares in the secondary market, his ability to do so without depressing the price is limited unless he spreads the sales over a long period of time. The bottom portions of each Panel of Table 7 present calculations of the ratio of the number of shares issued in the PIPE to the post-registration volume over specified periods following the PIPE issuance. Given that an investor who wishes to sell an equity position without depressing the stock too much can only sell a relatively small fraction of the daily volume, this calculation provides insights into the ability of PIPE investors to exit their positions during this time period.

For unregistered PIPEs, there are on average 4.14 times as many shares issued in the PIPEs as total transact in the first month following registration. The ratio is lower for registered PIPEs, with 1.16 times as many shares issued transact in the first month. Clearly, it would be impossible for PIPE investors to sell all of their shares during the first month following registration. While we do not know what fraction of the volume of any particular stock is made up of selling by PIPE investors, these calculations indicate that if PIPE investors limit their trades to a maximum of 10 percent of the daily volume as would probably be necessary to avoid depressing the stock price substantially, it will take at least two years for them to exit their unregistered position and 6 to 12 months to exit their registered positions.

Consequently, it appears that the ability of investors to sell their shares is restricted since PIPEs tend to be issued in relatively illiquid stocks. In addition, our sample contains relatively liquid PIPEs because the issuers are traded on NYSE or NASDAQ. The common stock PIPEs that were excluded from our sample trade over-the-counter and therefore are even more difficult to sell than the PIPEs in our sample.

5.4. Holding Period Adjusted Returns

PIPEs are a type of investment for which the returns depend on the holding period, since a large portion of the return investors receive come from the discount received at the time of the investment. Investors have an incentive to sell the stocks they receive in the PIPE as soon as possible, but are limited by registration requirements and low trading volume. It is impossible to know the actual holding periods of investors without frequent, detailed data on their holdings. However, the facts that they have strong incentives to sell quickly and that volume increases following the PIPE suggests that at least some of them try to unload their positions as soon as they can. There is an unobservable limit on the number of shares an investor can sell on a particular day, since selling too aggressively will drive down transaction prices. To approximate the returns an investor would receive with a strategy that he could potentially adopt, we assume that the PIPE investors follow a strategy of selling a constant fraction of the daily volume until their position is unloaded and calculate the returns from this strategy. We perform these calculations assuming that the PIPE investors sell 10% of the daily volume each trading day until their position is liquidated.

Table 8 contains estimates of the returns received by regular and PIPE investors assuming the investors follow this strategy, which adjusts for the holding periods that investors plausibly could have achieved.[16] Panel A contains the results for full sample, Panel B for unregistered PIPEs, and Panel C for registered ones. The second row of Panel A shows that if one sells 10% of the daily volume every day

---

[16] A comparable calculation assuming the investor sells 20% of the daily volume is presented in Internet Appendix Table IA.1.

subsequent to registration, it would take over a year (384 days) to sell the position. Market investors perform somewhat (4.9%) better than peer firms on average, but the median PIPE issuer does slightly worse (-0.6%), suggesting that the issuing firms have a somewhat more skewed distribution than their matched firms. PIPE investors, however, do much better than investors in peer firms. HF/PE investors receive a 22.4% higher return than investments in the matched firms and non-HF/PE investors have a 15.8% higher return over the period in which they hold the PIPE. In terms of annualized return, both HF/PE investors and non-HF/PE investors earn over 100% abnormal return per year.[17]

Panel B presents the results for unregistered PIPEs. HF/PE investors receive a 26.9% average abnormal return with selling 10% of volume per day over an average of a 511 day holding period, while non-HF/PE investors average a 11.4% abnormal return over an average of a 397 day holding period. These returns correspond to an average annualized return of 64.6% and 24.6%, respectively.

Panel C presents similar results for RDOs and shows that PIPE investors average a 16.8% abnormal return. Since the average holding period of RDO is much shorter (237 days), the annualization effect becomes stronger for the return on RDOs so that PIPE investors average an annualized abnormal return of 168%.

The fact that the annualized returns are much higher if the investor can sell the stock faster highlights the importance of the holding period. If the investor can sell the PIPE sooner and reinvest the money at an equivalent rate (which might not be possible in practice), then they would earn a substantially higher annual return. Of course, these calculations assume that the HF/PE investors could sell their stocks without affecting the price using either strategy. The extent to which selling does affect prices would lower the abnormal returns that PIPE investors receive, and presumably would lower them more the more quickly the investor sold the shares.

---

[17] One important caveat about the annualized returns is that the average value is heavily affected by a small number of observations taking an extremely large value due to compounding.

6. Issuers' Costs of Finance and PIPE Investor Returns

These calculations suggest that, despite the fact that returns decline with holding periods and there are impediments to selling the stock acquired in a PIPE as quickly as an investor would like, PIPE investors do earn substantially higher returns than investors who purchase equity in a similar company that does not issue a PIPE. A natural question to ask is whether these higher returns occur because of market imperfections, or if they reflect the return investors receive for bearing the risk associated with the PIPE. If the returns represent compensation for providing capital to a financially constrained firm that could not raise capital from other sources, then there are several predictions that we should observe in the data. First, we expect that when PIPE issuers are in worse financial shape, we should be more likely to observe more risk tolerant investors such as hedge funds or private equity funds providing capital to them. Second, we expect that the size of discount as well as the holding period adjusted expected returns should increase with the risk of the PIPE issuers. Third, we expect that the volatility of returns to PIPE investors should be higher when the issuer is in worse financial condition.

We test these hypotheses and present the results in Table 9. In Columns 1-2, we present regressions predicting whether or not there is a hedge fund or private equity fund participating in the PIPE syndicate (Column 1) or the share of capital that hedge funds and private equity funds provide (Column 2). As independent variables, we include firm size, profitability, a measure of intangibility and firm age. Presumably, size, profitability and firm age are likely to be positively correlated with financial resources, while intangibility is likely to be negatively correlated with it. The estimates in these equations suggest that the coefficients on size and profitability are negatively related to hedge fund or private equity fund participation while intangibility is positively related to it. These results are consistent with the view that hedge funds and private equity funds are more likely to invest in PIPEs of more risky companies.

In terms of economic significance, when the size of firm increases from the 25th percentile ($41 million) to the 75th percentile ($228 million), holding other variables at their mean values, the likelihood of HF/PE participation decreases by 23%. Likewise, an increase of intangibility from the 25th percentile to the 75th percentile is associated with a 7% higher probability of HF/PE participation.

In Column 3, we present equations predicting discounts on PIPEs using the same specification as in the prior columns. Consistent with the univariate results in Table 4, smaller firms tend to have larger discounts. Profitability is also negatively associated with the size of discounts

In Column 4, we estimate the extent to which holding period adjusted (annualized) returns are a function of financial constraints, using the returns calculated assuming that investors sell 10% of the daily volume each day. The coefficients on size and profitability are negative and large in magnitude; for example, a one standard deviation increase in firm size (1.26) is associated with a 23.4% decrease in annualized holding period adjusted return. All these findings are consistent with the notion that when firms are more financially constrained, they have to offer potential investors larger expected returns through the use of discounts and warrants.

In Column 5, we estimate the extent to which the volatility of returns facing PIPE investors is a function of issuers' financial constraints. We measure the volatility of PIPE investor returns as the annualized standard deviation of issuers' daily stock returns over the holding period, where holding period is computed assuming that investors sell 10% of the daily trading volume. Similar to the results for expected returns, we find that size, profitability, and age are negatively associated with the volatility of returns. These results are consistent with the view that PIPEs issued by more financially constrained firms are more risky than PIPEs issued by less financially constrained firms.

Overall, the results in Table 9 are consistent with the view that the returns earned by PIPE investors are a function of the risk involved with them. Capital is provided to the most financially constrained firms by the most risk tolerant investors, hedge funds and private equity funds. PIPEs from more financially constrained firms have both higher holding period adjusted returns and higher risk. These results are all consistent with the view that the excess returns earned by PIPE investors are compensation for the risks they face by providing capital to financially constrained firms.

7. Summary

In a PIPE transaction, a syndicate of investors provides capital to an issuing firm in exchange for a public security, often equity, which is sometimes accompanied by warrants and other rights. PIPEs are an important source of finance for small public firms, providing approximately the same amount of capital as seasoned equity offerings for small firms in recent years. This paper examines a sample of 3,001 common stock PIPEs and evaluates their role in corporate finance. We estimate the cost of finance of issuing firms through the returns received by PIPE investors and evaluate the extent to which the financial condition of the issuing firms affects both the identity of the PIPE investors and the returns they receive.

Issuing firms make PIPEs attractive to investors by offering them at a discount to the prevailing secondary market price and by including warrants in the package offered to investors. In our sample, the capital provided to the issuing firm is worth an average of 11.2% less than the market value of the equity plus the Black-Scholes valuation of attached warrants. Therefore, PIPE investors are tempted to exit their positions quickly, capture this discount and then reinvest their capital. In addition, as has been reported in prior literature, the stocks of firms that issue PIPEs underperform their peers subsequent to the issue. These effects combine to make PIPE returns decline with holding periods, especially if one adjusts for the time holding the position by annualizing the returns. Therefore, to estimate the returns PIPE investors receive, one also has to estimate the time in which they hold the position simultaneously.

There are two factors that limit the ability of investors to exit their positions quickly. First in 80% of the PIPEs in our sample, investors receive unregistered stock that cannot be sold on the secondary market until it is registered, which occurs an average of 100 days following the issuance. Second, the stocks of issuing firms tend to be relatively thinly traded. So, if an investor wishes to sell his shares without depressing the stock price too much through price pressure, he will have to spread his sales out over time. Since the returns to investing in PIPEs decline with holding period, the more an investor spreads out his sales, the lower his return will be.

It is impossible to know exactly how long PIPE investors hold their positions, since holding period data are not publicly available. However, a reasonable strategy for an investor would be to sell a constant fraction of the daily volume each day following registration until the investor has sold his entire position. If an investor were to follow this strategy and sell 10% of the daily volume, it would take an average of 384 days to exit the position, and the total return (including the change in the value of any attached warrants) would be 19.0%. This holding period adjusted return is substantially (and statistically significantly) higher than the -2.1% return that an investment in a matched firm would earn over the same period.

The source of these above market returns could be a market imperfection of some sort, or it could be that investing in PIPEs is risky and the that the "abnormal" returns reflect the reward to bearing the risk of providing equity to an otherwise financially constrained firm. To evaluate the extent to which the risk of the issuing firms explains the returns to PIPE investors, we perform three tests. First, we consider the identities of the investors in the PIPEs. About two-thirds of the PIPEs in our sample include hedge funds and private equity funds in the syndicate. Conditional on participation, these risk-tolerant institutional investors provide an average of 72% of the capital raised. These PIPEs tend to be from smaller and less profitable firms, who are more likely to be financially constrained. In addition, the PIPEs in which hedge funds and private equity funds invest earn much higher returns; the holding period adjusted return to these investments, assuming that investors sell 10% of the daily volume, is 22.4%, compared to the 15.8% earned by the investors in PIPEs that do not contain hedge funds or private equity investors. Presumably these HF/PE PIPEs were issued by financially constrained firms, so the returns they earn are compensation for providing capital when other sources of finance were unwilling to do so.

Second, over the whole sample of PIPEs, the risk of the issuing firm is strongly related to the returns investors earn. Holding period adjusted returns decrease significantly with the size and profitability of the issuing firms. Third, the risk of PIPE investments, measured by the volatility of subsequent stock returns, is positively related to the risk of the issuing firms. It appears that that the

returns earned by PIPE investors come from the risks they face in providing capital to poorly performing firms.

Overall, our results confirm the view of other studies such as Brophy et al. (2009), that PIPEs are issued by firms that are not likely to have alternative sources of capital. They offer discounts and warrants to investors, who consequently earn returns higher than they would receive from investing in comparable firms in the public markets. The worse financial shape the issuing firm is in, the more attractive is the return distribution they have to offer investors, and the most constrained PIPE issuers are sufficiently risky that hedge funds and private equity funds end up being the primary providers of capital.

References

Amihud, Y., 2002, Illiquidity and Stock Returns: Time Series and Cross-Section Effects, *Journal of Financial Markets*, 5, 31-56.

Asquith, P., and D. Mullins, 1986, Equity issues and offering dilution, *Journal of Financial Economics* 15, 61-89.

Barclay, M.J., C.G. Holderness, and D.P. Sheehan, 2007, Private placements and managerial entrenchment, *Journal of Corporate Finance* 13, 461-484.

Brophy, D.J., P.P. Ouimet, and C. Sialm, 2009, Hedge funds as investors of last resort? *Review of Financial Studies* 22, 541-574.

Chakraborty, I. and N. Gantchev, 2013, Does shareholder coordination matter? Evidence from private placements, *Journal of Financial Economics* 108, 213-230.

Chaplinsky, S. and D. Haushalter, 2010, Financing under extreme risk: Contract terms and returns to private investments in public equity, *Review of Financial Studies* 23, 2789-2820.

Cronqvist, H. and M. Nilsson, 2005, The choice between rights offerings and private equity placements, *Journal of Financial Economics* 78, 375-407.

Edmans, A. and C.G. Holderness, 2017, Blockholders: A survey of theory and evidence, in B.E. Hermalin and M.S. Weisbach, ed.: *The Handbook of The Economics of Corporate Governance* (North-Holland).

Gomes, A. and G. Phillips, 2012, Why do public firms issue private and public securities? *Journal of Financial Intermediation* 21, 619-658.

Hadlock, C. J., and J.R. Pierce, 2010, New Evidence on Measuring Financial Constraints, Going Beyond the KZ Index, *Review of Financial Studies*, 23, 1909-1940.

Hertzel, M., M. Lemmon, J.S. Linck, and L. Rees, 2002, Long run performance following private placements of equity, *The Journal of Finance* 57, 2595-2617.

Hertzel, M. and R.L. Smith, 1993, Market discounts and shareholder gains for placing equity privately, *Journal of Finance* 48, 459-485.

Kaplan, S.N. and P. Strömberg, 2003, Financial contracting theory meets the real world: An empirical analysis of venture capital contracts, *Review of Economic Studies* 70, 281-315.

Krishnamurthy, S., P. Spindt, V. Subramaniam, and T. Woidtke, 2005, Does equity placement type matter? Evidence from long-term stock performance following private placements, *Journal of Financial Intermediation* 14, 210-238.

Lyon, J.D., B.M. Barber, and C. Tsai, 1999, Improved methods for tests of long-run abnormal stock returns, *Journal of Finance* 54, 165-201.

Smith, C,W., 1986, Investment Banking and the Capital Acquisition Process, *Journal of Financial*

Economics, 15, 3-29.

Wruck, K.H., 1989, Equity ownership concentration and firm value: Evidence from private equity financings, *Journal of Financial Economics* 23, 3-28.

Wruck, K.H. and Y. Wu, 2009, Relationships, corporate governance, and performance: Evidence from private placements of common stock, *Journal of Corporate Finance* 15, 30-47.

Wu, Y., 2004, The choice of equity-selling mechanisms, *Journal of Financial Economics* 74, 93-119.

Wu, Y., Z. Wang and J. Yao, 2005, Understanding the positive announcement effects of private equity placements: New insights from Hong Kong data, *Review of Finance* 9, 385-414.

Table 1

Time Series of PIPE Investments

This table reports time series statistics on the number and dollar volume of PIPEs split by the type of securities issued. The sample includes all PIPE transactions in *PrivateRaise from* 2001 to 2015 with non-missing CUSIPs, excluding Rule 144A offerings and confidentially marketed public offerings. Common Stock includes issuance of registered or unregistered shares of common stock. Conv. Debt or Pref. includes issuance of convertible debentures or preferred stock. Equity Line is a commitment by the investor to purchase equity securities from the issuer over a set timeframe. Other Types include other types of convertible securities, non-convertible debt, non-convertible preferred stock, and prepaid warrants. All categories may include warrants in the package of securities.

	Common Stock		Conv. Debt or Pref.		Equity Line		Other Types	
	Obs.	$ Bil.	Obs.	$ Bil.	Obs.	$ Bil.	Obs.	$ Bil.
2001	597	8.5	377	8.5	122	2.2	77	1.4
2002	511	5.7	350	7.7	54	0.7	58	0.7
2003	781	9.7	325	4.9	44	0.5	77	2.3
2004	909	10.6	454	4.4	82	1.0	51	1.2
2005	824	10.9	500	7.9	83	1.9	58	1.4
2006	1,030	21.1	520	6.1	79	2.1	102	4.3
2007	1,139	35.6	471	13.5	49	1.1	143	18.9
2008	714	28.6	378	68.9	41	1.0	104	18.6
2009	733	17.7	267	12.4	64	1.9	84	3.7
2010	924	22.2	253	8.4	117	1.6	66	2.3
2011	752	11.9	208	4.3	100	1.4	130	16.8
2012	601	12.3	225	7.9	81	1.1	158	17.3
2013	592	9.7	234	7.1	76	1.3	190	23.9
2014	649	14.7	256	11.0	68	0.7	201	30.0
2015	540	24.5	259	10.0	72	0.9	248	34.0
Total	11,296	243.9	5,077	183.0	1,132	19.2	1,747	176.9

Table 2

A Typical PIPE: The December 2006 Private Placement of
United American Healthcare Corporation

This table reports the terms of a representative PIPE transaction from our sample. United American Healthcare Corporation is a provider of contract manufacturing services to the medical device industry. On December 13, 2006, UAHC issued $6.5 million of common stock to raise capital to pay start-up costs associated with its subsidiary in Tennessee. This private placement was completed by a syndicate of 10 investors led by Heights Capital Management. At the time of issuance, UAHC was listed on NASDAQ.

Basic Information

Announcement date	12/14/2006	Issuance amount ($MM)	6.5
Placement type	Unregistered PIPE	Security type	Common Stock
Market cap. ($MM)	61.9	Market stock price	$8.20
Number of shares	1,000,000	PIPE issuance price	$6.50

Warrant Terms

Warrant type	Fixed	Number of warrants	100,000
Maturity	5 years	Strike price	$8.50
Other covenants	i) Anti-dilution protection (weighted-average adjustment) ii) Cashless exercise		

Investor Allocations

Investor Name	Investor Type	Investment Amount
Heights Capital Management, Inc.	Private Equity	$1,300,000
Miscellaneous Trusts & Pension Funds	Miscellaneous	$1,027,000
Iroquois Capital Management, LLC	Hedge Fund	$877,500
Braeburn Financial Group	Asset Manager	$868,850
Hudson Bay Capital Management LP	Hedge Fund	$715,000
Stafford Capital Management, LLC	Hedge Fund	$500,500
Individual Investors	Individual	$455,000
Kensington Partners LP	Private Equity	$431,145
Joslynda Capital, LLC	Hedge Fund	$162,500
Nite Capital, LP	Hedge Fund	$162,500

Rights and Restrictions

i) Mandatory registration: Issuer has to file a Registration Statement no later than the 30th day after the Closing Date. Issuer has further agreed to use its best efforts to cause such Registration Statement to be declared effective no later than the 90th day (or 120th day if the Registration Statement is subject to review by the SEC) following the Closing Date.

ii) Limitation on future issuance of securities: During the period beginning on the Purchase Agreement date and ending on the Trigger Date (normally the 60th trading day following the Registration Statement is declared effective), the issuer will not be permitted to offer, sell, grant any option to purchase or otherwise dispose of any of its or its subsidiaries' equity or equity equivalent securities;

iii) Right of participation: If, from the Trigger Date until the 1-year anniversary of the Closing Date, the issuer proposes to issue securities convertible into common stock, the issuer is required to first give the investors a chance to purchase up to 40% of such securities on the same terms.

Table 3

Summary Statistics

This table reports summary statistics on PIPE issuers and transaction terms in Panel A, and investor compositions in Panel B. Each observation represents a distinct PIPE transaction. The sample consists of transactions involving common stock (registered or unregistered at issuance), with or without fixed strike price warrants. The sample is restricted to transactions with stock price data in *CRSP* and excludes transactions for which the pre-closing price in *CRSP* is different than the pre-closing price in *PrivateRaise*. Accounting figures from the year prior to issuance are collected from *Compustat*. Market leverage is the ratio of total debt to total debt plus market capitalization. Asset Market-to-Book is market capitalization plus total debt divided by book assets. Daily Trading Volume is the average of daily share volume times closing price over the quarter prior to the closing date of the PIPE transaction. Days to Mandatory File and Effect Registration are the contract terms requiring filing and effectiveness of a registration statement for PIPEs that are unregistered at issuance. The rows labeled Ex Post report the actual time to filing and effectiveness of the registration statement. Negative values of these variables are truncated at zero, affecting 6 observations. R&D expense is assumed to be zero when it is unreported in *Compustat*. All ratios are winsorized at the 1% level to mitigate the impact of outliers.

Panel A: Issuer and Transaction Terms

| | All PIPEs | | | HF/PE PIPEs | | | | | | Non-HF/PE PIPEs | | | | | |
| | | | | Unregistered | | | Registered | | | Unregistered | | | Registered | | |
Variables	Mean	p50	Obs.	Mean	p50	Obs.	Mean	p50	Obs.	Mean	p50	Obs.	Mean	p50	Obs.
Issuer Characteristics															
Revenue ($MM)	353	20.2	2,448	172	20.3	1,255	146	8.1	372	791	31.7	714	269	15.5	107
Book Assets ($MM)	1,245	51.2	2,453	799	42.7	1,259	367	41.3	372	2,549	96.5	715	829	67.9	107
Market Cap. ($MM)	445	109.3	3,001	245	95.1	1,544	278	111	447	861	136	884	576	152	126
Market Leverage (%)	18.3	7.2	2,441	18.2	7.6	1,255	13.8	2.9	370	21.2	9.1	710	17.3	5.6	106
Cash/Assets (%)	35.0	23.9	2,453	33.1	20.7	1,259	47.4	51.6	372	30.4	17.3	715	45.0	48.0	107
EBITDA/Assets (%)	-38.5	-22.0	2,371	-37.7	-19.8	1,241	-59.7	-46.2	350	-28.0	-13.1	686	-47.6	-31.5	94
PP&E/Assets (%)	22.4	10.5	2,395	21.3	9.5	1,254	19.5	8.7	348	26.6	13.7	698	16.8	7.7	95
CapEx/Assets (%)	5.8	2.2	2,422	5.9	2.3	1,239	4.5	1.2	372	6.7	2.8	705	4.0	1.4	106
R&D/Assets (%)	25.5	10.8	2,448	24.6	10.2	1,255	40.0	29.5	372	17.9	2.4	714	35.4	21.4	107
Asset Market-to-Book	3.1	1.8	2,441	3.2	1.8	1,255	3.6	2.4	370	2.7	1.6	710	3.8	2.1	106
Years since IPO	8.7	6.5	2,455	8.3	6.1	1,259	10.0	8.4	372	8.4	6.2	716	11.6	8.3	108
Daily Trading Vol. ($MM)	5.8	0.6	2,455	2.5	0.5	1,259	3.1	1.0	372	11.6	0.5	716	16.2	1.3	108

Continue on the next page

Variables	All PIPEs			HF/PE PIPEs						Non-HF/PE PIPEs					
				Unregistered			Registered			Unregistered			Registered		
	Mean	p50	Obs.	Mean	p50	Obs.	Mean	p50	Obs.	Mean	p50	Obs.	Mean	p50	Obs.
PIPE Terms and Conditions															
HF/PE share (%)	47.0	49.7	2,529	69.4	76.0	1,429	88.3	100.0	224	0.0	0.0	787	0.0	0.0	89
Issue amount ($MM)	35.3	10.0	3,001	28.7	11.0	1,544	24.5	11.7	447	53.2	7.5	884	30.2	10.0	126
Issued/Outstanding Shr. (%)	17.6	11.4	3,001	21.7	14.0	1,544	15.0	11.3	447	12.8	7.7	884	9.2	6.7	126
Issued Shares/Daily Volume	68.0	19.2	2,455	85.5	26.1	1,259	24.6	13.3	372	66.5	16.9	716	23.6	8.7	108
Days to Mand. Reg. File	36.0	26.0	2,053	42.6	30.0	1,260	0.0	0.0	447	91.8	45.0	220	0.0	0.0	126
Ex Post Days to Filing	33.5	15.0	1,448	50.0	29.0	739	0.0	0.0	447	85.1	38.0	136	0.0	0.0	126
Days to Mand. Effect. Reg.	77.5	90.0	1,886	106	90.0	1,164	0.0	0.0	447	151	99.0	149	0.0	0.0	126
Ex Post Days to Effect.Reg.	60.2	33.0	1,442	90.4	60.0	732	0.0	0.0	447	150	80.0	137	0.0	0.0	126
Warrants Included	0.39	0.00	3,001	0.48	0.00	1,544	0.46	0.00	447	0.23	0.00	884	0.16	0.00	126
Warrant Expiration (Years)	4.6	5.0	1,145	4.7	5.0	732	4.8	5.0	206	3.9	4.0	187	4.7	5.0	20
Warrant Moneyness	0.91	0.87	1,150	0.93	0.89	726	0.83	0.82	206	0.93	0.88	198	0.87	0.82	20

Panel B: Investor Composition

Investor Type	HF/PE PIPEs				Non-HF/PE PIPEs			
	Participation by (%)		Shares bought by (%)		Participation by (%)		Shares bought by (%)	
	Mean	Obs.	Mean	Obs.	Mean	Obs.	Mean	Obs.
Hedge Funds/Private Equity Funds	100	1,991	72	1,653	0	1,010	0	876
Mutual Fund	14.7	1,991	3.7	1,653	5.2	1,010	3.9	876
Financial Institution	26.9	1,991	5.5	1,653	14.7	1,010	11.9	876
Trust/Endowment/Pension/Foundation	20.7	1,991	1.8	1,653	7.0	1,010	4.0	876
Individual Investor	29.7	1,991	4.6	1,653	12.4	1,010	7.0	876
Corporation/Strategic	4.7	1,991	0.7	1,653	32.4	1,010	33.5	876
Insurance Company	4.9	1,991	0.5	1,653	2.3	1,010	1.4	876
Insider/Affiliate	8.1	1,991	0.7	1,653	14.7	1,010	7.8	876
Broker-Dealer	4.8	1,991	0.4	1,653	1.0	1,010	0.4	876
Foreign Investment house	2.6	1,991	0.3	1,653	1.7	1,010	1.0	876
Sovereign Wealth Fund	1.0	1,991	0.2	1,653	1.9	1,010	1.9	876
Miscellaneous	11.5	1,991	1.4	1,653	4.1	1,010	1.8	876
Unknown	34.0	1,991	8.2	1,653	27.8	1,010	25.3	876

Table 4

Summary of PIPE Discounts

This table reports summary statistics by issuance year of discounts on PIPE transactions. We lose 53 observations from the full sample (3,001 observations) due to the lack of contractual data (e.g., warrant term and strike price) required for the calculation of warrant value. The discount is the difference between the market value of securities purchased in the transaction and the price paid by the investor, as a percentage of the market value of securities purchased. The sample is split into PIPEs without and with warrants, unregistered and registered, and HF/PE PIPEs and non-HF/PE PIPEs. Obs. is the total number of transactions in each year, % with Warrants is the percentage of transactions including warrants, % Reg. is the percentage of registered transactions, and % HF/PE is the percentage of transactions involving hedge funds or private equity funds. Negative discounts mean the investor paid a premium to the market price. Market values are computed using the last closing price prior to the transaction closing. Warrants are valued using the Black-Scholes call option model adjusted for dilution, with annualized volatility estimated over the trailing three months and capped at 50% and the risk-free rate interpolated from the swap curve.

Panel A: Annual Summary Statistics

	All PIPEs	without Warrant	with Warrant	% with Warrant	Unregistered	Registered	% Reg.	HF/PE	Non-HF/PE	% HF/PE	Obs.
2001	10.1	5.2	24.0	26.0	10.1	10.4	10.9	18.6	2.7	46.7	304
2002	10.4	4.7	19.8	38.0	11.4	6.1	17.5	14.9	3.2	62.0	234
2003	17.3	11.2	25.3	43.4	18.0	12.1	12.1	19.7	10.7	73.2	272
2004	13.5	7.8	20.2	46.4	14.4	8.5	14.9	15.7	6.4	76.6	248
2005	14.3	7.4	21.2	50.0	15.6	9.2	19.8	16.8	5.8	77.5	222
2006	13.8	6.6	21.4	48.2	14.8	9.2	18.6	14.9	10.1	76.5	226
2007	10.9	4.9	20.3	39.1	11.4	7.6	14.5	13.2	1.7	80.2	248
2008	8.1	4.1	14.7	38.0	7.6	9.9	22.3	11.2	1.6	68.1	166
2009	10.0	4.5	17.8	41.6	8.8	12.4	33.1	12.7	5.8	60.2	166
2010	11.8	6.6	21.5	34.7	12.2	10.6	25.9	16.1	4.4	63.3	147
2011	9.7	7.3	13.7	37.7	10.7	6.3	23.2	11.9	6.7	57.2	138
2012	4.6	0.0	20.3	22.9	3.6	8.6	19.5	8.7	-2.1	61.9	118
2013	9.0	5.4	18.1	28.4	8.8	9.9	23.1	13.3	2.8	59.0	134
2014	9.6	6.6	16.6	30.1	9.7	9.5	27.0	10.5	8.2	60.1	163
2015	6.1	1.9	16.7	28.4	4.4	10.4	28.4	8.9	1.6	61.7	162
All Years	11.2	5.7	20.1	37.8	11.6	9.5	19.4	14.5	4.6	66.3	2,948

Panel B: Cross-Sectional Splits

	Mean	StDev	p25	p50	p75	Obs.
Split by Issue Amount ($)						
0 to 4.9 million	13.9	26.4	1.6	13.9	27.2	803
5 to 9.9 million	11.5	23.3	2.3	13.2	23.7	575
10 to 19.9 million	11.7	18.4	3.9	11.8	20.8	630
20 to 49.9 million	8.9	17.9	2.4	9.1	16.7	577
50 million and above	7.2	21.7	1.9	7.6	15.4	363
Split by Market Capitalization ($)						
0 to 49.9 million	14.1	30.0	3.8	14.8	27.2	753
50 to 99.9 million	14.0	18.3	5.3	14.3	24.2	634
100 to 199.9 million	10.7	18.6	2.2	10.9	19.7	632
200 to 499.9 million	7.1	18.5	0.0	7.7	16.5	522
500 million and above	7.3	18.5	1.4	7.0	14.2	407
Split by Ratio of Issued Shares to Old Shares Outstanding						
0% to 4.9%	5.5	27.4	-0.8	5.4	15.8	641
5.0% to 9.9%	10.6	18.2	2.4	11.0	20.3	681
10.0% to 14.9%	13.1	16.7	5.6	13.3	23.0	512
15.0% to 24.9%	12.8	23.2	5.2	13.1	22.5	761
25.0% and above	16.1	21.4	3.8	13.3	27.1	353
Split by Trailing One-Year Stock Return						
-50.0% and below	8.4	34.0	0.0	11.3	22.0	558
-49.9% to -10.0%	9.9	20.3	0.1	10.4	20.5	738
-9.9% to 9.9%	9.0	17.4	0.0	7.9	18.8	400
10.0% to 49.9%	11.4	14.4	3.5	10.4	18.6	520
50.0% to 99.9%	14.2	21.2	6.1	13.0	24.7	302
100% and above	16.7	16.5	7.8	14.6	25.8	429
Split by Issued Shares/Daily Volume						
0 to 10 days	8.4	25.7	0.0	9.4	19.2	796
10 to 20 days	12.4	18.0	2.9	11.9	21.4	429
20 to 60 days	12.5	17.6	4.1	11.4	22.5	611
60 days and above	11.4	26.1	2.3	10.9	22.6	581
Split by Registration Status						
Unregistered	11.6	24.0	2.4	12.0	23.2	2,376
Registered	9.5	11.7	2.3	8.8	15.5	572

Table 5
Buy-and-Hold Returns to Market and PIPE Investors

This table reports summary statistics of buy-and-hold returns after PIPE transactions. Panel A presents the statistics for the full sample, and Panel B for the subsamples split by registration status. Market Investor Return is the return earned by purchasing the PIPE issuer's stock on the market on the transaction closing date and holding it for a fixed period. PIPE Investor Return is the return earned by purchasing securities in the PIPE transaction and holding them for a fixed period. Abnormal returns are relative to the return on a matched firm, which is obtained by considering all firms in the same 2-digit SIC industry that did not previously issue a PIPE in the sample period and selecting the firm with the minimum sum of the absolute differences between the standardized equity book-to-market ratio, the standardized log market capitalization, and the standardized Amihud (2002) illiquidity measure. Warrants are valued using the Black-Scholes call option model adjusted for dilution, with annualized volatility estimated over the trailing three months and capped at 50% and the risk-free rate interpolated from the swap curve. Observations where this sum exceeds two are excluded due to poor match quality, which removes 423 observations from the full sample. *t*-stat is the bootstrapped skewness-adjusted t-statistic from 1,000 draws with replacement.

Panel A: Full Sample

	Mean	StDev	t-stat	p25	p50	p75	Obs.
Market Investor Abnormal Return (%)							
3 months	-0.5	47.9	-0.6	-23.3	-0.9	20.6	2,513
6 months	-4.2	63.6	-3.2	-34.2	-5.0	25.5	2,485
1 year	-5.2	97.6	-2.7	-47.9	-6.7	32.0	2,422
2 years	-8.0	157.1	-2.4	-63.0	-7.6	47.3	2,123
PIPE Investor Abnormal Return (excluding Warrants) (%)							
3 months	10.2	53.6	7.8	-16.8	6.2	33.5	2,513
6 months	6.3	70.1	4.3	-29.2	1.3	37.6	2,485
1 year	4.6	103.2	2.2	-42.9	-0.9	44.3	2,422
2 years	1.9	160.9	0.5	-56.0	-1.2	57.8	2,123
PIPE Investor Abnormal Return (with Warrants) (%)							
3 months	17.4	59.6	11.0	-13.1	10.9	40.0	2,513
6 months	13.2	76.9	8.6	-25.9	4.4	43.8	2,485
1 year	12.1	114.1	4.8	-39.8	1.7	50.1	2,422
2 years	10.1	175.7	2.4	-55.0	0.7	62.9	2,123

Panel B: Subsamples Split by Registration Status

	Unregistered			Registered		
	Mean	p50	Obs.	Mean	p50	Obs.
Market Investor Abnormal Return (%)						
3 months	-1.1	-1.1	1,988	1.6	-0.2	525
6 months	-5.4	-5.3	1,966	0.2	-3.6	519
1 year	-6.5	-7.2	1,918	-0.3	-5.4	504
2 years	-12.2	-9.3	1,674	7.5	-1.2	449
PIPE Investor Abnormal Return (excluding Warrants) (%)						
3 months	11.2	7.5	1,988	6.7	2.9	525
6 months	6.6	1.6	1,966	5.5	-0.1	519
1 year	4.5	-0.9	1,918	4.7	-0.3	504
2 years	-1.1	-2.2	1,674	12.9	1.3	449
PIPE Investor Abnormal Return (with Warrants) (%)						
3 months	18.6	12.0	1,988	13.0	5.5	525
6 months	13.8	5.1	1,966	11.2	2.1	519
1 year	12.3	1.5	1,918	11.4	4.1	504
2 years	7.7	0.3	1,674	19.0	4.4	449

Table 6

Summary of PIPE Announcement Returns

This table reports summary statistics of announcement returns for the PIPE transactions in our sample. The raw announcement return is the stock return from 4 trading days before to 5 trading days after the announcement date of the PIPE transaction. The abnormal return is the raw return minus the CAPM benchmark return from the realized market return over that window, with beta estimated using daily returns over the year prior to the announcement date. Betas are bound between -1 and 3, which impacts less than 1% of observations. 17 observations with new issuance more than 5 times the number of previously outstanding shares are excluded from the sample. *t*-stat is from a regression of the abnormal announcement return on a constant, with standard errors clustered two ways by firm and month of announcement. % Warr. is the percentage of transactions with attached warrants.

	Mean	StDev	*t*-stat	p25	p50	p75	% Warr.	Obs.
Raw Return (%)	4.2	25.1	8.1	-7.9	0.4	11.3	39.3	2,963
Abnormal Return (%)	4.0	24.7	8.2	-7.8	0.5	10.9	39.3	2,963
Abnormal Return Split by Offering Type (%)								
Unregistered	5.3	24.9	10.0	-6.7	1.3	12.0	39.2	2,392
Registered	-1.3	23.3	-1.3	-13.6	-3.5	6.1	39.6	571
Abnormal Return Split by Investor Composition (%)								
HF/PE	2.1	23.7	3.7	-9.8	-0.8	8.8	47.9	1,971
Non-HF/PE	7.9	26.2	8.5	-4.9	3.1	14.5	22.1	992
Abnormal Return Split by Warrant Status (%)								
without Warrant	5.7	23.1	9.7	-5.0	1.9	11.3	0	1,800
with Warrant	1.5	26.9	1.8	-12.4	-3.1	10.1	100	1,163

Table 7

Summary of Trading Volume and Returns around Closing and Registration

This table reports summary statistics on trading volume in PIPE stocks. Panel A presents the statistics for the full sample, and in Panels B and C the sample is split into PIPEs with and without hedge funds and private equity funds participation. Each observation represents a distinct PIPE transaction. The registration date is defined as the effective date of the registration statement for unregistered PIPEs and the closing date of the transaction for registered PIPEs. Daily Abnormal Volume is defined as the difference between the average daily volume in a window after closing (registration) and the average daily volume over the three months prior to closing (registration). Raw Return around closing (registration) date is the stock return from 4 trading days before to 5 trading days after the registration date. Abnormal Return is the raw return minus the CAPM benchmark return over that window. Fraction of Post-Registration Volume Required to Sell Issued Shares is the ratio of issued shares to realized volume over various windows after registration and describes the amount of daily volume the PIPE investors would need to trade to exit their positions. *t*-stat is from a regression of the variable of interest on a constant, with standard errors clustered by month of closing. All ratios (except returns) are winsorized at the 1% level to mitigate the impact of outliers.

Panel A: Full Sample

| | Unregistered | | | | | | | | Registered | | | |
| | At Closing | | | | At Registration | | | | At Closing & Registration | | | |
Variables	Mean	p50	t-stat	Obs.	Mean	p50	t-stat	Obs.	Mean	p50	t-stat	Obs.
Daily Abnormal Volume (%)												
1 week	55.7	3.4	13.7	2,425	30.5	-10.3	4.6	865	49.1	2.9	7.2	573
2 weeks	46.2	1.2	12.7	2,425	26.9	-5.0	5.0	853	41.2	0.0	6.8	573
1 month	41.1	-0.4	11.2	2,424	34.8	-5.2	5.6	853	38.0	-0.5	5.9	573
Returns (%)												
Raw Return	4.2	0.8	7.5	2,427	-2.9	-1.7	-5.4	865	-2.1	-4.0	-1.9	573
Abnormal Ret.	4.1	0.6	7.6	2,427	-3.2	-2.2	-6.6	865	-2.5	-3.7	-2.3	573
Percentage of Post-Registration Volume Required to Sell Issued Shares (%)												
1 month		n.a.			414	124	15.7	859	116	58.8	14.6	571
3 months		n.a.			124	43.3	14.9	850	36.4	18.9	14.6	571
6 months		n.a.			52.8	19.9	15.5	850	17.6	8.9	14.5	570
12 months		n.a.			23.5	8.5	14.9	846	7.8	4.0	13.6	567
24 months		n.a.			10.6	3.8	13.0	824	3.4	1.7	11.5	555

Panel B: HF/PE PIPEs

| | Unregistered | | | | | | | | Registered | | | |
| | At Closing | | | | At Registration | | | | At Closing & Registration | | | |
Variables	Mean	p50	t-stat	Obs.	Mean	p50	t-stat	Obs.	Mean	p50	t-stat	Obs.
Daily Abnormal Volume (%)												
1 week	56.5	5.3	11.5	1,542	36.0	-9.9	4.7	731	49.2	5.3	6.6	447
2 weeks	48.4	3.4	10.7	1,542	31.1	-4.3	5.0	723	44.5	4.3	6.4	447
1 month	42.2	1.0	9.6	1,542	39.9	-3.9	5.6	723	40.8	1.5	5.5	447

Continue to the next page

| | Unregistered | | | | | | | | Registered | | | |
| | At Closing | | | | At Registration | | | | At Closing & Registration | | | |
Variables	Mean	p50	t-stat	Obs.	Mean	p50	t-stat	Obs.	Mean	p50	t-stat	Obs.
Returns (%)												
Raw Return	3.5	0.0	5.7	1,543	-3.3	-2.0	-6.0	731	-3.0	-4.7	-2.4	447
Abnormal Ret.	3.3	0.0	5.5	1,543	-3.6	-2.6	-6.9	731	-3.6	-4.8	-2.8	447
Percentage of Post-Registration Volume Required to Sell Issued Shares (%)												
1 month		n.a.			442	142	14.9	727	111	62.2	14.7	446
2 months		n.a.			212	70.7	13.9	721	54.0	31.7	14.8	446
3 months		n.a.			134	48.3	14.3	721	36.0	20.6	14.4	446
6 months		n.a.			57.0	22.2	14.9	721	17.7	9.6	14.4	446
12 months		n.a.			25.2	9.8	14.3	718	8.2	4.4	12.4	443
24 months		n.a.			11.2	4.3	12.0	702	3.5	1.8	10.1	432

Panel C: Non-HF/PE PIPEs

| | Unregistered | | | | | | | | Registered | | | |
| | At Closing | | | | At Registration | | | | At Closing & Registration | | | |
Variables	Mean	p50	*t*-stat	Obs.	Mean	p50	*t*-stat	Obs.	Mean	p50	*t*-stat	Obs.
Daily Abnormal Volume (%)												
1 week	54.3	0.1	9.0	883	0.2	-18.0	0.0	134	48.9	-7.8	3.3	126
2 weeks	42.5	-2.4	8.1	883	3.4	-12.5	0.4	130	29.6	-8.5	2.8	126
1 month	39.2	-5.1	7.4	882	6.3	-13.0	0.7	130	28.3	-7.0	2.7	126
Returns (%)												
Raw Return	5.5	1.9	6.2	884	-0.8	-0.3	-0.6	134	1.1	0.2	0.6	126
Abnormal Ret.	5.4	1.4	6.4	884	-1.0	-0.4	-0.9	134	1.4	0.3	0.8	126
Percentage of Post-Registration Volume Required to Sell Issued Shares (%)												
1 month		n.a.			259	57.6	5.2	132	132	38.6	5.7	125
3 months		n.a.			67.3	15.7	4.9	129	37.6	12.2	5.7	125
6 months		n.a.			29.2	8.5	5.2	129	17.2	6.3	5.7	124
12 months		n.a.			14.1	4.4	4.7	128	6.4	2.8	6.3	124
24 months		n.a.			7.0	1.7	4.1	122	2.8	1.0	6.8	123

Table 8

Holding Period Adjusted Returns to Market and PIPE Investors

This table reports summary statistics of effective holding period returns after PIPE transactions, assuming that PIPE investors sell 10% of post-registration daily trading volume. Panel A presents the statistics for the full sample, and in Panels B and C the sample is split into Unregistered PIPEs and RDOs. Market Investor Return is the return earned by purchasing the PIPE issuer's stock on the market on the transaction closing date and selling 10% of post-registration volume daily until exiting. PIPE Investor Return is the return earned by purchasing securities in the PIPE transaction and selling 10% of post-registration volume daily until exiting. Abnormal returns are relative to the return on a matched firm, which is obtained by considering all firms in the same 2-digit SIC industry that did not previously issued a PIPE in the sample period and selecting the firm with the minimum sum of the absolute differences between the standardized equity book-to-market ratio, the standardized log market capitalization, and the standardized Amihud (2002) illiquidity measure. The return to matched firm is calculated assuming that investors sell the matched stock at the same rate as the PIPE stock. Warrants are valued using the Black-Scholes call option model adjusted for dilution, with annualized volatility estimated over the trailing three months and capped at 50% and the risk-free rate interpolated from the swap curve. Annualized returns are capped at 3000% to mitigate the impact of outliers, which affects about 3% of observations. *t*-stat is the bootstrapped skewness-adjusted t-statistic from 1,000 draws with replacement.

Panel A: Full Sample

	Mean	StDev	t-stat	p25	p50	p75	Obs.
Market Investor Abnormal Return (%)	4.9	101	1.5	-20.7	-0.6	22.2	1,244
PIPE Investor Abnormal Return							
Holding Period (Days)	384	336	48.3	131	288	542	1,244
Excluding Warrants (%)	12.7	112	3.5	-16.8	4.1	29.7	1,244
With Warrants (%)	21.2	118	5.0	-13.8	7.8	38.4	1,244
With Warrants - Annualized (%)	105	461	13.9	-16.1	9.1	59.2	1,244
PIPE Investor Abnormal Return : HF/PE PIPEs							
Holding Period (Days)	405	341	40.3	140	303	580	1,009
Excluding Warrants (%)	12.6	112	3.1	-16.2	4.3	31.3	1,009
With Warrants (%)	22.4	120	4.4	-12.8	8.8	41.8	1,009
With Warrants - Annualized (%)	104	457	12.8	-15.9	10.4	59.0	1,009
PIPE Investor Abnormal Return : Non-HF/PE PIPEs							
Holding Period (Days)	295	297	19.9	76.0	198	398	235
Excluding Warrants (%)	13.5	113	2.1	-18.8	3.5	24.7	235
With Warrants (%)	15.8	113	2.6	-17.8	3.8	26.7	235
With Warrants - Annualized (%)	109	481	5.6	-16.2	3.0	60.3	235

Panel B: Unregistered PIPEs

	Mean	StDev	t-stat	p25	p50	p75	Obs.
Market Investor Abnormal Return (%)	4.4	115	0.9	-27.0	-1.7	26.5	715
PIPE Investor Abnormal Return							
Holding Period (Days)	493	355	34.9	210	397	710	715
Excluding Warrants (%)	14.4	132	2.7	-24.3	3.9	36.4	715
With Warrants (%)	24.4	140	4.1	-20.6	6.8	44.2	715
With Warrants - Annualized (%)	58.1	316	6.1	-19.0	6.2	46.3	715
PIPE Investor Abnormal Return : HF/PE PIPEs							
Holding Period (Days)	511	357	30.3	224	417	742	599
Excluding Warrants (%)	15.6	129	2.5	-21.9	5.0	37.5	599
With Warrants (%)	26.9	139	3.7	-18.4	8.9	48.4	599
With Warrants - Annualized (%)	64.6	328	6.3	-17.6	9.0	47.5	599
PIPE Investor Abnormal Return : Non-HF/PE PIPEs							
Holding Period (Days)	397	328	12.7	156	306	515	116
Excluding Warrants (%)	8.2	148	0.5	-34.0	-4.7	25.2	116
With Warrants (%)	11.4	148	0.8	-32.6	-2.9	26.2	116
With Warrants - Annualized (%)	24.6	242	1.0	-24.0	-3.2	38.8	116

Panel C: Registered PIPEs

	Mean	StDev	t-stat	p25	p50	p75	Obs.
Market Investor Abnormal Return (%)	5.6	78	1.3	-13.0	0.0	16.8	529
PIPE Investor Abnormal Return							
Holding Period (Days)	237	241	27.6	64.0	157	327	529
Excluding Warrants (%)	10.5	77.6	2.4	-11.0	4.3	21.7	529
With Warrants (%)	16.8	80.2	3.2	-8.5	8.3	33.0	529
With Warrants - Annualized (%)	168	600	13.7	-10.8	12.2	77.9	529
PIPE Investor Abnormal Return : HF/PE PIPEs							
Holding Period (Days)	249	244	25.8	74.0	165	340	410
Excluding Warrants (%)	8.1	81.3	1.6	-12.5	3.1	21.7	410
With Warrants (%)	15.9	84.4	2.6	-8.7	8.8	34.1	410
With Warrants - Annualized (%)	161	593	10.6	-12.1	12.0	77.8	410
PIPE Investor Abnormal Return : Non-HF/PE PIPEs							
Holding Period (Days)	196	223	15.5	45.0	105	308	119
Excluding Warrants (%)	18.5	62.9	4.9	-6.9	7.2	23.1	119
With Warrants (%)	20.0	63.9	5.2	-6.9	7.4	27.4	119
With Warrants - Annualized (%)	191	623	7.9	-6.1	17.2	79.5	119

Table 9

Issuers' Financial Condition and Their Cost of Finance

This table presents the relation between the issuers' financial conditions and various measures that characterize their cost of finance. Probit (Column 1) or OLS (Columns 2-5) coefficient estimates and corresponding *t*-stats (in parentheses) are reported. The dependent variables are the indicator variable of HF/PE participation (Column 1), the percentage of shares bought by HF/PE investors (Column 2), the size of discount including warrant value (Column 3), holding-period adjusted returns (Column 4), and the annualized standard deviation of issuers' daily stock returns over the holding period (Column 5), respectively. Holding periods are computed based on the scenario of selling 10% of post-registration daily volume. Size is the natural log of market capitalization. Profitability is the ratio of EBITDA to book assets. Intangibility is one minus the ratio of PP&E to book assets. Age is the number of years since IPO. All ratios and the volatility of returns are winsorized the 1% level to mitigate the impact of outliers. All specifications include year fixed effects. Standard errors are robust to heteroskedasticity and account for double clustering by firm and issue month. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% levels, respectively.

Dep. Var.	HF/PE Participation	HF/PE Share	Discount	HP-Adj. Return	Volatility of Returns
	(1)	(2)	(3)	(4)	(5)
Size	-0.134***	-0.032***	-0.022***	-0.186*	-0.122***
	(-4.78)	(-3.36)	(-4.37)	(-1.95)	(-7.85)
Profitability	-0.144**	-0.081***	-0.010	-0.439*	-0.210***
	(-2.06)	(-2.80)	(-0.91)	(-1.71)	(-5.26)
Intangibility	0.224*	0.065	0.018	-0.530	-0.031
	(1.81)	(1.39)	(0.76)	(-1.24)	(-0.45)
Age	0.003	0.003*	-0.000	0.002	-0.004**
	(0.71)	(1.78)	(-0.50)	(0.10)	(-2.41)
Constant	0.274	0.311***	0.186***	4.402***	1.597***
	(1.31)	(4.36)	(3.09)	(3.77)	(9.29)
Year FE	YES	YES	YES	YES	YES
Observations	2,364	1,991	2,326	965	965
Adjusted (Pseudo) R^2	0.0643	0.0808	0.0340	0.0792	0.280

Figure 1

Time Series of PIPE and SEO Issuance by Small Firms

This figure reports annual issuance of PIPEs and SEOs for firms with market capitalization under $1 billion from 2001 to 2015. SEO data are obtained from SDC Platinum. The SEO sample includes primary offerings by U.S. listed companies with non-missing data on CUSIP and market capitalization. All PIPEs includes common stock, equity line, convertible preferred stock, convertible debt, and other types of PIPEs in *PrivateRaise*, excluding Rule 144A offerings and confidentially marketed public offerings, but placing no restrictions on investor type. Stock PIPEs includes the common stock subset of the All PIPEs sample.
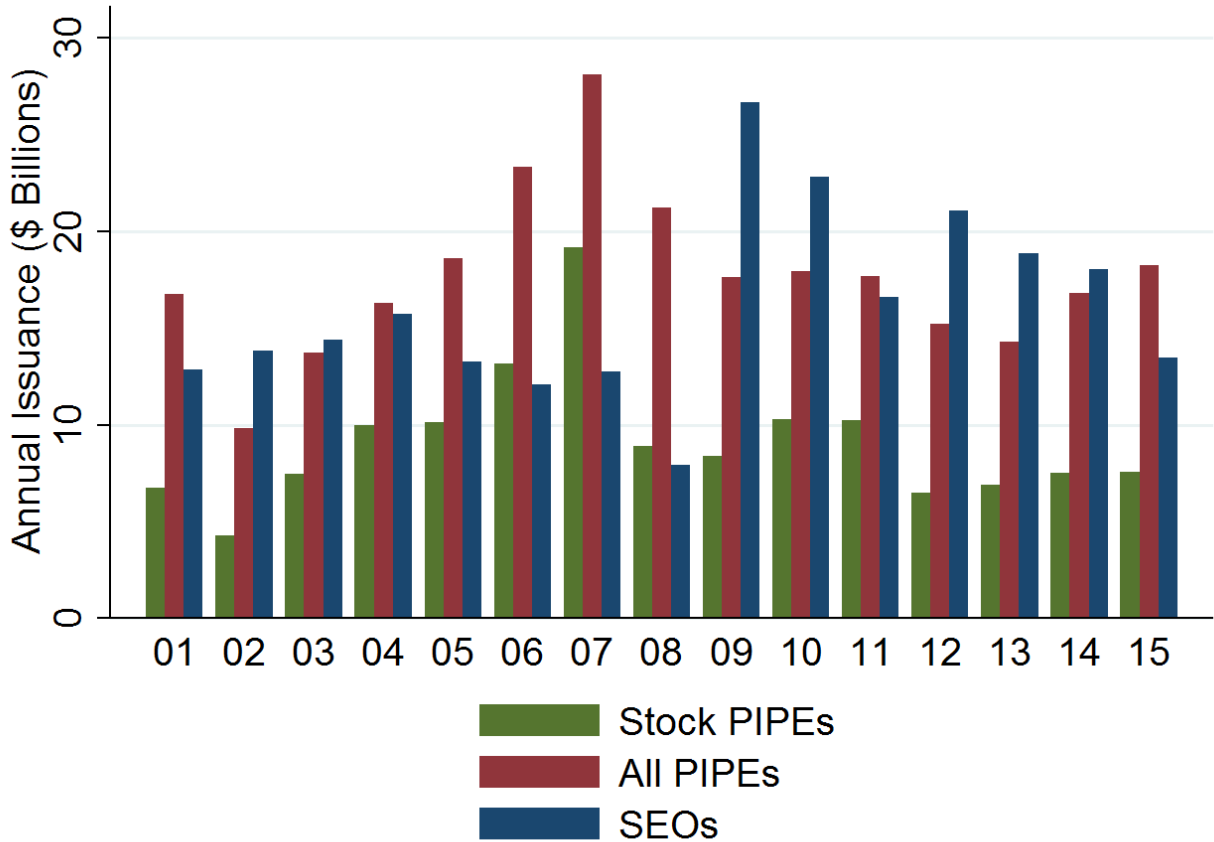
Figure 2

UAHC Prices and Volumes around the December 2006 PIPE

This figure reports the price and trading volume of United American Healthcare Corporation (UAHC) from one month before the closing of its December 2006 PIPE transaction to one month after the effective registration date for the shares sold in the offering. The vertical line on December 14, 2006 marks the announcement of the transaction after the market close. The vertical line on January 26, 2007 marks the effective registration date.
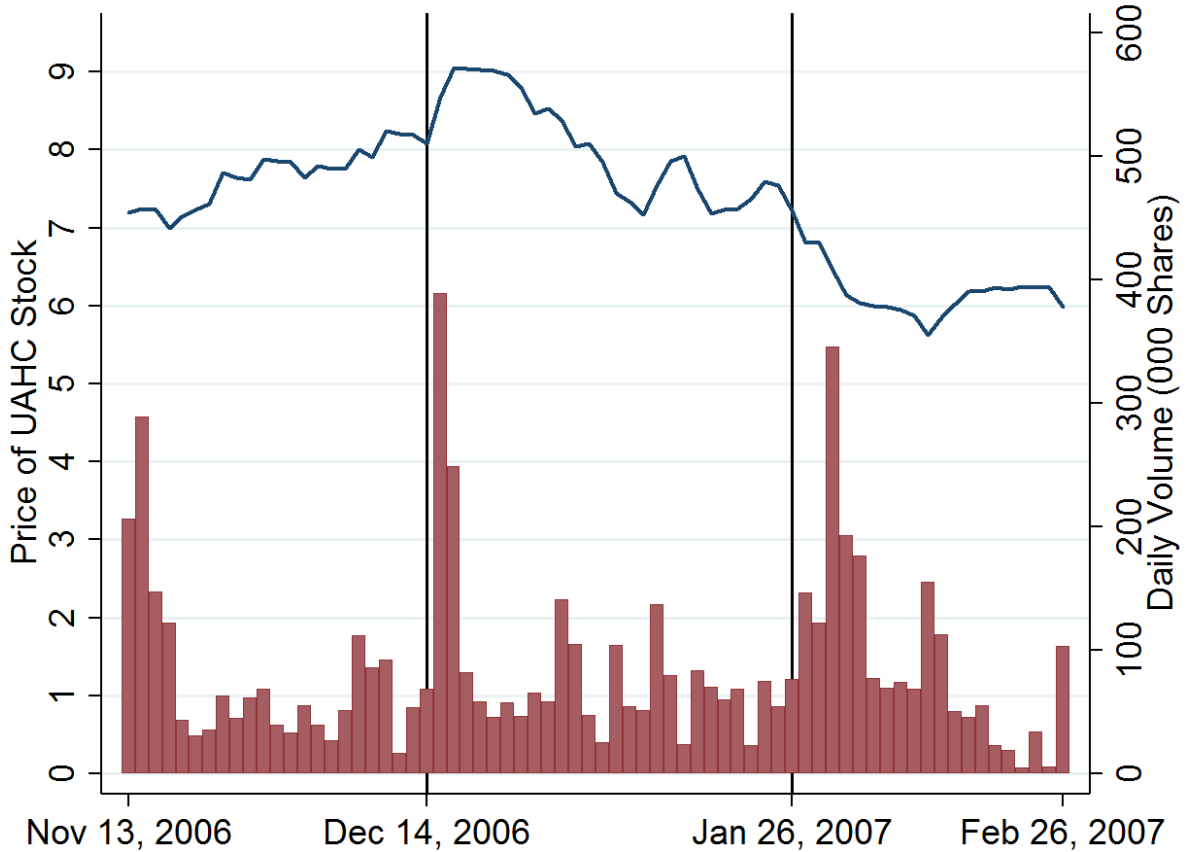
Figure 3

Distribution of Returns to Market and PIPE Investors

This figure reports histograms of the distributions of returns to regular investors in PIPE stocks and participants in PIPE transactions. Market Investor Return is the return earned by purchasing the PIPE issuer's stock on the market on the transaction closing date and holding it for a fixed period. PIPE Investor Return is the return earned by purchasing securities in the PIPE transaction and holding them for a fixed period. Abnormal returns are relative to the return on a matched firm, which is obtained by considering all firms in the same 2-digit SIC industry that did not previously issue a PIPE in the sample period and selecting the firm with the minimum sum of the absolute differences between the standardized equity book-to-market ratio, the standardized log market capitalization, and the standardized Amihud (2002) illiquidity measure.

Table IA.1

Holding Period Adjusted Returns to Market and PIPE Investors: Alternative Trading Strategy

This table reports summary statistics of effective holding period returns after PIPE transactions, assuming that PIPE investors sell 20% of post-registration daily trading volume. Panel A presents the statistics for the full sample, and in Panels B and C the sample is split into Unregistered PIPEs and RDOs. Market Investor Return is the return earned by purchasing the PIPE issuer's stock on the market on the transaction closing date and selling 20% of post-registration volume daily until exiting. PIPE Investor Return is the return earned by purchasing securities in the PIPE transaction and selling 20% of post-registration volume daily until exiting. Abnormal returns are relative to the return on a matched firm, which is obtained by considering all firms in the same 2-digit SIC industry that did not previously issued a PIPE in the sample period and selecting the firm with the minimum sum of the absolute differences between the standardized equity book-to-market ratio, the standardized log market capitalization, and the standardized A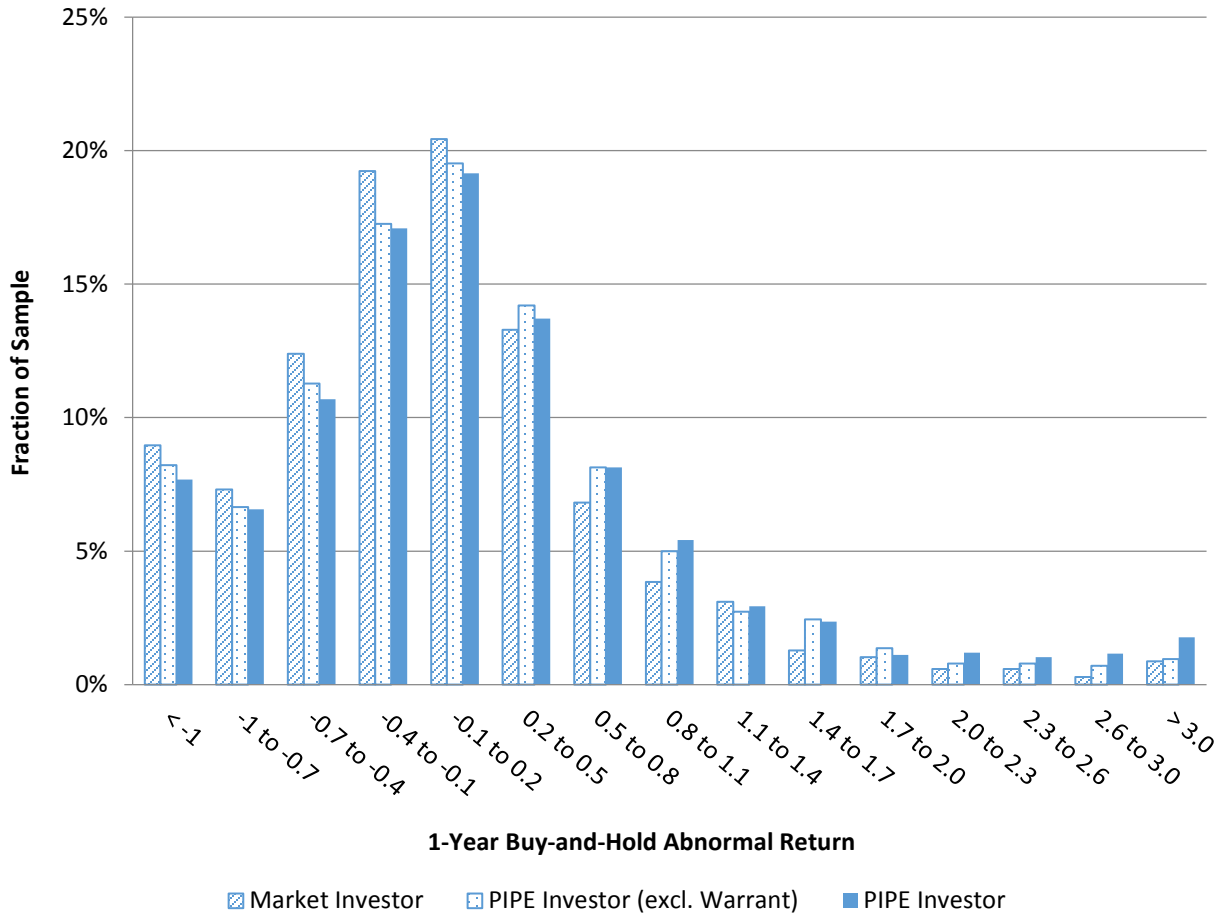mihud (2002) illiquidity measure. The return to matched firm is calculated assuming that investors sell the matched stock at the same rate as the PIPE stock. Warrants are valued using the Black-Scholes call option model adjusted for dilution, with annualized volatility estimated over the trailing three months and capped at 50% and the risk-free rate interpolated from the swap curve. Annualized returns are capped at 3000% to mitigate the impact of outliers, which affects about 3% of observations. *t*-stat is the bootstrapped skewness-adjusted t-statistic from 1,000 draws with replacement.

Panel A: Full Sample

	Mean	StDev	t-stat	p25	p50	p75	Obs.
Market Investor Abnormal Return (%)	4.6	86	2.0	-17.3	-1.2	16.8	1261
PIPE Investor Abnormal Return							
Holding Period (Days)	271	278	40.0	76	177	356	1,261
Excluding Warrants (%)	11.8	95.9	4.7	-14.4	3.6	23.4	1,261
With Warrants (%)	19.8	101	7.2	-10.5	7.8	34.6	1,261
With Warrants - Annualized (%)	113	526	7.4	-16.1	9.8	61.5	1,261
PIPE Investor Abnormal Return : HF/PE PIPEs							
Holding Period (Days)	285	284	37.7	85	196	381	1,026
Excluding Warrants (%)	12.0	94.9	4.4	-14.5	3.0	24.7	1,026
With Warrants (%)	21.2	101	6.7	-10.1	9.3	37.5	1,026
With Warrants - Annualized (%)	104	500	5.9	-16.0	11.4	62.3	1,026
PIPE Investor Abnormal Return : Non-HF/PE PIPEs							
Holding Period (Days)	209	244	16.7	43.0	128	285	235
Excluding Warrants (%)	10.7	100	1.7	-13.9	4.2	16.8	235
With Warrants (%)	13.3	101	2.3	-13.0	4.3	20.1	235
With Warrants - Annualized (%)	154	626	4.5	-18.2	6.5	58.4	235

Panel B: Unregistered PIPEs

	Mean	StDev	t-stat	p25	p50	p75	Obs.
Holding Period (Days)							
Market Investor Abnormal Return (%)	6.7	105	1.7	-24.9	-2.7	23.8	722
PIPE Investor Abnormal Return							
Holding Period (Days)	366	300	31.0	146	276	484	722
Excluding Warrants (%)	15.7	118	3.9	-21.4	4.2	33.9	722
With Warrants (%)	25.0	124	6.1	-16.9	8.9	43.2	722
With Warrants - Annualized (%)	76.4	432	3.9	-20.9	8.8	56.7	722
PIPE Investor Abnormal Return : HF/PE PIPEs							
Holding Period (Days)	378	303	29.8	149	283	503	606
Excluding Warrants (%)	17.6	116	4.1	-19.2	6.3	35.3	606
With Warrants (%)	27.9	123	5.9	-14.4	10.7	46.8	606
With Warrants - Annualized (%)	77.5	404	3.9	-19.5	11.5	59.0	606
PIPE Investor Abnormal Return : Non-HF/PE PIPEs							
Holding Period (Days)	303	276	11.3	115	230	383	116
Excluding Warrants (%)	5.9	128	0.4	-28.2	-3.7	21.8	116
With Warrants (%)	9.8	129	0.8	-27.0	-2.8	22.7	116
With Warrants - Annualized (%)	70.5	557	1.3	-30.2	-0.7	42.2	116

Panel C: Registered PIPEs

	Mean	StDev	t-stat	p25	p50	p75	Obs.
Holding Period (Days)							
Market Investor Abnormal Return (%)	1.9	50.9	0.8	-9.8	-0.4	9.4	539
PIPE Investor Abnormal Return							
Holding Period (Days)	143	181	18.5	34.0	83.0	184	539
Excluding Warrants (%)	6.6	53.2	2.6	-9.2	3.1	15.8	539
With Warrants (%)	12.8	55.5	4.3	-4.5	7.1	23.8	539
With Warrants - Annualized (%)	162	627	6.6	-8.6	11.5	71.8	539
PIPE Investor Abnormal Return : HF/PE PIPEs							
Holding Period (Days)	151	185	17.6	38	90	198	420
Excluding Warrants (%)	4.1	50.1	1.5	-10.6	1.3	14.3	420
With Warrants (%)	11.6	53.0	3.2	-5.8	8.0	24.8	420
With Warrants - Annualized (%)	142	611	4.8	-10.5	11.0	67.3	420
PIPE Investor Abnormal Return : Non-HF/PE PIPEs							
Holding Period (Days)	117	164	12.2	25.0	54.0	147	119
Excluding Warrants (%)	15.3	62	4.1	-2.0	5.1	16.6	119
With Warrants (%)	16.8	63	4.6	-2.0	5.4	17.1	119
With Warrants - Annualized (%)	235	680	9.5	0.0	11.7	116	119